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Perspectives on 21st Century Agriculture: A Tribute to Walter J. Armbruster

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DEDICATION

A farm boy from Indiana, through a somewhat circuitous route, became the president of Farm Foundation. In the process he helped, supported, encouraged, and learned from many others. Walt, this book is a tribute to you and to all you have helped, supported, encouraged, and learned from along the way. They have become part of what you are today.

Perspectives on 21st Century Agriculture: A Tribute to Walter J. Armbruster

Edited by
Ronald D. Knutson
Sharron D. Knutson
and David P. Ernstes



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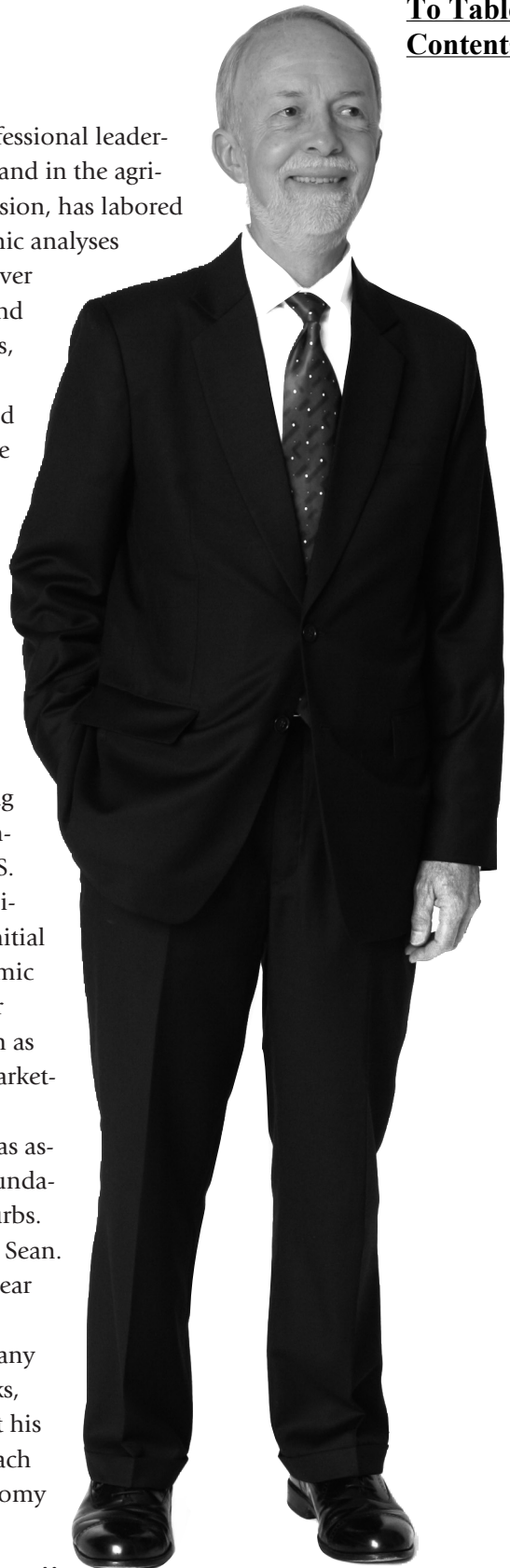
Walter J. Armbruster

Walt Armbruster, in his professional leadership of Farm Foundation and in the agricultural economics profession, has labored tirelessly to champion quality economic analyses that are useful in making decisions. Over the years, he has helped to organize and host countless conferences, workshops, and symposia designed to connect economic analysts with the public- and private-sector decision makers to make the analyst's work useful in practical business decisions and to foster informed, policy-maker decisions.

Walt's background is typical of many agricultural economists of his generation. He was raised on a small farm in southeast Indiana. His father worked off the farm in the local community. After high school, he attended Purdue University, earning a B.S. and M.S. in agricultural economics. Following a tour of duty in the U.S. Army, Walt attended Oregon State University earning a Ph.D. in 1970. His initial employment was with USDA's Economic Research Service (ERS). He worked for USDA for eight years, first at ERS, then as staff economist for the Agricultural Marketing Service (AMS).

In 1978, Jim Hildreth hired Walt as associate managing director of Farm Foundation. Walt moved to the Chicago suburbs. He and Helen married and had a son, Sean. With this beginning, Walt built a 30-year career of service to Farm Foundation.

Over the years, Walt published many applied academic articles, edited books, and made scholarly presentations. But his true legacy is one of service and outreach designed to help the agricultural economy



grow and adjust to change. He has been elected to numerous positions of professional leadership including the presidency of the American Agricultural Economics Association, The American Agricultural Law Association (the only nonlawyer to hold this position), and the International Food and Agribusiness Management Association. He has served as secretary-treasurer of the International Association of Agricultural Economists since 1991. His highest honors and distinctions were being named a fellow of the American Agricultural Economics Association and a fellow of the International Agribusiness Management Association.

The articles in this volume reflect Walt's passion for policy analysis grounded in applied economics. The articles explore the past, examine the present, and look into the future of public policies related to agriculture, the food system, and the many issues of rural America. They focus on the current rapid pace of institutional change with an eye on the critical issues of the next generation. Walt's legacy is one of making Farm Foundation a more effective catalyst for change and adjustment in addressing the critical issues of the day.

– Steve A. Halbrook and Ronald D. Knutson

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The editors also acknowledge the support of the Agricultural and Food Policy Center, Texas A&M University.

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A History of Service



For 75 years – through the Great Depression, a world war, a technological revolution in agriculture, and 12 administrations in Washington, D.C. – Farm Foundation has provided about \$100 million (today's dollars) for projects and activities designed to improve the economic and social well-being of agriculture, the food system and rural America. For more than one third of that time, Walt Armbruster has been closely associated with Farm Foundation as associate managing director and managing director/president. The following article salutes those individuals most closely associated with the Foundation and remembers Walt's career of service to the organization and agriculture and rural America.

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The Enduring Legacy of Farm Foundation

Walt Armbruster served as managing director/president of Farm Foundation² from 1991 to 2007. Counting his prior service as associate managing director, he was employed with Farm Foundation for 30 years. His retirement comes at the time of the 75th anniversary of the founding of the foundation. As Farm Foundation marks that milestone, it is appropriate to take this opportunity to remember the individuals who were most associated with the foundation – its principal founders and professional leadership. This chapter then summarizes the foundation’s distinctive operating style and finally, touches on its legacy.

The Founders

Farm Foundation was conceived during the agricultural crisis of the 1920s and born in the midst of the Great Depression. Although many individuals were involved in its founding, Farm Foundation acknowledges Alexander Legge and Frank Lowden as its founders and sponsors.

Alexander Legge

Alexander Legge was one of the United States’ greatest business leaders. From 1922 to 1933, he was president of International Harvester. He arrived at that position – the pinnacle of agribusiness at that time – by an unconventional path. Born in Wisconsin in 1866, he grew up on a large farm near Schuyler, Nebraska. After a stint as a cowboy in Wyoming, he returned to Nebraska and became an apprentice claim collector for the McCormick Harvesting Machine Company branch office in Omaha. He was remarkably successful. Within eight years, he was tapped to head the Chicago company’s worldwide claims collection division. In 1902, when McCormick merged with five other leading farm implement manufacturers to form the International Harvester Company, Legge was promoted first to assistant manager of sales and then general manager of the new company.

¹ The author is a research associate in the Agricultural and Food Policy Center at Texas A&M University and worked with Farm Foundation on a contract basis from 1997-2003. Ernstes, Ronald D. Knutson, and the late- R.J. “Jim” Hildreth wrote, *Farm Foundation: 75 Years as a Catalyst to Agriculture and Rural America*. (Oak Brook, IL: Farm Foundation, 2007), from which this chapter is derived.

² Farm Foundation is a nonprofit, publicly supported organization headquartered in the Chicago, Illinois, area. Governed by a 29 member board of trustees, and led by a small professional staff, it serves as a catalyst to improve the economic health and social well-being of U.S. agriculture. It predominantly sponsors projects in the agricultural social sciences.

Legge's business skills were not unknown outside of International Harvester. In 1917, he was selected as vice chairman of the War Industries Board by President Wilson. At the conclusion of the war, he was part of the mission developing the economic section of the Treaty of Peace at Versailles.

As president of International Harvester, Legge was credited with defending the company against an anti-trust suit which allowed it to maintain its dominant market position. In the 1920s, Legge marketed tractors and implements, which were superior to International Harvester's competitors and introduced the popular Farmall tractor. Without his leadership, it could be argued that International Harvester may not have survived the turbulent 1920s and the onset of the Great Depression.

Alexander Legge cared deeply about agricultural and rural people. In the late 1920s, Legge recognized that the crisis in agriculture demanded urgent action. He led efforts to create a private organization to assist agriculture and rural people. That endeavor would become Farm Foundation. He was also involved in early government activities. From July 1929 to March 1931, he took a leave from International Harvester and served as chairman of the Federal Farm Board under President Hoover. In this capacity, Legge tried valiantly to assist an agricultural sector, which was overcome by the Great Depression.

Legge died in 1933, before Farm Foundation was fully organized. He donated his personal fortune to "... a foundation to be devoted to the general welfare of the farming population of the United States and improvement of the conditions of rural life." His gift is the heart of Farm Foundation's endowment.

Frank Lowden

Farm Foundation's other principal founder and sponsor was Frank Lowden. He was born near Sunrise City, Minnesota, in 1861. When he was seven, his family moved to Iowa. Starting his career as a school teacher, he saved enough money to attend Union College of Law, now Northwestern University School of Law. After graduating in 1887, he practiced law in Chicago. In 1896, he married Florence Pullman, daughter of the founder of the Pullman Palace Car Company.

After several unsuccessful political contests, he was elected the U.S. House of Representatives, serving from 1906-1911. He was elected governor of Illinois from 1917-1921. A contender for the Republican presidential nomination in 1920, he was deadlocked with Leonard Wood at 311 ½ votes on the eighth ballot, which enabled Warren G. Harding to gain the nomination. In 1924, he refused to run as Vice President on the Republican ticket.

Lowden recognized the plight of agriculture in the 1920s and worked on many fronts to improve the quality of life for farmers and rural people. He was a friend of Alexander Legge and an enthusiastic supporter of Farm Foundation. After Legge's death, Lowden assumed the leadership of the foundation. He served

as chairman of the board of trustees from 1933 to his death in 1943. Lowden's will bequeathed Farm Foundation 21,000 acres of land in Lincoln County and Desha County, Arkansas.

The Leaders

In 75 years, only five men served as managing director/president of the foundation. This position, appointed by the board of trustees, is responsible for the day-to-day operations of the foundation and supervision of its programs. Traditionally, this position has been held by a professional agricultural economist. Since Farm Foundation's leaders have been long serving and highly visible; the foundation has come to be associated with the individual at the helm.

Henry C. Taylor

The man selected to be Farm Foundation's first managing director, Henry C. Taylor, was the most preeminent agricultural economist of his day and the father of the agricultural economics profession. Taylor's 11-year tenure at the helm of Farm Foundation was only part of a career of international prominence.

Taylor was born in southeastern Iowa in 1873 to a successful farming family. He received his undergraduate degree from Iowa State University in 1896. It included two years of preparatory work at Drake University. He received a Ph.D. from the University of Wisconsin-Madison in 1901. For his dissertation, "The Decline of Land Owning Farmers in England after 1815," Taylor studied in Europe for two years.

After receiving his degree, Taylor joined the faculty at the University of Wisconsin. His first charge was to establish a course in agricultural economics. In 1909, he helped establish the Department of Agricultural Economics at Wisconsin-Madison.

In 1919, Taylor was called to Washington to organize USDA's then scattered work in economics into the Bureau of Agricultural Economics. As head of the bureau, Taylor supervised work, which is currently being done by predecessor organizations such as the Economic Research Service, National Agricultural Statistics Service, Agricultural Cooperative Service, Foreign Agricultural Service, and the Agricultural Marketing Service. Taylor fell victim to changing political winds and was terminated from his position in 1925.

Embittered by his experiences in Washington, Taylor joined the Land Economics Research Institute at Northwestern University. While there, he accepted the directorship of a Country Life Commission for Vermont in 1927. Taylor directed a comprehensive survey of rural Vermont from 1928 to 1931. He also served as a member of a committee to review the work being done by missionaries on rural problems in Japan, Korea, China, and India. In 1933, Taylor was appointed United States Member of the Permanent Committee of the International Institute of Agriculture at Rome, Italy by President Franklin Roosevelt.

While at the International Institute of Agriculture, Taylor accepted the position of managing director of Farm Foundation effective November 1, 1935. He served until 1945, heavily influencing the direction of types of programming during those years. In 1952, Taylor published with Anne Deweese Taylor, *The Story of Agricultural Economics*. Taylor's mind and enthusiasm never faltered, and he remained the dean of agricultural economists until his death in 1969.

Frank W. Peck

Frank Winfred Peck replaced Taylor as managing director. At the time of his appointment, he was a member of Farm Foundation's board of trustees and president of the St. Paul Federal Land Bank. Born in 1885, he received a B.S. degree in 1912 and M.S. degree in 1917, from the University of Minnesota. He started his professional career on the agricultural economics staff at the University of Minnesota from 1912 to 1919.

In 1919, he was called by Henry C. Taylor to Washington, D.C., to head the Office of Farm Management in the Bureau of Agricultural Economics, USDA. He returned to the University of Minnesota to serve as the director of the Minnesota Agricultural Extension Service from 1921 to 1933. For five years during this period, he was also the vice director of the Minnesota Agricultural Experiment Station. In 1933, he participated in the organization of the Farm Credit Administration. He was appointed the first cooperative bank commissioner in the Farm Credit Administration and served in this capacity for three years, returning to Minnesota as the director of the Agricultural Extension Service in 1936 when his leave from the university expired. He became president of the Federal Land Bank of Saint Paul in 1938.

Peck served on the board of trustees of the Farm Foundation from 1942 to 1945. In 1945 he was appointed as the managing director of Farm Foundation and served until his retirement in 1954. Peck and his deputy, Joseph Ackerman, are credited with devising the committee system, which would define Farm Foundation's programming into the 1990s. Peck died in 1966.

Joseph A. Ackerman

Farm Foundation's third managing director, Joseph A. Ackerman, was born in 1904, near Morton, Illinois. He attended the University of Illinois, where he received his B.S. degree in 1929, M.S. in 1930, and Ph.D. in 1938. While working for his Ph.D. degree, he attended Harvard in 1931-32 on a social science research fellowship in agricultural economics

He worked as a professional farm manager in Decatur, Illinois, in 1930-31 and 1933-34. He did extension work in farm management at the University of Illinois in 1932 and from 1934 to 1939. He then joined the staff of Farm Foundation in 1939, becoming associate managing director in 1942 and managing director in 1955.

While at Farm Foundation, Ackerman was very active in the leadership of other service organizations – a tradition which has continued with other managing

directors/presidents. He served the American Farm Economic Association as vice president in 1949-50 and as president in 1954-55. He was constantly at the elbow of the organization, assisting it in numerous ways. As secretary-treasurer of the International Association of Agricultural Economists, 1955-73, he played a key role in organizing and conducting its triennial conferences and in helping to insure its continuing effectiveness. He provided leadership in revitalizing the American Country Life Association in the postwar years, serving as president of the organization in 1947 and 1948.

Ackerman served as national president of the Farm House Fraternity from 1948 to 1952. He was secretary-treasurer of The American Society of Farm Management and Rural Appraisers from 1939 to 1944. He participated actively in school affairs as a board member and officer at the local, state, and national levels. He served as president of the National School Board Association from 1966-67.

Ackerman was named a Fellow of the American Agricultural Economics Association in 1964. His efforts in expanding leadership training opportunities for extension personnel and in strengthening extension work in agricultural economics led to recognition in 1959 by Epsilon Sigma Phi, national honorary extension fraternity, for outstanding service to extension.

After retirement from Farm Foundation, he spent three years with the Ford Foundation in New Delhi, India, applying the experience he had gained in the United States. Ackerman died in 1976.

R.J. "Jim" Hildreth

Joe Ackerman's successor, R.J. "Jim" Hildreth, was born in Des Moines, Iowa, in 1926. He was raised on a farm near Huxley, Iowa. After serving in Europe in World War II, he did undergraduate work in economics at Iowa State University (1949), and specialized in labor economics for his M.S. degree (1950). After teaching at Augsburg College in Minneapolis for two years, he received a Ph.D. from Iowa State University in 1954 in economics.

In 1954, he joined the faculty of the Department of Agricultural Economics at Texas A&M University. He was appointed research coordinator for West Texas, Texas Agricultural Experiment Station and assistant director one year later. He joined Farm Foundation in 1962. He served as associate managing director until 1970. He was managing director until his retirement in 1991.

During his tenure, Hildreth was elected president of the American Agricultural Economics Association and secretary-treasurer of the International Association of Agricultural Economists. He served on committees and on the board of trustees of the National Planning Association, as well as advisory committees of the American Medical Association, American Bankers Association, American Veterinary Medical Association, and Boy Scouts of America.

He was elected a Fellow of the American Agricultural Economics Association, the American Association for the Advancement of Science, and the Soil and Water

Conservation Society. He also received the Distinguished Service to Rural Life Award from the Rural Sociological Society, and the Henry A. Wallace Award from Iowa State University.

In retirement, Jim retained a keen interest in Farm Foundation. He was in the process of writing a history of the foundation at the time of his death in 2002.

Walter J. Armbruster

Walt Armbruster was born in 1940 in Lawrenceburg, Indiana. He grew up on a farm and later received B.S. and M.S. degrees in agricultural economics from Purdue University. Following a tour of duty in the U.S. Army, Walt earned a Ph.D. in agricultural economics from Oregon State University. He worked at USDA on marketing efficiency, institutions, and policy issues. His research position in USDA's Economic Research Service was followed by two years as the staff economist for USDA's Agricultural Marketing Service. Walt joined Farm Foundation in 1978 and became its president in 1991. He served as author or editor on a number of marketing research, education, and policy publications and provided leadership to organize several institutions, which continue to stimulate work in these areas.

While at Farm Foundation, Armbruster served as president of the American Agricultural Economics Association and the American Agricultural Law Association; secretary-treasurer of the International Association of Agricultural Economists; a board member of the Council on Food, Agriculture, and Resource Economists and the National Agricultural Research, Extension, Education, and Economics Advisory Board. He is a Fellow of the American Agricultural Economics Association and of the American Association for the Advancement of Science, and was named Purdue Distinguished Agricultural Alumnus in 2000. Armbruster served on numerous regional research and extension committees of the land-grant university system, professional association committees, national advisory boards, and USDA committees.

Armbruster's 15-year tenure was a period of rapid change at Farm Foundation. He and the board are credited with transforming a largely 1930s-style organization to modern times. Most importantly for the long-term success of the organization, he was heavily involved with revamping the management of the foundation's trust funds, which led to a doubling of the trust's value during his tenure.

Operating Style

Farm Foundation is probably best known for its unique operating style. At its founding, Farm Foundation had assets of about \$1 million. Early on, the board of trustees and staff recognized that the foundation was a small organization with limited means. It was determined that the foundation could be more successful working as a catalyst with other groups and organizations than trying to engage in independent research and education endeavors. Farm Foundation's programming strategy can be summarized in three distinct eras.

Centralized Research Coordination (1934-1940s)

During the Henry C. Taylor years, the board desired that Farm Foundation's work serve as yeast-stimulating thought, which would result in action that would be self-supporting and self-multiplying. After a careful consideration of needs, the following areas were identified as where the foundation's input could be the most successful: land tenure, health and medical care of rural people, rural education, and national policies affecting agriculture. A staff was hired to directly coordinate specific projects in these areas.

The Committee System (1940s-1990s)

The focus of Farm Foundation changed in the later Taylor years. As World War II ended and transportation became more available, it was recognized that the foundation could be more successful in harnessing the expertise that existed in land-grant universities by paying travel and costs for them to cooperate in responding to critical national or regional issues. In collaboration with the land-grant university system and USDA, Farm Foundation began supporting regional and national research and extension committees. Under Frank Peck, the foundation expanded the committee system and within a few years, it was almost the total focus of the organization.

The committees were topical in eight general areas within the social sciences: land economics, farm management, agricultural marketing, public policy, rural sociology, rural development, research strategy, and administration. Farm Foundation staff had substantial input into the agenda and content of the committee work. Staff also brought the perspectives of the Farm Foundation board of trustees and the segments of agriculture and agribusiness they represented. Through this interaction, Farm Foundation was associated with the agricultural and research agenda in the agricultural social sciences in all 50 states. In the 1960s through the 1980s, the foundation also focused on developing methodologies and promoting public policy education as tools for applying research results to important issues facing agriculture, the food system, and rural people.

Strategic Programming (1990s-present)

Entering the 1990s, the Farm Foundation board of trustees saw the need for a more systematic approach to programming. Consequently, a strategic plan and six areas for priority attention were developed: globalization; environmental issues; new technologies; consumer issues; role of agricultural institutions; and changing rural communities.

This change encouraged Farm Foundation to seek new collaborators and work to a greater degree outside of its traditional university partners. Reflecting increased globalization, Farm Foundation began to look more at international issues. It also increased its association with USDA agencies through cooperative agreements; providing funding for collaborative projects of mutual interest. Staff involvement in foundation-funded projects continued to be a hallmark of its programming.

In 2004, the foundation's programming style was further revised with a three-year business plan which defined three types of sponsored projects:

- Risk/incubator projects to build professional networks, to incubate ideas, and to highlight new approaches;
- Keystone projects to enrich project partnerships, to extend the work of project partners to key stakeholder audiences, and to inform the policy debate;
- Leadership/showcase projects are staff-directed projects addressing major issues facing agriculture, the food system, and rural communities.

The Legacy

In the past 75 years, Farm Foundation has remained the only foundation in the United States devoted exclusively to agricultural and rural issues. Over the years, it has sponsored thousands of worthy projects. For a small organization, its impact has been considerable. This success has been due to the leadership of its staff and board of trustees.

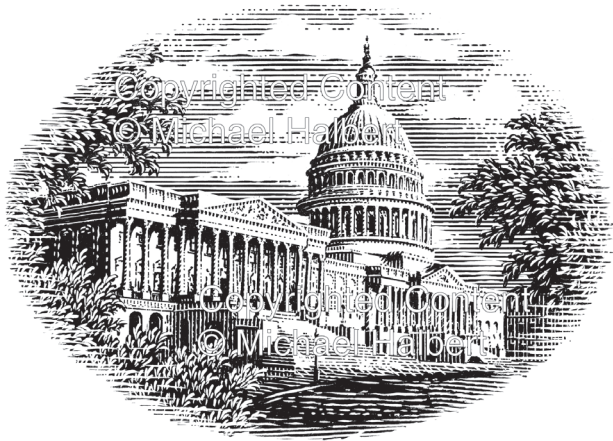
Farm Foundation has stayed true to its original mission while evolving with changing times. In the Henry Taylor years, Farm Foundation hired specialists to address under-served topics such as land tenure, rural health, and rural education. Later, it coordinated research between USDA and university scientists. From the 1990s through today, the foundation has focused on projects within designated program priority areas to address timely, evolving societal issues, collaborating with academia, government, and industry to maximize human and financial resources devoted to these issues.

As the Farm Foundation Armbruster era ends and a new era begins, Armbruster's successor will inherit an organization with a celebrated reputation, a rich history, and a noble calling.

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Policy Education

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***F**or many, Farm Foundation is synonymous with policy education. The basic Farm Foundation approach has been one of developing a set of policy options, analyzing their consequences, and leaving it to the audience to decide which is best considering their values and preferences. This approach was developed by a group of insightful policy education advisors early in the history of the Foundation. While deemed to be consistent with democratic principles, the approach is not without controversy. From time to time, there have been those who would have desired that Farm Foundation vote and take an advocacy position on particular policy issues and options. Farm organization leaders have generally been opposed to this approach on the grounds that advocacy is what they do for a living. Educators note that advocacy is not education because by definition it is not objective and balanced. In one way or another, the following set of articles deals with this issue of policy education.*

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Passing the Torch: The Generational Transition for Nonadvocacy Public Policy Education and Outreach

Public Policy Education – Then and Now

The land grant tradition of public policy education was developed to fit its times. This educational approach successfully sustained programs when land grant specialists commanded the attention of audiences across a state without competition from television, let alone the internet and multi-tasking. Audiences could be galvanized around one or two issues of particular interest to citizens on a state or national basis. Coincident with this ability to personally reach an audience of interested citizens (often those in economic or political leadership positions relative to others in their community) came the development of the public policy education paradigm. This approach was enabled by the network of extension educators who assisted the educational process across a state.

The public policy education paradigm required that the public policy educator first worked with citizens to help identify the issue or problem at hand. (While this sounds trivial, many identify a symptom rather than the underlying problem.) Once the identification was accomplished, then the task was to help citizens develop possible alternatives for dealing with the issue or problem. Once a set of potential alternatives was developed, then the task was to determine the consequences of each alternative and compare them. The concept of consequences was important and utilized instead of something like benefits and costs because some individuals' costs would be others' benefits. At this point, the paradigm required that the public policy educator step aside and let the citizens choose the alternative they believed was most appropriate for them rather than have the policy educator recommend a specific solution on the basis of his or her judgment and values.

To some extent what was developed with public policy education in the land grants reflects the debate by economists of positive versus normative approaches to economics. Positive being defined as what is (just the facts) and normative defined as what ought to be. Milton Freedman's "The Methodology of Positive Economics" became the economics profession's reflection of the positive economics approach with its emphasis on the predictive value of economics as its primary task (Friedman, 1953). The question often posed was whether applied economic analysis could be conducted in a way to be completely value free given the large number of assumptions and judgments required in analysis.

¹ The author is a professor at Purdue University. He is the current president of the American Agricultural Economics Association.

A more realistic approach was put forward by Lionel Robbins in his essay on "Political Economy" (Robbins, 1981). Robbins admitted that values had to enter analysis, indirectly if not directly, and argued that value judgments affecting analysis were probably unavoidable for important questions and were appropriate so long as those undertaking the analysis declared their values up front. This approach begins to address the criticism often leveled at public policy educators that they were in a position to skew analyses along the lines of their own values and in essence influence the choice of alternatives and policy.

The role of traditional public policy education was not only confounded by the question of values influencing the process, but also by some basic characteristics of information and education (Hahn, 1994).

- First, people are more interested in interpretation than in facts;
- Second, information is never neutral (back to Lionel Robbins point);
- Third, trust is a key element.

In terms of the process that a public policy educator goes through with an audience, there are some key issues with respect to the information requirements of the process that are critical to the success of the venture (Hahn, 1994):

- At the outset, information has to be sought on the basis of what information is needed not on the basis of what information is available.
- We also know that information needs will be different at different stages in the policy making process and needs to be brought to bear at the appropriate time.
- Different information may also be needed for different audiences.
- Finally, the effective inclusion of expert information in policy education depends as much on the quality of the process facilitation as it does on the quality of the information.

The successful resolution of these issues hinges on the good judgment and even-handedness of the educator.

To add to these concerns, public policy education, almost by definition, deals with issues that are controversial. First, this means that the public policy educator needs institutional support to thread his or her way through the controversy and remain effective and employed (Barrows, 1980s). Timing also becomes critical for when to enter the debate on the issue if the purpose is to increase public understanding of the issue. The Goldilocks dilemma operates here; not too early, before people are concerned enough about the issue to be willing to work on it, and not too late at the point where firm battle lines are already drawn and citizens have already made up their minds on the issue. The mantra here has traditionally been finding the teachable moment (Barrows, 1980s). One example of timing in bringing about change is revisions in water policy in some regions of Australia in the 1990s.

Little change was accomplished for decades as holders of water desperately held on to their rights. Finally, after years of drought, the nature of the issue changed; and a new allocation for water seemed possible. The new rules allowed, for example, the inclusion of provision for in-stream flow as well as for use. The current drought will likely bring more reform.

The other related difficulty is which issue to choose for policy education. This involves the need for judgments on the part of the public policy specialist. In order to increase the chances of the specialist's involvement improving the quality of public decision making through better understanding of the issues and trade-offs involved, the educator usually had to lead an issue, i.e. look ahead and decide which issue was going to be of importance before it burst on the scene for decision makers and the public. At this point, the educator takes a risk preparing to work on an issue by gathering information and identifying and making contact with stakeholders and decision makers before it is apparent that public decisions will have to be or are likely to be made. The consequence of this is that substantial effort and professional capital may be spent on something that never becomes an important issue. With experience, public policy educators usually developed the ability to discern which issues would become important.

The Nature and Extent of the Task

The nature and extent of the task outlined above becomes critical to the passing of the generational torch. Think in terms of the requirements for public policy education imposed on the educator by the task and the environment of public debate in a democracy – a democracy that today is increasingly overloaded with information.

- People are interested mostly in interpretation;
- Information is never neutral;
- Trust is key;
- Information needs are specific;
- Different information is needed at different times;
- Different information is needed for different audiences;
- High quality process facilitation is essential;
- Important issues are likely to be controversial and may be career threatening;
- Timing is everything;
- Impact depends upon choosing an issue of importance to citizens and decision makers.

We are still assuming that what is desired is policy education where the public and the decision makers ultimately choose a policy to deal with an issue – i.e., that the educator does not choose the policy for them. With the list above in mind, conceptualize the personal attributes, skill set, and experience level that would be

needed for an individual to have a good probability of threading one's way through such a minefield.

Initially, public policy education in the land grant environment functioned on the basis of a relatively narrow focus for the issues that would be addressed (initially those related to agriculture, resources, and rural concerns), and there was a limited set of individuals who were identified to undertake such a role (usually specialists in Agricultural Economics Departments having familiarity with institutions and context as well as the subject matter). Often, public policy specialists remained in more limited areas of recurring concern – such as farm policy. Over time the issues spread from the traditional base began to become broader, for example, starting with whether social security should be extended to farmers (as self employed individuals) and ultimately to such issues as community development, energy policy, and the structure of the food system. These latter issues directly affected more than just those in production agriculture.

In the 1980s, the scope of what had been called public policy education was broadened further and renamed public issues education (pie). The goal was to involve more disciplines in public policy education and also take on an even broader set of issues than was being served by the already expanded public policy education (Public Issues Education Materials Task Force, 1994). This changed both the nature of the task, the environment in which it was undertaken, and (in some cases) the degree to which policy/issues education was an information providing process informed by analysis. At this time there were already a number of public policy educators who had worked on issues well beyond the traditional agricultural and rural concerns.

How do These Changes Affect the Passing of the Torch?

In the 1980s, cooperative extension was suffering from declining resources and was insecure about its role and the competition between serving existing clientele and new clientele that had important needs and might also provide a broadened basis for support. In addition, other organizations increasingly adopted the mantle of providing information and became competitors for resources. These changes were reflected in changing roles for extension economists who had dominated public policy education (Wallace).

In the 1960s and 70s, not only were issues a bit more narrowly focused, but there was an identifiable cadre of individuals, mostly in land grant agricultural economics departments, who did policy education and mentored young staff to take on that particular role. At most land grant universities of any size, there were one or two senior staff doing public policy education and at least one apprentice. In one's mind's eye, one could go across the country and identify this set of individuals who served at most of these institutions. There was a built in audience for such events as the National Public Policy Education Conference, and younger specialists were

mentored by the broader community of public policy educators at this annual event. This group was identifiable both by their discipline and by their association with other policy educators.

What happened? Budget cuts in the 1970s resulted in positions not being filled in land grant institutions across the country, so the pool of understudies did not grow as the ranks of existing public policy educators declined. In addition, senior staff in public policy education found themselves having to react more quickly to an even broader set of issues crowding on the public. With public issues education (pie), the issues of concern to educators expanded further as did the effort to rapidly train and engage faculty from other disciplines (outside the group largely populated by agricultural economists and other social scientists). The training stressed issues management and facilitation more than previously, and the analytical role of formally assessing alternatives and trade-offs was not always possible given the backgrounds of the new entrants into "pie."

An important support function also declined with the shift to public issues education. There was less of a professionally cohesive cadre of individuals around the country working on problems similar to ones other policy educators might be working on. The greater breadth of issues and multiplying approaches to public issues education resulted in it becoming more difficult to have regional activities and educational efforts concentrating on a small number of policy education themes at a given time where subject matter support could more easily be given across state borders. Policy education and then issues education became more atomized in terms of content and methods applied.

We are beyond the point where there is a tight national group or regional groups of policy or issues educators who have a common paradigm of policy education. In addition, the subject matter of policy issues has become more specialized as has the particular community of citizens interested in that policy area. A policy specialist who practices policy education on energy policy has to do a phenomenal amount of continuing self-education in the topic to be credible to the energy industry and energy consumers – let alone to regulators, interest groups, and politicians. It becomes a case of being a policy educator in a limited number of specialized areas if one is to have impact and improve decision making in the policy process itself for that specific issue. A subject matter generalist policy educator can work with interested citizens and increase their capacity to enter the debate on such issues but cannot have the impact on the determination of today's specialized policy issue as was once the case. The number of groups entering the decision process on a given issue has multiplied; the groups have become more deeply involved in the decision process; and these groups have become more specialized and knowledgeable to support their own views. Trust between the educator and others with whom the educator must work has remained a critical factor in the process, and it is even more difficult to develop the essential trust relationships across a broader number of players and issues.

How Then Does the Torch Get Passed?

Young professionals who take jobs at educational establishments today are more specialized in their initial skill endowment than they were several decades ago. Though their official responsibility might be outreach or engagement with the public and interest groups, the expectation is that a good portion of their time will be spent communicating with their peers. Until the individual receives tenure or some alternative job security, there has to be a greater emphasis on this activity (which can have more value than some admit). What this does do is decrease the time available for developing the kinds of people skills, institutional knowledge, and trust required to deal with the basic task of policy education.

The other question is motivation. Motivation can either be through rewards or through interest in the task sufficient to motivate. Rewards, professional or monetary, have never been particularly impressive for public policy education work. Most rewards have tended to be internalized and associated with factors that provided self motivation. The apprenticeship to a public policy specialist who had such motivation was often a key to passing the torch. Many of the psychic rewards and support for a policy educator came from the cadre of like public policy educators across the country engaged in similar activities. As this cadre has shrunk in size or become diffused in their approaches and interests, so has the sense of support and approbation for public policy work.

In those institutions where some kind of public policy education or public issues education continues today, the mentoring/apprenticeship relationships have to be a major factor in passing the torch. This is especially true given the increasingly complex and controversial issues that can also pose professional risk to the individual's career. A new entrant to policy education working on controversial issues needs to have the example and active support of mentors or peers who survived the difficulties of education in the midst of controversy. This is one of the few places where administrators can play a critical defining role – making it clear that within the ground rules of nonadvocacy policy education that the individual will receive the backing of the institution, especially when issues are controversial. Another important role for administration would be to make it clear that policy education is a function that needs to go on somewhere in the institution and is a core activity that is expected to be continued.

Given the early career demands, the point at which a young professional begins to be seriously involved in policy education has probably been delayed by five to seven years (not coincidentally the tenure or permanent contract probation period). Part of the decline in individuals engaging in policy education with intensity may not be just the decline in the number of educators but also the time lag for the next generation to be willing and able to come forward.

What I see in some institutions is a small cadre of individuals, largely in some applied economics role but also in some technical as well as other social science

fields, who have gained professional stature in their core discipline and are now interested in becoming involved in some aspect of the policy process. This might be something like what was traditionally thought of as public policy education. It might also be a desire to bring their specialized expertise (in climate change – in energy) to the policy process and to improve that process through increasing the quality (and quantity) of relevant information for decision makers. Often, comprehensive problem identification and analysis of alternatives and their consequences are not part of the task seen by such individuals. The question this group asks is how to effectively enter the policy process where they might make a difference. This is somewhat akin to the desire of NGOs to bring their message to the table – but these individuals often separate themselves from the motivations of NGOs in their attempt to bring more accurate or better balanced information to the table. They see themselves in more positive than normative terms. This is conceivably an entry point for combined efforts in policy education where the subject matter expert can team with others who specialize in issue and problem identification and analysis of alternatives and consequences.

What Torch will be Passed and to Whom?

We are unlikely to see a resurgence of broadly gauged policy educators and educational programs of the type that flourished decades ago. What we do see is a small group of professionals whose career was shaped by the public policy education model still practicing under that paradigm. We also have a small next generation group that has been mentored by that group as well. Relatively recently, we have the small number of individuals who have emerged in fields that are central to technically complex policy issues like energy and climate change who also desire to become involved in the policy process. This group could begin to be linked with others who do what may be more like traditional public policy education on a narrower set of issues in which they develop some basic expertise, but more importantly they develop links to the subject matter specialists referred to above. We have individuals today from traditional policy education who play this role linking with subject matter specialists on complex issues, and we also see young professionals being mentored directly or indirectly by such individuals to perform in a similar mode. We do not see as much administrative recognition of the public policy education role involving this specialized subject matter linkage as we did previously in the more generalized role. Part of this may be because the new role has to be multidisciplinary. At a given institution, recognition of policy education may be less because there is just less of it, and it is less obvious what is going on. One concern is the need to recognize the role of the individual having the specialized technical knowledge as being a key to the public policy effort and rewarding that role as well as the role of the policy education specialist.

How is Such a Generational Transfer Fostered?

I start with the assumption that involvement in the public interest by educational professionals in public policy education is a good thing and should be fostered by public institutions. Involving a new generation of land grant specialists is critical if such an activity is going to be continued. What then needs to be done?

- There has to be strong administrative support for the nonadvocacy public policy education function. Administrators need to understand the risks involved in controversial issues and both make sure staff knows how to deal with them and in turn protect the staff when a nonadvocacy approach is followed.
- There has to be some kind of internal mentoring and support for young staff undertaking the role of a public policy or public issues educator.
- It would be most helpful to have some formal external support system from colleagues at other institutions who undertake similar activities and who provide a broader sounding board and a peer group that encourages superior effort.
- There has to be a linkage with subject matter expertise that goes well beyond what was sufficient for traditional public policy education. It is not possible today for policy specialists to self study enough to become competent to carry a policy program in many new areas that have a high technology or science component. Problem identification, determination of alternative solutions, and applied economic analysis of the alternative solutions to determine their consequences cannot be done in such issue areas without in-depth understanding of the science and/or technology involved.

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Collaboration and Institutional Innovation

The intended purpose of this article is to provide a policy educator's perspective on issues that are likely to affect agriculture, food, and its related industries, resources, and interests for the remainder of the 21st century. That is a tall order for an educator who spent more time in the last century than in the current one in a discipline that is less than a century old. The past is not prologue for the future. This article does review the author's perceptions regarding public policy education history, track record, changing environment, development of new institutional models, and continuous search for resources. The challenge in addressing this topic is to make a few key points regarding the relevance and importance of collaboration and institutional innovations in public policy education without too much wandering around. It is hard to boil one's chosen profession down to a few lessons learned for the sake of posterity. But how else can we expect the next generation to learn from our efforts, successes, and mistakes.

Perceptions From Looking Back

Farm Foundation's activities in supporting the National Policy Conference for 50 plus years played a critical role in enhancing the performance of land grant university extension policy education professionals across the country. Coupled with its ongoing commitment toward multi-state and national projects, Farm Foundation has played a catalytic role in molding these disparate human assets into a national network that addressed a wide range of important policy issues that influence agricultural industries and rural people. As an institution, Farm Foundation has demonstrated an example of what can be accomplished by seeding collaboration and institutional innovation on a national scale.

Seasoned professionals attended the National Policy Conference to learn policy education frameworks for emerging issues and to hear the latest findings from nationally recognized policy researchers and experts. New policy education professionals attended the National Policy Conference to learn the principles and methods for conducting objective policy education programs and to integrate themselves into a national professional network. In turn, all participants used the opportunity to incorporate new material into their state and local policy education programs throughout the year.

¹ The author is a professor of economics and an extension public policy economist at Iowa State University. He is director of the Community Vitality Center.

Many of the public policy education stalwarts refer to the first 25 years of the National Policy Conference as the golden era for policy education. University budgets were expanding. The numbers of university and extension public policy education positions across the country were increasing as university budgets expanded. Participation in the annual national policy conferences peaked at an all time high with more than 150 participants. A number of high profile projects were successfully conducted nationally, adding stature to the national network for conducting relevant programs for the relevant clientele interests.

Before we conclude that this growth and success was due solely to the efforts of the professionals who organized and benefited at that time, it is well to remember the context. The national network of public policy education emerged out of the earlier interest by agricultural economics professionals who were engaged in assisting agricultural and rural leaders in understanding the choices relating to a maturing agriculture and rural America. The policy setting and seeds for economic growth were established during the years prior to the first National Policy Conference.

In many ways, the context and flavor of our modern world has been created by events that occurred prior to and during World War II. At the end of WWII, the U.S. represented half of the world's economy and was the dominant military power. With *big stick* diplomacy, the U.S. provided leadership in establishing the United Nations, International Monetary Fund, World Bank, and General Agreement on Tariffs and Trade. These four international institutional innovations provided the structure and context for multinational policy coordination mechanisms that are used today for resolving political disputes, promoting economic development, encouraging trade liberalization, and coordinating monetary policy and exchange among the nations of the world.

In another vein of structure and context, World War II also created a new enlightened generation of young leaders and citizens returning from war with a global understanding of the consequences of political, economic, and societal systems that operate under tyranny, without rule of law, and without freedom to choose. After the calamity of war, the *greatest generation* was ready to come home, get to work, apply its new-found skills and knowledge, make a living, make a home, have a family, and prosper in peace. It produced the baby boom generation. The one-third boost in the birth rate provided a dominant demographic statistic that has influenced domestic economic, political, social, and institutional changes during the past 50 years.

A third vein of structure and context was created by pre-WWII conditions. The closing of the western frontier and Great Depression generated unprecedented unemployment, farm exodus, and rural poverty. It caused a rethinking of national policy and government's role in agriculture and rural society. Prior to this time, we were essentially a nation where most of the American population lived on farms and in rural areas. Things were so bad during the Depression that one South Dakota market quotation recalled in Don Paarlberg's book, *American Farm Policy*, cited "#2 shelled

corn at 4 cents per bushel, #3 shelled corn at 2 cents per bushel, and eared corn 3 cents less."

It was during this era, that the nation moved from a market-oriented settlement policy to a *new deal* of public policy with government intervention into markets and safety net programs. Related to agriculture, were policies and institutional innovations designed to address the farm surplus, farm income, and rural poverty problems. Acreage set-asides, grain reserves, and price and income supports served as the core of agricultural policy for the next 63 years. This era fostered an emerging agricultural economics profession and need for new institutional innovations to deal with the consequences of periodic rural surpluses. Some leaders of the profession were increasingly asked to serve as advisors to policymakers and educators for clientele leaders and citizens. The National Policy Conference was established in 1950 and represented an institutional innovation that Farm Foundation sponsored. It was consistent with a Jeffersonian style of democracy that was emerging.

The *greatest generation* placed priority on channeling the technological progress that won the war toward domestic economic productivity and growth, earning a higher income, educating their kids, and generating an opportunity for the higher quality of life. The mantra was to create an opportunity for a better life than that experienced by their parents during the Great Depression when they were kids. The U.S. economic engines started in many sectors and provided the context for unprecedented growth for succeeding generations. Unprecedented numbers of youth went to school, so decision-makers built more schools throughout the whole country. Unprecedented numbers of high school graduates went to college, so college enrollments broke new records in the 1970s. In many ways the golden era of policy education was created by the same underlying societal demographic trends and consequences on university budgets during a modern era of enlightenment.

If the first 25 years of the National Policy Conference could be referred to as the golden era for universities, extension, and public policy education, the last 25 might be referred to as the era of retrenchment, reinvention, and entrepreneurial innovation. The winds of change occurred in the institutional context and in educational tastes and preferences of the American public. In addition to identifying the relevant emerging issues, a dominant reoccurring theme emerging during the National Policy Conferences of the 1990s was the needed adjustments in the national network and program delivery to provide a sustaining environment for conducting policy education work.

Over the course of the past 50 plus years, many agricultural policy researchers and extension education professionals have collaborated with Farm Foundation in one fashion or another on a wide variety of policy education projects. While the Foundation's goal may have been its mandate of serving as a catalyst for change and adjustment in Agriculture and rural America, the incentive for policy researchers and extension educators was that collaboration with Farm Foundation represented an

opportunity to pool resources, access expertise, and generate a much greater capacity to accomplish outcomes than could have been accomplished in isolation.

The topics from the 1953 National Policy Conference included: Old-Age and Survivors Insurance, Wheat Price Policy in the United States, Questions Faced in Developing a Public Policy Program, Political Parties and Pressure Group Considerations in Agricultural Politics. In 1954, the focus turned to "Expanding Outlets for American Farm Products, Alternative Methods for Stabilizing Farm Income, and Increasing the Effectiveness of Public Policy Education. In 1955, the topics included Taxation in Relation to Changing Demands for Services, Water Problems and Policies; Economic Growth and Stability; and Problems of Low-Income People in Rural Areas.

Part of the initial purpose of the National Policy Conference, was to bring together some of the best minds of the profession to examine the principles and methods for effective policy education. J. Carroll Bottum articulated the basic objectives of policy education as follows: (1) to develop an active interest in public issues, (2) to increase understanding about the facts, issues, and values involved, (3) to increase people's ability to make judgments based on evidence and logic, and (4) to create the desire and ability to participate effectively in solutions to public issues (*Journal of Farm Economics*, Vol. 37, No. 5, Proceedings Number [December 1955], pp. 1307-15). J. B. (Heavy) Kohlmeyer outlined the alternatives and consequence best practices for conducting policy education on controversial issues in a manner that would allow the presenter to objectively educate the audience and survive (*American Journal of Agricultural Economics*, Vol. 51, No. 5, Proceedings Issue [December 1969], pp. 1357-64).

Fast forward to 1998 and 1999 and the National Policy Conference topics included Agricultural International Trade Policy; Foods Safety Policy and Issues; Land Use on the Rural-Urban Interface; Consequences of Government Devolution on Agriculture, Communities, and Families; Immigration and the Changing Face of Rural America; and Regulation of Concentrated, Animal Feeding Operations. What changed? One cannot argue that the importance and relevance of the topics changed. In fact, it could be argued that such topics are of more importance in today's interdependent world than they were more than 50 years ago when the world was less interdependent.

A viewpoint from inside the profession suggests that there were significant direction shifts in the availability of resources across states, the commitment of institutions, the erosion of positions, and the emergence of specialized centers and clientele interests. The internal view was a response to external societal changes including declining farm numbers, increasing farm size and specialization, rural out-migration of youth, and an aging rural population base, advancements in transportation, communications, and perceptions about where the future opportunities were located.

Lessons Learned as a Young Professional

As a professional, I came of age at the beginning of the second 25 years, and signs about the winds of change were already apparent. I have attended every National Policy Conference since 1981. I attended out of the need to hear the latest perspectives on issues that I was dealing with in my home state as a policy educator. When you take a job in a state where you are the only person in the whole state who does what you do, you develop a quick appreciation for the national network of professionals who do what you do in other states and the institutions that support the national network.

Most of my extension programs included some elements of analysis picked up from National Policy Conference presentations and expertise. My first topic was on taxes. Governmental finance was an area familiar to policy education professionals. In fact, the North Central policy educators had put out a regional publication during the previous decade on where taxes came from, how they were spent, and comparisons of various government finance and tax indicators across the states.

My first extension meeting in Harding County, South Dakota, was a memorable one. It was a meeting on taxes organized by the county agent in Buffalo, South Dakota. This is a sparsely populated county in the Northwest corner of the state where the stocking rates are more than 40 acres per cow. West River ranchers always said their reputation for hardy stock was because the cattle had to stay in a slow trot in order to find enough to eat.

Well, six people showed up for my first extension meeting. I had visions of a packed house and expressed a mild sense of disappointment to the county agent. He was smiling and had a sense of accomplishment on his face. So I asked him to explain it to me. He said he was very pleased with the turn-out. He also said that what you do not understand is that we go for quality out here. Quantity does not always matter. Those six people own half the county, and there is not anything that goes on in this territory that they do not know about. Well that certainly put a different spin on the meeting.

But it also became apparent to me that large audiences will not come to meetings in remote locations to hear about policy topics, unless the topic directly affects their pocketbook or unless the speaker was a real entertainer like my policy education mentor, Barry Flinchbaugh. In fact, most policy topics do affect the pocketbooks of the general population but usually in a way that is perceived to be indirect and less subject to personal control – unless you are one who happens to own half the county.

So I wondered if there was a more efficient way to provide policy education, particularly, if you accept the Jeffersonian model for building a strong democracy – a model in which educating the masses is as important as educating the elites. It was during this era that I learned that most people are not interested enough in most topics to go to a meeting, but they are typically interested enough to learn and read

about policy topics in the newspaper or a farm magazine. Integrating policy education into the preferred information venues continues to be a challenge as society increasingly uses the internet and becomes more familiar with events and happenings around the globe than they sometimes are about events a few blocks away in the same community.

Living the lesson, I started a weekly column series for local newspapers and farm magazines that was distributed by the University Extension Communications Service. One of the things I really liked about my position in South Dakota was that I could change topics periodically. New policy topics emerged with every legislative session. Among other topics, I was responsible for creating balanced voter information brochures on ballot initiatives. New issues regularly emerged and provided opportunities to clarify problems, outline alternatives, assess probable consequences, and outline tradeoffs.

A decade later, the habit of writing regular columns served me well in a different state and university position. After debating my old professor for a number of State Banking Association annual meetings, we were asked to co-author a regular column series for Farm Journal and Farm Progress Publications throughout the next decade. Periodically, I would often use bits of information and perceptions gleaned from the National Policy Conference presentations and network of policy educators. It has been about five years since I wrote the last column, but I still run into people who say, "Oh you are that straight guy who debates that other fella with a cigar in the farm magazine." I had a tendency to underrate the potential impact of this exposure, but the magazine with my last column was on the coffee table in the Governor's office. So while I may have only rarely gotten in to see the Governor, my columns made it in more regularly.

The five-years of experience in South Dakota during the 1980s farm finance crisis and the next five economic recovery years in Iowa set the stage for winning a National Distinguished Extension Program Award in 1992 and provided the next hard lesson learned that guided the rest of my professional career. South Dakota provided a lot of valuable experiences. The faculty were only one deep in every function, and there were few egos so everyone worked together as a team.

A colleague and I did a banker survey to assess the farm crisis, in part because we did not have enough funds or time to do a farmer survey, and we thought we would provide a better picture. The bankers also indicated that they preferred having the university extension service provide farm financial technical assistance over the state department of agriculture, which had hired some former experienced farmers to provide financial counseling. This information was used to convince administrators to let us organize a series of financial management meetings around the state.

We collaborated with extension specialists from agronomy, animal science, and engineering and with others from economics to organize a series of meetings around the state called, "Farm Finance Tips for Saving \$15,000." Nearly 100 to 350 farmers showed up to every meeting – a great outcome in a sparsely populated state. The first

part of the meeting focused on using financial statements to determine the farmer's current status; then we focused on farm enterprise management and marketing tips that when summed together would generate \$15,000 in savings for an average size farm. If the farmer was still losing ground and had already incorporated the best management practices, then the handwriting was on the wall, and it was time to begin thinking about repositioning or exit strategies.

Looking back, one has to believe that it was the right and proper role for the university's agricultural economics expertise to step forward and help the state's most severely stressed farmers during the worst financial crisis since the Great Depression. However, not all agreed. It did not take long for the farm crisis in a rural state to show up in the form of a downturn in state budget revenues and spending, which translated into more cuts in the university budget. The Governor was disgruntled over the banker survey comments regarding his agriculture secretary's farm finance technical assistance program, so he slated the agriculture policy position for elimination. Wild Bill was the type of politician who very quickly concluded whether or not you were on his side. As far as he was concerned, there was little neutral ground for programs he did not sanction.

The story goes that the regents made the request to the new university president who refused to carry it out. He concluded it did not make sense to fire someone who just received two awards for organizing the research and extension programs in question. As a result, President H. Ray Hoops maintained his integrity and became the president with the shortest tenure in SDSU history. By that time I was headed out of state to a higher paying position at a bigger university. In a more recent decade, the former governor was eventually forced to resign from Congress to spend jail time for vehicular homicide while intoxicated. The one regret that I had was that I never had the opportunity to sit down and break bread with the governor to explain the purpose, objectives, and principles of policy education. Early on, I had asked the dean for permission to do so, but he said no.

The second half of this story occurred in Iowa. During the next five years, I worked with my new dean to attract a significant four-year Kellogg Foundation grant. We conducted a series of statewide satellite town meetings down-linked to 90 or more county extension offices. Every six months, the Citizens Advisory Board would select a new public policy topic on the state and local policy education agenda. The Public Policy Education Project (PPEP) worked to attract sponsorship of about 35 interest groups for each topic, pre-produce an educational video to clarify the issue and outline the major alternatives. The broadcast quality video would air during the first 30 minutes of the statewide satellite town meeting. The next 30 minutes featured a balanced set of expert panel members to respond to questions called in from the local audiences across the state. The final segment of each town meeting featured a locally facilitated small group discussion process and ended with participants registering their preferences on a survey for tabulation in a statewide report. The topics selected included the 1990 farm bill, Future Directions in Health Care,

Waste Management Policy, Drug Abuse Policy, the Future of Iowa Schools, and the State Deficit Crisis.

PPEP attracted about 1,500 to 3,000 local leader participants to each statewide town meeting and won the Distinguished Extension Program Award from the American Agricultural Economics Association in 1992. The methods were discussed at the National Policy Conference the following year. The hard lesson learned is that you can have the best program with the most impact that wins national awards, but the program may fail if the Kellogg funding runs out in the middle of a state budget crisis. No sour grapes here; universities sometimes work in a way that is oblivious to the sustainability of institutional innovations and enhanced outcomes. A note for next time: start laying the groundwork for sustainability much earlier in the project and hope that budgets are flexible when the soft money ends.

A Final Midcourse Adjustment for Sustainability

Soon after the PPEP-demise experience, I made a commitment to become more entrepreneurial. Farm Foundation and the National Policy Conference network provided me with an opportunity to serve as the lead on three major national policy education projects. During the 1990s, the economy was strong and growing rapidly, which showed up in the form of land use conflicts as demand for new housing, new businesses, new industry pushed cities outward. The project, "Land Use Conflict: When City and Country Clash," was an innovative partnership including Farm Foundation, Kettering Foundation, the National Issues Forum, and collaborating elements of the national extension network.

The success of the first collaboration led to a second project, "The New Science of Food: Facing up to Our Biotechnology Choices." Materials for these projects can be found on Farm Foundation's web site. These projects followed the entrepreneurial model emerging from universities where the rewards increasingly go to those who seek contracts and grants. The collaboration in these two projects provided sufficient resources for doing the work of the project, and subcontracts were let to a few people with expertise or specialized centers to complete the work of the project.

In contrast, I led a third National Project in the mid-1990s called the National Survey of State Animal Confinement Policies. This project followed the traditional model where colleagues from many states pledged and invested their personal staff time and resources to collaborate in generating a joint national project outcome. This project likely had greater educational outcomes because people in each state were invested in getting the research done and presenting the outcomes to home-state policymakers and clientele. Working together financially accomplished what no one individual state would accept in terms of costs for completing the national survey of states. However such projects are difficult to organize, manage, assure quality, and sustain funding. I still receive calls annually about whether the national survey has been updated, but no one individual or institution has attracted momen-

tum and resources to update the project. Why, because no one can afford to spend the time to organize a project on a *pro bono* basis unless the issue is of interest among policymakers and clientele demands a project.

The entrepreneurial center model will likely win out during the 21st century as long as policy educators are faculty are expected to compete with other faculty in terms of grants and contracts. Entrepreneurial faculty figure out quickly where the low hanging fruit are located in terms of sustainable incremental funds. Perhaps the advantage is in special purpose centers aligned with emerging agenda of federal and state policymakers or private sector endowment philanthropists. In recent years, many centers have emerged to focus on specialized issues areas including agricultural policy and trade, sustainable agriculture, water quality, biotechnology, renewable energy, food safety, food security, nutrition and obesity, entrepreneurship, innovation, and philanthropy to name a few. It is increasingly difficult for meagerly funded policy education generalists who hop from issue to issue every six months to compete effectively for university rewards and incentives and with education leaders aligned with an outreach function of a fully funded center.

During the past decade, I have been testing an alternative strategy for sustaining resources. If one cannot compete with a competing strategy, perhaps one can compete by adopting a similar center strategy. There is no preordained reason extension professionals cannot compete effectively in managing a university center. In fact, some of the oldest centers in the profession envisioned a strong extension component. An early extension policy education leader, J. Carroll Bottum from Purdue, spent time at Iowa State when the Center for Agriculture and Rural Development (CARD) was initially established. In more recent years, the Agriculture and Food Policy Center at Texas A&M University was directed by extension policy economist Ron Knutson.

The basis for creation of the Community Vitality Center, the center for which I serve as the founding Director, came from three sources. During the 1990s, I had participated in the leadership of the emerging Rural Policy Research Institute (RUPRI). At that time, RUPRI was doing a number of innovative and productive projects and included representation from both research and extension. This institutional startup venture provided a useful experience for other home-state initiatives to come. It was also during this time that I came across a group of rural Iowa community leaders called Positively Iowa. They felt that agriculture and metropolitan centers represented the dominant political forces of the state. The economy helped those areas to recover from the farm finance crisis of the 1980s, but the network of 950 nonmetro communities in Iowa had not fully recovered and, from their point of view, were being left out. Similarly, I had observed the role that Farm Foundation played in supporting networks, organizing innovative projects, and stimulating dialogue over the years.

After a meager existence for nearly a decade, Positively Iowa developed the concept for a center to serve as a catalyst in identifying and promoting strategies for

enhancing community vitality. Enough political spadework was done to include the concept as a Governor's Strategic Planning Council recommendation. The concept was shopped around, and Senator Harkin sought congressionally directed appropriations to initiate and sustain the concept at about \$250,000 per year.

A planning group of rural leaders and university representatives developed a unique double bottom-line approach for institutional decision making. All policies and projects must meet concurrence of the governing board and university administration. The board included representatives from all higher education institutions and economic development agencies. In addition, a two-thirds voting majority came from community leaders representing diverse rural community interests – from mayors, county supervisors, business leaders, nonprofits, and farm bureau. This approach avoided previously experienced problems of agency dominance or administrator indifference.

During the five years that the center has been in operation, only three initiatives have been adopted: Community Entrepreneurship, Community Philanthropy, and Rural-Urban Policy Studies. Seed funding has been provided in collaborations with over 110 community leadership groups interested in entrepreneurial projects, over 110 community philanthropy groups, and a dozen policy studies ranging from wealth transfer, case studies of community entrepreneurship, and studies of new movers to identify actionable strategies for community leaders in retaining and attracting residents.

In a nutshell, the element missing from the PPEP project days of the early 1990s, has been organized and embodied in a board with motivated leaders who help sustain funding and create favorable dialogue about issue-oriented policy education projects with policymakers, interest groups, and university administrators. CVC does periodic newsletters to 2,500 state and local leaders and organizes educational academies in addition to all of the community demonstration, policy studies, and dialogue projects. In the future, policy educators who wish to be generalists will need to build institutions with capacity to sustain resources and support the breadth of the agenda envisioned. The final most critical component of the institutional innovation is a board of diverse leadership interests. Its members live the issues everyday; they see the consequences; they help design the research; they participate in the delivery; and they go to battle when needed to sustain the resources on campus or in the policy arena.

Concluding Observations

It is unfortunate that it took two-thirds of a professional career to figure it all out and put in place the institutional innovations necessary for a sustainable concept to work. I am at the tail end of the baby boom generation. Today, new university presidents are in their late 50s before they are hired. When I was a college student, it was common for university presidents to be hired in their early 40s. This

intergenerational comparison again provides a demographic indicator of the level of generational competition for resources, sophistication, and professional legitimacy. The good news is that after the baby boom generation comes the baby bust. Perhaps younger professionals will have greater opportunities and access to resources at a younger professional age in the future than that experienced by the current generation of policy educators.

Farm Foundation has made a monumental decision to discontinue support for the National Policy Conference in favor of creating a new Institute for Public Issues Education. While the concept represents a bold change for the future, the question remains whether or not the old model of *pro bono* collaboration that helped me throughout my career will be sufficiently competitive during the next century to attract and sustain the next generation of policy educators. Or alternatively would establishing an institute that includes a network of centers who wish to be aligned with Farm Foundation make a more competitive model in terms of providing professional homes and sustainable resources for a network with national capacity on a wide range of public policy education topics? Such fodder represents an important and useful discussion. Farm Foundation has invited such a discussion for input as the new institute structure takes shape. Those who have a stake or a legacy in this area, have a responsibility to participate. This is similar to the observation of a former city council member about the local policymaking process – “the rules will be made and influenced by those who show up.”

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The Alternatives-Consequences Approach

Walt Armbruster and Farm Foundation have been key players in the public policy process in the second half of the 20th century and into the 21st. Thus it is fitting that the evolution of policy education within the land-grant universities be addressed in this tribute.

Contemporary public policy education has its roots in the distinction we all learned about in sophomore economic principles courses, positive economics versus normative economics. Positive economics was descriptive in nature. Data about a situation or issue were gathered; statistical and economic analysis was applied; and ultimately reports that would be useful to the public and to policy makers for reference in determining a solution were issued.

Normative economics, by contrast, is prescriptive. Within the land-grant system in particular, we were encouraged to embrace the former and to avoid the latter. Not only does normative economics expose the educator to possible misinterpretation or errors in the data, imprecise analysis and the like; the prescriptive cure for a problem gets into values. Facts are facts, although there can be debate based on what we think are facts, but everybody has a unique value system. And values play a key role in policy decisions.

As an example, Willard Cochrane, a brilliant economist, argued during the 1950s that mandatory supply control should be applied to U.S. agriculture based on his treadmill theory of technological innovation in farming and on his studies of the inherent instability of farm commodity prices. Right or wrong, Cochrane's prescription ran afoul of conflicting values over big versus small government, freedom to make managerial decisions, preference for free market solutions versus socialistic planning. Cochrane was pilloried in the farm press. Debates were fiery and nonproductive.

Not only did advocacy fail to move the policy education process along, it could cost a person within the land-grant system his job. I was always told (and now retell the tale periodically, although I am unsure of the facts) that Ted Schultz was driven out of Iowa State University by dairy interests because of a study of the economic advantages of a new product, margarine, versus butter. Thus, the University of Chicago became the academic home of the esteemed economist who would later be awarded the Nobel Prize.

¹ The author is professor emeritus at Clemson University. He is the recipient of Farm Foundation's R.J. Hildreth Award for Career Achievement in Public Policy Education.

According to legend, the baseline for contemporary public policy education was born in the 1950s, when a couple of Purdue Agricultural Economics professors participated in a conference on a particularly hot issue of the day in Chicago. The press was present. The next morning the *Chicago Tribune* ran a feature article complete with quotes from the professors about what should be done about the problem. In desperation, the two set about trying to buy up all the copies of the *Tribune* that had been sent to Lafayette and West Lafayette, Indiana, an expensive and ineffective proposition.

The professors survived the fallout that followed but vowed that it would not happen again. Thus was born the Policy Alternatives and Consequences framework for public policy education. This framework goes well beyond the sterile recitation of the facts of positive economics as called for in basic economics texts, but produces rich answers that avoid the pitfalls of advocacy.

Over the years, one by one, the notebooks of lecture notes I took at Purdue have been culled from my bookshelves. But one thin loose-leaf binder remains. It is Agricultural Policy 640, taught by the legendary Carrol Bottum. There, on the first two pages are laid out the principles of public policy education as espoused by Bottum and our first guest lecturer, John Dunbar. Were these the economists quoted in the *Tribune*? I never knew but always suspected so. But it could have been Heavy (J.B.) Kohlmeyer, another guest lecturer in Bottum's class. Or both.

Some have asserted that the alternatives-consequences approach to public policy education is a unique tool used by agricultural policy specialists in dealing with commodity policy in programs dealing with the farm bill. Not so! One of the first successful applications of the approach was by Kohlmeyer in a lengthy statewide educational program in Indiana dealing with public school consolidation.

School consolidation was a bitter issue in the 1960s. It pitted rural interests versus urban interests; rural communities versus other rural communities; parents versus school administrators. Kohlmeyer told us he would lead off each meeting with the statement:

The issue we are here to discuss tonight is how to assure the best quality education for our kids.

Consolidation was but one option among several discussed. Eventually, it became the option selected statewide by local citizens and public officials after a heated debate and learning process. The instructors were able to stay above the controversy, and Purdue's reputation as a servant of the citizens of Indiana as well as a top level land-grant university was enhanced. Kohlmeyer's program was also insightful by pointing out the importance of proper framing of the issue so as not to create additional controversy. In a nutshell, according to my lecture notes, the most appropriate approach to solving policy problems for an educator or advisor is "the presentation

of the problems and the alternative solutions and their implications, leaving to the public the job of appraising the policies in the light of their own criteria.”

More specifically:

1. Presentation of the problem;
2. Delineation of the issues;
3. Presentation of the possible alternative solutions;
4. Analysis of the consequences of each of the solutions;
5. Appraisal of the alternative solution by affected parties.

My notes also stress the importance of not phrasing policy outcomes in terms of good and bad. For what is good for one of the affected players is likely to be bad for another.

The alternatives-consequences approach is not without pitfalls. It did not keep an element of the crowd from shutting off the lights on Ron Knutson during a conference on one occasion. Neither did it prevent a load of manure from being dumped at the entrance to Barry Flinchbaugh’s office door at Kansas State. These two policy educator colleagues have been perhaps the two foremost practitioners of the approach over the past 30 years. They were, in fact, so nonpartisan in their approach that I did not learn they were both Republicans until a few years ago.

The plain fact of the matter is that all of us who have been credible land-grant policy educators over our careers have at the very least been summoned to the dean’s office, suffered a tongue-lashing by a commodity group executive committee, or fielded a call from the president’s office. It goes with the turf!

In most all such cases, when offered proof that a program or publication relied on science – based facts, did not stray into values, and did not advocate a prescriptive solution; the administrators backed us to the hilt. I recall that Max Loyd and I, years ago, co-authored a newsletter that pointed out that South Carolina cotton producers received the lowest price for cottonseed of any state in the Cotton Belt. Meanwhile, South Carolina livestock producers paid the highest prices for whole cottonseed and cottonseed meal among the same states. We stated that among other alternatives, direct farmer-to-farmer contracting between large dairies and feeders with cotton farmers was a possibility. The cotton ginner and feed dealers immediately petitioned the dean for a meeting, demanded a retraction, and stated that Clemson had no business dealing with such issues.

Upon hearing the explanation that our report was based on reliable published data from USDA, observing that we did not advocate a particular solution, and noting that we did not use any inflammatory language (price gouging might have been appropriate); the dean patted us on the back and told us to keep up the good work. Although I am sure that he was more conciliatory to the industry in private, we were told that he told the complainants this was precisely Clemson’s role – to present the facts and to educate the people of South Carolina in a nonpartisan manner.

Perhaps the golden age of public policy education was in the 1970s and 1980s when a series of national projects used the alternatives – consequences approach to address key issues of the day. The Farm Foundation, the National Public Policy Education Committee, and the Extension Service played key roles in these programs.

First came *Who Will Control U.S. Agriculture?* Emanating from the North Central Public Policy Committee, the educational materials produced had a Midwest bias. But policy educators such as Paxton Marshall and me at Virginia Tech as well as those from other regions were easily able to adapt the template to fit the particular issues and commodities in our region. It is a shame that a remake of this project was not undertaken to focus on the massive structural adjustments that occurred in the 1990s.

Following *Who Will Control U. S. Agriculture?* were a number of more targeted, but equally important educational efforts. They include *Marketing Alternatives for Agriculture: Is There a Better Way?*, *Who Will Market Your Products?*, *Speaking of Trade*, and *Federal Marketing Programs in Agriculture: Issues and Options*. Walt Armbruster played a key role in all of these projects.

More recently, declining program support from Extension Service-USDA pushed programs in different directions, but efforts continued utilizing the alternatives – consequences approach. Two long-lived programs were “Southern Agriculture in A World Economy,” sponsored by the Southern Extension Public Affairs Committee, and the Cornell Program on Dairy Markets and Policy Extension Education Committee, which involves dairy economists from a number of land-grant universities and the Texas A&M Agricultural and Food Policy Center.

Finally, there have been successive major policy efforts aimed at alternatives for omnibus farm bill legislation every five years or so, dating back at least to the 1973 bill and continuing with the present legislation being debated now.

I am proud to have been a contributor to a number of these educational efforts. In my view, they included the best and brightest members of the public policy education fraternity and the agricultural economics profession at large. Peer pressure sufficed to enforce deadlines and to insure neutrality and the absence of value judgments. Authors’ meetings were sometimes filled with tension but were fun. I witnessed one of the grand old men of our profession, Harold Breimeyer, being verbally pummeled in one such meeting. Harold had not followed the model and had strayed into advocacy. But his next draft met the criteria of the steering committee. In another case, the peanut program authors tried to convince the steering committee that the only conceivable peanut policy alternative was the then current quota program. They were unsuccessful in their arguments. Nowadays, the peanut program is long-gone.

Over the past 15 years or so, a number of newer models of policy education have arisen. They fall under the rubric of Public Issues Education. They include such teaching methods as “Discovery and Analysis,” “SHAPES,” “Interest-Based Problem Solving,” “National Issues Forums,” and “Citizen Politics.”

I strongly believe that such models have a place in policy education and have used them in my programs. I have a framed certificate that reads "Public Issues Management School, Certified Facilitator." It goes on to state that as a graduate, I have successfully completed 50 credit hours of Public Issue Alternative Dispute Resolution Approaches and Conflict Management Techniques to include Group Facilitation and Public Issue Negotiation. I am often asked to facilitate in programs we are conducting and enjoy it. I know how to squelch a loudmouth without anybody, including the guilty party, knowing I am doing it. I can rip a flip chart page from its easel without tearing it apart.

I consider myself a policy educator. Sometimes, I feel the need to rely on facilitation. But a facilitator is not an educator. In fact, facilitators are urged not to factually contribute to the debate. I find the newer models long on process and short on educational content. The new role models rely on self-learning. Self-learning can be dangerous without a guide to the pertinent facts and data and without help in sorting out the potential impacts of alternative choices. All policy alternatives have unwanted and often unanticipated consequences, and it is up to the educator to figure these out. The internet and numerous other new avenues of communication can contribute to self-learning, but one needs to be very, very careful. Just because it is on the internet does not make it a fact, and some websites are loaded with misinformation, values, and subtle advocacy.

The best introduction I ever received during my career was from the Chairman of a Farm Bureau Commodity Executive Committee a few years ago. He stated, "Our next speaker is Dr. Harris from Clemson. You all know him. Over the last 20 years he has told us a lot of things that we didn't want to hear. But I don't think he has ever us told a lie!"

I owe that tongue-in-cheek compliment to the use of the alternatives and consequences approach to policy education.

Descending from my soap box, I want to again thank Walt Armbruster and the Farm Foundation for support of important and comprehensive public policy education programs over the years. These programs have had an important impact in contributing to the Jeffersonian ideal of an educated electorate.

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Role of Farm Foundation in Policy Education

As someone recently observed, “If you haven’t been on a farm or ranch in the last five years, you do not understand agriculture today.” Like the ever-changing agriculture industry, so too, have the challenges of government and business policy procedures evolved. Today, 150,000 farmers and ranchers produce 75 percent of everything we eat and drink, and with 300 million Americans, 150,000 is a very small minority in the political arena. Every day, production agriculture is challenged by growing minority views on a host of topics, such as how our animals are raised – particularly what constitutes humane treatment – how our crops are produced, how we control insects and disease, and how our farms contribute to pollution of our air and water. And now we add a new dimension to the political and moral hazards of agricultural policy: whether food should be used for energy production.

With so many significant problems facing our country’s food supply, a great importance is placed on how policy makers will receive the information they need to make the best determination for our future. With the decreasing familiarity with farm and ranch life and the increasing changes in policy procedures, the education of our political leaders will be imperative to the future security of our industry.

Education in America has undergone several revolutions, often controversial and many times conflicting, in the last couple of decades.

Agriculture education, specifically, has participated in, been challenged by, and continues to adapt to the needs of a changing society. At one time, every child had a direct and personal connection with a farm. They helped plant and harvest. They cared for the animals and understood that a mistreated animal was not productive. Foreign trade was selling eggs to a neighbor or trading a side of beef to someone in town for the supplies to survive another year.

Today, 98 percent of the population does not live on a farm, and as each generation passes, the general populace knows and understands less and less about food production. In a society that is now force-fed or willingly participates in news and talk shows that operate 24/7, public opinion is shaping an understanding of agriculture that will remain and possibly even grow in significance. Perhaps of increasing importance to the future of agriculture, is determining how knowledge will be provided to our lawmakers at the local, state, national, and international levels and who will provide it to them. Public schools, universities, think tanks, and other means of

¹ The author is senior government affairs advisor for Olsson, Frank, and Weeda, P.C. He is a former congressman from Texas.

education will play an even greater role for tomorrow than in the past of supplying the basic information and sound foundation of knowledge for our lawmakers.

Agricultural food policy was once a relatively simple political and economic exercise. Basically, three entities were involved: the House and Senate Agriculture Committees, USDA, and a very limited number of farm organizations. Today, hundreds of trade associations, consumer advocacy groups, very large businesses, commodity associations, animal rights activists, and talking heads of 24/7 news have joined the fray – competing with the original three to shape our food policy.

The difficulty in the current political arena lies in how elected representatives, with limited or non-existent knowledge, learn enough in a short period of time to cast votes that can affect the very future of any agriculture enterprise at anytime. For example, recent votes in the Illinois Legislature shut down the horse processing industry simply because they were influenced by a small but very vocal and politically powerful group. Under the pretense of protecting animal rights, this group vehemently lobbied against the right of a horse owner to humanely end the life of his or her own horse, under the supervision of a veterinarian, because they were opposed to the human consumption of meat by anyone in the world. In this case and others like it, policy makers were influenced by emotion, not fact. Members of Congress and the Illinois Legislature and Governor who believe, they say, in personal property rights were quick to join an impassioned frenzy to deny that right to the owners of one particular species. What issue will be next? Who will join the lynch mob? When will America's farmers and ranchers have to face more unwarranted policies based on uninformed and emotional decisions? Agriculture education must, at all levels, play an important role in preventing this.

It is not by accident that we have in the United States the most abundant, best quality, and safest food supply at the lowest cost to our consumers of any other country in the world. Our research and education systems deserve a tremendous amount of credit for this accomplishment. Our land-grant and other post-secondary education institutions turned out the researchers, business majors, and teachers who have contributed to making it so. And for over 70 years, the Farm Foundation has led in challenging our industry to attack each new opportunity with facts and consensus building for solutions. The Bennett Ag Roundtable semi-annual meeting provides a forum to explore new issues in open dialogue. In what may better be called industry-led solutions, the Farm Foundation has presented the venue and catalyst for meeting industry problems in a positive and productive way. Under the tutelage of Farm Foundation staff, agriculture and rural America have, in a very real and substantial way, benefited from the policies derived from the Farm Foundation activities and their ultimate use by policymakers.

As each new issue has presented itself, the Farm Foundation has been in the forefront holding workshops, policy forums, studies, and other discussion opportunities to thresh out the options and provide consensus-driven suggestions to successfully confront and ultimately solve the problems presented. Always in a non-partisan

manner, the Farm Foundation has done its job by challenging those who participate and enriching the general population with the results.

As was stated earlier, farm bills were once written by three entities – the House and Senate Agriculture Committees, USDA, and the general farm organizations. Today, there are tens, if not hundreds, of groups who to some degree or another influence agriculture policy, sometimes positively and sometimes not. Under the leadership of Walt Armbruster, an environment was created that provided different views from many groups on the various farm bill titles. The Farm Foundation determined that such an opportunity could benefit policymakers by narrowing the differences through informed dialogue and even helping those who have stronger opinions mold them in a more useful manner.

This past year, the Farm Foundation actively dealt with a series of projects, including researching biofuels for the present and future, a study of the future of American agriculture in North America, and the beginning of the 2007 Farm Bill Forum in Washington, D.C., which has proven to be on the very cutting edge of the changing dynamic of U.S. agriculture. Through the Farm Bill Forum, the Farm Foundation – one of the best-kept secrets in Washington, D.C. – has been exposed and utilized to a fuller potential. By providing a venue for the multitude of aggregate and special interests to present their views in an open dialogue, the Farm Foundation created an educational forum for the participants and an avenue for providing assistance to Congress and the Administration.

As always, the more you think you know, the more you know you did not know, particularly when it comes to government development and implementing policy. But one thing has become abundantly clear: the role of education in policy development has never been more important than it is today, and it will be even more so tomorrow. Today's leaders must meet the challenges or suffer the consequences – consequences that will ripple through the agriculture industry, our country, and the rest of the world. Each succeeding Congress will be led by leaders farther and farther removed from the farm or ranch. Knowledge will not come from a vacuum. Someone will always be providing information, whether factual or not, to shape policy to his/her own design. Our future leaders and their staff will seek out entities that, by research and process, have demonstrated they can produce a product that will question the thinking of all sides, present optimal solutions to solve the problem of the time, and provide a forum to accomplish such actions. The Farm Foundation and its numerous participants and partners must ensure that our future policymakers are thoroughly informed and that the voice of the agriculture industry is heard in a manner based on sound, fact-driven science.

Congress today is badly bent, if not broken. Difficult decisions are postponed indefinitely. Simply put, most of the problems of today are being passed on to our grandchildren, and that is not what the Farm Foundation advocates. It looks for a problem to solve and constantly challenges its members and others to do the same. When a problem is identifiable, the Farm Foundation promptly searches out the

most knowledgeable people working in that area on all sides of the question and pulls them together to form a consensus on possible alternatives or solutions. These are then passed on to policymakers who hopefully will make good use of them.

Perhaps the most important aspect of the past, present, and future of the Farm Foundation is its name. As any builder knows, the foundation of any building is critical to its future. Farming and agriculture is what it is today because of the foundation upon which it was built. Agriculture education was, and is, a key building block in that foundation. However, education is not an exact science. It has never been and never will be. It is extremely important that all generations have the best information possible on which to base their decisions and that the best trained minds explore the information in depth to reach the best possible outcome. You can have the best idea since sliced bread, but if you fail to get 218 votes in the House of Representatives, 51 Senators, and a Presidential signature, you cannot make it happen for you or prevent it from happening to you.

If future congresses and administrations are going to make the best decisions for our future agriculture production needs, they will be better served if someone constantly challenges the status quo. Bringing the best minds together – sometimes conflicting, constantly searching, but never straying from what they believe – is the right direction for our agriculture policy. The agriculture industry must learn to use the 24/7 news and talk shows to their advantage and not allow them to be dominated by the voices who have very strong opinions but very little substance. The best defense is always a good offense. You cannot win many games without scoring more points than your opponents do, but that is not to say that our opponents will cease to score. They will score when they have good plays, but we must score more points grounded in sound science and be able to use a constantly improving agriculture educational system in our public and private schools, pre-schools, grade schools, high schools, colleges, and universities. It is only then that our policymakers will have true access to the information necessary to make sure our grandchildren and those of the world will be fed.

In this lies the current and future role of the Farm Foundation. The Farm Foundation and its partner organizations must continue to provide an educational base and industry-led solutions for our lawmakers in Congress. The service provided by the Farm Foundation and other agricultural groups will be extremely important for the livelihood of future generations of farmers and ranchers. And because of the current efficiency of U.S. farms and livestock and poultry producers, Americans spend less of their disposable income on food than any other people of the world do. Americans spend ten percent of their disposable income on food whereas the French spend 18 percent, the British spend 22 percent, and the Japanese spend 28 percent, while the people of India spend as much as 50 percent of their disposable income for food.

Only by making sure that future policymakers have the best education and information base can our grandchildren be assured that they will also be well fed by world standards.

Research and Extension Policy



Realizing that public sector agrifood research and extension are at a crossroad, Farm Foundation Board and Round Table discussions often focus on the appropriate balance of public- and private-sector research and extension programs. Only a few decades ago, the U.S. agricultural research and extension system was considered to be a model for the world. Since the conference of patent rights for biological innovations (new life forms), private sector investments in agrifood research have mushroomed while public sector research has increasingly become concentrated in a few prestige land-grant universities. The remaining land grants are struggling to maintain a credible research program, and many are becoming little more than teaching colleges for agriculture. While research is adjusting to change, extension faces much more severe challenges as private sector firms develop their own outreach systems, as federal funding has declined, and, often, as state funding has also declined. As a result, not only has the number of extension faculty declined, but salaries also have not kept up with either their research or private sector counterparts. In some states, extension has adjusted to its changing demographics by servicing urban and suburban residents with urban gardening, landscaping, and youth programs. Increasingly, questions arise as to whether extension is becoming a social program as opposed to an agricultural program. Throughout its history, Farm Foundation has committed substantial resources to catalyzing adjustment both in research and in extension as important public institutions serving the agriculture sector.

Enhancing Small and Minority Farm Profitability and Rural Community Viability Through New Partnerships

Looking Back

Though 1890 land-grant universities were established by the U.S. Congress in 1890, it was not until 1966 and 1972 that they began receiving federal formula funds for research and Extension. This contrasts sharply with the fact that 1862 land-grant universities began receiving funds for research and Extension in 1887 and 1914. Outstanding leadership from within the 1890 land-grant community, including Richard D. Morris (Alabama A&M University) and B.D. Mayberry (Tuskegee University), coupled with struggle and support by many others and a 1967 report issued by the National Research Council entitled, "Report of the Committee on Allocation of Research Funds to Selected Land-Grant Colleges," resulted in the first federal formula funding allocated for agricultural research at 1890 land-grant universities. In 1966 the U.S. Department of Agriculture (USDA) provided \$283,000 for research, and in 1972 the U.S. Congress appropriated \$12,600,000 for research and Extension distributed to seventeen 1890 land-grant universities (B.D. Mayberry, *The Role of Tuskegee University in the Origin, Growth and Development of the Negro Cooperative Extension System 1881-1990*, Tuskegee University, 1989). Total research and Extension federal formula funds allocated for the current eighteen 1890 land-grant universities is \$72,162,935 for FY 2006-07.

This partnership between the 1890 land-grant universities, the U.S. Congress, and USDA has strengthened research, Extension, and academic programs in agriculture and natural resources, food and nutrition, family and community development, and related areas at the 1890 land-grant universities. The result has been development of campus environments where faculty, staff, and students are engaged in discovery and innovation and working with families and communities most in need. The graduates of these programs are serving the nation and the world as professionals and leaders in agriculture, business, science, engineering, human health, veterinary medicine, education, family and community development, and many other areas and have contributed significantly to diversification of the private sector, government, and academia.

A review of research and Extension programs at the 1890 land-grant universities before and after receiving significant federal formula funds in 1972, indicates that a range of areas has been targeted, depending on changing state and national

¹ The author is professor and dean, College of Agricultural, Environmental, and Natural Sciences and director, George Washington Carver Agricultural Experiment Station, Tuskegee University.

needs and USDA foci over time. However, two research and Extension foci of the 1890 land-grant universities that have transcended the uniqueness of state needs, rapid changes in technologies, and time, have been small and minority farms and rural community development. Examples are given below of partnerships that have addressed these two themes over the past 20 years. The partnerships, processes, and impacts are important to note in that they provide insight into the changing dynamics within the seventeen southern and border states where the 1890 land-grant universities reside. The eight brief summaries of selected regional and state-based initiatives are shared to exemplify the spirit of cooperation among the 1890 land-grant universities and their partners during the period of the 1980s through 2007 and provide hope for the future, especially for those who have lived and labored for progress and justice in the persistently poor counties in the Southern Black-Belt Region.

Common Ground: 1890 Land-Grant Universities, Small Farmers, and Rural Communities

State Matching of Federal Formula Funds

Partners. The 1890 land-grant universities, state legislators, and governors.

Process. Through leadership manifested in the 1890 Council of Presidents, Association of Research Directors, and Association of Extension Administrators, and with support of many friends in the land-grant community, government, community organizations, and the private sector, in 1999 the U.S Congress passed legislation that required states to provide matching funds for the 1890 federal formula funds, as had been the case for the 1862 land-grant universities since their inception in 1862. Thus, in the year 2000, the states began a process of increasing state funds to match federal formula funds of 1890 land-grant universities. Though each state manifested the response to the congressional mandate differently, as of 2007 most 1890 land-grant universities have received at minimum a 1:1 match of state and federal formula funds. As was the case in 1966 and 1972 for federal formula funding, the years 2000 and 2007 for state funding are historical markers when the congressionally mandated requirement for states to match federal formula funds for 1890 land-grant universities was finally initiated and manifested.

Impacts. A critical result of these new resources is that they are providing consistent opportunities for the 1890 land-grant universities to work together with each other and with 1862 and 1994 land-grant universities, community-based organizations, and the private sector. Distinctive strengths are being developed and leveraged to better serve the public, with a decrease in duplication of effort because there is time and resources for joint planning and effective communication. The 1890 land-grant universities are now in a position to assertively serve in ways they could only dream about in the past because of a lack of resources.

Southern Food Systems Education Consortium (SOFSEC)

Partners. Tuskegee University, Alabama A&M University, Alcorn State University, Florida A&M University, Fort Valley State University, North Carolina A&T University, Southern University & A&M College, South Carolina State, University of Arkansas at Pine Bluff, community-based organization partners in eight states, and the Kellogg Foundation.

Process. In 1993 the Southern Food Systems Education Consortium was initiated through a partnership of six 1890 land-grant universities and selected community-based partners in the Southern Black Belt. Funded initially through the Kellogg Foundation, over a nine-year period the number of 1890 institutions involved in SOFSEC grew to nine 1890 land-grant universities, and community-based partners in each state increased substantially. The SOFSEC program focused on: institutional change, sustainable food and agricultural systems, K-12-university partnerships, and community and economic development. SOFSEC functioned using the following principles: community-based input and leadership were highly valued, resources and credit were shared, and we consistently erred on the side of inclusion. Through its Executive Council, SOFSEC learned to make a consortium-wide decision in 24 hours when necessary and to develop a consortium-wide proposal in two weeks.

Impacts. The outcomes from SOFSEC have been revolutionary in nature and internalized across the region. Specific impacts included: K-12 mini-grant program for teachers that increased hands on science and natural resources learning experiences in underserved school systems; expansion of research and demonstrations for alternative agricultural products/practices including goat, agroforestry, small land-holder timber management, and organic/low input vegetable production; assisted Black farmers in the Black Farmer Law suit against USDA; increased focus on diet, nutrition, and health for African Americans; emphasis on interdisciplinary research, team teaching, and distance learning; recommendations of reward systems for both individuals and teams for research, teaching and/or outreach effectiveness; better communications among 1890 land-grant universities and their partners; and increased emphasis on policy issues that impact underrepresented communities.

Southern AgBiotech Consortium for Underserved Communities (SACUC)

Partners. Alabama A&M University, Alcorn State University, Florida A&M University, Fort Valley State University, Langston University, North Carolina A&T University, Prairie View A&M University, South Carolina State University, Tennessee State University, Tuskegee University, University of Arkansas at Pine Bluff, small farmers, K-12 teachers and students, community leaders, USDA, and the private sector.

Process. The Southern AgBiotech Consortium for Underserved Communities (SACUC) was a regional partnership that involved 1890 land-grant universities in ten states – Alabama, Arkansas, Georgia, Florida, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, and Texas. SACUC focused on reducing informa-

tion and knowledge gaps in agricultural biotechnology among underserved communities through hands on laboratory experiences by K-12 teachers and students, small-farmer vegetable production comparisons using biotechnology-improved and unimproved seeds.

Impacts. Farmers, community leaders, and teachers were better informed and became more knowledgeable about biotechnology. Science learning was enhanced for K-12 students through hands on laboratory experiments. Information sources, race, age, and county socioeconomic status did not affect producer perception of mandatory labeling of biotech products; a majority of producers surveyed advocated mandatory labeling.

Black-Belt Regional Commission

Partners. University of Georgia, North Carolina State University, Tuskegee University, Alabama A&M University, Alcorn State University, Florida A&M University, Fort Valley State University, North Carolina A&T University, Southern University & A&M College, South Carolina State, University of Arkansas at Pine Bluff and community-based partners in eleven states, the U.S. Congress, and the private sector.

Process. This eleven state initiative focused on counties where the poverty levels have not decreased over the past 20 years. Intensive work across the region collected information regarding key challenges impacting persistent poverty. Issues and indicators included health care, jobs, and economic development, quality of K-12 education, and transportation. Resulting reports included “Dismantling Persistent Poverty” published by the University of Georgia and “Persistent Poverty in the South” published by Tuskegee University.

Impacts. The reports served as the basis for legislation that was introduced into the Senate (by Senator Zell Miller) and the House of Representatives (by Congressman Artur Davis). Differences in the two bills are shown in Table 1. The work by the 1890 land-grant universities and community-based partners raised the central questions of the extent of participation by local constituencies, involvement of higher education and community-based organizations, inclusion of all eligible counties in the southern region, and adequate funding on par with the Appalachian Regional Commission.

Small Farmer Regional Marketing Project

Partners. The Small Farmer Regional Marketing Project was competitively funded by the USDA Integrated Food and Agricultural Systems program and included eight states and nine 1890 land-grant universities – Fort Valley State University, Tuskegee University, Alabama A&M University, Alcorn State University, Florida A&M University, North Carolina A&T University, Southern University & A&M College, South Carolina State, and University of Arkansas at Pine Bluff. SRDI land-based centers were Arkansas Land & Farm Development Corporation, Boggs Rural Life Center,

Table 1. Differences in Bills Introduced as a Result of Two Studies of Persistent Poverty in the South.

Senate Bill Sponsored By Zell Miller 3/05/03 – based on UGA Study	House Bill Sponsored By Artur Davis 2/11/03 – based on SOFSEC/CBO Study
Incorporated the UGA recommendations	Incorporated the UGA and SOFSEC/CBO recommendations
Overall Power: Governors and Alternates	Overall Power: Governors, Alternates and a representative from Constituency Representation Boards
Local Decisions by Local Development Districts	Local Decisions by Local Development District (80%) and Constituency Representation Boards (20%)
Input role for higher education & community-based organizations	Integral role for higher education & community-based organizations
Includes 2/3 of eligible counties	Includes all eligible counties
\$20 million per year for 7 states	\$500 million per year for 14 states; includes sub regions similarly to Appalachian region in this regard

Federation of Southern Cooperatives, Franklinton Center at Bricks, North Carolina Indian Cultural Center, and Penn Center.

Process. The SOFSEC and SRDI partners worked integrally together on a regional approach to marketing goat meat, fruits and vegetables. The project 1) identified, in each state, the lead underrepresented minority goat producers, whose farms served as demonstration sites for new goat farmers, often those who had a history of raising cattle, 2) provided starter goats for new goat farmers and identified markets for goats across the South; 3) worked with vegetable and fruit farmers across the region in the development of direct farm sales through farmers’ markets, set up demonstration sites for organic vegetables and fruit production, assisted with providing drip irrigation and mulching systems, explored sales to school lunch programs, and examined the feasibility of processing center hubs across the region.

Impacts. The number of goat and fruit and vegetable farmers, who are underrepresented minorities, increased in all of the participating states. Farmer participatory research, demonstration, and marketing projects are continuing across the region though the grant was completed in 2005. Direct sales by minority farmers through farmers’ markets have increased as a direct result of the project. A major marketing center is being developed in the Alabama Black Belt as a direct result of the project.

Alabama Agricultural Land-Grant Alliance (AALGA)

Partners. Alabama A&M University, Auburn University and Tuskegee University.

Process. SOFSEC provided outstanding leadership development for the 1890 land-grant agricultural administrators, faculty, staff, and students involved. Thus, when the opportunity for forging an alliance in the state of Alabama between its three land-grant universities to work together on problems confronting farmers and rural communities, Alabama A&M and Tuskegee Universities were ready to partner with Auburn University and other state bodies in a new way. The catalyzing opportunity was federal legislation, passed in 1999, that required each state to match USDA formula funds at the 1890 land-grant universities. In Alabama this require-

ment was manifested through an agreement between the three land-grant universities signed by their presidents and deans of agriculture to form the Alabama Agriculture Land-Grant Alliance (AALGA). As a result, a new line item was developed in the state budget for AALGA. The AALGA line included state matching funds for Alabama A&M University and Tuskegee University plus a separate fund (line item) to be split equally between the three land-grant universities for joint research. These latter funds are administered through a project selection process that requires a faculty member from each university with a definitive role in the project.

Impacts. 1) Historic barriers were broken by faculty from the three land-grant universities working together on joint research projects. 2) The state funds were provided to match the required increase in USDA formula funds each year until the 1:1 federal match was obtained in FY 2006-07 at both Alabama A&M and Tuskegee Universities. 3) The state legislature increased its overall support to all three land-grant universities for agricultural research and Extension. 4) Citizens of Alabama gained the benefit of collaboration by three institutions to solve agricultural, environmental, and food related challenges in the state. 5) Duplication of efforts was minimized through effective communications. AALGA information and newsletters can be found at <http://aalga.org>.

Black-Belt Family Farm Fruit and Vegetable Market Center (BBFAFFMC)

Partners. Governor's Black-Belt Action Commission, AALGA – Tuskegee University, Alabama A&M University and Auburn University; Federation of Southern Cooperatives, the Alabama Department of Agriculture, Alabama Power, farmer cooperatives, faith-based and community organizations, government and business leaders, and the Alabama State Legislature.

Process. A direct result of SOFSEC, Small Farmer Regional Marketing Project, and AALGA has been the development of the Black-Belt Family Farm Fruit and Vegetable Market Center to be located in Dallas County, Alabama, to serve underserved farmers in the 12 Black Belt and adjacent counties. The Center is being developed to process fruits and vegetables grown by Black-Belt farmers and to identify markets for the produce. The Center will utilize the faculty and students of the three land-grant universities to test production and processing methods that fit market demand and are appropriate for the crops grown by the participating farmers. Partnerships will be developed between the participating farmers through their marketing cooperative, other farmers in the area, and market outlets. Funding for the market has been provided by the Alabama State Legislature.

Impacts. The Center evolved from the Governor's Black-Belt Action Commission and is the number one agricultural project of the Governor's Commission. The evolution of the market center is still underway. The goal is to increase income to underserved and limited-resource farmers in the Alabama Black Belt, to develop stable markets for fruits and vegetables produced, to increase the availability of nutritious,

locally-grown produce for local consumers, to provide new jobs, and to show Black-Belt youth that agriculture and cooperative, smart marketing can improve the quality of life for rural people. A key component of the initiative is that through AALGA, the three land-grant universities are committing the human and technical resources to ensure a modern, efficient food-processing and market center, including joint research and demonstrations by faculty, staff, and students from the three land-grant universities.

Professional Agricultural Workers Conference (PAWC)

Partners. The 1890 land-grant university faculty, staff, and students; USDA; and other federal agencies and professionals; 1862 land-grant university faculty and staff; community-based organizations and leaders, farmers, and rural community and agricultural leaders are integral partners in PAWC. The PAWC Advisory Board is a cross section of leaders from throughout the southern region and nation.

Process. Initiated at Tuskegee University in 1942, the Professional Agricultural Workers Conference has served as a format for professionals to come together and explore challenges, successful models, and new approaches for serving farmers and rural communities and consumers. At the heart of the unique role of PAWC is the coming together of the faculty, staff, and students of the 1890 land-grant universities with USDA and other federal, state, and community-based partners to: celebrate career efforts of outstanding leaders who exemplify the life of George Washington Carver through the Carver Hall of Fame Award Banquet, sponsored annually by the Farm Foundation; honor the legacy of 1890 land-grant leaders who contributed significantly to the land-grant mission; provide key-note addresses by national and regional leaders on challenges and opportunities in agriculture, rural development, and related areas; host competitive research presentations by graduate and undergraduate students on agricultural, food, environmental, and rural development topics; share presentations of success stories by faculty, staff, and community-based organizations; support the annual MANNRS-Tuskegee Chapter student banquet and host an international issues workshop. In 1987 and again in 2000, the PAWC Advisory Board assessed its role and rededicated itself as an annual forum committed to a world that values and promotes equal opportunity and equitable access to information and technology for sustainable development of communities and natural resources (<http://www.pawc.info>).

Impacts. The PAWC is organized in a manner that engages participants in workshops on topics such as food, nutrition, and health; natural resource, forestry, and environmental issues; community and economic development, small farm issues, preventing Black land loss, African American connections with Hispanic Americans, Native Americans, and Asian Americans; marketing agricultural products by small and limited resource farmers, K-12 and community youth education and career opportunities in agricultural and environmental sciences, rural community challenges, forging partnerships to move the southern region forward, and international chal-

allenges and opportunities. Important impacts of PAWC have been the development of and adoption of policy recommendations for implementation at the federal, state, and local levels; and the facilitation of partnerships, collaborations, and networking among individuals, groups, organizations, and corporations

Looking Forward

These examples clearly indicate that when forged partnerships focus on those most in need and processes are manifested in which participants share resources and credit for work done in a spirit of growing trust, cumulative gains can be made. The Black-Belt Family Farm Fruit and Vegetable Market Center, which is still a work in progress, exemplifies many previous years of working together with a wide range of partners that eventually has netted broad support for an effort that brings together best practices, best minds, and big hearts – young and old – in a region that has been most neglected by state and federal resources over many, many years. Human and material capital are accumulating and are doing so in manner that the small and minority farmers will finally have an opportunity to develop together until they can find their collective wings and fly on their own energy, business acumen, and integrity. It is fitting that this effort is being facilitated by a land-grant alliance forged out of a history of struggle and shaped in modern times by learnings and wisdom of local grass-roots leaders coupled with support by such entities as the Kellogg Foundation Food Systems Program, the Farm Foundation's long-term sponsorship of PAWC, and federal formula and state matching funds, which have finally arrived after 120 years. Most important has been the 1890 and grant universities discovering and rediscovering each other and their collective power, especially when forged with alliances of their long-term, community-based organization counterparts at local and regional levels, 1862 land-grant universities with new people and organizations of good will with common goals.

This has been a long road, but this is also just the beginning. We envision safely grown crops and animals in sustainable agricultural ecosystems with efficient irrigation and integrated pest, sustainable and/or organically grown management systems where nutrition, freshness, taste, and value result in ready markets and informed, satisfied customers such that farmers consistently get very good prices for their fresh and added-value, high-quality products. Where appropriate, the collective pooling of farm products grown by small farmers to predetermined high standards makes possible multiple-market options that bring the best possible returns over time. Youth from the community are involved, working alongside their elders and gaining self confidence, a work ethic, and quantitative skills required in today's world – college youth sharing with community youth, artists sharing with farmers, and bankers contributing with joy to the growth of local/regional marketing cooperatives, such that, finally, wealth accumulates for families from previously forsaken, historically poor, rural Black-Belt communities. Black, White, and growing numbers of Hispanic

and other peoples dance in step to the music of profitability and sustainability with all in the community gaining ground. We can see, smell, and feel the future – join our vision!

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Will Extension be Relevant In the 21st Century?

There has been a plethora of articles written and speeches delivered over the past 10 years addressing the relevance of Cooperative Extension and the usefulness of the land-grant university system in the 21st century. Martin (2001), Payne (2007), Payne (2006), Bull *et al.* (2004), McDowell (2001), ECOP (2002) are just a few of these works. Being relevant is largely in the eyes of the beholder – or in the case of Cooperative Extension, it is in the eyes of the publics it serves. Cooperative Extension is and can continue to be very relevant if it holds to the principles that have served it well these past 100 years. As bureaucratic agendas shift, if Cooperative Extension fails to make a significant economic impact for the public good, then Extension’s constituencies will be less supportive, and the extension program will not be viewed as relevant.

Why the Rhetoric on Relevance?

A quick review on the evaluation of the land-grant university system and the role Cooperative Extension plays within this framework will be useful in understanding the reasons for the debate and conclusions drawn in this paper.

The authors recognize that today’s land-grant system was shaped by a number of federal acts, including the 1862 and 1890 *Morrill Acts* and the *Equity in Educational Land-Grant Status Act of 1994* (tribal colleges). However, for discussion purposes, the *Morrill Act of 1862* will be highlighted as the beginning of the land-grant evolution. The first *Morrill Act* established the concept of the land-grant university system based on the underlying premise that American social and economic development could be best served if higher education were made broadly available to the citizenry. The initial focus of land-grant universities, established as a result of the *Morrill Act*, was to make higher education affordable and not just a privilege of the wealthy. Educating students about practical uses of the agricultural and mechanical arts so graduates would stimulate economic wealth also was a major objective.

However, it was quickly realized that for the goal of economic development to be realized, the land-grant system must employ basic and applied research on technologies to disseminate to the graduates so that they would have the tools necessary to succeed in expanding economic activity. Thus in 1887, Congress passed the *Hatch*

¹ Edward Smith is director, Texas Cooperative Extension, The Texas A&M University System; Roland Smith is associate director for agriculture, natural resources, community economic development, Texas Cooperative Extension, The Texas A&M University System.

Act, which added research and discovery for the benefit of the public to the mission of the land-grant university.

Yet, there was still a disconnect between technology development in the university and the adoption of new technology by society. The graduates of the land-grant system were not necessarily diffused throughout the economy, and the expectation of broad-based economic development due to technology adoption was not fulfilled.

To help address this *adoption gap*, Seaman Knapp was hired by the U.S. Department of Agriculture as a Special Agent for Promotion of Agriculture in the South. Knapp firmly believed that for farmers to adopt new research-based technology and practices, they had to see the practices work on land near their own operation in a whole-farm system versus very controlled research generated in a research institution. In 1903, a large scale demonstration on 70 acres on the Walter C. Porter farm in Terrell, Texas, was implemented by Dr. Knapp. The demonstration of cultural and pest control practices was so successful that there were more demands on Dr. Knapp for similar demonstrations throughout the region.

It was Dr. Knapp's vision that research dissemination could be accomplished through farm demonstrations across the region if the people being targeted could trust the research and see that it added economic value in large scale commercial applications. A delivery network was needed to listen to the people's needs and bring research solutions to address the needs. It was believed that to be effective in developing such a network, funded individuals, known and trusted by the citizens, should be identified to work in local communities and trusted to address the issues.

In 1906, in Smith County, Texas, the first county agent was hired as a partnership between the federal government and the local community. This model also was very successful and led to the evolution of Cooperative Extension as the third leg of the land-grant system – academic teaching, research, extension education. This work culminated in 1914 with passage by Congress of the *Smith-Lever Act*, which directed land-grant universities to take the university to all citizens through the Cooperative Extension Service. The concept was unique in that it was funded initially through a two-way partnership and eventually became a three-way partnership that included federal, state, and county governments to address the issues of society at that time. In 2006, the 100-year anniversary of the first county extension agent in the U.S. funded by a combination of federal and local dollars was celebrated in Smith County, Texas.

So, what has changed since 1862, 1887, 1906, and 1914? What has not changed! The U.S. Census of 1910 showed that more than 33 percent of the American work force indicated their occupation was farming, fishing, or forestry. The last U.S. census data available (2000), on the other hand, showed that less than one percent of the workforce indicated they were involved in the occupation of farming. In actual numbers, 2.95 million farm workers were identified during the 2000 Census – down

from 13.56 million in 1910; at the same time, the U.S. population was growing from 92 million to 281 million! So governments at all levels – federal, state, and county – have been scrutinizing the funding for Extension, given the perceived downsizing of the agricultural industry since the early 1900s. Because the early history of Cooperative Extension was tied to the needs of a citizenry in rural America, there is a perception that Cooperative Extension should be limited to that audience in the future – thus minimizing its purpose.

In reality, the benefits from Cooperative Extension serve a broad range of socioeconomic audiences – in both rural and urban settings. Also, it is not readily understood by many that agricultural production is only a small portion of the total economic activity associated with getting food and fiber from the farm to the consumer. In Texas, for example, it is estimated the food and fiber system accounts for about 9.5 percent of gross state product – in excess of \$85 billion in 2004. In Texas, approximately one in seven jobs is linked to the total food and fiber system. USDA's Economic Research Service (Edmondson, 2004) estimated that the food and fiber system (FFS) contribution to the national GDP was 12.3 percent in 2001 (\$1.24 trillion). The FFS also accounted for 16.7 percent of U.S. employment during 2001 according to the Economic Research Service (ERS). Unfortunately, due to major changes in data series collected and reported by federal agencies, a figure comparable to the 2001 FFS contribution to national GDP will not be available for future years (Sundell, 2006).

Model for Relevance

Cooperative Extension exists today to serve the people wherever they live, and to serve them in ways that extension expertise, experience, resources, and capacity can best benefit them. In order to best benefit them and enhance the public good, Cooperative Extension must work on issues that are locally identified as important and contemporary to an ever-growing, diverse population. No matter where in the world that Extension exists, its success in improving people's lives depends upon following the simple principle of bringing science to solve the people's own identified problems. Recently funded projects in the Middle East that target revitalization of extension education in Iraq and Afghanistan must be based on this principle if they are to be successful.

It is essential to involve local people – both in program development and program delivery. Local residents must be involved in deciding what Cooperative Extension can do to improve their economic well-being or the economic well-being of their region. They must also be involved in planning and implementing programs to address their identified issues and needs. For Cooperative Extension to be relevant in the 21st century, extension administrations and land-grant universities must not deviate from the principles of obtaining stakeholder input to identify relevant issues, establish priorities, frame the appropriate response actions, and interpret the

results back to the impacted audience in a language they can understand – not just *extensionese*. It is not by accident that the graphic in Figure 1 starts and ends with extension clientele. A quick overview of the Texas Cooperative Extension program development and delivery model is as follows:

Needs assessment should involve a structured approach to determine what is relevant to stakeholders and local citizens. Approaches to needs assessment could include meeting regularly with special interest groups, county, and other local committees, and working with elected officials at local, state, and federal levels. All these groups should reflect the perceived needs of the various publics they represent, not just personal concerns. The local, resident extension educator is a key component to this process. Target audiences are diverse; therefore, programmatic responses must be diverse. The local extension educator is in the best position, by working with local stakeholders and volunteers, to interpret the needs of constituent groups to extension specialists and researchers in the land-grant system. The local extension educator also is essential to effective communication among the components providing the land-grant university response.

Knowledge and technology are growing at exponential rates. Clientele problems are becoming more costly and timeliness more critical on this information fast track. Therefore, teams of extension specialists and research faculty are absolutely essential to providing the appropriate response to the identified needs of target audiences. While disciplinary focus is important to expand the science in key areas, the ability

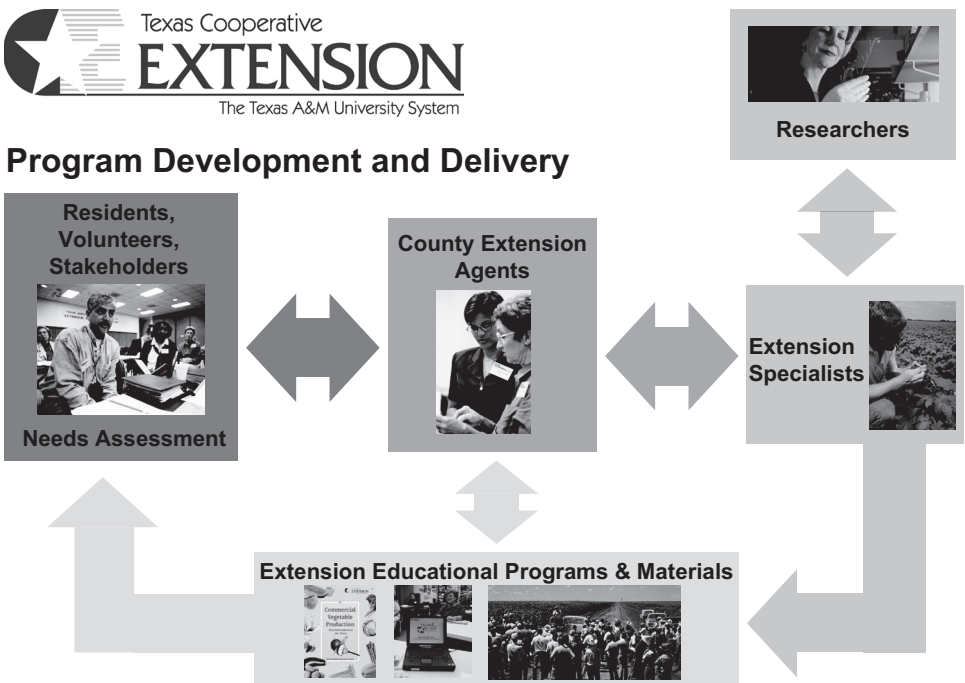


Figure 1. Extension Program Development and Delivery Model.

to integrate technology into a systems or multi-disciplinary framework is what is needed to meet clientele needs and remain relevant.

Based on identified issues and priorities, key educational resources, programs, or curricula are developed to address those specific needs. Educational programs may be delivered in a variety of ways, depending upon the topics and target audience needs. In fact, the term, relevance, is not limited to whether the subject matter in extension programs meets a special need; relevance also could be impacted by how and when a customer wants to receive that information.

We would argue that for Cooperative Extension to remain relevant to its many constituent groups over the next century there must be renewed buy-in to this total program development and delivery model by important decision-makers of the land-grant university system and those who fund them. The model is doomed to failure if any one function is eliminated or compromised. Too often, university administrators, agency heads, or internal stakeholder groups view one function of the model as more or less important than the others – leading to stress on the entire framework and the risk of functions becoming irrelevant in the future.

Extending Our Relevance

A final comment on the relevancy of Cooperative Extension deals with telling our story in terms of the economic impacts on people's lives and the added public value. The story must be told in ways that are easily understood by stakeholder groups – including elected officials. We can follow the program development and delivery model perfectly and generate excellent programs that are valued by our program participants. However, unless we can communicate the results in the economic terms of jobs and dollars, then our story is not likely to be heard. While being true to the development and delivery model in Figure 1 is a necessary condition for a successful extension program, it is no longer sufficient to assuring resources so Extension can remain relevant in the future. Fiscal pressures on governments make very important the need to demonstrate our public value beyond the direct impacts to our clientele. (Kalambokidis, 2007). While direct beneficiaries of our programs have always been a source of political support for Extension, demonstrating our public value to nonprogram participants is essential in today's political environment. Debord (2005) states, "Elected officials ... want to know what programs cost and compare this to how they are beneficial to the economy..."

The message of public value must be clearly delivered. In Texas, we conduct economic impact studies on some of our major extension programs. The list of studies can be found at <http://agecoext.tamu.edu/econimpact/>. By reviewing the more

in-depth reports, readers can see how we attempt to translate aggregate program impacts into dollars and jobs, which is understood by our publics.

Conclusion

Rasmussen (1989) stated that, "The mission of the Cooperative Extension Service is to help people improve their lives through an education process which uses scientific knowledge focused on issues and needs." The relevancy of Cooperative Extension then is based on the simple principles of bringing the best science to meet the prioritized needs of the customer in the areas where Cooperative Extension has a competitive advantage. Those areas are agriculture and natural resources, health and human sciences, youth and leadership development, and community economic development.

As stated earlier in this discussion, many individuals are concerned and focused on whether Cooperative Extension is or can remain relevant so that it can secure resources and continue its mission into the future. This discussion is important because it provides opportunities to re-visit the vision and passion held by those who have gone before us in making our system the envy of the world.

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U.S. Agricultural Research and Technology Policy for the 21st Century

During the 20th century, and especially during the past 50 years, U.S. agriculture has undergone a remarkable transformation. Farms are much larger and many fewer than they were 100 years ago; they are also more specialized, more capital intensive, and technologically more sophisticated. Changes on farms have been accompanied by changes off farms, both in the agribusiness and food marketing chain and in rural regions that depend on farming. The main driver of these changes has been technological innovations, both on and off farms. These innovations have released labor for other uses, saved land and other resources, enhanced product quality and value to consumers, and resulted in much more abundant supplies of cheaper and safer food and fiber (Alston and Pardey, 2006). Inevitably, new technologies have also sometimes had unfortunate consequences, but the overall net result of agricultural innovations is a much more productive, prosperous, resilient, and globally competitive food and fiber sector than would have been possible otherwise. Consequently, either directly or indirectly, innovation in agriculture is at the center of most agricultural policy issues.

It is not always widely or well appreciated that technological innovation has been an essential force, playing a central role in the economic development, growth, and prosperity of U.S. agriculture. Even those who appreciate the importance and role of innovation in developing, advancing, and sustaining agriculture do not necessarily understand the innovation process. Many seem to take for granted a sustained continuation of past patterns of innovation-based growth and prosperity regardless of government policy that relates to agricultural science, technology, and innovation. In particular, complacency about these matters has been implicit in recent discussions of agricultural policy in the United States.

Past Productivity Patterns

Measures of inputs, outputs, and agricultural productivity provide tangible evidence of technological innovation and its importance. In recent work we developed state-specific measures of the prices and quantities of 74 categories of outputs and 58 categories of inputs, for the 48 contiguous U.S. states over the years 1949 through 2002. (Details on the data and indexing procedures can be found in Andersen, Al-

¹ Alston is a professor in the Department of Agricultural and Resource Economics, University of California, Davis. Pardey is a professor in the Department of Applied Economics at the University of Minnesota. The authors thank Connie Chan-Kang and Steve Dehmer for their assistance and the Minnesota Agricultural Experiment Station and the California Agricultural Experiment Station for funding support.

Table 1. Inputs, Outputs, and Productivity in U.S. Agriculture, 1949-2002.

	Year		Full Period	Sub-Period					
	1949	2002	1950-02	1950-59	1960-69	1970-79	1980-89	1950-89	1990-02
	<i>index</i>		<i>average annual growth rate, percent per year</i>						
Input (X)	100	95	-0.10	-0.07	-0.23	0.20	-1.00	-0.00	0.00
Output (Q)	100	245	1.69	1.98	1.44	2.71	0.81	1.73	1.55
MFP (Q/X)	100	258	1.79	2.05	1.67	2.51	1.81	2.01	1.12

Source: Compiled by the authors with data from Anderson, Alston, and Pardey (2006); (available at <http://www.instepp.umn.edu/>).

ston, and Pardey 2006, and on the website of the International Science and Technology Practice and Policy Center, InSTePP at the University of Minnesota.) Using these measures we constructed state, regional, and national indexes of prices and quantities of aggregate input and output, and multifactor productivity (MFP) in U.S. agriculture for the period 1949-2002 (Table 1). These data reveal some interesting patterns of change.

In 1949, agriculture accounted for 8.3 percent of U.S. national gross domestic product (GDP). Since then the agricultural sector has shrunk in relative terms to 1.8 percent of GDP in 2002, while continuing to grow in absolute terms. In 2002, the quantity of output produced in U.S. agriculture was more than double the 1949 quantity. The output mix changed, too, with a slight increase in the share of crops versus livestock and a significant increase in the share of specialty crops within crops; and output tended to become more spatially concentrated. During the same period, aggregate input quantities declined slightly causing the index of MFP to grow faster than output. This slight decline in total inputs reflected a very significant reduction in use of labor and, to a lesser extent, land; and increases in the use of capital and, more importantly, purchased inputs such as fuel and fertilizer. One consequence of this particular pattern of agricultural productivity growth is that considerable labor has been released from agriculture to be productively employed elsewhere in the U.S. economy.

In annual rate-of-change terms, aggregate output increased by 1.69 percent per annum over the 1949-2002 period; aggregate inputs used in agriculture declined by 0.10 percent per annum, and so measured MFP grew by 1.79 percent per annum. Higher-than-average rates of output growth in some regions, were associated with correspondingly higher-than-average growth rates of input use (e.g., the Pacific states), productivity (the Southeast and Delta states), or both. The Delta, Southeast, and Northern Plains regions recorded the highest regional productivity growth rates; the Northeast, Southern Plains, and Mountain regions, the lowest. However, each region experienced solid productivity growth on average during this period – av-

verage annual productivity growth ranged between 1.32 percent and 2.64 percent among regions.

Our estimates indicate an almost across-the-board decrease in productivity growth in the period 1990-2002, compared with earlier periods. In terms of annual averages, only four states out of 48 experienced a higher rate of productivity growth in the period 1990-2002 as compared with the period 1949-1989. By decade, from the 1950s through the 1980s, the national annual rate of productivity growth ranged from 1.67 percent to 2.2 percent and averaged 2.01 percent per year over the 40 years 1950-1989. But from 1990 to 2002 (the last year for which data are currently available), the agricultural productivity growth rate averaged 1.12 percent per annum.

This measured slowdown in productivity growth is statistically significant and appreciable. The difference in percentages may appear small, but the effects are cumulative and compounding. A one percent compounding growth in productivity would result in productivity being 22 percent higher after 20 years; a two percent compounding growth in productivity would result in productivity being 49 percent higher after 20 years. Applied to an industry with an economic value of \$300 billion per year, the difference between one percent and two percent growth in productivity compounding over time represents tens of billions of dollars per year even after only a decade or two. At issue is the extent to which the recent productivity slowdown is a temporary effect of a run of bad weather – weather effects accounted for at least some of the lower productivity rates in the 1990s – versus a more enduring consequence of other factors, including a slower rate of innovation.

Sources of Productivity Growth

One of the great challenges in empirical economics is to obtain useful and meaningful measures of productivity growth and attribute it among the multiple contributing sources. The attribution and interpretation are tied up with the methods of measurement. For instance, our input quantity measures have included adjustments for the effects of changes in quality of land associated with irrigation, changes in quality of farm labor associated with age and education status of farm operators, and changes in the composition and quality of capital. Thus, our measures of productivity growth are net of changes in input quality of these types and must be attributable to other factors.

The other factors that affect measured productivity include weather, pests, and diseases, soil fertility, and other environmental factors; knowledge, information, managerial ability, and know-how of the farm operator; the scale and location of production and the product mix; and other unmeasured aspects of the technology of production, some of which are embodied in inputs such as seeds, agricultural chemicals, and machinery. Some of these factors are transient. Long-term and sustained growth in productivity is generally attributed primarily to various forms of

technological change resulting from innovations adopted by farmers, but the potential sources of these innovations are many. Some innovations are the result of tinkering by farmers and trial and error on farms, but more often and especially more recently a greater share of agricultural innovation can be traced to more-organized scientific and industrial research and development efforts conducted and funded by both government and the private sector. Even within this category of public- and private-sector agricultural R&D, attribution problems abound given the roles of various state and national governments around the world, and multinational research activities.

Agricultural technologies do not respect geopolitical boundaries. For instance, wheat varieties developed by a private firm, university, or government research agency in California or Minnesota may well be adopted – usually after some adaptive research and development – in Australia, Argentina, Brazil, Canada, China, and Mexico. International spillover benefits of these types complicate an already-difficult attribution problem of deciding which research, conducted by whom, and when was responsible for a particular technological innovation or, even more problematically, a particular gain in agricultural productivity.

Much work has been done attempting to solve this attribution problem, but it is a very difficult problem for both conceptual and empirical reasons, and many aspects remain uncertain (Alston and Pardey, 2001). In the absence of compelling direct empirical evidence, how might we address this uncertainty and form a view about the role of public, agricultural R&D in contributing to productivity growth (i.e., as opposed to the other main contributors – the innovative activities of individual farmers and other private innovative activity including organized R&D in the private sector)? Drawing on past and on-going efforts to decompose the sources of growth in U.S. agricultural productivity, at least half of the productivity growth should be attributable to organized R&D, and at least half of that half to public-sector agricultural R&D. Based on these rough assumptions, then, at least one-quarter of MFP growth in agriculture is attributable to public, agricultural R&D.

The Value of Productivity Growth

What is growth in agricultural productivity worth? Between 1949 and 2002, the national aggregate index of input quantities declined from 100 to 95, but the national aggregate index of the quantity of output grew from 100 to 245, and consequently MFP grew at a compound annual rate of 1.79 percent from 100 to 258 (Table 1). If MFP had not grown after 1949, the quantity of output would have moved in line with the quantity of input, and the output index in 2002 would have been 95 instead of 245, less than 40 percent of the actual amount. Alternatively, to produce the actual quantity produced in 2002 but using 1949 technology would have required an additional 2.58 (i.e., $245/95$) times the actual quantity of inputs used. In terms of either additional output for the given amount of inputs actually used in 2002, or

inputs saved in producing the actual amount of output produced in 2002, productivity growth since 1949 generated benefits worth more than 60 percent of the 2002 output.

Applying this 60 percent factor to the value of U.S. agricultural production in recent years, about \$300 billion per year, productivity growth since 1949 saved resources worth more than \$180 billion per year that would have been required otherwise to produce that output. Even if only half of that total benefit from improved productivity is attributable to organized research, \$90 billion per year (in recent years) is more than ten times the total annual U.S. public and private agricultural research spending (excluding extension), in the range of \$8 billion per year (in recent years). But this comparison is misleading because it ignores the lag relationships in the research-development-adoption-disadoption process that spans decades – today’s research investment will not affect technology or productivity at all for quite a few years, but eventually it can be expected to have a large effect, and the effect will continue for many years. The delay makes the benefits less valuable in present value terms; but offsetting that, the enduring nature of the impacts of a particular innovation over multiple years makes the total benefits greater than just one year’s worth.

In fact, formal benefit-cost analysis of the private and social payoffs to agricultural research would support benefit-cost ratios of well more than 10:1, more typically in the range of 20:1 or more. These estimates mean that a dollar of research spending today will generate a stream of future benefits, through productivity gains, that is equivalent in value to an immediate dividend today of twenty dollars or more. Very few public or private investments can be expected to return dividends on this scale.

Based on measures and reasoning of this type, as well as specific studies of particular research programs and particular innovations, and other types of econometric investigations, a great quantity of largely consistent and collectively compelling evidence has now accumulated on the returns to agricultural R&D (Alston *et al.*, 2000). This evidence shows three important things: first, agricultural R&D pays off very handsomely for society; second, there is no evidence that the social returns from more recent R&D investments are lower than from research done decades ago; and third, in spite of significant government action to encourage private investment and direct government involvement in funding and conducting agricultural R&D, the United States as a whole has continued to substantially under-invest in agricultural research.

U.S. Agricultural Research Policy

The unfettered workings of the free-market mechanism do not provide enough of certain types of scientific research, including agricultural research. The fundamental problem is a failure of incentives because private investors cannot fully appropriate the returns to investment in certain types of research. Hence, government

intervention is called for. One form of government intervention is to provide legal institutions, such as plant breeders' rights, patents, and other property rights that make returns to invention more appropriable, and to provide other more-direct incentives such as tax breaks or subsidies to encourage private investment in research (Wright *et al.*, 2007). In the United States, these institutions have been effective and improving, especially for certain types of research such as agricultural machinery, chemical fertilizers and pesticides, and certain types of plant varieties. As a consequence, in recent years, the private sector in the United States has been spending in the range of \$5-6 billion per year on agricultural R&D. The provision of enhanced incentives has been an important role for government. However, in most countries, including the United States, a more visible and probably more important government intervention to correct private-sector underinvestment in research has been to conduct research in public institutions funded by general government revenues. In recent years the public sector in the United States has been investing around \$4.3 billion per year on agricultural research and an additional \$1.8 billion per year on agricultural extension.

In the United States, publicly performed agricultural research and extension is funded using a mixture of funds from a number of federal and state government agencies and the private sector, through a variety of mechanisms. Federal intramural research is conducted by the Agricultural Research Service (ARS) and Economic Research Service (ERS). The federal government also helps fund agricultural research at State Agricultural Experiment Stations (SAESs) through a combination of formula funds, competitive grant funds, special grants, and cooperative agreements. Earmarked funding has risen as a share of total public funding in recent decades. In turn, SAES research is supported through a combination of funds from state government, the private sector, and self-generated funds (including royalty payments) in conjunction with various federal funding sources. Similarly, agricultural extension is provided by state or local governments using a combination of federal, state, local, and private funding sources.

Agricultural research and extension spending grew rapidly during most of the 20th century, and especially during the 1960s and 1970s. More recently the growth has continued but at a generally slower rate, including the private research and more so for extension. In the 1980s total spending on public agricultural R&D (including extension) stalled, and it grew in real terms by only 0.12 percent per year during the 1990s. During the past few years growth in public agricultural research (but not extension) has picked up somewhat. On the other hand, we are now seeing early warning signs that the growth in private agricultural research has slowed.

In summary, over the past 10-20 years, spending on agricultural research and extension grew in real terms across the board, but the rates of growth differ across states, between state and federal sources, between research versus extension, and between public and private research. In total, private agricultural research spending has grown faster than public agricultural research spending; research spending has

been growing faster than extension spending; and SAES spending has been growing relative to USDA intramural spending. These changes in funding and execution of research and extension must have some implications for the nature of research being undertaken and its impacts, but these effects are difficult to disentangle, especially because the changes in trends have occurred relatively recently and their full effects will not be realized for some time.

In addition to these broad changes in funding patterns, the balance among the types of research being undertaken has shifted, at least in the public sector, with a drift away from research emphasizing on-farm productivity enhancement towards research emphasizing other subjects such as post-farm processing, food safety and quality, human health and nutrition, and natural resources and the environment. Many of these subjects have important implications for farmers and agricultural production, even when their immediate focus is far from farming, and many could be expected to have social payoffs comparable to those from farm productivity-enhancing research. At the same time, however, a drift of the research emphasis away from farm productivity enhancement can be expected to result eventually in slower rates of farm productivity growth and a commensurate decline in competitiveness of U.S. agriculture on the world market.

The trends away from research directed towards on-farm productivity seem likely to continue. One indicator is the emphasis of various proposals that were submitted for revisions to the Research Title of the 2007 farm bill. A number of proposals supported enhancement of funding for research emphasizing environmental issues, biofuels, and specialty crops (Alston and Pardey, 2007). These new priority areas could entail research that results in enhanced farm productivity, but the rationales for the proposed new priorities were not expressed in terms of the net benefits from productivity enhancement. Rather, they referred to concerns about global warming, energy self-sufficiency, and obesity. It seems unlikely, then, that priorities for projects within those priority areas will emphasize farm productivity improvement; any such effects are more likely to be incidental than intended. Further, even though the proposals generally called for enhanced total funding, a more likely scenario is one in which any increase in funding for research in areas of new or increased emphasis – such as environmental issues, biofuels, and specialty crops – will come at least in part at the expense of the more-traditional research agenda related to on-farm productivity enhancement.

Long-Term Implications of Changing Research Priorities

The accumulated evidence from studies by agricultural economists consistently and convincingly shows that the United States has persistently underinvested in research directed towards enhancing farm productivity. The evidence clearly shows that the benefits to the nation from such investments have been consistently many times greater than the costs. The same may be true of other types of agricultural

research (and indeed on other types of scientific, industrial, and medical research) but much less evidence is available on the returns to research in these other areas; in many cases the benefits are much more difficult to demonstrate. In the light of the evidence that is available, it is difficult to justify a reduction in total research funding or, in particular, a reduction of funding for research related to farm productivity enhancement.

Unfortunately, however, the consequences of shifts of research support may not be immediately obvious: successful agricultural research takes a long time to affect productivity, but then it affects the path of productivity for a long time. In many cases it may take 20 years before we begin to feel the effects of a change in research spending implemented today. Policymakers may not entirely appreciate these implications, or they may be operating in a political context with a much shorter planning horizon in which consequences far in the future are heavily discounted. Whether for these reasons or others, research support has drifted away from (rather than added to) the traditional agenda, and recent discussions in the context of the 2007 farm bill indicate that a continuation of that drift can be expected. Similar trends are underway in many other OECD countries but not in all. At the same time, several developing countries are ramping up their agricultural research spending – especially China, India, and, to a lesser extent, Brazil – and producers in these countries are already significant competitors with American farmers.

In the longer term – of several decades – a reduction in the rate of U.S. spending on productivity-enhancing agricultural R&D will imply a slowdown in the rate of growth of U.S. agricultural productivity, and an erosion of U.S. competitiveness on world markets. These consequences may take decades to become apparent, but they will also take decades to reverse. The slowdown in U.S. agricultural productivity growth in the 1990s might offer some early warning signs of consequences of the changes in agricultural R&D spending patterns in the 1980s and 1990s, but it is difficult to discern such effects given the myriad influences involved and the time lags. A further and more subtle concern is the fact that the world's poorest people in other countries have depended on spillovers of agricultural research results and technology from the United States. To the extent that U.S. agricultural R&D is no longer about farm productivity enhancement, or is more proprietary in nature or more specific to U.S. circumstances than it was in the past, the potential for such spillovers in the future will be diminished.

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Agricultural Research and Extension Policy in Retrospect: Implications for the Future

The agricultural economics literature is virtually unanimous in its findings that public investments in agricultural research have yielded high social rates of return, typically in excess of 20 percent per year, over recent decades. (Griliches, Huffman, and Evenson; 1993) In addition to these investments, the rapid pace of technological change in U.S. agriculture can be attributed to a combination of factors including, for example, the profit incentives offered by the private enterprise system, policy changes allowing agribusiness to capture a larger share of the benefits of research discoveries, and a state-federal partnership in supporting land-grant university research, teaching, and extension programs. The result has been a rapid uptake of technology resulting in persistently enhanced productivity.

Despite this record of successes, further adjustments in public policy to more closely resemble U.S. science policy are proposed, resulting in substantial change in some of the institutions that have contributed to agricultural productivity. This paper is a condensation of the contributions to an AAEA organized symposium in July 2006. It briefly recounts the history of U.S. agricultural research and education, discusses the current and evolving issues, and suggests options for policy adjustment.

Historical Foundations of U.S. Research and Extension Policy

USDA research, development, and extension (RDE) activities are currently conducted primarily in four agencies of the Department: Agricultural Research Service (ARS); Cooperative State Research, Education, and Extension Service (CSREES); Economic Research Service (ERS); and the National Agricultural Statistics Service (NASS). ARS, ERS, and NASS are primarily in-house agencies serving the research missions of the USDA, including its action agencies. CSREES acts primarily as a conduit for research and extension funding to eligible private and state institutions by means of formula, competitive, and special grants. CSREES funds constitute the major part of RDE funds provided by USDA to the land-grant universities although

¹ This paper is a synopsis of a symposium organized by the Senior Section of the American Agricultural Economics Association in Long Beach, CA on Jul 25, 2006. The symposium was composed as a tribute to Wayne Rasmusen, USDA historian (1940-1986) by Anne Efland, ERS; a base paper by Farrell (ERS Administrator, 1977-1981); and discussion by Lee (ERS Administrator, 1981-1993); and Acker (Kansas State University President, 1975-1986); with Knutson (professor emeritus, Texas A&M University) as organizer and moderator, including interaction with audience professionals. The full text of the base paper and discussion comments are available on the AFPC website at <http://www.afpc.tamu.edu>.

other agencies such as ERS and ARS and action agencies such as FAS and APHIS transfer limited project funds through cooperative agreements with eligible institutions. NASS maintains some 45-field offices in state departments of agriculture or at land-grant universities where much of its statistical data gathering and dissemination functions is performed.

The USDA FY 2006 budget for RDE totaled nearly \$3.0 billion; \$1.3 billion for ARS, \$1.2 billion for CSREES (\$700 million research, \$451million extension), \$75 million for ERS, and \$380 million for research and development in other agencies, primarily the Forest Service, and including \$200.0 million for NASS. Public support for research and extension is more than matched by state cooperative research, extension, and statistics services.

Based on research by Baker *et al.*; Geweke *et al.*; Rasmussen, 1962, 1982, 1989; and Smith and Roth, Farrell segmented the development of USDA's RDE policies into four broad eras, which are summarized as follows:

System Creation (1862-1914)

During this formative period, rapid expansion in domestic and export demand created the need to raise production efficiency, enhance the capacity of the large number of small farmers, and improve the income and well-being of rural, agriculturally dominated communities. As a result, a series of federal and state research and extension institutions and activities was created; the imprint of which remains to the present. Included were:

- 1862, USDA established.
- 1862, *Morrill Act* established land-grant colleges.
- 1887, *Hatch Act* funded state agricultural experiment stations to conduct research, often attached to land-grant colleges.
- 1890, *Second Morrill Act* established historically Black land-grant colleges.
- 1905, Office of Farm Management, an ERS antecedent, established.
- 1914, *Smith-Lever Act* established the agriculture extension system as a cooperative federal, state, and county system to disseminate research results.

System Takeoff (1914-1950)

The inter-war period was marked by substantial growth of research and extension programs at both the state and federal levels. Total public funding for research from state and federal sources increased from an annual average of \$9 million during 1910-19 to \$46 million in 1930-39 and nearly \$70 million in nominal terms by the end of World War II with USDA in-house research accounting for nearly 60 percent of the total.

Mechanization, development of improved plant varieties, and an array of manufactured production inputs emanating from RDE investments substantially boosted agricultural output and productivity. Milestones during this era included:

- In 1922, USDA established the Bureau of Agricultural Economics (BAE), the direct forerunner of ERS, to provide economic information and analyses to better understand price and income problems and help farmers make informed production decisions.
- In the 1930s, Congress enacted New Deal price and income support, soil conservation, crop insurance, food assistance, and rural rehabilitation programs.
- In 1938, BAE was assigned the role of central planning for department policy and analysis of policy impacts.
- Also in 1938, the Regional USDA (ARS) research labs were created.

These actions, combined with those of the previous era and the related public investments, set the course of USDA programs and agricultural research and extension for many years to come. "Getting two blades of grass to grow where one had grown before" became the slogan of national agricultural research and extension policy. In that respect, the USDA RDE policies were eminently successful by virtually any criterion of evaluation.

Golden Era (1950-90)

In the golden era of USDA cooperative research, programs multiplied in number and breadth; staffing grew exponentially; and funds flowed freely at both the state and federal levels. In 1950-59, total public sector funding for research averaged nearly \$136 million annually; by 1960-69 it had more than doubled to \$310 million annually; during 1980-89 the annual average had multiplied to \$1.7 billion in nominal terms. Although USDA in-house research nearly quintupled during this era to \$500 million, its share of total public investment had declined to about 30 percent, reflecting even more rapid expansion in state funding. USDA funding of extension also grew rapidly in this era to nearly \$370 million in 1990 – a nearly three-fold growth from 1970 in nominal terms. Milestones in this period included:

- 1953, USDA research was consolidated into the newly created Agricultural Research Service. The BAE was dissolved following controversy over its role in USDA policy-making. (Wells *et al.*)
- 1961, ERS and NASS were created as independent agencies in USDA. The ERS research mission has since been expanded to include economic development, river basin and watershed programs, and natural resource policy.
- 1965, the *Special Research Grants Act* authorized USDA to make grants to research institutions outside the land-grant system.

- 1970, the *Plant Variety Protection Act* awarded plant breeders intellectual property rights for new crop varieties produced from seeds, particularly field crops; later this extended to vegetables and tubers; and utility patents were authorized for plants and animals in 1985 and 1987 respectively. These policies stimulated both public and private research investments.
- 1972, the *Federal Rural Development Act* authorized USDA funding for research and extension in rural development at land-grant agricultural colleges.
- 1977, Title 14 of the *Food and Agriculture Act of 1977* authorized a competitive research grant program in USDA; provided for sustained federal funding for 1890s; authorized funding for colleges of veterinary medicine.
- In 1977, ERS, SRS, and Farmer Cooperative Service were merged, and in 1981 they were each restored to agency status; the ERS field staff at land-grant universities was eliminated in 1983; and the Science and Education Administration was created to enhance coordination of research, teaching, and extension within USDA and with the states.
- In 1980, the *Bayh-Dole Act* stimulated private research investments and public-private research partnerships by granting all institutions “certainty of title” for inventions resulting from federally funded research whether conducted at universities or in government labs. Private sector research in chemicals, plant breeding, machinery, pharmaceuticals, and food processing expanded rapidly; public-private partnerships expanded.
- The 1981 farm bill established the National Research Initiative (NRI) competitive grants program as an independent program in USDA and conferred land-grant status to 29 Native American Colleges with authorization of annual appropriations for extension and teaching.

These actions and the related RDE investments resulted in a huge flow of science-based information and technology with the effect of transforming the structure, organization, and productivity of the farm sector. During this period, an elaborate system of linkages between the USDA and the states was developed, including joint USDA-state program planning, coordination, reporting, and accountability mechanisms. As this transition proceeded, federal funding to the states from non-USDA sources such as NIH, NSF, and the Department of Energy and EPA steadily assumed greater significance. In response to changing state and federal priorities, research and education programs shifted gradually but cumulatively from the near singular focus on the productivity of the farm sector to include marketing, food safety, quality, and nutrition, natural resource use and conservation, environmental quality, and rural development.

Turning Point: 1990s-Present

By 1990, growth in total public funding of the system began to slow while NRI support doubled to \$181 million; private sector investments accelerated over \$4

billion in response to changes in policy that allowed private firms to capture greater returns on their research and development investments. Ballooning federal deficits combined with rising research costs, particularly in biological science in areas such as biotechnology, resulted in a decline in formula funding. That pressure led to substantial downsizing of staff and programs in the early 1990s and again at the turn of the century. CSREES formula funding (*Hatch Act*) for the state experiment stations declined 24 percent, and that for extension (*Smith-Lever Act*) dropped nearly 46 percent in real terms between 1997 and 2005.

One of the important driving forces in altering the research agenda in this era was the basic scientific advancement in the biological sciences. Coupled with advances in information technology that greatly expanded the data management and analytical capabilities of researchers, new vistas of genetic engineering and biotechnology research and development related to plants and animal genetics came into prominence. Colleges of agriculture revised their curricula, reorganized departments, recruited a new breed of scientists trained in cellular and molecular biology, and aggressively sought financial support beyond USDA. Similar types of realignment of research priorities occurred in USDA to exploit the potential of the new technologies in the plant and animal sciences, in biomedical fields, in human nutrition, and in environmental sciences. As these developments occurred, the costs of research were ratcheted up sharply.

In response to these underlying currents, the USDA reorganized its RDE activities in the mid-1990s to achieve closer coordination between research and extension by merging the Cooperative State Research Service and the Extension Service to create CSREES. A set of competitive grant programs described as Integrated Activities (Section 406) was created to further encourage joint research/extension programming. Greater emphasis was placed on regional and multi-state research/extension in response to allegations of duplication of effort among states and USDA and to enhance coordination across state lines. Finally, in an effort to enhance coordination among all major RDE agencies, USDA reorganized reporting lines among the RDE agencies, creating an Undersecretary for Research and Education to whom ERS, ARS, NASS, as well as CSREES each reports administratively. The net effects of that reorganization are debatable.

The wisdom of administrative placement of ERS and NASS in the sphere of the Undersecretary for Research and Education rather than under the USDA's Chief Economist (Assistant Secretary for Economics) has been debatable. Some contend that the integrity and independence of ERS and NASS are enhanced by placing them offline relative to the immediate Office of the Secretary (aka Chief Economist) and its policy/political functions. Others contend that the reorganization in the long run weakens the position of the Chief Economist and ERS in the USDA and in the eyes of the Congress by creating a policy disconnect and by ERS' appearance as an independent research agency rather than as USDA's economics service agency. Some argue that, the ERS role in policy analysis has decreased as the Office of the Chief

Economist has assumed a greater role in outlook, policy analysis, and energy. However, insiders report that the Office of Chief Economist has full access to ERS and that ERS' involvement in policy analysis is as heavy as ever. ERS employment has fallen 28 percent. Salaries now absorb nearly two-thirds of the annual ERS budget; extramural support, primarily to the land-grant colleges of agriculture, constitutes about nine percent of the ERS budget.

During this era, extension and the smaller to mid-size land-grant universities took the greatest hit. Extension downsized its faculty and staff dramatically in most states as the number of commercial farms declined and sought to obtain advisory services from the private sector or directly from scientists often located in the larger universities (Acker). The notion of each county staff having its own agents and staff has gradually evolved in favor of a multi-county structure. These changing policies and priorities lead some to question whether land-grant universities and USDA are abandoning their traditional missions of serving production agriculture. These more parochial interests are often not supportive of sending their money outside the state in support of multi-state and regional programs even if it means greater efficiency and progressiveness (Lee). Others contended that continued use of public funds directed to support well-capitalized, increasingly concentrated commercial agriculture could no longer be justified as a public good. Still others contend that integrated activities programming links the farmers who produce most of the production closer to research, making for more efficient and responsive programming to the long-term advantage of both research and technology transfer. In any event, the time has come for a major reassessment of state-by-state duplication of RDE programs.

Policy Issues and Proposals for Change

Many of the current RDE institutions have their origins in the late 19th and early 20th centuries in times when the nature of agriculture and society was vastly different from the early 21st century. Institutional obsolescence and associated rigidities play a role in constraining adjustments to change. Extension, for example, continues to be organized on a county basis although fewer and fewer of today's issues can be addressed adequately on that basis.² The social and economic interdependence of agriculture with other sectors and communities, coupled with information technology developments (IT) and the collective capacities of the private sector, raise basic questions regarding the organization, methodologies, and program focus of extension. Similar issues exist for research at the state level. That is, the increased complexity and interrelated nature of research areas raises questions of whether small and mid-size universities can any longer be expected to be competitive and efficient

² The inefficient and obsolete nature of county governments is not only limited to the county extension offices but also extends to most county level functions such as the delivery of fire and police protection, human services, and infrastructure development and maintenance. This reality has been grudgingly accepted by the U.S. Congress in allowing individual USDA agencies to move forward on the justified consolidation of its farm program-related county agency offices across agencies and across counties.

outside of the teaching function. It may be that there is excess capacity and excessive duplication among the experiment stations and extension services nationally.

Lee indicated that there have been adaptations to change, but the food and agriculture complex is changing much more rapidly than is the RDE system, with the result being great institutional stress and strain. But that stress can be turned by bold and wise leaders to define creative new directions that restore the vitality of the system and broaden the base of support. The alternative is to resist change, lose relevance, and watch the support base continue to erode away.

According to Acker the increasing research capabilities of the private sector have important policy implications for the RDE system. The enhancement of those capabilities means that some types of research, particularly developmental and applied research and extension, once conducted in the public sector, might now be left to private organizations. In some cases, the private firm will have related extension-type programs of a quality at least equal to that of the local or state extension system. Those capabilities suggest that more attention should be directed to formal public-private partnerships as a means of sharing costs. In a word, agricultural commodity interests will get more research and extension by contributing cash to the system, in addition to supporting its legislative agenda. However, state and federal research institutions must review their policies to ensure that their integrity and public responsibilities are not compromised by such partnerships.

Lee believes that the national RDE system is at a policy crossroads. The character of agriculture and rural America has changed irrevocably. So has that of science itself. The biological revolution has opened vast new scientific vistas, many with application to science in general as well as to agriculture, food, natural resources, and environmental quality. Research and extension policy paradigms of previous decades are in many respects inadequate for the future. Today the vast majority of USDA staff and funding are employed to manage national programs and are not very well connected to land-grant universities. More and more federal funds are available to non-land grants. The vast majority of faculty and administrators, many of whom are not products of the land grants, neither understand nor dwell on the uniqueness of the land-grant system and the importance of maintaining the state-federal partnership. In many cases, the historical concept of the land grant being the peoples' college has been lost to state and community colleges, while the land grants have evolved into competitive universities, competing with their sister state universities for students and academic visibility.

Choices must be made regarding the balance across the continuum of fundamental, applied, and developmental research and extension at the federal, state, and county levels. Regional or multi-state collaboration taking fuller advantages of IT might enhance efficiency of research and extension programming. Linkages among federal, state, and private research, development, and extension institutions, including their roles and comparative advantages, need to be revisited. There is an emerging consensus that U.S. public fundamental research is seriously under-funded and

to some extent impeded by current RDE policies and institutional infrastructure. Concurrently, however, the very question of the roles of the public RDE system in the contemporary and prospective setting where agriculture is less unique relative to other industries begs for rigorous reexamination.

There are also questions regarding the comparative productivity of formula funding versus competitive grants. Huffman and Evenson recently shed considerable light on this issue. Their research quantitatively concluded that not only does agricultural research and extension have positive impacts on productivity (rate of return to research of 49-62 percent) but also that Hatch funds have larger impacts than competitive grants.

These policy issues cannot be resolved by simple palliatives or simply throwing more money at them, although it cannot be denied that a high marginal value exists for new funds for many purposes. Most of the issues and policy options will precipitate lengthy and contentious discussion and debate. Some can be addressed only through structural reform of the system. However difficult or protracted the process of adjustment may be, continuation of current policies is not a viable alternative if the system is to retain its legacy of scientific progressiveness and adaptability of the past century.

Bush Administration Proposal

The position of the Bush administration is revealed in its FY 2007 budget proposals as well as in those of previous years. Not new in the proposal is the elimination of special earmark grants, which has been typical of past Republican and Democrat administration proposals. Regardless of these proposals, Congressional earmarks are part of reality and are not likely to go away (Acker). Recent USDA budget proposals convey the administration's clear preference for competitive funding over formula methods of distribution, contending that competitive funding is more likely to yield higher quality results that better meet national needs. It also might be asserted that the current formula by which grants are distributed is seriously outdated and not reflective of conditions in contemporary agriculture and rural communities. While the specifics of the Administration's FY 2007 proposal hold formula funding at approximately its current level, they propose to dramatically alter the distribution of Hatch funds by redirecting 55.6 percent of the funds (\$98million) to nationally, competitively awarded, multi-state, multi-institutional projects in the first year with the remaining multi-state funds being phased into competitive grants from formula funds over a four year period as multi-state projects are completed. Part of this redirection has already been implemented by redirection of about 25 percent of the formula funds being spent out of a multi-state fund established in FY 2006. The USDA budget also proposes a 37 percent increase in NRI from the FY 2006 total of \$182 million. However, nearly two-thirds of the increase would be derived from transfer of funds from the so-called Section 406 account supporting

integrated research-extension programs on topics such as water quality, food safety, and pest management.

Land-grant universities argue that further reductions in formula grants (about 30 percent of agriculture research and divisions' expenditures by land-grant universities) could undermine their ability to maintain a critical research-extension infrastructure in an era of declining state support. They further argue that reductions in formula funding could result in losing funding in research areas that address state-specific needs that, while critical to an individual state, might not rise to the level of a national priority. Finally, there is the contention that competitive grant mechanisms discriminate against smaller institutions with lesser capacity to bear the high transaction costs associated with competitive grant procedures. Clearly, we are at a pivotal moment in the history of formula funds. However, while the Administration's position is a clear indication of direction of change, it must be remembered that, in reality, the Administration proposes, and the Congress disposes. This is the case for both the authorization and the appropriation processes.

Land-Grant Proposal

The Board on Agriculture Assembly of NASULGC is preparing a proposal to create, within USDA, a new, independent agency – the National Institute for Food, Agriculture, and Natural Resources. This proposal, referred to as CREATE-21 (Creating Research, Extension, and Teaching Excellence for the 21st Century), would consolidate in the Institute the agencies, programs, and activities currently within the USDA's research, education, and extension mission area (ARS, CSREES, and presumably ERS and NASS), and the Forest Service R&D under leadership of a Director appointed by the President and confirmed by the Senate for a six-year term and reporting administratively to the Secretary of Agriculture. One of the primary purposes of the reorganization would be to reduce duplication and enhance integration and program focus among USDA RDE agencies.

The Institute would be charged with responsibilities for fundamental and applied research in the agricultural sciences; preservation and enhancement of the environment; provision for education and extension programs to enhance the vitality of youth, families, and communities; sustenance and expansion of the capability of both the Department and the land grant and related university partners' capabilities to perform state, federal, and private sector funded research, extension, education, and international programs.

Programs of the Institute would be collaboratively determined by the Director and land-grant universities and related partners with recommendations from a National Stakeholder Advisory Committee. The proposal envisions a broad and integrated portfolio of programs to be organized by problem/solution areas and funding mechanisms including capacity-building grants (including formula grants) and competitive grants to focus on problems of pressing multi-state, national, and international significance.

The current budget of the agencies to be consolidated in the Institute approximates \$2.75 billion per year. The proposal would authorize doubling that level to \$5.5 billion per year within seven years. Seventy five percent (\$2.06 billion) of the increase would be for competitive grants of which 70 percent would be directed to fundamental research with 20 percent of that set-aside for the 1890s, 1994s, and smaller 1862 land-grant institutions. Integrated (research/extension/education) competitive grants would constitute the remaining 30 percent with the same 20 percent set-aside for 1890s, 1994s, and 1862s. The remaining 25 percent of the \$2.06 billion (\$688 million) would be for capacity programs of which 50 percent would go to land grants as competitively distributed multi-institutional funds. As a bottom line, the effect of this proposal, like that of USDA, is to sharply increase competitive grants as a share of total RDE funding.

Danforth Proposal

The Danforth proposal in the U.S. Senate would create a somewhat similar but more narrowly focused National Institute of Food and Agriculture within the USDA. It would authorize a major increase in USDA RDE funding and changes in mechanisms for linkage of institutions within and outside the USDA. However, the Danforth bill is more narrowly focused on fundamental research and revitalization of agricultural research facilities at institutions of higher education, independent, nonprofit research institutions, and consortia of those institutions.

As with CREATE-21, the proposed National Institute of Food and Agriculture would be an independent agency within the Department and would report directly to the Secretary. The design and functioning of the Institute would resemble those of the NSF and NIH with funds distributed on the basis of peer reviewed, competitive grants. The Institute, with the approval of the Secretary, would be authorized to consolidate funds of existing agencies having functions similar to the Institute with the proposed new funds. Authorization of new funds would begin at \$245 million in FY 2007, rising annually to \$966 million in FY 2011 and years thereafter.

Comparative Analysis and Concluding Remarks

Both the NASULGC and Danforth proposals are designed to sharply increase USDA funding for fundamental research to meet future domestic and international demand for food and fiber and to keep agriculture competitive in global markets. Both point to opportunities to extend and apply, in agriculture, recent scientific advances in fields such as genetics, cell and molecular biology, proteomics, and information technology. Both point to the need for an expanded research effort to mitigate or harmonize the long-term effects of agriculture on the environment, enhance the long-term sustainability of agriculture, and improve public health and welfare. Both stress the importance of peer-reviewed, competitive grants as the preferred means of achieving high quality, scientific results. The NASULGC proposal is the more inclu-

sive in its explicit recognition of the need to strengthen extension as well as research and to maintain or enhance the infrastructure at smaller research institutions. Both would require a large bureaucracy and substantial transaction costs to administer.

Both proposals set ambitious funding goals at a time when there is likely to be intense budget pressure on all types of federal discretionary spending, including that for nondefense R&D. The difficulty of developing effective support for fundamental research in the Congress and among agricultural stakeholders is illustrated by the modest progress in funding of the NRI during the immediate past decade.

Having agricultural RDE at its current turning point in history, calls for bold action. The increased importance of competitive grants means that the university vice chancellors, deans, and directors have changed from primarily working with farm organizations and legislators to increase largely unrestricted use appropriations to balancing that interest against hiring grant-obtaining faculty who can meet a set of clearly defined missions and goals (Acker).

For all three proposals, the position of extension seems tenuous and underemphasized relative to research. State extension budget reductions, which often have been steep and disproportional relative to research, lead one to question the long-term viability of extension as currently organized and programmatically focused. Some states are privatizing selected extension functions, and many have moved toward consolidation of extension staff. All state extension organizations have been and are being pressured to further develop and serve broader public interests in fields such as natural resource use, environmental quality, human nutrition, and rural development as well as their interrelationships with agriculture. Acker points out that **instead of defending the status quo, extension directors and faculty should be leading their industry in adapting to the new realities of societal and technological change.**

While these challenges exist, history demonstrates that the decentralized federal/state RDE partnership in agricultural research and extension has been a remarkably adaptive, scientifically progressive, and, on the whole, a successful institution for more than a century. Today, however, the partnership is at a policy crossroads.

The partnership either can continue on the course of marginal adjustments in its organization, management, and funding and run the risk of stagnation and loss of public confidence, or it can undertake institutional reform and seek major increases in public funding. In either case, **further attention should be given to formal public/private partnerships as a means of sharing costs of research. However, state and federal research institutions must ensure that their integrity, objectivity, and public responsibilities are not compromised by such partnerships.**

A great strength of the partnership has been its abilities to adapt successfully to its changing environments. That legacy will surely be challenged in the years ahead.

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In Search of Economic Answers to Evolving Agrifood Issues

Following market changes as prices, supply, and demand work toward equilibrium naturally occupies the bulk of research by many agricultural economists. Factors contributing to such change are the subjects of countless theses and introductions. The cultural shift, both nationally and world-wide, from an agrarian-based society to a post-industrial agricultural sector, has transformed everything, from ways we use the land and other inputs to the types of food we eat. Agriculture may be facing some of its greatest challenges for which we need data, analysis, and research.

Past analysis demonstrates how technological change kept stride with economic, sociological, and political changes. For example, the sweeping change from animal power to tractor power freed up many acres previously devoted to growing feedstocks. Related technology promoted more efficient production using electrical power, hybrid seeds, soil management, irrigation and tillage advances, and systematic breeding programs. These technologies also freed up human labor, and allowed individual farmers to farm more acres than before – or leave the farm altogether for job opportunities in cities. A surplus of farm products was now eligible for export. Agricultural economists were there to describe and analyze these changes as they affected the economic and social fabric of the rural communities as well as farms and farm households.

Technology will continue to spur productivity gains in agriculture, but future challenges require different kinds of information. Economists must stay topical by revising their understanding of the changes affecting the market through conversations with key relevant market participants.

Connecting With Information Sources Keeps ERS Research Relevant

USDA's Economic Research Service (ERS) has long informed public and private decision-making on economic and policy issues involving food, farming, natural resources, and rural development. A major challenge for ERS researchers is to keep current on issues and related methodologies. Connections with institutions such as Farm Foundation help ERS forge and maintain contacts with farmers, industry, and other researchers. These contacts are essential to maintain credibility with those us-

¹ The author is acting associate administrator of Economic Research Service, USDA. The author thanks C. Edwin Young, Neilson C. Conklin, Mitchell Morehart, Michael LeBlanc, Mark Denbaly, James MacDonald, and Dale Sims for their insights, comments, and input. The views expressed here are those of the author, and may not be attributed to the Economic Research Service or the U.S. Department of Agriculture.

ing the data and information, to deepen researchers' understanding of issues, and to anticipate upcoming needs of policy and decision-makers.

Providing regular economic research reports for the food and agriculture industry requires a large commitment of resources. At the same time, the structure of agricultural markets and industries is changing in ways that affect the ability to collect, and the role of, USDA information. Because research dollars are scarce, the success of the research is assured by cooperation with other researchers about both the level of detail and the presentation of information provided by each.

What types of data are needed to analyze the new challenges facing agriculture? How will policy be applied to more freely governed markets and to emerging markets for new products? What production technologies are imminent, and how will they affect production and market efficiencies? What will be the resulting structure of agricultural markets along the supply chain from inputs to farm to processing to retail to consumer?

Data Needs Are Changing

Through a variety of workshops and listening sessions, the Farm Foundation has facilitated the discussion and vetting of projects to satisfy current data needs and future priorities. The 2003 workshop, *Data to Serve 21st Century Agriculture*, helped ERS inform state and other agricultural leaders about the expanded data collection in USDA's Agricultural Resource Management Survey. That same year, Farm Foundation and ERS cosponsored a conference on product differentiation and market segmentation in the grains and oilseed industry. That conference brought together producers, grain handlers, food manufacturers, and other stakeholders to discuss information needs related to new products and new markets. Participants at the 2004 conference, *Food and Eating Consequences of Time-Use Decisions*, discussed how adding a proposed food and eating module to the U.S. Bureau of Labor Statistics' American Time Use Survey would provide additional information on consumer behavior.

As markets change, research must also shift to describe the flow of goods and services through the food and fiber system and to measure financial and other rewards to industry participants. ERS researchers have examined how producers efficiently supply agricultural products to local markets. Research is now shifting to information on global crop inventories and livestock numbers, prices, costs, and returns to best determine resource allocation, levels of production, proper marketing channels, and appropriate firm-level investments (see MacDonald *et al.*, 2004; MacDonald, Hoppe and Banker, 2006; Regmi and Gehlhar, 2005; Dyck and Nelson, 2003). Research has addressed how processors, wholesalers, and retailers supplied products to consumers for additional preparation at home. But, products are increasingly and more extensively processed before the consumer buys them, and more food is purchased ready-to-eat, or at foodservice establishments. Future research will shift to

examine the types of market information that best guide producers on desirable attributes demanded by consumers, and optimal pricing and volume (see Fernandez-Cornejo and MacBride, 2002; Oberholtzer, Dimitri, and Greene, 2005; Dimitri, Tegene, and Kaufman, 2003). Consumers have long used data on prices and other product characteristics to allocate their food and fiber budgets among alternative products for basic nutritive needs. Now, the need for data has shifted such that specific dietary/ethnic preferences and sensory or credence attributes of products are accounted for (e.g., Just, Mancino, and Wansink, 2007; Golan *et al.*, 2004).

Researchers collect and analyze data to find solutions to essential production and marketing issues. After implementation of policy decisions, new data are required for evaluation of the new situation. The key to success in managing production, marketing, distribution, and consumption of food and fiber is ready access to the right information at the right time.

Information Sources Are Changing

The problems of agriculture have grown more complex, more interdependent, and more international. The demand for more and better data increases, but the supply is limited because government activities are constrained by budgets. Not only are new data needed, some data are becoming more difficult to obtain or are obsolescent (Offutt, 2002).

What are some of the new issues for which data are lacking? Numerous questions arise about market responses to policy change and about the appropriate role of federal programs to facilitate adjustment. What are the impacts of existing policies; how are they distributed; and how would they change if policies change? Would policy reform impose significant adjustment costs on large numbers of farm households and/or rural communities? Heckman (2001), speaking about microdata, suggests in his Nobel Lecture that “the availability of new forms of data has raised challenges and opportunities that have stimulated all of the important developments in the field and have changed the way economists think about economic reality.” Establishment (farm-level) data are vital in understanding individual or firm behavior and are necessary to determine the marginal impacts of changes in policy or other events.

Another example of needed (or disappearing) data at the farm level is prices for agricultural commodities, which are increasingly less transparent and less connected to minute changes in the market. Instead, both marketing and production contracts are governing the movement of more product from the farm, and markets are increasingly less local, making the traditional price signals from the auction barn or the elevator less used and less useful. Since contracts are private transactions, fewer mechanisms are in place that allow for public price discovery at the farm level. Mandatory price reporting by the cattle industry is a lone example of the posting of prices under contract, but the system of reporting is complex, and using the data is compli-

cated (Perry *et al.*, 2005). An increasing reliance on formal contractual relationships across agriculture creates challenges for policy design and data collection (MacDonald *et al.*, 2004). With fewer transactions occurring in open cash markets, traditional approaches to data collection for price reporting are becoming outdated. Moreover, contract participants as well as policymakers may also need different types of information to guide their decisions.

We also have limited information about what happens to agricultural products as they travel from farm to final consumption. Our inadequate understanding of post-farmgate food production and consumption puts consumers, the ultimate bearer of threats to the Nation's food supply, and producers at greater risk during a biosecurity event. Recent tracking of cattle with bovine spongiform encephalopathy (BSE) (Mathews, Vandever, and Gustafson, 2006) or *E. coli* 0157 in spinach (Calvin, 2007) underscores that successful management of an accidental or intentional introduction of contaminants will depend on the ability to rapidly detect, report, and control the movement of infected food or animals. Although USDA has steps to ensure program and service delivery, it is clear that improved information on animal slaughter, food processing plants, and final distribution and consumption of all products is necessary for the Department to respond to potential biosecurity threats and provide traceback potential.

The past 10 or 15 years have brought an explosion in the number of new product introductions and differentiated products. Retail food stores now offer greater novelty, variety, and convenience as exemplified by organic produce, exotic fruits, marinated cuts of meat, or brands of wine. Will spending on food consumed away-from-home continue to rise, reflecting the purchase of food with more built-in services (see Stewart, Blisard, Bhuyan, and Nayga, 2004)? One of the primary drivers of change in the retail sector has been the growth of nontraditional retail food outlets (see King, Leibtag, and Behl, 2004). Have consumers' decisions to shop at stores like Wal-Mart, Costco, Target, and others helped to increase variety while at the same time lowering consumer costs?

At the top of the supply chain, questions about consumers' food choices abound (see Lin, Variyam, Allshouse, Cromartie, 2004; Mancino, 2007). How will the U.S. food sector respond to the slow overall growth in U.S. consumer demand for food? How will it fulfill consumer preferences for foods with particular quality, safety, environmental, or credence attributes? How will the system reorganize to trim costs and more quickly accommodate changing demands? What do these changes imply for the relationships between growers and others in the food marketing system? How is globalization reflected in the organization of the U.S. food system? How will information technologies continue to influence the supply chain?

Food choices – and by extension, nutrition and health – depend a great deal on prices. Understanding the linkages among products and prices, therefore, requires reliable data. A traditional source for food prices is the Consumer Price Index (CPI). Unfortunately, the CPI does not fully account for the lower price options offered by

nontraditional retailers or for the distribution of prices over the course of a month (see Hausman and Leibtag, 2004). As a result, significant differences exist between price changes measured using point-of-sale proprietary scanner data and the CPI estimates. Accessing proprietary data to adjust the CPI would greatly enhance data and analyses pertaining to consumer price and choice. However, the proprietary nature of the data means that it is not publicly available and comes at a high cost. Purchasing the data after it ages reduces its cost but precludes early analysis of trends and limits analysis to that of time series changes. How do researchers obtain reliable data to analyze the potential impact of any policies that affect the relative cost of foods?

Just as economists accounted for changes resulting from the mechanization of agricultural production, we need perceptive analysis of changes due to information technology (see Daberkow, Morehart, and McBride, 2006). Recent advances that parallel the rapid growth in Internet use enable data transfer that was not possible before. Data are gathered and transferred more easily through automated data collection and dissemination systems. The Internet allows research to be shared more broadly and eases collaboration across great distance. Podcasts and webinars (seminars over the web) reinforce the written word. The changes that follow scientific and engineering innovations have economic components, and economists need to position themselves to study them.

New-Generation Farm Policy Tools

Farm Foundation has provided forums to discuss many of the policy issues relevant to today's farmers. In 2005, a group of experts on dairy policy convened to discuss the interactions between the structure of the dairy industry and USDA dairy programs. Also in 2005, the *21st Century Farm Policy* conference gave participants from industry, academia, state and federal government opportunity to discuss the next generation farm policy tools – bonds, revenue insurance, buyouts – and additional coverage for specialty crops, organic markets, and aquaculture. That discussion continues in the Farm Foundation-sponsored *2007 Farm Bill Forum*, a series of public forums engaging stakeholders on food and agricultural policies. Other conferences, such as *Policy and Competitiveness in a Changing Global Food Industry: Modeling Agricultural Trade Policy*, enabled stakeholders to discuss what policy topics to research. Forums to meet with policy workshop participants bolster USDA's ability to develop appropriate research programs on economic and policy issues involving food, farming, natural resources, and rural development.

Agricultural policies continue to evolve to address a broader range of issues. In addition to efforts to design less distortionary commodity policies, governments are seeking new ways to tackle such problems as conservation, food safety, obesity, and renewable energy sources. These developments create challenges for policy analysts who must examine new policies with limited market information. One way of addressing these challenges is to improve data acquisition, which ERS has already

begun. Another is to consider alternative methods for cases in which data are either unobtainable or are very complex. Following are examples of areas for which we need either more (or better) data or more research or both.

Disentangling the effect of policy changes among market participants is difficult and requires new paradigms, data, models, and methods (OECD, 2006). A major obstacle to research on assessing potential policy impacts ex-ante is the lack of adequate data since these programs have not been implemented. New research methods are needed to understand the impact of foreseeable policy so that better policy is undertaken.

Direct, decoupled, and transition payments to farmers are a bellwether of farm policy options to come. Direct payments, which are not made on the basis of current production, may end up manifested as additions to household (rather than enterprise) income. Thus, ERS is motivated to develop a household modeling framework (Fernandez-Cornejo, 2007; Burfisher and Hopkins, 2004). However, direct and decoupled payments can be devised for different purposes (e.g., transitional, environmental, regional income support) and can take a variety of forms, some of which challenge the forthcoming generation of household behavior-based general equilibrium models in ways that warrant attention well before potential farm policy reform.

Congress enacted a counter-cyclical payment program in the *Farm Security and Rural Investment Act of 2002* to stabilize farm income in a way that is decoupled from specific production of specific commodities. Legislation has been introduced that would replace federal income and price risk management programs with incentives for farm operators to manage risk through available private-sector opportunities (futures, options, and savings). This change would fall in a class of policy interventions akin to the Canadian Agricultural Income Stabilization Program, which includes some government incentives. Among the proposals for CAP reform in the European Union is a systematic, long-term buyout of farm program beneficiaries, using tradable bonds as the vehicle for transitioning out of the need for annual support of commodity sectors. Now U.S. policy analysts (Orden, 2006; James and Griswold, 2007) are asking, "Is the tobacco buyout a sign of reforms to come?" and "Should the rights to farm program benefits be bought out?"

Economic analysis that models impact of the current and future agricultural policy schemes is difficult because of several complicating factors. Counter-cyclical payment schemes, federal inducement of the use of private risk management tools, and buyout bonds are among a potpourri of new-generation policy tools that share several features: (a) little or no ex-post experience on which to base evaluation of economic performance and implications; (b) the expectation for resource reallocations between agriculture and other sectors of the economy; (c) long-run and dynamic versus annual modes of operation; and (d) a transition adjustment period, especially long for buyouts.

The current set of farm policy evaluation models available within and outside ERS does not perform well (if at all) without ex-post information that describes behavioral response to program incentives. Few models explicitly incorporate the cyclical dynamics on which counter-cyclical and risk-smoothing policies rely. None explicitly incorporates transition dynamics. As a new crop of policy approaches is gaining attention, agricultural economists can say little about the implications of different ways of implementing these new generation policies in the U.S. context. New model techniques and new ways to describe results are needed.

The Future of Agricultural Production

Productivity on U.S. farms is many times that of 100 years ago. Contrary to the predictions of Thomas Malthus, over the last two centuries production of agricultural commodities in the world has grown faster than population. What Malthus did not foresee was the power of agricultural research to develop new and more productive technologies. During the 20th century, U.S. agricultural productivity grew faster than the rest of the U.S. economy. Agricultural output in 2002 was 2.6 times higher than in 1948 while input use actually declined over the past half century (Ball, 2005). Increased productivity accounts for the difference. In recent years, however, productivity growth appears to have slowed, raising questions about future trends.

Agricultural research has devoted many resources to increasing productivity but has traditionally focused on labor-saving efficiencies. Farm Foundation has recently developed conferences on the economics of technologies contributing to that productivity – biotechnology, technology regulation, intellectual property rights, and the new science of food. What technologies and production practices will deliver foods to the table in the future? What new products will chemists formulate from the proteins and fats in agricultural commodities? And, can agriculture also solve our energy problems as well? Technology transfer will affect the competitive and comparative advantage of U.S. farmers. Research is needed to better explain the market forces resulting in and driving productivity improvements as well as to understand the implication of increasing global access to the latest information and technology.

Weather and climate have always affected agricultural production and will continue to do so. Weather's effects are recounted in the various commodity outlook reports (see ERS website, Outlook Reports <http://www.ers.usda.gov/Publications/Outlook/> for more information). ERS uses various models to estimate the effects of global changes in climate and other atmospheric conditions (Lewandroski *et al.*, 2004). Recent analysis assesses the potential impacts of global warming on developing countries in the tropics and discusses how future climate change research could contribute to food security policies in the region (Darwin, 2001). Climate change is more than temperature effects on crops and livestock production – it includes changes to water availability and the resulting effects of climate change on weeds,

pests, and pathogens. It also includes possible ways to reduce greenhouse gas emissions and enter the renewable energy markets. Economists will need resources to address the relative importance of future climate stresses on agriculture, land resources, water resources, and biodiversity.

Agro-technology has introduced more effective plant breeds (such as high-yielding varieties), enhanced land management techniques (such as terracing), and improved water management tools (such as irrigation). Now, biotechnology enables the development of crops with value-added vitamins and minerals to achieve health goals and to meet consumer demands for specialized products (see Tegene, Huffman, Rousu, and Shogren, 2003). The next phase of bio-technology may develop transgenic animals with production-efficiency traits or make other value-added traits more viable. While we can only speculate on the specific form technological advances will take, we can address economic questions of resource allocation, price, and marketing raised by developments in the life sciences. These types of market innovations tend to segment markets into small proprietary components that create substantial analytical challenges.

Other production technologies will have an effect on resource use as well. Research is asking question such as: How are markets affected by global sourcing of products? What is the price effect on meat and other proteins of heightened concern for animal welfare or possible human contact with diseased animals? What are the costs associated with altered production practices to assure food safety? What are the trade-offs between water for cities and water for food? What are the pressures on price when the demand for agricultural products becomes more than just for food or fiber?

What Form will Markets Take?

Farm Foundation's pre-eminence as an agricultural institution has allowed it to direct attention to topics like modeling farm structure, farm savings accounts and farm safety net, and forces shaping the dairy industry and animal agriculture. However, agricultural markets are complex and have more players than farmers alone.

Appreciating the role of the consumer is key to understanding the shape, structure, and evolution of the agricultural and food system. Emerging patterns in food demand help explain the transformation of agriculture from a commodity business, in which competition to sell homogenous goods is based solely on price, to one that delivers a broadening range of quality-differentiated products (see Elbehri, 2007; Cook and Calvin, 2005). In a mature food market such as in the United States, growth in the share of domestic demand by one food product likely only comes at the expense of another. While the proportion of household income spent on food has fallen steadily over the past century, per capita food expenditures continue to rise because of increasing demand for variety and quality. Tracking these changes and developing data systems to capture the changes is a challenge.

Changing demographic patterns, rising incomes, and strong and differing preferences for food safety and quality in the world are reshaping global food markets (see Regmi and Gehlar, 2005; Regmi *et al.*, 2005; Gale, 2003). Consequently, economists seek to understand what determines food choices, including economic, safety, physiological, and cultural factors. In concert with consumer-driven change, biotechnology and information technology can promote cost reduction throughout the supply chain and facilitate product differentiation according to consumer tastes and preferences. At the same time, industrial reorganization (such as through contracting) may endanger competition, with possible harmful impacts on farmers. We lack much of the basic data to follow these changes in the agricultural system.

As farm structure continues to evolve, collection of economic information about the sector needs to follow. Four features characterize long-running changes in how the farm sector is organized to deliver traditional, differentiated, and biotech foods to the consumer (see Hoppe, Korb, O'Donoghue, and Banker, 2007). First, production is shifting, in almost all commodities, to larger farms. Second, production is not shifting to publicly held corporations (at least in the United States), and most large farms continue to be family owned and operated. Third, farms are specializing in particular stages of commodity production and are relying on other farms or service providers to provide inputs or conduct production tasks. Fourth, formal contractual relationships govern a growing share of the transactions between farmers and their input providers, service providers, and buyers. The connections that organizations like Farm Foundation facilitate with farmers and industry participants are essential for the success of Economic Research Service's ability to continue to analyze these changes.

The role of biotechnology in structural change in the U.S. agrifood sector can be understood in terms of changing markets and consumer demand (see Shoemaker *et al.*, 2001). On the one hand, negative consumer attitudes toward biotech foods (particularly in the European Union) have spurred the development of a market for nonbiotech crops and foods. On the other hand, the emergence of consumer benefits from agricultural biotechnology – such as lower food prices or foods engineered to have superior quality attributes such as better taste or nutritional content – may trigger growth in demand for biotech foods and crops. Ultimately, consumer demand will determine the strength of biotech food markets and the relative prices of biotech and nonbiotech foods.

Computer-based marketing, despite the early hiccups, provides farmers with broader access to both products and customers, with size of order and distance diminishing in importance. How can farmers identify and tap into profitable niche markets? Can case studies reveal the elements of success for a farm business? What alternative business forms may be useful in a sector with diversity in human capital endowments, in financial and physical assets, and in proximity to markets? What is the potential of e-commerce across all kinds of agricultural organizations?

Not only are the agricultural economies of Canada, Mexico, and the United States increasingly behaving as if they form one market, but global sourcing of products is becoming more common (see Zahniser, 2007; Haley, 2004; Vollrath, 2003). Firms are reorganizing their activities around continental and global markets for both inputs and outputs. For example, many North American pastures and feedlots contain animals that have lived in more than one NAFTA country, and U.S. consumers are purchasing fresh tomatoes and peppers produced by their neighbors both north and south. To encourage this trend, decision-makers in both government and the private sector have pursued greater institutional and policy coordination. Structural changes within agriculture have also facilitated integration, as have continued population growth and sustained periods of economic expansion, which have boosted consumer demand and forced new economic arrangements within the agricultural and processed food industries.

Lately, it seems as though every conference, workshop, and meeting devotes at least some time to biofuels. Although most bioenergy production currently comes from agricultural crops such as grains, oilseeds, and sugar; research is increasingly focused on cellulosic sources of biomass such as wood and perennial grasses, use of which would expand the range of potential feedstocks. In the United States, ethanol (produced mainly from corn) is the largest source of bioenergy fuel additive or substitute for petroleum fuel, with biodiesel (made from vegetable oils and fats) providing a smaller share of bioenergy. The surge in the use of corn for ethanol is increasing the price of corn received by producers, thereby reducing the need for income support to the Nation's feedgrain sector (Westcott, 2007; Baker and Zahniser, 2007). Effects trickle-down to a livestock industry dependent on corn and soybeans for feed, with repercussions for land use, farm income, environmental quality, and rising food prices.

Changes in farm and market structure should not surprise us, as they are a natural outcome of market forces and information flows. These ongoing changes, however, create new challenges for policymakers and for analysts who seek to collect the data that can best inform policy. Our farm sector data collection and reporting have focused on single farms as the unit of observation, and reporting has emphasized a wide range of farm sizes. Developing new reporting techniques to accommodate changes in farm size is relatively easy, but other elements of organizational change will be more difficult to track. We are beginning to see more farm firms that encompass several independently operated farms, as well as farm firms that integrate production decisions across many sites. We do not yet track multi-farm firms, and these developments will create challenges for how we define and survey farm businesses. Finally, changes in organization create challenges for tracking farm income and expenses as more stages of commodity production split among farms and as non-farm entities provide more farm inputs and perform more on-farm services.

What's the Next Thing? (Conclusion)

The scope of issues around agriculture continues to expand, magnifying the need for economic research and policy analysis on environmental and natural resource issues, food safety, rural development, food assistance, global climate change and nonfood uses of agricultural products. Even traditional topics like agricultural production, global trade, and consumer demand are more nuanced due to biotechnology, nontariff trade barriers, integration of markets and demand for differentiated, quality-enhanced products.

At the turn of the 20th century, several authors wrote about the pending tidal change in agriculture (Daschle and Dole, 2007; Boehlje and Doering, 2000; Tweeten and Thompson, 2002). The transformation was anticipated because of changes in the supply chain, resultant changes in market structure and privatization of data through contracts, application of information technology and biotechnology, modification of trade flows, and possible revisions in farm policy due to budgetary pressures or a change in the public mindset. Agriculture, like other markets, evolves to meet the needs of its customers. The advantage that agriculture has over many other industries is that the need for the product the industry produces – food (or sustenance) – will not become obsolete. In fact, the product mix is expanding to include nonfood uses, which include fuels, pharmaceuticals, and other future, unknown products.

How do economists anticipate research needs? Answers to questions enumerated here will facilitate the research. First, what data are needed to examine questions about farms, farmers, rural communities, food processing and marketing, and consumers? Next, what are options for U.S. agricultural policy that might help maintain a competitive agricultural system? Advances in agricultural productivity have led to abundant and affordable food and fiber through most of the developed world. What will be the future for productivity growth in the agricultural sector?

Finally, farm structure underlies the efficiency and competitiveness of the farm sector, the well-being of farm households, the design of public policies, and the nature of rural areas. The U.S. food system is a complex network of farmers and the industries that link to them. Those links include makers of farm equipment and chemicals as well as firms that provide services to agribusinesses, such as providers of transportation and financial services. The system also includes the food marketing industries (food and fiber processors, wholesalers, retailers, and foodservice establishments) that link farms or processors to consumers. What will the structure of the agriculture and food system look like in the future, and what issues should we be examining today to inform decisions about the form that the market takes?

Research for informed public policy making must be relevant and timely and must meet disciplinary and professional standards. Credible economic research is the result of developing an economic hypothesis appropriate to the problem at hand, making appropriate and supportable assumptions about the economic be-

havior of parties involved, reaching conclusions about the effects of alternative policies, and expressing the appropriate qualifications and uncertainty about the conclusions. Scoping workshops, reviews of methodology, and evaluation of results are essential features of research. Partnerships with organizations such as the Farm Foundation provide a public service by facilitating the research process in the government and at universities. As changes in agricultural markets occur, the analysis of the consequences of potential policy changes is critical. By vetting the findings in public venues, Farm Foundation contributes both to the research process and to the democratic process.

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Dynamics of Change In Agriculture and Land-Grant Universities

For more than 140 years, land-grant universities have been central players in advancing American agriculture and, in turn, American economic development. Through education, research, and outreach, land grants have consistently assisted agriculture in responding to ever-changing challenges and conditions.

It is clear for a variety of reasons that agriculture is again in the troughs of significant change, and land grants must adapt to help retain the competitiveness and viability of traditional clientele and stakeholders. Further, public research universities, including land grants, are themselves facing new pressures and realities calling for fundamental change.

In this short paper, I will review the case for refocusing land-grant universities and offer a few modest recommendations meant to enhance their service to 21st century American agriculture. I will start by discussing emerging needs in research and education driven by changes in the sector we serve.

American Agriculture Today

Agriculture is being reshaped by at least six forces that require land-grant universities to innovate to remain useful and effective. These are: (1) changing costs and cost structure in production agriculture; (2) rising consumerism; (3) globalization of the marketplace; (4) intensified concerns about environmental protection; (5) declining population and political influence; and (6) increased private sector-proprietary research and product development. Taken together, the changes we are experiencing are revolutionary rather than evolutionary.

For nearly 100 years after the creation of land-grant universities, farming was dominated by fixed rather than variable costs. Thus researchers could improve farm profitability by simply increasing yields of major crops. Universities built research programs around this important but rather simple objective. Crop breeders, plant pathologists, entomologists, and all others involved could measure their success on the degree to which their work contributed to increases in output per acre.

Today, however, in many cases variable costs dominate and thus the research “objective function” has become much more complex. The research agenda now includes: plant development with drought resistance aimed at reducing irrigation costs; disease and pest resistance (or integrated pest management) aimed at reduc-

¹ The author is president of New Mexico State University. He is a member of the Farm Foundation Round Table.

ing use of chemical inputs (and costs); and new labor saving-replacing technologies, among other things.

Likewise, the advent of activist consumerism has heightened demand for new agricultural products (foods and nonfoods) with qualities and characteristics that meet specific consumer expectations, tastes, and preferences.

Consumers now want a wide range of food choices, a healthier food supply, new renewable energy crops, evergreen turf grasses, a growing range of ornamental-landscape products and so on.

And while agriculture seeks to address this new consumer agenda, it must do so while practicing stringently imposed standards of resource conservation and environmental stewardship. In some instances, these standards are explicitly or implicitly imposed and may be contradictory.

Over the past several decades, the U.S. farm population has dropped precipitously along with the number of farms in this country. This has eroded the influence of a once powerful political sector. Because few Americans now have a direct connection to agriculture production, the public's sympathy for the plight of farmers has largely disappeared. As a consequence, public policy that once promoted and supported agriculture has become increasingly regulatory and, in some cases, hostile.

Land-grant universities, which could once attract large numbers of "farm kids" to populate their student bodies in the college of agriculture, now must turn to other populations. Recruiters from agriculturally related industries can no longer expect to hire new university-educated employees with "farm backgrounds."

Most certainly global integration of both export and import markets has reshaped agriculture in ways not anticipated even a few decades ago. Lower-cost competitors have invaded the international commodity markets where once American farmers dominated. Many farmers are now being challenged by imports in their home markets.

Globalization has had a profound and complicated impact across virtually all agricultural sub-sectors. For example, the rise in the international price of petroleum has stimulated production of alternatives such as ethanol that has, in turn, diverted corn output from animal feed markets. Rising corn prices, driven by the demand for ethanol, have imposed a cost squeeze on poultry and cattle producers.

Where once new research-based agricultural technology was produced by land-grant universities, now a substantial share comes from private sector for-profit companies. Farmers could once count on new crops, products, and solutions publicly provided and transferred largely at taxpayers' expense. Now much of the technology used in production agriculture comes with a user-specific price tag. Land grants remain a primary player in agricultural research, but they, too, are increasingly patenting and licensing new technologies, crops, and products. This continues to change the relationship between traditional clientele and their universities.

Dynamics of Higher Education

Along with adjusting to new realities facing traditional and emerging clientele, land-grant universities must address changes coming to higher education in general. Land grants, like other public universities, grew over the past several decades due to two waves of students: those on the GI bill and the baby boomers. In both cases, the student populations were reasonably homogenous. Thus, universities developed very efficient, “factory” approaches to educating large numbers of students. Today, however, student bodies are increasingly heterogeneous. As a consequence, universities must create and implement programs that address the needs of a very wide “bandwidth” of students with varying backgrounds, educational foundations, expectations, and capabilities.

In responding to the two large waves of students, universities built buildings, hired faculty, and expanded programs. However, these buildings are now 40 to 60 years old. The largest cadre of faculty ever trained and appointed – the baby boom faculty – is about to retire. So, the two biggest assets of any university – the faculty and the physical infrastructure – now demand renewal and replacement. This will be a very costly undertaking.

At the same time, students rightfully expect full availability of new technologies, comfortable residence halls, high-quality food service, and so forth.

Funding and retaining high-quality faculty may prove a significant challenge, and this could be especially so in the STEM disciplines. For a number of reasons, the pipeline of future faculty is not nearly as full as it once was. Moreover, the competition for faculty is intensified among universities and between universities and the private sector.

New public expectations and pressures on universities call out for reaction and response. The Spellings report, the Kellogg Commission report, and “Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Economic Future” are just a few of the published studies sending strong messages that universities must change to meet several challenges.

All this and many other forces are driving universities to seek new ways to serve and respond. The ultimate frustration is that universities must struggle with making fundamental change in an era of declining real resources. Along with “crowding out” of funding for higher education by other public needs such as Medicare, Social Security, defense, etc., the “crowding out” budget impact is occurring internally at many universities. Differentials in the dynamics of costs for various research and educational programs are shifting internal resource allocations. The costs of “big biology,” for example, have risen precipitously in recent years. Meeting these new science-funding demands may well be “crowding out” institutional investments in and support for other important programmatic areas. This means those who lead

universities, most certainly including land grants, must be resilient, clever, nimble, and creative.

Final Observations, Summary, and Recommendations

Colleges of agriculture, and indeed, the larger land-grant universities, are faced with pressures and incentives to change from two overarching forces: the substantial transformation facing agriculture and the related clientele cry for help from land-grant universities. To remain relevant and useful to both traditional and emerging clientele, land grants and the component units must constantly seek new things to do and new ways to do them.

This response must occur at the same time that the environment and conditions in higher education are changing as well. New opportunities, new constraints, new functions (and some old ones as well) must be confronted across universities and across the “system” of higher education.

Those who lead and influence land-grant universities must then find ways to meet new needs in serving and new ways to provide and fund services.

To do so, several rather general recommendations are revealed. First, we must start by using the extension model as an “intelligence-gathering” function in the university. To meet the needs of those served, there must be an effective means of defining those needs. A modified extension service seems to me the quickest and most efficient means to move in this direction.

Second, universities must continue to seek ways to align activities, projects, and programs with the identified needs of clientele and stakeholders. Among other things, this will most certainly mean continuous emphasis on interdisciplinary/multidisciplinary approaches to all programs.

Third, universities must build new partnerships, collaborations, and bridges within institutions, among institutions, and between the university system and outside agencies. Doing so offers numerous opportunities to enhance both program effectiveness and efficiency.

Fourth, land-grant universities must continue to struggle with the challenge of balancing their public service responsibilities with the demands and rewards from privately-oriented proprietary educational and research projects. By struggle I mean the balance point will be ever in motion and in some ways situational.

Finally, university faculty, on and off campus, must find ways to connect with the traditional sectors and industries their programs serve. As fewer and fewer faculty members have agricultural backgrounds, the natural connection which once existed must be replaced with new linkages.

Most certainly history suggests land-grant universities are up to the task of adapting to new challenges, changing realities, and external pressures. But doing so will mean basic change in institutional structure, processes, and relationships.

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Public Policy and Public Engagement: The Role of Purdue University

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The *Morrill Acts of 1862 and 1890* creating land-grant universities were among the most revolutionary pieces of legislation ever passed into law by the United States Congress. These acts created the framework for a network of universities across the United States that is emulated worldwide. The *Morrill Acts* were dedicated to providing world class educational opportunities for sons and daughters of working class Americans, creating at least one educational institution in every state. These universities have evolved into many of the world's premier research and discovery systems, especially in scientific fields related to food, agriculture, and natural resources. Purdue, as Indiana's land grant university, has become one of the preeminent institutions in this network and enjoys a worldwide reputation for excellence in many of its programs. Throughout much of the 20th century, Purdue was especially effective in helping shape agricultural and public policies on a national, state, and international scale. This paper attempts to assess the characteristics of Purdue University and the dynamics of its relationship with the people of Indiana that might have contributed to Purdue's success in shaping public policies.

Historical Perspective

Public policy dawned as a major sub-discipline in the field of agricultural economics following the depression years of the 1930s and emerged more fully after World War II. Government programs in the 1930s and 40s changed the economic dynamics of agriculture at the producer and farmer level. Government policies did not affect farmers uniformly. Depending on the policy, geography, mix of enterprises, and region of the country, individual farmers were more or less advantaged by specific policies. Entire regions of the country might be differentially advantaged or disadvantaged. Crops and livestock producers were affected quite differentially. Depending on their situation, some would be winners; others would be losers. Research on this economic environment and the various policy implications created an ideal teaching environment for extension education. Extension education had previously focused almost entirely on providing technical advice: how to improve crop production, how to increase animal productivity and employ better husbandry practices, how to improve family and household living practices. Public policy edu-

¹ Lechtenberg is interim provost, Purdue University. He has been a member of the Farm Foundation Board of Trustees since 1998 and is its 2007 chairman. Hardin is owner of Hardin Farms, Danville, Indiana; he is Vice-Chairman of the Board of Trustees at Purdue University and has been a member of the Farm Foundation Roundtable since 2000.

cation emerged as an extension education priority emphasis as a direct result of the impacts of government programs on farmers.

Public policy at Purdue emerged in the Agricultural Economics Department, which was so-named in 1942. The department had been previously called the Farm Management Department, having been first organized as a Purdue administrative unit in 1920. By the early 1940s, thirteen public policy research projects were under way in the department. Public policy emerged as a high priority in the department due to a couple of very important developments. The academic framework within which public education on agriculture policies could be carried out in a scholarly manner was developed at this time, and the emergence of several pioneering faculty and public policy educators helped advance the policy agenda at Purdue.

Developing public policy was a contentious process and required a carefully crafted framework for discussing the positives and negatives of various policy options. Broad stakeholder support was needed before public policies would be accepted, and understanding the consequences of various alternatives was essential to gaining such acceptance. Implementing effective policy depended on the willingness of many farmers to balance their enlightened self-interest against the broad public interests and probably contributed to Purdue's success in helping shape public policies.

The academic approaches within which such public policy education could be conducted effectively were developed during this time. The alternatives and consequences approach was shaped by several Purdue faculty members and became the framework for public policy education that is still widely used and endorsed today. This teaching approach has proven to be a highly effective technique for public policy dialogue well beyond farm policy.

The Farm Foundation also contributed significantly to Purdue's policy expertise and capabilities by encouraging the policy interests of key faculty. Travel scholarships for faculty, leadership development meetings, and coordination activities all had significant impact. Farm Foundation played a key role in developing policy expertise among agricultural economics departments generally, but collaboration and cooperation with Purdue was especially influential. For example; Howard Diesslin, Associate Managing Director at the Farm Foundation for 12 years, left in 1962 to become Director of the Cooperative Extension Service at Purdue, where he served until 1983.

Purdue University's engagement with its public across Indiana and the nation has not been limited to the agricultural fields. During much of the early 20th century, Purdue engineers and scientists were closely allied with the railroad and transportation industries, contributing ideas and much know-how to these industries. These linkages and partnerships helped create a philosophy among faculty that was embraced broadly across the university. The application of science to solve practical problems of business and industry was a noble endeavor, one that enhanced the value and worth of the institution and the quality of the scientific enterprise. The fact

that this mindset was embraced across the entire university, at least to some degree, helped create an academic environment that made it possible for creative agricultural faculty to engage in public policy dialogue with farmers and other constituents throughout Indiana.

Factors Contributing to Purdue Impacts

Faculty, staff, and other people associated with Purdue University have clearly had significant impacts on agricultural and public policy over the last half of the 20th century. Whether this impact has been significantly greater than that of other land-grant universities is a subject that could perhaps be debated. Whatever Purdue's impact, it has been attained through the people – faculty and former students – who have been associated with the university.

Early Years

Purdue's early involvement with agricultural and public policy can be traced to an early connection with the Farm Foundation. In 1947 the Farm Foundation sponsored ten one-thousand dollar scholarships for young faculty in agricultural economics to attend the first post-war international agricultural economics conference, held in England. Three of these scholarships were awarded to two young Purdue faculty members, Lowell Hardin² and Earl Butz, and to Clifford Hardin,² a recently minted Purdue Ph.D. by then at Michigan State University. These young faculty members attended the conference and then visited several war-ravaged countries in Europe. This experience helped shape their early careers and they, in turn, helped shape the directions that Purdue programs would take over the next several decades. Two of these three individuals, Clifford Hardin and Earl Butz, became secretaries of agriculture and Lowell Hardin became Department Head at Purdue, and through assignments with international foundations, one of the architects of the international agricultural research center system around the world. This early post-war engagement by the Farm Foundation in nurturing young faculty set the stage for a long and productive relationship between Purdue and the Farm Foundation. This relationship has persisted over the intervening sixty years.

Professor E. C. Young, an early and respected leader in agricultural economics at Purdue, encouraged young faculty and students to go into the policy arena. He encouraged them to obtain a strong theoretical economics background. Several studied at the University of Chicago, a leading institution in providing theoretical training. This combination, a strong theoretical and scientific underpinning and keen interest

² Lowell Hardin recounted that, even though the Farm Foundation scholarship of \$1000 was quite generous, attending the conference was still a financial stretch for young faculty with families, and Mrs. Hardin and Mrs. Butz were consulted. They ultimately agreed that their husbands should attend the conference because they may not have another opportunity to travel internationally.

in solving problems, has characterized Purdue's approach to policy education and development.

Purdue University was a major contributor and major player in educational programs offered under the GI Bill. This immediate post-war program brought a large number of very talented and motivated individuals to the university whose world and life experiences had never been equaled. These students were a special challenge to young faculty as they expected their course content to be highly relevant to their experiences, as well as academically challenging. Associate Dean David Pfendler played a key role helping many of these students recognize that they could play a very special role across the state and nation. He encouraged some of the very best students to become involved in local, state, and national politics. Many did and several were quite successful statewide and nationally, serving as members of the Indiana General Assembly, as state agency heads, in federal agencies and as members of Congress.

As these newly minted Purdue graduates emerged as leaders in agriculture and communities across Indiana, they brought with them a keen knowledge of scientific agriculture, emerging concepts in policy, and a level of friendship and camaraderie that created a fertile ground for the policy ideas and public policy discussions being developed by the faculty in agricultural economics. They were receptive to the ideas, generally, and helped provide credibility for the faculty and their ideas because the ideas had been vetted with leading producers.

Faculty, Students, Educational Approaches

Public policy education was first identified as a departmental priority in 1945-46. Professors J.C. Bottum, J.O. Dunbar, and J.B. Kohlmeyer were early leaders in policy education. Other pioneers included Don Paarlberg and Earl Butz. These individuals formed a brain trust that attracted top quality graduate students. Because of these individuals, and others, Purdue became a magnet for talented young people with an interest in public issues and public service. Purdue became recognized as an institution where policy could be pursued professionally and where, if well done, one could succeed academically as well. As with successful programs in nearly all areas of endeavor, it was the Purdue people who made the institution's impact in the policy arena. The students who pursued graduate education with this cadre of faculty became policy leaders nationally and world wide. Many continue in key roles today.

Purdue faculty approached education on policy issues with a strong market based philosophy. Educational programs were nearly always crafted to provide an understanding of how policies might be distorting or counteracting normal market forces. The financial implications, both to farmers and to the general public, were part of the policy dialogue and emphasis was placed on the financial rewards that

might be achieved in the absence of market distorting policies. If there was any Purdue perspective, it was to let the markets work as freely as possible.

Advising and mentoring students has always been a high priority for Purdue agriculture faculty. Purdue students have received very high quality academic advice, and because of the close personal relationships with faculty, they also received sage nonacademic advice. Partly as a result, faculty created an expectation of leadership in the minds of their students. Graduates were expected to become informed leaders – leaders politically, leaders in designing responsible policies, and leaders in their communities. Many were successful in doing so and this helped establish an environment across the state of Indiana for intelligent policy dialogue – led by the faculty (extension specialists) who had been their mentors at Purdue.

Programs and Partnerships

During the 1960s, 1970s, and 1980s Purdue faculty conducted an annual series of day-long policy discussion seminars in twelve regions of Indiana. These seminars were held in January and February and provided the opportunity for faculty to engage in policy debate on both state and national issues. Two major topic areas set the discussion agenda: national agricultural policy and state policy. These seminars were designed not only to inform citizens about issues but also to listen to their concerns

This approach was especially effective in building credibility on the part of the faculty. These seminars were widely recognized as a highly effective approach for gathering grass roots input on important policy issues. As a result, the synthesis, analysis, and resulting policy alternatives that were developed by Purdue faculty had credibility. Other states adopted similar approaches.

This series of seminars helped establish credibility and leadership on issues well beyond the farm gate. Purdue policy educators helped frame the arguments surrounding school reorganization in the 1960s, the discussions of state tax structures, state pesticide laws and regulations, and state utility/energy needs forecasting.

In the mid-1950s, with departmental sponsorship, a group of 30 to 40 leading Indiana farmers formed the Purdue Farm Policy Study Group. In their still ongoing biennial meetings, the group discusses local, state, national, and international policy issues and identifies further research and analysis needs.

Much of the success that Purdue faculty and educators have had in the policy arena can be traced to their ability to anticipate issues early, before the issue actually becomes a major priority on the public's agenda. The genius of several of Purdue's early policy educators was their ability to identify these issues and get ahead of the curve with effective education programs.

Purdue has long supported and encouraged faculty to develop effective partnerships with private sector entities. These relationships encompass sponsored research arrangements and agreements, educational program partnerships, technology commercialization and licenses, new company start-ups, and strategic corporate partner-

ships of various kinds. These relationships were carefully monitored and policed appropriately via university policy, but these relationships also helped the credibility of Purdue faculty on key policy issues.

Purdue was blessed over many years to have had a strong contingent of Economic Research Service adjunct faculty located at the university. These top flight professionals greatly enhanced the critical mass and expertise of faculty engaged in the policy arena. These individuals also helped leverage Purdue's influence within USDA and other governmental policy settings.

Administrative Environment

Administrative leaders created an expectation that all faculty should engage with the public. Engagement with clientele and being responsive to questions and calls from producers and others across Indiana was understood to be the responsibility of everyone, not just extension specialists and teachers. Faculty who focused predominately on research also had the responsibility to respond when asked to help with public programs, solve problems, or answer questions from the citizens of Indiana. This expectation helped create a favorable academic environment in which extension specialists, teachers, and others who devoted their scholarly efforts predominately to serving citizens of the state were recognized and rewarded for doing so. Graduate students were also encouraged to become involved and engaged with the public.

Department heads and leaders not only expected such engagement on the part of faculty, they tracked and measured such involvement and rewarded it. This all helped create an environment in which it was quite acceptable to be involved in the debate on public and highly visible issues so long as one's involvement was done academically and with the goal of informing the debate, not of choosing sides or becoming an advocate for one position. The alternatives and consequences approach to policy education made it possible for faculty to engage in the policy debate in a scholarly and academically acceptable manner. Using this approach, contentious and emotionally charged issues could be debated so long as the educator did not become an advocate.

Purdue faculty became engaged in international agricultural work as soon as major institutional development opportunities arose. These opportunities attracted the very best faculty and were highly encouraged by the administrative leaders in the Department of Agricultural Economics and in the School of Agriculture. These international assignments greatly broadened the perspectives of the participating faculty and students and deepened their understanding of the impact that governmental policies could have on the economic health and on agriculture in developing nations. They returned from these assignments with greater insights and understanding of the importance of policies and a greater appreciation for those who dedicated

their careers to policy and who were especially skilled in facilitating public policy debate.

Administrative leaders at Purdue encouraged faculty to take temporary assignments in state and federal agencies and as staff in offices of political leaders. These experiences added to their credibility in leading policy discussions among producers and others. It also helped form the policy, with perhaps a Purdue perspective, at early stages in the debate; before political positions had become solidified and at a time when education and academic perspectives could be most effective in helping to shape the policy. Purdue faculty members were not only encouraged to take on these roles, they were also recognized and rewarded for doing so. Don Paarlberg, for example, spent roughly half of his professional career on the Purdue campus and half in Washington, D.C., serving the administrations of Presidents Eisenhower, Nixon, and Ford.

Indiana's state administrative structure relative to agriculture has historically placed significant responsibility on the university to administer regulatory and educational programs. Many state programs are the purview of the state department of agriculture. In 2004, Indiana officially created a department of agriculture whose director reports to the lieutenant governor and whose primary responsibility is to promote and advance the agricultural and food system economy. Purdue continues to have responsibility for those programs that it has historically administered. This special relationship between the university and state government provides additional opportunity for the Purdue faculty, staff, and administrative leaders to engage with clientele across Indiana, focusing primarily on the information and education attendant to effective and efficient regulatory policies. This structure gave the university great visibility, and still does, on key regulatory policy issues; more than it likely would have had in a different state government structure.

The promotion and tenure system at Purdue has evolved over many years but is generally regarded as one that recognizes the scholarly contributions of faculty in support of learning and engagement missions as well as the research mission of the university. This cannot be said of all land-grant universities. At Purdue, faculty can be promoted based on their scholarly contributions to engagement and extension. It is critical, however, that these efforts are truly scholarly and recognized by peers as such, within the university academic community and nationally. Long lists of interesting activities, alone, will not meet the scholarship criteria.

Finally, it is important to recognize that Purdue administrators allocated sufficient university resources to policy education and research to support a credible presence. These resources were, in turn, leveraged significantly by the faculty to garner additional support for students and staff to develop high impact programs. This

administrative support and resource allocation spanned many years and several administrative leaders at the department, dean, and university leadership levels.

Current and Future Engagement

The excellence and energy with which Purdue faculty have engaged the State of Indiana, the nation, and the world continues as aggressively today as in years past. Dr. Martin Jischke re-energized Purdue University to become the model of land-grant university engagement. The university's mission and strategic plan clearly embrace the tripartite mission of learning, discovery, and engagement. These missions have also been strongly endorsed by the university's board of trustees.

Purdue's current engagement goals involve four key strategies: a) enhance Indiana economically, b) build a strong K-12 education system in every corner of the state, c) graduate students with a strong service learning, community, and public service mindset, and d) instill a culture of life-long learning and continuous professional development throughout Indiana's people, companies, and organizations.

Engagement at Purdue, today, is about advancing education, partnerships, and policy in agriculture, but it is also about advancing education, partnerships, and policy in manufacturing, healthcare, energy, science and technology education, the environment – all of the issues that challenge today's world. To impact the regional economy, Purdue programs are redefining and expanding opportunities for technical assistance to business and industry. To enhance and support K-12 education, new faculty are dedicated specifically to engaging the Colleges of Engineering, Technology, Education, and Science to schools across Indiana and to joining the colleges of Agriculture and Consumer and Family Sciences in support of students, teachers, and local school leaders. Purdue has committed faculty and administrators to developing service learning programs for our undergraduates to teach these students the added value of bringing what they are learning to assist the larger community around them. Purdue has always been dedicated to the principle of life-long learning for those in agricultural endeavors; today, Purdue offers a vast range of life-long learning seminars, workshops, and courses to build the knowledge of citizens.

Discovery Park, a new interdisciplinary and multidisciplinary research program established in 2001, has developed a complement of major centers dedicated to research and education on a wide array of very important societal problems: healthcare, biotechnology, nano-sciences, energy, entrepreneurship, environmental stewardship, advanced manufacturing, cyber infrastructure, oncological sciences, e-enterprise, learning, and regional development. More than a thousand faculty members are associated with one or more of these centers. Each center is committed to an interdisciplinary approach to solving problems within its domain. Discovery Park

leaders are committed to using knowledge to immediately help Indiana effectively address the challenges and opportunities in each of these arenas.

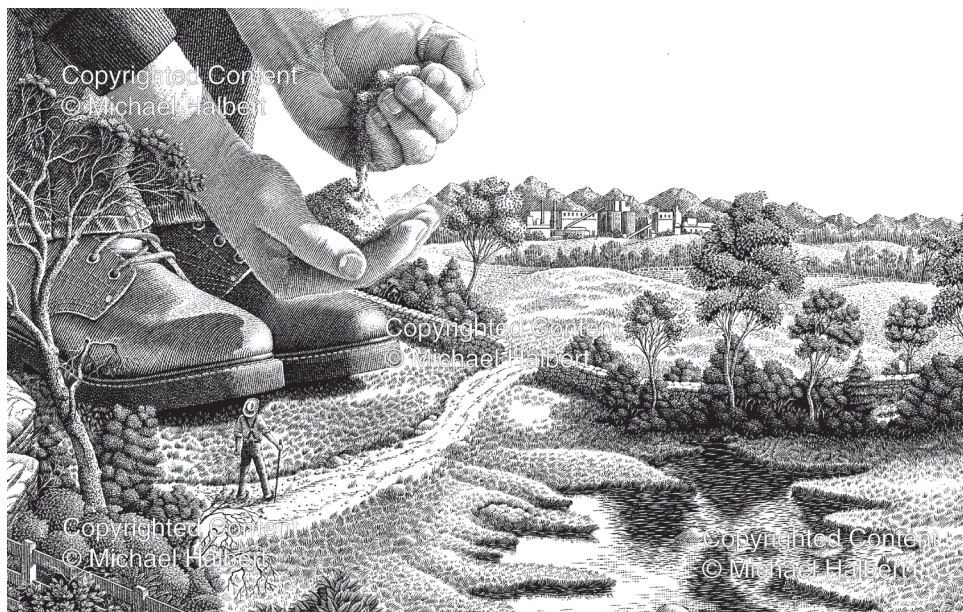
The model developed decades ago to enable faculty to engage in public policy debate in agriculture and in agricultural extension is being adapted, and key elements are being applied across the entire university and across all sectors of the state's economy to learn about the challenges that people in the state face and to develop creative programs and policies to address these challenges. University engagement at Purdue is not just about agriculture and family sciences. It is the agenda and priority of the entire university. Increasingly, the health and wealth of rural communities is dependent on the nonagricultural economy. Purdue is dedicated to using all of its expertise and resources to advance Indiana educationally and technically, and to develop policies that encourage and advance Indiana as a place of choice to live and work.

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- Henry Wadsworth, Professor Emeritus of Agricultural Economics; Associate Dean and Director of the Purdue University Cooperative Extension Service, 1983-1999.

US Farm, Resource and Food Policy



Farm, resource, and food policy continue to be the central focus of Farm Foundation's education programs and certainly of its Round Table's discussions. As a result, it should not be surprising that Farm Foundation has among active participants and alumni, congresspersons, secretaries and undersecretaries of agriculture, USDA administrators, commissioners and directors of federal and state government agencies, and farm organization presidents. These leaders are and have been informed facilitators of rational and constantly changing government policies. While subsidies are still plentiful, the policy landscape has changed and is changing in the direction of placing greater emphasis on resource issues, nutrition programs, and food safety. Farm Foundation assists this process of policy adjustment by helping people understand the impacts of proposals for farm, resource, and food policies and programs.

A Survey of the Policy Landscape Affecting Food and Agriculture

The global agriculture and food system now faces structural changes as great as any faced in the past – even considering the massive substitution of capital for labor during mechanization and advances involving hybrids in the first half of the last century and the continuing technological advancements including chemical fertilizers and pesticides and a flood of new varieties, rapid advances in disease control, and the new genetics from biotechnology that occurred in the latter half.

Each of those seismic shifts made the system more efficient and more commercial. But, the current revolution – a tired word, by now, if there ever was one – is affecting the complete system almost at once. It appears to be shifting both demand and supply – demand, through the very sharp expansion of markets for a few commodities, and supply because the potential demand expansion is almost infinite as far as agriculture is concerned; and its cost pressures are adjusting unevenly throughout the system, also driven by nonagricultural trends concerning energy and global politics. Thus, it could mean not just the adjustment of one or a few prices but of almost all prices up and down the various marketing chains.

In the past, only vast wars have had a similar impact. Now, the renewable fuels revolution, in a single stroke, is transforming a system that has traditionally out-paced all food and fiber demand growth into one facing ratcheting worldwide pressures on basic agricultural resources.

The world today is better equipped to deal with these sharp changes than it has been in the past, but a key question is whether it is equipped and prepared well enough. We are used to the advent of major new technologies, ever-changing consumer wants, new policies, and a host of other factors that have demanded adjustment and adaptation. But the required adjustments now beginning could approach even faster and deliver more widespread impacts because they will be global. The interconnections across economic sectors and across oceans are now more numerous, more direct, and more immediate and will be more difficult to harness than nearly all of those of the past.

At the same time, policy issues have become more complex, more globally intertwined, and have enormously important impacts for the business environment. But, while market and technical forces are already signaling rapid shifts, many gov-

¹ The author is chief economist, Deere & Co. He previously served as Under Secretary for Farm and Foreign Agricultural Services, USDA, and has also served as senior staff economist in the President's Council of Economic Advisors. He is a member of the Farm Foundation Board of Trustees and a fellow of the American Agricultural Economics Association.

ernments still intervene to remarkable extents and struggle to be abreast of the rapid pace of development and to remain relevant.

This chapter is a very brief survey of some long-standing, evolving, and emerging issues as they appear across the policy landscape, now and soon confronting the food and agriculture business.

Renewable Energy

The agriculture industry long has sought to expand its markets beyond food and fiber, and into other markets, especially for industrial products. Such efforts met with little success until recently when conditions converged to stimulate investment in production capacity for renewable fuels. Several factors are contributing to this new trend including subsidies, mandates and environmental concerns; but the major factor was a sharp increase in petroleum prices and geopolitical tensions across the Middle East, among other regions.

Both Brazil and the United States long have had significant ethanol industries; and production of biofuels has occurred elsewhere, although quantities have been relatively small. The current market environment now is attracting enormous amounts of capital, and capacity is expanding rapidly in many parts of the world. Agricultural commodity prices, reflecting this new demand as well as that resulting from global economic growth, have moved to significantly higher levels, and long term futures market prices show them remaining there through much of the decade.

Despite the enormous interest and excitement in the new trends, the world still does not know quite what to make of the renewable fuel phenomenon. The agricultural community generally views it favorably, as do proponents of reduced dependence on foreign oil and some environmentalists. At the same time, it is generating concerns about the long term environmental impacts associated with certain cropping practices and rotations, the extent of the subsidies involved, the impacts of higher prices on other segments of the farm industry, and the erosion of US commodity competitiveness overseas as land prices rise sharply.

These growth trends and the adjustments they are forcing have spawned a more profound debate – food vs. fuel – about the competition for commodities for food use or fuel use and perhaps a reversal of the long-term trend of lower real commodity prices. While crop output thus far has been adequate to meet demands for all uses, the system is stretched; and prices are increasingly volatile so that any supply disruption would immediately ignite a fiery debate that could call the entire renewable fuel initiative into serious question.

There is potentially more to the story. Renewable fuel proponents argue that the food vs. fuel issue can largely be avoided altogether by using feedstocks other than grains. A wide range of cellulosics is now being considered actively and alternative production processes developed to use a broad range of materials, at least some of

which can be produced on land other than the prime farmland used for food production. Significant funding from both public and private sources is being devoted to cellulosic research to improve the economics by increasing the biomass output per unit of land, developing more efficient conversion processes, and defining new infrastructure (producing, transporting, and storing huge volumes of biomass) to support a cellulose industry. The critical question is how much time and investment will be required for these obstacles to be overcome.

In the meantime, the sugarcane and corn-based ethanol industries continue to expand fuel production, with significant impacts on the agriculture industry, most notably cropping patterns and practices, marketing channels and pricing patterns. More change is in the offing as genetic improvements promise to boost crop yields quickly, thus changing machinery requirements, farming practices, handling and storage patterns, and likely extending the location of production beyond traditional areas.

This would seem to be an area in which forward-looking policy could help guide the rational development of a renewable fuels industry. Immediate issues already abound, such as whether to release government-idled, fragile land or remove the duty on imported ethanol. And, many more are waiting in the wings to be noticed, including how to structure a forward-looking farm policy in this changed environment and how to guide the emergence of a cellulose-based industry.²

Globalization – Trade Policy

It is ironic that just as the global food and agricultural system appears to be reshaping itself with emerging new markets and new suppliers (both largely in the developing world), the zeal for liberalizing international trade has diminished to the point of disappearing. Fears, in developed and developing countries alike, of further globalization and of strong competitors (such as China) – along with the growth of new domestic markets – appear to be outweighing the appeal of expanding foreign markets and new customers.

The latest in the post-World War II series of multilateral trade negotiations, the Doha Development Agenda launched in December 2001 in the very somber period just following the 9/11 terrorist attacks, now has all but ground to a halt with only the slightest possibility given to its revival and successful conclusion any time soon. Most observers expect it to go dormant for several years until the worldwide political mood improves and a new set of national leaders can once again build enough political capital to launch another bold initiative.

² There is, for example, a direct linkage between farm policy and energy policy that appropriately could be coordinated. Consider, the primary federal incentive for ethanol production is a \$0.51 per gallon subsidy. By 2015, this subsidy could cost more than \$7 billion per year (based on production of 15 billion gallons of renewable fuels, including 14.2 billion gallons of ethanol). Thus, assuming a continuation of the policies in the 2002 farm law, any projected *decrease* in commodity program outlays over the life of the 2007 farm law will (at least) be partially compensated for by the projected *increase* in ethanol subsidies.

Beyond the multilateral negotiations, the domestic politics of trade policy have turned bleak in many countries. Several factors are contributing but a backlash to globalization is an important one. The accelerated pace of change, sometimes with painful adjustment in concentrated sectors, has attracted extensive media attention while the considerable benefits, often widely diffused, found few vocal champions. That certainly has been the case in the United States where competition from foreign automakers was concentrated in the upper Midwest and where furniture factories and textile mills closed in the southeast. Even in places where the benefits of trade are most prominent such as rural areas where a major industry, agriculture, depends upon foreign markets for almost one-third of its total sales, support for trade often is only lukewarm at best. Thus, we now face the prospect of failure for four bilateral trade agreements pending in the Congress – all highly advantageous to the food and agriculture sectors. One, the Korea Free Trade Agreement (FTA), holds enormous potential for expanded agricultural sales. And, the extension of Trade Promotion Authority, which would facilitate additional new agreements, appears unlikely until a new administration is fully ensconced in 2009 and perhaps not even then.

The current sentiment toward trade does not bode well for the global food and agriculture industry, and it could well usher in a period of far more contentious trading relationships than in recent years. Important challenges, including several focused on US policies for cotton and corn, already are pending in the World Trade Organization (WTO), and many more are likely. At the same time, failure to conclude the Doha Round will erode political support for the WTO and its dispute resolution capability and authority among trading partners worldwide. A weakened WTO would be a most unfortunate development, coming just at a time when important new challenges involving non-economic trade barriers are fast emerging.

The new challenge appears in the form of sanitary and phyto-sanitary regulations that are increasingly becoming significant trade impediments. While such regulations inherently are science-based, the question naturally arises as to whose science and who is the arbiter of determining the currently accepted science involving plant and animal diseases and other technical matters. Three international bodies were meant to play the role: the International Plant Protection Convention – a part of the United Nation's Food and Agriculture Organization (FAO) – for plants; the World Animal Health Organization (OIE) for animals; and the Codex Alimentarius for processed foods. But, member countries have been very slow in expanding the capacity of these bodies to meet the growing challenge just as efforts have lagged in fully integrating them into the WTO process. Moreover, many members are simply refusing to abide by or even accept their guidelines for safe trading in products, as illustrated by recent blatant episodes involving BSE (mad cow disease) and avian influenza. Failing significant and speedy progress in this area, the disciplines of the international trading system will be severely challenged and further eroded, and especially should new diseases emerge.

The inward, clearly more protectionist sentiment in the United States also is being reinforced by recent food safety scares (involving domestic vegetables and imported Chinese products), emergence of interest in locally grown foods and the *food miles* indicator (the carbon footprint for food – emissions from transporting food long distances) and from concerns about terrorist tampering. Furthermore, these concerns are being reinforced by a growing mythology about the economic impacts of trade – even to the point where many Americans believe all trade is inherently unfair to them and a threat to their way of life.

New agreements that further facilitate global trade are about far more than just expanding commerce, of course. They are fundamentally about economic growth, about expanding the size of the economic pie for all, but especially for the developing countries, to narrow the ever-widening gap between the incomes of rich and poor nations. This was indeed the very premise for the current WTO negotiations, and the reason it was called the *development round*. Open economies, expanded trade, and expanded private capital flows – all break long-established protectionist barriers and bring new technologies and management expertise essential for more rapid growth and improved living standards.

If a long hiatus develops before the issues preventing a new multilateral agreement are resolved, the global income gap surely will only grow wider, further heightening animosities and global tensions. For many countries, especially the developed ones, expansion will continue as new partners for bilateral agreements are quickly found, but this process could be far more difficult for the developing countries, especially the least developed countries which have little to offer. (Already, talk is being heard of US-Japan and US-EU free trade accords). Unfortunately, the inevitable result will be splotchy agreements (of highly varying quality with variously omitted politically sensitive products and sectors) and trading patterns. In addition, such agreements can do little to solve issues (such as domestic farm subsidies) that require multilateral arrangements.

This is the very time that far-sighted policies are most needed, policies that recognize the dynamics of the global food and agriculture system including new supplier countries (e.g., Brazil) as well as emerging and new markets (e.g., the Asian region) emerging as literally millions of consumers cross the \$1 per day and \$2 per day rungs on the income ladder and enter the market economy. If ever trade facilitation agreements and rules were needed, the coming decade and beyond is the time. Harnessing the benefits of globalization and crafting new trade disciplines clearly is a paramount long term challenge.

Developing World Role

The role of the developing countries in the global economy has been significantly shifting for some time, especially with the sustained rapid growth of countries such as China and India and more recent growth of Brazil, Indonesia, and others. The size of

the developing countries economies in total has grown to the point that they now constitute fully 25% of the global economy (\$9.6 trillion out of \$37.3 trillion, in constant 2000 dollars) – but they are growing twice as fast. One significant result of this growth is the impact on the global food market. With 46% of the global population of some 6.5 billion living on less than two dollars per day, the growth that boosts incomes is propelling literally millions of people up another rung on the income ladder. This certainly helps improve the meager living standards and particularly helps improve diets in terms of both the quantity and variety of foods. The expanding demand for food, particularly in the developing countries was already contributing to the strong growth in commodities demand, well before the grain/oilseed price explosion related to renewable fuels that occurred in September 2006.

Economic prospects for the developing world appear favorable, at least for the foreseeable future as their resources become more valuable, according to the World Bank and other forecasters. This would suggest that the developing countries in the aggregate will continue to play an increasingly important role in the global food markets on the consumption side.

The developing world also is drawing greater attention on the production side of the global food and agriculture markets. Prospects are improving for expanding agricultural output and improving productivity in several important parts of the world. In the upper tier of developing countries, Brazil in recent years has burst upon the scene as a major producer and exporter. It also is one of the few places in the world with the land resources to rapidly expand output and is fast developing the infrastructure to accommodate such growth. Several of the Commonwealth of Independent States, notably Russia, now are expanding output after achieving some greater stability following the breakup of the Soviet Union. China is improving productivity and expanding output of certain commodities. India now has a concerted effort underway to reverse declining productivity and significantly expand output. And, most notably, in Africa where per capita food production actually has been declining, several initiatives also are underway to reverse the decline, better utilize the available resources, and thus be able to better feed more of the growing population.

It is this consumption and production activity that should make the Doha market access negotiations particularly attractive to the developing world – expanding trade among developing countries themselves, especially since 70% of the duties the developing countries pay today are to other developing countries.

Nevertheless, the growing roles of the developing countries as both suppliers and consumers promise to significantly alter the global food market dynamics, trading patterns, and competitive landscape in the years ahead.

National Farm Policies

Farm policies in the developed countries continue to be a significantly contentious issue despite the widespread and growing view that they are anachronistic, and

even harmful to producers, economic growth, and sector stability. In the United States, the time when a clear objective was being addressed by these programs seems to have passed long ago; so today proponents find it increasingly difficult to identify the coherent objectives necessary to be highly persuasive.³ Continued passage of conventional farm bills increasingly requires ever-expanding coalitions along with expanded funding in order to placate would-be reformers. This situation results in a hodge-podge of programs, many with increasingly predictable, although unintended, consequences, which spawn distortions throughout the sector and the economy. Yet today, market conditions appear poised to make redundant many of the provisions of the programs that remain in place.

Several new considerations have come into play in recent years; these have heightened uncertainty around the programs and that could well contribute to significant change in the future. Globalization has ended the time when domestic policies and programs could be pursued with little notice given to their effect beyond national borders and on other producers and consumers in other markets. Policies that result in real or perceived adverse impacts on others, at the very least, result in global disapprobation for the offender if not a direct challenge in the WTO.

This has certainly been true for both the European Union and the United States. The passage of the 2002 US farm law was followed immediately by a chorus of criticism from around the world (as well as in the United States). The principal charge was that the domestic supports provided by the law alter the global competitive landscape – domestic subsidies encourage extra production that moves in part into world markets depressing prices to the disadvantage of other producers. West African cotton producing nations pressed this point through the Doha negotiations, placing US negotiators on the defensive and somewhat souring the atmosphere around

³ Even though there are only about one-third as many farms as in 1940, the sector has continued to expand its volume and sales, meet virtually all US food and fiber needs, and also be a major supplier to markets overseas. As farm numbers have declined, the dominance of commercial operations has grown, with many operating on a very large scale. In addition, farms have become more specialized in their operation and far more diverse in their organization.

For more than 30 years, U.S. agriculture has been tri-modal in structure – *commercial* operations with annual product sales of over \$250,000 each; small, *lifestyle* farms with annual sales of less than \$100,000 each (and usually with negative net farm income); and a *transition* group with annual sales of between \$100,000 and \$250,000 each. There have been significant changes in the relative importance of each group to the sector, even since the mid-1990s.

This presents a real dilemma in defining a one size fits all policy since individual producer needs and those of a very diverse sector vary widely. Even when focusing on only one segment such as the commercial sector, policy dilemmas quickly emerge owing to the continuing consolidation.

The commercial segment's trend toward concentration is evident from noting the (declining) number of large operations necessary to account for 50% of sector sales. The importance of the larger farms is startling. In 2002, a mere 389 farms accounted for 10% of all sales with an average of \$51.6 million each. Another 3,201 farms accounted for an additional 15% of sales and averaged \$9.4 million in sales each, while 30,495 farms accounted for an additional 25% of sales with an averaged of \$1.6 million in sales. That is, only 34,085 farms accounted for 50% of total farm receipts that year. Two million other farms shared the remaining 50% of sales, averaging only \$47,888 each.

Farms with annual sales over \$1 million almost doubled their sales between 1996 and 2004 – in fact, this 1.6% of farms provided almost 45% of the total value of farm production in 2004.

[All data and calculations are from the most recent (2002) United States Department of Agriculture/National Agriculture Statistical Service Census of Agriculture and USDA/Economic Research Service.]

the talks. More directly, the Brazilian government led a group to formally challenge the US cotton and other programs through the WTO. The dispute panel found the programs noncompliant, and the matter continues unresolved, but it likely will reverberate for a long time.

Now it is virtually certain that more challenges will be made to the developed country subsidy programs, especially those of the EU and United States. This creates a high degree of uncertainty surrounding the programs, and has led at least some of their beneficiaries to search for alternative support systems that are WTO-compliant. In spite of these developments, little attention has been given by researchers in universities or think tanks as to the potential for the developed country farm sectors if they were unshackled from the decades-old programs.

The EU meanwhile, with total subsidies approaching four times those of the United States, has been able to move itself out of the cross-hairs of global criticism by decoupling its programs so that benefits no longer depend upon what or how much is produced. Still, its policies are criticized, especially on the grounds that it simply moved supports from one WTO box to another. Critics contend that changing the form of support is only a partial substitute for greater reductions in their level and that border protections as well as the supports that remain still distort markets significantly. The EU has a scheduled 2008 health check for its earlier Common Agriculture Policy "reform," but big questions still remain as to the policy's purpose and eventual direction.

While the developed countries' domestic subsidy schemes are under increasing criticism, some of the developing countries most prominent in leveling that criticism appear to be standing on slippery slopes themselves. As their affluence grows, they are succumbing to the temptation to subsidize their farm sectors in distorting ways, as well, when domestic political pressures become intense. Perhaps the most notable of these is Brazil whose subsidies to commercial producers now exceed several billion dollars annually. India, China, and Mexico also are becoming more prominent, while Korea, Taiwan, and other upper-tier developing countries provide immense border protection to their farm sectors. This trend further underscores the need for a robust multilateral trade accord to obtain first a standstill and then roll-back in distorting domestic support schemes.

Climate Change and Carbon Trading – Agriculture/Forestry Role

The debate about humanity's influence on the global climate appears all but settled, with a fast-forming consensus that some action now is required to reduce atmospheric greenhouse gases. In the United States, a critical development was the ruling by the Supreme Court that carbon dioxide is a pollutant under the regulatory jurisdiction of the Environmental Protection Agency. Meanwhile, individual states already are enacting measures to control carbon dioxide emissions, and several far-reaching proposals recently have been placed before the Congress. Various ap-

proaches for effecting large-scale reduction of emissions have been advanced, ranging from strict regulation with punitive taxes to voluntary, market-based programs. Regardless of the approach suggested, recognition appears to be growing that carbon dioxide can be removed from the air and stored in terrestrial ecosystems – concepts that present an opportunity for farmland and forests to be included in measures to address the problem.

Much discussion has focused on so-called *cap and trade* systems involving limiting and subsequently reducing greenhouse gas emissions and allowing trading in carbon emission permits on transparent markets such as the Chicago Climate Exchange. Agriculture and forestry can both remove carbon dioxide from the atmosphere and prevent emissions from occurring, thus creating *offsets* to emissions, which would have value in a cap and trade scheme. This would occur through changes in land use and production practices and require comprehensive definitions and standards defining such practices and denoting their effects.

The type and extent of a role for agriculture and forestry is still an open policy question of potentially enormous consequence for the sectors. Just as industrial products such as renewable fuels open a market beyond food for agriculture, so would creating offsets, tangible products with an economic value that also help address a much broader social problem.

Food

Any look across the policy landscape reveals food as a substantial issue that takes many forms – but which is perhaps not yet embodied in clearly distinguishable forms for action. Several public policy aspects of food are already debated in the policy arena, while several others appear to be just emerging or evolving into new forms.

Recently, much attention has been given to food safety following *E. coli* outbreaks in California vegetables, adulterated products imported from China, and various other product recalls. Added to this is an ongoing concern about terrorist threats to the food supply – and the general backlash against globalization and food imports. Although not particularly focused, such concerns keep alive discussion of the merits of consolidating regulatory functions now spread across several agencies into a single food agency in the United States. They are prompting regulatory reform in China and much more stringent regulation in many other parts of the trading world. They also continue to have trade implications, such as adding to the backlash against China and possible punitive measures by the Congress to address the bilateral trade imbalance. And, such concerns also figure into the locally sourced food movement, on the dubious premise that local food is likely to be safer than that which comes from far away.

Another aspect of a food-related issue with enormous implications is obesity and dietary change. It seems clear that consumption patterns already are beginning

to change and likely will continue for some time as the consuming public gains greater awareness and responds to the issue. The implications for food and agriculture are for potentially significant shifts in consumption patterns, which ultimately would be reflected in the production sector and on through the value chain. While specific impacts are difficult to predict, foods such as fruits and vegetables would appear to be favored.

It also is highly likely that the obesity issue will manifest itself in a number of different public policies. Under the guise of dietary improvement, for example, the U.S. House of Representatives included additional funding in its version of the farm bill for direct government purchase of large quantities of fruits and vegetables for the school funding programs. Conversely, arguments against supports for other products have been made (although to no avail) citing their contribution to the obesity problem.

A relatively new development is the emergence of a local food movement, variously described as the new organics movement. The emphasis is upon sourcing food locally, a response to food safety concerns, the carbon footprint of food, diet, and other factors. It is being reflected in a large increase in the number of small-scale farmers around urban areas who sell directly, community gardens, and various other arrangements to procure food much closer to the point of consumption. While still on a small scale and a miniscule share of total consumer spending for food, it could pose important implications for the food and farming system should it become larger and be enduring.

Very recently, discussion concerning the appropriate form, efficacy, and effectiveness of international food aid has intensified. Donor countries typically provide assistance both directly and through international bodies, most notably the UN's World Food Program. And, over time most countries have come to provide their contributions in cash. In contrast, the United States, long the largest contributor (well over one-half) of both emergency and developmental food aid, has insisted on providing in-kind (food commodity) assistance. Moreover, the commodity aid must be from U.S. farms and be transported in U.S.-flag vessels.

Increasingly, the efficiency of this approach is being called into question. Critics note the high cost of transporting commodities long distances, especially recently as shipping costs have increased enormously, the lengthy time requirements to delivery, and the significantly higher costs of U.S. vessels over those of competitor countries. And, for nonemergency aid, the practice of monetization (selling donated commodities in local or nearby third country markets and using the proceeds for development projects) is being questioned as well. Critics argue that the practice depresses prices in local markets, thereby reducing incentives for local farmers to expand output, thus perpetuating shortages. This recently led one major international nongovernmental organization to announce its refusal to accept such food donations in the future.

In addition, U.S. food aid practices have become an issue in the current Doha Round WTO negotiations. The allegation is that commodity food aid amounts to an export subsidy, in essence a means for disposal of surplus output, thus distorting markets to the detriment of other producers.

There are, of course, credible counter arguments to all of the specific criticisms. For example, there is ample evidence of cash contributions being easily diverted and ending up in Swiss bank accounts rather than as food packets in famine-stricken areas. But, proponents of the current system are quick to note that the overall amount of assistance is closely connected to the form of that assistance. They emphasize that global food aid requirements are growing and that donors will be asked to do even more in the future. They suggest that without the strong political support of the agriculture and maritime interests for commodity food aid, the Congress would be unlikely to continue funding even at current levels. Early tests of this notion soon may be evident since proposals for allowing some cash donations or purchases of non-U.S. origin commodities are included in the farm bill now wending its way through the Congress.

In any event, the structure of the global food aid system, especially for emergency assistance, can be expected to be a continuing issue. There appears to be growing global sentiment for all donor contributions to be cash and coordinated through a central body, likely the World Food Program. Proponents can be expected to pursue this notion even though the largest donor nation continues to reject it.

Water

Water is fast becoming the most constraining natural resource for the agriculture and food sectors worldwide. Water resources are under pressure due to increased competition from urban and industrial users, regional scarcity, use inefficiencies, security, pollution, and ecosystem impacts. Global consumption, only 10% of accessible freshwater in 1900, is well over one-half today and likely will reach 70% by 2025. Tension and conflict can be expected to increase around issues related to security, quality, availability, and cost of water as consumption likely will continue to increase faster than population growth.

Agriculture accounts for 70% of total available water use and can expect to come under increasing regulation and oversight as competition for this resource intensifies. Freshwater availability will dramatically affect future agricultural practices and the location of food production around the world, as it has traditionally done. Scarcity can be expected to drive improvements in irrigation technologies and foster new farming practices. Greater emphasis will be given to water management and to market pricing and trading rights.

Labor – Immigration

The availability and mobility of labor already is a major issue in several parts of the world and can be expected to become more important as we move farther into the century. Shifting demographics point to shrinking labor forces in most developed countries, especially in Central and Eastern Europe, the northern Mediterranean, and parts of East Asia including Japan and South Korea. Making the transition will be difficult and brings to the fore the appropriate role of government in facilitating the adjustment.

More immediate is the array of very complex labor issues in the United States, each of which has huge economic as well as social implications. And, food and agriculture are among the economic sectors most affected. Without immigrant workers in both food processing and certain farming sub-sectors, labor is simply not available in some areas at wages employers are willing to pay or can pay and still be economically competitive. Without access to casual, seasonal labor, considerable restructuring and perhaps relocation of agricultural sub-sectors will be required. Even though the problem is acute, the Congress has been unable to enact legislation that might have rectified the problem in dealing with immigration. In its absence, two developments are bringing greater turmoil to the situation. First, states and some municipalities are moving to address the issues with a variety of often restrictive measures. Second, the federal authorities have stepped up enforcement of laws that forbid employers to use illegal workers. The result is a most unsettled labor situation affecting both production agriculture and certain food processing sectors.

Clearly, the situation is untenable for any length of time, but how it is resolved has important implications. At its most elemental level, it involves the variability and future location of certain types of farming (labor intensive) and of meat and poultry production and processing, among others. It also relates to the pace of capital-labor substitution where that is still possible, competitiveness in international markets, and a host of other indirect and tertiary aspects.

Stepping back and looking ahead across the global landscape, it is obvious that labor availability, cost, location, and skills will be important factors determining the characteristics and scale of the agriculture and food sectors of many countries of the world. That, in turn, will importantly determine future investment flows and trade patterns.

Concluding Observations

The agriculture and food system is in the midst of a thoroughgoing restructuring that is, as yet, only superficially recognized and widely misunderstood. These trends are being driven not by one major development or event as in the times past but by a confluence of powerful forces reflecting market changes, technological advances, and public opinion and policies. World economies and consumer incomes continue

to grow, especially in places where any additional purchasing power first stimulates food demand. As these markets expand, new suppliers also are gaining prominence, with investment stimulated by strong commodity prices. At the same time, industrial demand for commodities for biofuels now has reached significant proportions and promises strong additional growth in the near future. The already-strong competition for resources appears certain to intensify and has propelled commodities and their markets to new importance and significance.

Much of the new market-driven activity has been made possible by relatively recent technological advancements. Some, like agricultural biotechnology, are widely known, but it is the combination of several technologies, mostly little-known, that is driving productivity gains, output expansion, and new product developments. Computers, global positioning satellites, ubiquitous monitors and sensors, and creative software developments – in machines, irrigation systems, storage, and processing facilities along with plant and animal genetic enhancements, new farming practices, and myriad other scientific advancements, perhaps minuscule by themselves but suddenly in combination with others, which make new products and processes possible through enormous efficiency gains. Some also enable environmental improvements at the same time.

These developments are affecting both developing and developed countries, a fundamental change in the global economic structure. Thus, in this century for the first time in history, globalization is supporting the benefits of growth worldwide. It is offering economic incentives and advanced communications technologies that insure that new farming, food processing, and renewable fuel technologies are almost immediately available worldwide.

The broad scope and rapid pace of all this market-driven change and technology inevitably will come into conflict with social attitudes, policies, and regulations that fight change. Governments and their institutions by their very nature are slow to react and prone to address yesterday's problems rather than anticipate and avoid problems of the future. The potential negative impacts of retrogressive policies can already be seen in many areas where globalization has made policy issues more complex and intertwined while existing institutions struggle to keep pace and maintain relevance.

Even a cursory review of the policy landscape clearly suggests that such policy issues can be expected to become more numerous and more intractable. And, it clearly suggests that if we are to realize the full potential of the opportunities now before the global food and agriculture system – not only to better feed the world but also to provide renewable energy and stimulate rural development in an environmentally sustainable fashion – then more visionary policies and regulatory practices are essential along with expanded commitments to principled policies and rapid adjustment by governments and institutions to accommodate future global trends.

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Agriculture, Food Systems, Rural Communities, and the Global Marketplace: Contradictions and Complementaries

In graduate school Walter Armbruster was interested in all of the specializations agricultural economics had to offer. The breadth of the Farm Foundation program has been a hallmark of his tenure as President. He views agriculture with knowledge of the economic, social, and natural environment in which it exists. The following words reflect Walter's perspective, with emphasis here placed on common forces underlying concerns about food, agriculture, the natural environment, and community development.

The United States in a global context is the focal point here. Again, this is consistent with Walter's perspective. Three fundamental developments are identified initially. The discussion that follows deals with contradictions inherent in these developments and then with complementarities that may relieve these contradictions.

Fundamental Developments

Attention is first directed to changes in perceptions of the U.S. work force. Consider gender and ethnicity, for example. It is illegal to deny opportunity based on such characteristics, and the widespread compliance that prevails suggests support for both the spirit as well as the letter of the law. The energy and imagination of large numbers of the population have been enhanced with positive impact on production, consumption, and lifestyles. Only one illustration need be cited. Sandra Batie, now Professor at Michigan State University, and Walter were fellow graduate students at Oregon State University. In 1990 Sandra became the first woman to be president of the American Agricultural Economics Association, an organization in existence since 1910. Since 1990, three additional women have been elected to that office. Comparable examples could be cited for numerous areas of human endeavor in the United States.

A second development pertains to public policies for protection of the natural environment. There is little need to review Earth Day 1970, or environmental measures since then, for those likely to read this book. Regardless of how one regards particular environmental protection measures, few deny the fundamental importance of the environmental movement.

¹ The author is professor emeritus at Oregon State University. He is a fellow of the American Agricultural Economics Association.

The growth of the global marketplace constitutes a third significant major force considered. Improvements in knowledge together with resulting technical innovations, especially in communication, have magnified the potential impact of world trade. Practical people understood this, and political changes have followed.

These three developments are socially and economically interdependent and have not yet run their course. Women, and others, have not yet achieved full equality; environmental protection measures continue to be forthcoming; and trading opportunities remain to be discovered and implemented.

Contradictions

Contradiction 1

A glaring contradiction exists with respect to attitudes about the U.S. labor force and immigration policy. Through its existence the U.S., justifiably, has been proud of its willingness to accommodate and assimilate immigrants, although not always without prejudice. It now must accommodate a strong demand for labor, share an extensive border with a nation having a lower per capita income and excess labor. The U.S. is pondering if it wishes for a segment of its population to remain part legal and part illegal indefinitely. The U.S. agricultural industry is a part of this complex situation and will be affected by any immigration reform measure that may be adopted.

In 2001 irrigation water was curtailed on a reclamation project in the Klamath Basin of Oregon by actions taken under the *Endangered Species Act*. The sucker population in the Upper Klamath Lake was believed endangered if water levels were not maintained. The loss of income by irrigators commanded great media attention. Native American interests let it be known they had long suffered from the loss of natural resources taken by northern European settlers decades earlier. In stark contrast, essentially no attention, media or otherwise, was given to the farm laborers, mostly Hispanic, on the previously irrigated farms. When it became apparent considerable land would not be irrigated in 2001 and few crops harvested, many of these people quietly departed from the area. Most probably went to labor markets elsewhere in the U.S. At that time Oregon had one of the highest unemployment rates in the U.S., and Klamath County had the highest unemployment rate in Oregon (in excess of seven percent). The local community provided significant help for the families of farm laborers who remained in the community temporarily as breadwinners sought employment elsewhere.

The contradiction becomes clear. The U.S. typically has recognized a collective responsibility for domestic economic participants. The justification for exclusion here rests on the illegal nature of the immigrant farm workers, even though employers knowingly employ illegal workers. Does our society bear a responsibility for the welfare of these illegal workers? Generally speaking, labor laws outlaw discrimination except for violation of immigration laws. Such violations occur in labor markets

both by those who supply as well as by those who hire labor. American agriculture and rural communities clearly have a stake in how this contradiction is addressed.

Contradiction 2

There exists an uneasy alliance between environmental interests and the agriculture – food industry. Since Earth Day the environmental movement has attracted additional adherents, and the food industry has become increasingly consolidated, reflecting globalization and economies of scale.

Busch and Bain write:

Virtually every nation on earth, and the international community, has four distinct agencies responsible for and mandated to enforce food safety, animal and plant health, environment, and labor standards.

Regulation of the agriculture-food industry is fragmented within, as well as among, the four areas identified by Busch and Bain. Regulations typically are related to specific, identifiable problems. Public support is essential to the environmental movement, with such support depending on the identification of problems broadly perceived.

The agriculture-food industry responds over time to its own imperatives. Many observers have noted that farming has become increasingly bimodal. Commercial farms integrated with the commercial food industry have decreased in number, but those remaining have greater output. Those farms that rely more heavily on direct marketing, or short supply chains, have increased in number and, on average, have greater volume. The driving forces in the two cases are very different.

The integrated food industry depends on technology that permits volume production, processing, and marketing. Globalization has increased size of market enormously. And, as Adam Smith taught more than 200 years earlier, size of market is a major source of increased efficiency. These increased efficiencies affect every phase of the industry – production, processing, financing, and marketing – although the rate of change is not uniform among all phases of the industry.

The dynamics of economic change are different for those farms that rely heavily on direct marketing or short supply chains. The differences stem in an important way from economic differences between homogeneous and heterogeneous products. Those farms that rely on direct marketing must distinguish their output in the minds of consumers from output of the integrated, high volume, food industry. These qualitative distinctions may include taste, appearance, and environmental quality as well as other characteristics. Not surprisingly, farms emphasizing direct marketing likely are near population centers with potential affluent customers.

The contradiction here is how an integrated industry characterized by significant economies of scale can best accommodate regulations at various fragmented

points in the production-processing-marketing process. I served for eight years on the Environmental Quality Commission in Oregon and spent a decade with a public policy environmental think tank in Washington D.C. I believe the uncertainty of environmental regulation is of greater concern to industrial firms than regulation as such. Industrial firms tend to favor regulations sufficiently specific and stable to permit their cost to be incorporated in business plans. Direct market farms have their distinctive environmental problems. If environmental standards such as organic are specified, specific production practices and defined output often follow. Economies of scale opportunities will exist if warranted by size of market.

Contradiction 3

Rural communities in the United States exist in an urban dominated society. Dependable anticipation of rural developments rests on an accurate assessment of urban trends. These statements hold both when the focus is on rural areas near urban boundaries as well as on the distant countryside.

The pull of the urban on the rural is nowhere more dramatic than with rural young people. They have migrated to urban places in great numbers for several decades. The older, less well educated, and less physically able have tended to remain in rural places. Metropolitan places often have spilled outward and encompassed previously non-metropolitan places. Clearly proximity makes a difference. Increased urban employment possibilities can transform a rural labor market. A higher percentage of the non-farm labor force in the United States resides in rural places than is the case in most industrialized countries.

The distant hinterlands are affected as well. The distant small place typically has excess capacity in most of the services it offers, and additional population and additional economic activity are highly attractive. As a result, competition often develops among such places for activities that urban places do not want. Extraction industries, penal institutions, concentrated livestock operations provide examples. Success in attracting such activities may be counterproductive in a longer run setting; a place may later become even less attractive than it would have been in their absence.

Rural America, then, is a study in contrasts. There may be an abundance of economic opportunity near metropolitan or urban places. At another extreme, some hinterland places yearn for more people and greater economic activity. Yet rural places typically may have one thing in abundance that is in short supply in densely populated places – natural environmental amenity assets. The great challenge in rural America is to bring this relative abundance and scarcity of human and natural resources together in mutually satisfactory ways. This is a task that decentralized market based economies have been unable to resolve in developing economies around the globe.

Can Contradictions Become Complementarities?

New concepts and different social arrangements will be required to turn the contradictions described above into complementarities. Yet this is what the American experience has been about – making use of new institutions to elevate the population to improved levels of well being in the presence of great difficulties.

The approaches advanced are not adoption-ready and cry out for improvement and modification. If progress is to be made at least three processes must be at work:

1. Established institutions periodically reassess and reorient as economic and social change occurs.
2. Innovations are made because a premium is placed on new ways of viewing old problems.
3. Social learning occurs as new information is recognized, evaluated, and used.

How Will Group Decisions Get Made?

The federal-state-local division of powers in the United States has provided a large and diverse nation with important flexibility and adaptability. This fundamental structure has been tested in numerous ways including a great civil war.

Each level of government has responsibility for an accumulation of responsibilities and duties that arose from a different priority mix than exists at present. There is great need for an identification of those items for which each level of government has a high comparative advantage. When this is accomplished, the best level for dealing with other responsibilities would be easier to recognize. For example, the discovery, statement, and protection of fundamental national values clearly are a special responsibility of the federal government. Yet the implementation of programs consistent with those values need not rest exclusively with the federal establishment. State governments may have a comparative advantage in the testing of, and experimentation with, new approaches and directions. And local government typically is uniquely suited to discovering and accommodating local comparative advantage and conditions.

Unfortunately, prevailing economic theory does not fit well with this political structure. Neoclassical economic theory provides only for group decisions at the micro and macro levels; everything between is ignored. The implicit conclusion is that group decisions exist only at the national level with individual economic decisions coordinated only by markets or federal governments. To be sure, regional, urban, and rural economics have developed approaches and techniques that are useful at the intermediate level. Regrettably, these approaches have not been incorporated in mainstream neoclassical economic theory (Castle). Recognition of intermediate group decision making and an appreciation of the comparative advantage of different levels of government – federal, state, local – underlies the following discussion.

Attention is directed next to the simultaneous operation of trends described at the outset – perceptions of the labor force, different relations between agricultural and environmental interests, and changing global trade relations. In each of the following sections some facet of reality is discussed that is currently being ignored or neglected.

Legal or Illegal?

Our nation is engaged in a vast social experiment. We build walls to keep people out. But we need workers and pay them to come. Communities extend and withdraw various umbrellas and safety nets. There is variation among state and local governments with respect to benefits provided and civic responsibilities expected. This vast experiment is generating an enormous amount of information that is neither collected nor analyzed nor used generally.

The information has the potential of informing legislators and others as they struggle to develop immigration legislation. Yet one must ask if we are wasting much of the value of the events unfolding before our eyes. Leadership is needed to describe this potential and identify how it can be realized. Educational institutions, public policy institutions, other nongovernmental organizations, and federal agencies all could play important roles.

The global marketplace is rapidly changing the human resource needs of this Nation as well as others. The experiment described above provides an opportunity to bring basic empirical information to bear in designing alternatives and estimating consequences of different courses of action. Perhaps the Farm Foundation and other foundations could stimulate the Land-Grant Universities to provide leadership in analyzing the results of this vast social experiment. The traditions of our nation are consistent with viewing current immigration problems as an opportunity to create new institutions capable of dealing with needed social change in the global marketplace.

Agriculture, Food, and the Environment: Who will control the Environmental Agenda?

American agriculture has many accomplishments to its credit. It has provided abundant food to many at increasingly lower prices. Certainly it is entitled to some of the credit for the longer lives and improved health of the population. Even so, the environmental side effects have not always been desirable. Ground water contamination, unhealthy working conditions, and soil erosion provide examples. It is not obvious how best to make these historically conflicting objectives mutually compatible. But the best chance of doing so is to work with, rather than against, prevailing powerful trends.

Global markets have brought the production, processing, and marketing of food under the control of extremely large commercial firms. The global marketplace has permitted economies of scale to flourish. Can such organizations be made to ad-

dress the needs of the natural environment, the welfare of consumers, and the requirements of a successful business?

Approaches to environmental protection in the United States have fallen in two broad categories. One has been labeled “command and control.” With this approach regulatory authorities seek to impose control over what is produced or over how it is produced or both. The other approach relies on simulated markets and imposed market type economic incentives. Neither approach is ideal for application in a global marketplace for food served by large multi-national firms.

The command and control approach to environmental protection, as practiced in the United States, is based on an assumption, usually implicit rather than explicit, that environmental agencies have adequate budgets for whatever tasks they are assigned. For one example of the difficulty this can cause, consider the *Endangered Species Act*. This act asserts responsibility for all plant and animal species in the United States – clearly an impossible task. Elaborate criteria have been established for the designation of threatened and endangered species – clearly a monumental undertaking. Yet budgets for the accomplishment of these tasks are clearly inadequate. Under such conditions, political considerations are likely to trump biological importance when decisions are made about obtaining the greatest amount of species protection per dollar spent. This does not necessarily mean the act is poorly administered; rather it is a logical outcome of the unrealistic premises underlying the creation of the act.

In the case of agriculture and food, strict adherence to the command and control approach will be unsatisfactory for either environmental protection or operation of the industry. This is recognized by many environmentalists as well as industry personnel, even though some may be reluctant to discuss their concerns openly.

Both groups are taking some actions that may result in a new and different approach. Many agriculturalists have taken action, or made public statements, consistent with industry acceptance of major social environmental responsibility. So far as I know, major environmental interests have not indicated a willingness to entrust such a responsibility to industry. Yet realities of the global marketplace may force an industry – government environmental accord. Obviously such an accord would need to specify responsibilities of each. The final responsibility for specification of environmental industry standards must rest with government as agents for the public generally. This need not be in the absence of industry input, but there should be no question of where the final responsibility rests. Possible public reaction to failures to meet environmental standards will create market risk for firms within the industry. A properly designed inspection system combined with financial penalties would serve as a deterrent to irresponsible industry actions or negligence.

Existing trends are consistent with such an approach. (Busch and Bain) Fewer and larger firms facilitate coordination within an industry. Retail level firms have a vested interest in maintaining quality of the foodstuffs they sell. Fewer and larger firms have capacity for coordination of environmental standards across internation-

al borders. Increasing numbers of farmer groups have emerged organized around some form of environmental or product quality. As environmental regulations are better specified and stabilized, costs will be lowered, and with the prospect of improved environmental quality.

Human and Natural Resources in the Countryside

Neoclassical economic theory suggests human migration is the single best solution to economic prosperity, as well as among trading partners. Young people, and many of their parents, have long known that more economic opportunities are urban than rural based. These young people have migrated to urban places in great numbers for several decades. Rural places have retained a disproportionate number of older, less well educated, and less physically able people. These realities need to be recognized as strategies for rural people and places are formulated.

In the following paragraphs, brief suggestions are offered as guides for rural populations that find themselves at some distance from central cities or metropolitan areas. Even though they have not migrated to urban places, they should recognize their culture and their economy are urban dominated. This does not mean they need to emulate urban society in every respect. Indeed, in some cases there will be advantages associated with their uniqueness. Nevertheless, benefits will flow from knowledge of urban trends and aspirations. The following suggested strategies pertain to (1) human resources, (2) natural resources and natural amenities, and (3) human created amenities.

Even though all of the remaining population in a rural place are not as dependent on markets as are the young people who have migrated to the city, some rural people will be. Regardless of market dependence, opportunities for self investment should not be neglected. Rural or urban, modern society is complex and must be studied to be understood. Most rural places in the hinterlands have excess service capacity and can easily accommodate more people or economic activity. Even though there are more places looking for foot loose industries than the reverse, the most attractive places will be those with a socially aware population. Educational facilities should not be only for those who will leave but also for those who remain.

Rural places, by definition, have more space than urban places. An important service the rural place provides to the urban place is access to natural resource related amenities. The dramatic, spectacular, highly unusual natural amenity may not be necessary to supply urban demands. Space, openness, and solitude are in short supply in most urban places. Clearly the satisfaction of such needs comes at a cost. There is considerable evidence that urban people recognize this and are willing to compensate others for the enjoyment of such benefits. As local people use natural resources in traditional ways – for farming, forestry, and mining – they should be aware of their possible use as an amenity for urban people.

Not all amenities stem directly from natural resource use. Some are of human creation such as educational systems and cultural attractions as well as waste dis-

posals and water supply systems. Those attributes of a place that serve the existing population well usually will be attractive to prospective settlers as well. Consider housing as one example. Home ownership as a percentage of total wealth declines rapidly with increases in net worth. Typically there is a market for comfortable, well-maintained houses in most communities. This makes housing a high-priority investment opportunity for many rural residents. It contributes to enjoyment and morale in the present and holds the prospect for yielding financial returns in the future.

Conclusion

This chapter encourages thought about problems pertaining to agriculture, food, and rural communities that result from recent social trends. Unprecedented, inconsistent policies and social contradictions have arisen. Suggestions were made for different ways of viewing the division of responsibilities among federal, state, and local government; for intermediate decision-making (state and local), for agriculture and the environment, and for rural communities.

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Joe L. Outlaw, Luis A. Ribera, Henry L. Bryant
and James W. Richardson¹

U.S. Biofuels: Interaction and Outlook for Agriculture

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Interest in renewable energy production in the United States has surged – beginning around the turn of the 21st century. Renewable energy production generally refers to electricity production from several sources (hydroelectric, wind, solar, and methane digesters) and biofuels production (ethanol and biodiesel). From 2000 to 2006, biodiesel production grew from two to 1.6 million gallons, and ethanol production grew from 250 to more than six billion gallons per year.

Initially, biofuels production was primarily supported by farmers and their organizations as a mechanism to expand the market for their products as feedstocks for biofuels, thereby increasing the demand for their products and leading to higher prices. Environmentalists and community leaders joined in to support biofuels as cleaner burning, more environmentally friendly fuels that also increased economic activity in rural towns and communities by bringing in a new tax base and new jobs.

The final push for renewable energy in general, and specifically biofuels such as ethanol and biodiesel, came from President Bush in his 2005 State of the Union address when he championed biofuels as a real solution that would help lessen the reliance on foreign oil imports from questionable areas of the world, thereby increasing national security.

Governments around the world have enacted policies designed to encourage bioenergy production, encourage bioenergy use, and protect bioenergy producers from international competition. Some countries, such as the United States, have policies in place to do all three. In the short run, it can be argued that government support can provide the needed encouragement to develop a new industry. Past performance shows that political pressure arises to continue government policies designed to protect a new industry well beyond the startup years. However, in the long

¹ Outlaw is a professor and extension economist and co-director of the Agricultural and Food Policy Center, Texas A&M University. He is a member of the Farm Foundation Board of Trustees and the Farm Foundation Round Table. He a recipient of Farm Foundation's Outstanding Achievement in Public Issues Education award in 2002 and in 2003 (group award). Ribera is an assistant professor and extension economist and program director for international projects for the Agricultural and Food Policy Center, Texas A&M University. Bryant is a research assistant professor, Agricultural and Food Policy Center, Texas A&M University. Richardson is a regents professor and co-director of the Agricultural and Food Policy Center, Texas A&M University. He is a recipient of Farm Foundation's Outstanding Achievement in Public Issues Education award in 2003 (group award).

run, the cost of production will determine whether or not biofuels can be viewed as a viable energy alternative.

Bioenergy production is generally perceived in a positive light by the public. However, there are many industry observers who wonder whether the industry will crumble when and if the price of oil declines or the government reduces or eliminates the blenders' tax credits. The answer is – it depends. Knowing what the price of oil is only gives you part of the information needed to address this question. The other part being the costs of production and specifically feedstock costs. From early 2006 to early 2007, the price of feedstocks for ethanol basically doubled, while the price of soybean oil (the primary feedstock for biodiesel) increased more than \$0.10 per pound adding roughly \$0.74 and \$0.77 per gallon to the costs of ethanol and biodiesel, respectively.

As the industry matures, there will likely be combinations of low and high oil prices and feedstock prices that result in profits or losses for the biofuels sector. Price volatility is likely with and without government support. This paper summarizes the current situation and outlook for ethanol and biodiesel in the United States. Obviously the outlook will be influenced greatly by the production economics of the industries, meaning their costs of production relative to their substitutes – gasoline and petroleum diesel.

Status of Ethanol and Biodiesel

Even though ethanol and biodiesel production are both biofuels, they come from two very different processes and types of feedstock. Ethanol production, thus far in the United States, converts the starch in corn into ethanol. Biodiesel production converts vegetable oils, fats, lard, and recycled cooking oils into biodiesel.

Ethanol

The U.S. ethanol industry initially began to take shape in the late 1970s producing what was then called gasohol in response to a doubling of oil prices (increasing nearly \$30 per barrel). As a result of crude oil prices rising to nearly \$40 per barrel in the early 1980s, the industry expanded rapidly; and by the mid-1980s, there were an estimated 170 plants producing approximately 400 million gallons per year (Vander Griend). However, by July 1986, the price of oil retreated back to \$10 per barrel, and the gasohol industry collapsed as costs per gallon were not competitive with gasoline at lower oil prices. Few ethanol plants stayed in the industry, but those that did began focusing on decreasing production costs. By the late 1990s, the costs of production for ethanol were competitive with gasoline, primarily due to larger plants realizing scale economies, reduced enzyme costs, and higher corn to ethanol conversions. It should be noted that the blenders' tax credit remained in place throughout the 1970s and 1980s, providing about the same amount of incentive now as was provided some thirty years ago.

There are well over 100 ethanol plants in operation in the United States with around 50 more supposedly under construction. The U.S. ethanol industry has been expanding as fast as plants could feasibly be built. Over the past year, as corn prices nearly doubled, some of the proposed ethanol plants have dropped their plans and/or put them on hold. Most industry observers realize the Renewable Fuels Standard (RFS) contained in the *Energy Policy Act of 2005* will not be binding because significantly more ethanol will be produced than is mandated under the RFS. For ethanol production to remain profitable, the market demand for ethanol will have to increase, or the RFS will have to be increased. There are a number of proposals in the United States Congress that would significantly increase the mandated amount of ethanol used in the United States. These measures, if passed into law, would provide additional growth signals for the industry by expanding the demand for ethanol.

Table 1. Ethanol Production for All Uses for Selected Countries, 2004-2006.

	<u>2004</u>	<u>2005</u>	<u>2006</u>
	(Million Gallons)		
Brazil	3,989	4,227	4,491
U.S.	3,535	4,264	4,855
China	964	1,004	1,017
India	462	449	502
France	219	240	251
Russia	198	198	171
South Africa	110	103	102
U.K.	106	92	74
Saudi Arabia	79	32	52
Spain	79	93	122
Thailand	74	79	93
Germany	71	114	202
Ukraine	66	65	71
Canada	61	61	153
Poland	53	58	66
Indonesia	44	45	45
Argentina	42	44	45
Italy	40	40	43
Australia	33	33	39
Japan	31	30	30
Pakistan	26	24	24
Sweden	26	29	30
Philippines	22	22	22
South Korea	22	17	16
Guatemala	17	17	21
Cuba	16	12	12
Ecuador	12	14	12
Mexico	9	12	13
Others	364	732	297
Total	10,770	12,150	13,489

Source: Renewable Fuels Association (<http://www.ethanolrfa.org>).

Table 1 reports the 2004 to 2006 annual production (all uses not necessarily transportation fuel) for the major ethanol producing countries in the world. Brazil and the United States are by far the largest producers in the world. The United States remains the largest fuel market in the world. Given this distinction, it should not come as a surprise that many countries seek to export ethanol to the United States. The United States currently maintains a \$0.54 per gallon tariff on imported ethanol if it originates outside of what is called the Caribbean Basin Initiative (CBI). Countries within the CBI region can export ethanol to the United States and not pay the tariff. This has sparked a cottage industry of ethanol dehydration plants within CBI

Table 2. Imports to the United States by Source, 2002-2006.

Exporting Country	2002	2003	2004	2005	2006
	(Million Gallons)				
Brazil	0	0	90.3	31.2	433.7
Costa Rica	12	14.7	25.4	33.4	35.9
El Salvador	4.5	6.9	5.7	23.7	38.5
Jamaica	29	39.3	36.6	36.3	66.8
Trinidad & Tobago	0	0	0	10	24.8
Total	45.5	60.9	159.9	135.0	653.3

Source: Renewable Fuels Association (<http://www.ethanolrfa.org>).

countries that import hydrous ethanol from Brazil and send anhydrous ethanol to the United States. Table 2 contains the imports into the United States.

Biodiesel

In the United States, biodiesel has been experiencing rapid growth, increasing from only 0.5 million gallons per year in 1999 to 75 million gallons in 2005. As of January 2007, there were 105 biodiesel plants in the United States (National Biodiesel Board). Traditionally the industry was composed of relatively small plants (less than 10 million gallons per year). Over the past two years, there have been numerous announcements of larger plants (more than 30 million gallons per year) that have come on line. The rapid growth experienced over the past eight years appears to be slowing as vegetable oil prices have increased significantly, thus compressing plant margins. As with ethanol, there is an excise tax credit based on the percent of biodiesel in the blended product, up to \$1.00 per gallon for 100 percent biodiesel. As feedstock costs increase, the profitability of biodiesel production in the United States – even with the tax credit – will decline.

In the future, the pressure on biodiesel plant margins is expected to intensify as relatively higher prices for corn will cause further declines in soybean acres. With reduced soybean plantings, there will be less soybean oil (the primary feedstock utilized for biodiesel), and soybean oil will continue to increase, thus further reducing plant profitability. There are a number of studies indicating that over the next few years biodiesel plants will operate at less than capacity due to reduced profitability (FAPRI; Caldwell).

Table 3 summarizes 2005 biodiesel production for the major biodiesel producing countries in the world. Biodiesel production has largely been concentrated in Europe with Germany being by far the largest producer in the world.

Economics of Ethanol and Biodiesel

As indicated earlier, in the long run the relative costs of production between biofuels such as ethanol and biodiesel will determine whether they are economical alternatives to gasoline and diesel produced from petroleum oil. The following is a

Table 3. Biodiesel Production for Selected Countries, 2005.

	<u>Production</u> (Million Liters)	<u>Production</u> (Million Gallons)
Germany	1,921	507
France	557	147
United States	284	75
Italy	227	60
Czech Republic	136	36
Austria	85	22
Spain	84	22
Denmark	80	21
Poland	80	21
United Kingdom	74	20
Brazil	70	18
Australia	57	15
Sweden	7	2
Other Countries	102	27
World	3,762	994

Source: F.O. Licht, April 2006.

review of the latest cost of production estimates developed by the authors as well as those from other published research.

Ethanol

The primary feedstocks used to produce ethanol are grains (corn, grain sorghum, and wheat) and sugar cane. The process of making ethanol from grains has evolved over the past decade such that the grain (especially corn and grain sorghum) to ethanol conversion rate has risen while conversion costs have declined. Those new to the area may wish to view the extensive set of presentations given at four conferences on bioenergy coordinated by the Farm Foundation at their website www.farmfoundation.org. While ethanol yields per acre are higher for sugar cane based ethanol than any other currently available bioenergy feedstocks, it will not be covered here as there is currently no sugar cane based ethanol production in the United States. Around the world, scientists are racing to develop a low cost process to convert the cellulose from biomass into ethanol. While viewed as the future of ethanol production, it is discussed here because it will have a profound impact on the structure and viability of the current biofuels industry.

Grain. Ethanol costs of production using grain will vary from country to country depending on variables such as grain transportation costs, natural gas prices, and level of technology utilized. In the United States, for example, plant development has transitioned into a cookie cutter approach for new plants that are approximately 100 million gallons per year dry mill plants.

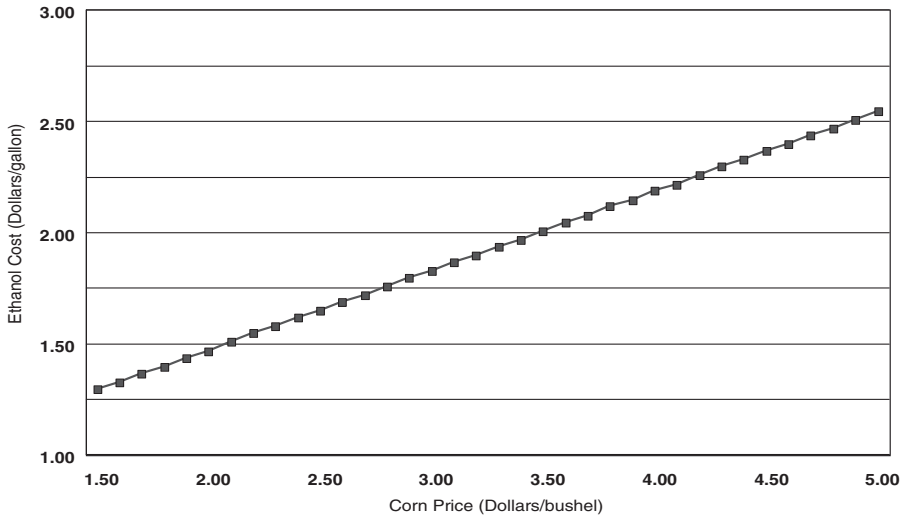


Figure 1. Ethanol Cost of Production Given Changes in Feedstocks Cost.

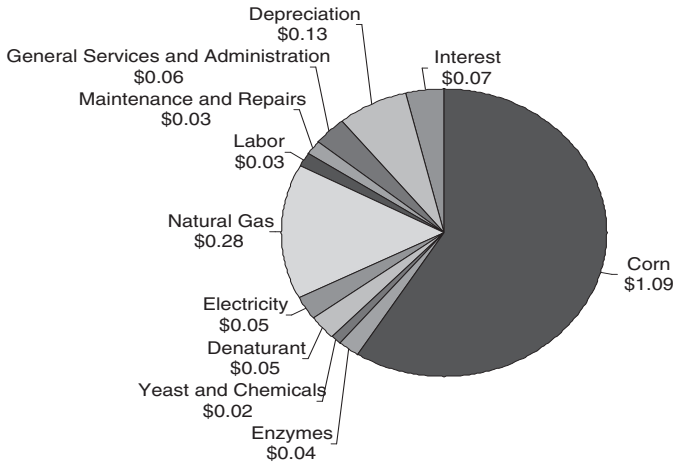


Figure 2. Estimated Costs (\$/Gallon) for a 50 MGY Dry Mill Ethanol Plant, 2006.

Source: Urbanchuk.

Figure 1 shows the relationship between the feedstock cost in dollars per bushel of corn and the cost of ethanol produced in dollars per gallon. The cost of ethanol (measured on the vertical axis) does not reflect the credit for DDGS sales.

Figure 2 contains a detailed breakout of per gallon costs of corn-based ethanol. As indicated, the price of corn makes up more than two-thirds of the cost of ethanol production. The other significant cost component is natural gas. The cost of ethanol

increases around \$0.25 per gallon for each dollar increase in the price of corn as long as DDGS prices maintain their normal relationship with corn prices (Eidman).

The authors' estimates of the total costs of ethanol production are \$1.81 per gallon in 2007 with a \$2.99 corn price (Richardson *et al.*). With an average ethanol price estimated at over \$2.10 per gallon and \$0.35 per gallon credit for DDGS sales, the plant has an expected profit of \$0.64 per gallon without any consideration of the blenders' tax credit. Other researchers have estimated similar ethanol costs with the primary difference being the corn price at the time of the study (Eidman; Urbanchuk; Shapouri and Gallagher; Tiffany and Eidman).

There are limits to the amount of grains that can be used to produce ethanol. For example, if the entire U.S. corn crop were used to produce ethanol, it would only yield approximately 15 percent of U.S. gasoline needs (Felmy). The feed and food industries, as well as our export customers, would be subjected to significant shortages and higher prices in the short run. In the longer run, the United States would likely lose customers and almost all of its cost advantages in livestock production. This is the primary reason most industry observers feel that, to make a meaningful dent in energy needs, cellulosic ethanol is what is needed.

Cellulosic. Depending upon whoever is quoted, cellulosic ethanol is anywhere from three to 10 years away from cost competitive commercial production (Khosla; Dale). Currently there is only one cellulosic ethanol plant in operation. Iogen has a one million gallon per year plant in Ottawa, Ontario, that uses wheat straw as the feedstock. As indicated earlier, a number of companies located in countries around the world are rapidly moving toward commercial-scale plants. For example, Abengoa, which has grain-based plants located in Spain and the United States, is reportedly going to begin producing cellulosic ethanol in Spain during 2007. In addition, Dedini, one of the largest plant manufacturers in the world, has developed a process to convert sugar cane bagasse into ethanol.

Current cost estimates of commercial scale cellulosic ethanol production in the United States are in the neighborhood of \$2.50 per gallon with expectations that within five years, costs would decline to around \$1.20 per gallon (Dale). Iogen officials have indicated their costs will be in that range when their commercial scale plant is operational.

There are a number of scientific breakthroughs that are needed to lower the cost of converting cellulose to ethanol. Other cost factors that get less attention but are equally important are the logistics and transportation costs associated with collecting, transporting, and storing a biomass feedstock. Considerable research is needed to reduce these costs and develop an economical system for handling large quantities of biomass. One alternative that seems to be getting some attention is module builder type equipment patterned after cotton handling equipment.

Biodiesel

The primary feedstocks that are currently used to produce biodiesel are vegetable oils and animal fats such as chicken fat, beef tallow, and lard. Used cooking oil is also collected and processed into biodiesel and has the added benefit of using a waste product to produce a biofuel rather than potentially becoming a biohazard if not disposed of properly. While the biodiesel industry is in its infancy in the Americas, it is a mature industry in Europe. The process of making biodiesel, which is called transesterification, is basically the same around the world. In the process, glycerin is separated from the fat or vegetable oil leaving behind methyl esters (the chemical name for biodiesel) and glycerin.

The primary differences in biodiesel production costs from plant to plant are the costs of the feedstocks and the quality of the biodiesel from the various feedstocks. Feedstock costs represent two-thirds of the cost of biodiesel production. Different feedstocks yield different biodiesel quality. For example, canola is believed to be a superior feedstock to other vegetable oils. Palm oil, which has been relatively inexpensive, produces a biodiesel which has poor cold weather properties.

Unlike the ethanol industry, there do not appear to be as many areas where the costs of production can be greatly reduced with technological advances. One major area of concern for biodiesel producers is the development of renewable diesel by oil refiners using refining-type technologies (hydrotreating) (Caldwell). The renewable diesel produced by hydrotreating can be produced in the same facilities that are producing petroleum diesel. This yields economies of scale and is fungible with petroleum derived diesel. Currently, renewable diesel qualifies for the blender's tax credit that is provided to biodiesel.

Oilseeds. Soybean oil, and, to a limited extent, cottonseed oil are the primary feedstocks in the United States. It is estimated that close to 90 percent of the biodiesel processed in the United States uses soybean oil as the feedstock. This primarily reflects availability and relative prices. When comparing vegetable oil prices, soybean oil has historically been the lowest cost and most available in the United States as it traditionally was the secondary product with the meal being the soybean product with the greatest demand. The emerging biodiesel industry has increased the demand for vegetable oils in general, which has led to higher soybean oil prices. Vegetable oil prices have increased more than \$0.10 per pound over the past year, which has greatly reduced the economic viability of plants using vegetable oils as the feedstock.

Figure 3 shows the relationship between the feedstock price in dollars per pound of oil and the cost of biodiesel in dollars per gallon. The estimated costs per gallon of biodiesel for a small scale plant are in Figure 4. Feedstock costs represent \$2.48 per gallon or 84 percent of the \$2.94 per gallon cost of production with a \$0.33 per pound soybean oil price. Again, costs of production differ in other studies due to different assumed feedstock costs, but their costs are generally in the same area (Eidman; Paulson and Ginder).

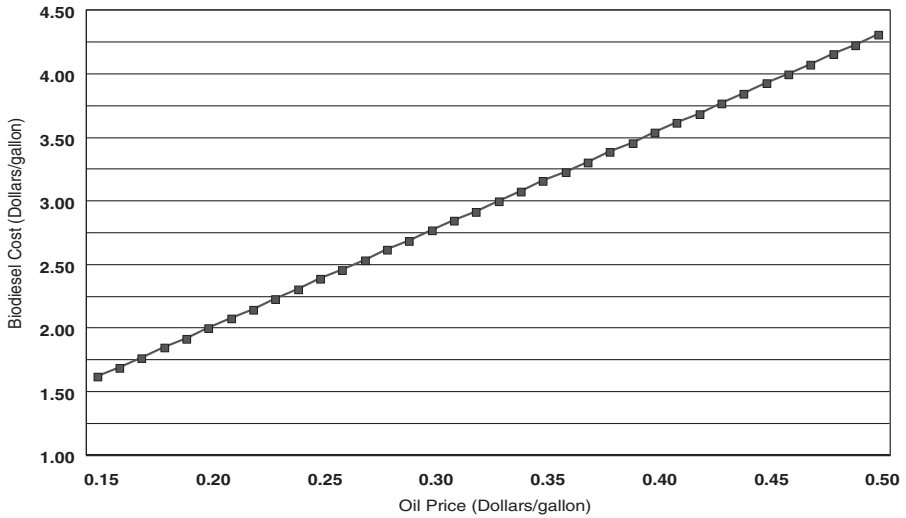


Figure 3. Biodiesel cost of production given changes in feedstock price.

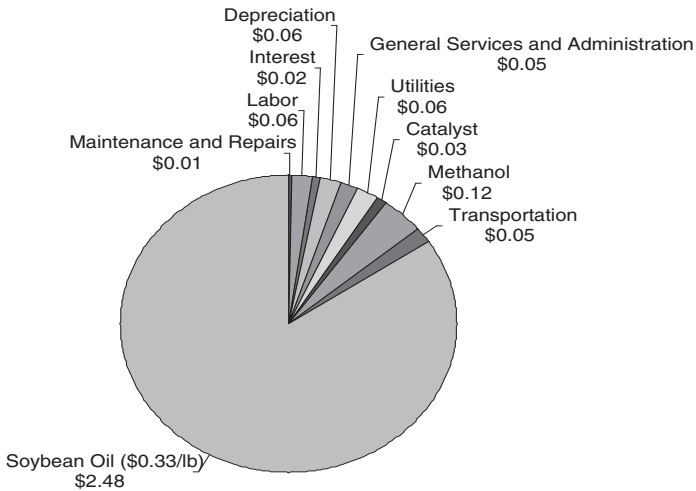


Figure 4. Estimated Costs (\$/Gallon) for a 10 MGY Biodiesel Plant Using Soybean Oil as the Feedstock, 2006.

Source: Fortenbery.

Animal Fats and Waste Grease. Animal fats and waste grease have historically been priced at roughly one-half the cost of vegetable oils. As vegetable oil prices have increased, so have animal fats and to a lesser extent waste grease. Smaller scale biodiesel plants tend to have more flexibility in shifting between feedstocks than do larger plants. In light of recent soybean oil price increases, biodiesel producers

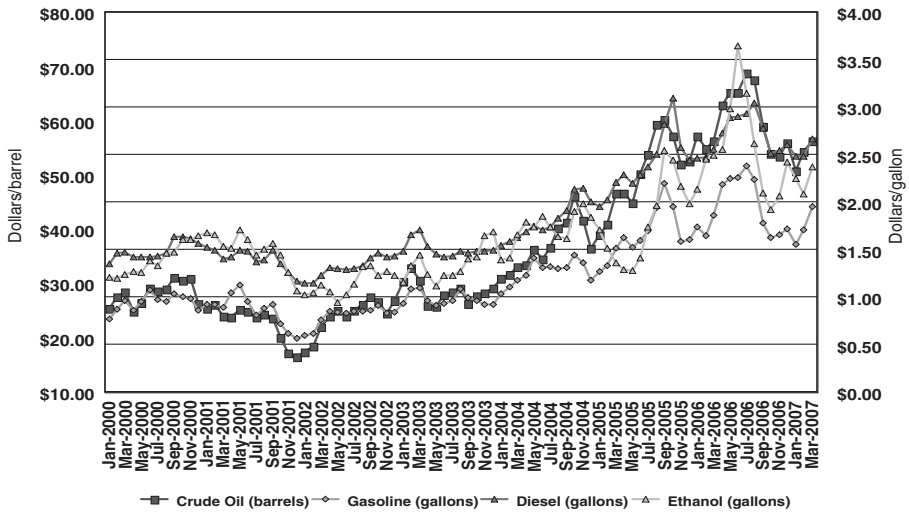


Figure 5. U.S. Prices of Crude Oil, Regular Gasoline, No. 2 Diesel, and Ethanol, Monthly, January 2000 – March 2007.

Source: U.S. DOE, EIA.

have begun blending cheaper animal fats and waste grease (when available) with relatively high priced vegetable oils to average down feedstock costs.

Agricultural and Energy Market Interaction

A full appreciation of the prospects for biofuels production requires consideration of the broader market context in which they appear. Market prices for biofuels are highly positively correlated with crude oil, gasoline, and petroleum diesel fuel prices (Figure 5). In the past, ethanol has traded at a premium to gasoline on average in the United States. This relationship was briefly reversed in early- to mid-2005 as logistical difficulties associated with ethanol distribution depressed prices in primary production areas. Ethanol price appreciated substantially relative to gasoline during late 2005 and 2006 as ethanol largely replaced MTBE as a gasoline oxygenate in response to environmental concerns. Biodiesel has typically traded at a very small premium to petro-diesel, although spot markets for biodiesel are very thin.

Ignoring spatial and logistical considerations, the value of ethanol relative to gasoline will be determined by its energy content (lower than that of gasoline), oxygen content (higher than that of gasoline), and octane rating (higher than that of gasoline). In the U.S. market for ethanol, the latter two factors have been predominant in the past, leading to the aforementioned price premium. However, there is good reason to believe that the premium will erode, if not reverse, in the future. In the United States we currently produce more ethanol than is needed for domestic gasoline oxygenation, and current marginal demand, therefore, reflects ethanol's

other characteristics. Given ethanol's lower energy content, the source of the current premium must be its octane rating.

Approximately one-third of blended motor fuel sold in the United States is octane-enhanced (i.e., premium or mid-grade, rather than regular unleaded) indicating a substantial potential demand for the high octane characteristic of ethanol (EIA, 2005). However, this premium will gradually erode as ethanol production increases, and marginal demand begins to reflect simply the energy content.

In contrast to ethanol, biodiesel's prospects as a fuel additive are uncertain. Biodiesel can be used to enhance the lubricity of the ultra-low sulphur (petroleum) diesel that is now required in the United States, but other additives can be used to gain the same effect without introducing quality, cold flow, and filter clogging concerns. Biodiesel contains about seven percent less energy than No. 2 petroleum diesel. Given these considerations, a reasonable guess at this time is that biodiesel prices will evolve toward trading at parity to or slightly below petroleum diesel prices.

The quantities of liquid fuels consumed in the United States dwarf the feasible levels of biofuels production using traditional agricultural commodities as feedstocks. Thus, as biofuels production expands, we will increasingly find that the prices of relevant commodities will be largely determined by their values as biofuel feedstocks, assuming a continuation of current energy market conditions and normal agricultural market conditions. A short supply of corn or soybeans would obviously have the potential to send prices for these commodities higher than their implied values in liquid fuel production, however. Under such circumstances, equilibrium prices would be determined by complex interactions between many factors, such as renewable fuel use mandates, oxygenate demand, and demand for the agricultural commodities for uses other than biofuel production.

Concerns have been raised about the effects on related markets of the diversion of ever greater quantities of agricultural commodities toward biofuels production. For example, livestock organizations have voiced a concern that a short crop would cause considerable economic difficulties for their sector. Their concern has increased considerably as feedgrain prices have doubled. Most recognize that at least in the short term there will likely be losses for livestock producers (Collins). However, there are representatives of the ethanol industry who feel that there is no need for any policy changes that would result in slowing the growth rate of the ethanol industry (Jennings).

Researchers have taken two approaches to estimating the effects that the growth of the biofuels industry will have on the agricultural economy in coming years. First, some researchers apply standard econometric and equilibrium displacement techniques (FAPRI, 2005; Togoz *et al.*, 2007). Togoz *et al.* (2007), for example, employ the equilibrium displacement approach. They project corn and soybean prices decreasing from current levels in coming years as the market premiums for ethanol (relative to gasoline) reverse. They further project increases in the area devoted to

corn production and increases in livestock and dairy prices from the levels of recent years. They also argue that the small proportion of the U.S. auto fleet that is able to use greater than 10 percent ethanol in blended fuel will limit eventual ethanol production levels to around 14 billion gallons per year. The difficulty in using econometric or equilibrium displacement methods is that they are geared toward measurement and prediction of marginal changes. However, the ongoing changes in agricultural economy due to biofuels growth are rather dramatic. Also, such models rely on measuring behavioral responses of agents in the economy using historical data (or they employ such measurements made previously) that do not reflect these relatively new activities. For example, econometrically estimating an equation representing biodiesel demand for soybean oil is essentially impossible given that biodiesel production levels were trivial until just last year.

Other researchers have taken an alternative approach, in which cost and engineering data for biofuels production are used to infer the prices that producers could afford to pay for agricultural commodities under a given set of market conditions (Bryant and Outlaw, 2006; Bryant, 2007; Tyner, 2007). Considering the production cost information in the previous section, current subsidy levels, and the relative energy content of biofuels, this approach suggests that the values of the energy contained in corn and vegetable oils are higher than current market prices for these commodities. These prices are therefore likely to experience continued upward pressure over coming years as biofuels production continues to expand, assuming fossil energy prices do not decline substantially. This implies even greater price increases for livestock and dairy products than those projected by the econometric and equilibrium displacement approaches.

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US Farm Policy at a Crossroads

Two related topics are explored in this paper. The first topic addressed is the demise of the historic farm policy objective of managing prices to provide farmers with reliable income and consumers with reliable supplies of farm products. The second topic addressed is a justification for public policy to help crop farmers manage revenue risk as well as the implications of the justification for the structure of such a program. The paper ends with a summary of these two topics.

Demise of the Historical Farm Policy Compromise

Current U.S. farm programs grew out of the Great Depression of the 1930s (U.S. Department of Agriculture [USDA], Economic Research Service [ERS], 1984). The compromise that underpinned these programs was commonly referred to as the “ever-normal granary.” Its objective was to manage the price of farm commodities for the benefit of both farmers and consumers. Key policy instruments were minimum support prices, annual acreage set asides, and public stocks. When farm prices were low, government would require farmers to set land aside and would acquire public stocks of crops through a minimum price nonrecourse loan program. These actions raised farm prices, thus benefiting farmers. When farm prices were high, government would reduce set asides, thus bringing land back into production and would sell public stocks. These actions reduced farm prices, thus benefiting consumers.

This original compromise has been undermined by changes in the economic situation of U.S. consumers and producers. For consumers, their share of expenditures devoted to U.S. farm products contained in food (e.g., corn in corn flakes, cow’s milk in cottage cheese, etc.) has declined substantially: from 11 percent in 1947-1949, the first years data are available, to less than two percent today (see Figure 1). Thus, farm prices are less important to U.S. consumers today than when the original farm policy compromise was crafted. Reflecting this change in the economic situation of consumers, their connection to managing farm prices essentially ended when the *Federal Agriculture Improvement and Reform Act of 1996* eliminated annual acreage set asides and most public stock programs (USDA, ERS 1996).

¹ The author is the McCormick Professor of Agricultural Marketing and Policy, Ohio State University. This paper is based on the testimony of Carl Zulauf before the House of Representatives Committee on Agriculture, Subcommittee for General Farm Commodities and Risk Management, September 21, 2006. The testimony is available at <http://aede.osu.edu/people/publications.php?user=zulauf.1>

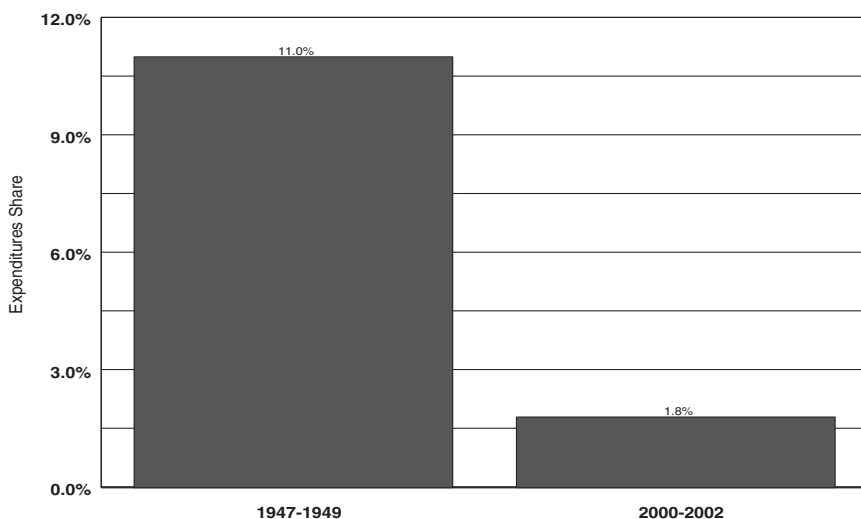


Figure 1. Expenditures on U.S. Farm Products used for Food, U.S., 1947-2002.
 Source: original calculations using data from USDA, ERS, 1968 and 2007b, and U.S. Department of Commerce, Bureau of Labor Statistics, 2007.

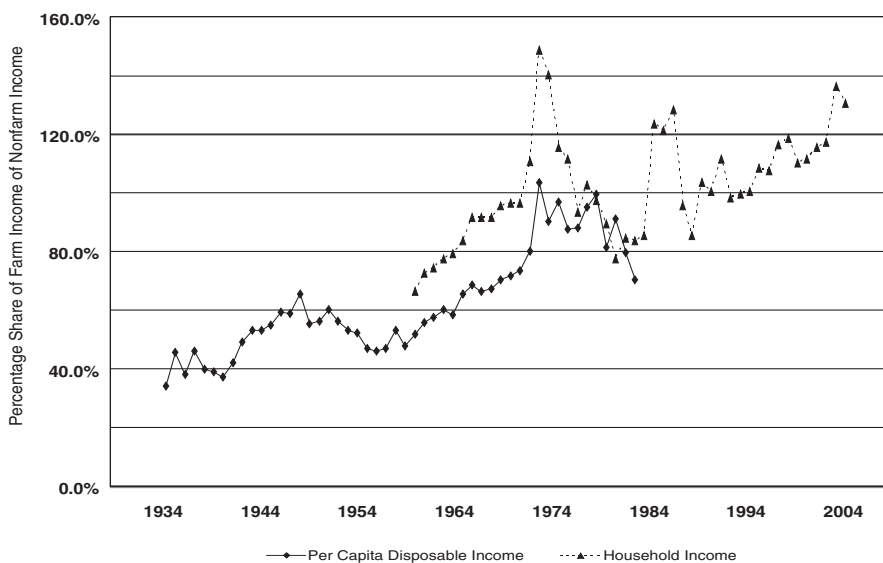


Figure 2. Farm Income Relative to Nonfarm Income, U.S., 1934-2004.
 Source: original calculations using data from USDA, ERS, 1984 and 2007a.

From the perspective of farmers, a key long-term change has been the increase in their income relative to U.S. nonfarmers. In 1934, per capita income of the U.S. farm population was only 33 percent of the per capita income of the U.S. nonfarm population (see Figure 2). In contrast, during recent years, farm households have had a higher average income than nonfarm households have. Factors behind this trend include the growth in off-farm income of farm households, more efficient farm pro-

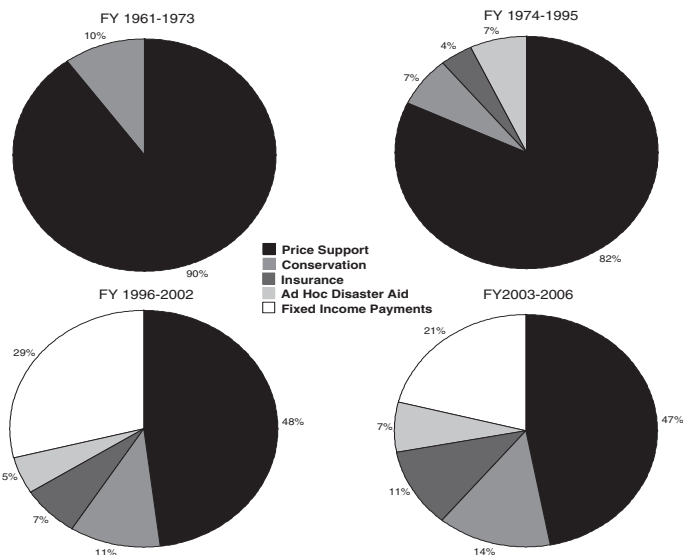


Figure 3. Spending on Farm Programs by Category, U.S., Fiscal Years 1961-2006.

Notes: (a) Among the prominent price support programs are the nonrecourse loan, marketing loan, market loss, counter-cyclical, and dairy price support programs. (b) Among the prominent conservation programs are the Conservation Reserve Programs of the 1950s-1960s and post 1985, Environmental Quality Incentives Program, Conservation Security Program, and Wetland Reserve Program. (c). Source: original calculations using data from the Budget of the United States Government, Fiscal Years 1962 – 2008.

duction, and the consolidation to fewer and larger farms. While comparing farm and nonfarm income is difficult for various statistical and economic reasons, this historical trend makes it unsurprising that questions are being asked about whether it is an appropriate use of public funds to transfer income to farmers for the purpose of increasing their income.

The declining role of the historic farm policy compromise is also apparent from the changing share of spending on programs that make payments to farmers (see Figure 3). Spending on programs tied to farm prices (for example, nonrecourse loans, marketing loans, and counter-cyclical payments) has declined from a 90 percent share of spending on programs that made payments to farmers in the 1960s to a 47 percent share during the 2003 through 2006 Federal Fiscal Years.

In contrast to the declining focus on farm prices, the share of spending on farm risk programs has grown from almost nothing during the 1960s to nearly 20 percent over recent years. Farm risk programs include insurance, mostly for crops, and *ad hoc* disaster assistance. The latter is provided on a year specific basis to help farmers affected by natural disasters.

Based on a review of the farm policy literature and discussion with farm policy experts, the justification for providing publicly financed farm risk programs appears to be that farming is perceived to be an inherently risky economic activity. In con-

trast, as a general rule, public involvement in helping private firms manage risk should occur only when private management tools are missing or are cost prohibitive. Stated alternatively, public assistance in managing private market risk is appropriate only when private risk management markets are incomplete. The rest of the paper examines whether private risk management markets are incomplete, laying the foundation for a justification for publicly financed risk management programs. It also explores the implication of this justification for the structure of a public risk management program. However, before beginning this discussion, a common classification of risks into idiosyncratic and systemic risk is presented (Lintner, 1965, and Sharpe, 1964), along with its implication for the existence of private insurance.

Overview: Idiosyncratic vs. Systemic Risk

Idiosyncratic risk is risk that is unique to an individual. For example, the probability that a person's home catches fire is largely independent or uncorrelated with the probability that another person's home catches fire. Private insurance is likely to develop for an idiosyncratic risk in which the likelihood that any one policyholder has a claim at a particular time is acceptably small. Insurance companies can use statistical properties, such as the law of large numbers, to estimate the cost of insuring someone against an idiosyncratic risk (for example, a home fire). Moreover, the cost of the insurance premium to a buyer is likely to be reasonable if insurance indemnity payments can be spread over many policyholders.

In contrast, systemic risk occurs at the market level. Thus, occurrence of a systemic risk affects many individuals at the same time. In other words, occurrence of a systemic risk is correlated among individuals. Private insurance companies often go bankrupt when a systemic risk occurs because many policyholders collect at the same time. Thus, it is highly unlikely that private insurance will be successful in covering a systemic risk. The recent withdrawal of private insurance companies from providing hurricane insurance illustrates the importance of systemic risk. As recent hurricanes have demonstrated, hurricanes can cause large insurance payments at one point in time, potentially imperiling the survival of the insurance company.

Justification for Public Policy to Help Crop Farmers Manage Revenue Risk

Prior to planting, crop farmers can manage their revenue risk through strategies internal to the firm. Specifically, they choose to produce the crop(s) with the highest expected revenue at the lowest risk, or by deciding to produce no crops at all. Farmers use these management strategies extensively, especially after the *Federal Agriculture Improvement and Reform Act of 1996* allowed them the freedom to decide which, if any, crops to produce and still receive farm support payments (USDA, ERS, 1996). Compared with 1996, acres planted in 2006 to soybean were 18 percent higher while acres planted to barley, sorghum, and wheat were 51 percent, 50

percent, and 24 percent lower, respectively (USDA, National Agricultural Statistics Service, 2007).

After deciding what crop(s) to produce, a farmer confronts the risk that the revenue received at harvest is less than the revenue expected when the planting decision was made. This risk results from declines in prices and/or yields.

Changes in prices generally occur at the market level because of changes in market supply and demand. Thus, price risk is largely systemic; although idiosyncratic price risk can occur when price declines more or less in a local area. Many private market strategies exist to help farmers manage systemic price risk. The most common are selling futures, selling forward contracts, and buying put options. However, contracting production prior to harvest to manage price risk can create its own risk. Specifically, the amount harvested may fall short of the amount contracted. Note, that after harvest, the size of the crop is known. Thus, using private market tools to manage price risk after harvest does not create its own risk.

Yield risk can be idiosyncratic to an individual farmer or a small group of farmers. Yield risk can also be systemic if a wide-spread weather event occurs, such as a large-scale drought. Moreover, yield and price risks do not perfectly offset one another. Thus, their product, gross revenue, also has a systemic component. Because of the existence of systemic yield and revenue risk, it is not surprising that experiences from around the world reveal that, except for hail insurance, private companies have not provided insurance against farm yield and revenue losses unless public subsidies are provided (Tweeten and Zulauf, 1997).

Conclusion. Risk markets for crop revenue are incomplete, but only over the period between the decision to plant a crop and the harvesting of that crop. Thus, it is appropriate to consider public policy options to help crop farmers manage their revenue risk between the time the decision to produce a crop is made and the crop is harvested.

Integrated Farm Revenue Risk Management Program

Crop farmers confront both systemic and idiosyncratic revenue risk. Thus, two different risk management programs are needed: one for the systemic revenue risk and another for the idiosyncratic revenue risk. However, the two programs need to be integrated to maximize their effectiveness.

Because private insurance is unlikely for a systemic risk, a national revenue deficiency program should be offered by the federal government. A gross revenue target would be calculated for the U.S. at a time before planting the new crop. The revenue target would equal the product of expected U.S. price times expected U.S. yield. Realized gross revenue would be calculated at harvest using a measure of U.S. price and yield. If the realized gross revenue at harvest is less than the gross revenue target established prior to planting, then a national deficiency payment is made for each acre planted to the crop.

The idiosyncratic risk can be addressed by an individual farm gross revenue insurance product. It would be similar to the current revenue insurance product, but it would be rated only for the idiosyncratic risk at the individual farm level. The share of a farm's risk that is systemic and thus shared with all other producers of the crop would be removed from the insurance contract. The reason is that the national revenue deficiency program covers the systemic revenue risk. Removal of the systemic risk should allow insurance companies to offer higher levels of coverage at a lower cost to farmers for the risks that are unique to the farmer. The federal government could decide whether it wanted to subsidize this insurance product.

To coordinate the national revenue deficiency program with the individual farm revenue insurance, the same preplanting and harvest prices should be used. For example, the price determination procedures currently used by the Risk Management Agency could be used.

To illustrate the national revenue deficiency program, a numerical example is provided for corn planted in 2004. The expected and realized yields are from the U.S. Department of Agriculture's monthly Crop Production reports. For 2004 corn, the realized revenue at harvest was less than the revenue expected when planting decisions were being made. A \$0.79 per bushel decline in price more than offset a 13.4 bushel increase in yield.

Because incomplete risk markets exist only between the planting decision and harvest, the revenue target of the national revenue deficiency program needs to be reset each year to reflect the price and yield expected for that year. Thus, the target would follow the market over time. This characteristic raises the possibility that the national revenue deficiency program might be

Example of Average National Revenue Deficiency Payment: Corn 2004	
USDA Expected U.S. Yield:	145.0 bu./acre
February Insurance Price:	\$2.83/bu.
Expected U.S. Revenue:	\$410/acre
Realized U.S. Yield (October):	158.4 bu./acre
October Insurance Price:	\$2.05/bu.
Realized U.S. Revenue:	\$325/acre
Revenue Deficiency Payment = \$85/acre (\$410 - \$325) (at a 100% coverage rate)	

minimally distorting to the market. The rationale for this hypothesis is that, should a distortion that stimulates production exist, the resulting higher supply produced this year would lead to a lower market price, which in turn would lead to a lower revenue target the next year, which would discourage production.

Summary

U.S. farm policy is at a crossroads. The historic farm policy objective of managing prices for the benefit of consumers and producers has been undermined by changes in the U.S. farm sector. On the other hand, private risk markets for farm

crops are incomplete, implying that farm programs could be redesigned to help farmers better manage their risk rather than provide income transfers. In fact, this transformation is already underway, as spending on farm insurance programs has been growing substantively over the last 15 years. However, the close-to-annual passage of *ad hoc* disaster assistance suggests that the current set of farm programs has substantial holes when it comes to helping farmers manage risk.

Farmers face two kinds of revenue risk. Different programs are needed for each risk, but they need to be coordinated to maximize their effectiveness. A national revenue (price times yield) deficiency program can address the systemic, market-wide risk that farm revenue can decline for all farms due to lower prices and/or widespread yield losses. An individual farm gross revenue insurance policy can address the risk that the gross revenue of an individual farm can decline more than the national farm revenue. The latter would be similar to the current revenue insurance product, but it would be rated only for the idiosyncratic risk at the individual farm level. In other words, the share of a farm's risk that is systemic would be removed from the insurance contract. The cost of individual farm revenue insurance should decline. To further increase coordination between the two programs, the same prices would be used in both programs.

The national revenue target would be reset each year. This characteristic raises the possibility that market distortions over time could be minimal, thus potentially affecting the World Trade Organization classification of the program. Last, the economic need for *ad hoc* disaster assistance is reduced by protecting both yield and price, by providing timely payments from both the national revenue deficiency program and crop insurance at harvest, and by reducing premiums for individual farm level insurance.

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The Green Payment Debate: Alternative Paradigms and Resulting Tradeoffs

Green payments refer, in general, to agricultural payment programs which have environmental goals, where the payments are not related to a producer's production decisions. Such programs pay agricultural producers to undertake activities that have a positive impact on environmental outcomes. They can range from cost sharing for specific farm practices to whole farm management of environmental resources, as well as providing rewards to producers who historically have been particularly excellent stewards of the environment. (Hanrahan and Zinn, 2005). In the U.S., green payments have a long history (Helms, 2003). However, while public interest is high with respect to the current 2007 farm bill debate, the term, green payment, is frequently defined as those programs that merge income support and conservation payments and not just those with environmental goals.

This paper will examine the concept of green payment programs in the United States. First, the paper will examine the reasons why green payments have become an alternative policy instrument in the 2007 farm bill debate. Second, the paper will examine some of the challenges that will arise if Congress decides to move from income support programs to green payment programs, including the challenges created for the design of green payments because different political actors rely on different paradigms (and therefore different goals) for the agricultural sector. Finally, this paper will conclude by examining the use of green payment programs as a classic problem in policy design and whether such a program can be designed to address multiple policy objectives.

Why the Current Green Payments Debate?

At first blush, the current policy interest in green payments seems surprising since the history of farm policy is that both conservation goals (e.g., the protection of on-farm soil fertility) and environmental goals (e.g., the improvement of downstream water quality) has always been subordinate to income support and budgetary goals (Doering and Schertz, 1999; Browne, 1995). Throughout the history of the U.S. farm programs, it is the prevailing assumption of policymakers and interest groups that a dollar spent to obtain conservation/environmental outcomes comes at the expense of dollars to support producers' incomes. Moreover, any change in policy objective that creates a change in the existing distribution of payments – such

¹ Sandra S. Batie is the Elton R. Smith Professor and David B. Schweikhardt is a professor; both are in the Department of Agricultural Economics, Michigan State University, East Lansing, Michigan.

as a move from income support objectives to conservation/environmental objectives (and many other proposed reforms) – has meet political resistance from existing program beneficiaries and congressional representatives who clearly rank farm income maintenance as their highest priority (Browne, 1995). As a result, the program dollars directed at conservation/environmental goals have been a fraction of that directed at farm income support.

Given this historical inertia, why are advocates of green payments gaining political traction during the 2007 farm bill debate (at least in rhetorical terms)? First, there is considerable dissatisfaction with the distributional consequences of the existing farm commodity programs. Namely, the existing programs have generated considerable public attention and criticism of the distribution consequences of these programs – both between taxpayers and farmers and among farmers. The regressive distributional consequences of these programs, when comparing taxpayers and commercial farmers, have become the target of numerous media reports (Washington Post, 2007; Environmental Working Group, 2007). In addition, issues have also arisen between those farm producers who are eligible for income support (e.g., corn and wheat producers) and those who are not (e.g., fruit and vegetable producers). In particular, this division has raised political demands that programs relevant to this second group of producers – such as conservation and research – be increased (Specialty Crop Farm Bill Alliance, 2007).

Second, both societal changes and scientific changes may be contributing to the increased interest in green payments. As U.S. citizens experience an increase in per capita income, their demand for goods – including their demand for environmental quality – will increase. Such an increase in the demand for environmental quality has been recognized in other areas of environmental policy (Hervani and Tweeten, 2002). It appears that American society is witnessing just such an increase in the demand for environmental quality related to the environmental side effects of agriculture as per capita income increases. As Crosson (1998) has noted, the income elasticity of the demand for food is notoriously low in an industrialized country – indicating that the demand for food increases relatively slowly as income increases. Also, the elasticity of demand is likely to be less than the income elasticity of the demand for environmental quality. If this conclusion is true, then voters are likely to register these demands for environmental quality in the political process with a call for an environmentally-benign, or even environmentally-enhancing, agricultural system.

In addition, changes in technology provide new opportunities for scientists to both discover the impact of the environmental side effects of agriculture and to trace the origin of such effects. When new scientific discoveries are made about the impacts of agricultural production on human or environmental health, new interdependencies are created between farmers and nonfarmers (Schmid, 2001). In the face of new interdependencies, nonfarmers are likely to express new political demands that such interdependencies be mitigated or eliminated. Once again, political de-

mands are likely to express preferences for policy objectives other than farm income support.

Finally, these factors leading to political demands for changes in U.S. farm programs are arising at the same time that the United States faces international political pressures to change its programs. A 2004 decision by the World Trade Organization (WTO) found that the U.S. cotton program did not comply with the rules of the WTO (World Trade Organization, 2004b). In particular, the U.S. program was found to suppress world cotton prices because it did not provide U.S. subsidies in a nondistortionary manner; that is, the program affected U.S. producers' planting decisions. Moreover, to the extent that negotiators in the Doha round of WTO negotiations have had success in reaching agreement on future rules for agricultural subsidies, those rules are likely to require a greater degree of decoupling so that programs are likely to be required to have even less impact on the production decisions of producers (World Trade Organization, 2004a). In addition, the international debate has also included a distributional element, with critics of U.S. farm programs questioning the distributional impacts of such policies on farm producers in other countries (Oxfam, 2002). For example, U.S. cotton subsidies are indicted as a source of poverty for African farmers (Oxfam, 2002).

Thus, one likely reason for the recent interest in the concept of green payments is a perception that green payments can address these distributional, environmental, and international trade compliance challenges. One assumption held by many of the advocates of green payments is that green payments can be win-win-win solution in addressing the emerging problems of the farm sector. This win-win-win assertion refers to green payments potentially providing (a) a win for farmers' incomes, (b) a win for the environment, and (c) a win for trade by making U.S. agricultural programs compliant with the rules of the World Trade Organization (WTO). In trade negotiating circles, this win-win-win phrase is sometimes shrunk to the phrase doubly green – taken to mean that green payments are environmentally green and inside the WTO green box.

Different Designs, Different Outcomes

Is it correct that green payment programs provide a win-win-win alternative for policymakers? If the budget financing green payments were large enough, green payments could be designed that achieved both broad income support objectives and broad agri-environmental goals – such as water quality protection or wildlife habitat preservation. To accomplish these objectives of addressing a wide range of environmental problems in a manner that complies with the rules of the WTO, however, where green payments are clearly linked to environmental performance outcomes, is problematic. If the budget is constrained, or if green payments need to meet the spirit of the WTO green box, then the win-win-win scenario is likely to dissolve.

Difficult tradeoffs exist regardless of the program design. At least two reasons explain these tradeoffs. First, there is not a one-to-one correspondence of (a) the land in farms that are probable targets for income support with (b) the land in farms that are probable targets for environmental improvements. As demonstrated by studies of green payment programs (e.g., Claassen *et al.*, 2001 and 2004), different designs of green payment programs result in:

- different levels and geographic distribution of income support,
- different impacts on various agro-environmental outcomes, and;
- different program costs.

A cursory comparison of the existing distribution of U.S. farm program payments – with a ranking of the “green-ness” of those programs – gives a rough indication of the changes in payment distribution that must occur if existing programs are to be converted into green payment programs (Figure 1). Among the existing U.S. programs, loan deficiency payment programs have the largest budget cost but would probably rank as the least green among all U.S. programs. On the other hand, programs that come the closest to meeting a true definition of a green payment, such as the Environmental Quality Incentives Program and the Conservation Security Program, have a relatively small budget support among U.S. farm programs. Any attempt to move from existing, largely income support, programs to a green payment design would again cause a major shift in funding levels, distribution mechanisms,

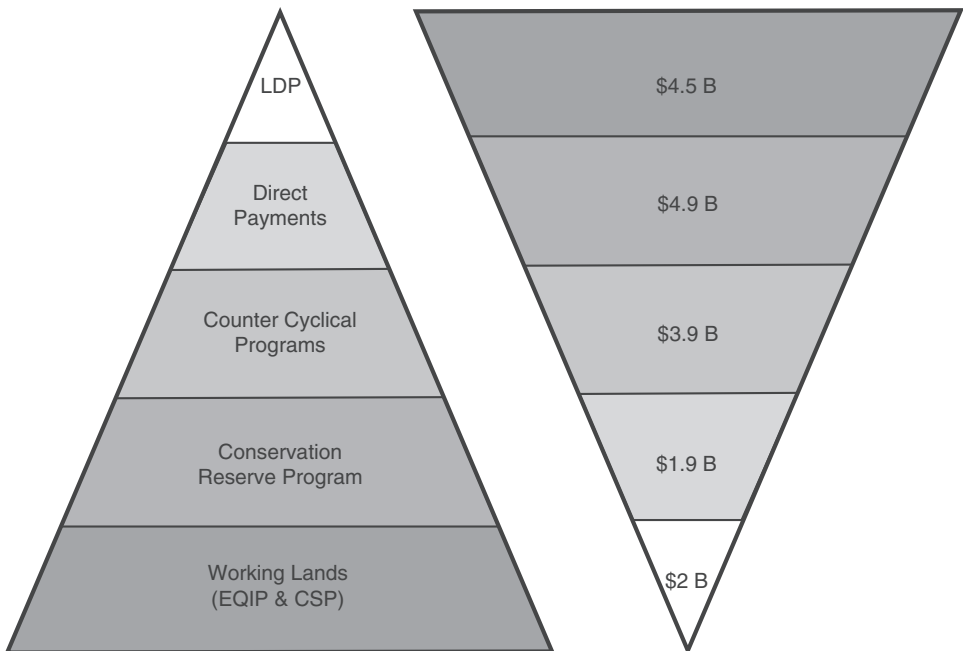


Figure 1. Farm Bill “Green-ness” and 2006 Budget Allocations.

and the geographic distribution of payments. The reality of these changes may pose the largest political barrier to the creation of a true green payments program.

Also, the WTO green box designation requires that a green payment be linked to a recognized environmental outcome and not provide more funds than the actual cost of the practices necessary to achieve that outcome (World Trade Organization, 1994, Article 12(b); Hanrahan and Zinn, 2005). Income support objectives, however, require that the producer receive more than the cost of any practice adopted to meet the environmental goal. Otherwise, there would not be additional income support over and above the costs of producing the environmental service and no protection (addition) of the producer's income. Paying producers more than it costs them for adopting an environmental-enhancing set of practices would appear to violate WTO rules.

As the debate has transpired in deliberations about the 2007 farm bill, however, it is often assumed that a green payment alternative would provide a win-win-win outcome to the multi-dimension policy problem facing U.S. agriculture. If such an assumption is not critically analyzed, it can provide significant momentum that misleads the debate and possibly results in the choice of a policy alternative that is destined to fall short of at least one of its multiple objectives (i.e., that is found to be noncompliant by the WTO or that fails to generate the anticipated improvements in environmental quality).

Different Paradigms, Different Designs

In addition, the specific design of a green payment program will differ depending on the mental model of agriculture or paradigm held by its designer. These alternative paradigms are different sets of ideas that guide agricultural policy development and program selection. Josling (2002) has provided four broad paradigm characteristics that can be used to examine the various positions within the green payment debate. Each paradigm is defined by a vision of what are the desirable goals for agricultural programs. These paradigms, in turn, define the role of the state in agricultural policy and the potential contributions that a green payment program could make in accomplishing the policy objectives of the agricultural sector. These four paradigms are:

- State-assisted or dependent agriculture,
- Market-based or competitive agriculture,
- Multifunctional agriculture,
- Globalized agriculture.

The **state-assisted** agricultural paradigm features a governmental role of (a) protecting the agricultural sector from market instability and (b) expanding markets for

agriculture (including the alternative of surplus disposal). This paradigm has been dominant throughout much of the history of U.S. agricultural policy.

The **competitive** agricultural paradigm, in sharp contrast with the state-assisted paradigm, establishes the government's role as one of (a) minimizing domestic support, (b) elimination of export subsidies, and (c) improving foreign market access. Such an approach might also be referred to as the agricultural sector's version of the free trade paradigm. Beginning in the late 1970s, farm bill debates have oscillated between the state-assisted paradigm and the competitive paradigm. Some farmers and members of Congress have been reluctant to abandon the domestic agricultural policies provided in the state-assisted paradigm and rely on export market access, while others have seen export market growth facilitated by the competitive paradigm as being the only means of success for U.S. agriculture. The dominant paradigm and the policy alternatives emphasized in each farm bill have alternated as different perceptions of the problems of the U.S. farm sector were identified as the most important.

The **multifunctional** agricultural paradigm has a distinctly European flavor and promotes government subsidies for public goods supplied by the agricultural sector (e.g., open space amenities, biodiversity, water quality protection, rural development, regional food products, or alternative energy production). A central assumption of the multifunctional paradigm is that protecting these public goods requires resources to be managed and that such management may be beyond the capacity of an individual manager. This paradigm may also include concerns about the size and type of operations that are worthy of public support. Furthermore, as Potter (2005) notes, "Because society is assumed to have no prior property rights to these environmental outputs, it assumes that taxpayers must subsidize farmers to produce or protect them and that voluntary management agreements – linked to standard payments – offer the best mechanism for achieving this objective."

Finally, the **globalized agricultural** paradigm asserts that "countries do not trade; firms do." With this perspective, producers are seen as part of a supply chain whose role is to deliver consumer-responsive, high quality, safe products. They are the land and animal managers in this food chain. Government's role is to facilitate the smooth functioning of the food chain with such policies as environmental and food safety harmonization. Or, at a minimum, government should not "muck up" these supply chain relationships with interfering policies that dictate the terms and conditions of these relationships.

Each paradigm has different underlying assumptions about the nature of the agricultural system and different implications for the role of government in agriculture, the need for income support, the objectives for trade policy, and the design of green payment programs. For example, some green payment advocates want any payments to serve as an alternative means of income support. Differing versions of this argument, however, reach different conclusions about who should receive such payments. One version of this argument contends that commodity payments should

be replaced with green payments. A different version contends that every farmer – not only those that produce program commodities – should be eligible for green payments. The case for a wider distribution of payments is made by U.S. Senator Tom Harkin (D-Iowa), and it is the argument that underlies the concept of the Conservation Security Program. Depending upon the nuances of these arguments, some advocates of green payment programs can be said to rely on either the state-assisted or the competitive agricultural paradigm.

Others advocate that only those farmers who provide multifunctional services should be eligible to receive green payments. There are also various versions of this proposal. Some contend that only working lands should be eligible for green payments. Others conclude that only certain practices (e.g., conservation tillage) or types of enterprises (e.g., organic producers) should be eligible to receive green payments. Still others argue that only small- or mid-sized farmers should receive green payments. These proposals rely mainly on the multifunctional agricultural paradigm.

Finally, and heard with less frequency in the policy debate, are those advocates who contend that the objective of a green payment program is to assist farmers in providing high-quality, value-added, consumer-responsive products that are competitive in a global market. These advocates rely on the globalized agriculture paradigm.

No Win-Win-Win; Just Choices

As each of these proposals is scrutinized more closely, it is apparent that tradeoffs exist between the pursuit of the three goals of income support, environmental enhancement, and WTO compliance. On close inspection one finds that few win-win-win situations exist with green payments, and the choices confronting policymakers are more like a zero-sum game.

On closer inspection of green payments, one once again learns that the government cannot accomplish three policy targets – income support, environmental performance, and WTO compliance – with only the one policy instrument of green payments. As each program design is developed, it will result in a different geographic distribution of payments, a different level and incidence of payments among producers, and a different level of achievement of the three policy objectives.

Conclusion

Confronted by a situation of seemingly compatible policy objectives, advocates and policymakers are likely to see green payments as a means of addressing multiple policy objectives for U.S. farm policy. Such conclusions are misleading. Green payments, rather than being a single solution to multiple objectives, present a classic problem in public policy design. Namely, if a government wishes to pursue mul-

multiple policy objectives, it must, by definition, use multiple policy instruments. If the government wishes to pursue two policy targets, then it must use at least two policy instruments to achieve those targets (Johansen, 1965). If a policy addresses more targets than it has instruments at its disposal, then at least one of those targets must be left unsatisfied.

If the government seeks to address two policy targets – such as income support and environmental protection – and uses only the one policy instrument of green payments, then it will be unable to accomplish at least one (and probably both) of its targets. If green payments are designed to accomplish an income support target, the payments are unlikely to be distributed in a manner that fully addresses a relevant environmental protection target. On the other hand, if green payments are designed to accomplish environmental objectives, payments are unlikely to be distributed in a manner or at a time that supports an income protection target. Such a problem is common to “almost any problem in economic policy” (Johansen, 1965), but it has received little or no recognition among advocates and policymakers. As a result, the green payments alternative, like all other policy alternatives, leaves us in much the same position. There remains a need to identify, acknowledge, and weigh the tradeoffs among our public policy alternatives.

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Incidence of Government Subsidies and U.S. Farm Households

Susan Offutt's (2002) presidential address to the American Agricultural Economics Association stressed the need for policy analysis focused at the farm household level. Considerable heterogeneity in the farm population (particularly in off-farm employment) and the multiple objectives of contemporary farm policy imply that a household oriented disaggregation provides an important perspective from which to conduct analysis. Understanding cross-household differences in both the farm business and allocation of family resources is critical to evaluating the distributional impacts of federal government programs.

Previous studies on the distribution of government payments have primarily relied on farm size classes (measured by the value of sales) to characterize the incidence of government payments (e.g. Sumner, 1990; Tweeten and Hopkins, 2003). This singular focus offers ease of communication but presents significant difficulty in analyzing the impact of changes in government programs since farms of similar size respond quite differently to changes in policy (Tweeten, 1993; Sumner, 1990).

The importance of understanding the distribution of government payments in the farm population is as important today as ever. Commodity programs have enjoyed significant political refuge in broad support from a U.S. population supportive of preserving the family farm unit including the heritage and values associated with it (Tweeten, 2003). It is easy to anticipate some erosion in this political support when observing U.S. farm household incomes that have outpaced those of the average U.S. household for several years (21% higher in 2004 at median values).

Certainly these income estimates are inflated from an inclusive definition of farms (a minimum of \$1,000 in potential agricultural sales) since average nonfarm income for farm families is higher than household income of nonfarm families (Tweeten, 2003). This does not imply a large share of farm households in the population that can be safely ignored in policy analysis however. Farms with sales less than \$250,000 (i.e. USDA defined small farms) own 68 percent of agricultural assets in the U.S. and 61 percent of farm land (Hoppe *et al.*, 2007). These farm households are critically important to understanding the secondary impacts of commodity policy as determined in land markets.

¹ Gray is an associate professor and associate director of the Center for Food and Agricultural Business at Purdue University. Keeney is an assistant professor at Purdue University.

The primary reason for investigating government payment distributions across farm households is to evaluate how effectively payments are targeted toward family farms in need (Sumner, 1990). Given the variability in importance of nonfarm income in the farm household population, disaggregating the farm population according to household level decisions (e.g. farm and non-farm resource allocations) rather than just farm business decisions (e.g. scale of operation) represents an important first step toward analyzing the effectiveness of farm programs.

This paper takes that first step using a household oriented farm typology to examine the incidence of farm policy. The objective is to understand how farm program payments are distributed among farm household types that differ significantly in the allocation of household resources. This will provide an improved basis for determining the effectiveness of U.S. farm policy for transferring tax payer dollars to farms that are perceived to have the greatest need and point the way forward for analysis of the distributional impacts of changes in farm policy.

The Farm Household Typology

The NASS/USDA Agricultural Resource Management Survey data have recently been used to identify a set of mutually exclusive farm household types (Briggeman *et al.*, 2007). Household choices on consumption levels, operator and spouse labor allocation, investment in farm and nonfarm assets, and borrowing are used to sort household observations into the groups given in Table 1, using cluster analysis. Summary statistics for each of the groups are provided in Table 1 as well and are referred to in the discussion of each group that follows.

Single Income Ruralpolitan

The first household group, Single Income Ruralpolitan (SIR), comprises 21 percent of the farm population. The allocation of labor hours, importance of nonfarm assets, and relative importance of on- and off-farm distinguish this group. In SIR households, the operator is the primary earner, with full-time, off-farm employment (2,072 off-farm hours on average). This off-farm employment is accompanied by high off-farm income (\$65,762). The primacy of the operator's hours and labor earnings in the total for the household leads to the single income designation, while the importance of off-farm investment, labor employment, and income supports the designation of these households as ruralpolitans.

Double Income Ruralpolitan

A second set of ruralpolitans is identified next in Table 1. This group represents 26 percent of the farm population and is similar to the SIR group. The

Table 1. Household Decisions and Additional Household Variables Means for the U.S. Farm Typology.

US Farm Household Typology	Household Decisions							Additional Household Variables			
	Percent of Sample	Household Consumption	Operator Farm Hours	Spouse Farm Hours	Operator Off Farm Hours	Spouse Off Farm Hours	Farm Assets	Nonfarm Assets	Household Farm Income	Household Off Farm Income	Operator Age
Single Income Ruralpolitan	21%	\$40,180	897	78	2,072	164	\$355,719	\$236,930	\$(2,634.00)	\$65,762.00	50
Double Income Ruralpolitan	26%	\$49,108	969	397	2,152	1,823	\$381,053	\$271,123	\$(3,703.00)	\$82,995.00	49
Active Seniors Farm Operator with Spouse Working Off Farm	26%	\$24,166	1,093	76	70	47	\$305,158	\$132,466	\$4,204.00	\$7,242.00	67
Traditional Farms	12%	\$40,897	2,092	239	89	2,030	\$621,017	\$244,228	\$16,852.00	\$51,122.00	53
Commercial Farms	7%	\$34,805	2,965	1915	106	200	\$984,607	\$152,477	\$30,235.00	\$12,761.00	56
Commercial Farms	8%	\$38,405	2,360	125	141	112	\$1,925,877	\$336,693	\$49,014.00	\$21,391.00	59

Note: 2003 ARMS data is used with 17,728 observations weighted to represent 2,084,715 U.S. family farm households.

primary exception is spousal employment, with the operator’s spouse working significantly more hours in an off-farm occupation (1,991 hours on average). Based on this distinction, the second household group is identified as Double Income Ruralpolitan (DIR).

Active Seniors

Active Seniors (AS) is the third group in Table 1, representing 26 percent of the farm population. Mean levels for household choice variables are below all other groups with the exception of operator farm hours, which are larger than for either of the ruralpolitan groups. The average age of operators in this group is highest among all household groups (hence the senior designation) while the average labor hours for this group supports an active label as opposed to retired.

Farm Operator with Spouse Working Off Farm

The farm household literature identifies off-farm work as a risk mitigating strategy for the variability in farm income (Mishra and Goodwin, 1997; Mishra and Sandretto, 2002). The fourth group in Table 1 identifies closely with this literature as the household is dually employed in the farm and nonfarm economy. This Farm Operator with Spouse Working Off Farm (FOSO) group is distinguished by having the third most farm labor hours on average and the presence of a spouse working in an off-farm job. The FOSO group constitutes 12 percent of the farm household population.

Traditional Farms

Knutson *et al.* (1997) contend that a traditional farm has the majority of the management and work being supplied by the operator and his/her family. With an operator and spouse who contribute the largest quantity of farm labor hours worked on average, the fifth group is labeled as Traditional Farms (TRAD, seven percent of population). In Table 1, we see that the TRAD group has large farm assets to complement the commitment of family labor and management time.

Commercial Farms

The final group in Table 1 is Commercial Farms (COM), constituting eight percent of the farm population. These farms have an operator working primarily on the farm like the TRAD group with less spouse engagement in the farm business on average. The designation of Commercial arises from the high value of farm assets relative to labor allocation by the operator and spouse. In addition, the COM group has the greatest asset level and on-farm income among all groups.

Distribution of Government Payments Among Farm Household Types

Having briefly described different household types in the U.S. farm population, we now turn to the question of how government payments are distributed among these. The information in Table 2 summarizes the distribution of farms, government payments, and value of production in percentage terms for all farms and the previously described household types.

In addition to the household types, we adopt two basic rules to aid in comparison. First, all households are categorized by whether or not they are dependent on farm income as a primary source of income for the household. Households are termed farm dependent if at least one-half of their household income is from the farm. The second distinction, divides farm households according to the farm business' reliance on government subsidies. Three categories are used here to distinguish households that receive no government subsidies, farms that do not rely on government subsidies, and farms deemed to be reliant on government subsidies. All government payment sources (commodity payments, conservation payments, etc.) reported by survey respondents are included. A standard farm metric in current use is that a farm's net operating margin is around 20 percent. We halve this value to derive payment dependency, so that a farm with 10 percent or more of its revenue generated from government support falls in the dependent category.

The first section of Table 2 summarizes the distribution of households, government payments, and value of production across all farms. The first four columns examine farm households that are not dependent on farming as a primary source of income. Seventy-one percent of the population falls in this category. This percentage illustrates the diversity of today's U.S. farm households – at least, as USDA currently defines a farm (potential to generate \$1,000 in farm sales). The largest portion of the nonfarm dependent group (51 percent) receives no government payments and contributes six percent to the total value of agricultural sales. An additional 20 percent of households are not dependent on income from but receive agricultural subsidies (sum of columns 2 and 3). This 20 percent includes the 13 percent of the farm population that are not dependent as a household on farm income, yet, whose farm revenues are dependent on subsidies. This nonfarm dependent/payment dependent group receives government payments amounting to 17 percent of government spending on agriculture.

Table 2. Distribution of Subsidy Payments Across Farm Household Types.

	Non-Farm Dependent				Farm Dependent				All Farms
	No Subsidies	Not Subsidy Dependent	Subsidy Dependent	All Nonfarm Dependent Farms	No Subsidies	Not Subsidy Dependent	Subsidy Dependent	All Farm Dependent Farms	
All Farms									
Farms	51%	7%	13%	71%	10%	10%	8%	29%	2,084,715
Subsidies		4%	17%	21%		28%	51%	79%	100%
Value of Production	6%	6%	4%	16%	29%	38%	16%	84%	100%
Single Income and Double Income Ruralpolitans within the Group									
Farms	66%	9%	16%	91%	4%	3%	2%	9%	47%
Subsidies		9%	52%	61%		13%	26%	39%	15%
Value of Production	24%	16%	10%	50%	19%	21%	9%	50%	12%
Active Seniors within the Group									
Farms	48%	5%	13%	66%	16%	8%	10%	34%	26%
Subsidies		2%	19%	21%		14%	65%	79%	14%
Value of Production	11%	3%	3%	17%	33%	29%	20%	83%	9%
Farm Operator w/ Spouse Working Off-farm within the Group									
Farms	39%	9%	11%	59%	10%	18%	14%	42%	12%
Subsidies		6%	13%	19%		27%	54%	81%	26%
Value of Production	5%	9%	5%	20%	16%	43%	22%	80%	21%
Traditional within the Group									
Farms	18%	5%	7%	30%	22%	27%	22%	71%	7%
Subsidies		2%	7%	9%		38%	53%	91%	19%
Value of Production	2%	3%	2%	7%	26%	46%	21%	93%	21%
Commercial within the Group									
Farms	16%	6%	8%	30%	21%	29%	20%	70%	8%
Subsidies		2%	8%	10%		36%	54%	90%	26%
Value of Production	2%	3%	2%	6%	42%	39%	12%	94%	37%

Across all farm households, 29 percent of farms rely on farm income as their primary earnings source. These farm dependent households account for 84 percent of the value of production and reported receiving 81 percent of total subsidy value. Only 10 percent of these farm dependent households receive no government payments, yet they account for approximately 29 percent of the value of production. Eight percent of farm households depend on farming for household income with a farming operation reliant on government subsidies. This group of farm dependent/subsidy dependent farm households receives 51 percent of all government payments while generating only 16 percent of the total value of production. This ratio of subsidy receipts to farm revenues illustrates how government payments tend to be concentrated among a small number of farm households whose farm businesses are not large in the farm economy but operate with great sensitivity to government programs.

The remaining sections of Table 2 break down the distribution of farms, subsidies, and value of production for each of the household types previously described. The ruralpolitans groups are quite similar in their distribution of subsidies and are combined here. Ruralpolitans farm households account for 47 percent of all farms, receive 15 percent of all subsidies, and account for 12 percent of the value of production (percents in the rightmost column). Within the ruralpolitans group, 66 percent of households receive no government payments and do not rely on farming for

household income. Fifty-two percent of subsidies to ruralpolitans are concentrated in the 16 percent of households that are nonfarm dependent/subsidy dependent. Much of the value of subsidies received by these households is related to conservation programs such as CRP and EQIP. While only two percent of ruralpolitans households are farm dependent/subsidy dependent, they receive 27 percent of the government transfers to ruralpolitans households.

Active Seniors account for 14 percent of all subsidies, and account for nine percent of the value of production. Within this group, 34 percent are reliant on farm income. Interestingly, 65 percent of all subsidy receipts by Active Seniors go to households that are farm dependent/subsidy dependent. This group accounts for only 20 percent of the value of production by Active Seniors. The disconnect between proportions of farm revenue government payments is attributable to a high reliance by Active Senior households on CRP payments for farm income. Clearly, changes to conservation programs would be expected to significantly impact this group of households relative to any others. This is particularly true considering that this group likely has the least ability to adjust household resources in response to program changes.

The three household types in the bottom half of Table 2 are the primary farm households engaged in production agriculture. Summing the values in the rightmost column of Table 2 for these three household groups reveals that 79 percent of the value of agricultural production comes from these households. In addition, these three groups receive 71 percent of all government payments while accounting for only 27 percent of all farms.

Forty-one percent of the FOSO households are dependent on farming as the primary source of income. Among these, only 10 percent receive no government payments. FOSO households that are farm dependent/subsidy dependent receive 54 percent of government payments while generating only 22 percent of the value of production within the group. In contrast, 70 percent of Traditional farm households are dependent on agricultural income. Twenty-two percent of TRAD households are simultaneously farm and subsidy dependent, capturing 52 percent of the government payments while producing 21 percent of agricultural revenue within the TRAD group.

As expected, there are fewer FOSO households that rely on farming as their sole source of income. However, for those that do rely on farming the government subsidies are distributed similarly to the TRAD and COM farm households. The most notable difference in the Commercial farms relative to the FOSO and Traditional farm households is that this group, as a whole (rightmost column), receives 26 percent of subsidies but accounts for 37 percent of the value of production. This statistic is partially related to farm activity mix, with a larger concentration of large livestock operations falling in the COM household group. It also suggests that, despite popular rhetoric, the majority of farm subsidies do not necessarily go to the largest farm businesses.

Finally, Table 2 shows that among the three household types primarily engaged in farming, the majority of subsidies are concentrated in those farming operations where households are dependent on the farm business for income, and the farm business is dependent on government payments for profitability. For ruralropolitans, in contrast, we see the majority of government subsidies within the group going to households that are not dependent on farming for the majority of their household income.

Conclusions

The distribution of government subsidies discussed here offers a snapshot of how government payments are distributed across household types. However, this snapshot points a much clearer path (than a farm size distribution) toward examining distributional impacts of farm policy changes. Resource allocation decisions, especially between farm and nonfarm activities are likely to be much more consistent with the groupings of farm households that we have used. Analysis of changes in farm programs must recognize that resource mobility of farm households is diverse and that the ability of farm households to adjust to changes in farm policy is highly variable. Labor allocated to the nonfarm economy tends to be lumpy, so groups with off-farm occupations (SIR, DIR) have a limited pool of time to devote to farm labor and management. These are contrasted with occupational farm operators (TRAD, COM), who may find incentives in farm program changes to spread their management time over more acreage or animals, or complement their time with larger/newer facilities and equipment.

The results presented here also suggest that the current distribution of the various types of government payments appears to be concentrated among farm households with the greatest need. Within the FOSO, TRAD, and COM farm households, government payments are concentrated on families whose income is dependent on farming and where farm profitability is dependent on subsidies. Within each of these household types more than 50 percent of the government subsidies went to households that accounted for little more than 20 percent of the value of production by that group. Thus, it would appear that despite the fact that current farm programs are not specifically designed to target certain households, the outcome resulting from program parameters and farm household decisions is a concentration of payments on households in need.

Finally, the information here only represents the distribution of government subsidies in one year. Research efforts should be focused on how payment distributions change over time and with different policy regimes. In addition, further examination of the incidence of government subsidies should focus on differential resource mobility and its influence on response to policy.

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From George to George: The Relationship Between Farmers and Government

Society, through its elected officials, has had a contract with agriculture. A relationship between farmers and their government has existed since colonial times. It has been a contentious relationship at times. Many adjectives have historically described the relationship. Critics have even used the word incestuous to describe the relationship. This essay will examine the relationship (society's contract with agriculture) historically and attempt to crystal ball the future.

Periodically, there have been attempts to reform the relationship (most unsuccessful) or even sever it. The first decade of the 21st century is one of those times. Will it be successful? Unlikely, if history is the guide. It is both an economic and a political issue. It is part of the dynamics of the political economy. Furthermore, the words relationship, reform, and success are loaded with value judgments. How do you describe the relationship? Reform is in the eye of the beholder. Success is a relative term.

A Missouri farmer by the name of Harry S. Truman was fond of saying that the only thing new in this world is the history we have not learned. He who ignores history is destined to repeat it. As we examine the relationship between farmers and the government, known under the umbrella as agricultural policy, we will discover that history clearly repeats itself.

Where to begin? Given the current occupant of the White House and knowing some history, it seems appropriate to label this discussion from George to George – Washington to Bush. U.S. agricultural policy is rooted in biblical times. The government has been involved in agriculture since the beginning. Some historians trace the beginning of organized farming to 10,000 years ago in Egypt. But, let us begin with the first George. No one during the colonial period was more qualified to appraise the agricultural possibilities of America than our first President. Washington was an able farmer. He kept daily records and was well informed about the scientific treatment of the soil and animal husbandry. He was concerned about conservation practices and lamented that our lands were originally very good, but use and abuse have made them quite otherwise. He would, I suspect, approve of the environmental quality incentives program (EQIP) and the conservation security program (CSP). His estate at one time included 40,000 acres valued at half a million dollars.

¹ The author is a professor at Kansas State University and a member of the Farm Foundation Round Table since 2001, a member of the Farm Foundation Board of Trustees since 2001, and a 1998 recipient of Farm Foundation's R.J. Hildreth Award for Career Achievement in Public Policy Education.

During the Washington administration, a tax on imports, including foodstuffs, was levied. Many refer to this as the first American agricultural policy. Sound familiar? Current trade disputes with the European Union, Canada, and Mexico and the disagreements in the Doha Round of the WTO over export subsidies and tariffs and quotas have roots in the administration of the first George.

Today, three percent of the farmers produce half of the agricultural sales. Concentration in farm numbers and agri-business firms such as meat packers is a hotly contested issue. Would this disturb George Washington? Certainly it would not as much as it would disturb Thomas Jefferson. The father of agrarian democracy called farmers, the precious part of state. He purchased Louisiana (including the Great Plains) against his better judgment. Why? Even though he philosophically opposed buying new territory, he reasoned that the Midwest and the Great Plains would allow the U.S. to remain a democratic agrarian society with all of its virtues and values.

Agricultural policy in the beginning of the 21st century is deeply rooted in agrarian populism. Just listen to any discussion of agricultural policy, and the preservation of the family farm will be the underlying theme. Preambles to farm bills from the *McNary-Haugen Act* of the twenties to Freedom to Farm in the nineties called for parity income for family farmers with their city cousins. Jefferson would have been pleased. The support for farmers' markets and buying locally produced foodstuffs and the popularity of organic foods attest to the interest in Jeffersonian agrarianism in the 21st century.

Jefferson purchased Louisiana, but it was not distributed to a nation of family farmers until Abe Lincoln from rural Illinois signed the *Homestead Act of 1863*. During the midst of the Civil War, Lincoln not only created the *Homestead Act*, he also established the U.S.D.A. (United States Department of Agriculture) and signed the *Morrill Act* establishing the people's universities known as land-grant universities. Land was made available in every state to establish agricultural colleges to educate the masses. The sons and daughters of farmers and laborers were to be educated in agricultural sciences, home economics, engineering, mechanical arts, and even the classics. This educational system remains intact today, but it is becoming controversial. Lincoln intended for the land-grant university to be the people's university. The establishment of experiment stations and extension services was designed to carry out Lincoln's mission and take the university to the people.

Federal funds and state revenues were appropriated to educate the masses, discover new knowledge, and distribute it to the people. Today, fewer and fewer funds are coming from the taxpayer and more and more from private sources such as tuition and grants from corporate sources. Some are asking, has the people's university become the captive of corporate interests? Can ordinary citizens afford a university education? Is the land-grant system trying to become research think tanks and emulate the Ivy League schools? This is an agricultural policy issue, I would argue, that needs serious examination. In the 1970s, it was common for land-grant universities

to receive half of their funds from the states. Today, they receive less than a quarter of their funding from the states, and in at least one state, less than 10 percent. If this trend continues, what is the difference between private institutions and public institutions? Who will do the basic research in the agricultural sciences? Who will train the next generation of agri-business personnel? Will agricultural productivity decline in relative terms?

The young professionals in the land-grant system have a real challenge to adapt Lincoln's mission to the 21st century. After roughly a half a century involved in the land-grant system as a young 4-H member on a small family farm, undergraduate and graduate student, county agricultural agent, professor, and extension agricultural policy specialist, I have some advice. Strive for objectivity, work on practical problems faced by the people, and deliver your results regardless of whether or not it pleases powerful special interest groups. Maintain, at all costs, the integrity of the system. Remember the old Jefferson admonition to educate the people so that they can apply their values to the issues. Equip them to make decisions based on empirical evidence, research, and the facts rather than myth and emotion. Use the alternatives/consequences approach to do analyses. Be content with whatever the people decide because you have equipped them to choose the best alternative the political system can produce in the public interest. Idealistic? Perhaps! But, history, I will argue, has shown that the process works!

The first Roosevelt (TR) began the conservation movement at the turn of the 20th century. It blossomed into the Soil Conservation Service (now NRCS) which played a vital role during the dust bowl and the Great Depression. Conservation has been a part of every farm bill with programs like the Soil Bank, CRP, EGIP, and CSP. The 21st century brought a new conservation ethic, which may be enhanced to fight climate change. The 2002 farm bill was the most conservative-minded farm bill in history, spending as much in one year as the previous farm bill spent in six years.

U.S. farm politics, though rebellious at times, (Washington faced the Whiskey Rebellion and Reagan faced the American Agricultural Movement) did not attempt to intervene in the marketplace until the 1920s when the Depression began on the farm. Two members of Congress (Charles L. McNary from Oregon and Gilbert N. Haugen from Iowa) introduced the first farm bill, which was to intervene in the marketplace and support prices. It was a two-price plan wherein domestic allotments were supported at fair levels, and remaining production was to be dumped on the foreign market at world prices. Sound familiar? The export enhancement program enacted during the Reagan administration functioned like a two-price plan. President Coolidge vetoed the McNary-Haugen farm bill twice. In one of his veto messages, he called it "government price fixing, once started, has alike no justice and no end." His crystal ball was quite clear, given the history of farm programs from F. D. Roosevelt to the present and into the foreseeable future. In fiscal 2000, farm programs that Coolidge called an economic folly cost the Federal Treasury \$32 billion – a record to date in nominal dollars.

How come that rugged individualist, bastion of free enterprise, the U.S. farmer would ask for the government to intervene in the marketplace and support prices and income? The Great Depression shook the foundation of agrarian free-enterprise philosophy. Jefferson's dream came to a screeching halt. Farm income was cut in half. Bankruptcy loomed over the horizon. Farms were lost and lives shattered, and so we experienced Hoover's Federal Farm Board, Roosevelt's *Agriculture Adjustment Acts of 1933 and 1938*, Truman's Brannan Plan, Eisenhower's Soil Bank, Kennedy and Johnson's diverted acres, Nixon and Ford's set aside, Carter's farmer-owned reserve, Reagan's PIK, Bush the elder's triple base, Clinton's Freedom to Farm, and now Bush's counter-cyclical revenue plan – from George to George.

Each administration takes familiar programs, reforms them and renames them. Truman's Brannan Plan (defeated in the Congress) was a decoupled direct payment. The hallmark of Freedom to Farm, enacted in 1996, was flexibility – a decoupled direct payment. Ike's Soil Bank became the CRP. History does repeat itself.

U.S. farm policy has historically been based on price supports, land retirement, stored reserves and income support (loan deficiency, counter-cyclical, and direct payments). The name is politically very important. In 1954, we had tremendous surpluses at politically acceptable prices. What to do? Dump them overseas for loans, foreign currencies, and gifts. And so, Public Law 480 was passed. Was it called *The Surplus Dumping Act of 1954* – no, it was Food for Peace. How could anyone possibly oppose food for peace? Price supports became parity prices. Parity has a good ring to it. It means fairness and justice. It is an index number that compares prices paid to prices received indexed to 1910-14. At the beginning of the 21st century, it is grossly out of date and in no way measures the well being of America's farmers. Yet, it is still calculated and a part of the agrarian folklore. Farm bills have had attractive names historically – for example, *Food Security Act* and *Freedom to Farm*. After September 11, 2001, farmers began to talk about farm programs as homeland security.

In 1949, we passed the *Agricultural Act*, which was a permanent amendment to the *Agricultural Adjustment Act of 1938*. The AAA of 1938 was a revised AAA of 1933. Revision and reintroduction were necessary since the Supreme Court declared the '33 Act unconstitutional. Every farm bill since 1949 has been a series of temporary amendments to the permanent legislation. As those amendments sunset, we propose a new series of amendments, which then become the new farm bill. This occurs historically every four to seven years. The 2002 farm bill expires in 2007. If a new bill is not passed or the old one extended, the permanent legislation (the 1938 Act with 1949 amendments) becomes the law. This is grossly out of date and insures that action is taken.

U.S. agricultural policy has accomplished: (1) parity income, (2) conservation of natural resources, (3) disaster assistance, (4) an enhanced asset base, and (5) a safety net under farm income.

Income per farm household now exceeds parity with urban household income, if government payments are included. Payments are either directly or indirectly tied

to conservation. Disaster aid is periodically passed. It was attached to funding for the Iraq War in 2007. Crop insurance is an established part of agricultural policy. The benefits of commodity programs have been capitalized into land values and rental rates, enhancing the asset base. For example, it is estimated, assuming 100% capitalization, that if farm program payments were eliminated, land values in Kansas would drop by approximately one third. Clearly, the government has provided a safety net under farm income.

A perennial issue is who gets federal farm payments – wealthy corporate farmers or family farmers? The question is loaded with value judgments. Defining small as less than \$100,000 gross sales, the small farmer gets about one fourth of the payments. Defining large as more than \$500,000 in gross sales, the large farmer gets about one fourth of the payments. If you define the family farmer as one between small and large, about half the payments go to the family farmer. This is arbitrary and very difficult to enforce. Historically, less than one percent of U.S. farmers have been impacted by payment limits.

What U.S. farm programs really do is decrease the pain of adjustment to new technology and innovation. Market forces prevail. Technology marches on. It is basic to economic man just as new discovery is. Our history is one of adjustments to technology and economic forces. We have farm programs to decrease the pain of the adjustment, and in spite of their numerous critics, they have succeeded in doing that. Society's contract with agriculture, given the goals, historically has delivered.

Should society's contract with agriculture be continued? That is a political question beyond the confines of a professional agricultural policy specialist. Will it be continued is another question that can be predicted without value judgment. As we go through each farm bill cycle, many pundits predict this will be the last farm bill. So far, they have been wrong, and a clear crystal ball still shows, as did Coolidge's, that there is no end in sight. Current debate centers around the level of funding, equality among commodities (program commodities and nonprogram commodities such as fruits and vegetables), the level of market distortion (WTO compliant), and dividing the pie among income support, conservation, renewable energy, research and education, rural development, and feeding and nutrition programs. Some argue that traditional commodity programs dating back to the 1930s should be eliminated, and the funds should be diverted to conservation, renewable energy, and rural development. That is not a new argument peculiar to the 21st century.

Corollary to the issue over continuing society's contract is the budget deficit. The 2002 farm bill was enacted in an era of lucrative budgets and relatively low prices. The next farm bill will be enacted with relatively large budget deficits and relatively high prices. Consequently, fewer funds will be available for commodity programs, but that is irrelevant given the fact that commodity programs are an entitlement (a contract). Fewer funds will be authorized than in the 2002 farm bill, but during the life of the next farm bill, if prices or perhaps revenues fall, appropriations will have to increase. Discretionary funding for other programs such as conservation and re-

newable energy (new to the farm bill in 2002) are heavily impacted by the budget. The economic and political atmosphere is such that authorized spending for commodity programs will not be enhanced. Enhancements will be shifted to conservation and renewable energy.

Why this outlook? How can 21st century policymakers continue ancient, out-of-date programs as commodity programs are labeled by the critics and large urban newspapers? First, agricultural policy is not made in New York City, Los Angeles, or even Washington, DC. It is made by members of Congress who answer to the folks back home. Second, agricultural policy still carries remnants of bipartisanship. Third, farm groups have learned how to practice the politics of the minority, to build coalitions issue by issue, and to find commonality with environmentalists on conservation, with bankers in protecting the value of assets such as land, and with food stamp recipients who depend on feeding programs enacted in the farm bill. Fourth, farmers always have the aura of a well fed nation and weather disasters in their arsenal of arguments for special treatment. Food security is a powerful economic and political argument.

Historically, it has taken less than a handful of members of Congress from both sides of the aisle and in both Houses to pass a farm bill and Presidents do not veto farm bills. Will there be changes in the future? Certainly, but the contract between society and the farmer is not about to be abandoned. But, what about the contention that farmers can prosper without these payments? A data bank of approximately 2,000 family farmers in the Kansas State University Farm Management Associations shows that in 2004, the record year for net cash farm income, 40 percent of that income came from government payments.

What about the contention that farm programs violate WTO rules and, therefore, we are forced to spend less and overhaul these programs? First, how much any country spends on farm programs is not the issue at the WTO. It is not how much is spent. It is how the funds are spent. The WTO places farm programs in boxes. Important for this discussion are the green and amber boxes. Green box programs are considered nonmarket distorting and have no expenditure limits (from a purist standpoint, at least theoretically, any government program distorts the market). Green box payments do not encourage production through a guaranteed price for actual production. The direct decoupled payment used in the U.S. and in the EU is considered green box. Farm programs, such as the marketing loan and the counter-cyclical target-price program, guarantee price and encourage production. WTO places them in the amber box (at least not in the green box) in which each country has a limit. Conceivably, funds that have been tentatively spent on amber box programs could be shifted to green box programs and be WTO compliant. A side issue with the decoupled direct payment at WTO is the lack of complete flexibility with the prohibition of planting fruits and vegetables on program crop acreage. This will be addressed in the next farm bill.

Market distortion is not only central to WTO talks; it is also a domestic policy issue. What should be the degree or level of market distortion is the question? Beginning with the 1985 farm bill, U.S. agricultural policy began the process of decoupling farm program payments from price and production. The 1996 farm bill eliminated the target price counter-cyclical program, froze marketing loan rates, and introduced a direct payment decoupled from price and production. This gave farmers more flexibility to farm the marketplace rather than to farm government programs. It shifted some of the price risk from the government to the farmer and forced farmers to use nongovernmental risk management tools. The 2002 farm bill added a counter-cyclical, target-price program to the 1996 farm bill but decoupled it from current production – thus, less market distortion. The EU contends they are 90 percent decoupled while the U.S. appears to be going in the opposite direction.

It is not rocket science to understand that if a farmer produces a crop, he has the opportunity to prosper. If he does not produce a crop, he is in a difficult situation, to say the least. Thus, it is hard to understand the support for a marketing loan program that is worthless without production and a counter-cyclical target price program that does not yield a payment in times of widespread weather disasters. Consequently, the Bush administration introduced, in 2007, a counter-cyclical, revenue target program similar to the target price program except that it is based on a target revenue. If gross revenue falls below the target, a payment will be made based on a formula. This would enhance the safety net under farm income.

I chaired a commission created in the 1996 farm bill to examine the role of the federal government in 21st century production agriculture. It was a nonpartisan broad based commission in that it included members across the spectrum of beliefs and philosophies as to the government's role. The commission held hearings across the country and took written and oral testimony from academics, farmers, and interest groups across the agricultural and food policy spectrum. The conclusion: it is the role of the federal government to provide a safety net under farm income with minimal market distortion. The commission agreed on that statement unanimously. Debate then proceeded on the definition of minimal and how to achieve the government's role. The majority of the commission members recommended continuation of the direct payment and a counter-cyclical, target-revenue program. Of course, central to any policy issue is the role of the government or in terms of farm programs specifically, the size of the holes in the safety net. A target revenue program produces smaller holes in the safety net than a target price program.

The 2002 farm bill was the greenest in history in terms of conservation programs. A debate ensued over conservation on idle lands versus conservation on working lands. This debate is ongoing and will continue in future farm bills. The new program in the 2002 farm bill, the CSP, clearly was designed to shift the emphasis to working lands. It is a case in point to the question of authorization versus appropriation. Funds authorized for the CSP were shifted to *ad hoc* disaster relief, and the CSP was forced into a minor program in a few watersheds. However, it did establish the

principle of conservation on working lands. The debate on the next farm bill will pursue the idea of merging EQIP cost share programs with the tier approach in the CSP. Conservation is one part of U.S. agricultural policy that has broad-base support from environmentalists, sportsmen, and farmers.

Rural development has historically been a poor stepchild to commodity programs. Again, a case where funds are authorized, but a lesser amount is appropriated. The next farm bill may, however, be an exception because rural development is now tied specifically to renewable energy. Renewable energy is no longer just an economic or even an environmental issue. Politically, at least, it is now a national security issue. Both political parties have decided that the U.S. will work to reduce dependence on Middle East oil. Energy independence, though extremely difficult to achieve, is certainly politically correct. Couple this with the concern over climate change, and the role of fossil fuels and renewable fuels become very politically potent.

The war on terror is the first war in recorded history where one side funds both sides. The U.S. buys Mideast oil and even our so-called friends in the Mideast use the funds to train the next generation of terrorists. Is it rational? Rational people think not! Renewable energy is: (1) national security, (2) environmentally friendly, (3) enhanced farm income, (4) long run, cost effective, and (5) rural development.

A broad based nonpartisan group of farmers, agri-businesses, conservationists and academics have set a goal of 25 x 25. Twenty-five percent of our energy consumption in 2025 will come from renewable resources (grain, bio-mass, wind, solar, thermal, and hydro). That cannot be achieved with grain-based ethanol and soy-based biodiesel without creating a food versus fuel controversy in which fuel will lose. Bio-fuels of the future will come from bio-mass such as wood chips, wheat straw, corn stover, and grasses in addition to grain and soy. With the bulk involved in bio-mass conversion to ethanol, the process will be done locally, and that will create jobs in rural America – thus, the connection between renewable fuels and rural development. Agricultural policy of the future will address food, fiber, feed, and fuel.

Is the interest in renewable energy a flash in the pan? No! Why? To repeat, it is national security with the full engagement of the Pentagon. Major oil companies are investing in bio-fuels. For example, BP now calls itself Beyond Petroleum, and Conoco and Tyson have entered into an agreement on using chicken fat to produce biodiesel.

The next farm bill will be generous to the research and development of biofuels specifically from cellosic sources. The success of 25 x 25 depends on new scientific discovery. The nay sayers think it is a flash in the pan, but the resources now committed, with billions over the horizon, indicate otherwise. The same was once said about the microchip.

Is society's contract with agriculture alive and well? Will the relationship between farmers and the government continue? Will the federal government continue

to put a safety net under farm income? Will history repeat itself? The evidence is clear! The issue will not be if there should be a safety net. The issue will be the size of the holes and the composition of the net. The contract with agriculture has stretched from George to George – George Washington to George W. Bush – or perhaps to George P. Bush in 2028.

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Changing Attitudes Toward U.S. Farm Policy

If ever there were a sign that the attitudes toward farm policy were changing in the United States – that the number of stakeholders involved has grown beyond the few traditional commodity groups – just look at the funding shift in the proposed 2007 farm bill, which shows significant increases in nutrition, specialty crops, healthy diets, and conservation. For example, the House farm bill earmarks nearly \$1 billion of matching money to protect existing farmland from subdivisions. That’s an historic number because prior to the 2002 farm bill – only five years ago – that number was virtually zero.

Thirty years ago one state had a farmland preservation program. Now twenty-seven states have such programs, and numerous private organizations and local governments also purchase conservation easements to protect farm and ranch land from development. In 2006, more than \$250 million was spent nationally on the purchase of development rights and conservation easements. Twenty years ago that number was less than \$10 million. I do not bring up these figures to toot our own horn, although we like to think we have played a role, but merely to illustrate how things have changed in one policy realm in which American Farmland Trust works daily.

But this shift in attitude extends well beyond farmland preservation. Across the country, a variety of new interests has become involved in the development of food and agriculture policy, bringing to the fore issues of nutrition, food safety, national security, and support of local farmers. More credence is now being given (and that will be reflected in new farm bills) to producers of fruits, vegetables, and other specialty crops. They have planted a stake in the moral high ground by aligning their goals with that of a farm bill with even more emphasis on eating a healthy diet – preferably one that includes a variety of foods produced ever closer to home. As a result, farmers of corn, soybeans, wheat, cotton, and rice are now not the only ones at the farm bill negotiation table. And that will be true for the long haul, permanently changing the farm policy frontier; for as we know well, political constituencies will develop around those programs that deliver funds. The farm bill passed by the House of Representatives in July 2007, shifts spending away from traditional commodity programs, so that 66, 15, and nine percent goes to nutrition, commodity, and conservation programs respectively. Additional support for specialty crops

¹ The author is president, American Farmland Trust.

or farmers' markets does not necessarily result in government payments directly to those producers. Rather, an emphasis in this direction would mean help with research, disease control, marketing, and infrastructure that gets products to market.

Despite the increased emphasis on food quality, conservation, and local food systems, it is unlikely there will be any shift in the relative role of different levels of government. The federal programs will continue to provide the bulk of funding; and local and state governments, while getting more involved in food issues, will focus their efforts on their traditional roles – including the important responsibility of land use planning. This is a subject near and dear to our hearts; it is one that deserves national attention; but it is not one that needs national land use planning. As a result, groups like ours will face an even greater responsibility – one we welcome – to provide tools to local communities to better plan their futures and the futures of their local agricultural community. And the federal government will increasingly provide financial resources to both assist with necessary planning and implementation of those plans.

The issue of fostering an agriculture that directly benefits the lives of nearby residents, whether the community is Lincoln, Nebraska, or Newark, New Jersey, is gaining traction. That means that any consumer (as well as environmental, civic, and even religious groups) should have a say in what the farm bill does or does not do. We do not think this is a short-term social phenomenon. That is not to say that farm bills will be everything we think they should be. But the pendulum has swung a bit more in a direction we like.

While we have been toiling away for years preaching the benefits of farmland preservation, we cannot take too much credit for events that have helped push the present discussion. First, the events of 9/11 have made everyone take notice of the potential vulnerability of our food chain to bio-terrorism or contamination. Second, actual incidents of food contamination (whether for pets or humans) have many more people interested in exactly where, and under what conditions, their food originates.

This sets the stage for a national dialogue about the competition for land and how a society allocates it for long-term needs. At this time, that discussion does not happen in Washington, which still operates in response to the crisis of the moment; but there are increasingly more voices asking for the debate to occur.

It is only natural that we worry about the entire package of issues when it comes to farming, not just whether we're preserving farmland. After all, it would be a lot tougher arguing to preserve farmland if farmers do not have reasonable opportunities to work the land and make a good living.

The decades ahead are very promising for U.S. farmers. The high levels of discretionary income (or conversely, the record low portion of take home pay we use to feed ourselves) provide wonderful opportunities for farmers, especially those near cities, to capture higher margins for value-added products. And, there is a growing population in the developing world that wants a better diet driving demand for food

and fiber around the world. Farmers in the United States should be in a good position to capture those promising markets.

In addition, the development and use of biofuels such as ethanol will utilize large portions of the country's agricultural resources. This is both a blessing and a problem. While it lifts net income for thousands of farmers, it will also put unprecedented pressure on the nation's natural resources. Increased challenges with soil erosion and water quality, combined with the continued loss of 1.2 million acres of farmland per year to urbanization, are land-based issues that must be confronted in the years ahead.

It is right that the public, worried about the environment, food safety, and the use of their taxes, wants to know what public goods they are getting in return for the billions spent in the federal agriculture budget every year. Too often, the money allocated for conservation is siphoned off for other things, leaving conservation programs high and dry. For example, in recent years, funds authorized for the Conservation Security Program have been diverted to emergency disaster assistance. When three out of four farmers applying for funding under existing conservation programs are turned away, which is what happened in 2004, the programs simply will not achieve the environmental goals that the public expects.

Hopefully, future farm bills will reflect the needs of all of agriculture as well as the general public upon whom we all depend for continuing support both in Washington and at the supermarket check out counter.

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My Role in Agricultural Policy

Election to Congress in 1976

I had no prior experience in agriculture before my surprise victory against congressman Garner Shriver in November 1976. I was a Jewish, relatively urban (Wichita, Kansas), nonagriculturalist son of a scrap dealer, oilman, and minor league baseball owner (Wichita Aeros). None of this was a prescription for victory. Yet, my campaign was partially based on being an advocate for family farms, and I actually won the race because of my specific commitment to farm and rural issues and my promise to be an advocate for more of the district than just Wichita. I won large margins in Reno County, Kansas (60%), a farm center, which compensated for closer margins or narrow losses in other counties. I won partially because we were still in a post-Watergate world.

I did not initially seek a seat on the House Agriculture Committee, preferring a seat on the Commerce Committee (with jurisdiction over energy and health care), but on the advice of my campaign manager, Myrne Roe, I changed my mind and won the seat. I was one of the most urban members of a predominately rural committee, which allowed me to build bridges between urban and rural interests, both on the committee and in the full House. This was incredibly important, given the very small numbers of members of the House who come from farm country. Working with Congressman Sebelius and later with Congressman Roberts and Senator Dole, we worked as a credible team on issues beneficial to Kansas and the Plains states – commodities, livestock, disaster assistance, and USDA operational matters. This also gave me time to develop an interest and leadership role in noncommodity issues such as nutrition (food stamps, where I played an active role in the four farm bills), commodity futures (where I became one of the few experts on these issues during my early years in the House and helped write the 1982 and 1986 *Futures Trading Act*), and ethanol (one of the very first substantive bills I introduced in the House in 1977 was on the promotion of gasohol). I was very eclectic in my interest on the agriculture committee in Congress, in part because I saw great opportunities in pursuing issues beyond just the traditional commodity programs although I fought hard for them as well. But I always kept in mind my role as a bridge builder and consensus broker between urban and rural and geographical issues as well. And

¹ The author is president of the Motion Picture Association of America. He is a former Congressman from Kansas and a former Secretary of Agriculture under President Clinton. He is a member of the Farm Foundation Round Table and was a member of Farm Foundation's Board of Trustees from 2001-2006.

I kept my seats on other committees to reinforce my more general role in House issues (Judiciary, Science and Technology, Intelligence [chairman]) so I would not be perceived as only an aggie in my interests and influence.

In the late 1980s I became chairman of the Wheat, Soybeans, and Feed Grains subcommittee (later General Farm Commodities) and helped write the 1990 farm bill, *Soybean Promotion Act*, and many other pieces of farm legislation.

Appointment as Secretary of Agriculture in 1994

In 1994, I lost my re-election for a 10th term to Todd Tiahrt (guns, NAFTA, abortion, Clinton, bad campaign). But within six weeks, I had been nominated to be Secretary of Agriculture replacing Mike Espy. By the way, I had been seriously considered as Secretary in 1992, immediately after Clinton was elected, but Espy was chosen instead. I was helped in my selection by the very close association with Leon Panetta, White House Chief of Staff, and Vice President Al Gore as both were in my 1976 freshman House class. But I suspect that the main reason I was chosen for the USDA job (beyond my keen sense of humor and BS quotient and my experience on the Agriculture Committee), was the fact that Bob Dole was the new Senate Majority Leader, and Clinton wanted someone who could get confirmed easily, particularly since there were a few existing Cabinet members with ethics issues. And Clinton felt that if Dole supported me, I was the man. And so it happened. I also got a lot of assistance from Pat Roberts, Bob Dole, and Dick Lugar, the then Chairman of the Senate Agriculture Committee. And Clinton knew me from my congressional days and felt I was bipartisan enough to handle the unique nature of agricultural politics. And I had tried not to burn any bridges during my legislative days.

So I became USDA Secretary on March 30, 1995, and immediately did a nationwide farm and rural tour. My first priorities were to make sure the farm programs were being professionally and courteously administered nationwide and to address the specific concerns of members of Congress. Keep the congressmen happy if possible, or at least keep them informed, and do not surprise them was my mantra throughout my term. I quickly learned that the principles of agricultural policy were largely congressionally controlled or mandated, particularly the southern commodities (cotton and rice), and dairy; and most administration initiatives in this area were somewhat peripheral to congressional initiatives. This was true even in the development of the 1996 *Freedom to Farm Bill*, which the Administration reluctantly supported. It was true then, and true now, that administrations rarely take a significant, successful lead on commodity programs in the face of congressional pressure. I personally find this unfortunate because I think changes are needed, but it is a reality even the current Administration faces as well. So I largely put my stamp on issues outside the traditional farm commodity subjects (although I never neglected them either).

So in addition to making sure that the traditional commodity programs were being properly administered, especially federal disaster and crop insurance modernization, I focused on other things – especially on food safety. I felt that if the public had confidence in the safety of the food supply, agriculture would be a beneficiary. So we modernized the entire food safety and inspection system and implemented a national HACCP program in meat and poultry inspection. We also aggressively enforced sanitary standards and took aggressive actions against meat and poultry plants that we viewed as violating the rules. This earned us some enmity from some in the livestock industry, but ultimately it helped on the confidence issue. I was a bit of a zealot here. We also worked to build confidence with the consumer on BSE (mad cow disease) as well as other sanitary and phytosanitary measures such as Karnal Bunt, and in the process we worked to keep our export markets open to American products. We also took the lead in helping farmers find new markets: implementing the national *Organic Standards Act*, which has facilitated the fastest growing part of American agriculture; substantially enhancing our nutrition programs – Food Stamps, WIC, Child Nutrition, Team Nutrition in public schools (first real improvement in school nutrition), Dietary Guidelines Modernization and new Food Guide Pyramid; facilitating the national farmers’ markets initiative; and aggressively promoted a rural development agenda to encourage modernization of water, sewer, telecommunications, and other infrastructure and underserved areas around the country, and related economic development.

Conservation programs were a high priority, especially in managing and expanding the Conservation Reserve Program and related efforts, and we increased spending and focus on a variety of conservation programs. However, my biggest challenge in this whole area was managing the U.S. Forest service, the largest single part of USDA. The Clinton/Gore Administration was committed to a whole new way of national resource management, and the operation of our national forest was no exception. Timber cutting on our national forests was dramatically reduced, which earned up the enmity of many western progrowth and development interests. We were constantly involved in major litigation in implementing these policies, many involving forest plans, and many involving implementation of the endangered species act. This was all new for a Kansas boy growing up in Sedgwick County and not accustomed to seeing many trees. The Forest Service took a tremendous amount of my time, and it also meant that other committees of Congress were responsible for major parts of our jurisdiction, especially in the appropriations area. But one of my jobs was to use my political expertise to try to quell the grumbling on the Hill from some of the less environmentally committed members of Congress on forestry issues – at least on these issues.

We also played a big role in international matters, especially in food aid where we provided the leadership for tens of millions of tons of food assistance worldwide, especially in sub-Saharan Africa and south Asia. Our USDA team often led the interagency effort in these areas. We were also very active on trade issues, usually

being part of the Government negotiating teams for bilateral and multilateral efforts, and often butting heads with the European agricultural commissioner, Franz Fischler, on issues such as genetically modified organisms, food safety issues, and the precautionary principle. We also began the successful effort to stop the E.U. ban on hormone fed beef from the U.S., although that issue still remains somewhat unresolved.

Finally, one of my biggest and most difficult initiatives was in civil rights. For decades, the Department had developed the reputation of being the last plantation and of not being minority friendly in farm programs and in relationships with our own employees. We tried our best to turn that label into the People's Department, Lincoln's term. Within a year after I took over, USDA was in the middle of significant class action litigation involving classes of farmers and employees, and we received a lot of unfavorable press about our past civil rights compliance, particularly in the administration of farm programs through farmer elected county committees and state committees of the Farm Service Agency. So we committed thousands of people hours and lots of funds to solve the problem, settling large civil cases (especially *Pigford vs. Glickman*, one of the largest civil rights cases ever settled against the Government). We also undertook a serious and difficult review of internal USDA compliance with civil rights matters and reorganized the Department of Agriculture to deal with them and made modifications to the FSA committee system to make it more inclusive. Of everything I did at USDA, this will probably stand out as my most significant accomplishment; although at the time I did not get a lot of credit from traditional production agriculture circles. But it was right, and USDA is a better place for it, and largely my successors have carried on the effort.

Conclusion

Above all, in my years in the Congress and at USDA, I tried to be a good politician in balancing the many competing interests in agriculture; a bridge builder between urban and rural, liberal and conservative, commodity programs and nutrition programs, conservation and production – all to carry out policies in a constructive way to get something done and to give the consumers confidence in our programs and in the safety of their food. I tried to be an advocate for traditional farm and rural interests as well as for the poor and needy at home and around the world in serving the people of America.

And now, I have gone from the job of raising popcorn to selling it.

Developing Rural America



Just as farm structure and the agricultural and American economy have changed, so rural communities have been forced to adjust. Some have been successful in making these adjustments and continue to do so, while many have essentially disappeared, just as many more farms have disappeared, and the two are not unrelated. Many previously rural communities have been and are being consumed by urban growth while others have become retirement communities for the aging American population. Today, many rural communities are viewing biofuel investments as their key to growth and survival. While this may be the case for some, the key to rural development lies in visionary leadership. Farm Foundation has a history of supporting rural leadership education and development programs that build communities for the long term as opposed to seeking quick fixes. There are no quick fixes for rural development in the rural areas of the South, in West Texas, Western Kansas, or Western Minnesota.

Creative and Entrepreneurial Economies: Fact or Fiction in Rural America?

The trends are familiar to those who are careful observers of rural America. The economic make-up of many rural places is changing; the demographic composition is shifting; the ability to retain educated adults remains difficult at best; and the capacity to maintain and expand key local services to residents is straining the coffers of local governments. While there is no simple solution regarding the best route for tackling these and other important concerns, the advice proffered by Wilkinson in the early 1990s serves as a poignant reminder of the priorities that should be central to any comprehensive effort to invigorate rural communities. He notes:

...jobs and incomes – good jobs and steady income – must be secured for the residents of small towns and their surrounding rural areas. (Community) development that does not start with jobs and income simply does not start... (Wilkinson, 1991).

This article delves into job and income creation strategies presently being touted as important avenues for strengthening the economies of metro and nonmetro communities. In particular, we examine the role that creative activities are playing in rural America, an approach being elevated to the forefront of economic development strategies through Richard Florida's 2002 book on *The Rise of the Creative Class*. The second approach we examine is entrepreneurship, giving attention to how well nonmetro areas are doing in terms of launching entrepreneurial activities.

Policymakers, local government/community leaders, economic development organizations, foundations, nongovernmental groups and others, are increasingly advocating that both strategies be incorporated into the long-term job creation/expansion portfolio of communities. The question is, "Do either of these economic development approaches make sense for rural America?" This is the very question that we explore in this document.

The first section of our article takes stock of the current shifts occurring in the economic structure of rural America. It is intended to serve as a reminder of the changing economic complexion of rural areas. We focus next on creative workers, documenting the growth of creative occupations across the metro and nonmetro corridors of the U.S. The state of entrepreneurship is explored in the third section of our brief, taking note of where self-employment may be thriving in metro and nonmetro areas of America. We then examine the link (if any) between the growth of creative workers and the expansion of entrepreneurial activities in metro/

¹ Beaulieu is a professor and director of the Southern Rural Development Center at Mississippi State University. Goetz is a professor and director of the Northeast Regional Center for Rural Development at Pennsylvania State University.

nonmetro areas. We do so in light of Florida’s (2005:49) contention that the launching of new entrepreneurial activities is associated with increases in the number of creative people in the locality. The final section of the article outlines a series of options that rural communities might ponder as they seek to create a blueprint for their economic future. It suggests that a long-term economic plan must start with a realistic assessment of the role that creative people and entrepreneurs might play in fueling the economic future of rural America.

A Snapshot of the Economy of Rural America

Many have observed that the economic complexion of the U.S. economy has shifted from agriculture and manufacturing to one rooted in service activities (Powell and Snellman, 2004). This shift from production to nonproduction employment is the result of many factors, most notably the expansion of global competition and the growth of information technologies (Johnson, 2006), as well as displacement of workers through other types of technological change. In this environment, firms engaged in the production of standardized high volume products (the type of enterprises common in many rural areas in recent decades) face monumental challenges. Simply put, past sources of economic competitiveness in rural areas (such as low cost labor and access to natural resources) are emerging as less important assets in a global economy (Munnich and Schrock, 2003).

A visual portrayal of the changing nature of the rural economy is captured, in its simplest form, in Figure 1. As the figure reveals, over 42 percent of full and part time workers in the late 1960s were employed in the goods producing sector (composed of farming, forestry, agricultural services, mining, manufacturing, and construction industries). Today, that number has dipped to approximately 27 percent. On the other hand, the service-producing sector (i.e., transportation, utilities, wholesale/retail trade, finance/insurance/real estate, government/

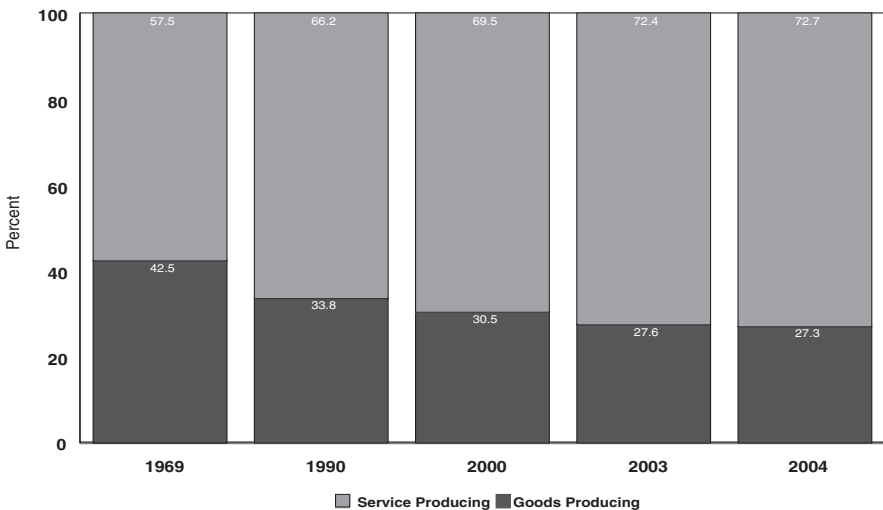


Figure 1. Employment Composition in the Nonmetro U.S., 1969-2004.

Source: Bureau of Economic Analysis, Regional Economic Information Systems.

government enterprises, and services industries) has made impressive gains over the past three and half decades – swelling from 57 percent in 1969 to nearly 73 percent of all nonmetro jobs today.

Returning to Wilkinson’s (1991) observation regarding the twin importance of jobs and incomes, there is clear evidence that the changes noted in Figure 1 have resulted in major nonmetro job gains. In fact, over 4 million jobs were added to the nonmetro economy over the 1990-2004 period, a growth of nearly 19 percent. But these job gains offer no hint of the financial remuneration captured by nonmetro workers who are employed in these industries – the second piece of the puzzle that Wilkinson stated is critical to the vitality of rural areas. On that dimension, the trends are far less encouraging.

Figure 2 examines average wages secured by part- and full-time workers located in metro and nonmetro areas over the past 30 years. All wages are adjusted to 2005 dollars to allow meaningful comparisons to be made over the time. A number of important observations can be gleaned from the information reported in Figure 2. In particular:

- Nonmetro workers employed in the goods producing sector held their own during the 1970s relative to metro workers, experiencing similar upward movement in average wages;
- Nonmetro goods producing sector employees outpaced metro service producing sector workers in terms of average earnings for much of the 1970s and 1980s

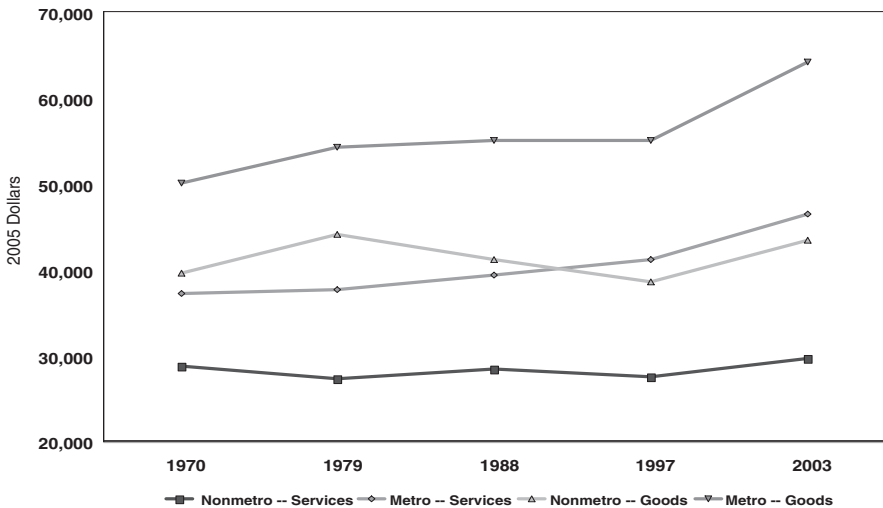


Figure 2. Average Compensation Received by Metro and Nonmetro Workers (Full & Part Time) Across Sectors.

Source: Regional Economic Information System and Stratamodel. 2002-06 USDA/AMS data.

but had lost ground to their metro service producing sector counterparts by the latter part of the 1980s;

- Nonmetro service producing sector workers have seen very little real growth in average wages over the course of the last three decades; and,
- The average earnings gap between metro and nonmetro workers has widened since 1988, regardless of employment sector. Specifically, nonmetro service producing sector workers received 72 percent of the average earnings secured by metro workers in 1988, but this figure fell to 64 percent by 2003. Similarly, nonmetro-based goods producing workers received 74 cents for every dollar paid to metro goods producing sector employees in 1988 but captured less than two-thirds of the 2003 average wages of metro workers.

These results offer some inkling of the economic challenge that several rural American communities face today. Certainly, the vacant factories, mills, and industrial parks that dot the landscape of these places are a daily reminder that the rural economy has changed and that the magnets for low-wage employment now rest in overseas countries such as China and India (The National Academies, 2007; Rosenfeld, 2005). The question that local leaders and citizens must now ponder is this: "What economic development strategies make sense for rural communities today?" While the answer is far from being straightforward, an expanding chorus of individuals, organizations, and agencies is suggesting that the economic prosperity of our nation rests on its capacity to support creative activities and to spur its entrepreneurial spirit (Schramm, 2006). Is there any empirical evidence that these economic hopes are taking hold in rural America today?

Before turning to an examination of this question, it is important to define the terms creative economies and entrepreneurship. We begin by discussing the first concept and then address the issue of entrepreneurship in a latter section of the article.

The Creative Economy and Its Key Components

Research suggests that knowledge is an intangible resource embedded in individuals that enables them to use information, education, and past experiences to create ideas and innovations (Henderson and Abraham, 2005; Metcalfe and Ramlogan, 2005; Munnich and Schrock, 2003). The capacity to innovate, however, does not occur in a vacuum; it is shaped by a variety of contextual features. These contextual factors include persons, institutions, organizations and communities (networks) with whom a person interacts – entities that play vital roles in supporting a person's creative activities (Cortright, 2002; Henderson and Abraham, 2005; Saravia and Miranda, 2004). As Florida remarks:

Although creativity is often viewed as an individual phenomenon, it is an inescapably social process. It is frequently exercised in creative teams. Even the lone creator relies heavily on contributors and collaborators. Successful creators have often organized themselves and others for systematic effort (Florida, 2002: 34).

Increasingly, knowledge is seen as the fuel that is driving the U.S. economy (Henderson and Abraham, 2005:1). Capturing and expanding knowledge-based jobs is dependent on a host of factors. These include: (1) the availability of talented,

well-educated and trained workers; (2) access to productivity-enhancing information and communication technologies; (3) public policies and local institutional systems that support innovation; (4) nearness to institutions of higher education that help address the education and skill enhancement needs of knowledge workers, and that serve as generators of new ideas and innovations; (5) the physical proximity of the community to larger metropolitan areas; and (6) the availability of natural resource amenities (Barkley and Henry, 2004; Cortwright, 2002; Goetz and Rupasingha, 2003; Henderson and Abraham, 2004; Powell and Snellman, 2004; Romer, 1998). Taken as a whole, the components of a thriving knowledge economy will be a challenge for nonmetro areas to meet, given their historic dependence on physical inputs or natural resources, versus intellectual capacity, as the foundation of their economies (Powell and Snellman, 2004).

Closely aligned with the knowledge economy research is the creative class notion advocated by Richard Florida (2002). In his book, *The Rise of the Creative Class*, Florida reaffirms the central role of knowledge and ideas in stimulating economic growth and the importance that key contextual elements (what he labels as talent, technology and tolerance) play in attracting creative people and creative industries to communities. He suggests that the creative class is constituted of individuals employed in occupations that require a high level of creative problem solving, as well as persons who produce or depend on artistic, cultural, and designer goods and services (Rosenfeld, 2005).

Despite the increasing importance that creative people play in fueling economic growth, Florida argues that communities remain wedded to a “business climate” strategy, one bent on attracting firms to their locality. Innovative firms, he suggests, are less attracted to places offering financial incentives and more to areas having a large pool of talented and creative people living there. Consequently, he suggests that communities move from a business climate to a people climate set of strategies – ones that are more inviting and attractive to creative workers (Florida, 2002: 283). As he notes,

...it’s important for a place to have low entry barriers for people – that is, to be a place where newcomers are accepted quickly into all sorts of social and economic arrangements. Such places gain a creativity advantage. All else being equal, they are likely to attract greater numbers of talented and creative people – the sort of people who power innovation and growth (Florida, 2002: 250).

The Distribution of Creative Workers in Rural America

One of the most difficult aspects of monitoring the presence and growth of creative workers is settling on a metric that best reflects this concept. Recent studies have provided some valuable insights on how one might do so. Henderson and Abraham (2004), for example, define knowledge workers as those engaged in management, business, financial, professional, and related occupations, positions that require a high level of knowledge in order for complicated job-related tasks to be completed. Florida’s (2002) quantification of the creative class is virtually identical to Henderson and Abraham’s measure of knowledge workers. The only exception is the inclusion of high-end sales and sales management workers into Florida’s measure of the creative class. As such, we combine the knowledge and

The New Metropolitan Designation

The Office of Management in Budget (OMB) introduced a new county classification system in 2003. It was designed to better capture and portray the distribution of population and economic activity across the United States. The new measure uses the Core-Based Statistical Area (CBSA) as the mechanism for classifying U.S. counties. The CBSA county designations are as follows:

Metropolitan Areas: Central counties with urbanized areas of 50,000 or more residents; Also includes outlying counties with 25 percent or more of the employed population commuting daily into these areas.

Micropolitan Areas: Nonmetro counties with one or more urban clusters of 10,000-49,999 persons. Includes outlying counties with 25 percent or more commuting into these areas.

Noncore Areas: All nonmetro counties not meeting the new micro classification.

creative concepts into one measure for purposes of this study and label it “creative workers or creative class.”

Recent articles by McGranahan and Wojan (2007a; 2007b) introduce some important refinements to the creative class measure offered by Florida (2002). Among the limitations of Florida’s analysis, they contend, is the exclusive attention given to metropolitan areas as the principle residential sites for the most creative class (implying that nonmetro areas are less viable places for creative people), as well as weaknesses in the manner in which the creative class concept is measured. They find, for example, that the occupational groupings that Florida employs are very broad in nature, representing 22 summary occupations reported in the 2000 U.S. Census. When these broad categories are disaggregated into a finer set of occupational groupings, McGranahan and Wojan observe that several of the detailed occupational categories require little creative activities. As such, they recast Florida’s creative class measure, making it only inclusive of jobs that genuinely require creative-type tasks. They examine the extent to which these kinds of workers are present outside metro areas of our nation. Wojan, Lambert, and McGranahan (2007) explore the presence of a specific class of creative workers – artists – outside of metropolitan areas of the U.S. For this report we adopt the refined measure of the creative class in general produced by McGranahan and Wojan (2007a).

Presence of Creative Workers in Metro and Nonmetro Areas

Research suggests that metropolitan areas are outpacing their nonmetropolitan counterparts with regard to the presence of creative workers (Florida, 2002; Henderson and Abraham, 2004). We wanted to explore whether this was in fact the case by classifying all U.S. counties (or areas given comparable designations)

Table 1. Persons Employed in Creative Occupations by Metropolitan Status, 1990 and 2000.

<i>Metropolitan Status</i>	<i>1990</i>	<i>2000</i>	<i>Numerical Change 1990-2000</i>	<i>Percent Change 1990-2000</i>
NONMETRO Noncore	981,983	1,242,028	260,045	26.5%
Micropolitan	1,829,205	2,264,362	435,157	23.8%
METROPOLITAN	23,115,678	29,080,256	5,964,578	25.8%
Total	25,926,866	32,586,646	6,659,780	25.7%

into one of three categories – metropolitan, micropolitan, or noncore counties. This typology represents the newest metropolitan status typology introduced by the Office of Management and Budget in 2003 (see box for a definition of these three county types). We then examined how many individuals within each of these county types were employed in creative occupations.

As Table 1 reveals, the number of metro-based creative workers was sizable in 1990 (over 23 million persons) and grew by nearly 26 percent during the span of the 1990s (to over 29 million). In fact, of the net increases in creative workers realized over the 1990-2000 period in the U.S. (i.e., 5,964,157 persons), 89.5 percent occurred in metro- America. While the numerical gains were much smaller, the rate of growth of the creative class in nonmetropolitan counties between 1990 and 2000 was not inconsequential. In fact, micropolitan counties experienced a 23.8 percent growth in their creative workers over the ten-year period, while the rate of expansion was slightly higher in noncore counties at 26.5 percent.

While Table 1 provides valuable information on the overall expansion of creative workers over the 1990-2000 period, it provides no clue of whether the growth was consistent across all counties, or confined to a smaller core of metro and nonmetro counties. Figure 3 helps shed some light on this matter. It presents information on the proportional growth of creative workers in metro and nonmetro (i.e., micropolitan and noncore) counties between 1990 and 2000. The results indicate that a number of metro counties (nearly 94 percent) saw their share of workers engaged in creative activities grow between 1990 and 2000. Equally impressive were the gains uncovered in micropolitan and noncore based nonmetro counties where 84 percent of the former and 81.6 percent of the latter experienced growth in the proportion of its workforce engaged in creative activities over the ten-year span.²

Pace of Growth of Creative Workers: What Types of Counties Have Fared the Best?

Having discovered in Figure 3 that the expansion of creative workers occurred across a variety of geographic areas over the course of the 1990s – from the densely populated metro areas to the more remote noncore counties – we wanted to determine which of these counties led the way, or lagged behind, in terms of capturing an expanding share of creative people. Were the best performing counties

² The McGranahan and Wojan study focuses on creative workers located in metro and nonmetro areas. Our report extends their work by employing the new OMB definition of metro/nonmetro areas, one that further classifies nonmetro counties into micropolitan and noncore based counties.

Table 2. Change in the Rate of County Employment in Creative Occupations Between 1990 and 2000, by Metropolitan Status.

Placement of U.S. Counties	METROPOLITAN STATUS			
	Nonmetro, Noncore	Nonmetro, Micropolitan	Metropolitan	Total
TOP TIER (24.9% and over)	25.8% (353)	10.3% (69)	18.8% (200)	20.0 % (622)
2 nd TIER (15.6 - <24.9%)	17.2% (235)	17.8% (119)	25.0% (266)	20.0% (620)
3 rd TIER (9.6- < 15.6%)	15.4% (211)	23.4% (157)	23.8% (252)	20.0% (621)
4 th TIER (3.1 - < 9.6%)	17.7 (242)	23.1% (155)	21.0% (224)	20.0% (621)
LOWEST TIER (Less than 3.1%)	23.9% (327)	25.4% (170)	11.5% (122)	20.0% (619)
TOTAL	100% (1368)	100% (670)	100% (1065)	100% (3103)

Note: McGranahan and Wojan provided the number of individuals employed in creative jobs in 1990 and 2000. On the basis of their raw data, we were able to generate the information presented in this table. Numbers of counties falling into each table cell are noted in parentheses.

likely to be metro, or did the micropolitan and noncore, nonmetro counties hold their own? We turn to Table 2 to help shed some light on this matter.

Table 2 classifies all 3,103 U.S. counties into quintiles based upon each county’s percent change (between 1990 and 2000) in the rate of employment in creative occupations. For example, one micropolitan county had 19.7 percent of its labor force employed in creative occupations in 1990. By 2000, its proportion had increased to

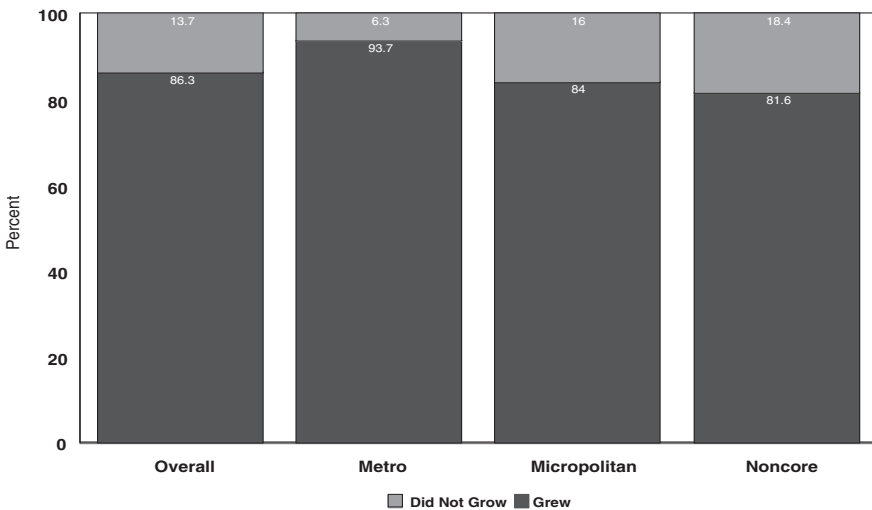


Figure 3. Counties Whose Share of Creative Workers Grew Over the 1990-2000 Period (Relative to Total Employment).

22.6 percent. So, the percent change in the rate of employment in creative jobs was calculated to be +15 percent (the 2000 figure of 22.6% divided by the 1990 figure of 19.7%, which represents an increase of 15%). This rate of change resulted in that county being placed into the third tier in Table 2.³

The top tier is composed of counties that experienced at least a 25 percent rate of growth in the proportion of people employed in creative jobs. Surprisingly, over one in four noncore counties fell into the highest quintile, followed by 18.8 percent of metro counties, and about 10 percent of micropolitan counties. A fourth of all metro counties placed in the second highest quintile in terms of the change in the rate of employment in creative occupations between 1990 and 2000, with some 17 percent of micropolitan and noncore counties placing in this second tier. Counties faring the worst (with less than a 3.1 percent change in the rate of employment in creative occupations) tended to be either micropolitan (25.4 percent) or noncore (23.9 percent) areas, and only a small percent of the worst-performing counties were metro (11.5 percent).

These results are mixed when it comes to nonmetro areas. As Henderson and Abraham (2004) suggest, some rural areas (especially noncore counties) have clearly succeeded in attracting and retaining creative workers, as our results would tend to confirm. On the other hand, a number of nonmetro areas – be they noncore or micropolitan – have experienced little or no growth of people employed in creative jobs.

Examining Entrepreneurship Across Metro/Nonmetro Areas

There is an expanding chorus of people that believes that entrepreneurship can play a central role in spurring the economy of local communities (Drabenstott, 1999; Low *et al.*, 2005; Southern Growth Policies Board, 2005). According to Low *et al.* (2005:61-62), a strong linkage exists between the growth of entrepreneurship and the long-term economic health of an area. The reasons are that entrepreneurs bring ideas and innovations to the table and help generate new jobs, all of which translates into wealth creation for the local community or region in which these entrepreneurs are embedded.

A recent article by Goetz (2005) maps the growth of entrepreneurs in nonmetro areas since the late 1960s. He offers clear evidence that entrepreneurs (which he defines as nonfarm proprietors) have become a larger share of all jobs in rural America, growing from less than 14 percent in 1969 to over 18 percent thirty years later. Similarly, Low and her associates (2005) conclude that rural areas have become the home for a growing number of entrepreneurs. They find that noncore counties are leading the way in terms of the percent of the workforce classified as entrepreneurs.

Like Low *et al.* (2005), we examine the nature of entrepreneurship across metro, micropolitan and noncore counties in the U.S. We adopt the definition of entrepreneurs embraced by Goetz and Low *et al.* – persons who are self-employed in a nonfarm-related business (also referred to as nonfarm proprietors). We examine shifts taking place in entrepreneurial activities across metro/nonmetro areas over the

³ Data on U.S. counties are often presented by quintiles. Each quintile presented in this study represents one-fifth (or 20 percent) of all counties in the U.S.

Table 3. Number of Nonfarm Proprietors by Metropolitan Status, 1990-2000.

Metropolitan Status	1990	2000	Numerical Change, 1990-2000	Percent Change, 1990-2000
NONMETRO Noncore	1,587,747	1,977,305	389,558	24.5%
Micropolitan	2,016,143	2,599,187	583,044	28.9%
METROPOLITAN	16,041,101	20,960,130	4,919,029	30.7%
TOTAL	19,644,991	25,536,622	5,891,631	30.0%

Source: Regional Economic Information System (REIS).

1990-2000 period and assess how the rate of expansion of self-employed individuals differs across metro and nonmetro areas.

The growth of nonfarm proprietors (be they full or part-time) over the course of the 1990s is presented in Table 3. On an overall basis, self-employment grew by 30 percent in the U.S. during the ten-year period, reaching nearly 5.9 million proprietors. The fastest pace of expansion occurred in the metropolitan areas of the country (30.7 percent). At the same time, entrepreneurial activities proved to be quite strong in nonmetropolitan counties. In particular, self-employment expanded by nearly 29 percent in micropolitan areas and by 24.5 percent in noncore based counties.

While Table 3 provides information on the overall expansion of nonfarm proprietorships across the metro/nonmetro landscape, it offers little hint as to how many of the 3,103 counties actually experienced an upswing in the proportion of their workforce who were self-employed. We turn to Figure 4 to get a better snapshot of the number of counties that experienced an increase in the share of their workers who were nonfarm proprietors during the 1990s. According to Figure 4, nearly 72 percent of noncore counties experienced a growth (between 1990 and 2000) in the

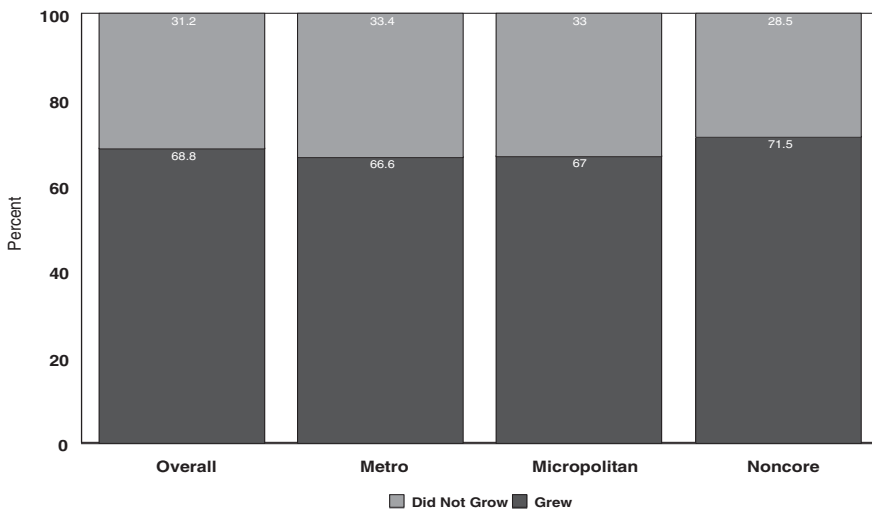


Figure 4. Change in the Proportion Nonfarm Proprietor Employment, 1990-2000.

Table 4. Change in the Proportion of Employment Tied to Nonfarm Proprietors Between 1990 and 2000, by Metropolitan Status.

Placement of U.S. Counties	METROPOLITAN STATUS			
	Nonmetro, Noncore	Nonmetro, Micropolitan	Metropolitan	Total
HIGHEST (26.5% and over)	23.3% (319)	17.2% (115)	17.5% (186)	20 % (620)
2 nd HIGHEST (13.7 - <26.5%)	21.9% (299)	21.4% (143)	16.8% (179)	20% (621)
MIDDLE (4.2 - < 13.7%)	17.9% (245)	20.6% (138)	22.3% (237)	20% (620)
2 nd LOWEST (-5 - < 4.2%)	17.8 (244)	19.9% (133)	22.9% (244)	20% (621)
LOWEST (More than a 5% decline)	19.0% (260)	20.9% (140)	20.6% (219)	20% (619)
TOTAL	100% (1367)	100% (669)	100% (1065)	100% (3101)

share of workers who were self-employed, a somewhat higher percentage than that found in micropolitan and metropolitan counties.

Table 4 captures the intensity of growth in self-employment across the three geographic areas of interest. The top tier includes counties that experienced the highest growth in the proportion of the workforce classified as nonfarm proprietors between 1990 and 2000 (i.e., a 26.5% rate of growth or higher). Results show that nearly 1 in 4 noncore counties experienced the highest upswing in the share of their workers involved in self-employment activities. The figures were somewhat lower for metro and micropolitan areas (17.5% and 17.2%, respectively). At the other extreme, an equal share of metro, micropolitan, and noncore counties (about 20 percent in each county type) experienced a decline in the share of their workers involved in proprietor-owned businesses over the 1990 to 2000 time span (reported in the lowest tier portion of the table).⁴

In general, self-employment became a critical aspect of the economy of noncore counties during the span of the 1990s, representing a response both to new economic opportunities and to reductions in wage-and-salary employment at local factories. Over 45 percent of these counties realized at least a 13.7 percent increase in the proportion of their employment tied to nonfarm proprietors during the decade (i.e., counties that fell into the two tiers). Showing the least expansion were metro areas, with better than 43 percent of their counties placing in the lowest two tiers (i.e.,

⁴ It is important to note that counties placing in the top quintile on nonfarm proprietorships may not be the ones that are seeing an overall strengthening of their economic conditions. In some cases, it may be a symptom of major economic challenges facing some counties. For example, nonfarm proprietorships may have become a larger share of the employment base of a county simply because other segments of its local economy may have suffered sizable declines (such as losses of jobs associated with the manufacturing sector). As Goetz (2005) notes, many nonmetro counties have suffered job losses due to globalization and adoption of labor-saving technologies.

counties that either experienced little percentage growth, or actual decline, in the proportion of the workforce that was self-employed).

Growth of Creative Workers and Nonfarm Proprietorships: Are They Linked?

There is an implied connection made by Florida (2002) that creative people spur the growth of new entrepreneurial ventures. He notes that “greater and more diverse concentrations of creative capital ... lead to higher rates of innovation, high tech business formation, job generation and economic growth” (Florida 2002:249). In his most recent book, *The Flight of the Creative Class* (2005:49), Florida states that new firm formations are higher in areas having a larger share of creative people. Low and her colleagues (2005) suggest that entrepreneurs are key conduits for bringing new ideas and innovations to the marketplace. Certainly, one of the best sources for such new ideas and innovations is persons who are part of the creative class.

In order to determine if the presence of a large cadre of creative workers results in the expansion of entrepreneurial activities across metro and nonmetro areas, we identified counties placing in the top quintile in terms of the percent of their workforce employed in creative occupations in 2000.⁵ We then sought to identify how many of these counties actually experienced an increase in their rate of nonfarm proprietors over the 1990-2000 period (that is, self-employed people represented a larger share of the workforce in 2000 than they did ten years earlier). We discovered that 381 of the 620 counties met both conditions. What proved quite interesting was the geographic distribution of these 620 counties. As Figure 5 reveals, over 78 percent of these counties were metropolitan, while only a handful were either micropolitan (11.5 percent) or noncore based areas (10.2 percent)

On the other side of the coin, we wanted to examine the entrepreneurial activeness of counties that placed in the bottom tier in terms of the share of their workforce involved in creative occupations in 2000. Did these counties experience a positive growth in the share of their workers who were self-employed? What we

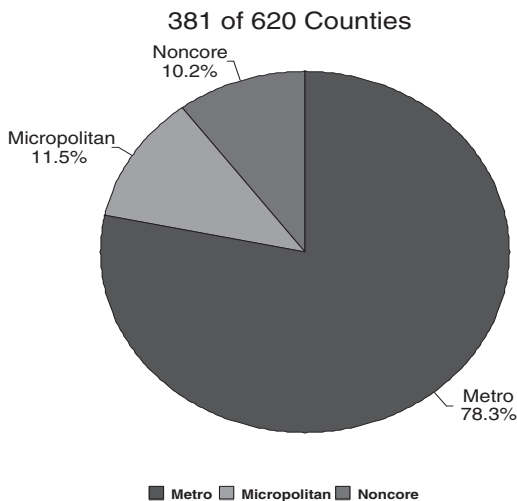


Figure 5. Counties With the Highest Quintile of Creative Workers in 2000, and Whose Share of Nonfarm Proprietors Grew Between 1990-2000.

discovered was that the rate of nonfarm proprietor employment increased in 465 counties of the 620 U.S. counties whose presence of creative workers was among the worst in the United States. As Figure 6 indicates, the lion's share of these counties was labeled nonmetro, noncore counties (76.6 percent), with the remainder being metropolitan (12.2 percent) or micropolitan areas (11.2 percent).

The findings suggest that the limited presence of creative workers did not serve as a barrier to the rise of nonfarm proprietorships (as a percent of total employment) during the period of the 1990s. Less well understood, however, are the factors that may have spurred the growth of the nonfarm proprietorships in these counties. In some cases, the nonmetro counties have a small employment base, thus making it relatively easy to register a positive growth in entrepreneurial activities. On the other hand, these counties may be the victims of a deteriorating economy as a result of the loss of manufacturing, agricultural, or other goods producing sector jobs. In such cases, self-employment may be a survival strategy being used by noncore residents to generate an income for themselves or their households. These are questions that need to be more fully explored in future research endeavors.

Few, if any, previous authors have addressed empirically (or explicitly) the fact that the presence of a creative class is necessary but not sufficient for economic growth to occur. It is not enough for individuals to have bright ideas; those ideas also have to be translated into economic activity, and this requires the presence of managers (the doers). In future work we will explore the synergies that may or may not exist between those with ideas and those who help implement them.

Conclusions

The challenge of creating decently paying jobs remains a vexing problem in rural America today, much as it did when Wilkinson (1991) offered his prophetic statement about the twin importance of jobs and income as the beginning ingredients to building strong and vibrant rural communities. The economic churning in

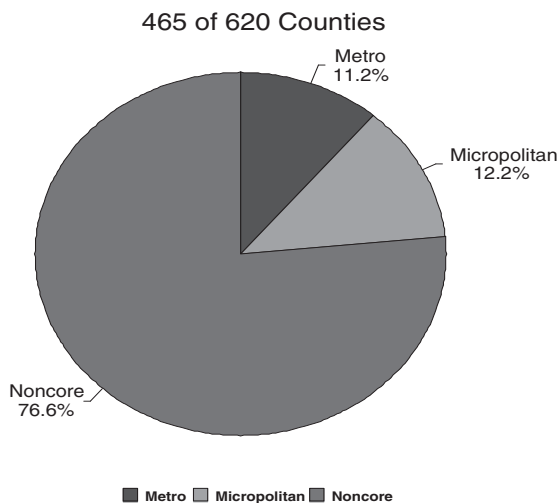


Figure 6. Counties With the Lowest Quintile of Creative Workers in 2000, but Whose Share of Nonfarm Proprietors Grew, 1990-2000.

today's global market makes it clear that rural leaders need to explore new economic development strategies that make sense for nonmetro areas.

The buzz resulting from Florida's work on the creative class has helped focus attention on the role of the creative class in spawning economic growth in rural America. A careful look at the data suggests that creative workers remain embedded in our nation's metropolitan areas, much like Florida (2002; 2005) asserted in his works. Today, nearly nine out of 10 persons employed in creative occupations are located in metropolitan America. While the number of creative workers living in micropolitan and noncore, nonmetropolitan counties has grown by 24 percent or more over the decades of the 1990s, they represent only minor shares of the labor force of these types of counties. It is critical that local leaders carefully assess whether they have the set of attributes that are likely to position them to grow their creative workforce.

McGranahan and Wojan (2007b) recently argued that these features include their natural resource amenities (such as attractive climates, lakes, and other recreational venues), higher education institutions, artistic havens, and ready access to advanced information technologies. This is not to suggest that nonmetro areas that fail to possess these features cannot become magnets for creative workers. However, nonmetro areas lacking these important elements must be realistic about their chances of really growing their creative economies. As of 2000, less than 15 percent of noncore counties had workers in creative occupations, half of the rate found in metro areas. So building an economy founded on creative workers may be a difficult feat to achieve in these localities.

In our view, genuine economic opportunity exists for many nonmetro areas in the entrepreneurial arena. Nonfarm proprietors grew by nearly a million people between 1990 and 2000, a heftier numerical increase than that of creative workers during this same period of time. Recent data (not shown in this report) show that self-employment has continued at a steady pace in both micropolitan and noncore nonmetro counties of the U.S. since 2000. In fact, over one in five persons in the nonmetro labor force today are nonfarm proprietors. However, their average annual earnings remain well below that of their metro counterparts. This is the area of greatest need and greatest opportunity to many rural areas. The key is to get local leaders and economic development agencies to take entrepreneurship seriously as a viable economic development strategy.

There are a host of strategies that nonmetro-based leaders may want to consider in their quest to strengthen their entrepreneurial activities. These include efforts to address the needs of existing and emerging entrepreneurs with regard to their business planning activities, ways to identify and expand their markets, and improving the efficiency of their operations. Without question, providing expanded access to financial capital to support and expand their operations is critical as well. Another key innovative strategy, recently proposed by Markusen (2007), is to increase the local consumption of locally produced goods and services. This places the idea of export or economic base theory on its head, and the strategy may have important impacts.

Finally, what local leaders do to help create an environment that is hospitable to entrepreneurs is crucial. Helping facilitate the creation of entrepreneur networks, providing entrepreneur coaches, establishing local incubators to help launch new businesses, streamlining the permitting and licensing process for new proprietors,

and celebrating entrepreneurship in general can help create a milieu where entrepreneurship is not only allowed to develop but thrives.

Without question, the growth of entrepreneurial activities will continue to make impressive gains in areas that are positioned to take advantage of these opportunities. Whether all parts of rural America will be coming along for the ride remains to be seen. But one thing is certain, it will not happen without local leaders and citizens thinking differently about the economic development strategies that are best aligned with their unique resources and assets.

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Mobilizing Internal and External Resources for Rural Community Development

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Rural communities throughout the North, particularly those outside of high amenity regions (McGranahan and Wojan, 2007; Boardman and Saint Onge, 2005), have experienced population decline and economic restructuring. In response, some rural communities have engaged in a variety of proactive strategies to adapt to structural changes. We have observed two distinct approaches to economic development in our studies of rural communities in the United States: self-development and industrial recruitment (J. Flora *et al.*, 1997; Green *et al.*, 1990; C. Flora *et al.* 1991; J. Flora *et al.*, 1993). While industrial recruitment still has a large following among local and state economic developers, despite studies that show that governments seldom gain back their investments in terms of public revenue generated (Summers and Branch, 1984), self-development, including supporting local entrepreneurship, is a Community Economic Development (CED) strategy of increasing interest to a variety of communities, technical assistance providers, and rural communities (Blakely and Bradshaw, 2002).

In our field studies in the United States and in Latin America, we have found two archetypical approaches to stem the tide of rural community decline. One is for a few key leaders to make contacts with a few key legislators to garner financial capital (through earmarks) in order to construct built capital, which, it is assumed, will then yield community benefits – or at least improve the competitive position of the key leaders. Focusing on local deficiencies, in practice, links specific federal programs to local needs, with the federal programs often determining the local needs. In our monitoring and evaluation of the U.S. Empowerment Zones, Empowerment Communities, and Champion Communities, we found approaches undertaken by the initiating groups (Aigner *et al.* 1999; Aigner *et al.*, 2001; Flora, 2003).

In contrast, participatory approaches focus on civic engagement to mobilize multiple resources for widespread social and economic benefits. An asset-based approach (Green and Haines, 2001) builds heavily on Kretzman and McKnight (1993). When the approach is state-led, as in the LEADER programs in the European Union, public-private partnerships across sectors invest local and external assets (Pezzeni, 2000) with a focus on local capacity building. Different forms of this participatory approach are utilized by many private foundations in the United States (Richardson and London, 2007), the EZ/EC (Empowerment Zone/Enterprise Community)

¹ Flora is the Charles F. Curtiss Distinguished Professor of Agriculture and Sociology and Director, North Central Regional Center for Rural Development; Bregendahl is an assistant scientist, and Fey is a program coordinator, both at the North Central Regional Center for Rural Development, Iowa State University.

program developed by the U.S. Department of Agriculture (Reid and Flora, 2004), a number of Canadian development efforts (see, for example, Markey *et al.*, 2005; Tiepoh *et al.*, 2004; as well as the Canadian Community Futures Program), and those in Australia (O'Toole and Burdess, 2004) as well as in New Zealand (New Zealand Department of Internal Affairs, 2006). This approach, which is less state-centric, brings together neo-liberal central governments with progressive local civil society, both seeing market actors as potential allies.

CED approaches can be either centralized or participatory. The participatory CED approach suggests first widely mobilizing local resources, even in very poor communities, while the centralized approach relies on local elites' strong links to outside funders. While the first approach may result in both community conflict and consensus and slow the time of project delivery (Jaffe and Quark, 2005), the second creates dependency on outside entities and insider brokers (Aigner *et al.*, 2001).

Our research looks at the balance between inside and outside capital investments using a self-development lens. When resources are invested to create new resources, they become capital. We utilize seven capitals: **natural** (Jansson *et al.*, 1994), **cultural** (Bourdieu, 1986), **human** (Becker, 1975), **social** (Coleman, 1988), **political** (Turner, 1999), **financial** (Eisinger, 1988) and **built** (Chicoine, 1986). These capitals are heuristic devices, designed to allow identification of the entire range of community assets, which, when invested to create new resources, become capital. The Community Capitals Framework is further explained in a number of publications addressing rural development (Emery and Flora, 2006; Flora, 2004). A particular asset can be classified in several ways, depending on the goals set by the community. (See Figure 1)

Our guiding hypothesis is that balanced capital investments with appropriate attention to the mobilization of both internal and external capitals are associated with high levels of community economic development success. Building on Granovetter's seminal analysis linking economic outcomes with social structure (1973; 1985), we have constructed a four-fold table of sources of capital investments and community outcomes. (See Figure 2). When there is no investment internally or externally, no change occurs. The wealthy provide for themselves individually, usually by investing personal financial capital (and at times political capital), while the situation of the poor continues to deteriorate in terms of all the capitals, including the prevalence of environmental racism and classism. When external investments are high, and internal investments are low, clientelism and dependency emerge, as local actors wait for someone to do something (the cargo cult mentality), and a few brokers – often with political and economic connections or social service providers – use personalistic ties to bring resources to fill local needs.

When capital investments are only internal, and no capital investments come from the outside, there is opposition to any change. And often those communities do not invest many of their capitals in the community field (Wilkenson, 1991), as there are strong sub-groups based on kin or class that impede collective efforts for

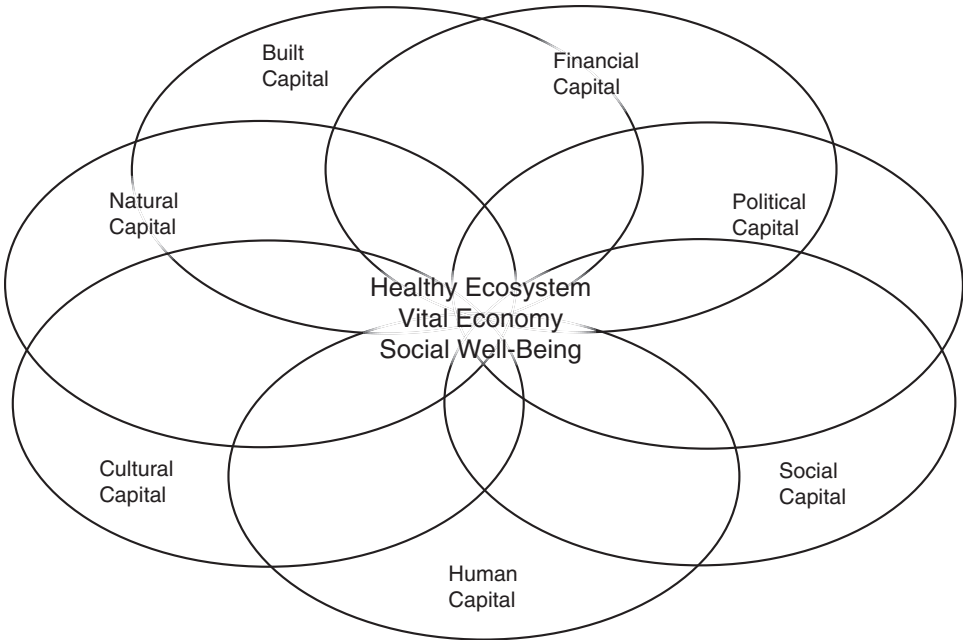


Figure 1. Relationship of Community Goals and Assets.

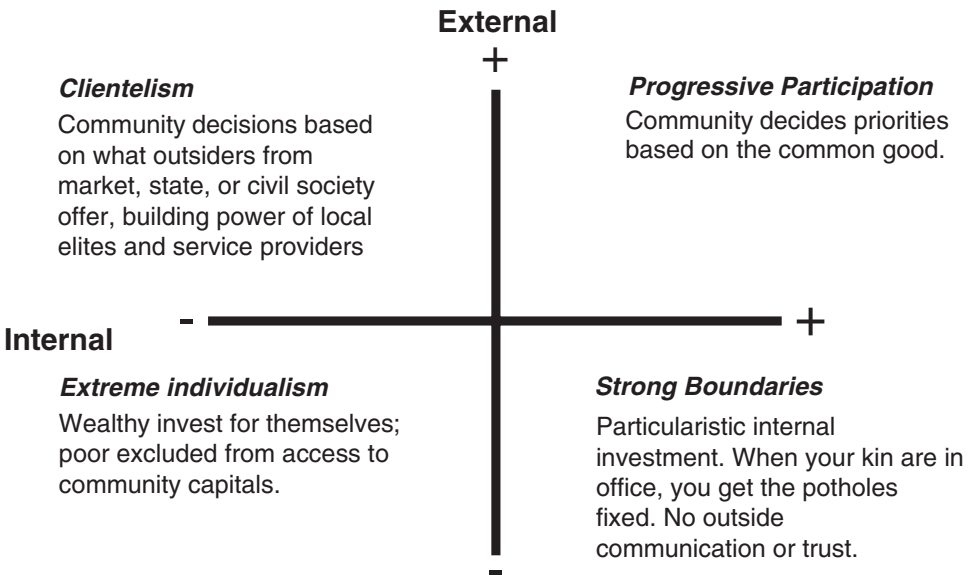


Figure 2. Impacts of Different Sources of Capital Investments on Community Outcomes.

community improvement. When there is a balance of investments from the inside and the outside, community actors engage in progressive participation, allowing different points of view to be heard and mobilizing internal and external investments in multiple community capitals.

Methodology

In order to analyze the initial motivations for community capital investments, the processes of such investments, and the impact of capital investments in rural communities, we identified successful rural communities in land-rich countries with a common heritage. We choose English-speaking communities in countries where not only size but also distance from urban places impacts community economic development opportunities. As an ex-English colony, we chose to look at Australia, Canada, New Zealand, and the U.S. Because our funder focused on West Virginia and wished to address that state separately, we left West Virginia out of our U.S. sampling frame.

We conducted a combined Internet and library search for communities, under 10,000 people in the U.S., Canada, New Zealand, and Australia, which were making great strides in community and economic development. We used the following terms in our search:

- Community development case studies,
- Community economic development case studies,
- Small community case studies,
- Small town revitalization,
- Town revitalization efforts.

We then selected the rural communities with the most data available. We supplemented the web or written records with e-mails and calls to town authorities or individuals listed in the write-ups as leaders. Because of our interest in the impact of external investments, we choose those communities that identified some source of external investment from market, state, or civil society sources. This eliminated one of our quadrants from our analysis.

We coded the motivations for CED, the CED investments, and the CED outcomes according to which of the community capitals each motivation, investment, and outcomes most represented. We discuss measuring the seven capitals in Fey *et al.*, 2006.

The communities analyzed defined themselves as initially economically depressed, generally because of a decline or loss of a major industry, the closing of small businesses, or a significant decrease in population. Often, local groups had a wake-up call about the condition of their community and realized they had to act. Local action and outside assistance helped these communities improve their social condition, as well as their economic situation.

We created case studies of each of the 37 communities, while simultaneously coding the capitals that were reported as motivators, capitals invested in, and the capitals that were reported improved. We then calculated the logistic coefficients from stepwise binomial regression on the capital investments by category (present or absent) with the capital improvements (present or absent).

By creating a three-fold classification among these 37 successful communities as to the degree to which they had improvements in multiple community capitals, we created three categories of high, medium, and low success. We did not do further multivariate analysis because of the small sample size.

Results

Types of Capital Investments

In discussing the associations between capital investments and capital outcomes, we only report the relationships derived from the stepwise binomial regression for logistic coefficients that are significant at the $<.05$ level of probability.

Natural capital declines, either through natural disasters or through environmental concerns, motivated CED activities in over one-third of the communities. These communities invested in a variety of natural capital projects that linked with the other community capitals, particularly political capital, in terms of changes in local land use regulations. These were most successful when both internal and external capitals were mobilized, including political capital, social capital, and human capital.

Cultural capital investments often linked heritage tourism and natural capital. In the case of cultural capital, almost all of the investments, except those in infrastructure that supported the cultural capital efforts, came from within the community. In fact, there was a negative relationship between cultural capital improvements and external investments, such as seeking advice from a natural heritage organization or setting up a local chapter of a national trust. Investments in cultural capital created new built capital to support local heritages, such as museums and cultural centers. More importantly, investment in cultural capital was also highly related to the formulation of a local strategic plan, a major activity that separated the highly successful communities from the less successful ones.

Human capital provided the impetus for CED based on population loss, loss of a school, health concerns, and concerns about youth retention. Human capital investments included workforce development, entrepreneurship training, educational improvements, stabilizing or increasing local population, and improving community health care, as well as specific training programs around human capital development, such as self-empowerment, developing local youth job skills/entrepreneurialism, and telecommunications training. These specific training efforts were helped most by outside investment.

Social capital investments included CED efforts based on:

- improving relationships;
- improving leadership;
- improving quality of life;
- retaining youth and involving them in the community;
- seeking positive external recognition;
- developing a strategic plan;
- identifying community objectives;
- improving community participation in local affairs;
- establishing training programs to increase social capital such as asset mapping, leadership, community assessment, correctional facility acceptance;
- involving residents in CED;
- engaging youth and elders in the community;
- actions linking external social capital involvement to the community social capital base, including utilizing outside groups to conduct workshops and assessments;
- organizing a community event;
- organizing a volunteer effort;
- the number of local organizations involved in the CED efforts;
- the number of external organizations involved in the CED efforts;
- the number of local organizations with a board member on the CED board;
- the number of external organizations with a board member on the CED board;
- the number of organizations that contributed materials to any CED undertaking.

Social capital outcomes related to social capital investments included the emergence of new leaders, youth viewed as partners in the CED efforts (which proved to be a key social capital investment that positively impacts all the other capitals), and the formation of new groups around the CED efforts. In all the communities, the CED efforts resulted in existing leaders becoming more effective at securing resources for the community and community members becoming more cooperative in general. Investments in social capital resulted in local youth involvement in the CED efforts and youth viewed as partners in CED.

The number of CED-involved groups that contributed legal services was positively related to positive CED outcomes, including decrease in the median age of the community, improvement in health care, and health care benefiting from outside funding. The number of groups involved in CED contributing socialized local knowledge was positively associated with community members learning new skills and to childcare improvement. The number of groups involved in CED contributing training was positively related to K-12 improvement, adult education improvement, and the educational sector benefiting from outside funding. The number of groups

contributing CED leadership had a positive relation to health care improvement, health care benefiting from outside funding, and work force development benefiting from outside funding. But it contributed negatively to K-12 educational improvement and adult education improvement.

Internal social capital investments were positively related to business district enhancement, enhancement of residential housing, and strengthening of cultural facilities, whereas external social capital investments were negatively related to enhancing cultural facilities and enhancing the business district.

Political capital served as an impetus to CED when local government initiated CED activity. However, that was related negatively to new community connections to the local, regional, county, and multi-county governments. Investments in political capital included building relationships between CED board members and local town/county governments and with state/federal governments, inclusion of a variety of government representatives from various levels on the CED board, and seeking endorsement and support for their local strategy (which was not always granted). This last effort, where the CED board moved forward with its own strategic plan, proved most effective in creating new connections with external government.

Financial capital concerns often motivated the initial CED effort, including the loss of small businesses, decline in primary industries, loss of services, increasing poverty, available grants, a big business moving in, and dependence on a single source of employment. Financial capital investments included efforts to provide, improve, or retain services, good, or businesses; retain revenue; retain jobs; stabilize the local economy; merge the town for economic development activities; and improve the energy plan. (These last two could also be viewed as political capital investments). Those investments made the largest impact in improving the business district, Local financial capital investments, through bond issues and tax incentives to leverage local financing, contributed positively to improvement of government buildings (political capital) and cultural facilities (cultural capital).

Built capital served as an impetus to CED based on deteriorating infrastructure and beautification needs. Built capital investments included efforts to provide, improve, or retain community facilities; improve infrastructure such as housing, telecom, revitalize downtown, beautification, and establish an industrial park. The types of infrastructure most positively impacted by local efforts were transportation, buildings in the local business district, recreational facilities, and educational facilities. Local financial capital investment was most positively related to recreational and landscape improvements. Local built capital investment of community buildings in CED efforts was positively related to improved cultural facilities, while the use of medical facilities in the CED effort was related to improvement in childcare facilities. External investment in business buildings resulted in business development.

Internal and external capital investments were important for built capital and human capital, with less importance for the other capitals. In all the capital out-

Box 1. Differences Between Higher and Lower Outcome Communities.

<ul style="list-style-type: none"> • Articulate a long-term, unifying vision; • Are interested in projects that meet long-term community outcomes; • Write a strategic plan to begin CED efforts; • Pursue projects leading to collective gains; • Have completed projects showing the ability to get things done that can bring new funding opportunities; • Often target CED actions to extend beyond the economic sector; • Rely on catalysts other than the economy to galvanize CED efforts; • Primarily form new groups for the CED effort, showing an innovative spirit; • Sometimes use pre-existing groups to promote the CED effort, showing use of existing organizational assets; • Never rely on individual interests to lead CED efforts; 	<ul style="list-style-type: none"> • Lack a long-term, unifying vision; • Are interested in projects that meet short-term project goals; • Write a strategic plan during or after CED efforts, instead of at the beginning; • Pursue projects leading to individual gains; • Are often in the process of completing projects; • Often limit CED actions to address the economic sector; • Rely on loss of businesses or economic downturns to catalyze CED efforts; • Primarily form new groups for the CED effort, showing an innovative spirit; • Sometimes use pre-existing groups to promote the CED effort, showing use of existing organizational assets; • Frequently rely on one or two individuals (often entrepreneurs) to lead CED efforts;
<ul style="list-style-type: none"> • Often solicit new ideas for CED; • Often encourage outsiders to play an active role in the CED effort; • Sometimes hire a part- or full-time coordinator to promote CED; • Typically fill newly created jobs with local people. 	<ul style="list-style-type: none"> • Rarely solicit new ideas for CED; • Are less willing to encourage outsiders to play an active role in the CED effort; • Rarely hire a part- or full-time CED coordinator to promote CED; • Do not always fill newly created jobs with local people.

comes, internal multi-capital investments were critical for improvement to occur. While overt concerns about social capital rarely motivated CED, local investments to increase social capital resulted in increases in social capital as well as the other capitals.

Widespread Participation and Community Capital Outcomes

While all the communities were successful, we found key differences in the investment process among the higher outcome and lower outcome communities (see Box 1).²

We found that reliance on a few individuals and traditional elites resulted in a heavy dependence on outside financial capital investments for particular projects, rather than local and external multiple capital investments in more holistic community development. This resulting clientelism and exclusion tended to concentrate the benefits of community development in the hands of fewer community members. That meant that increases in financial capital, built capital, and political capital were not widely distributed and that the capital multiplier effect found in the more successful communities did not occur.

Communities evaluated as low occurred with equal frequency in Canada, Australia, and the U.S. All the New Zealand Communities were categorized as high,

² This section draws heavily on Fey *et al.*, 2006.

but we were only able to identify three communities in that policy setting. Many of the high communities, particularly in Australia, made specific efforts to be more inclusive in the governance of CED. The high communities, with more widespread participation, not only invested in more community capitals, but also saw improvement in more as well. Further, they reported more inter-community capital investment with multi-community capital impacts. The high communities lowered their median age (but did not increase their population size), raised per capita income, maintained or preserved natural capital, and made new connections with different levels of government, while the low communities achieved few of these outcomes.

Conclusions

All the communities rejected industrial recruitment as a model, with no investment in industrial parks, although one community began its CED efforts when a large company moved in. Instead they chose self-development, based in various degrees investing local assets first.

While none of the communities was able to measurably increase population,³ an indirect indicator of youth retentions in some of these communities is the decline of the median age, in contrast to other rural areas in their countries. New, locally owned businesses and new jobs for local people were created in the high performing communities. Communities experienced improvements in natural capital, cultural capital, human capital, social capital, political capital, financial capital, and built capital primarily through internal investment and strategic investment in built capital and human capital from the outside.

Perhaps most notable were the sometimes negative impacts on outcomes of outside capitals investments, particularly that which substituted outside experts for local knowledge and relationships. Increasing political capital was related to several community outcomes, but when it was initiated solely by the local government, without involving market and civil society actors, the efforts tended to fail. Local governments were found to be critical partners, but poor drivers of the CED process.

Finally, we found that widespread participation resulted in more local investments of more types of capital. Widespread participation did not stem outside capital investments, but it definitely tempered it to be more multi-faceted in investment decisions. In particular, decisions to increase the use of local built capital to increase human, cultural, and natural capital led to improvements in those capitals and financial capital as well.

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³ In part this is because it was extremely difficult to get data over time for these small communities, many of which were unincorporated.

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Revitalizing Rural Communities: Agricultural Producers' Emerging Role in Public and Private Innovation

Agriculture and agribusiness were once the primary drivers of vibrant rural communities, but rural communities now rely on a variety of private and public enterprises to be prosperous and dynamic. Although more traditional tenets of development might suggest that efforts should be focused on business development, employee recruitment or infrastructure investments; what is now occurring in rural America marries these economic stimuli with a focus on partnerships, attention to quality of life, and a focus on healthy communities.

Some would go so far to say that past and existing farm policies have led to some disconnect between the agricultural sector and the development interests of rural communities (Browne *et al.*, 1992). Still, the opportunities for agriculturalists to work with a diverse set of partners and develop innovative enterprises appear to be strong and growing. In effect, there is a greater push for agriculture to focus on multiple objectives in its strategies, following the multifunctionality approach of our European counterparts (Goodman, 2004). This approach, emphasizing the production, externality, and public good aspects of the agricultural sector is one framework to consider when discussing the potential interaction between the future agriculture sector and rural America.

Yet, policies and strategies to encourage and enable a more diverse set of public-private partnerships and investments in emerging opportunities are either missing, ineffective or underutilized. The goal of this article is to present an overview of some of the emerging opportunities for agricultural-led economic innovation, followed by a brief list of fields with potential for public and private partnerships in an effort to take advantage of dynamic market forces. The paper concludes with a discussion of how future policies may be focused in an effort to nurture economic and community development that more fully integrates the agricultural sector and takes the multifunctional nature of food production and land stewardship into consideration.

Alternative Uses for Traditional Agricultural Production

There is much attention to the issue of adding value in agriculture, and although this can be defined in fairly broad terms (including all levels of multifunctionality that will be discussed here); we begin with a discussion of production-oriented value

¹ Thilmany is a professor at Colorado State University. She is a Farm Foundation Fellow for 2006-09. Watson is a research assistant at Colorado State University.

added enterprises. Most attention has been on approaches that produce something new (specialty crops, energy crops), retain ownership of agricultural products in hopes of securing a higher share of the food dollar (vertical integration), and promote product differentiation schemes (organics, local/regional product origin designations). Yet, there are a myriad of entrepreneurial activities that could be initiated by agricultural producers if one considers the broad array of functions that could be attributed to farm land and other rural assets.

Corn is not just for cattle anymore. The potential for making biofuels from corn (or, even better, switchgrass) has been much discussed and promoted; however, additional alternative uses for traditional agricultural products also exist. Biodegradable plastics can be made from a wide variety of oil seeds; high quality construction materials can be made from common agricultural wastes; and even the beleaguered tobacco plant has the potential to be resurrected for its ability to be engineered to produce complex pharmaceutical compounds. Investing in these types of enterprises, however, takes a new way of looking at agriculture beyond the commodity crop model where the harvest is simply taken to the local elevator for a known price. Whether discussing bioenergy, life science uses for agricultural products, or any other product development; a business owner or community's response can be through innovation and coordination given the very different nature of business strategies and supply chain models in the emerging industries.

Innovation. Innovation focuses on improving existing processes, procedures, products, and services or creating new ones, such as research about alternative crops that can be grown successfully by producers to replace traditional crops. Many alternative crops can be cultivated with traditional agronomic methods, thus reducing the learning curve and startup costs associated with switching production. Some alternative crops that show promise include industrial hemp and kenaf for fiber; camelina, jojoba, and castor bean for their oil; and quinoa for human consumption.

Innovative activities have also been driven by research on finding industrial, nonfood uses for common agricultural products. Several innovative processes include producing ethanol from corn, biodiesel from soybeans, and particleboard from straw. This type of innovation requires producers to think outside the box as they search for new, higher value uses for old crops or, alternatively, new uses for parts of the crop that were once considered waste. Beyond the research and development innovations, these products generally require entirely different supply chain and marketing plans, which communities may lack the infrastructure to support.

Coordination. Developing alternative agricultural products takes many of the conventional agronomic skills as well as additional processing and marketing skills. Community, cooperative extension, and government programs will need to provide training and incentives for the development of these skills. Few individuals possess all of the very different skills necessary for processing, marketing, and busi-

ness management as well as staying efficient with their own production enterprises. Therefore, a coordinated effort is needed to increase market efficiency, new market penetration, or cost reduction.

In an effort to invest in a broader portfolio of economic enterprises, the farm sector and rural communities can forge new partnerships. For instance, vertical coordination is commonly used for food products, but it may also be an effective solution for alternative enterprises since agricultural producers and rural communities have less expertise in the managerial challenges of energy, life science, and fiber industries. Vertical coordination strategies could include contracting, strategic alliances, licensing agreements, and single ownership of multiple market stages in different levels of the supply chain. Although these may develop between private parties without intervention, there may be a role for rural development policy to provide financing incentives, mediation services, and public investments that “oil the gears” of coordination. In summary, many observers believe that both upstream and downstream linkages of business enterprises will continue to increase in the 21st century, and rural communities will do well to embrace more economic coordination opportunities.

Value Added and Entrepreneurial Enterprises

The produce-and-then-sell mentality of the commodity business is being replaced by the strategy of first determining what attributes consumers want in their food products and then creating or manufacturing products with those attributes. Market forces have led to greater opportunities for product differentiation and added value to raw commodities because of increased consumer demands regarding health, nutrition, and convenience. Producers are now able to create specialized products for segmented subsets of the population, taking advantage of the recently popularized “long tail” principle of marketing where, when offered the choice, consumers will gravitate toward more specialized and differentiated niches (Anderson, 2006).

New enterprises can vary from marketing crops like organically grown vegetables and grains, growing and processing corn for sweeteners and fuels, producing specialty cheeses, and even agritourism enterprises focused on travelers who want to experience part of rural America’s heritage. In any case, producers have a challenge to be responsive to consumer demands by providing the desired products and services: thereby requiring an even greater entrepreneurial spirit.

What market and policy factors may influence the emergence of entrepreneurs? Both push and pull factors are involved. On the push side, some entrepreneurs emerge because of too few alternative opportunities, a force that is very likely to be more prevalent in rural areas and traditional agricultural markets. This explains the increasing diversification of off-farm income and enterprise diversification among agricultural producers. On the pull side, it is argued that entrepreneurs see untapped

market opportunities that they develop business models to address. Rural enterprises are less likely to have a comparative advantage in this respect, although the gap between rural and urban areas may be narrowing with Internet infrastructure and the real-time access to market trends and information. Moreover, some argue that there is a new market opportunity in building brands on a “sense of place” where rural areas may be able to draw on heritage, food-based cultures, and unique natural amenities that cannot be competed away in a global marketplace.

This pull to exploit potential market opportunities leads nicely into another issue, the emergence of a creative class in economic development. The primary role of government in supporting this emergence is a new approach to education, and continuing education, to support creative-oriented small business and an evolving management curriculum development focused on new business skills, including supply chain management and entrepreneurial business strategies. In addition, innovation may require growth in new models of funding and nurturing economic development, focusing on financing intellectual property, and product development, rather than solely capital and physical infrastructure investments.

One way to forge new partnerships with traditionally urban industries (life sciences, creative arts) is through more interaction and regional clustering. Urban encroachment is often seen as a threat to rural communities and agricultural lands; yet, it also represents increased access to those who are innovating and spending in urban areas.

With recent focus on the environmental benefits of buying locally produced agricultural products (Foster *et al.*, 2006), community supported agriculture (CSA) has seen remarkable growth. According to USDA data in 1990, there were an estimated 50 farms engaging in CSA; that number ballooned to over 1,140 in 2005. Community supported agriculture represents an avenue for agricultural producers to secure stable revenue sources while allowing urban and suburban residents to feel connected to the land, gain access to high quality produce, support local farming communities, and help reduce their environmental footprint.

Agriculture produces many nonmarket goods as well. Agricultural production, while providing base income to the community, also preserves open space and the rural landscape. Many city dwellers value open countryside and seek it out for recreation and for respite from urban and suburban sprawl. While it may be based on a romanticized picture of agriculture and rural America, there does seem to be public support for protecting agricultural lands and open spaces. These open spaces, especially those on the urban fringes, then become destinations for bicyclists and motorized recreationalists alike. These weekend warriors can be potential new customers to a local CSA and to local businesses, or more importantly, open their eyes to potential business alliances that seek to more effectively leverage the natural resource base of rural communities.

Creating Value through Improving Amenities

Highly skilled workers and high wage businesses are attracted to areas that have more natural amenities (Deller *et al.*, 2001; Power, 1996). Additionally, entrepreneurs and other creative types have been shown to be drawn to higher amenity areas (McGranahan and Wojan, 2007). All else being equal, the young and the educated are moving to areas with high natural amenities. Thus, investments in natural amenities, either through greater investments in public lands or continuing partnerships to enhance conservation on private farms and ranches, can lead to real endogenous economic growth by attracting new businesses and entrepreneurs to the community.

When agricultural lands are converted to natural areas or put into conservation reserve programs, both the communities themselves and the visitors to the communities benefit from the increased recreation opportunities, improved viewscapes, and additional ecosystem services. Residents in the communities benefit from these natural areas on a daily basis, and visitors are increasingly drawn to these amenities. The additional visitors provide an opportunity for economic base development by bringing in new dollars to the community. Therefore, a continuation of conservation programs has value above the income generated by the government payment, including preservation of natural land and water resources for future production and the potential benefit of increased tourism for those agriculturalists developing tourism opportunities in response to increased wildlife populations developing on these lands.

There is a down-side to this type of development, though. Enticing higher skilled labor and employers may spur local economic growth and provides communities with quality job opportunities in the long run. However, it can negatively impact long time residents by making housing less affordable, increasing congestion, taxing local public services, and creating an abundance of low paying service sector jobs. Clearly, broad community involvement in the planning and development process is needed to confront and mitigate this problem.

Creating Value through Environmental and Stewardship Services

Mid-sized agricultural enterprises have long been the primary stewards of a majority of privately owned U.S. land. Conservation practices and programs that are economically viable and contribute to healthy soils and water for more productive lands may begin to be even more rewarded through private markets and public programs. Through USDA programs, such as the Wetlands Reserve Program, Conservation Reserve Program, and the Conservation Security Program; filter strips, riparian forest buffers, grassland waterways and wetlands have improved soils and cleansed waterways. Windbreaks have reduced wind erosion, conserved energy, and reduced heating bills. Moreover, recent investments through the Environmental Quality In-

centives Program help to reduce solid-waste runoff and lower fertilizer costs. Each one of these practices and programs has contributed to a healthy watershed and more productive lands shared by the entire community.

In addition to government programs that pay for specific stewardship practices, new opportunities to create value on that land may improve landowners' ability to further heighten their conservation and capital improvements to that large land base. One unique aspect of the push toward bioenergy is the potential intersection of conservation and energy programs in future farm and state energy/conservation policies. The obvious connection is the lessening dependence on nonrenewable energy sources such as fossil fuels, and the cleaner burning fuels that are being developed by scientists who hope to use wind, crops, or biomass created on our rich land base. However, there is also potential for more subtle interactions, with conservation programs initiated on wind farms, biomass production that includes crops that are water- or soil-saving, and use of products that might otherwise fill landfills (as waste management is an increasingly political challenge to community development planners).

Beyond preserving our rural landscapes and open spaces, new paradigms in agricultural production are also serving to preserve our genetic resources. Increasing crop diversity to take advantage of new alternative crops, uses and energy production may help a region's ecology, improve soil quality, and reduce the risk of disease epidemics. The potential harm of narrow genetic base and monoculture production was seen in the Corn Leaf Blight epidemic of 1970. In 1970, over 46 million acres of hybrid corn, shared a common parental line, making it highly susceptible to the Corn Leaf Blight. While the economic impacts of that event were tempered by stockpiles of corn surpluses from previous harvests, the potential for agricultural disease epidemics spurred by a lack of genetic diversity was demonstrated. In creating conservation reserves and wetland reserves, farmers are working to remediate and preserve threatened habitats and species as well. Finally, the recent trend toward niche marketing can also provide a public good by encouraging more diversity. For example, the re-emergence of heirloom vegetables and alternative grains has led to the potential for greater crop diversity and greater genetic diversity within crops. In short, farmers may become more significant players in preserving germplasm and diversity for a broader range of plant and animal populations.

Envisioning Future Policies for Rural America

Agricultural communities have been changing and evolving in America for as long as the country has been in existence. Communities are dynamic entities that evolve as they react to the cacophony of real socioeconomic forces acting upon them. These forces are a function of history, geography, demographics, and economics. A goal agricultural producers and regional development planners alike should be to identify the forces that are acting on the community at both the micro and the

macro level, and determine how the community might respond. The question for community planners and officials is how to best respond to the forces that are acting on the community and what are the intended and unintended consequences of this response.

Commodity agriculture is becoming increasingly corporate, and large scale and small farms are struggling to stay in agriculture, and enterprises operating at each end of the size scale could benefit from new models of business innovation. The future of thriving agricultural communities is to diversify production, incorporating consumer driven agriculture, innovation, and quality of life considerations. Agriculture can no longer be counted on for vigorous employment creation, but in areas where no feasible economic alternatives exist, a slowdown of employment loss in agriculture can alleviate depopulation problems, and the base income that is generated in agriculture will indirectly support a sizable proportion of the economic activity in these communities. However, rural communities will change as the development climate shifts.

Communities are faced with the challenge of what policies to promote in order to create community driven growth. This is growth that is intended to meet the needs of its current inhabitants while protecting the long-term interest of the community as a whole. This type of development understands that human capital (such as education), social capital (such as arts and humanities), and natural capital (such as natural amenities and protected natural lands) all have real economic benefits in the community. Policies that invest in these types of capital have been shown to create communities that are more productive and attract better jobs in better industries (Power, 2002; Florida, 2002). Agriculture and agricultural communities need to continue innovating and embrace the diverse scope of value-added enterprises.

The public and private economic relationships between agriculture, other natural resource based industries, and rural communities are changing. One way of interpreting the multiple roles assigned to agriculture is that it is an activity entrusted with fulfilling certain functions in society. Consequently, multifunctionality is not merely a characteristic of the production process, but rather, it takes on a value in itself.

Local leaders face critical decisions as their communities adapt to the globalization of agriculture, increasing emphasis on natural resource conservation, information age technologies, and demographic change. Throughout US history, policy and perception have assumed that rural development would be strongly integrated with agriculture, or more specifically, traditional food-based farm production. But, the significant resources invested in agriculture (land, human capital, and water) are now the focus of broader development activities, from customized, regionally based food businesses to life science entrepreneurs to the rapidly developing bioenergy movement. There is no sign that more traditional uses of the land and people in agriculture will diminish, but rather, that these resources will be better leveraged to create new income streams to the owners of those resources and their communities. In

short, we are likely entering an era of multifunctional agricultural land use, requiring agriculturalists to manage a more complex portfolio of enterprises than ever.

Maintaining or making an activity more multifunctional can become a policy objective. There is a growing awareness of the positive and negative noncommodity outputs of agriculture among rural and urban citizens, and governments are increasingly looking for ways to ensure that the noncommodity outputs of agriculture correspond in quantity, composition, and quality to those demanded by society. The standard policy recommendation in situations where a combination of private and public goods is produced, is to let market forces freely determine the level of production, consumption, and trade of the private goods, while at the same time addressing any underprovision of public goods and any positive or negative externalities through targeted and decoupled policy measures. Moreover, each public good objective or externality should be addressed through a separate policy instrument that influences the target variable directly.

In terms of programs, unique infrastructure needs and new educational models are both of concern. Since the types and nature of clusters that may develop in new entrepreneurial models will differ, government economic and rural development programs may need to nurture business services, rather than more industrial infrastructures, as a support mechanism for emerging enterprises. In addition, given unique human resource needs, educational models in land grants and community colleges should be rethought and refined to reflect the new skills needed. Incentives for K-12 and higher education instructors to develop new curricula targeted at entrepreneurial needs is one possibility. USDA's Rural Development envisions itself as a venture capital entity, investing over \$72 billion since 2002 to provide equity and technical assistance to finance and foster growth in homeownership, business development, and critical community and technology infrastructure. With more recently initiated projects, the agency now recognizes the need for new types of infrastructure including: Internet broadband access to attract citizens and businesses; access to the electric grid to support bioenergy enterprises; rural health provision as the demographics and expectations for rural citizens evolve; public safety facilities; and finally, access to continuing education as the Information economy continues to ask for new skills.

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Global Forces Affecting Agriculture



Since the 1970s, globalization has become the major force affecting farm, resource, and agricultural policy. While U.S. agriculture was once widely accepted as having an absolute economic advantage in soybeans, hogs, poultry, and many fruits and vegetables, this is no longer the case. The predominance of U.S. agriculture internationally is being questioned as its farm economy switches from producing corn for international markets and as a feed for livestock to bioenergy. Supply chains, often with U.S. namesakes such as Burger King, Smithfield, and Wal-Mart, have become global in scope. The increased importance of international institutions such as trade agreements, the World Trade Organization, and a wide array of United Nations organizations reflects these more important global markets in which the United States competes. The number of acronyms are mind boggling but important to know and understand – WTO, CAFTA-DR, MERCOSUR, APEC, OIE, ISO, SPS, SPP, IPPC, CODEX, etc. Farm Foundation has been more involved in the study and development of these international institutions than most people realize. This involvement reflects the realization that globalization is for real, and the days when U.S. farm policy can be determined without considering its impacts on the peoples and economies of other countries are numbered.

Globalization: 21st Century Agricultural Trade and Development

From his early years with the U.S. Department of Agriculture-Agricultural Marketing Service to his years as president of the Farm Foundation, Walt Armbruster's career has been dedicated to creating transparency in agricultural policy by fostering greater understanding of economic problems and to promoting economic education. Globalization of markets is an area that has and continues to need attention, both because of its far-reaching impacts and because the impacts of globalization are often indirect and difficult to directly observe.

In honor of Walt's many contributions, the objective of this paper is to provide insight into changes and potential challenges that lie ahead in the on-going process of agricultural market globalization. In particular, I will focus on three primary areas, though this is certainly not an exhaustive list. First, I will address the area of gainers and losers in trade liberalization/globalization. Second, I will examine the major players in the developing world and their implications on the globalization process. Finally, I will address how terrorism has changed the way in which we view trade and some of the unintended consequences of that change in view. Hopefully, the result will be to give a flavor for the complexities that exist in globalization and the need for transparency in the globalization process if the process is to result in increases in world welfare.

Who's Ox is Gored? Gainers and Losers in Globalization

Since the late 1600s and early 1700s, there has been a fundamental understanding that trade is good. That is, trading with others allows one to concentrate on the task he or she performs best and trade surplus production for other products desired. Formalized by David Ricardo, the theory of comparative advantage has been a centerpiece of economic trade theory for nearly two hundred years. We have learned a lot since the initial idea was put forward. For example, comparative advantage may be created by investments in human capital. Or comparative advantage may dissipate with shifting technologies or resource endowments. We have also learned of the vulnerability of the theory to issues such as fixed, immobile resources being combined with mobile resources. But at its heart, our modern understanding of trade still hinges on the concept of comparative advantage.

Based on this theory, we deduce that people are made better off by reducing trade restrictions and allowing the free flow (as much as possible) of resources. If we

¹The author is a professor at Mississippi State University.

reach the maximum, then no one can be made better off without making someone worse off. This result is not a matter of conjecture. It is a mathematical fact, depending, of course, on the validity of the initial assumption. Even assuming that the initial assumptions are correct, however, does not mean that no one is not made worse off in the transition. Rather, it simply means that the gains by the gainers are larger than the losses by the losers so that the gainers could buy off the losers and still have gains left over. At the same time, we should be clear that trade theory does not prescribe free trade. The benefits of free trade are a possible, but not a necessary, outcome of trade. Government policy can be designed to exploit other countries (more on this below).

It is in this sense that trade theory predicts that global welfare is enhanced with free trade. But theory matters little if you lost your job as a result of trade liberalization. Herein lies the difficulty with public discussion about trade. The costs of trade (job losses, plant closings, etc.) are directly and easily observable. The benefits (greater efficiency, lower prices, more efficient allocation of resources) are not.

The debate leading up to the passage of the North American Free Trade Agreement (NAFTA) provides a useful illustration of the discourse on trade. NAFTA opponents like H. Ross Perot spun horror stories about the great sucking sound of American jobs being moved to Mexico. We were told about the potential massive displacement of U.S. manufacturing and the associated losses in capital and skilled labor positions. At the same time, NAFTA proponents glowed with anticipation about the increased market efficiency, lower prices, and development of the Mexican economy that was to stem the flow of illegal immigrants.

As it turns out, both were right, and both were wrong. We did not witness massive job losses. To be sure, some sectors were hard hit with job losses, while other sectors have seen increased employment and exports. At the same time, we did not see huge reductions in illegal immigration; neither have we seen dramatically lower prices. Also, to be sure, employment opportunities have increased in Mexico but not rapidly enough to offset labor supply. And we potentially have access to a greater range of products such as fresh fruits and vegetables at seasonally lower prices. But these facts are hard to demonstrate empirically.

The story of NAFTA represents a microcosm of globalization in general. For those caught in the middle with little understanding of the underlying economic phenomenon, they were simply caught between two diametrically opposed arguments with no tools or information to seek out the truth. While the protectionist arguments of Ross Perot and others are patently incorrect and self-defeating, the willing or unwilling complicity of the economics profession in failing to adequately illuminate the potential negative consequences of trade agreements is equally irresponsible. As a result, those individuals who were caught unaware in the transition post-NAFTA have become increasingly cynical and skeptical of claims of benefits of trade. They can potentially form the base of populist movements toward protectionism because they provide living examples of the consequences of trade liberalization.

Of course, not everyone can be warned, and even those who are warned may choose to ignore the signs. But most people, when given enough warning and opportunities for adjustment to a new life, will accept the change, however begrudgingly. The economics profession, however, failed these individuals in the NAFTA debate because we were overly focused on quantifying benefits. In so doing, we have made our job more difficult in the future.

Finally, multilateral negotiations through the World Trade Organization (WTO) are predicated on the theory of free trade. Complete free trade, however, is not likely to happen. Pragmatically, free mobility of resources is not possible. Politically, nations are not likely to give up their sovereign right to regulate trade within their countries or to protect their citizens. But many policymakers appear bent on pursuing multilateral negotiations. There is no evidence to suggest that more benefits can be obtained through the WTO than through bilateral negotiations.

The 800 Pound Gorilla

It should come as no surprise that the 800 pound gorilla in the room will continue to be China. But, in fact, other developing countries/regions such as India and South America will increasingly flex their economic muscles through rising incomes and purchasing power. These developments should reemphasize the importance of international trade agreements, differentials in domestic policy, and exchange rates as sources of competitive advantage/disadvantage.

Despite the editorializing of the Wall Street Journal and others, the position of U.S. production *vis-à-vis* China has deteriorated and is not expected to improve under the status quo exchange rate and policy regime. The depreciation of the dollar in the past several years has helped correct trade imbalances between the U.S. and much of the world. But, the pegging of the Chinese yuan to the U.S. dollar has led to a situation where the relative value of those currencies has changed little. As a result, the trade deficit with China has not adjusted. Couple this with lax labor and environmental regulation (lower regulatory costs), and the result has been a significant competitive advantage toward Chinese business. U.S. businesses have attempted to respond through foreign direct investment, but that strategy is complicated by complex ownership rules in China.

This problem is too deep and complex to sufficiently address here, but the upshot is that China will continue to exert a heavy influence over the future of the globalization process. The growth of low-tech manufacturing has transfigured the demand structure for labor in the U.S. away from unskilled to skilled labor. But what will happen when education and technology make it more cost effective to have high-tech manufacturing in China? Certainly, the exchange rate driven current account deficit with China is providing incentives for businesses to relocate manufacturing to China, but the capital account surplus in China is providing their government with the necessary cash to make rapid and large investments in infra-

structure and human capital formation. Whether they fully exploit this opportunity remains to be seen.

On a larger, more general scale, the focus on globalization will lie in the developing world for the foreseeable future. The developing world is where much of the future income growth will occur, and along with it, the most rapid shifts in demand for higher value, more processed goods. But to fully exploit the growth in income will require a change in approach for U.S. businesses. Marketing into these foreign markets will require understanding culture, logistics, and other features of the local markets and may also require shifts in manufacturing to meet the demands of the foreign buyers.

At the same time, international bodies like the WTO must come to grips with the new realities of world markets as well. It is difficult to imagine how one can continue to list China as a lesser developed country (LDC) when it has experienced years of double-digit economic growth and billions of dollars in a capital account surplus. Likewise, Brazil has experienced rapid economic development. Continuing to allow self-designation as an LDC confers special opportunities on these countries to protect domestic production from foreign competition. Coupled, in China's case, with perverse exchange rate policies, and this presents the opportunity for massive resource misallocations and artificial competitive advantages that lead to a skewed distribution of employment and wealth into the future.

To be sure, China and India are likely to be good customers for U.S. agricultural production as their resource base already is not sufficient to adequately provide the food and fiber products they demand. But Brazil, on the other hand, represents a potential formidable competitor for U.S. agriculture (and, in some areas, is already surpassing U.S. agriculture in terms of productivity and foreign market penetration). But we should not be so *naïve* as to believe that agriculture is the primary driving force in the political debate about globalization. Agriculture is certainly important to the developing world, but is only a fraction of total trade for the developed world. As such, we should expect political concessions for agriculture by the developed world in order to secure market access for industrial goods. These concessions, however, are likely to be to the disadvantage of agriculture.

Terrorist Mentality: Changing the Path of Globalization?

According to the Rand Terrorism Database, there were 26,281 reported terrorism incidents globally between 1968 and 2006, resulting in approximately 89,000 injuries and 36,000 deaths. However, over that time period, only 10 incidents involved food or water, resulting in five injuries and no deaths. Nevertheless, terrorist acts involving the food and water supply remain a serious risk due to their potential widespread impacts on human health, but more importantly, on their economic impacts.

There are, of course, naturally occurring diseases and contaminations that result in human sickness and death. These sources impose costs on the food system for prevention, control, and remediation. There is a natural ambient risk associated with these sources of disease due to their natural occurrence that consumers accept. But the added dimension of unknown risk arising from nefarious actions by terrorists changes the perceived risks by consumers, thereby fundamentally changing the nature of demand for food products (Turvey).

Goods that are traded are potentially more vulnerable to terrorist acts because it allows terrorists to contaminate the good remotely without having to physically enter a country and potentially be identified by security. We have traditionally handled contamination issues through sanitary restrictions. Because naturally occurring outbreaks are (somewhat) random, the system of closing borders to particular imports after an outbreak has worked reasonably well. But with the advent of planned attacks on the food system, *ex post facto* sanitary restrictions may not work as well.

But what can be done to prevent a terrorist from using imported goods as a delivery mechanism for terror? Of course, good intelligence and monitoring are essential to identifying problems before they arise. Better tracking of agricultural and food shipments will also aid in rapid identification of problems and rapid remediation. Mechanisms like a national identification system for livestock take on higher values in the face of potential terrorist attacks. But, all these measures come at a cost – either indirectly through taxes for intelligence or directly in terms of higher food costs to pay for tracking and identification systems.

Herein lies the potential changing path of globalization. At the very least, added requirements for tracking, identification, inspections, etc., mean higher costs for imported goods, and thus, less trade. Some may argue that less trade is desirable. But consumers ultimately suffer through higher prices and less choice. Some others have also naively argued that the increasing security measures have led to economic development in the areas to serve the security sector. These are resources that could have been deployed to other areas but are instead being devoted to address an external risk.

The above is simply a reality of the world we live in, and the markets will sort out the ultimate changes in prices and quantities. But more unfortunately, the risk of contamination may ultimately lead to abuse of the sanitary restrictions in the WTO to prevent trade that should, even under the higher cost structures imposed by greater risks, occur either as a safety first approach against perceived risk (unintentional side effect) or as use of potential risks to manipulate political outcomes (deliberate abuse). For example, assume the U.S. has intelligence that indicates terrorists are plotting to inject cyanide in Spanish wine. In response, the U.S. bans all imports of Spanish wine. While this might appear unseemly according the WTO rules, you certainly are not going to get an argument from U.S. consumers, and successful argument in the WTO that the ban is illegal is unlikely. But what if the U.S. suddenly felt that the Kenyan government was supportive of terrorism, and, citing “risks of

terrorist activity," banned the import of Kenyan coffee. This certainly doesn't pass "sanitary" muster.

The problem is that the line between legitimate concern for public safety and abuse of the system as a nontariff barrier is quite blurry. The general response to risk is to do less of whatever is risky. So the natural impact of terrorist risk on trade will be to trade less. But this risk can be compounded by government action that only serves to exacerbate the trade volume reduction. From an economic standpoint, the consequences are clear – higher prices and less choice. To this point, there have, thankfully, been few incidents that have disrupted trade flows (the mad cow case of recent history is a notable exception), and there have been no major terrorist attacks on the food system. So as of now, consumers still have reasonable confidence in the food system. But the recent *E. coli* incident in spinach highlights how just a small contamination can have major economic impacts on the food system, even with relatively small human health effects. So the risk of terrorism, so far, has had little influence on the course of globalization, but that may be reason enough for terrorists to make it their next target.

Conclusions

Globalization as a process is nothing new. In fact, it is a process that has been ongoing since the dawn of human civilization. Our modern view of globalization has been of a process of increasing trade and exchange of ideas and knowledge that has been steadily progressing, interrupted only by periodic wars, plagues, etc., that disrupt the normal functioning of human life. The process of globalization will continue, but its path is heavily influenced by many factors.

Consumers are not impotent in this process and exert heavy influences on the political process as well as by expressing their preferences in the marketplace. Transparency in development of international policy will aid in diffusing conflict over perceived inequities but will not eliminate dissent. Policies that recognize the impacts of affected groups are also necessary if continued movement toward globally integrated markets is to proceed.

Recognition of effects is also a two-way street. While the developed world must come to grips with the effects of its agricultural subsidies and trade policies on world markets, the developing world must also recognize the impacts of differential environmental, labor, and exchange rate policies on trade patterns as well. The differential rates of trade liberalization between the developed and developing world are potentially creating a distortion in the patterns of trade and globalization.

Finally, the role of terrorism on the future pattern of globalization should not be underestimated. As of yet, we have had no major terrorist events involving agriculture and food. But if we do, we can expect serious calls for reconsideration of how food is produced, transported, and traded. A better understanding of these and other variables will help us prepare for the future. The Farm Foundation and others

can continue to contribute to our understanding, thereby promoting the long-term viability of American agriculture.

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Increasing the Competitiveness of North American Agriculture by Strengthening NAFTA

All too often, NAFTA is criticized as a threat to particular segments of the farm and agribusiness sector, both by economists who are paid to represent these segments and by politicians who seek votes at any price. Calls go out to level the playing field by creating barriers to trade, which in reality results in a playing field that is marked by potholes and divots. Farmers and their representatives in one NAFTA country are no less likely to play this protectionist game of finger pointing than are those in another country.

The fact is that NAFTA has been very good for agriculture. A recent study by Zahniser clearly indicates that NAFTA has increased trade, employment, and foreign investment. However, these increases could be much greater if farmers and their political representatives were willing to take the steps needed to more effectively utilize the resources in producing those crops and products for which they have the greatest comparative advantage. Some of the challenges and opportunities to expanding markets for North American agriculture come from countries outside North America, such as Brazil in the cases of soybeans, poultry, pork, and ethanol; Argentina in the cases of wheat and corn; China in the cases of fruits, vegetables, and cotton; and Africa in the case of cotton.

For more than a decade, Farm Foundation has joined with USDA, Agriculture and Agrifood Canada, and the Mexican agricultural secretariat (SAGARPA) as a catalyst for evaluating the effectiveness of NAFTA in expanding trade. This has been done through a series of annual workshops involving farmers, agribusiness, policy makers, and academics. The proceedings of these workshops have been published in the form of commissioned papers, which served as the basis for discussion in the workshops, and executive summaries that captured the key conclusions reached in the discussions.² This chapter showcases the major conclusions reached in these workshops and their rationale as a guide for strengthening NAFTA and the competitiveness of North American agriculture. The paper also reflects on how these workshop discussions have affected my thinking on a wide range of policy issues.

As will be explained subsequently in more detail, the provisions of NAFTA are largely limited to eliminating tariffs and quotas, which will be largely accomplished in 2008, and to providing for a dispute settlement process in cases involving national antidumping and countervailing duty laws and sanitary and phytosanitary (SPS) regulations. The agreement explicitly provides

¹ The author is a regents' professor emeritus at Texas A&M University, a member of Farm Foundation's Board of Trustees from 1996-2005, chairman of its Board in 2002-2003, and member of the Farm Foundation Round Table from 1996-present. He received Farm Foundation's R.J. Hildreth Award for Career Achievement in Public Policy Education in 1998. He is a fellow of the American Agricultural Economics Association. This paper benefited greatly from the helpful comments of Steven Zahniser, ERS/USDA, and Karl Meilke, University of Guelph.

² Can be accessed through <http://naamic.tamu.edu/>.

for no meddling with farm policies such as the U.S. farm price and income programs; the Canadian marketing boards for wheat, dairy, and poultry; and the Mexican support programs. In contrast, the European Union (EU) has an elaborate administrative and legislative structure that has been quite effective at harmonizing its farm programs across countries. While neither suggesting nor advocating the EU structure as a strategy that NAFTA ought to follow, there are many opportunities for accomplishing positive institutional change.

Trade Disputes

NAFTA's administrative structure is largely limited to a dispute settlement process that employs a Secretary located in each NAFTA country capital to establish and administer the dispute review panels process (Raynauld). These disputes occur mainly in the areas of conflicts over the national antidumping and countervailing duty laws (sometimes referred to as trade remedy laws) that exist in each NAFTA country and in the requirement that SPS regulations be based on science.

Trade Remedy Laws

Each NAFTA country has trade remedy laws (TRLs). These are administered by the U.S. International Trade Commission and the U.S. Department of Commerce; by the Canada Customs and Revenue Agency and the Canadian International Trade Tribunal; and by Mexico's Secretariat of Economy (SE). These laws basically prohibit dumping, meaning sales below the full economic cost of production and provide for the implementation of countervailing duties that offset the amount of dumping. While there are differences in the interpretation of the requirement that injury be demonstrated, the key determination involves whether there were sales below full economic cost. Economists define full economic cost as including variable costs, fixed costs, imputed costs for unpaid family labor, and contributed capital (generally referred to as opportunity cost).

For lawyers and testifying expert witness economists, trade remedy cases are like going to heaven. But for the farmers who pay the legal bills associated with these cases, TRLs are a ticket to somewhere else. After reviewing the literature and the Manitoba corn dumping case of the late 1990s, Loyns (2004, p. 335) concluded "in economic terms, trade remedy laws do not fit the problem and their application is not contributing to more even terms of trade." They do not fit the problem because farm prices regularly fall below the cost of production. While it may be argued that farm subsidies contribute to this phenomenon, which ironically is not prohibited by NAFTA, even without subsidies it is a well known and widely understood fact that farm prices are often below farmers' full cost of production. This fact is the prime justification for price and income support policies. Their application does not contribute to more even terms of trade because the remedy is a restraint on trade. In addition, the public and privately imposed legal costs of prosecuting and defending a trade remedy

case are an astronomical windfall to the economic and legal profession, from farmers and the treasury.

What should be done about TRLs? The conclusion from years of extensive interaction between industry, government, and academia is that they should either be done away with or be substantially modified regarding their application to agricultural commodities. As they have been applied to agriculture, TRLs clearly are counterproductive. This fact is a result of the behavior of farm prices, or for that matter by any competitively structured commodity having highly inelastic supply and demand characteristics. At a minimum, Meilke, Rude, and Zahniser make the point that there needs to be much broader recognition that agriculture is a cyclical industry and that “dumping” prevails at the bottom of nearly every production cycle when the standard of comparison is market prices versus the full cost of production. These cycles are common to all three NAFTA members, and the likelihood of predatory pricing in primary agricultural products is small. The result is the need for a different standard under NAFTA for determining when dumping exists and when countervailing duties are justified. The existence of an economic expertise within the NAFTA Secretariat would help in this regard.

Sanitary and Phytosanitary (SPS) Regulations

In the past decade, NAFTA SPS regulations have been confronted with several serious challenges. The most threatening of these, Bovine Spongiform Encephalopathy (BSE or mad cow disease), appears to have been brought under control at least with regard to the United States and Canada, albeit after extensive negotiation and needless finger pointing at the highest levels of government (Sparling and Caswell, 2005). While the NAFTA countries have reached and tested agreements regarding how to deal with low pathogen forms of Avian Influenza, the ability to deal with high pathogen strains that are transmittable among humans remains to be tested. In addition, there are ever-present concerns about the ability of NAFTA countries’ regulatory systems to deal with issues of bioterrorism.

Beyond dealing with SPS issues as they arise and the application of risk and science based principles common to international organizations, there is no NAFTA mandated mechanism for dealing with SPS issues on a trilateral basis (Green *et al.*, 2005).³ There is general agreement that SPS risks, resource commitments, and enforcement standards are not as high in Mexico as in the United States and Canada. Yet, proposals such as funding joint risk assessment and training facilities fall on deaf ears, particularly in United States policy making circles. It does appear that greater progress has been made in plant-related SPS issues due to coordinating activities of the North American Plant Protection Organization (NAPPO), the counterpart of which is noticeably absent in animals.

³ It is true that the NAFTA accord creates an SPS committee to work on these issues, some of which have been addressed.

What should be done about the SPS regulatory framework under NAFTA? Specific actions and strategies suggested by Knutson and Ochoa for accomplishing greater NAFTA regulatory coordination include:

- Each country should appoint a ministerial level agriculture focal point for NAFTA coordination. This individual should be the voice for NAFTA in ministry decisions affecting other NAFTA countries.
- Each country should make a concerted effort to make its agrifood regulations consistent with the related international organizations (WTO, OIE, CODEX, IPPC, and ISO).
- Joint laboratories should be established for risk assessment, research, and training related to NAFTA regulatory issues. The success of this type of joint venture between the U.S. and Canada has been experienced in the pest regulatory activities of IR-4 laboratories.
- Special effort should be made to create a level technical and scientific playing field related to agricultural regulatory issues across the NAFTA countries. The joint laboratories would be a step in this direction, but advance university training programs also are needed in the case of Mexico.
- Harmonized surveillance, testing, and tracing disease and pest problems that hold the potential for adversely affecting production in each of the NAFTA countries must be adopted. Priority should be given to implementing harmonized animal identification systems and for adoption, at all levels of the food chain, of requirements for Hazard Analysis Critical Control Point (HACCP) methods.
- Formation of a coordinating organization for SPS standards for animal agriculture and their products, comparable to NAPPO, should be initiated and tenaciously pursued.
- There is need for greater uniformity in policy analysis both in each country and within a strengthened NAFTA Secretariat. The economic impacts of SPS initiatives must be subject to policy analysis if public investments are to be made and people are to enter these decisions with their eyes open and without surprises.

Farm Policies

Hardly a NAAMIC or PDIC workshop was completed without a discussion of U.S. farm policy as a source of NAFTA trade disputes and conflict. One of NAFTA's most basic weaknesses was a provision that effectively allowed the three countries to set up their farm programs without any constraints. By this provision, or lack thereof, each country has been able to establish its program without consideration of the impacts on the other two countries. And they have done this. More accurately, because of the more liberal U.S. subsidy programs, both Mexico and Canada have been put in a position of attempting to match to the U.S. farm bill provisions so as not to put their farmers at a disadvantage. The threat of countervailing duties has been insufficient to offset the political

power of commodity organizations in the United States, and NAFTA does not appear to be a sufficient priority to warrant a farm bill veto.

No matter how unpopular it is for a U.S. economist to say it, farm policy textbooks such as that by Knutson, Penn, Flinchbaugh, and Outlaw, inevitably make the point that direct farmer payments have two primary effects:

- They increase production and lower the market price. This happens both because direct payments increase farmer returns/profits and because risk is reduced. Farmers, as economically rational beings, respond to both of these factors by increasing the amount of the production. The increase is greater in the short run if the payments are tied to the quantity produced, as is the case for the marketing loan, than if they are decoupled. But it is probably also the case that no payment is truly decoupled considering the life of farm programs.
- They increase the price of land. Any payment for virtually any purpose gets capitalized into the price of land. This bold statement holds for green box as well as amber box payments. The interesting and little recognized effect of payments and the capitalization process is to raise the cost of production through higher rental rates and the imputed opportunity cost of land. Therefore, from a NAFTA and global market perspective, farmer payments are counterproductive – the inevitable consequence being that U.S. farmers become increasingly less competitive within NAFTA and internationally. While Canadian farmers may bemoan the fact that their government has not seen fit to subsidize its farmers as much as the United States does, in the process they may be placed at a comparative advantage relative to U.S. farmers. This concept might be a contributing factor to the increased competitiveness of Canada in commodities such as wheat, beef, and hogs.

Integrating Labor Markets

A major policy and political issue involves the immigration from Mexico and the treatment of illegal aliens. While politically treated as a U.S. issue, it clearly is a bilateral issue between the United States and Mexico and might be better treated as a NAFTA issue. After all, market integration ultimately involves integration of the labor and capital markets as well as product markets. While integration of the capital and product markets has made substantial progress to the benefit of all three countries, little attention has been given to the labor market.

In their 2006 base paper contribution to the NAAMIC workshop, Meilke, Rude, and Zahniser pointed out that in 2005, U.S. agriculture employed an about 1,047,000 farm workers and that about one-half of the hired labor force in crop agriculture is undocumented. Many more are employed in the agribusiness sector, particularly in the meat industry. This is both an economic and a social issue that directly affects the lives of many people. On the darkest side, they note that in 2005, 475 persons perished seeking to capture the economic rewards of U.S. employment and to satisfy the needs of U.S. employers, many of which are agricultural. There is no easy solution, but agricultural interests

clearly have a direct stake in its timely resolution. Moreover, this issue is of direct concern to NAFTA and should be treated as such.

Getting Policy Makers on the Same Page

One of the keys to making any trade agreement successful involves getting policymakers to agree on a set of goals for the agreement and an action plan for accomplishing those goals. The goals and the action plan both need to be accessed and updated regularly. This requires that the key policymakers in the relevant program areas meet on a regular basis to dialog about mutual issues and problems confronting the bloc of countries, which are parties to the agreement.

Institutions such as NAAMIC can play an important preliminary role to such dialogs in surfacing issues; in analyzing policy options and their consequences; in fostering the type of objective dialog and interaction needed to reach a policymaker, industry leader, and academic consensus for moving forward in setting goals and actions for future progress in reducing trade tensions. This type of forum allows issues and policy options to be analyzed outside of the political arena where political grandstanding is minimized because it is not productive. It also fits well with the previous suggestion that there be, at the ministerial level of each key government agency, an individual who has a primary responsibility of moving the trade agreement forward in accomplishing expanded trade and market integration.

Strengthening the NAFTA Secretariat

Beyond NAFTA Secretaries located in each NAFTA country capital to establish and administer dispute review panels, there is no NAFTA Secretariat having analytical, investigatory, or review functions designed to move NAFTA forward. This fact is in direct contrast to the European Union (EU), which has an elaborate commission, budgeting process, and legislative body. In administering the EU's Common Agricultural Policy (CAP) and trade policy, the commission is continuously evaluating, reporting, and injecting for discussion new ideas for policy and program change that might be considered to move both CAP and the EU forward to the next level of integration. By all standards, this process has been highly effective in fostering change and adjustment.

This positive evaluation concerning the EU is not designed to endorse either the CAP or its trade policies. It is not to suggest that a NAFTA common market or economic union ought to be pursued. It does suggest that if NAFTA is to move to the next level and maximize the competitiveness of North America as a region, a strengthening of the function and powers of its Secretariat may

be required. It also suggests that the existing NAFTA functions could be more efficiently and effectively pursued by strengthening the NAFTA Secretariat.⁴

Specific suggestions for strengthening the NAFTA Secretariat that go beyond those suggested for dealing with SPS issues⁵ include:

- The establishment of a NAFTA Headquarters with a Director General appointed to oversee the evolution of the NAFTA Secretariat.
- Establishment, within the Headquarters, of liaison offices representing each member country.
- The immediate movements of the NAFTA Secretaries handling the dispute settlement function to that Headquarters.
- The establishment within the new Secretariat of an economic analysis body, the initial responsibilities of which could include: collection and compilation of data relevant to NAFTA, issuance of an annual report on the economic status of NAFTA as a bloc with baseline future projections, evaluations of the impacts of differences in country policies and opportunities for making them more compatible, evaluations of proposed changes in country policies on NAFTA as a bloc and on each member country, preliminary evaluations of the merits of disputes filed with the Secretariat.

Concluding Remarks

NAFTA has been a highly successful first step in dealing with many of the cross-country issues that could only be effectively addressed on a trilateral basis. Aside from issues specifically contained in the NAFTA agreements, such as the elimination of tariffs and quotas, progress has been heavily dependent on the development of crisis conditions, such as the BSE outbreak. Two, much publicized Presidential Initiatives that were designed to move NAFTA forward have been pursued and have accomplished little, at least as far as agriculture is concerned. One was the Partnership for Prosperity (P4P), and the other was the Security and Prosperity Partnership (SPP). More substantive changes are needed if NAFTA is to move forward. Most of these changes raise issues of sovereignty, which are difficult to overcome. But in a globalized world, countries are inherently less sovereign, and borders are inherently more open.

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⁴ Greater detail on the underlying rationale for strengthening the NAFTA Secretariat can be obtained from Meilke, Rude, and Zahniser and from Knutson and Ochoa.

⁵ The SPS suggestions need to be pursued now and could be pursued within the current NAFTA framework, albeit more efficiently if the NAFTA Secretariat were strengthened as suggested in this section.

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Increasing the Competitiveness of Mexican Agriculture

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Mexican agriculture is characterized by a distinct dichotomy between a highly commercialized economy of progressive state-of-the-art farms, much like those found in the United States and Canada, as well as by many small, often subsistence, noncommercial farms. As in the United States and Canada, there are many family farms that are struggling to compete and keep pace with rapid technological change that characterizes North American agriculture.

Our job in SAGARPA is to help Mexican farmers become more competitive and to provide producers a way to improve their income. We visualize a Mexican agricultural sector that contributes to the competitiveness of the North American agricultural economy by producing those commodities for which Mexico has the greatest comparative advantage. We believe that the challenge for North American farmers and ranchers is not in competing against each other; rather it lies in most efficiently and safely feeding our people as well as expanding our competitiveness internationally. By our people, we not only refer to the more than 100 million Mexican consumers, but also to the approximately 300 million consumers in the United States and 33 million in Canada.

To assess competitiveness, observers often refer to changes in market share, exports, and profitability. However, the competitiveness of a nation's product is ultimately rooted not in any single outward measure but in the quantity and quality of the country's productive resources [Dohlman *et al.* (2003)]. In other words, a more appropriate discussion of competitiveness would target specific products within a nation and the factors that drive their success.²

The objective of this paper, thus, is to explain what we identify as the major areas of success of Mexican agricultural products competing in the international market and how we can most effectively build upon these successes to further position Mexican agriculture in the global arena. The paper concludes with policy implications, and because this book commemorates the leadership of Walt Armbruster, we also add important implications for future Farm Foundation programming.

¹ Jones is Under Secretary in SAGARPA, the Mexican Ministry of Agriculture. He has been a Federal Senator and a Congressman representing the State of Chihuahua and is an active participant in the North American Agrifood Market Integration Consortium (NAAMIC) and its predecessor, the Policy Disputes Information Consortium (PDIC). He has also been a Farm Foundation Round Table speaker. Ochoa is General Director in SAGARPA and has been International Project Coordinator in the Agriculture and Food Policy Center at Texas A&M University, a member of the Planning Committee for PDIC and NAAMIC as well as an author of several of their base papers and executive summaries. Sherwell is Deputy General Director in SAGARPA and is an applied economist, currently leading a team of economists developing different agricultural economic models, including the Mexican baseline model.

² See Dohlman *et al.* (2003), Gale (2002), Osborne and Trueblood (2002), and Schnepf *et al.* (2001) for discussions related to the agricultural productivity in China, Brazil, Argentina, Russia, and Ukraine.

Trade and Success

International trade allows consumers around the world to have year-round access to all types of fresh foods, regardless of the region's climate. Thanks to trade, consumers who live in unfavorable climates for agriculture, such as those with long and cold winters, are able to fulfill their demand of fresh produce through imports.

However, international trade in agriculture goes beyond climate constraints; it also is affected by economic issues that arise. For example, changes in the exchange rate as driven by monetary and fiscal policy can have dramatic effects on trade. The bottom line is that when international markets are efficient, after considering all economic factors, a product should not be produced in a region if it is not cost-competitive.

Mexico has been very successful in being competitive and in expanding fresh produce markets. Mexico's climate allows the production of almost any type of fresh fruit or vegetable. Besides climate attributes, Mexico maintains economic advantages producing these commodities. Harvesting products such as strawberries, broccoli, avocados, and green onions is labor intensive, and the cost of labor has been highly competitive in Mexico.

Mexico grows fresh produce on approximately four percent of its agricultural land, and almost 20 percent of the production is exported. Today, Mexico is the seventh largest fresh produce exporter to the world and the main supplier to the United States. In addition, the reduction of trade barriers through NAFTA and the development and application of sanitary and phytosanitary regulations have been helpful to further improve trade.

Mexican fresh produce exports to the United States have almost quadrupled since 1990 (Figure 1). Fruit exports to the United States rose from approximately \$200 million in 1990 to more than \$900 million in 2006. At the same time, Mexican vegetable exports to the United States increased from \$775 million to \$2.5 billion.

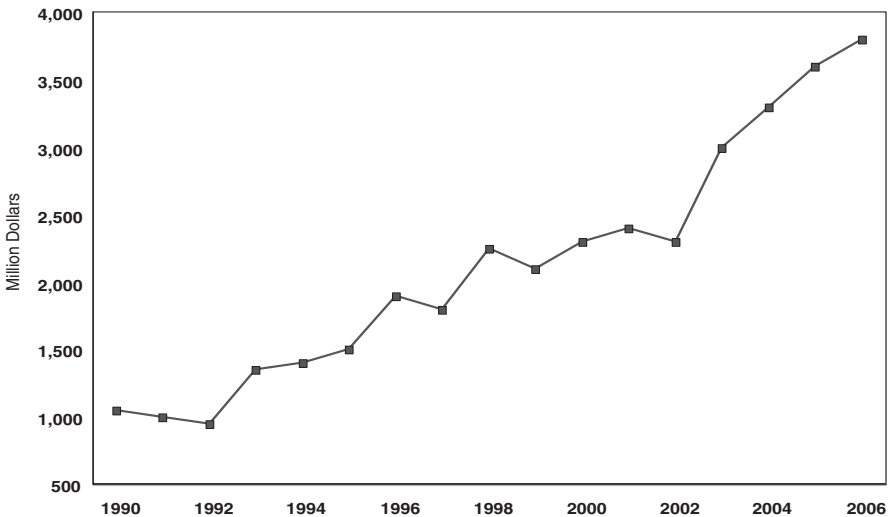


Figure 1. Mexican Fresh Produce Exported to the United States, 1990-2006.
Source: USDA.

On the other hand, Mexican trade with Canada is very small; yet, the annual growth rate is faster than the growth rate for Mexican exports to the United States. Mexican agrifood exports to Canada increased 35 percent last year from \$672 million to \$906 million. The majority of the agrifood Mexico exports to Canada is fresh fruits, vegetables, and nuts. This pattern is similar to the agricultural trade between Mexico and the European Union; it began from a

Table 1. Mexican Avocado Exports by Country (Thousand Dollars).

Country	2005	2006	2007
United States	239,566.3	188948.6	227,586.6
Japan	45,375.2	49155.1	22,750.3
Canada	29,637.5	28925.4	16,166.4
Chile	0.0	58.1	12,399.9
El Salvador	14,345.4	17920.5	8,339.6
Costa Rica	8,494.4	9676.5	6,397.1
France	21,621.1	17221.5	5,533.4
Guatemala	7,496.4	8507.8	4,786.8
Honduras	6,317.0	8482.1	4,574.3
Hong Kong	554.5	853.1	1,244.7
Netherlands	3,133.1	3052.3	800.9
U.K.	670.9	3364.3	777.8
Germany	92.8	34.2	370.2
Korea	0.0	445.5	309.6
Panama	0.0	0.0	291.6
Spain	987.8	1428.7	102.0
Ukraine	0.0	297.4	48.4
Belgium	408.4	67.5	36.4
Denmark	0.0	31.2	33.5
Other	92.5	0.5	0.3
Total	378,793.3	338,470.2	312,549.7

Source: SFA-SAGARPA

lower base level but is growing at an accelerating pace. Last year Mexican exports to the European Union grew almost 40 percent, reaching a total of \$45 million.

Thus, Mexican agrifood exports have increased significantly, mainly due to the competitiveness of its fresh produce subsector. Some of the most important export products are explained as follows to illustrate this point.

Avocado

Today, the Mexican avocado accounts for more than 50 percent of the total U.S. consumption of this product, surpassing Chile, which led the U.S. avocado market for several years. Mexico now maintains the largest market share for avocado consumption in the United States. However, Mexico's success is not a coincidence. Since 1914, the United States had banned avocado imports from its southern neighbor due to phytosanitary concerns. After improving sanitary conditions, the USDA partially lifted the ban in 1993. As a result, demand for Mexican avocados increased from one million pounds in 1993 to 269 million pounds in 2005. SAGARPA estimates that Mexican avocado exports to the United States will grow approximately 20 percent in 2007, and it is expected that this trend will continue in the future (Table 1).

Mexico's success with avocado exports is not limited to the United States. During the previous six years, avocado producers, with federal support, have established phytosanitary campaigns, which have contributed to open markets in China, Korea, and Chile. An expansion of Mexican avocado sales also is expected in the European market.

Onions

Most of the green onions consumed in the United States are grown in Mexico. Shipment data show that, in 2003, 87 percent of the U.S. green onion supply came from Mexico. Green onion imports to the United States from Mexico reached \$92

million in 1991-93. By 2003-2005, imports of onions reached \$150 million (Figure 2).

However, US imports fell from 178 thousand metric tons in 1991-93 to 174 thousand metric tons in 2003-2005. This resulted, in part, due to a lack of incentives for Mexican producers to adopt additional food safety practices. The asymmetric information problem here means that produce grown with more food safety practices does not receive higher prices.³ A survey conducted by Calvin and Cook (2007) indicates that five out of seven Mexican green onion producers stated that the decision to adopt better food safety practices was or would be due to their own initiative, not due to the requirements of the shipper. Nonetheless, by the end of 2003, demand of green onions dropped because of food safety concerns. Thus, for the November 16-29, 2003 period, estimated losses for Mexican growers, considering lost sales and lower prices on actual sales, totaled \$10.5 million. As a result, SENASICA (Mexico's food safety and quality agency) designed and enforced a mandatory food safety program for green onion exporters.

Tomatoes

Mexico has become one of the largest tomato exporters in the world and the number one supplier of tomatoes to the United States. Tomato exports to the United States increased dramatically as a result of tariff reduction due to NAFTA. Currently, Mexico exports more than \$500 million, equivalent to more than 600 metric tons of tomatoes a year (Figure 3).

Mango

The United States is fully dependent on imports to meet its demand for mangoes. Mexico is the dominant supplier of this fruit to the United States, accounting for over 60 percent of total U.S. mango consumption. In 2006, Mexico's shipments to the United States were at a record high, reaching 180.4 thousand tons. One of the

³ In fall 2003, large outbreaks of hepatitis A in the United States were associated with consumption of green onions from Mexico. See Calvin *et al.* (2007).

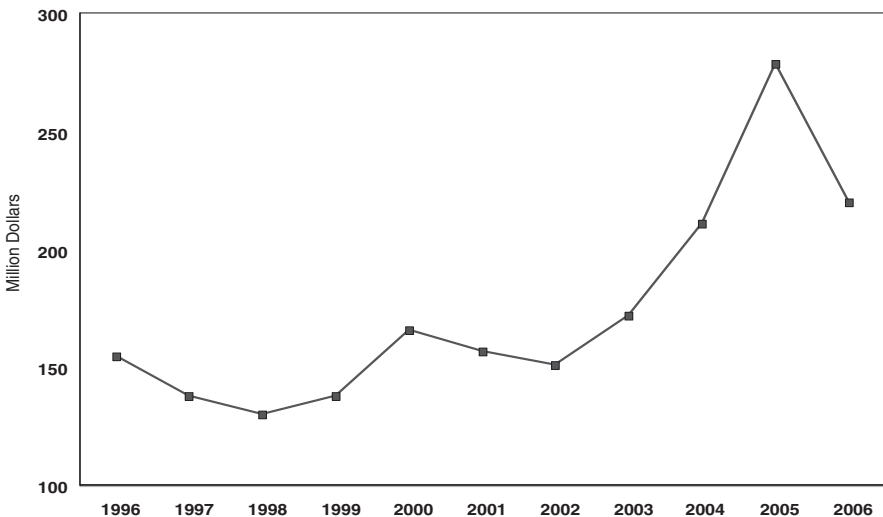


Figure 2. Mexican Onion Exports, 1996-2006.

Source: SFA-SAGARPA.

major challenges for Mexican producers, besides facing cold weather and heavy rains, will be the recent opening of the US market for imported mangoes from India, the world's largest mango producer and consumer. Indian mangoes have been banned from the United States for the last 17 years due to phytosanitary reasons.

Papaya

Mexico is the largest supplier of papayas to the United States, accounting for over 70 percent of total imports during 2004-2006. An increasing trend in fresh

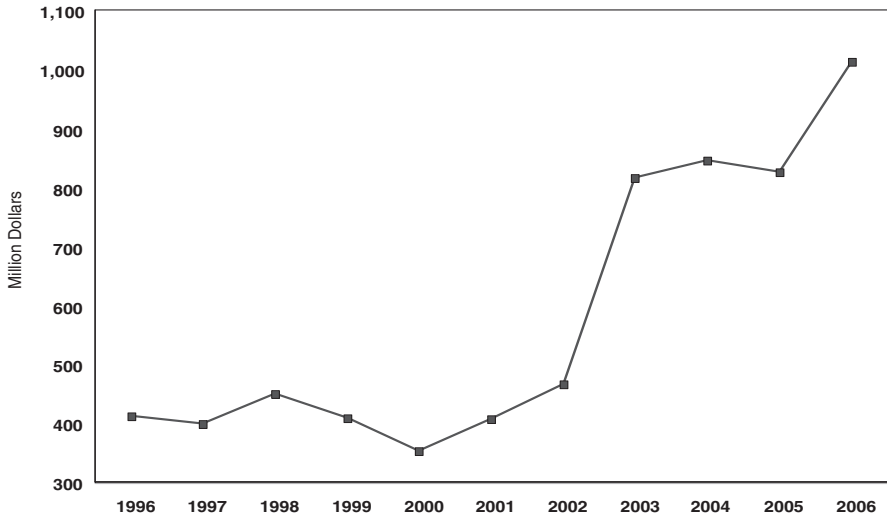


Figure 3. Mexican Tomato Exports, 1990-2006.

Source: SFA-SAGARPA.

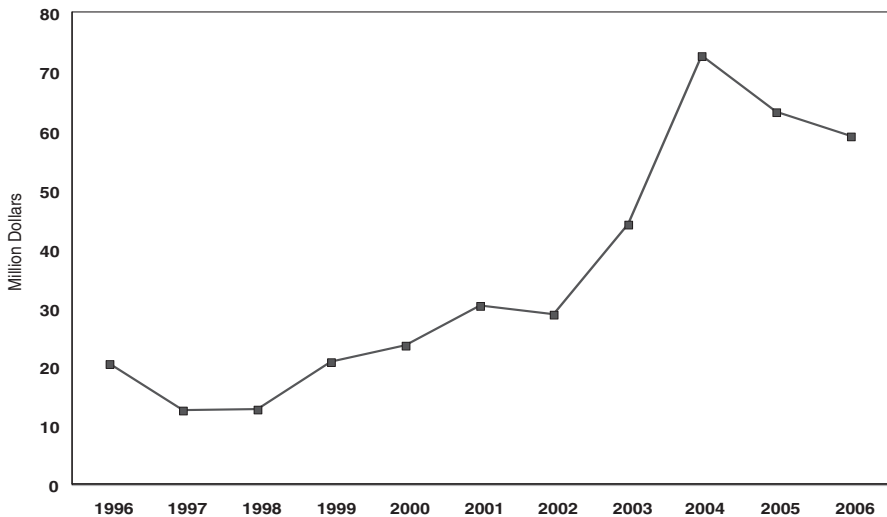


Figure 4. Mexican Papaya Exports.

Source: SFA-SAGARPA.

papaya consumption in the United States [Perez and Pollack (1997)] and a declining production in Hawaii, mostly as a result of disease problems, has given Mexico an even greater presence in this market. Imported papayas from Mexico rose to 91 thousand tons, up 13.7 percent from the previous year, but down 3.3 percent from the record-high shipments in 2004 (Figure 4).

Limes and Grapes

The Mexican grape crop is progressing well due to favorable weather, along with a larger harvested area. Total grape production

in Mexico will be up from the previous seasons. Because of the more abundant crop, there will be more Mexican grape supplies available for export in the spring and summer, particularly to the United States, which is Mexico's largest export market for grapes (Table 2).

In the lime market, U.S. imports increased 28 percent in January through March 2007, from the same period a year ago. Ninety-five percent of the imports were from Mexico, whose shipments were up 29 percent (Table 3).

Meat

Sanitary barriers are now the major factors limiting further integration of the North American meat markets. Bovine Spongiform Encephalopathy (BSE) is a disease that causes major disruptions to beef and cattle trade. Nonetheless, the cattle that the United States imports from Mexico tend to be young and are destined for further grazing, feedlot finishing, and slaughtering in the United States. Under normal trade conditions, the United States is a net importer of cattle from Mexico.⁴

The Mexican and U.S. poultry sector markets are more closely integrated than Canadian and U.S. markets, due to Canada's production and import restrictions. The second and third largest poultry-production firms in Mexico are U.S.-based companies: Tyson and Pilgrim's Pride.⁵ On the other hand, the United States imports very little Mexican poultry, largely because of the incidence of Exotic Newcastle Disease (END) among Mexico's flocks. The good news is that the United

⁴ Given strong U.S. demand for grain-fed beef and Mexico's general lack of well-developed feed grains and cattle-feedlot sectors, it makes economic sense for Mexico to export feeder cattle (and import beef) rather than produce beef from grain-fed cattle for export or the domestic Mexican market. See Hahn *et al.* (2005).

⁵ Of all the meat production sectors, broiler production is the one where foreign direct investment is the most important source of Mexican market integration with the United States.

Table 2. Mexican Grape Exports by Country (Thousand Dollars).

Country	2005	2006	2007
United States	156,566	108,584	141,815
Belize	100	110	67.0
Germany	0.0	0	30.0
Costa Rica	271	163	24.0
Others	238	345	0.0
Total	157,714	109,203	141,935

Source: SFA-SAGARPA

Table 3. Mexican Lime Exports by Country (Thousand Dollars).

Country	2005	2006	2007
United States	154,214	186,098	131,471
Japan	880	1,124	2,521
Netherlands	1,520	1,700	1,322
France	748	673	1,622
Germany	648	441	514
Belgium	544	588	1,213
Canada	1,172	1,349	1,610
Spain	47	46	187
U.K.	294	447	981
Italy	95	218	164
Switzerland	39	27	84
Other	259	35	15
Total	160,459	192,747	141,705

Source: SFA-SAGARPA

States has allowed regionalization for END. As a result, the Animal Plant and Health Inspection Service (APHIS) has determined that the Mexican States of Campeche, Quintana Roo, and Yucatán are considered END-free. APHIS also considers Sinaloa and Sonora to be low-risk regions for transmitting this virus. Having disease-free status is the first step to allowing Mexico to ship fresh or frozen poultry to the United States. The next step in this process is to have plants certified by the USDA's Food Safety and Inspection Service (FSIS). Disease-free status with FSIS certification would allow Mexico to export some fresh and frozen poultry to the United States. Salin *et al.*, (2002) provide support for the development of a competitive Mexican poultry market in the United States.

Organic Products

The total value of production of Mexican organic products exceeds \$270 million a year on average. The sector has registered an average rate of growth of 27 percent. In addition, the planted area allocated to organic products has gone up from 23 thousand hectares in 1996 to 307 thousand hectares in 2005. The favorable performance of the sector is mainly due to the commercial feasibility and competitiveness of organic products.

Being labor intensive, Mexican production of organic products represents a great socioeconomic impact on the farm. It is estimated that there are 123 thousand producers with 307 thousand hectares allocated to these kinds of crops. That is less than three hectares per producer.

Floriculture

The U.S. fresh flower market represents great potential for Mexican business development. The size of the U.S. flower market consists of about six billion dollars per year. Mexico's geographic and climatic conditions further position Mexico as a natural supplier in North America.

Currently, Mexico's flower planted area equals 11 thousand hectares. It is estimated that eight percent is produced under greenhouse conditions. The great variety of floricultural products produced in Mexico is fostered by demand generated by United States supply chains. Canada and some E.U. countries could favor Mexico's role as a supplier of such goods and place Mexico in a competitive position with other Latin-American countries such as Colombia, Ecuador, and Costa Rica.

In Mexico, the most important producers of flowers are the states of Estado de Mexico, followed by Puebla and Sinaloa. The State of Mexico produces 80 percent of the total flower exports by generating, on average, 25 million *stems* and 10.8 million *flower pots*. Approximately 90 percent of the national flower production is sold to national markets, and the rest is exported to other countries, predominantly the United States and Canada. February and May are peak months due to Mother's Day and Valentine's Day.

Building on Our Successes

Past experiences, both success and failures indicate that five key strategies will provide Mexico with an advantage over competitors by more effectively serving consumer interests:

HACCP

Hazard Analysis and Critical Control Points (HACCP) involves seven principles resulting in a safer food supply:

1. Analyze hazards. Potential hazards associated with a food and measures to control those hazards are identified. The hazard could be biological, such as a microbe; chemical, such as a toxin; or physical, such as ground glass or metal fragments.
2. Identify critical control points. These are points at which food safety problems can be most readily identified in food production, from its raw state through processing and shipping for consumption by the consumer.
3. Establish preventive measures with critical limits for each control point. For a cooked food, for example, this might include setting the minimum cooking temperature and time required to ensure the elimination of any harmful microbes.
4. Establish procedures to monitor the critical control points. Such procedures might include determining how and by whom cooking time and temperature should be monitored.
5. Establish corrective actions to be taken when monitoring shows that a critical limit has not been met.
6. Establish procedures to verify that the system is working properly.
7. Establish effective recordkeeping to document the HACCP system.

HACCP offers a number of advantages over traditional food handling practices. Most importantly, it focuses on identifying and preventing hazards from contaminating food. In addition, it is based on science, permits more efficient and effective government oversight, and appropriately places responsibility for ensuring food safety on producers, food manufacturers, distributors, and retailers. Finally, HACCP helps food companies compete more effectively in the world market, and it reduces barriers to international trade.

Traceback

The International Organization for Standardization (ISO) defines traceability as the *ability* to trace the history, application, or location of that which is under consideration. No traceability system is complete and fail safe. Firms determine the necessary breadth, depth, and precision of their traceability systems depending on three objectives [Golan *et al.* (2004)]:

1. Improve supply management.
2. Facilitate traceback for food safety and quality.
3. Differentiate and market foods with subtle or undetectable quality attributes.

In the food industry where margins are thin, supply management, including traceability, is an increasingly important area of competition. A firm's traceability system is a key to finding the most efficient ways to produce, assemble, warehouse, and distribute products. Golan *et al.* (2000) concludes that labeling might be an appropriate policy tool in the following circumstances:

1. Consumer's preferences differ.
2. Information is clear and concise.
3. Information on product use enhances efficiency.
4. Costs and benefits of consumption are borne by the consumer.
5. Standards, testing, certification, and enforcement services can be established. No political consensus on regulation exists.

Grades and Standards

A well-performing market requires that the quality of products can be readily assessed through a system of grades and standards. Only then can product prices be readily compared. In the area of food safety and quality, the Mexican program, commonly referred to as *Agrifood Armor* emphasizes the establishment of a quality certification program for agrifood products (Inspección de calidad agropecuaria). This voluntary program is intended to minimize disputes among buyers and sellers and to ensure that the sales price reflects the quality of the product.

NAFTA-Wide Risk Assessment Laboratories

The NAFTA region's security must be seen as a common interest and priority. Domestic security will never be accomplished if regional security is not achieved. Animal, plant health, food safety, control and diagnosis of diseases must be addressed and treated as a regional block. This requires a system of regional NAFTA-wide laboratories to deal with sanitary and phytosanitary issues, including research and training.

Investments in Education and Outreach

Assuring the next generation of science, power, and knowledge for regional agricultural security will be achieved only by investing in education. However, this effort must be carried out through regional educational programs developed by NAFTA members and according to the needs of the trading block.

Integrating the Americas' Trade

Increasing trade in the Americas will improve the well-being of consumers and will give the opportunity to producers to reach other markets. However, this requires that the NAFTA region be more fully integrated in terms of its markets, its economies, and its policies.

In the long run, integration will extend beyond NAFTA. Mexico will play an important and strategic role integrating the northern and the southern hemispheres. In Latin America, Mexico is the country with more experience in international trade and has the closest trade relations with the United States and Canada.

SAGARPA as Catalyst and Partner for Change

In SAGARPA, we are working to make Mexican agriculture more competitive, profitable and sustainable. In this new era, we are trying not only to increase agricultural production, but also to develop the economies of rural areas, while using the country's natural resources properly.

A necessary condition for achieving the above objective is that agricultural policies must be efficient and consistent. That is, they need to be efficient because

resources are limited, and they need to be allocated where they guarantee the highest economic and social impact among the alternatives. Policies also must be consistent with the needs and capabilities of the nation and the NAFTA region.

The effectiveness of our policies will depend on the level of harmonization, convergence, and compatibility with the policies implemented by our trade partner, especially NAFTA members. That is, we believe that policies, programs, and regulations among countries must be designed in a way that no policy or program generates negative externalities on the partners' sectors. In other words, policy makers need to work together to achieve the common good.

If we assure this, the resources allocated through SAGARPA'S policies and programs should not be considered, by any means, a public expenditure but a definite productive investment.

Farm Foundation's Leadership Role

Farm Foundation has played an instrumental role in public policy education and outreach. Through its active support and participation in the North America Agrifood Market Integration Consortium (NAAMIC) and its predecessor, the Policy Disputes Information Consortium (PDIC), Farm Foundation has established the leadership necessary to analyze policy and market integration among the members of the NAFTA block. Also, by its leadership in the project, "The Future of Animal Agriculture in North America", Farm Foundation further developed the momentum for prospective thinking among the industry leaders in the trading block. Farm Foundation has set an example of leadership in outreach, analysis, and education for the policy makers of North America.

Conclusions

We believe that the Mexican agrifood sector is a key component for Mexican economic development and also, an important element of NAFTA's performance as a competitor internationally. However, in order to achieve a more prosperous agricultural sector, it is necessary concentrate production among those commodities for which we have a comparative advantage. We have identified fresh produce and organic products as one of the major successes in Mexican agriculture. Its great biodiversity provides Mexico with the natural resources to be a key player in the agrifood specialty-product market.

The opportunity exists to improve the economic condition for many involved in the Mexican agrifood sector. The idea is to allow producers to obtain a sizeable source of income without having to migrate to other areas of the country or abroad in search of better job opportunities. We believe that in order to achieve a strong economy under NAFTA, agricultural policy must achieve harmonization and convergence among its members.

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Virtual Integration in Future Global Agrifood Supply Chains

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The global agrifood system continues to undergo transformation from a commodity-based system to a relationship-based system of differentiated products. Grocery retailers are gaining market power relative to other supply chain participants. A partial response to this transformation is the development of supply chains established for the purpose of creating value through knowledge management and a focus on vertical information flows. These specialized value-creating vertical marketing clusters result in powerful product and service brands, which implies minimal variation in the quality of ingredients and end products through operations and information management. The recent explosion of innovation involves information technology, such as radio frequency identification (RFID) and frequent shopper cards that tie into demographic information, along with designer genes from the bioengineering of commodities and food products. These innovations have provided private business the opportunity, as never before, to create value for downstream customers by tailoring their output to target market segments.

From a strategic planning viewpoint, it is interesting to develop scenarios that assist in thinking about how agrifood supply chains may morph and develop in the longer-term future. To this end, we develop two scenarios to enhance the thinking of analysts and planners about the nature of future global agrifood supply chains. These scenarios are designed to promote robust thought and discussion.

This chapter is divided into three sections: 1) background, which makes the case that the modern business environment portends the strategic role that knowledge management plays in value creation, 2) development of two boundary/scenarios to illustrate strategic confluence of information quantity and quality, value chain players, and value chain governance; and 3) how supply chains and agrifood firms may change and emerge over time in reaction to the new information-rich global economy.

Background

Three major forces affect food supply chains around the world: an increasing consumer demand for new quality attributes, major technological changes, and globalization. These forces are not just significant but also complex. They are also interdependent and self-enforcing, which in turn creates opportunities for novel food supply chain structures to emerge.

¹ Sporleder is professor and holds the Farm Income Enhancement Chair in the Agricultural, Environmental, and Development Economics Department at The Ohio State University. Goldsmith is associate professor and executive director of the National Soybean Research Laboratory, and the Soybean Industry Endowed Associate Professor in Agricultural Strategy at the University of Illinois. Cordier is a professor and chair of the Department of Economie Rurale at the Agricampus, Rennes, France.

Shift in Consumer Demand

Historically the purpose of food consumption was sustenance through ingesting calories and nutrients. After that need was met, taste became important in preferences. Most recently convenience is a prime determinant of consumer food preferences. For much of this evolution, transaction-driven supply chains were sufficient to move raw agricultural products downstream in the food supply chain. Government standards, which are broad and forgiving, dominated. These government-defined quality attributes facilitated trade and minimized transaction costs through their limited scope. Information was a public good. Exchange was governed through spot and forward markets providing fair supply-demand price elicitation. Commodity futures markets were considered the highest form of reference markets for agricultural commodities by providing large quantities of information, guiding production and flow decisions, and bringing to one central point the price discovery process and the interest of consumers and producers. Information symmetry, the competitive process of eliciting the reference price, and decisions by the actors in the food supply chain all were based upon public rather than private information systems.

Modern consumers now ask for more, as tastes and preferences mature and the opportunities of satisfaction dramatically expand through technology and globalization. Also much of this information has become a private good (Sporleder *et al.*). Companies, networks, and chain captains all are designing *mass customize* solutions, e.g. using scanner data to fulfill consumer demand with an increasing load of dedicated information.

In addition to nutrients, taste and convenience, some consumers now consider personal health, which is both a short-term attribute in the sense of food safety and a longer-term attribute in the form of functional foods and nutraceuticals. Interestingly, as obesity has become an epidemic brought on by lifestyle choices and convenient high-caloric products, personal health attributes have been added to the bundle of expectations consumers place on their foodstuffs.

Technological Changes

The present and future are described as the *Age of Knowledge* because science and technology are integrated for increasing productivity and consumer value, and, in turn, enhance average worldwide living standards (Federal Reserve Bank of Dallas). Knowledge formation is increasing at increasing speeds to address the rapid development, shifts, and expansion of consumer demand.

Transportation and communication technology have allowed efficiency gains since the 1970s, cutting real *ad valorem* freight rates by more than 40 percent. Goods are now moving around the world, not only at low cost but also, with containerized and parcel shipping, from producer to final consumer using customized contracts or private third party-services. More recently, digital communications not only significantly decreased the average costs of exchanging information, but also allow knowledge transfer at near-zero marginal cost and without practical limits to speed. As a consequence, the supply of information in knowledge products is not limited, allowing increases in the quantity demanded without necessarily a rise in price.

Biology is the science of tomorrow and follows the silicon era that so effectively boosted communication technologies. Biology, through genetics, is about information storage, duplication, and transfer under the most sophisticated devices ever imagined. Biology will impact preventive and curative medicine for everyone

at an accelerated pace. For example, genetically engineered crops can provide both environmental and health benefits for consumers.

Nanotechnology allows integration of biology and information technology through nanoscale approaches. For instance, DNA markers alert individuals through adapted information and communication systems to any alteration of the biological information system. Blood pressure and quality are now real-time and continuously monitored via biosensors. Biosensors are also increasingly used in food science to detect pathogens without disrupting food processing or product flow.

Globalization

Globalization is a complex reality, covering hopes and fears, fed by technological changes and inducing major changes in living standards and consumer demands around the world. Globalization involves a feedback system. Technology enables globalization, which, in turn, increases market size, returns to scale, competition, capital flows, and, therefore, political pressure for multilateral trade agreements and market access among countries. Globalization allows for and promotes foreign direct investments by permitting capital to seek its highest return anywhere in the world. The impact is extraordinary in many ways.

Globalization increases competition, making it more difficult for firms to raise prices when costs rise. Greater competition also drives managers to add value to goods or services to keep ahead of competitors. As a consequence, production is constantly transferred to the most efficient and innovative firms in a globalized marketplace. Consumers directly benefit through better, faster, and cheaper products.

The “Wikipedia phenomenon” allows for information, research, and teaching to be spread at near-zero cost around the globe, which, in turn, lowers barriers of information inequality. As of mid-2007 the free encyclopedia, created in 2001, already contained more than 2 billion words in 245 languages. The *Knowledge Age* is booming, bringing a new sense to globalization and opening new relationships among humans along with new means and opportunities for creating value in a sustainable world. A knowledge-rich economy changes the very nature of consumption as a growing number of goods and services are distributed to new buyers without diminishing others’ consumption.

Finally, globalization has meant the development of global standards and international monitoring of adherence to those standards in such areas as environment, animal welfare, food safety, cultural diversity, and workers’ rights. More sophisticated consumers demand that entire value chains adhere to specific standards. For example, the precautionary principle, supported by the European Community, means consumers take into account the meta risk imbedded in the technology and applied science underlying products.

These dynamics serve to shrink the globe and bring a sense of world community unlike ever before. The rapid advance in science provides a platform for developing scenarios that facilitate our thinking about the future of global food supply chains and the simultaneous demands placed on it by consumers.

Two Agrifood Supply Chain Scenarios for the Future

As the global food system replaces transaction-driven supply chains with alliance-driven supply chains, the opportunities for designing inimitable products and processes to meet demand dynamics will intensify. In an effort to better understand

the opportunities and challenges in defining the economic implications on future agrifood supply chains, hypothetical yet plausible future *boundary* scenarios are useful. The scenarios are *boundary* because they are intended to impel our thinking to the periphery of what could shape the future demand for food globally. The scenarios highlight rapid technological and scientific advances, which shape factors that will determine the dynamics of future food demand. One of the two *boundary* scenarios is as follows:

The Genetic Crystal Ball

A Proactive Scenario. World genetic science is racing ahead toward a day when physicians are able to predict diseases that individuals are susceptible to well in advance of the actual malady. Biological scientists and medical professionals can examine some human cells, pull out the DNA, stretch it across a screen, and diagnose more than one thousand genetic defects that could mean trouble, ranging from rare disorders to more common ones such as heart disease and cancer.

Genetic testing is progressing at a pace that challenges even physicians and genetic counselors to keep pace. The technology is driven by scientists eager to claim the prize of predicting diseases before they happen and perhaps preventing them.

This scenario is based on the foundational concept that the demand for certain specialized foods is significantly enhanced over time. The potential for the proliferation of many small specialized niche markets for foods also may be enhanced. Rapid biotechnological advance blurs the lines between food and medicine. The science of biotechnology applied to food products and processes may be a key supply chain driver over the coming decade. Rapid enhancement in the capability of food processors to produce foods that have beneficial health effects results from the era of biotechnology.

This scenario is based on the foundational concept that the demand for specifically engineered food products with embedded designer health benefits for target populations becomes the norm within global supply chains. Foods increasingly become delivery systems for medical intellectual property. The potential for the enhanced demand for nutraceuticals and functional foods would result.

A Hypothetical Case of the Proactive Scenario. The example for this scenario is based on an additional two key assumptions: 1) information is abundant and cheap, but not necessarily complete (there are unavoidable risks to the decision-maker) and 2) there exists a simple value chain of life science (nutraceuticals, pharma, and biotechnology), food manufacturing (taste), retail (logistics).

Joe Simmons and Jacques Fougere, lifelong friends had dropped into a pastry shop in Jacques home town of Rennes, France, for a coffee and something to eat. Joe was over on business for a week, just passing through town. This gave him the opportunity to visit his friend but more importantly share western France's most delicious pastry the Kouign Amann (pronounced Koon-ya-man) with Jacque. It was no simple purchase though. You see this baked pastry is 58 percent butter and 21 percent sugar. And in western France that is salted butter. Though it may be one of the most delicious foods in the world, the health implications complicated Joe and Jacque's decision to purchase. So they stared some more at the Kouign Amann because Jacques just completed his annual visit to Global Life Science Inc.

Global Life Science, having just acquired data management giant Data Systems Integration, Inc., was now offering faster and enhanced graphics for Jacques's

personal digital assistant (PDA). He now had access to his 52nd annual baseline genetic scan. Always conducted the week after his birthday, the updates included any mutations or genetic changes. The PDA had updated forecast estimates for all illnesses and diseases. Real-time analysis of all food consumption was integrated with the powerful genetic database. The PDA's food analysis capabilities were compatible with the universal standards for nanotechnology. Jacques had purchased the Restaurant Add-In as well so when away from home he could easily assess the health implications of his purchases. Finally on a more personal note, and unbeknownst to Joe, Jacques was the proud owner of the Matsushita Nirvana 9000, a wet chemistry analytical toilet that provided Global, in real time, with additional valuable health status information on Jacques. He had not though purchased this year's newest enhancement, the restaurant add-in.

Jacques scans the Kouign Amann's edible nanochip and the PDA begins to blink. He pauses because there is a risk component bundled with the Kouign Amann. The device indicates a negative disease impact greater than the 0.01 percent threshold he had set in his default personal settings. Global's analysis has determined that his risk for diabetes and heart disease will be significantly increased at the margin if he eats the Kouign Amann. The increased likelihood of disease will affect two key variables – life expectancy and beauty index.

Jacques already knew that his genetic risk associated with the diseases was high. His past consumption behavior had been poor, so his historical health trends were above preferred levels. The PDA pointed out that the Kouign Amann, if consumed, would specifically impact his weight, body fat, and artery closure. The high definition graphical display of his complete lifetime history showed that upon consumption his weight would raise from 72.7249 to 72.8461 kilograms, his body fat index would rise from 24.2347 to 24.2401 and three of the four major heart arteries would become more clogged. Unfortunately only the right coronary artery remained clear.

The final output from Jacques' powerful handheld device provided three remediation options: 1) step away from the Kouign Amann; 2) run 3.6 miles at a 9:04 pace; or 3) shift over to the nutraceutical line of Global Baked Nutraceutical, Inc. that aren't as tasty but contain a delicate blend of kidney function boosters, artery cleansing agents, and blood-pressure lowering beta-blockers.

Medication Reactive

A Reactive Scenario. Biotechnological advances applied to human medicine have increased exponentially in the past decade. No end is in sight for rapid change and an increasing store of intellectual property relative to cloning of human body parts, genetic manipulations of all kinds, and chemical drug advances that portend the day when nearly any human nutrition or medical condition can be productively addressed through biotechnology or chemistry. In essence, a portion of this scenario is that the consumer is liberated from strict guidelines and behavior. The results from the consumer expectation that fixing whatever needs to be medically repaired becomes an ordinary consumer expectation.

This scenario is based on the foundational concept that the demand for specialized high-margin foods would diminish over time. Food becomes more for *pleasure* (i.e. recreation and entertainment) than for sustenance or nutrition. The so-called *slow* food movement and minimal consumer consideration to the longer-term health consequences of foods consumed today becomes commonplace.

The potential for the lessened demand for nutrition and/or health characteristics of food products may result from this scenario. Long-term strategy of supply chain participants would be quite different as a consequence of this scenario. The agrifood supply chain consequences of this scenario are less certain compared to the previous scenario.

A Hypothetical Case for the Reactive Scenario. In this alternative scenario Joe has just completed his annual visit to Global Financial Services, Inc. Global Financial, having just acquired data management giant Financial Data Systems Integration, Inc., was now offering faster and enhanced graphics for Joe's PDA. He has uploaded his full 52nd annual portfolio analysis of all of his assets. His inter-celestial Moon REIT is up again but frustratingly his Pluto mining shares remain flat. Joe's personal medical asset status is current based on Global's real-time food analysis software package, which is compatible with the universal standards for nanotechnology. He was able to buy the restaurant add-in.

Joe now quickly scans his Kouign Amann's edible nanochip, purchases, and eats the Kouign Amann before even opening his PDA. He knows that all ailments can be cured and embodies to the fullest the French phrase, *joie de vivre* (joy of life).

Data about the Kouign Amann is fed in and his PDA begins to blink. Joe's medical asset portfolio is affected above the 0.01% threshold he established in his personal settings due to the consumption of the Kouign Amann. Global recommends that Joe should purchase a heart call option.

Joe's PDA makes one additional recommendation as a result of consuming the Kouign Amann, the purchase of a real heart call option. This would give Joe the right but not the obligation to purchase a replacement heart if he needed one in the future.

The PDA shows that the likelihood of needing a second heart is now 41.5498% in year 2020. There are currently four suppliers of hearts and associated calls that range in price and features. Global Financial utilizes *Consumer Reports*[®] quality reviews to help customers make more informed heart purchases. The British heart with its large volume and six chambers is preferred for those who value athletics and exercise later in life. The Jean Valjean heart scored very high for benevolence, and was followed closely by the American heart. The remarkable synthetic materials found in the artificial British heart also made it the leading choice for those planning a long life. Global Financial recommended the French heart to Joe based around four decision factors, the current exchange rates, relative current prices, Joe's historical activity levels, and his plans to be philanthropically active during the years 2020-2035.

Implications for Agrifood Firms and Consumers

For illustrative purposes both scenarios provide an exaggerated example of what the future relationship may be between medicine and food. The scenarios each make the point that the future agrifood system likely is to be based on an information-rich consumer who makes individual decisions concerning diet and health with more complex alternatives available than currently exist. The dynamics of these systems have vital implications for current firms in the global agrifood supply chain, firms that are currently in pharma supply chains, and for consumers globally. Either scenario likely will result in food firms catering to niche markets that are lower volume and more specialized in ingredients and flavor when compared to the mass marketed foods of today. We will discuss just some of the many potential implications of these

scenarios. Other analysts and decision-makers may well generate a different list of implications than we focus on in this chapter.

The implications for agrifood supply chains and firms operating within them are numerous. Perhaps one of the most important implications is that the future will be more complex than the present. The implication of enhanced complexity encompasses nearly all choices that firms must make over time: strategic choices, external choices, organizational choices, and operational choices. The factors that comprise each of these choices offer some glance at the future decision-makers must face.

The number of products offered in the market, the geographic scope of the firm (i.e. number of countries), and the source and sustainability of differentiation (i.e. brands, products, characteristics, etc) are leading elements of strategic choices. Firms successful at growth in the new dynamics of the global food system will be adroit at making the correct decisions regarding these elements, at knowing when to advance new products and services (a timing issue), and at exploiting new technology to enhance value to ultimate consumers. One small specific example of exploiting technology would be a food manufacturer taking advantage of the development of low-linolenic soybeans to produce healthier foods with lowered or no transfat.

External choices for the firm include regulatory, the nature and intensity of competition within a particular manufacturing industry, and the speed of innovation within the industry. These elements form the base for the decisions regarding external choices, and all will become more complex under either of the scenarios.

The organizational choices are important for all firms in the long term. The elements of organizational choice include the internal structure of the firm, the role of R&D and innovation within the firm, and other elements less well-understood by managers such as corporate culture. The role of food manufacturing R&D is less clear in either scenario than it is under the current supply chain.

Finally, operational choices are critical to long-term success and positioning of the firm. Perhaps one of the most important parts of operational choice is which supply chains the firm should align with and who will source the inputs for the firm. Issues such as strategic alliance versus joint venture may be very important at determining the success or failure of a firm within the context of the agrifood supply chain scenarios elucidated above. With the lines between food and medicine blurring, the choice also includes decisions about food firms aligning with nontraditional partners such as pharmaceutical companies.

The implications for consumers may depend more directly on which of the alternative scenarios above actually develops. In the reactive scenario, there is less reason for consumers to exercise restraint or pay strict attention to diet or even general long-term health consequences of lifestyle. This scenario portends faith in the medical community to *fix* whatever might go wrong.

In the proactive scenario however, consumer demand may be very sophisticated and definitive. The information-rich consumer understands much more keenly the health consequences of lifestyle, diet, and even the consumption of individual foods. An implication is that the consumer in this scenario will be more demanding and less forgiving of food manufacturers incapable of delivering healthy ingredients, foods, and diets. The functional food role will be critical in this scenario because essentially all consumers will demand them. Pharmaceutical and food manufacturing firm alliances likely will abound under this scenario. Less traditional players will occupy significant roles within agrifood supply chains.

The scenarios help analysts and others interested in the future of global agrifood supply chains to focus on the future and some consequences of currently evolving market dynamics. Although the scenarios may not predict the future, they assist in formulating consequences and implications of current long-term trends such as biotechnology and information technology. The intent is to stimulate our thinking about what type of food system we may have in the future and articulately discuss the desirability and costs of alternative systems. At the same time, strategic planning of agrifood firms may be enhanced by considering the implications of these scenarios to their current and future operations.

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Policy for GM Food: Why is It So Hard to Agree?

More than a decade has passed since commercialization of crops derived from modern biotechnology, often referred to as being genetically modified (GM) or genetically engineered (GE). Commercial planting and shipments date from the early- to mid-1990s when herbicide tolerant soybeans, followed by corn, were first marketed in the United States. Since that time, the area planted to GM crops has grown rapidly, exceeding 250 million acres 2006. More than half of this is located in the United States (primarily in soybean, corn, and cotton varieties) but appreciable areas are also grown in Argentina (mainly in soybean), Brazil (also soybean), Canada (mainly canola), India (primarily cotton), and China (also mainly cotton) (Brookes and Barfoot, 2006). These six countries, listed in declining order, are currently by far the largest growers of GM/GE crops, although the technology has spread wider, with at least some plantings estimated to be grown in 22 different nations in 2006 (James, 2006).

The picture of rapid growth in production of commercial GM crops suggests widespread public acceptance of biotechnology-derived foods. This is far from being the case. It is often noted that Europeans tend to be much more critical and cautious of agricultural biotechnology than North Americans (implying widespread approval of this technology in North America). This is an inference that also merits qualification, since many American respondents to national opinion surveys are not actually aware of GM food (Hallman *et al.*, 2004). As well, there are appreciable segments of the North American population that indicate aversion to identified GM-derived food, as shown by stated preference studies that indicate a need for discounts for consumers to purchase such food (e.g., Onyango and Govindasamy, 2005) and by identification of a sizeable group who strongly expresses unwillingness to make any such purchases, even when GM-processes result in product improvements (Hu *et al.*, 2004).

While attitudes to GM-derived food vary globally, it is also often inferred there are large populations where there is widespread public approval of biotechnology-derived food, such as in China. These inferences also require qualification. They mostly appear to be based on favorable general public attitudes to new technologies rather than on assessments for specific foods, and recent reports suggest increasing consumer wariness (e.g., Reuters, 2007). It seems that in virtually all nations and communities, as people become more aware of GM-derived food, mixed views

¹ The author is a professor emerita, Department of Rural Economy, University of Alberta, Edmonton, Alberta, Canada.

about agricultural biotechnology tend to emerge. One major purpose of this paper is to consider why this is the case. A second focus of the paper relates to the continuing differences in international policy relating to GM-derived foods, which are seen in the international disparities in GM labeling policy.

The Basis of Opposition to GM Food

Modern agriculture has been characterized by increases in productivity associated with new inputs and new methods of farming; farmers in high income nations have a history of rapid adoption of new technology. Economists (and many others familiar with agriculture) have viewed favorably the increases in yields and new cropping options developed from applications of science to farming, as a major means to improve the economic circumstances of both farmers and society. Public awareness and debate about the advances in genetic sciences and associated molecular biological methods surfaced in the 1980s (Pinstrup-Andersen and Schiøler, 2000). While public acceptance of medical applications of biotechnology became widespread, both in Europe and elsewhere (e.g., Gaskell *et al.*, 2002), agricultural biotechnology has been the basis of more dissension, and there is much less public acceptance of GM-derived food.

From one perspective, the new applications of modern agricultural biotechnology may be viewed merely as extensions in the evolution of crop breeding techniques. Early GM applications involved modifying input traits of crop plants, making these resistant to herbicides, insects, or viruses, rather than changing the discernable nutritive qualities or related output traits of these plants, leading them to be viewed as substantially equivalent to the conventional product. Industry representatives opposed calls, by consumer groups and nongovernment organizations, for labeling to identify crops that had been derived from GM technology. This, in turn, was seen by Europeans as both arrogant and dangerous to local food and environmental safety, as large multinational firms began to ship GM crops to Europe in the latter 1990s. Although there had been relatively less media attention in North America when GM food was commercialized, shipments of modified soybeans to Denmark and other European ports were met by extensive publicity and opposition by nongovernmental organizations. The outcry mobilized much opposition to GM food (Pinstrup-Andersen and Schiøler, 2000; Lassen *et al.*, 2002). As Torgerson (2005, p. 51) notes: "the public did not want genetically modified crops on the market, for a variety of reasons." The pending import of U.S. transgenic crops in 1997 acted as a trigger event around which very adverse public reactions crystallized in much of Europe.

Most concerns about agricultural biotechnology relate to its associated potential risks. These include possible food safety risks, environmental concerns, and social/ethical issues. Food safety issues concerns have included worry about allergic reactions that might be introduced to GM food (screening for allergens is a basic

feature of regulatory approval), as well as adverse possible effects of antibiotic resistance that might stem from the early use of antibiotic markers to distinguish the DNA transfer event (a practice that is no longer recommended). There have been numbers of comprehensive assessments of GM food safety by authoritative agencies. None of these has concluded that there are human health problems from GM food. For example, assessment by the International Council for Science (an organization of 111 national academies of science and 29 scientific unions) concluded: "Currently available genetically modified foods are safe to eat" (ICSU, 2003). Similarly, the World Health Organization states that currently approved GM foods "... are not likely to present risks for human health. In addition, no effects on human health have been shown as a result of the consumption of such foods by the general population in the countries where they have been approved" (WHO).² Like the assessment of food safety issues, it is recognized that environmental safety associated with GM events should be considered on a case by case basis, reflecting the need for bio-safety planning. Plant scientists and ecologists note that most crop plants (whether modified or not) are not that well adapted to life in the wild, but that domesticated plants and genes (again, whether modified or not) can move into other plant populations, and that such plant and gene transfers can be monitored and managed (Ellstrand, 2003). Even so, the International Council for Science has concluded: "... there is no evidence of any deleterious environmental effects having occurred from the trait/species combinations currently available" (ICSU, 2003).

A third general category of concerns about agricultural biotechnology involves social/ethical issues. These types of reasons for opposition to GM foods tend to be associated with qualitative dimensions, rather than the quantitative measures of risk. The latter relate scientifically measured relationships between events (e.g. doses) and probabilities of associated outcomes (i.e. responses). Social psychologists have noted that public perceptions of risks typically vary from their quantitative measures, reflecting the "social constructed" nature of such risks (Jasanoff, 1993). People's perceptions of the risks of particular innovations or activities tend to be associated with "dread," "familiarity," and the "number of people exposed" to the risk (Fischhoff *et al.*, 1978).

Similarly, voluntarily-adopted risks are better tolerated than those that are imposed, and risk perception is not independent of the potential benefit (utility) of an innovation. Thus a medical innovation that presents some risk but has a major potential benefit is perceived as less risky than an innovation with similar levels of quantitative risk but where little personal or social benefit is seen. To this point, prevalent GM-based traits are useful to farmers and industry, but they provide little direct benefit to consumers. Specifically, in 2006, herbicide tolerance (in GM soybean, maize, canola, cotton, and alfalfa) continued to be the most dominant GM trait, estimated to account for 68 percent of the planted area of GM crops, followed by Bt insect resistance (19 percent) and input traits that have been "stacked" cover

² It is also noted that conventional foods have not been subject to the same degree of food safety assessment as GM-derived foods (WHO).

more than one such feature (13 percent) (James, 2006). It is argued that consumers are unlikely to see utility from agricultural biotechnology until more definite and direct benefits to consumers and society are observed.

In addition, many people tend to favor technologies for food that can be regarded as natural or close to nature, but this is not the impression held for GM-derived foods (Bredahl, 2001). Judgment that a risky activity is inequitable in its distribution of benefits and costs also affects risk perceptions. The perception that the benefits of GM food currently accrue to large multinational firms, and associated concerns relating to the control held by these firms through patent ownership and related control of life forms, is another negative influence. Further, risk perceptions reflect whether there is trust in risk regulators and managers (Frewer *et al.*, 1995). Trust in the government agencies that regulate such risks is believed to be much higher in the United States than in Europe (Hebden *et al.*, 2005). In this context, poor performance of risk regulators relative to the European BSE crisis is believed by many to have eroded trust in food risk regulators and managers.

There is more extensive media focus on agricultural biotechnology in Europe (and in some other nations) than in North America (Hebden *et al.*, 2005). When accidents occur (e.g., with instances of contamination of shipments by unapproved varieties) media reports have a negative focus, reinforcing skepticism of the North American regulatory system. These various influences have undoubtedly contributed to the very negative perceptions of GM food held by many Europeans. It is believed that changes in these attitudes will require accurate information, demonstration of direct individual or social benefits, and public involvement in the development of a transparent policy for GM food.

Opposition to GM Foods

GM/GE food has come to be viewed as a lightning rod by major environmental and anti-globalization groups. These NGOs have built effective coalitions to attract media and public attention based on opposition to GM food, aided by the potent metaphor of the “Frankenfood” label. Public opposition led to the de facto EU moratorium on GM varieties, which applied from 1999 until the EU adoption of traceability and related policies directed at bolstering food safety. Treating the presence of GM-derived food as an evil to be driven back, anti-GM NGOs have been effective in lobbying food processors and retail chains (through demonstrations and write in campaigns) against using or selling GM foods since 1999. As noted in some North American agricultural economists’ assessments of labeling policies, (Carter and Gruère, 2003) in Europe, where mandatory labeling of GM content prevails, these actions have effectively reduced product choices available to consumers, despite the general expectation that mandatory labeling of GM-derived food content can, all else equal, be argued to add to consumers’ product choices.

Labeling Policy for GM Food

Consumer and public wariness of genetically modified (GM) foods has led many nations to develop labeling policies for foods derived from modern agricultural biotechnology. In most cases mandatory labeling has been specified. In contrast, voluntary labeling is the chosen policy approach for the United States and Canada. Detailed regulations to enable a voluntary labeling policy to become effective in Canada were time-consuming to develop. An even longer period of time applied in the unsuccessful efforts to develop consensus standards for GM food labeling at the international level, through the Codex Alimentarius.

The United States is opposed to mandatory labeling, arguing that food safety does not require the labeling of all foods from biotechnology. The U.S. adoption of voluntary labeling dates from 1992 (Belson, 2000), and in 2001 the Food and Drug Administration posted a draft guidance document for processors and retailers specifying voluntary GM labeling (US, FDA, 2001).³ This largely reflects political influences on public choice for the world's largest producer and exporter of GM food and is consistent with industry opposition to GM labeling, based on the understanding that identification of GM-derivation is likely to lead many consumers to seek substitutes when these are available (see, for example, the discussion by Hallman and Aquino, 2005). Voluntary labeling became a position supported by many American agricultural economists, on grounds that not only would the costs of labeling be less than with mandatory labeling, but this would also be equitable, since the costs of labeling, including segregation and label verification of potential "negatively stated" voluntary claims (i.e. claims of no GM content), would be borne by those consumers who were prepared to pay to avoid the new technology, rather than being borne by all consumers, as with mandatory labeling (e.g., Runge and Jackson, 1999).

Reflecting similar influences, plus pressures of being a small trading country integrated with the larger U.S. market, Canada followed the United States in adopting a voluntary labeling policy (except in cases of appreciable changes in food composition, nutritional value, or intended use, when labeling is required in both nations). In contrast, many other countries decided to adopt mandatory labeling policies for foods derived from modern agricultural biotechnology. This had been announced for some 26 nations, plus the European Union, by August 2001 (Phillips and McNeil, 2002).

It is a Canadian view that for labeling policy to be effective, truthful, verifiable, and not misleading; a labeling standard is required, which includes specifications for product and claim characteristics and verification. The complexity of standard definition is itself a potential source of confusion to consumers (Einsiedel, 2000), and the interests of different stakeholders lead to conflicts in defining a standard

³The FDA GM labeling draft guidance document takes a prescriptive approach; specific recommendations for and against GM claim wordings are described. No provision is made for negative claims. The experience of US claims for the absence of rBST content in milk suggests that negative GM claims would likely require a disclaimer statement.

(Veeman, 2003). The search for a consensus national voluntary labeling standard took more than four years of discussions through the Canadian General Standards Board before the Canadian GM labeling standard was adopted. This has not become widely applied.

The search for a consensus international standard for the labeling of food derived from modern agricultural biotechnology through Codex Alimentarius has taken much longer – some fourteen years at the time of writing – and seems unlikely to be resolved. Codex has been a mechanism to develop international consensus standards on food safety testing procedures for GM foods (see e.g., Codex, 2007) but the complex political economy underlying international differences in GM labeling policies has led harmonization of GM labeling to be an intractable problem.

Why is the development of an international labeling standard such a difficult task? Even apart from the major issue of whether labeling of GM content should be voluntary or mandatory, the devil is indeed in the detail. This is illustrated by the Canadian labeling debate which eventually reached agreement on both “does not contain” and “does contain” GM content claim statements. This process was contentious, reflecting conflicts amongst varied stakeholders’ interests: first in specifying the claim wording in using GM or GE terminology – consumer focus group discussions show that the latter is generally regarded as a more negative description.⁴ A second difficult issue concerns content thresholds for adventitious presence of GM content in a non-GM product: the more stringent is the threshold standard for accidental contamination, the higher are costs of segregation and identity preservation. These costs can increase appreciably as lower threshold levels are specified (Huygen *et al.*, 2004). A third issue involves the common specification of exclusions from required labeling (e.g., GM-derived enzymes, food processing aids, and additives for baking and brewing; these have commonly been exempted).

A fourth issue concerns the nature of the label statement. This requires agreement on a crucial distinction in wording for a mandatory GM label: whether this should be based on GM content (described by “contains GM product”), versus definitions that are entirely process-based (“derived by GM processes”). Why is this so important? In a situation where GM content is the basis of labeling, refined vegetable oil products like soybean, cottonseed, or canola oil, and similar foods like refined corn oil, do not have to be labeled since these do not include any detectible GM content (the modified material is contained in the plant protein, which is removed from these products in processing). However, where wording “is derived from GM/GE processes” applies, these products would require labeling. Without any scientific basis to detect GM content in these highly refined products, these types of products have commonly been excluded through the GM food definition, and thus have been exempted from labeling requirements.

In general it is possible to classify different mandatory labeling programs by the severity – or antagonism to GM content – implied in the standard based on GM

⁴ The wording defined in the Canadian standard specifies GE wording, which follows the wording specified in the guidance document for GM labeling in the United States (US, FDA, 2001).

definition. In many mandatory labeling plans, the requirement is for labeling to indicate when the product includes GM material (rather than being derived from GM material). This is not, however, the case in the European Union, when the process of GM derivation is the required basis for labeling. In this feature and in its threshold specification of 0.9 percent adventitious GM content, the EU GM labeling provisions are appreciably more stringent than in most other regions.

Where to From Here?

Major themes in the discourse relating to public policies for screening, approval, and commercialization of GM foods have included three main sets of concerns about GM food: possible food safety issues, potential environmental impacts, and ethical/social issues. The latter focuses on such concerns as the nature and distribution of potential benefits and costs of GM foods, the role and influence of transnational firms in defining national food policy and patenting genetic material, the extent to which science should be applied to modify nature relative to food, and the rights of individuals to be able to make informed choices about food. Ethical/social issues are increasingly recognized to be important to many people and to underlie much of the debate on GM food policy. However as new pharma products and industrial products (bio-fuels, bio-enzymes) become a more major focus of crop biotechnology, the debate about food safety and environmental impacts of agricultural biotechnology is likely to continue. Paradoxically, if such new products demonstrate utility to consumers and society, and with food biotechnology product improvements targeted on health and dietary improvements, negative public views of lack of utility agricultural biotechnology may moderate. The concurrent emerging agricultural biotechnology research focus on use of molecular markers in crop breeding tries to avoid transgenic products while benefiting from new biotechnology developments; this may also moderate consumer concerns.

As noted earlier, improving adverse attitudes about agricultural biotechnology requires accurate information, demonstration of direct individual or social benefits, and public involvement in the development of a transparent policy for GM food. Even so, individuals with very negative GM perceptions may not change their views, and simply providing accurate information may not mean that all hear or process this. For example, some social science research that attempts to assess whether risk perceptions mainly result from trust or whether attitudes influence views of trustworthiness suggests that those with adverse perceptions are less likely to trust any information source (Frewer *et al.*, 2005). As well, it seems that those who are opposed to GM food may be more likely to access information on this topic than those whose opinions are relatively unformed (Gao *et al.*, 2005). More research on how peoples' risk perceptions are formed and modified would add insight to this issue.

Internationally, disparities in views and interests on GM labeling are not consistent with a cooperative solution to the ongoing GM labeling stalemate in Codex. Differences in beliefs and cultural values, between Europe and North America, that underlie very different attitudes to mandatory and voluntary GM labeling lie at the heart of this impasse. It will be a continuing global challenge, to be mediated through the World Trade Organization, to avoid these differences being used as technical barriers to trade.

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The Road to Whole Farm Programming in Canada

Agricultural support programs have come under increasing scrutiny over the past two decades as successive attempts in trade negotiations have been made to curtail levels of support and to better identify (and subsequently reduce) those programs yielding the greatest distorting effects on trade. Support programs in Canada have gone through very substantial change over the past 50 years in response to these broad ranging economic, international, and social objectives and pressures. In attempting to understand the significant turning points and pressures for change, this paper examines the origins of policies for agriculture from the late 1800s to the present time. The paper is written with the understanding that policies in place at any point in time are highly path dependent; that is, policies in place at any point in time condition both the nature of change in the future as well as the pace and direction of change.

The paper is limited to an examination of the support and stabilization policies for Canadian agriculture. One closely related issue is the emergence of marketing arrangements within Canada, some of which involve support for prices or incomes for farmers. As well, the historic role of cooperatives, initially in the western Canada grains industry and subsequently in the Canadian dairy industry, has overtones of price stability and support in some cases. However, while these topics are noted throughout the paper where they specifically involve stability or support or relate to the determination of federal and provincial powers, their history is not detailed in this paper.

The paper begins with an outline of the origins of agricultural and immigration policy in Canada, two highly interdependent mandates in the early years following Confederation in 1867. Subsequently, the initial policy directions and the great national debates which deeply involved agricultural policy are examined. The paper details each of the major policy shifts in the several attempts to establish the safety net policy for Canadian agriculture, concluding with an outline of the Agricultural Policy Framework in place today, and the issues ahead in support and stabilization policies.

¹ The author is executive director of the Canadian Faculties of Agriculture and Veterinary Medicine in Canada. He was Assistant Deputy Minister, Programs Branch in Agriculture and Agri-food Canada, 1972-2004. He served as president of the International Association of Agricultural Economists and was the founding editor of *Agricultural Economics*.

From Colony to Independent Dominion: 1867 to 1945

Agricultural and Immigration Policy

From the time of Confederation in 1867, agriculture was paired with immigration in policy as well as the Constitution. Section 95 of the Constitution² was prepared on the understanding that the principle issue in agricultural policy was achieving a high rate of quality immigrants to take up the vast areas of unpopulated and underpopulated farm lands in the new Dominion, particularly in western Canada. It also established the concurrent relationship or joint responsibility among federal and provincial governments for the administration of agriculture. In policy, identifying and attracting quality immigrants dominated national policy for agriculture for at least the first 40 years and was a significant feature of policy until the 1930s. Immigration policy was in response to the need to populate Canada as well as a response to the demands in the UK and northwestern Europe for out migration of those unable to be absorbed into the economies of Europe as the industrial revolution effects were felt or recession and depression years occurred.³ Indeed, Fowke recalls that the inclusion of what is now western Canada in the Dominion as a region for immigration was a significant driver in the creation of Canada, since the lands in eastern Canada suitable for agriculture were largely occupied.⁴

Political Economy of Early Agricultural Policy

In support of the immigration policy for agriculture, the *Experimental Farm Stations Act*, 1887, was designed to strengthen research on new crops and technologies adapted to Canada's resource base. It was recognized as a necessary component of immigration policy for the livelihoods of settlers after arrival. There was the strong feeling among policy makers in Canada that the USA and other emerging nations (Australia and New Zealand, Argentina) were winning more and higher quality immigrants because of the limited agricultural technologies and crops adapted to the Canadian soils and climates, particularly in western Canada (Smith, 1920; Sifton, 1906).

In the period before the First World War, there was little taste for direct intervention in agriculture or commerce of any kind by government. John Stuart Mill captured the sentiment of governments accurately with the comment:

² Section 95 of the Constitution Act 1867 reads: "In each Province the Legislature may make Laws in relation to Agriculture in the Province, and to Immigration into the Province; and it is hereby declared that the Parliament of Canada may from Time to Time make Laws in relation to Agriculture in all or any of the Provinces, and to Immigration into all or any of the Provinces; and any Law of the Legislature of a Province relative to Agriculture or to Immigration shall have effect in and for the Province as long and as far only as it is not repugnant to any Act of the Parliament of Canada."

³ See Sifton, 1906; Smith, 1920; Cowan, 1928; Report of the Saskatchewan Royal Commission on Immigration and Settlement, 1930.

⁴ See Vernon C. Fowke, 1946. *Canadian Agricultural Policy: The Historical Pattern*. University of Toronto Press, Toronto, Canada. (Reprinted 1978, University of Toronto Press.).

... government ought to confine themselves to affording protection against force and fraud: that these two things apart, people should be free agents, able to take care of themselves and that so long as a person practices no violence or deception to the injury of others in person or property, legislatures and governments are in no way called upon to concern themselves about him. (Mill, 1892).

This philosophy of assuring fairness among economic participants appears to be rationale for the establishment of the Crows Nest Pass Agreement, 1897, for fixing the maximum charge for grain transportation west of Thunder Bay, and the *General Inspection Act*, 1906, the *Manitoba Grain Act*, 1900, and the *Canada Grain Act*, 1912, for setting grain quality standards and assuring fairness in grain trading. The grain transportation legislation effectively prevented railways from charging excessively for grain movements where a farmer had no effective recourse to other means of movement. Similarly, the grain grading and standards were put in place to assure that grain companies dealt fairly with grain growers on price, quality, and quantity. As well, the initial legislation on food inspection and meat hygiene occurred during this period, based on the protection of consumers against fraud, food contamination, and food borne pathogens. Before 1914, there was no form of direct support to farmers; support for immigration and assuring fairness in commerce formed the foundations for agricultural policy.

Another element in policy, which emerged during the first few decades of Canada, was the regional difference in setting policy directions and instruments. MacDonald's National Policy was one of protecting the development of an industrial base in eastern Canada while leaving western Canada in essentially an open trade situation as a source of raw material. This was largely a transfer of the original colonial policy of Great Britain (Great Britain as the source of industrial products, with colonies providing supplies and raw materials) to the new Canadian setting.⁵ That is, eastern Canada was to become the industrial base for the new Dominion while the west was to be the source of raw materials and supplies. The Crows Nest Pass Rates Agreement and the initial Board of Grain Commissioners were used for solving western Canadian problems and were not applied to eastern Canada. This separation in policy instruments and directions would persist for a century, covering not only the initial fairness and immigration issues, but subsequently in agricultural institutions and support mechanisms.

The Inter-War Period

The First World War strengthened agricultural prices as supplies were needed as part of the overall war effort. However, as soon as the war was over, there was a major collapse in grain prices. By this period, western Canada remained as a

⁵ See Vernon C. Fowke, 1946. *Canadian Agricultural Policy: The Historical Pattern*. University of Toronto Press, Toronto, Canada. (Reprinted 1978, University of Toronto Press.). This text has extensive detail on the rationale for the creation of Canada and the settlement and migratory policy considerations in adding western Canada to the new Dominion of Canada.

grain-dominated agriculture with substantial exportable surplus, mostly wheat. In eastern Canada, the rise of the dairy, poultry, and hog industries by 1880 reduced or eliminated the exportable surpluses of grain and generated an export industry based on meat and dairy products.⁶ As a consequence, the low grain prices after the war hit the west substantially harder than eastern Canada. By the 1920s, many groups in western Canada were strongly questioning the federal government's persistence in encouraging migration of farm and other agricultural labor (See the United Farmers of Canada position paper in: *Report of the Saskatchewan Royal Commission on Immigration and Settlement*, 1930, p. 200).

The Canadian government remained reluctant to directly support agricultural incomes or prices. The one action taken was the creation of the Canadian Wheat Board, 1919, to offer a means to support the price of wheat and have government as buyer and subsequent seller. Even with considerable pressure to continue the operations of the Board, the Board was in place for only one year. The federal government offered legislation to continue the operation of the Canadian Wheat Board, but placed the onus on the western provinces for any losses and required provincial legislation to activate the federal powers. No province succeeded in initiating these powers after 1919.⁷

In 1926, the federal government renewed and extended its commitment to the Crows Nest Pass rates. In 1927, the federal government passed the *Canadian Farm Loan Act*, creating a federal agency to lend on a first mortgage to farmers, up to a maximum of 50 percent of the appraised value of the property and on 20 percent of insured farm improvements, to a maximum of \$10,000. The province had to agree to the federal agency lending in the province before loans could be given. These were the only substantial actions taken in agricultural policy by governments until 1929. With the collapse of the cooperative grain pools in western Canada, the federal government reluctantly took over these pools temporarily providing some modest support in doing so. This action followed the work of three successive Royal Commissions regarding grains in western Canada, looking for means of solving the chronic problems of low incomes and prices.⁸

The Three Debates

There were three critical issues facing Canada during the 1920s and 1930s. All three issues were closely linked and all three had a significant influence on the development of policy for agriculture in Canada. These issues were:

⁶ Grain exports from eastern Canada to England began as early as 1820, and largely ceased by 1875-80.

⁷ See the Canadian Wheat Board Act, 28 June 1922. The act provided for power over all of Canada for the Board to buy, sell, store, transport and market grain, export quantities in excess of domestic requirements, and make advances to producers. However, Canada was not responsible for any deficits on the pool accounts, and the Act would not come into force until two or more provinces enacted legislation considered as adequate by Canada to provide the Board with the same powers as the 1919 Board. Finally, the powers under the Act terminated 15 August 1923.

⁸ See, the Turgeon Commissions, and D.A. MacGibbon, 1952. *The Canadian Grain Trade, 1931-1951*. University of Toronto Press, Toronto, Canada.

- the role of government in society and the economy: John Stewart Mill's view of the role of government as opposed to the emerging Keynesian view;
- the division of powers between the federal and provincial governments: the powers to govern within Sections 91 and 92 of the *Constitution Act*; and
- the growing imbalance in provincial fiscal capacity and the associated provincial powers under the *Constitution Act*.

The Keynesian debates on macroeconomic policy fostered in the first three decades of the 20th century did little to change federal policy approaches to managing the economy before 1930, in agriculture as well as in other sectors. In addition to this economic and philosophical debate about the role of government, Canada was still sorting out the nature and intent of the Founding Fathers regarding the division of powers between federal and provincial governments. Finally, the fiscal arrangements within the *Constitution Act of 1867* were coming under massive pressure. All three of these issues were linked, and agricultural policy directions were clearly caught up in all three.

The debate on the Keynesian approach to the role of government began long before the book by John Maynard Keynes, *The General Theory of Employment, Interest, and Money*, was published in 1935. Several earlier articles and books set out not only the difficulties of a minimalist role for government but also presented the foundations of his *General Theory*. These debates were not exclusive to economists but were widely debated in society and governments seeking to deal with the growing issues of unemployment, international trade, currency exchange, and economic management in the economy. Throughout the 1920s and early 1930s, Canada was struggling to find ways of encouraging the development of the nation and the economy within the confines of the federal and provincial powers in the *Constitution Act* and political views of the appropriate role of government. The USA experienced the same debate in agricultural policy with an act quite similar to the *Agricultural Adjustment Act of 1933* rejected in Congress during the late 1920s. The USA government shifted sharply toward a much larger role for government in managing the economy with the election of F.D. Roosevelt in 1932. The New Deal legislation included a substantially larger role for government in agriculture, beginning with the *Agricultural Adjustment Act, 1933*.

On the division of federal and provincial powers, Sections 91 and 92 of the *Constitution Act* set out the powers of each order of government. Within these powers, the federal government was provided with both specific and residual powers while the provinces were provided with specific powers only. In addition, the federal government could retrieve provincial powers by declaring any works within provincial jurisdiction for the general advantage of Canada or for the advantage of

two or more of the provinces.⁹ On the surface, it seemed that the federal government held very substantial powers under the *Constitution Act* in directing and leading in agricultural policies and programs. However, the specific provincial powers included property and civil rights, among other powers, which have been interpreted by the courts quite extensively. Furthermore, the Court has held that Section 95 was limited to only encouragement and support of agriculture and not to concurrency respecting marketing the products of agriculture.¹⁰ In general, while the original intent of the *Constitution Act* appears to have been designed to provide for a strong central government, the subsequent interpretations through courts and particularly the Judicial Committee of the Privy Council in London until 1949, have strictly limited the federal powers, offering the provinces large scope in interpreting and protecting provincial powers.

As governments began to assume a more active role in the economy to address unemployment, economic dislocation, drought, and grasshoppers, the difficulty in applying in a practical way the Sections 91 and 92 became apparent. In the 1920s, for example, a provincial marketing act, attempting to allow collective action by farmers to improve incomes, prices, and fairness in marketing, was declared *ultra vires* the *Constitution Act* because it attempted to regulate product which could move inter-provincially, a power reserved to the federal government.¹¹ The experience in the first half of the 20th century, particularly with the Judicial Committee in place until 1949¹² protecting and expansively interpreting provincial powers, limited the options for the federal government to provide leadership and action in designing policies for agriculture. Three obvious routes could have been pursued. Clearly, invoking Section 92(10)(c) of the *Constitution Act* to place activities within federal jurisdiction was an option, used in the case of the *Canadian Wheat Board (CWB) Act*, 1935. Another option was to challenge the interpretations of the Constitution and regain or re-establish very broad powers for the federal government in line with a strong central government. This option was clearly a long-term endeavor with uncertainty of outcome and was likely regarded as an attack on established provincial powers. The third route was to cooperate with provinces through formal

⁹ The significant elements of the Section are: "Section 92. In each Province the Legislature may exclusively make Laws in relation to Matters coming within the Classes of Subjects next hereinafter enumerated; that is to say, ... (10). Local Works and Undertakings other than such as are of the following Classes:...(c) Such Works as, although wholly situate within the Province, are before or after their Execution declared by the Parliament of Canada to be for the general Advantage of Canada or for the Advantage of Two or more of the Provinces."

¹⁰ For an excellent review of the shaping of federal and provincial powers in agriculture, see: Robert S. Fuller and Donald E. Buckingham, 1999. *Agriculture Law in Canada*. Butterworths, Toronto. Pages 142-158.

¹¹ Produce Marketing Act of British Columbia, 1926.

¹² The Supreme Court of Canada did not become the final legal arbiter in Canada until 1949. Prior to this, Supreme Court decisions in Canada could be appealed to the Privy Council in London, and heard by the Judicial Committee. One of the last verdicts of the Supreme Court of Canada appealed to the Judicial Committee involved a grain company whose inventories of oats and barley were taken over at the time oats and barley were placed under the Canadian Wheat Board. Interestingly, the Nolan case began before the references to the Privy Council were abolished in fall, 1949. In doing so, it was excluded from the termination of references to the Privy Council in 1949. Even though three courts in Canada, including the Supreme Court of Canada, found in favor of Nolan, the Judicial Committee found against Nolan in early 1951.

agreements on the understanding that where both parties joined in the agreement, the reality would be that provinces would be unlikely or less likely to challenge the actions taken in policy and programs. The federal government clearly chose the third, possibly the path of least resistance, upon which subsequent marketing and support policies are based. Indeed, provinces encouraged the federal government to take a more active role in forming multilateral federal-provincial agreements to limit the competitive provincial subsidies, which emerged in the 1970s.

With respect to the fiscal arrangements, the *Constitution Act of 1867* attempted to balance powers and revenue sources assigned to the two orders of government at that time. Nonetheless, by the 1930s, the largely indirect revenue sources assigned to the provinces were essentially drying up while all residual and growing sources of revenue remained with the federal government. It can be noted that the fiscal arrangements in the *Constitution Act* were written with only the four initial provinces in mind and the nature of revenues that existed at that time. As the western provinces joined the confederation, the indirect taxation capabilities that existed in the initial four provinces had not been developed in the west. By the mid-1930s, the three western provinces – Alberta, Saskatchewan, and Manitoba – had no fiscal capacity to even begin addressing the magnitude of the hardship throughout agriculture, even though many of the issues were within provincial jurisdiction.

This imbalance in fiscal capacity and assigned powers and the consequent forced fragility of the provinces eventually led to the Rowell-Sirois Commission, 1938-1940. While the Second World War intervened, the directions set out in this Commission and subsequent ones were pursued and implemented through agreements with the provinces in the late 1950s and 1960s. Effectively, the agreements gave provinces the right to income tax revenues, federal tax point sharing, and equalization payments.¹³

The Great Depression of the 1930s and the simultaneous droughts and insect damage throughout the North American Great Plains finally led to action by the federal government, even though there was little resolution of the three debates. In Canada, Prime Minister Bennett announced in January 1935 an approach similar to the USA government under President Roosevelt regarding the role of government, calling it by the same name as the USA's New Deal. His announcement was "reform means Government intervention. It means Government control and regulation. It means the end of *laissez-faire*."¹⁴ Several Bills were brought forward and passed by Parliament including:

¹³ The equalization payments were based on Section 36 of Schedule B of the Constitution Act: "Section 36. (1) Without altering the legislative authority of Parliament or of the provincial legislatures, or the rights of any of them with respect to the exercise of their legislative authority, Parliament and the legislatures, together with the government of Canada and the provincial governments, are committed to (a) promoting equal opportunities for the well-being of Canadians; (b) furthering economic development to reduce disparity in opportunities; and (c) providing essential public services of reasonable quality to all Canadians. (2) Parliament and the government of Canada are committed to the principle of making equalization payments to ensure that provincial governments have sufficient revenues to provide reasonably comparable levels of public services at reasonably comparable levels of taxation."

¹⁴ John T. Saywell, 2002. *The Lawmakers: Judicial Power and the Shaping of Canadian Federalism*. Published for the Osgoode Society for Canadian Legal History by University of Toronto Press, Toronto. pp. 203-5.

- a credit act for farmers (The *Farmers' Creditors Arrangement Act*, 1934)
- an agricultural marketing act (The *Natural Products Marketing Act*, 1934, 1935)
- three acts on labor standards
- two acts on unfair trade and competition
- one act for employment and social insurance funding, cost shared among government, employees, and employers.

Immediately following the election of Prime Minister King in October 1935, all of these measures were referred to the Supreme Court of Canada. The basic issue was whether these measures were consistent with the division of powers set out in Sections 91 and 92 of the *Constitution Act*.

Saywell describes the conflict in the marketing act as follows:

The ... Act ... attempted to locate a boundary between local (property and civil rights) and extra-provincial (trade and commerce) marketing regulation. The Dominion Marketing Board was given a broad authority to regulate the flow of products to markets, including withholding products from market and discouraging production or price-fixing. The constitutional incapacity of the federal government was to be overcome by the establishment of local or provincial producers['] boards under the laws of the province, which could exercise any or all of the powers of the Dominion board, or the boards could act conjointly. Moreover, no marketing scheme could be approved unless 'the principle market for the natural product is outside the province of production' or 'some part of the product may be exported'. Finally, in an obvious attempt to salvage something, section 26 provided that 'if it be found that Parliament has exceeded its powers in enactment of one or more of the provisions, none of the other or remaining provisions of the Act shall therefore be held to be inoperative or ultra vires.' Enabling legislation was passed by all of the provinces, and when the act went to court there were twenty-two marketing schemes in operation.¹⁵

While the credit act for farmers was upheld by the Court on the basis that bankruptcy and insolvency were within federal jurisdiction, the marketing act was unanimously rejected by the Supreme Court of Canada in early 1936. British Columbia appealed the ruling by the Supreme Court of Canada to the Judicial Committee in London but failed to overturn the Court decision. It would be another eleven years before a federal marketing act would provide for the basis for the marketing of farm products in Canada. Almost all provisions in the other legislation failed as well.

The *Canadian Wheat Board Act*, 1935, recreated the institution introduced in 1919, with initial prices for wheat guaranteed by the federal government, voluntary selling through the Board, common pricing adjusted for transport cost across the prairie region, and monopoly powers for import and export of wheat and wheat

¹⁵ Saywell, op. cit., pp. 215-6.

products for all of Canada. This is the first on going support mechanism in Canadian agriculture; although clearly, the federal government expected that the initial price guarantees would be set to minimize costs to the treasury. The creation of the CWB under federal powers essentially invaded provincial jurisdiction as set out in Sections 92 and 95 of the *Constitution Act*. To do so, Section 92 (10) (c) of the *Constitution Act* was invoked, placing the marketing of wheat in the CWB area of western Canada under federal jurisdiction. While this act was passed as part of the Bennett New Deal, it was not sent to the Supreme Court by Prime Minister King because it contained the Section 92(10)(c) reference.

The continuing reluctance of the federal government to become more heavily involved in managing the agricultural economy was clearly evident in the effort to terminate the Canadian Wheat Board after the 1938 year. While the Board bought and sold grain in 1935, no grain was offered for sale by farmers to the CWB in 1936 and 1937. The high initial price established for 1938 in relation to grain market prices attracted a good deal of grain to the Board, causing a substantial loss in the account, and paid by the federal government. Based on Justice Turgeon's recommendations and great political pressure from western Canada, the CWB was continued in 1939 and beyond, with considerably more modest initial prices.¹⁶ By 1943, the CWB took over the marketing of all wheat in the designated area of western Canada.

Other actions taken during the 1930s included the creation of the Prairie Farm Rehabilitation Administration, 1935, charged with consolidating the abandoned farm land in western Canada, rebuilding the capacity of this land, assisting with the infrastructure for adequate and sustainable water supplies for farms and rural communities, in short, trying to drought-proof the prairie area. The *Prairie Farm Adjustment Act*, 1939, provided for federal assistance to farmers for yield losses and crop failure in Alberta, Saskatchewan, and Manitoba. The act set out the conditions under which payments could be made, depending on the price of wheat, the area yield, and the amount of cultivated acres. Farmers participating in the program were required to pay a levy of one percent of grain sales to the fund. The federal government was to serve as the backstop to any losses in the program. The act was a rudimentary crop insurance arrangement funded by the federal government as necessary, but it included cost sharing with farmers.¹⁷

All three of these acts were exclusive to western Canada. No similar or related provisions were made for eastern Canadian agriculture.

¹⁶ G.E. Britnell and V.C. Fowke, 1962. p.198.

¹⁷ This Act continued in force until 1974, with levies collected from participating farmers. In the early 1980s, the remaining surplus in the fund was terminated and turned over to the Western Grain Research Foundation.

Reaching for Maturity: Comprehensive Approaches to Agricultural Support Policies: 1945-1980

The Second World War and Its Aftermath

The number of farms in Canada peaked in 1939. The Second World War rapidly drew farmers and farm labor into military and industrial activities to support the war efforts. The reduction in available agricultural labor sharply accelerated the emerging mechanization of agriculture and the consolidation of farms into larger units of production. The federal government, under wartime measures, provided for agricultural price supports for basic commodities through contractual arrangements, primarily with the UK, for dairy products, wheat, and bacon.¹⁸ The *Agricultural Prices Support Act*, 1944, for example, established the Agricultural Prices Support Board to prescribe prices for agricultural products at which the Board was authorized to buy products in the market,¹⁹ to pay the difference between the prescribed price and the average market price, to sell, dispose, package, process, store, ship, transport, export, and insure agricultural products, and to buy any agricultural products on behalf of other departments or agencies of the federal government when required.

This act set out for the first time the mechanism for agricultural price support. However, there is no specific direction in the act identifying the methodology for establishing the prescribed prices. The only direction for the Board is contained in Section 9(2):

In prescribing prices ... the Board shall endeavor to ensure adequate and stable returns for agriculture promoting orderly adjustment from war to peace conditions and shall endeavor to secure a fair relationship between the returns of agriculture and those from other occupations.

The issue of fairness in the economy remained as a policy objective in this act, comparing agricultural and nonagricultural returns or incomes. Stability and adequacy of income/returns are also noted as policy objectives although the stability objective was in relation to the change from wartime to peacetime, not necessarily the stability of farm prices *per se*.

During the war, western Canada was expected to provide grains for export and for use in eastern Canada while eastern Canada was expected to provide the pork, poultry, and dairy products (butter, milk powder, and cheese) for local domestic consumption and export. The federal government introduced the *Feed Freight Assistance Act* in 1941 to subsidize the movement of feed grains from Thunder Bay to parts of Ontario and to all of Quebec, Nova Scotia, New Brunswick, and Prince Edward Island and from Calgary and Edmonton into lower British Columbia to stimulate and expand the livestock industries in these regions. This assistance was

¹⁸ Frank Shefrin and Marjorie R. Cameron, 1946. *The Wartime Subsidy Program of the Dominion Department of Agriculture*. Economics Division, Canada Department of Agriculture, Ottawa.

¹⁹ Wheat was excluded in the powers of the Agricultural Prices Support Board since it was already under the Canadian Wheat Board Act, 1935.

modified from time to time, limiting its applicability to parts of Ontario and Quebec and extending the provisions to Newfoundland and Labrador, Yukon, and Northwest Territories. The program was terminated in 1995. As well, feed storage subsidies were used to encourage timely purchase of grain supplies by eastern Canadian farmers.²⁰

Following the war, the federal government pursued an immigration policy for displaced persons from European countries by allowing immigration of individuals on the condition they work on farms for one year, following which families were allowed to join them as permanent settlers in Canada. This policy exacerbated a growing problem of excess labor in agriculture, eventually referred to as the poverty problem in Canadian and American agriculture.²¹

The *Agricultural Products Marketing Act*, 1947 finally laid the basis for collective action by farmers in the marketing of agricultural products. Coupled with provincial legislation, these federal and provincial acts still form the basis for marketing arrangements in Canada. Additionally, the marketing of oats and barley in western Canada was placed under the Canadian Wheat Board on March 17, 1947, using the *National Emergency Powers Act of 1945*.²²

The Initial Comprehensive Support Arrangements in Canada: Post World War II

The contracts for delivery of agricultural products to the UK began during the war and continued until 1950. While, initially, annual contracts for agricultural products in 1939 were negotiated, a five-year agreement was initiated at the end of the war and was scheduled to terminate July 1, 1950. The expectation was that these contracts with the UK and others under Mutual Aid arrangements would continue well after 1950. The unforeseen phasing out and termination of these contracts for wheat, cheese, bacon, and butter led to an urgent debate on how to deal with the lower incomes and market access for these and other products. The first response was the *Agricultural Products Board (APB) Act*, 1951, which provided the federal government with powers to:

- sell or deliver agricultural products to the government of any country,
- purchase or negotiate the contracts for the purchase of any agricultural products on behalf of the government of any country,
- buy, sell, or import agricultural products, and
- store, transport, or process agricultural products.

²⁰ D. Berthelet, 1984. "Agriculture Canada policy and expenditure patterns, 1868-1983", *Canadian Farm Economics*, Vol. 19, No. 1.

²¹ D.E. Hathaway, 1963. *Government and Agriculture: Economic Policy in a Democratic Society*. The Mac-Millan Company, New York. pp. 253ff.

²² In the original Canadian Wheat Board Act, 1935, provision was made for the Governor in Council to add barley, oats, rye, and flax under the powers of the Board, by regulation.

This act reflected two significant changes in peacetime policy for agriculture. First, it was a rejection of the long-held view that governments should not be involved in commerce directly. It evolved from the experience initially with the CWB and the Second World War where government effectively was managing some outputs of agriculture for the national good. Second, it was recognition that government had a role to play in supporting agricultural prices and incomes. Agriculture had played a key role in absorbing labor during the Great Depression, providing manpower during the war effort, delivering food for domestic and overseas use during the war, and serving as an instrument of immigration following the war. In peacetime, government could not ignore the hardship generated from the breakdown in the contractual arrangements begun during the war. Nonetheless, the design of the act was to use the treasury to support the difference between the purchase price paid to farmers and the eventual sale price by government with government free to establish the initial purchase prices. The financial terms in the act provided that the Minister of Agriculture could enter into any arrangements so long as a loss was not expected on the sale of the product. In the case of loss, Parliamentary appropriations and Governor in Council approvals were needed. With limited appropriations, the act was limited in its ability to tackle the low price and income problems emerging in agriculture.

In 1958, the federal government promulgated the *Agricultural Stabilization Act* (ASA), the first act of its kind in Canada which foresaw direct payments caused by low prices to farmers with a specific formula for the support level.²³ Under this act, the federal government provided statutory, direct subsidies for nine commodities (named commodities) when the annual average price for any one of them dropped below 80 percent of the average price over the ten preceding years. The nine commodities were: cattle, hogs, and sheep; butter, cheese, and eggs; and wheat, oats, and barley not produced in the designated area defined in the *Canadian Wheat Board Act*. The level of support under the act could be raised above 80 percent although Governor in Council approval was required. As well, any other commodity or food product (designated commodity) could also receive support under the act for the purpose of stabilizing the price of an agricultural commodity, with approval of Governor in Council.²⁴

The preamble to the act and some provisions reflect a good deal of the debate surrounding the passage of this act. The preamble reads:

²³ The Prairie Farm Adjustment Act had provisions for triggering the national emergency provisions based on price, with Governor in Council approval, although the acreage payments were for yield reductions, not price support.

²⁴ Any payments for named commodities at the support level of 80 percent of the preceding ten years were statutory payments under the Act; that is, Parliament had already approved these payments under the Act and did not need to make annual appropriations for these expenditures. For support levels above 80 percent for the named commodities and for any designated commodities, annual appropriations were required for such expenditures.

Whereas it is expedient to enact a measure for the purpose of stabilizing the prices of agricultural commodities in order to assist the industry of agriculture to realize fair returns for its labour and investment, and to maintain a fair relationship between prices received by farmers and the costs of goods and services that they buy, thus to provide farmers with a fair share of the national income; therefore Her Majesty ...

The concept of fairness draws heavily on the earlier philosophical approaches of government regarding its role in the economy. The cost-price fairness relationship reflects the significant debate in Canada and the USA beginning in the 1930s and 40s about parity pricing.²⁵ The act requires that the " ... Governor in Council shall be guided by the estimated cost of production of the commodity, and such other factors as the Governor in Council considers to be relevant." Thus, the cost of production, as well as a parity concept of fairness, is embedded in the act. Finally, the act specifically refers to stabilizing the prices of commodities, not stabilizing incomes of farmers.

Two other acts filled out the first fairly comprehensive support system for agriculture. The first was the *Prairie Grain Advance Payments Act* (PGAPA), 1959, to allow the Canadian Wheat Board to make advances to farmers for wheat, oats, and barley stored on farms, in advance of delivery to the Board. Effectively, it provided cash flow for farmers through interest-free loans against future delivery of the three grains, the only subsidy element being the foregone interest by the federal government. The rationale behind the act was that deliveries to the CWB were controlled through permits, and, in many cases, farmers were waiting long periods of time to gain access to the elevator system to deliver their farm-stored grains.

The second act was the *Crop Insurance Act*, 1959, providing for federal funding to the provinces to operate subsidized crop insurance programs to farmers within each province. The initial funding arrangements were that the federal government would pay 50 percent of the administrative costs and the lesser of any amount of premiums paid by the province or 20 percent of the premiums. These arrangements were modified later to allow a province to sign up for the program by either (a) paying all of the administration cost while the federal government provided the insurance rate subsidy, or (b) the province could pay 25 percent of the total subsidy cost of the program within the province with the federal government paying the remainder of the subsidy. This is the first agricultural support program to introduce the concept of cost sharing between the federal and provincial governments. An earlier rudimentary crop insurance program in western Canada was operated under the *Prairie Farm Adjustment Act* (PFAA) with cost sharing between the federal government and the

²⁵ The Agricultural Adjustment Act, 1933, was based on providing support to farmers to restore purchasing power of farmers to the 1910-1914 level. This Act was declared unconstitutional in 1936 and replaced with the Agricultural Adjustment Act, 1938. Purchasing power parity meant that the relationship between prices of commodities sold by farmers and items purchased by farmers should be the maintained constant over time.

farmers.²⁶ Because crop insurance was seen primarily as falling within provincial jurisdiction, the federal government stepped back from the lead role in providing for crop insurance under the 1959 act, and, in turn, offered it to the provinces that wished to participate with federal assistance.

By 1959, the direct support arrangements were covered under five acts: *Canadian Wheat Board Act*, *Prairie Grain Advance Payments Act*, *Agricultural Products Board Act*, *Agricultural Stabilization Act*, and the *Crop Insurance Act*. While providing some statutory support for agricultural prices (and thereby, incomes), much of the support remained discretionary for the federal government. The initial prices for the CWB were set by the federal government, usually with an eye on minimizing the risk of any treasury cost. The advance payments for Board grains were relatively low cost while providing a substantial cash flow advantage for farmers. The APB operations were entirely discretionary, and only nine, albeit major, commodities had statutory support under the ASA. Finally, the federal government had budgetary and actuarial control over the provincially-operated crop insurance programs.

Dairy and Poultry

A large share of the ASA payments after 1958 were paid to the dairy industry for deficiency payments for industrial milk, the milk used for processing into butter, milk powders and cheese. Industrial milk was treated under federal jurisdiction while fluid milk was managed by provinces. The distinction comes from the fact that industrial milk products could be stored, and consequently traded interprovincially, a federal responsibility. Fluid milk was primarily a local industry during the 1950s and 1960s.

The continuing low prices for milk during the 1960s as well as the difficulties in marketing led to the *Canadian Dairy Commission Act of 1967*. Under this act, the Canadian Dairy Commission was created to assist in managing prices and quantities of industrial milk, as well as administering the ongoing and growing subsidy under the ASA. The powers to limit production, through joint action with the provincially-based Boards established under provincial legislation, began in 1974. At that time, the subsidy under the ASA was fixed at \$2.66/cwt (\$6.03/hl) and continued on all in-quota, industrial milk until terminated on January 31, 1997.²⁷

Egg and chicken producers faced many of the same marketing conditions as the milk industry in Canada. The *National Farm Products Marketing Agencies Act*, 1972 (now the *Farm Products Agencies Act*) set out the mechanisms under which tobacco, poultry, and egg products could be marketed. To avoid the earlier pitfalls in marketing legislation, both this act and the *Canadian Dairy Commission Act* relied

²⁶ However, the federal expenditures were not a fixed share of the PFAA program cost. The federal government made payments to the fund only when the producer levies were insufficient to cover the program costs.

²⁷ Note that the fluid and industrial milk quotas had been merged long before 1997, although the subsidy was provided on that portion considered to be industrial milk with fixed provincial shares of production.

on depositing federal and provincial powers in provincial and national boards separated from government to manage supply and set prices.²⁸

These two acts placed dairy and poultry products in an entirely different category for income stabilization and marketing than the remaining agricultural products. The *Farm Products Agencies Act* specifically denies stabilization payments for commodities under the act for which boards have been created. As a result, these commodities are dropped from further consideration in this paper.

Rebuilding the Safety Net System

By the 1970s, the five acts establishing the comprehensive safety net needed to be reworked. Grain prices had been declining through the 1960s as many grain markets were depressed from the large volumes of grains sold through foreign aid. The 1964 USA *Food for Peace Act* provided for the international movement of farm products under soft currency loans, reducing or eliminating in some cases, the commercial markets for grain. By the end of the 1960s, surpluses in Canada were growing; and in an attempt to limit the continued build up of inventory on farms, the Lower Inventories for Tomorrow Program (LIFT) 1970 was established to lower wheat acreage from over 20 million acres to about 12.5 million acres, with farmers paid for the acreages not planted compared to a historical base. Almost immediately, the USSR began purchasing grains from the USA and caused a sudden and sharp rise in grain prices in fall 1972 and throughout 1973. With LIFT, Canadian inventories were low, and the benefits from the much stronger prices were denied until future crop years could rebuild supplies. The frustration with low inventories caused by LIFT and the subsequently higher prices have built into Canadian policy views at farm, provincial, and the federal level, a very strong rejection of acreage or production limitations in grains, oilseeds, and livestock.

The rebalancing of fiscal powers and constitutional responsibilities through the agreements between the federal and provincial governments starting in the late-1950s, opened the way for the provinces and the federal government to substantially build the social safety nets within Canada – Old Age Security, the national and provincial health systems, and the Canada Pension Plan. This fiscal capability of the provinces also led to some provinces attempting province-only stabilization plans in agriculture in the early 1970s, in part because the federal guarantees under the ASA were regarded as insufficient. One of the pressures among provinces, which these provincial plans created, was considerable antagonism with adjacent provinces. The higher supports offered in one province were regarded as an attempt to encourage production and draw production away from neighboring provinces. This concern for competitive provincial programming has persisted in provincial governments since that time and has been expressed in a number of ways. The provincial expenditure

²⁸ The Constitution does not allow the federal government to delegate its powers to a provincial government; neither can a province delegate its powers to the federal government. The only way of pooling the federal and provincial powers to negotiate through the jurisdictional maze was to have each order of government deposit the required administrative powers in a separate agency for the establishment of these marketing arrangements.

limits on commodities contained in the Tripartite Agreements in the 1980s, the paper by Quebec in 1989 entitled "A Question of Equity", negotiated provincial shares of federal money in several programs from Canadian Special Grains to the Canadian Farm Income Protection Program, all demonstrate this persistent and nagging concern of provinces about regional and provincial fairness and competitive provincial programming.

In eastern Canada, grain corn demonstrated a very substantial increase in acreage with the earlier maturing varieties, and soybeans expanded to be a significant oilseed crop. The area in which both of these crops were grown grew substantially, with grain corn and soybeans moving into the northern counties of southern Ontario, the Montreal plain, and eastern Ontario, particularly after 1970. This initially led to export movements of these products, and subsequently provided a source of growth for animal agriculture in Ontario and Quebec. In Quebec, for example, the availability of local grain supplies, the closure of quota in 1974 for milk, and a farm community skilled in livestock production moved Quebec from a relatively small hog producing province in the 1960s to the largest producer of hogs in Canada during the 1970s, even though little or no ongoing support was provided by Quebec during this growth period.

Even though grain supplies were burdensome through the late-1960s and early 1970s, the fear of significant food shortages captured international attention by 1974. The entry of the USSR into grain markets placed considerable demand on wheat and corn markets, not previously felt. While Canada had opened grain sales to the USSR during the 1950s, the USA had denied movements to the USSR until the early 1970s. Agricultural policy within the USSR forced large changes in animal inventories whenever feed grain supplies were short. Canada and other suppliers could not make up these variations in supply within the USSR. As USSR domestic supplies and some imports became available, animal inventories were rebuilt each time the animal inventories had been run down. With the opening of USA sales of grain to the USSR, this policy was reversed, allowing imports to more fully offset the variations in USSR domestic supplies. This had the effect of adding to the demand for grain on a continuous basis as well as leading to greater expansion within the animal feed demand in the USSR, combined with greater volatility in world markets.

Inflation was rising in the general economy. With the ASA guarantee on the nine named commodities of 80 percent of the preceding ten years, inflation was rapidly eroding the support offered under the act. As well, wheat, oats, and barley in the CWB designated area did not have support similar to that of grains outside the CWB area. The initial price guarantee under the CWB was not used as a price support mechanism, but rather the initial price was set annually based on forecasts of what the market was expected to return for each of the Board grains. Similarly, the PGAPA provided for advance payments for the Board grains in western Canada, while no similar arrangement existed for storable commodities outside the CWB area or for the growing number of crops in western Canada outside Board jurisdiction. Clearly

regional tensions were growing between eastern and western Canada based on the differences in policy and program treatment.

The Crows Nest Pass Agreement was also coming under considerable pressure. The fixed rate on grain movement did not allow for inflation, and the railways and others in the grain movement industry were increasingly reluctant to invest in movement infrastructure with rising costs and fixed rail tariffs for grain. The result was a growing set of federal programs to rebuild the grain rail system in western Canada, add to the infrastructure with the purchase of modern grain hopper cars, double track parts of the system (Kicking Horse Pass), and build export and inland terminals for grain.

In the rebuilding of the safety net during the 1970s, five acts were created or modified. First, the *Agricultural Stabilization Act* was amended in 1975 to provide for guarantees for named commodities of 90 percent of the average market price for the five preceding years. The named commodities were changed to: cattle, hogs, and sheep; industrial milk and cream, corn and soybeans, oats and barley outside the CWB designated area. Dropped from the named list were eggs and poultry (because of their inclusion under the *National Farm Products Marketing Agencies Act*), wheat outside the CWB designated area (because of the marketing arrangements in Ontario under the *Agricultural Products Cooperative Marketing Act*), and butter and cheese (replaced by industrial milk and cream). The Governor in Council was enabled, as before, to prescribe support prices above the minimum for named commodities and at any level for designated commodities. In establishing the support level, the Governor in Council was to “reflect the estimated costs of production” in the year compared to the average of production costs in the five preceding years. As well, an addition to the act was that a support price could be set for a region of Canada, not necessarily for the entire country.

The ASA amendments also responded to the growing concerns of provinces about the equity of treatment by the federal government and levels of spending by adjacent provinces. Section 10 of the revised act stated:

Where provinces or producers or provinces and producers desire a greater prescribed price ... the Governor in Council may authorize the Board to enter into an agreement with these provinces or producers or provinces and producers to provide for a greater prescribed price unless the agreement:

- *would give the producers of the commodity a financial advantage in the production or marketing of the commodity not enjoyed by other producers of the commodity in Canada;*
- *would be an incentive to the producers ... to overproduce the commodity.*

This was the first recognition of potential joint operations of the support programs between federal and provincial governments. It began the slow process

of movement toward defined cost shares and the role of the federal government in managing the equity among participants in agricultural supports across Canada.

Second, to parallel these amended ASA levels of support, the *Western Grain Stabilization Act* (WGSA) was passed in 1976 to provide stability for the western grains and oilseeds. This exceedingly detailed and technical act defined support for grains and oilseeds in the CWB designated area as 90 percent of the five year area average net income (revenues minus named expenditures) for specified grains and oilseeds for producers in the program in comparison to the current year. A Fund was created in the Consolidated Revenue Fund (CRF) into which was paid a two percent levy by producers on eligible grain sales and effectively a four percent levy paid by the federal government.

The WGSA was the first attempt at a price/income support program with fixed producer-federal-government shares, and a composite of commodities, not support for each specific commodity. However, even though the act was the first to prescribe support as a net concept (gross revenues minus specified costs), the ASA had begun operating commodity specific programs with the support level specified as margin (price minus selected costs) a few years earlier, for example, hogs in 1973.

The WGSA had specific limits on the maximum eligible sales per farm operation covered under the act, i.e., \$25,000. The Governor in Council was enabled to raise this amount and to specify a higher support level than 90 percent. While the ASA had no specific limits, limits on sales eligible for subsidy were common. In hogs, for example, in the early 1970s, the limit was 200 hogs per farm operation per year. The economic rationale for these limits was that the stabilization was intended for the family farm, not for the large corporate farms, even though large corporate farms had a very small share of production. As well, the political concern with the large check under these programs was an on-going worry when the political rationale was based on the support for the struggling farm community.

Third, the *Prairie Grain Advance Payments Act*, originating in 1959, was amended in 1975 to update the amounts of the advances for stored wheat, oats, and barley in the CWB designated area. Fourth, with the considerable expansion of grains in eastern Canada, an arrangement parallel to the PGAPA was made for storable commodities, other than the three Board grains. The *Advance Payments for Crops Act* (APCA) was passed in 1977 offering advances for storable commodities throughout Canada, except the CWB grains in the CWB designated area of western Canada. The terms of the advances were essentially identical to those of the PGAPA. The PGAPA continued to be operated within the CWB, while the APCA was operated federally, through many farm organizations.²⁹

²⁹ The administration of these two Acts created very considerable difficulty in western Canada. Because the CWB was a creation by government, any advance made by the PGAPA had to be repaid before repayments under the APCA. For an advance under PGAPA, a producer approached the elevator operator, working under arrangements with the CWB. For an advance on another crop, the Canola growers association became the program delivery agent. Even when canola was delivered to an elevator, the payment to the producer was applied against the PGAPA advance until exhausted before being applied to the APCA advance.

The changes in the 1970s continued the distinction between eastern and western Canadian agricultural support, more specifically, support for western grains compared to all other commodities. Nonetheless, significant changes were underway:

- responding to a group of commodities, rather than commodity-by-commodity support (WGSA);
- cost sharing between federal government and producers (WGSA);
- enabling federal-provincial, federal-producer and federal-provincial-producer stabilization programs (ASA);
- support based on net returns, i.e., price or total sales minus relevant expenditures (ASA and WGSA);
- a fund within the CRF created to even out the anticipated variation in annual expenditures by the federal government (WGSA);
- recognizing the regional tensions between provinces and between the federal and provincial governments on equity of treatment (ASA); and
- crop insurance remained as area average coverage, not based on the individual farmer's experience.

The fifth program was the *APB Act*. In operational terms, the APB was still available as a support mechanism in agriculture. However, through experience, the APB performed well, better than the designation for support of a commodity under the ASA, under certain circumstances. In cherries, for example, a bumper crop could substantially lower prices, almost to zero, if unchecked. By offering to purchase some product from farms through the APB, the price could be maintained at a level that, when combined with the large volume, provided reasonable support for the commodity. The alternative would be a complete price collapse with deficiency payments made on a very large share of the crop. The product purchased by government could be processed, held off the market for a period of time, or sold into markets on a commercial basis not usually serviced by that commodity.

From a political perspective in the mid-1970s, the separation between western grain support policies and support for the rest of agriculture was continuing and growing. One historic reason for this was that the Canadian Wheat Board originally was not placed under the Minister of Agriculture. Technically, it was under the Minister of External Affairs and the Wheat Committee of Cabinet. On only two occasions has the CWB been placed under the Minister of Agriculture: the Hon. Alvin Hamilton in the 1958 government of the Right Honorable John Diefenbaker, and under the Hon. Charles Mayer during 1993 in the Mulroney government. The Hon. Otto Lang, Minister of Justice, was responsible for the CWB following the 1974 general election while the Hon. Eugene Whelan was Minister of Agriculture. It was clear that Whelan was disappointed at not getting responsibility for the CWB following the election, leading to some competition between Whelan and Lang for leading

agriculture in western Canada.³⁰ By maintaining the separation within the Cabinet, and the resulting competition between the two Ministers, the separation between western grains policy and policy for the rest of the sector deepened considerably. The separate acts for support measures, ASA and WGSA, and the separate advance payments acts, PGAPA and APCA, were the results.

Domestic feed grain policies were also adding to the emerging conflict. The CWB held responsibility for assuring adequate feed grain supplies within Canada, based on its monopoly position for export and import throughout Canada for wheat, oats, and barley, or their products. In the early 1970s, there was the strong belief that the CWB was selling feed grain to overseas customers well below the selling price for feed grain sold into eastern Canada. This generated considerable concern in eastern Canada leading eventually to formula pricing for barley and feed wheat (corn equivalent pricing based on nutrition, basis Toledo, with transport to Montreal). In doing so, the program indirectly stabilized local feed prices in relation to the larger North American markets for grains. Additionally, when Ontario, with a barley surplus in the early 1980s, attempted to sell barley overseas, the CWB initially denied the export permit, realizing that western grains may have to backfill any shortage that the export movement from Ontario might cause. The export eventually took place, but not without considerable acrimony between Ministers and regions, with a small payment from the federal government to the CWB to compensate for any additional costs the CWB may have incurred.

Globalization: New Trade Obligations and Market Pressures on Stability Policies and Programs, 1980-2004

The Troubled 1980s

The 1980s opened with three major events deeply affecting agriculture. The first was the USSR invasion of Afghanistan in December 1979, resulting in the USSR grain embargo by the USA, Australia, European Community, Argentina, and Canada. Because sales to the USSR were restricted for a period of time, a small compensation payment was made to western grain growers, based on an estimate of the declines in prices caused by the embargo. However, this event meant that food supply and its trade were being used as a political instrument in the Cold War. This followed a few export embargoes by the USA during the 1970s based on assuring adequate domestic USA supply (soybeans to Japan, for example) which greatly concerned importing nations, both developed and developing, much more than the economic effects of the embargoes seemed to warrant.

Second, the US Federal Reserve had grown increasingly uncomfortable with the rising level of inflation in the economy and, under Volker's leadership, sharply tightened money supply in 1979. Interest rates soared, reaching over 20 percent, hitting agricultural production and mortgage credit very hard.

³⁰ Eugene Whelan, 1986. *Whelan: The Man in the Green Stetson*. Irwin Publishing, Toronto, Canada, pp. 209-14.

Third, the 1981 farm bill under President Reagan was based on the expectation of strong and rising grain and oilseed prices for the foreseeable future. Built into the Bill were rising support prices for the following four years, with the USA government standing ready to purchase grain to maintain these prices. With growing supplies, the other exporters had less difficulty in exporting grain, while the USA was building domestic supplies. The 1985 farm bill changed this arrangement dramatically, allowing prices to find market-clearing levels with deficiency payments and loans as the mechanisms for price supports, and an export subsidy for grains to assure market penetration abroad. The result was relatively strong prices for grains and oilseeds in the early 1980s followed by a sharp reduction in prices in 1986.

With the strong prices after the early-1970s, the WGSA fund was building up rapidly. However, following the trauma of high interest rates and rising farm input costs, western grain farmers demanded access to their money, since levies had been paid by farmers into the account. By raising the level of support above 90 percent to respond in part to the drought conditions of 1985, substantial funds were paid out leaving the fund in deficit by the time of the 1985 US farm bill effects a year later. The result was a growing demand by western governments and grain farmers for additional federal assistance. Rather than rebuilding the funding within the WGSA, *ad hoc* drought funding for the crop and livestock industry in western Canada in 1985 and the Special Canadian Grains Program (SCGP I) were initiated, the latter providing \$1 billion in assistance for 1986. The funds were divided somewhat arbitrarily between eastern and western Canada rather than having a uniform national program, again maintaining the difference between programming in eastern and western Canada. This program was followed by the second Special Canadian Grains Program (SCGP II) in 1987, with \$1.2 billion paid to grain and oilseed producers, again divided somewhat arbitrarily between eastern and western Canada.

For 1988, there was another drought in western Canada, and another *ad hoc* program of \$750 million for income support and green feed. For 1989, the Farm Support and Adjustment Measures (FSAM) program provided about \$1 billion to the Canadian grain and oilseed industry compensating for the continuing low incomes and prices. This was followed by a second FSAM providing about \$800 million divided between the horticulture industry and the grains and oilseed industry.³¹ Throughout this period, the loudest cries for additional federal assistance were coming from the provinces.

Under the revised *Agricultural Stabilization Act*, the tripartite programs emerged in the 1980s. These programs, particularly in hogs and cattle, were stimulated by pressures to prevent individual provinces from creating programs which provided a competitive advantage to one province, in relation to adjacent provinces. By joining

³¹ Even though the safety net legislation was in place for specific programs, these Acts did not have the flexibility in most cases to provide legislated authority for these *ad hoc* programs. As a result, the Department of Agriculture Act was used in many cases. Section 5 of the Act reads: "The Governor in Council may assign any other power or duty to the Minister." This section, while criticized by the Auditor General on a number of occasions for its scope and breadth, offers very wide powers to the Minister of Agriculture and Agri-food so long as the Cabinet can be convinced of the actions.

forces across federal and provincial governments, common programming eliminated the competitive nature of provincial-only programs. Embedded in the programs was a provision for the federal government to withhold funding, in a province, which exceeded a predefined level of support for a program commodity. While exceeded in a few cases, no action was taken by the federal government to discipline provincial spending on a commodity. Simply, the political pressure to treat all farmers in a plan equitably with federal funds prevented the federal government from exercising this provision. The commodities in the tripartite programs were: hogs, lambs, beef, honey, apples, white beans, onions, and cow-calf. All three partners (producers, federal, and provincial governments) contributed to the schemes. While the arrangements were open to all commodities, the time and effort to make arrangements for the tripartite agreements commodity-by-commodity were complex and time consuming.

The successful countervail action by the USA against the import of live hogs from Canada in 1984, created the first significant pressure on commodity specific programming in Canada. Clearly the hog industry in Canada had expanded substantially in the 1970s and 1980s, and with limited slaughter capacity, live hogs were going to the USA in increasing numbers. Equally, the beef industry was expanding and becoming increasingly reliant on the USA for both meat and live cattle exports (feeder cattle and cattle for immediate slaughter). The hog countervail action by the USA forced growing concern in Canadian safety net development regarding commodity specific programming and triggered the search for means to avoid countervail action in the future. The beef industry in western Canada was sufficiently concerned about countervail action that the Alberta and British Columbia beef industries withdrew from NISA in its initial years, even though this was a whole farm program and less subject to countervail threat than commodity specific programming. Allied with this was the emerging text within the Uruguay Round of negotiations regarding the green box programming, indicating that commodity specific programs could never be excluded from countervail action, while generally available programming appeared to be a less threatened path to pursue.

The Canada-USA Trade Agreement in 1988-89 opened the way for the integration of production and processing within the North American economy for agriculture. Long established east-west trade within Canada had started to give way to Canada-USA trade and an integration of some industries, hogs and cattle/beef particularly, generating the pressures which resulted in the USA countervail action against Canadian hogs. With the agreement, trade in both raw and processed products between the two countries expanded very considerably. The huge USA market for both raw and processed products became the destination of preference for the growing exportable surpluses of Canadian products, which hitherto were faced with offshore markets or tariff barriers into the USA. Canada, on the other hand, was a relatively small market, already in surplus in many temperate products, and it offered little trade gain for the USA in temperate agriculture and food products. The result was that Canada faced growing political and economic threats of countervail

from the USA as markets in the USA began adjusting to the integration of production and processing across the two countries. The threat of countervail by the USA against Canadian agricultural products appears to be stronger and more consistent than against any other trading partner of the USA. The NAFTA agreement did not change this emerging threat to Canada, and it deepened the search in Canada for programs designed to avoid or minimize the threat.

The *ad hoc* programs for grains, oilseeds, and horticulture in the mid- to late-1980s captured much of the public attention and debate in agriculture. However, a very wide range of programs emerged in the 1970s and 1980s responding to specific climatic and economic events, at both national and regional levels. Livestock feed assistance because of drought in many locations and years, payments due to regional flooding which prevented planting or destroyed existing crops not covered by crop insurance in many regions and years, assistance because of closure of processing plants, winterkill in apples and strawberries, interest rebates, purchase or lease of hopper cars, box car rehabilitation, rail rehabilitation in western Canada – all of these programs and more – clearly left the perception that the safety nets in place were not adequately offering either income stability or protection against catastrophic events.³² The programs exacerbated federal-provincial relations since the federal government was often called upon to respond to these regional events even though, in many cases, the apparent responsibility lay with the provinces. As a practical and political matter, once responses by the federal government began, there was little recourse by the federal government to deny future involvement. As a result, the requests and the responses accumulated and grew over time.

The emerging trade concerns, the experience with tripartite programming, and the myriad *ad hoc* arrangements during the mid- to late-1980s for grains and horticulture led to strong pressures to renew and rebuild the safety nets for agriculture in Canada.

Rebuilding the Safety Nets Once Again

With several years of *ad hoc* programming experience and little improvement foreseen by industry or governments, the federal government along with the provinces' participation began a major policy review in 1989, starting with the Growing Together Conference in December 1989. Several task forces were established with industry, federal, and provincial representatives. One involved grains and oilseeds safety nets, and another was examining safety nets for the horticultural industry. The economic difficulty felt by governments was that farmers in the crops sector were increasingly making planting and crop choice decisions based on governmental programming

³² For the spending detail on these programs, see Marcel Huot, 1984. *Federal Agri-food Expenditures: 1970-71 to 1982-83*. Working Paper, *Agriculture and Agri-food Canada*, Ottawa. See also, Monique Rodier, 1985. *Federal Agri-food Expenditures: 1982-83 and 1983-84*. Working Paper, *Agriculture and Agri-food Canada*, Ottawa. The policy directions surrounding these issues were debated on a number of occasions. See for examples, W.M. Drummond, W.J. Anderson and T.C. Kerr, 1966. *A Review of Agricultural Policy in Canada*. Agricultural Economics Research Council, Ottawa; *Federal Task Force on Agriculture, 1969. Canadian Agriculture in the Seventies*. Government of Canada, Ottawa; *Task Force on Agriculture, 1977. Orientation of Canadian Agriculture*. *Agriculture Canada*, Ottawa.

rather than allowing farmers to adjust to changing market signals. While the hog and cattle industry representatives were involved from time to time throughout these task forces, there was very great reluctance in both of these industries to consider long-term industry subsidies or support, which could attract trade action by the USA. The hog industry was already facing countervail duties for movement of hogs into the USA following the successful USA case for CVD brought in 1984, while the Canadian cattle industry felt considerable threat from the USA for similar treatment.

The products of the grains and oilseed safety net task force were the Gross Revenue Insurance Program (GRIP) and the Net Income Stabilization Account (NISA). The former applied to the crops industry while the latter applied to the whole farm. To implement these programs, a new act was created, the *Farm Income Protection Act* (FIPA), which consolidated the *Agricultural Stabilization Act* thereby terminating commodity specific stabilization programs, the *Crop Insurance Act* excluding its specific cost sharing arrangements, and repealed the *Western Grain Stabilization Act* following the 1990-1991 crop year. The act allowed for a crop insurance program, legislated a NISA-type program, and set out guidelines for a revenue insurance program. It also allowed for special programming under certain conditions approved by Governor in Council. Industry representatives and the federal and provincial governments spent considerable time debating the principles under which the new act would operate. These principles, incorporated into the act, were:³³

- (2) in negotiating an agreement authorized under subsection (1), the Minister shall take into consideration the following principles in respect of any program to be established under the agreement:
 - (a) the program should not unduly influence the decisions of producers of agricultural products with respect to production or marketing, and should encourage adjustments with respect to production or marketing so as to improve the effectiveness of the responses of producers to market opportunities;
 - (b) the level of protection to be provided by, and the relative share of governmental contributions to be provided to, the program in relation to particular agricultural products or classes of agricultural products should be equitable and reasonably consistent with all other agreements, taking into account regional diversity;
 - (c) the program should encourage the long-term social and economic sustainability of farm families and communities;
 - (d) the program should be compatible with Canada's international obligations; and
 - (e) the program should encourage long-term environmental and economic sustainability.

³³ Farm Income Protection Act, 1991, Section 4 (2).

These principles summarize much of the concern and debate within governments and industry. First, the worry about programs driving farmers' planting decisions rather than responding to market signals was incorporated into the first principle. There was a wide range of emerging specialty crops, particularly in western Canada. The fear was that with long-term erosion of real grain and oilseed prices, programs could be locking farmers into a few large crops.

The second principle reflected the regional equity debates, coming from the arbitrary division in some of the 1980s *ad hoc* programs between eastern and western Canada, between and within horticulture and the grains and oilseed sectors, and between provinces. It also was an updating of the concerns which stimulated Section 10 in the *Agricultural Stabilization Act* as amended in 1975. The difficulty was that equity was defined differently across regions and sectors. For some, clearly in the case of Quebec, for example, equity was defined as the same number of federal dollars flowing to the province per dollar of farm cash receipts, regardless of the income levels, prices, or natural events in the province. Other sectors regarded equity in the use of federal spending as responding to the level of hurt in each sector and region, without any acceptable definition of hurt. The principle was an attempt to respond to these pressures and jealousies. It also began the slow process of bringing support policies back to national uniformity after decades of separation between eastern and western grains support policies and programs.

The third principle regarding the long-term social and economic sustainability of farm families and communities captured the view that farm families and their communities were being threatened by a progression of natural events as well as growing competition from abroad. It placed responsibility for the health of agricultural communities within agricultural policy and programs, even though few rural communities relied on primary agriculture for more than 20 percent of their economic activity.

The fourth principle is the first clear enunciation of the growing concern for potential trade action against Canadian agriculture. Following the countervail action on hogs by the USA in the mid-1980s, the livestock sector in particular was wary of any long term support programs, however they were designed. As well, the texts regarding treatment of agricultural subsidies in the WTO were being drafted with a view toward some types of support that might avoid trade action.

The fifth principle responded to the growing concern within agriculture as well as at the consumer and citizen level of the impacts of agriculture on the environment. This principle and other parts of the FIPA provided the first significant link between agricultural support funding and the protection of the environment.³⁴ Other more general environmental legislation was underway at the time. By placing specific

³⁴ FIPA, Section 5 (2). "An agreement respecting any program shall, subject to any applicable laws of Canada or a province, (a) provide for the circumstances and conditions under which insurance may be withheld, restricted or enhanced for the purpose of protecting the environment and of encouraging sound management practices to ensure environmental sustainability; and (b) require an environmental assessment of the program to be conducted within two years after the coming into force of the agreement and every five years thereafter, and provide for the manner in which the assessment is to be conducted." No actions have been undertaken to restrict programming under the Act as a result of Section 5 (2) (a).

reference within the FIPA, the attempt was to allow the Minister of Agriculture to establish environmental guidance for agriculture rather than relying on the more general legislation. The belief in the farm sector was that the Minister of Agriculture would be more responsive to their concerns than a Minister of the Environment would.

The Gross Revenue Insurance Program was intended to bring yield insurance together with gross income insurance. The original idea was that price times yield, aggregated across all crops on the farm, provided more effective stabilization of the whole farm than support programs for individual crops, and it would direct government funding to those suffering substantial losses. Under the individual crop approach, such as crop insurance, the gross income of the farmer could be above normal, and the farmer could still receive payments for the yield or price loss on one of the crops. Under the original concept for GRIP, the variation in gross revenue for the farmer would be the measure signaling payment.

As the program was implemented, Crop Insurance effectively remained as a separate program, and GRIP was to supplement the incomes of farmers in years with lower than normal gross incomes. During the development of the program, many variations were modeled in aggregate and for individual farms. The historic period against which current incomes would be measured was selected as the preceding 15 years, long enough to capture the high price levels of the 1970s within the average, providing, initially at least, substantial levels of support. Both Crop Insurance and GRIP were required under the act to have premiums to assure that funding arrangements were self-sustaining.

The Net Income Stabilization Program, designed by a small group of farmers, was a significant departure from earlier programming. It was a whole farm program, that is, all commodities were included automatically in the program unless specifically excluded. As well, it was based on the premise that farmers should take greater responsibility for stabilizing their own operation by choosing when and how to access funding available through the program. Essentially, governments and the farmer would bank funds each year in an account for the individual farmer, and allow the withdrawal of these funds under certain circumstances, although the farmer was not required to withdraw funds when triggered. Once triggered, it was the farmer's decision to withdraw the funds or to leave the funds until a future date when they were triggered again. Each farmer was allowed to draw funds out of his/her account whenever the net income in a year was below the preceding five-year average. Also, the farmer could withdraw funds from the account if the farm family household income was below \$25,000 or an individual's income was below \$15,000. These levels were subsequently raised to \$35,000 and \$20,000 respectively.

This program received surprisingly little debate among farm groups at the time of its initiation. While the cattle industry requested that cattle not be included in the program, the decision was left to the individual provinces to choose. As well, it was relatively low cost in relation to the emerging GRIP program where the debates on

regional and commodity equity, support levels, and cost sharing were being played out. Finally, this program had fixed cost-sharing arrangements among farmers, federal, and provincial governments on a long-term basis, the first of its kind outside of crop insurance programming in Canada.

The cost shares were set at three percent of eligible net sales for the producer, two percent for the federal government, and one percent for the provincial government. However, at the initiation of the program, the federal government paid some of the provincial shares and topped up the accounts for farmers. The rationale was that until accounts could be built up, there would be very limited stabilizing capability within the program. With the urgency by grain and oilseed farmers for relief from low prices, GRIP represented a far more important and immediate program than NISA because of this delay in NISA account build up. This funding arrangement in NISA temporarily resolved part of the equity debate. Within the program, every participant received money in his/her account every year regardless of need, region, or commodities produced. In doing so, the program generated very little emotion in the equity debate. By funding the program for each participating farmer, the participation level in each province established the provincial shares of the federal funding.

With the FIPA in 1991, the overall safety net included:

- 1) National programs:
 - a) Crop Insurance Program,
 - b) Gross Revenue Insurance Program,
 - c) Net Income Stabilization Account;
- 2) Provisions for *ad hoc* programs:
 - a) *Agricultural Products Board Act* (largely inactive, powers consolidated into the *Agricultural Marketing Programs Act* [AMPA], 1997),
 - b) Provisions for special measures (Section 12, FIPA),
 - c) *Department of Agriculture and Agri-food Act* (discretionary powers under Section 5);
- 3) Cash flow enhancement and price pooling programs for storable crops:
 - a) *Prairie Grain Advance Payments Act*,
 - b) *Advance Payments for Crops Act*,
 - c) *Agricultural Products Cooperative Marketing Act*,
 - d) *Canadian Wheat Board Act*.

With this package of instruments, the federal government felt for the first time in several years that there was a defensible set of programs domestically and internationally. Domestically, governments could deflect requests for *ad hoc* or special interest group funding by pointing to equitable programs available to all (who wanted access). The added fiscal burden in the provinces sat heavily on some, Saskatchewan in particular. However, the principle of cost sharing between

federal and provincial governments had been clearly established across the on-going programs. The original expectation was that with prescribed cost sharing in programs, provinces would be less willing to lead the calls for additional assistance from the federal government. From an international perspective, the NISA program as whole farm fit some but not all of the criteria in Annex II of the WTO for a green program, exempt from countervail. Subsidy levels were falling in line with expectations in the WTO, and there were upper limits on amber subsidies for all countries, providing some protection from continuously rising subsidies by other competitors.

One other element emerged from this program set in 1995. The overall federal-provincial cost shares were set at 60 (federal) and 40 (provincial) across NISA, GRIP, Crop Insurance, and advance payments programs. With specific cost sharing arrangements in place for NISA and GRIP but no longer for crop insurance, each province's allocation of funding left some funding for other uses. That is, with NISA and GRIP funds with specific cost shares built into each program (neither of which was 60-40), provinces could adjust crop insurance cost shares independently across provinces, top-up the national programs, or use the funds for other province specific programs so long as the overall 60-40 cost sharing relationship was maintained. As a result, companion programs were developed in most provinces to fully utilize the federal funding. A very wide range of programs was initiated through the 1990s, designed in some cases to add to existing support measures and in others to strengthen agricultural adaptation and adjustment.

As expected, GRIP began its first year with very large payments to grain and oilseed producers. Every year thereafter, the fifteen-year average on which support was based continued to weaken as the years in the 1970s and early 1980s were eliminated from the averaging period. As prices rose in 1994 and 1995, and the support levels weakened, surpluses in the GRIP accounts built. By 1995, Saskatchewan had withdrawn from the program with a large remaining program surplus, leading to the effective termination of the program in 1996 across Canada. Only Ontario continued the program for corn under the label of the Market Revenue Program.

The concern with federal budget deficits began to grow in the late 1980s and early 1990s. In 1995, the Program Review by the federal government sharply cut program spending. For safety nets, the total costs were to be reduced from about \$850 million annually to a maximum of \$600 million annually by 1997. The *Western Grain Transportation Act* payments were eliminated with a final payment of \$1.6 billion for farmers and \$600 million for infrastructure. The dairy payments were phased out beginning in 1995-96 and terminating in 1997-98 fiscal years. The Feed Freight Assistance Program was terminated with a final payment of \$64 million to affected producers.

In 1995, Alberta withdrew from the NISA program. Its withdrawal was based on concerns that government funding was going every year to every farmer regardless of need, the continuing antipathy of the Alberta and BC cattle industries to support measures, and that accounts were not being drawn down necessarily in response to

low returns on farms. The federal government used its allocation for the province to pay the entire NISA costs in the province, on the agreement that Alberta would operate support programs that would qualify for inclusion in the cost-sharing arrangement to meet the 60-40 requirement. In doing so, Alberta (and later Prince Edward Island) began crafting a program that would become the design basis of the Agricultural Income Disaster Assistance (AIDA) and Canadian Farm Income Protection (CFIP) programs a few years later.

The WTO Agreement and its agricultural provisions were signed in 1994 and took effect in 1995. There was the clear expectation that domestic subsidies would be curtailed in the developed countries. With the 1995 farm bill in the USA, the general expectation in Canada was that USA subsidies for the program crops would sharply decline, bringing the USA subsidy levels into line with Canadian levels emerging from the re-establishment of safety nets in the early 1990s and the Program Review in 1995. However, as droughts and some low commodity prices emerged, it became clear that there was not wide and continuing support in the USA for market oriented, limited responses.

In 1997, a number of acts were consolidated. The *Advance Payments for Crops Act*, the *Prairie Grain Advance Payments Act*, the *Agricultural Products Board Act*, and the *Agricultural Products Cooperative Marketing Act* together became the *Agricultural Marketing Programs Act*. The powers under the *Agricultural Products Board Act* became Section III of the new act entitled the Government Purchases Program, and the *Cooperative Marketing Act* became Section II of the act entitled Price Pooling Program. However, the two advance payments acts were rolled together as a single program, with the exception that the Canadian Wheat Board continued to operate an advance for Board grains in western Canada. All other program operations are carried out through arrangements with farm organizations. With this act in 1997, a common set of programs for agricultural safety nets had been achieved, the first nation-wide commonality in a century, at least in legislation, with the exception of the *Canadian Wheat Board Act*.

The stronger grain and oilseed prices after 1992 considerably eased the pressure on governments for *ad hoc* programming. Nonetheless, small regional events continued to create pressures for some redress both federally and provincially. But the new programs, NISA and GRIP, coupled with higher grains and oilseed prices, and the Crop Insurance and Advance Payments appeared to satisfy the needs of the grains and oilseed industries. The reduction of safety net funding to \$600 million annually by the federal government through the Program Review in 1995 did not stimulate major concern within the industry at the time. Even the termination of GRIP in all but Ontario in the mid-1990s, while difficult, did not force a reconsideration of the overall safety net package.

The decline of hog prices, starting in spring 1998, and their collapse in fall 1998, led to a new round of consideration of federal and provincial responses to this event and others of similar nature. The hog industry was still adamant that commodity

specific programming should not be used so that a commodity specific response to hogs was unacceptable. As well, grains prices had declined in 1997 followed by oilseed prices in 1998. The NISA and Crop Insurance programs were regarded in the industry as insufficient to deal with the sustained downturn experienced at the time, coupled with a forecast of continued low prices in these commodities for some time.

Alberta, upon withdrawing provincial funding from the NISA program in 1995, began an innovative program designed to deal with shortfalls in net income of farmers. Prince Edward Island followed suit soon after. This program essentially supplemented net income of farmers when the current year net income fell below the 70 percent of the average for the preceding five years. With the urgent pressure for action by the federal government and provinces to respond to the sudden collapse in hog prices and the run down in grains and oilseed prices, a slightly modified Alberta style program, AIDA, was adopted for the 1998 and 1999 years. It was whole farm, designed to meet the criteria of the WTO Annex II Paragraph 7 for green box to ensure it was not countervailable,³⁵ cost shared between federal and provincial governments on a 60-40 basis respectively, and with payments based on individual experience of the farm operator rather than all farmers receiving payments regardless of need or experience. Even though provinces had agreed to the 60-40 overall cost sharing in the safety net arrangements in the mid-1990s, some provinces were extremely reluctant to join this new program. Two paramount considerations by the provinces were involved. First, Saskatchewan, in particular, felt that the fiscal burden of an additional program was unfair to the province because of the very large proportion of the economy represented by the agricultural sector in the province. Second, the problems causing the income issues in agriculture were claimed to be international (particularly the extremely high grain/oilseed subsidies in the USA) and hence the responsibility/jurisdiction of the federal government alone. Nonetheless, all provinces eventually joined the federal government in delivering the new program.

The new AIDA program was clearly targeted at severe drops in income for the farm as a whole, providing partial relief by governments for losses greater than 30 percent of net income in a year compared to either the immediately preceding three years or the Olympic average of the preceding five years (three of the past five years, removing the highest and lowest years, as specified in the conditions for green programming in paragraph 7 of the WTO Annex II Agriculture Agreement). Since this program was outside of the cost-shared, safety net envelope established in 1995, efforts began immediately with industry and federal and provincial government to determine a new safety net arrangement starting in the 2000 year. The new three-year agreement reached in July 2000, called for NISA, Crop Insurance, CFIP, the federal advance payments programs, and the continuing companion programs to be funded from a single federal envelope of \$1 billion matched 60-40 by the provinces.

³⁵ This was the case at least while the peace clause was in place. This clause in the WTO, denying counter-vail action on green programs, expired at the end of 2003.

Provincial shares were established for the federal funding based on shares of gross farm receipts in each of the provinces.

The Agricultural Policy Framework (APF)

Once again, federal and provincial governments felt that a comprehensive set of safety nets had been established with the agreement in July 2000. Within a few months, however, the federal government announced an *ad hoc* program of \$240 million based on intense political pressure from Saskatchewan to assist grain and oilseed producers because of the combined changes of transportation subsidies and the change in CWB pooling practices. The funds were distributed based on the producer's nearest elevator and the change in basis caused by the two changes. One year later in March 2002, again from political pressure, the federal government announced \$500 million to be cost shared with the provinces on a 60-40 basis, to be distributed to all farmers within the NISA program and to any others wishing to provide equivalent data or sign up for the program. Clearly, the programs put in place along with the financial cost-sharing arrangements with the provinces were insufficient to deflect the pressures for additional income assistance.

As soon as the three-year framework agreement was signed in mid-2000 for the 2000-2002 period, federal and provincial Ministers began to construct a comprehensive approach to agriculture and agri-food policy for Canada. By June of 2001, federal-provincial Ministers had signed the Whitehorse Accord covering the goals, objectives, and performance measures for five broad areas of policy:

- risk management,
- renewal,
- environment.
- food safety and quality, and
- science.

By mid-2002, a Framework Agreement was signed outlining the parameters within which programming in each of these areas would be arranged by both orders of government, as well as the federal funding commitment of \$1.1 billion annually. During 2003, provinces and the federal government signed implementation and program agreements covering all areas of the APF including risk management (safety nets). However, in achieving the arrangement, an additional \$1.2 billion of *ad hoc* assistance was provided by the federal government (not cost shared with the provinces), \$600 million attributed to each of the years, 2002 and 2003. The money was distributed across all farmers based on their gross sales.

Because of the low aggregate net income in agriculture in 2003, additional federal funds were made available to farmers in winter/spring 2004. However, even though these funds went directly to all farmers, the payments were to be counted as revenue in the CAIS Program. In doing so, these *ad hoc* payments would reduce

the payments under the CAIS program, specifically for those farmers claiming CAIS Program payments. Where no payment under CAIS is made to a farmer for that year, the *ad hoc* payment essentially provides cash to a farmer who has not experienced a loss. Where federal only (not cost shared with the provinces) *ad hoc* funding is provided, provinces' cost under CAIS is reduced by this offset. As a result, provinces still have an incentive to press for federal only *ad hoc* funding.

These issues lie at the center of the continuing debates regarding equity and adequacy for risk management programming. The on-going program agreements incorporate fixed cost-sharing arrangements, targeted to those with income losses, and income-based rather than commodity specific programming. The agreements were designed with the intention that additional *ad hoc* funding would not be needed except in most unusual circumstances. However, *ad hoc* programming for some or all farmers has continued for each of the last several years with a number of side effects.

- *Ad hoc* payments reduce the CAIS Program payment for those claiming a CAIS Program payment in the year in which the *ad hoc* funding was received. For those not receiving a CAIS Program payment, i.e., experiencing no loss in the year, no deduction is made. Stated differently, those with losses receive no (or limited) benefit from the *ad hoc* payment; those without a loss in that year gain by the amount of the *ad hoc* payment.
- Where payments are made for extraordinary circumstances, such as BSE, these payments may also be counted as revenue for the farmer in calculating CAIS Program payments. Hence, where payments are made responding to a commodity-specific event affecting income, the *ad hoc* payments offer no (or limited) gain to the producer who reports a loss for the year. An affected producer with no loss for the year, gains by the full amount of the *ad hoc* payment.
- Even with fixed cost-sharing arrangements in place between federal and provincial governments for on-going programs, provinces still have the incentive to argue for federal only *ad hoc* payments since these payments can offset some provincial costs under the CAIS Program, whenever the federal government gives in to the provincial demand.
- Where one province agrees to cost share an *ad hoc* program (usually 60-40 federal-provincial), producers in that province receive greater support than in a province which does not agree to cost share an *ad hoc* program. Hence regional differences in support can arise with *ad hoc* federal funding, but not necessarily under on-going programming.
- The program agreements under the APF indicate 60-40 (federal-provincial) cost sharing for the on-going programs. The intention in the agreement was to assure that all costs under the CAIS and Crop Insurance Programs would be met annually regardless of the demand for the programs in any year. However, the federal-provincial agreement cannot legally bind the legislatures to appropriate

annual funding for the programs, so there can be regional differences in support available to farmers when a provincial legislature limits funding or fails to appropriate funding for the programs.

- With the programs designed to meet the needs of farmers to manage income risks from all or most sources, *ad hoc* programming was seen to be a last resort for completely unforeseen events with serious consequences for continuity of an industry, region, or sector. BSE or a 100-year flood would be examples of such an event. However, where lobby groups disagree with the move toward national, whole farm, income-based programming (or other elements of the programs); convincing governments to respond annually with *ad hoc* programming can undermine the support for the design features in the on-going programs. *Ad hoc* payments become a demonstration that the on-going programs cannot work in their present form.

Debates in the Future

With Agricultural Policy Framework in place for the period, 2003-2007, the debates are already beginning for continuation beyond this period. The shift in design of risk management programs is clearly oriented toward the viable commercial farms, in the sector, which can establish a profitable and productive track record in farming. Nonetheless, the continuing *ad hoc* programs to supplement income in addition to these on-going programs appear to be undermining the on-going programs established through the APF. The result is that the *ad hoc* programs seem to be responding to the perceived need for redistribution from one part of society to another based on an income deficiency in farming (income support) while the on-going programs are designed to assist farmers in the short term for losses which they cannot control (risk management or stabilization).

Two broad options (or some combination of them) seem apparent. The first is that in addition to the current on-going programs, some additional program may be needed to supplement farm incomes across the board. The difficulty with this option is that any across-the-board income supplements would be offset in whole or in part by the on-going programs, helping those most who do not experience losses in a given year, and helping those least who have partial or major losses in a given year. The second option is to provide a choice to farmers between the on-going programs on the one hand, and a continuing income supplement based on their own income history in agriculture on the other, but not both. This avoids the problem that the income supplements do not affect farmers equally as in the first option, but clearly delineates two sets of farmers in Canada. With fairness as a fundamental aspect through several decades of policy in Canada, the choice of these two options or some combination of them will be an exceedingly difficult one.

In terms of the evolution of the two on-going programs, both CAIS and Crop Insurance could be combined into an insurance style single program with whole farm and commodity-specific, yield-loss arrangements. A related issue for the next

round in the APF is the extent to which risk management programming becomes contingent on food safety and quality measures and environmental protection at farm level. While some jurisdictions are already pressing for greater linkage, establishing common ground across all provinces and industry groups will be exceedingly difficult. Nonetheless, the markets for agricultural products are already leading in this direction. The issue is whether governments are willing to speed this process to achieve an advantage for Canada in domestic or international markets.

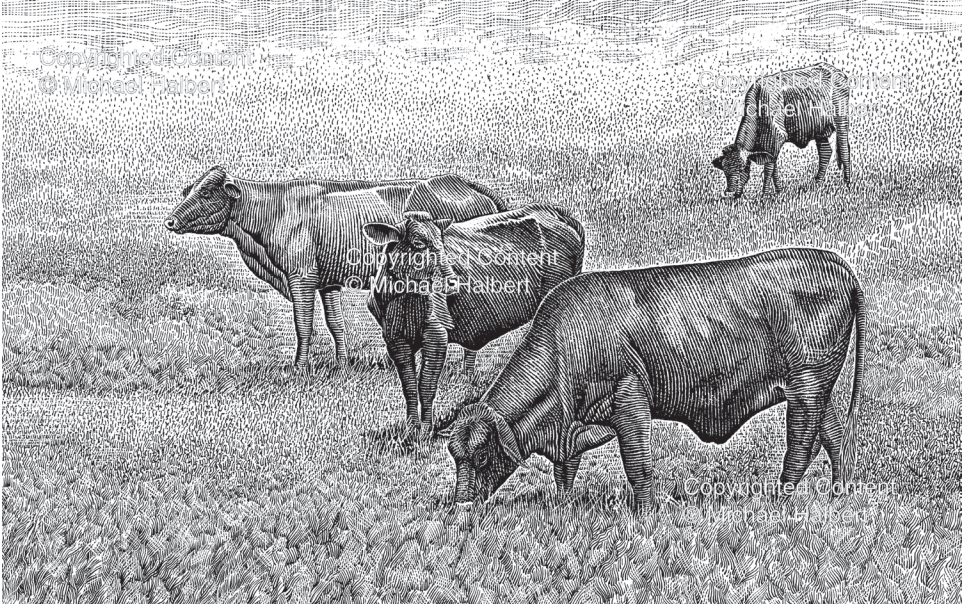
The final issue relates to the nearly moribund negotiations in the WTO. From initially strong commitments among member states to progressively reduce trade barriers, current support and progress toward further trade liberalization remains anemic. Two critical issues will need to be addressed if and when the WTO negotiations make progress. The high tariff levels in the dairy and poultry sectors in Canada are clearly a target in the negotiations, calling into question the current domestic prices and stability enjoyed in these industries. Equally, as the Aggregate Measure of Support (AMS) is lowered and increasingly limits the amount of support provided to farmers, the limits are not applied exclusively to the funds spent by government for risk management and/or income supplements. Market price support in the dairy and poultry industries is also included in the AMS. Some sharing of the reductions will be needed between the direct expenditures and the market price support. While the debates on distribution among farmers of the direct expenditures of governments for risk management and income supplements have a long and difficult history, finding fairness across an even wider spectrum of players and benefits in Canadian agriculture combines two of the more divisive issues in Canadian agricultural policy debates of the last 40 years.

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Structure of Agriculture



Many of Farm Foundations earliest programs involved concerns about land ownership, tenure, family farms, and their survival. In the 1970s, Farm Foundation educational programs such as *Who Will Control U.S. Agriculture* received national attention. Today, structural concerns revolve around the future of animal agriculture, the demise of many traditional agricultural cooperatives, and the impacts of bioenergy on land prices and ownership patterns. While it might be argued that while everyone talks about structure, nothing is done about it. Concerns about structural change in agriculture remain on the agenda, perhaps because of their impacts on the people and families associated with agriculture and Farm Foundation.

The Future of the North American Livestock Industry: Challenges and Opportunities

The North American livestock industry (beef, pork, dairy, and poultry) has and continues to undergo major structural change due to rapid evolution in product characteristics, worldwide production and consumption patterns, technology, size of operation, and geographic location. Production once dominated by independent, family-based, small-scale firms, is now led by larger firms that are tightly aligned across the production and distribution chain as evidenced for U.S. pork production in Figure 1 and U.S. beef production in Table 1. Slaughter of livestock is also increasingly dominated by larger firms as indicated for the U.S. in Table 2.

Contracts, vertical integration, and other types of marketing arrangements are increasingly important across nearly every market level – from input supply and seed stock to finished food product markets as reflected for U.S. pork in Figure 2. Niche markets for differentiated products that may command a premium from some consumers are growing. Similar trends characterize the Canadian and to a lesser extent

¹ The author is a distinguished professor, Purdue University. This article is abstracted from *The Future of Animal Agriculture in North America*, a study funded and coordinated by Farm Foundation. Boehlje coordinated one of the study Task Forces and wrote the chapter entitled “Economics of Production, Processing, and Marketing” for that study.

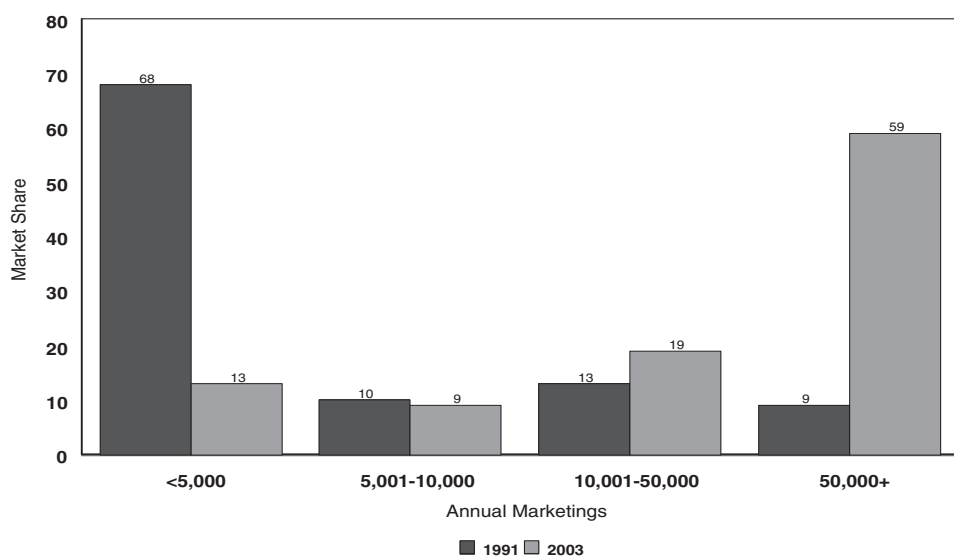


Figure 1. Change in Market Share by Pork Producer Size for 1991 and 2003.
Source: Boessen, Lawrence and Grimes, *2004 Pork Industry Structure Study*, June-July, 2004.

Table 1. Cattle Marketings by Size of Feedlot.

	2004	2005
Head	% of Annual Slaughter	
<1000	14.7	14.0
1-16,000	33.7	16.2
16-24,000	9.0	8.6
24-32,000	9.0	9.2
32-50,000	16.7	26.2
50,000 or greater	16.9	25.8

Source: USDA Cattle on Feed, NASS, February 2006.

Table 2. Four (4) Firm Concentration Ratios for Cattle, Sheep, and Hog Slaughter.

	1980	1990	2000	2004
	% of Annual Slaughter			
Cattle	28.4	58.6	69.6	70.9
Sheep	55.9	70.2	69.8	66.9
Hogs	33.6	40.3	57.1	61.3

Source: USDA, Packers and Stockyards Statistical Report, G1PSA SR-06-01, February 2006.

the Mexican livestock industry. As the industry has become more industrialized, specialized, and managerially intense, production and processing plant location options have expanded beyond traditional production regions with increased emphasis on global sourcing and selling.

There is great diversity in how livestock is produced in North America and the world, but common themes are emerging. As in North America, many countries are experiencing major structural changes in their production sectors, and environmental concerns in production are nearly universal. Technology adoption is rapid and a world standard is evolving to greater commonality of technology, size of production units, processing and quality, particularly in the case of pork and poultry but less so for beef and dairy in large part because of their reliance on forage.

Challenges and Opportunities

Demand

Demand for animal protein depends primarily on income and population growth. Predicted increases in income in developing countries, particularly in Asia and Latin America, will increase global demand for animal products during the next generation (Figure 3). In high-income regions like North America and Europe, consumers are demanding animal products with specific characteristics related to nutrition and health concerns and specific production practices. Because different con-

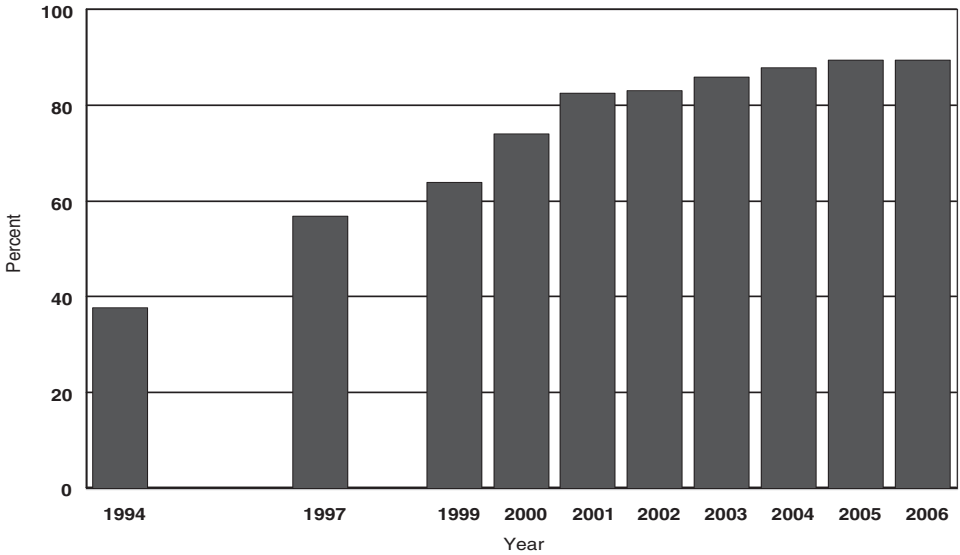


Figure 2. Percent of Hogs Sold Under Contract or Vertical Integration.

Source: 1994 and 1997 studies by University of Missouri, Pork Magazine, PIC, DeKalb Choice Genetics, National Pork Producers Council, Land O'Lakes. 1999-2006 studies by University of Missouri, NPPC, National Pork Board. 2002-06 USDA/AMS data.

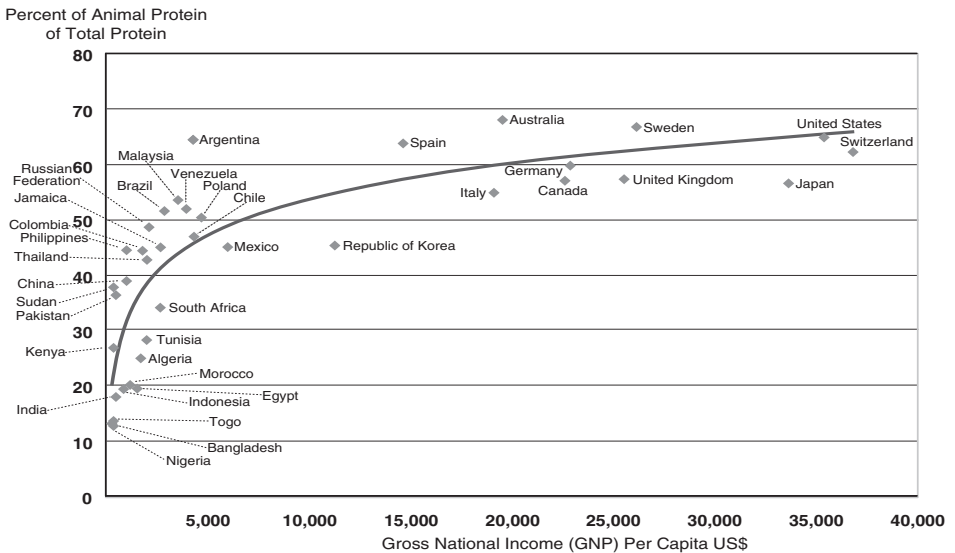


Figure 3. Animal Protein as a Share of Total Protein.

Source: Based on data through 2002 from FAO and World Bank.

sumers place different values on various product attributes, there will be markets for animal products with specific characteristics for which consumers are willing to pay premiums. For example, demand for niche market products like certified organic products is growing rapidly. Many small and mid-size producers can succeed if they

are able to position themselves to competitively provide products that command premium prices in the marketplace.

Supply Chains, and Size and Scale

There will be increasing emphasis on managing and optimizing livestock supply chains, from genetics to end users. This approach will improve efficiency through better coordination and quality control throughout the chain, reduce food safety risk, and increase the ability to quickly respond to changes in consumer demands. Retailers will impose consumer preferences on the production process through production specifications, including differentiated or specialized products, such as hormone free, organic, or animal friendly. Recent adoption of animal friendly production practice requirements by McDonalds (larger cages for poultry) and Smithfield (pens rather than stalls for gestating sows) are examples of consumer concerns being transmitted through the supply chain.

Food safety is a key risk for all segments of the livestock industry. Food products that make people ill, or in a worst case scenario cause death, can quickly destroy brand value, the most valuable asset of a branded food product company. Supply chain management using a traceback system, combined with quality assurance procedures such as Hazard Analysis and Critical Control Point (HACCP), facilitates control of the system to minimize the chances of a food contaminant, or to quickly and easily identify the sources of contamination. Traceability is increasingly a key motivation for controlled origination of raw materials from certified suppliers to implement a supply chain philosophy.

Animal identification and traceability systems have a key role to play in the future of the North American animal agriculture industry. Whether the underlying issue is animal health, food safety, animal welfare, process assurance, or quality attributes, animal identification and traceability are necessary. Canada is well ahead of the United States and Mexico on this issue. Identification and traceability systems will emerge rapidly during the next few years to enhance the industry's ability to respond to natural and intentional disease outbreaks, improve food safety, and provide assurances of food quality and wholesomeness. Some elements of these systems will be developed and managed by government; other parts may be purely private, and some elements may require public/private partnerships.

The supply chain approach will increase interdependence between the various stages in the production/processing/distribution chain. It will encourage producers and other members of the chain to form or join strategic alliances, networks, and other linkages to improve logistics, product flow, and information flow. Competition will occur in supply chains competing for a share of consumers' animal protein expenditures rather than individual firms competing for market share.

Supply chain optimization concepts have a significant implication for growth of the livestock industries. In the past, decisions concerning location of production, processing, and distribution centers were made in a relatively independent fashion.

In the future, this will not be the case. It is unlikely that new processing plants of optimal size to capture economies of scale will be constructed without specific plans for building production systems to supply those plants. Producers are not expected to invest in production capacity without assurance of access to processing plants that can pay competitive prices for their products. The benefits of a coordinated system will result in the development of production-processing centers and the supporting infrastructure as the optimal strategy for growth and expansion of the industry. This strategy will not only influence the geographic location of the industry, but also further increase the interdependence among the segments of the industry.

Ethanol Production and Energy Costs

Corn based ethanol has become a popular fuel source in the United States. In May 2007, 129 new ethanol plants were operational, and an additional 384 plants were planned or under construction in the United States. Ethanol production is projected to use almost 30 percent of the corn crop in 2008. Distillers grain, a co-product of ethanol production is used as an animal feed and will replace corn and soybean meal as a source of calories and protein in rations. This is particularly true for ruminants – beef and dairy cattle – that can utilize the high fiber distillers grain and to a lesser extent for monogastrics – hogs and poultry. A negative impact of distillers grain and other co-products is a concentration of and therefore higher excretion of nutrients, especially phosphorus. This will require more land for manure application to meet environmental regulations or a costly treatment of manure to recover phosphorus for distribution off farm. An additional problem in using distillers grain in rations is its fat content and composition – the fat of pork and milk products in particular is altered to be less desirable from both processing as well as health perspectives. The increased costs of production due to higher feed costs from increased demand for corn for ethanol will be felt mostly in North America, decreasing the region's world competitive position.

High energy prices increase costs of production. The United States has an animal production system that requires more fossil fuels than grazing or less confined systems. Some regions or countries will see higher energy prices in the form of higher transportation costs to import grain or higher irrigation costs to pump water to grow grain. Higher energy prices coupled with ethanol production may move some livestock production closer to ethanol plants to lower transportation and distillers grain drying costs. Those savings may be partially or totally offset, however, by the increase in grain cost closer to the ethanol plant.

Production Technology and Crop-Livestock Synergies

The management of livestock production is expected to trend toward more micromanagement of specific production sites, specific pens, and possibly even specific animals. The motivation will be to minimize costs and enhance product quality; this approach to production management will also increase the amount of information

available regarding what affects animal growth and well-being and product attributes that, in turn, will be used to refine the system.

Increased synergy between animal and crop producers is anticipated in the future. In a long-term scenario of fertilizer costs increasing and fertilizer resources diminishing, the use of organic fertilizers will likely be much more valuable. When rations can be formulated to meet a specific animal's requirements, the need to supplement diets will be reduced, reducing excess excretion of nutrients that need to be stored, treated, and used on cropland. Costs would also be reduced, as would the pressure on the environment. In farms, regions, or countries that import grain to feed animals because not enough is produced locally, manure nutrient management is more challenging.

Technologies are available to enhance the efficiency of animal production and control the impact of animal production on the environment. Large operations can better afford and manage manure treatment technologies, particularly those with high fixed costs. They can spread the costs over a larger volume of product and have sufficient volume to potentially sell value-added products. Some technologies in nutrition or housing designs are size neutral and will not affect the structure of the industry as long as the technologies are cost effective.

Feed Costs and Nutritional Technology

Feed is the highest operating cost – 50 percent to 60 percent – of most animal production operations. Any change in feed costs dramatically impacts profitability. Use of antibiotics, feed additives, dietary modifiers, and specialized feed ingredients has focused on increasing animal productivity. Research is underway to determine specific nutrient requirements for specific genetics. Recent biotechnology techniques have provided insight to the mechanisms controlling metabolism at the cellular level, allowing for development of diet modifiers or feed formulations to affect nutrient retention. These techniques will contribute to increased production and/or enable an increased price for an improved quality of product.

Many animal producers use specific feed ingredients or enzymes to reduce phosphorus levels in manure because of regulations on phosphorus applications to agricultural land. Animal production in areas with these regulations is at a cost disadvantage compared to areas in the world without such regulations. Some nutrition technologies influence the quality of the final animal product, which can potentially fit niche markets and result in value-added returns.

As noted earlier, the nutritional and logistics challenges and opportunities of using distillers grain in livestock rations will significantly impact the competitiveness of the industry. Increased demand for corn and soybeans for energy production will increase feed and livestock production costs and fuel a more intense feed/food vs. fuel debate unless or until distillers grains are more readily includable in livestock rations.

Labor and Immigration

Many segments of animal agriculture in the United States and Canada depend on a foreign born labor force. In the United States, many of these workers are from rural Mexico or Central America and are undocumented. The legal uncertainty associated with this undocumented work force has consequences for the workers and the companies for which they work. Workers may not receive full legal protections and may be reluctant to complain about working conditions. Employers are vulnerable to a variety of legal sanctions and risk the loss of a significant portion of their work force if immigration laws are strictly enforced. This legal uncertainty creates a cost that can be mitigated with revised government policies.

Technological advances and automation could dramatically alter labor requirements in production and processing. The constraint of labor availability in some regions or sectors could be reduced by greater substitution of capital for labor. Production is increasingly automated and sophisticated, including use of electronic monitoring and measuring devices to determine real time animal growing conditions and product quality characteristics. This information will be useful in reducing labor constraints as well as rewarding producers for quality attributes and in segmenting products into proper categories for efficient distribution to different end users.

Environmental Regulation

Some of the most critical issues to shape the structure and location of the livestock industry in the future are storage and utilization of manure and other byproducts from production and processing and mitigation of air and water pollution from the industry. Key environmental issues include:

- Recycling of animal manure,
- Processing manure into energy or other productive resources,
- Technological mitigation of nutrients and odors.

Until and unless technological fixes to environmental and odor problems occur, these challenges will continue to dramatically affect the size, location, and structure of the livestock industry. Relocation of the industry to geographic regions where there is more environmental absorptive capacity (lower population density, drier climates, fewer surface waterways, less permeable soils, or sufficient crop production), or where there is more willingness to exploit the environment, is likely to occur if technology is not available to solve environmental problems.

Environmental regulations can be a significant cost factor for the industry and will likely be a major factor in future investment decisions by the industry. While predictions of a “race to the bottom” are made, the increasing variability of regulation from location to location will impact decisions concerning the location of future animal production and processing units. Differences in environmental regu-

lation across countries, states, and provinces are problematic for animal agriculture. Broader multijurisdictional regulatory approaches may represent an opportunity for more efficient environmental management and lower industry costs.

Litigation related to environmental issues is a growing problem in the United States. While litigation is a symptom, not a cause of conflict, continued litigation can be expected unless there is meaningful legal reform that provides the industry with some safe harbor legal parameters in exchange for assuming greater responsibility for environmental concerns. Litigation or legislative outcomes must provide legal rights and responsibilities that balance business practices with environmental concerns to resolve the issues. In the environmental arena, uncertainty is often a greater problem than the level or type of environmental regulation.

Industry Mobility and Location

A major change in North American and world livestock production and distribution is the globalization of ownership and operations of production/distribution firms. Japanese companies have invested in pork production and processing systems in the United States (Oklahoma, Texas, Wyoming, and Indiana). The EU is encouraging European companies to locate operations in Asia, South America, and Eastern Europe. U.S. based companies have invested in processing capacity in Canada, Mexico, Brazil, Eastern Europe, and Asia. The livestock production/distribution industries are clearly becoming global in scope, not only with product exports and imports, but also with internationalization of production and processing. Today's technological systems can easily be transferred to other areas of the world, providing an environment where internationally focused livestock firms will likely build capacity offshore. In the future, only a very few livestock firms are likely to dominate world production and processing and will source and sell products globally.

In general, relatively low input costs, including feed, combined with modern technology and well developed input and product markets, institutions, and distribution systems, enable North America to be a competitive producer and supplier of quality livestock products. However, North America will be increasingly challenged in commodity production by Brazil in beef, pork, and poultry, and by Australia and Argentina in beef. It will be important for the North American livestock industry to maintain and increase its emphasis on quality attributes and differentiated products to expand its position in the global animal product markets and industries.

Environmental and odor problems may be significant deterrents to locating livestock production and distribution systems in various areas of

North America. But it is highly likely that much of the expansion in production to meet increasing worldwide demand for animal proteins will be by North American or European integrated production/distribution firms or alliances, regardless of where the production and plants are located. North America cannot rest its competitive case on low cost alone – it must adapt products to specific markets and provide enhanced quality control and health and safety assurances.

The Expected Future

Changes in the business climate, consumer behavior, or regulatory policy might interfere with the continuation of past trends and alter the long term direction and future of the North American livestock industry. Increasingly restrictive environmental regulations would make it more difficult to locate the industry in North America, or at least in various locales in the region. But continued emphasis and responsiveness on food safety and animal health regulations are likely to enhance the competitive position of North America relatively to other regions of the world that do not implement and enforce such regulations. More rapid development of niche markets for differentiated products would present a challenge to the commodity focused North American industry, but the U.S. production/distribution system is already adapting to this growing demand and has the capacity to continue to do so as the market expands. Increased demand for feedstuffs for ethanol production will impact the cost structure in the U.S. and Canada in particular, but technological advances in feeding distillers grains are likely to enable producers to include this feedstuff in much higher proportions in livestock rations. Returning to the traditional smaller scale, independent family farm business model is unlikely unless public policy mandates it, in which case the North American industry would encounter serious problems in maintaining global competitiveness.

The most likely future is that the North American livestock industries will respond to the challenges and maintain their competitive position in meat and animal product production and distribution. The trend to fewer and larger livestock and poultry production, processing, and marketing firms is expected to continue. The economies of scale in production and processing are significant and will drive larger scale, optimal size of the facility, as well as the firms. Firm level economies will be captured through effective supply chain management that improves cost efficiency and control, food safety and quality, and the ability to respond to consumer demands. Quality concerns will also drive more systematic, micro-managed production and distribution processes to reduce product variability and to improve conformance with quality standards and consumer expectations of uniform product attributes. Technology, including genomics and nutritional advances along with RFID and other tracing systems, will provide new efficiencies and information to better manage the system. Concerns about food safety and a drive to qualified suppliers and traceback will increase pressures for and payoffs of tighter coordination along the production and distribution chain.

Successful small to mid-sized producers face serious survival challenges in determining how they fit into integrated supply chain structures. Higher revenue may be possible in value-added niche markets where consumers pay high enough premiums for differentiated products to offset the increased cost of producing, processing, and distributing in small quantities. Small and mid-sized producers may be able to capture the market access and cost advantages of larger producers by joining a net-

work or alliance that acts like a large producer. Both of these options require a high level of cooperation and interdependence among producers.

The larger scale processing plants that will continue to be the norm require significant capital outlays and adequate supplies of live animals for efficient operations. Producers and their lenders are not expected to invest in production capacity if access is not assured to processing plants that can pay competitively for products. This interdependence will result in development of production-processing centers and supporting infrastructure as the optimal strategy for growth and expansion in the industry. The geographic location of such expansion will continue to be influenced by economics of scale and scope and the logistics of bringing feedstuffs to livestock and shipping livestock products to retailers. But capital and technology are increasingly mobile, and global livestock firms that locate production-processing capacity in different countries will increasingly dominate the industry. The implication is that the North American livestock industry will face even more competition in the future, but it is well positioned to compete in this increasingly global industry.

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Cooperatives in the 21st Century: Challenges and Opportunities

Agricultural cooperatives have undergone major changes since 1980. From 1980 to 2005, the number of cooperatives dropped by one-half. Of the 2,823 cooperatives that remained, 1,412 were primarily engaged in marketing of agricultural commodities; 1,128 were farm supply; and 356 were service types (USDA Rural Development). Gross annual business volume was \$92.5 billion in 1980 and since then has fluctuated but has remained around \$100 billion. Market shares have been static with cooperatives handling about 30 percent of farm marketing receipts and also about 30 percent of farm input sales. Business growth has been difficult since cooperatives operate in a mature domestic market with little international activity.

The 1990s experienced failures of some relatively large cooperatives. Farmland Industries of Kansas City, Missouri, the nation's largest cooperative at that time with interest in farm supplies, grain, and meats, went bankrupt. A large farm supply cooperative, AgWay of Syracuse, New York, did the same. Some others converted to other business structures or sold part of their business. Agrilink Foods, the largest manufacturer and marketer of frozen vegetables in the U.S. sold a majority equity investment to Vestar Capital. Members of Minnesota Corn Processors sold their farmer owned assets to Archer Daniels Midland. Dakota Growers Pasta Co., often used as an example of a successful new generation (value-added) cooperative, changed its business structure to a public stock company.

These events left some people asking whether the cooperative model is in trouble. Members of Congress have questioned whether cooperatives have gotten too big or lack proper management. In April 2007, the Antitrust Modernization Commission, which has been examining the nation's antitrust laws, submitted its final report to Congress and the Administration. As part of its recommendations, the Commission called for sunseting all immunities and exemptions, including the *Capper Volstead Act* and other agricultural immunities such as the *Agricultural Marketing Agreement Act*, the *Webb-Pomerence Act*, and the *Export Trading Company Act*. The debate centers not just on traditional agricultural cooperatives but also on food cooperatives, electric cooperatives, credit unions, and the new generation of value-added cooperatives.

While recent events may seem troublesome, they provide no evidence that the cooperative model is failing. To the contrary, there are many very successful cooperatives in business today. Cooperatives, like any other business structure, experience

¹ The author is an emeritus professor, University of Wisconsin, Madison.

problems, failures, or structural evolutions. Any number of major public stock companies has failed. There is nothing magic about the cooperative model. No business is guaranteed success. In many ways cooperatives are harder to manage than public stock companies. Cooperatives must meet the needs of a diverse group of members, be profitable, and obtain necessary equity capital to maintain and to grow the business.

The cooperative model is still a very viable business alternative. It is the responsibility of members and boards of directors to keep their cooperative successful into the future. Boards of directors and management must be receptive to change and to new and innovative business approaches. It may require innovative methods to acquire equity capital or build strategic alliances with other cooperatives and even with public stock companies to gain access to capital, modern technology, value-added products, or markets.

Challenges and Opportunities in 21st Century

Structural Change at the Farm Level

The continuation of a rather rapid structural change at the farm level means an increasing diverse membership for most cooperatives. USDA/NASS reports that in 2006 more than 55 percent of the farms had annual sales of less than \$10,000 and another 28.4 percent between \$10,000 and \$99,999. However, these two size classes account for 52.4 percent of the land in farms. Farms with annual sales of \$100,000 to \$499,999 account for 12.4 percent of all farms and 37.0 percent of land in farms. Just four percent of the farms had annual sales of \$500,000 or higher and accounted for 22.9 percent of the land in farms.

Cooperatives struggle with attempting to serve the needs of all members regardless of size but with different needs and expectations. Smaller members make up the largest portion of the membership of most cooperatives. These smaller members expect competitive prices that are not much different from prices of larger members. Larger members may be in a position to shop around and to negotiate favorable prices. While smaller members may comprise the majority of the membership, the majority of and an increasing share of the business volume may be with larger members. If the cooperative doesn't fulfill the needs and expectations of larger members, it could lose its business. The loss of business reduces operation capacity, driving up per unit operating costs for the cooperative and negatively impacting the remaining members.

Cooperatives cannot serve all members equally but must serve them equitably. This means differential pricing whether that is supplying farm inputs or marketing commodities. Differential pricing recognizes the difference in costs to serve small versus large members and/or differences in services requested. Differential pricing means different prices for small versus large members and/or differences in services requested but the same net margin per unit of product.

Cooperatives also need to decouple products from services provided and price accordingly. Some members may be interested in purchasing fertilizer but are not interested in the cooperative's fertilizer application service. Another member may purchase fertilizer but wants the cooperative to apply it. A small dairy farmer may only purchase protein and minerals. A large dairy farm operation may not only be interested in purchasing feed but expects a nutritionist from the cooperative to formulate a profitable dairy ration that changes as the price of feed ingredients changes. Thus, a cooperative must offer equitable pricing for both products handled and services provided.

Governance of cooperatives may hinder full implementation of differential pricing of products and services based on cost. One member one vote is practiced by most cooperatives. This often leads to all or most all of the board of directors representing the smaller members. The board may not support or recognize the need for differential pricing. Cooperatives need to evaluate their director nomination process to make sure candidates for director positions are qualified to serve as a director in a more complex business world and that the board of directors will represent the diverse membership. Cooperatives should also consider proportional voting that allows additional votes with a limit based on volume of business done with the cooperative. This may require a change in state cooperative statutes since not all states allow for other than one member one vote.

Cooperatives may not always offer the lowest price for farm inputs or the highest price for commodities marketed, but prices must be competitive. Nevertheless, cooperatives probably will not win the business of farmers by price alone. The new generation of farmers is not as loyal to cooperatives as their parents and grandparents may have been and are not going to do business with a cooperative just because it is a cooperative. Cooperatives must demonstrate an added value to members from what is offered by competitors, and this will probably be more than just price. But this is an opportunity for cooperatives doing business with a diversified membership. Smaller members may find difficulty in purchasing relatively small quantities of inputs along with associated services or marketing of a few head of cattle or a small quantity of grain. Many of these smaller farmers have off farm jobs and are interested in late day or weekend services. Cooperatives can profitably serve these types of needs of smaller farmers if differential pricing reflects the associated costs of doing so. By meeting these specialized needs, smaller farmers may recognize the need for and accept the prices the cooperative charges for inputs and services and/or prices paid for commodities marketed.

Larger members will demand competitive prices but may find value to their farm operation from services provided by the cooperative. Members with livestock may want a feed nutritionist. Crop farmers may be interested in a complete nutrient management plan, precision application of crop fertilizer and crop chemicals, and in the cooperative maintaining an informational bank on their planted acreage that not only documents fertility levels and applications but also crop varieties and as-

sociated yields and like information. While competitors may offer similar services, members may value the cooperative more because of the trust they have in the cooperative in serving the best interest of the members and not just interest in selling products.

Small cooperatives will have neither the personnel nor the technology to adequately serve this diverse membership. Thus, mergers, consolidations, and strategic alliances will continue to better position cooperatives to serve a diverse membership.

Structural Changes of Customers

Mergers and consolidations of profit corporations in the food business over the past two decades have significantly changed customers of cooperatives. Customers are larger in size, more sophisticated in purchasing, more highly leveraged, more opinionated, and much more demanding. This is a challenge for cooperatives attempting to serve these customers. It has forced cooperatives to merge and to form strategic alliances with other cooperatives and/or with their customers. Wal-Mart is now the number one food supermarket. Wal-Mart demands large volumes of high quality food products at very competitive prices along with dependable delivery and other services. This is a real challenge for cooperatives in the food business, but it is also an opportunity.

Cooperatives are small businesses in comparison to some of their potential customers. In 2006, Wal-Mart was the second largest U.S. corporation behind Exxon Mobil with \$315.7 billion in revenues. The largest U.S. cooperative was CHS, Inc., which had revenues of \$12.0 billion and ranked 188 in the list of the top 500 corporations. The only other cooperative in the list of top 500 corporations was Land O'Lakes, Inc. with \$7.6 billion in revenue.

Currently, there are cooperatives that are successfully and profitably serving these larger customers. Cooperatives need to recognize that they have two major advantages in serving the needs of food customers. First, opinion pools clearly show that the consumer of food products places a higher value on food products they know come from cooperatives. We see cooperatives with commercials on television or in print that capitalize on this very fact. A successful example of this is Florida's Natural cooperative with their *All Natural* ads that depict a grower handing off a carton of orange juice to a customer. But with private labeling and store brands, establishing a cooperative brand that is recognized by the consumer is not easily accomplished.

The second advantage is that cooperatives are in an excellent position to coordinate the link in the food system from producers to consumers. Cooperatives have an opportunity to work with their members to grow, produce, and market the volume and quality of commodities that meet the specifications of their food customers. With a growing interest in food safety and wholesome foods, cooperatives are in a position to capitalize on this advantage. Increasingly, consumers want to know how

their food is produced, where it came from, and how it was processed. Cooperatives can provide this information by tracking the food system from the point of production all the way to their customers.

Another trend in the food system is consumer interest in locally produced foods, organic foods, and natural foods. This may offer an opportunity for some smaller or mid-size cooperatives. Working with local farmers, and the majority are smaller farmers, cooperatives are successfully supplying fresh and processed food products to local farmer markets, restaurants, and food retailers. Local restaurants and food stores view local foods as an advantage in attracting customers. Such activity has been a means for supporting smaller farmers and local cooperatives. Projections are for this trend in consumer interest in locally grown, organic, and natural foods to continue. But because of this trend, larger food processor and marketers as well as large food retailers like Wal-Mart are increasingly offering organic food products at very competitive prices. But these larger companies are at a disadvantage in promoting locally grown food as well as food produced on smaller family farms.

There may be advantages for some cooperatives to form strategic alliances with major food companies. Capital requirements, risks, and the cost to enter a market may be greater than what the cooperative can bear. But there are opportunities for cooperatives to enter into supply arrangements with food processors. These processors may be willing to pay a premium for the cooperative's guarantee of a dependable supply of quality raw food products for processing. With these arrangements, the processor does not incur the associated costs of raw product procurement and dealing directly with individual farmers. Examples of successful alliances include Growmark, a farm supply and grain marketing cooperative with Archer Daniel Midland to market members' grain. Land O'Lakes, Inc., a farm supply and dairy cooperative, has an alliance with Dean Foods to supply raw milk to Dean Foods, but in addition, to receive royalties from dairy products sold by Dean Foods carrying the Land O'Lakes brand identity.

Globalization

Globalization of the food industry will increasingly impact commodity production and marketing in the next decade and beyond. Cooperatives do not have a strong track record for many major, successful, international, business activities. Some have had limited experiences, and more are getting involved. But the international market is growing, and cooperatives need to be involved if they also wish to grow as a business. Just five percent of the world population lives in the U.S. with six percent in the European Union, two percent in Japan, 21 percent in China, 17 percent in India, and 48 percent in the rest of the world. Of course, the opportunities to export commodities and food products will be impacted by future outcomes of World Trade Organization trade negotiations that determine levels of export subsidies and market access.

Cooperatives may look to strategic alliances and joint ventures with international partners to better engage in the increasing global food system. Successful examples currently exist. CHS Inc has a joint venture between their Holsum Foods division and Mitsui known as Ventura Foods. Both CHS Inc and Mitsui manufacture similar food products. The joint venture enables CHS Inc., as a regional cooperative, to better serve both domestic and international customers. CHS Inc has another joint venture with Mitsui called United Harvest. This is a grain export joint venture that enables CHS Inc to expand its global customers for grain. Dairy Farmers of America has a joint venture with Fonterra, a New Zealand dairy cooperative and the largest world exporter of dairy products. The joint venture is known as DairConcepts. Fonterra brought into the joint venture not only international marketing expertise but also technological innovations and advanced research for the manufacture of dairy and cheese ingredients as well as dried and grated Italian cheeses for retail, food service, and industrial markets, both domestically and internationally. Dairy Farmers of America has a joint venture called Southwest Cheese Co. with Glanbia, a dairy company from Ireland with international dairy, consumer foods, and nutritional products. The joint venture built a cheese and whey manufacturing facility in Clovis, New Mexico. On the farm input side, Genex, an artificial insemination cooperative headquartered in Shawano, Wisconsin, has joint ventures with Italy (Superbrown Cooperative), Denmark (Dansire Cooperative), Finland (Cooperative Finland), Netherlands (Dutch Cooperative CRV), and India (IndiaGen). These joint ventures enable Genex to access international customers, broaden their product lines, and obtain financial resources.

Cooperatives may pursue sources of raw commodities from other countries. Fruit and vegetable cooperatives, for example, source raw commodities from Mexico, South America, and elsewhere. With international sourcing, cooperatives are able to maintain a year around supply of fresh produce for their U.S. customers. Global Berry Farms is a good example. Global Berry Farms was originally organized in 1935 as Michigan Blueberry Growers Association. In 2000, in order to broaden its lines of fruit and to extend the time frame for its ability to supply fresh fruit, it entered into partnerships with Naturipe Berry Growers in California for strawberries and Hortifruit SA in Chile for red and black raspberries and assumed the name Global Berry Farms. Global Berry Farms is now the leading supplier of fresh berries the year around to food retailers. CHS Inc., which exports grain and soybeans and soybean products to some 60 countries, has established partnerships with grain companies in Brazil to expand its source of soybeans for exports to its customers.

Another opportunity for cooperatives to grow internationally is to establish business relationships with food retailers and food service companies as one of their primary food suppliers. Examples of retailers that are active internationally include Wal-Mart, Kroger, Safeway, and Albertson's. Food service companies that are growing internationally include McDonalds, Burger King, and Wendy's. These companies

are interested in obtaining a significant quantity of their food sources from the U.S. for their international business activities.

As these types of business activities grow, cooperatives in the future may look even more international with future membership comprised not only of U.S farmers but also of farmers located in other countries. International membership was challenged in a court case between Ocean Spray cooperative and Northland Cranberries, Inc. Northland claimed Ocean Spray was in violation of the 1922 *Capper Volstead Act* because it had not only U.S. cranberry growers as members but also growers from Canada as members. Northland claimed that “farmers” as mentioned in the *Capper Volstead Act* meant U.S. farmers only. The case was settled in September of 2004 with the federal district judge ruling that “farmers’ in the *Capper Volstead Act* is not specific to U.S. farmers and foreign as well as U.S. farmers could be members of a cooperative.

Bioenergy

Ethanol from corn and biodiesel from soybeans are currently hot topics of interest. More than 100 ethanol plants have been built and are operating in 19 different states. Another 50 or so are under construction or are in the planning stage. Some are organized as cooperatives, but many are LLCs, C-corporations, or some combination of business structures. The interest in cooperatives becoming active on bio-energy production is to capture add-value to the farmers growing corn and soybeans. But while ethanol and biodiesel are currently on a fast pace growth path, risks are not insignificant. There exist many uncertainties as to the profitability of alternative bio-energy products. Future profitability will hinge upon such factors as the future price of crude oil, continuation of federal subsidies, state and federal mandates on the use of bio-fuels, changing technology that increases efficiency of new plants but outdates older plants, future of alternative feed stocks to corn and soybeans for production of bio-fuels such as cello use materials, animal and other vegetable fats, and forest products, and international competitors, in particular Brazil with ethanol, from sugar cane, that can be exported at competitive prices.

Farmers struggle with securing sufficient equity capital to construct and start up an ethanol or biodiesel plant. CoBank and other commercial lenders will finance new plants but expect 40 or 50 percent equity capital. Further, with the potential risks mentioned, debt capital for new plants is becoming more difficult to obtain. Obtaining adequate equity capital is one reason for structuring the plants as an LLC and not as a cooperative. An LLC allows outside investors to have some control of the business. Some local farm supply cooperatives are partnering with investor owned bio-energy companies to construct and operate an ethanol or biodiesel plant. Regional farm supply cooperatives are doing the same. CHS Inc. has formed a joint venture with US BioEnergy Corp. to produce and to market ethanol and biodiesel.

There is an opportunity for local farm supply cooperatives with grain and/or feed facilities to participate in the bio-energy market without producing ethanol or

biodiesel themselves. Local farm supply cooperatives can enter into favorable contracts with bio-energy plants to supply the corn and soybeans and to be a marketer of by-products like distillers' grains. Biodiesel plants are interested in the oil but not the entire soybean. There is an opportunity for local farm supply cooperatives to construct a soybean crushing plant and sell the oil to a biodiesel plant and market the soybean meal to livestock customers.

Structure of Cooperatives

As previously indicated, the structural change at the farm and customer levels has pushed cooperatives to merge and/or form various strategic alliances. This trend will continue. Smaller cooperatives can still be successful as a business by specializing. For example, a farm supply cooperative struggling to be competitive and profitable may downsize by selling off its feed and fertilizer business and concentrating on home heating and/or farm fuels business. Others located near a growing urban center may expand into higher margin activities such as selling horse and pet foods and garden and lawn supplies. On the processing and marketing side, smaller cooperatives may be successful engaging in niche markets serving consumers interested in organic and natural foods, higher value specialty cheeses, or locally grown foods.

But the traditional regional cooperatives with a federated structure of local farm supply cooperatives as members are being challenged. Some local farm supply cooperatives have gross sales nearly as large as some regionals had 15 years ago. Large locals may be in a position to negotiate for and purchase farm production inputs at very competitive prices to what can be purchased from a regional cooperative. Further, transporting farm inputs such as feed or fertilizer from the regional cooperative to the local cooperative only to be reloaded and transported out to the local's farmer customer is inefficient and costly. Large farm customers may be in a position to negotiate for and to purchase farm inputs in large quantities to be delivered directly to the farm at very competitive prices. Thus, the question surfaces, can regionals add value to their local cooperative members who, in turn, can offer value to their farmer customers?

There is an opportunity to strengthen the federated cooperative system that adds value to both local supply cooperative members and their farmer customers. Regionals are in a better position than large locals to obtain fertilizer, feed, crop chemicals, and other inputs because of the greater bargaining power and interregional cooperative activities. Fertilizer is a good example. An increasing share of fertilizer is from off shore sources requiring special skills in procurement, transportation, storage, and price risk management. These are skills most locals would not have. Regionals have highly educated technical staff to support a staff of locals who face technical issues with farmer customers. Some regionals have research stations where crop varieties, feed ingredients, feed practices, etc. provide beneficial information to the local cooperative customers. Regionals can offer very useful risk management tools for local cooperatives to protect prices of feed, fertilizer, petroleum, and other inputs. In

return, the local cooperative continues its advantage of being a direct contact with the farmer customer and of providing services of value such as nutritional advice for feeding hogs and livestock, specialized feed rations and delivery, complete crop management plan that includes a data bank of production practices and yields, precision application of fertilizer and crop chemicals, and similar services. The local cooperative sells the fertilizer or feed to the farmer customer, but the actual delivery may come directly from one of the regional's storage centers.

Human Resources

The business success of cooperatives is dependent upon highly qualified employees and a highly qualified board of directors. A challenge is in the hiring of a general manager who not only has the necessary business and personnel management skills but also understands the cooperative model. General managers are hired to not only profitably grow the cooperative but also to operate a cooperative that demonstrates shareholder value to farmer members and to their customers of grains and food products.

Boards of directors need to be visionary; understand the complex business environment; be able to understand and analyze financial statements; be good at strategic, long-run planning; establish sound policies to further guide management of the cooperative; and to hold management accountable; but let management manage. To ensure qualified board members, cooperatives need to evaluate their nomination process to make sure the nominees have the necessary educational and/or experience background, understand the cooperative business model, are visionary, good decision makers, and will represent the best interest of the cooperative long term and the membership as a whole. This may mean that some decisions are at a cost to some members in the short run but are in the best interest of the cooperative and its members as a whole in the long run.

In conclusion, the cooperative model is not dead as a future successful business model. Quite the contrary, but cooperatives need to change and keep changing in how they operate to be a successful business that adds value to its changing farmer membership base and to larger and more sophisticated customers. Cooperatives need to be responsive to the globalization of the food system. Cooperatives will increasingly need to consider joint ventures, strategic alliances, and other partnering not only with other cooperatives but also with investor owned firms, some of which maybe international companies. There will continue to be opportunities for smaller cooperatives that focus on one or two profitable products or services or take advantage of niche markets such as organic, natural, and locally grown. But, the bottom line for business success will be highly qualified management, employees, and boards of directors.

Reference

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How Bioenergy Could Change Land Ownership and Values

Agriculture is undergoing a fundamental change based on the move toward a bioeconomy. Currently the bioeconomy consists primarily of fuels produced from renewable sources, especially corn and soybeans. Other crops and applications are in various stages of development. The bioeconomy has been described as “nothing less than a revolution in the way society will obtain vital sources of carbon and energy ... Agriculture will make this transformation possible.” (Robert Brown, Director Iowa State Biorenewable Program)

The change has touched all aspects of agriculture: the crops that are grown, the way they are grown, the amount of crops available for exports, animal feeds, farmers’ input usage, and the list could go on. Suffice it to say that everything has changed. We are moving from producing food and fiber to producing food, fiber, and energy and in different proportions.

A major impact of the changes is a rapid increase in land values and rents. These levels have not been seen for more than 25 years. The rapid rise in land values and rents has many ramifications. One of the major changes could be in land ownership and who has access to the land resource.

The move toward the bioeconomy comes at a time when the population of landowners is aging. Almost one-fourth (24 percent) of the farm land in Iowa is owned by people over the age of 75. And, the same percentage is owned by people between the ages of 65 and 74. The changing demographics would produce a dramatic change in land ownership over the coming years, even in the absence of the bioeconomy revolution.

This chapter discusses land ownership; where we are, where we have been, and where we might be heading. We are in a period that has been described as the new golden era for agriculture. That description has been used before throughout the past century. What does it imply for land ownership?

Before examining the issues surrounding land ownership, it is interesting to step back and consider what has happened to land values. Values and ownership are closely related. Higher land values hamper the ability of young people to acquire the land asset and decrease the ability of existing farmers to expand their operations. Higher land values can make land a more attractive investment and increase the competition for land.

¹ The author is a professor of economics, Director of the Beginning Farmer Center and the chairman of the Graduate Program in Sustainable Agriculture at Iowa State University.

There have been several booms in land values. One of the first documented instances was the speculator boom that ended with the financial panic in 1837.

The second land boom was during what was referred to as the golden age of agriculture from 1914 to 1920. It was said at the time, "There never was a more glorious opportunity in the history of the world for the Corn Belt farmer than there is today... to buy at present prices. In my opinion he cannot lose." (*Traer Star-Clipper, Tama County Weekly*, August 1919)

In the early 1970s, the third major land boom occurred. This period has been referred to as the second golden age of American agriculture.

We have entered another boom which is again being referred to as the golden age of agriculture. The bioeconomy boom comes on the heels of an investor-driven increase in land values for the past few years. For example, land values in Iowa have reached record levels for four years in a row and the bioeconomy boom is just starting.

Who drives these booms? What causes them and why do they end? Some people blame the speculators. "It may be well to point out that the farmers were not the cause but the victims of land speculation ... The land boom was nourished mainly by business men and bankers in country towns." (*Yearbook of Agriculture*, 1924) The boom in the 1970s also was blamed on speculators, but now farmers also were seen as contributing to the increasing land values. "Farmers and nonfarm investors bid up the price of land 23 percent during 1973." (Henneberry and Barnard, 1987) In Iowa, the current ethanol-fueled boom in land values also appears to be driven by farmers as well as by investors.

The 1920 boom prompted an Iowa State economist to write, "Every boom has a stampede of buyers just at its climax, before recession begins ... " In further discussing the 1920 boom he said, " ... the papers are full of it today; half the people you meet are talking of it ... It is nice for the real estate agents, but as for the farmers, a look at the future is not reassuring ... " (Nourse, 1919)

The current boom is fueled by the upsurge in demand for biofuels, especially corn-based ethanol. Work is under way to move us toward alternative sources for ethanol; biomass, animal manures, and so forth. Additionally, there is a growing demand for soy or biodiesel.

Ethanol is not new. The first ethanol was used in an engine in 1826, and Henry Ford is known to have pushed for ethanol as a fuel source. The interest in ethanol surged again in the 1970s with the disruption in oil supplies. Today the upsurge in interest is due to: 1) federal legislation that calls for a certain percentage of the fuel consumed in this country to come from renewable sources, 2) a change in gasoline additives, and 3) an overall concern with the stability of oil supplies.

The purpose here is not to digress into the current situation with respect to ethanol and the demand for biofuel. The literature is replete with articles discussing the current biofuel debate. For our purposes, we simply note that the

current boom in land prices is due to the upsurge in commodity prices, and the upsurge in prices is due to the demand for ethanol production. The upsurge in prices will have an impact on land ownership and ownership patterns.

Many books and articles document the changes that have occurred in farmland ownership in the United States. These offer a good background for considering where we are today with respect to farmland ownership issues and what the future might hold.

Farmland ownership by the individual farmer has been a U.S. goal since its founding. John Timmons, a noted land economist, wrote in 1945, "Rights in land and the ownership thereof have always been of fundamental importance to the development of American agriculture and the welfare of farm people." These ideals can be traced back to one of the founding fathers, Thomas Jefferson. It has been noted that "... land-owning farmers had enough autonomy and strength of character to ensure the preservation of the democracy. Thus, to Jeffersonians, farm communities ... were to be the bulwarks of the new republic." (John Timmons)

The land policies enacted by the U.S. government reflect this early attitude of encouraging individual farm ownership. Some of the very first legislation in the country was passed to curb feudal land practices in the Northwest Territory. Another act sold land in 640-acre tracts for as little as \$2 an acre. Finally, there was the *Homestead Act of 1862* which gave land away, providing you improved it and lived on it for five years.

Many concerns have been put forward surrounding land ownership and some have been expressed for more than a century. Among the dominant concerns:

Tenancy

Tenant or landless farmers have been a concern for a long time. There is a general feeling that owning a farm is a goal in and of itself. William Murray, an Iowa State economist, noted, "The typical Iowa farmer and his family have a strong, continuing desire to own a farm that belongs to them alone." With such a setting and feeling of land ownership, "It is not strange, therefore, that the nation was shocked in 1880 when the first agricultural census reporting farm tenure revealed that one farmer out of every four was a tenant." (Timmons, 1945)

Given the concern over tenancy, it is interesting to note that the percent of farmland rented has not changed too dramatically since early in the last century. The amount of U.S. farmland leased has ebbed and flowed over the last 100 years, ranging from a low of 32 percent in 1900 to a high of 45 percent in 1935. The percent of land rented was 43 percent in 1992, but it has since dropped, and in 2002 the amount of farmland rented was approximately 38 percent. So over 100 years, the percent of farmland rented has only changed by six percent. It should be noted that the 2002 Census changed the sampling frame so that

the results are not directly comparable with earlier years. But, even if we use the earlier numbers, there does not appear to have been a substantial change in the percent of the acres rented.

The tenure of the operator is where we have seen the biggest change over the past several decades. In 1910, just over half (53 percent) of the farms were held by full owners. Slightly more than a third of the farms (37 percent) were tenant farms, and only nine percent were a combination of owner and renter. Over time the percentage of full and part owners increased, and the percent of tenant farmers decreased. By the 1959 Census, the percent of part owners and tenant farmers was almost identical, 22 and 21 percent, respectively. By the 2004 Census, the part owner and tenant farm percentages had almost completely reversed. In 2004, 62 percent of the farms were full owners; 32 percent were part owners, and just six percent were tenant farmers. (USDA, 2006 Agricultural Statistics)

The biggest change that has occurred has not been in the percent of land rented but rather in the tenure of the farmers. People have shifted their belief that only through total land ownership could we achieve the desirable land ownership mix. Timmons in his 1945 article said that the move to full or part ownership was a move to "achieving sound ownership conditions." By then it was becoming apparent that emerging technology was going to require more acres than the typical farmer could afford. Therefore, to achieve optimum operational efficiency, farmers were going to need a mix of owned and rented acres.

Age

Another concern often expressed with respect to land ownership and potential changes is the age of the landowners. This question has been asked at different times throughout the past century. Unfortunately, the phrasing of the question has changed with different surveys so it is not possible to achieve a direct comparison with the changes over time.

The land ownership study conducted in conjunction with the 1920 Census of Agriculture reported that almost a third of the U.S. landlords (31 percent) were over the age of 65. (1924 report) The 1999 study examining land ownership reported that slightly more than half (51 percent) of the landlords were over the age of 65.

The 1988 and 1999 national surveys reported the age of owners based on the percentage of acres they owned. In 1988, 14 percent of the land was owned by people between 65 and 69 years old. Another 26 percent of the land was owned by people over the age of 70. By 1999, the percentage of land owned by people between 65 and 69 years old had dropped to 11 percent, but the percent of land owned by people over the age of 70 increased to 26 percent. In other words, the percentage of land owned by people over the age of 65 remained fairly constant from 1988 to 1999.

The situation in Iowa is different. In 1970 it was reported that 35 percent of the farmland was owned by people over the age of 65. A later study showed that the percentage had not changed much by 1982, but since 1982 the situation has changed dramatically. In 1982, 29 percent of Iowa farmland was owned by people over 65. In 1992 this percentage had increased to 42 percent, and by 2002 the percentage of Iowa farmland owned by people over the age of 65 had increased to 48 percent.

Even though it is not possible to obtain a direct comparison over a long period of time, it appears the age of landowners remained relatively steady for the first half of the century but has been increasing during the past several years. Aging owners means that there will be a turnover in land ownership. This is simply a fact of human existence; we all die sometime. So, as we look to the future, the issue of dispersed ownership identified by Raup, Timmons, and others will become more of a factor in land ownership and use.

Residence

One of the major concerns expressed throughout our history has been the amount of land ownership by absentee landowners. This is related to the tenancy issue, but the concern here is the location of the owner. The more distant the owner, the more potential problems there are that could arise. This is viewed as a problem for many reasons. Impacts on conservation, lack of opportunities for young people, money leaving the local community, and other social ills have been attributed to an increase in absentee ownership of farmland. Over 80 years ago it was observed that "Landlords who can visit their farms readily are more likely to be acquainted with and interested in the problems of managing, conserving and improving their property than owners less conveniently located." (Turner, 1926)

In Iowa, earlier studies in 1900 and 1920 showed that the residency of the owners had not altered dramatically compared to the 1982 survey results. The changing demographics and farming situation appear to be altering that situation.

As noted, the age of farmland owners is increasing. As the current farmland owners die, the land is most frequently passed to the family, with equal division of the acres among the siblings being the most common approach. This phenomenon is illustrated by the significant decrease in Iowa farmland held by sole proprietors and the significant increase in the amount of land held as tenants in common and in trust.

Equal division of the land among siblings has significant impacts on farmland ownership, particularly residence of owners. Other implications of equal division of farmland will be discussed shortly.

The division of the land among the siblings has manifested itself in Iowa by a significant change in the residency of the owners. In 1982, only six percent of Iowa farmland was owned by non-Iowa residents. By 2002, the percent of Iowa farmland owned by non-Iowa residents had increased significantly to 19 percent. This means that almost one in every five acres of Iowa farmland is owned by someone who is not a resident of the state.

A recent study of landowners found that 17 percent of those who owned land but did not farm it themselves listed sentimental reasons as their primary reason for owning the land. Sentimentality is an ambiguous reason for land ownership. Will the sentimentality transfer to the generation who was not raised on the farm? As land values increase, a question becomes, what is the price for sentimentality? What will be the tipping point? The answer to these questions will determine the supply of land for sale, and this will impact the ownership.

Future

The future is always uncertain. The situation for farmland ownership and the implications for who will farm the land are no exceptions. In fact, the future may be even cloudier with respect to farmland ownership.

One chronic problem facing agriculture with respect to land ownership and the future is the tendency for current landowners to divide the land equally among their heirs. This creates many problems, but it is especially difficult when one of the heirs wants to continue farming and the other heirs do not. Land is the major component of a farmer's estate. If they want to treat everyone equally, careful planning is necessary if they wish to avoid breaking up the land base to such an extent that it becomes impossible for one heir to have enough land to continue farming.

Unfortunately, farmers do not seem to be considering this as they look to the future. Recent surveys have shown that most farmers do not have a successor identified for their farming operation. More disturbing is that most farmers do not have an estate plan. The majority have wills, but a will is not a plan.

Another problem for farmers is the chronic weakness in land identified by Timmons in 1945. Timmons noted that there is tendency to capitalize all benefits accruing from farming into land values. This means that within a few years farmers are back to the position they were in before the boom started: handling more money but making the same profits.

This was illustrated during the last golden age of agriculture in the 1970s. Based on data from the Iowa Farm Business Association over the past 40 years, the average profit for the low-third profit group has been positive in only one year, 1973. The average profit for the high-third profit group has only been negative in one year; 1981, the year the widespread farm financial crises started.

Another dilemma in land ownership is illustrated by the situation of a young person who would like to return to the farm. There are the usual problems of intergenerational transfers that have to be dealt with, but now there is one big additional problem. The parents more than likely are part owners and part renters. With this arrangement there may be enough income, but if the rented land is lost there will be serious financial difficulties. The higher the rented base, the greater is the risk of a sudden change. For example, consider the case where the landlords are in their 80s, and they have five children. The current farmer has worked with the landlords for years, but what will happen when the current landlords die is anybody's guess. This is a situation being played out all over the Midwest, and it will only become more commonplace.

All of this makes the outlook for beginning farmers cloudy at best. This is evidenced by the increased concerns being expressed over the future for beginning farmers. While the current boom does not help with the ability to access land or with land-intensive methods of earning an income, there are opportunities opening that will require more management skills rather than more land. Organic production, local foods, animal welfare issues, and environmental concerns offer farmers some revenue opportunities not considered just a few years ago.

A final consideration with respect to the changing land ownership is the issue of conservation and preservation of the land. Will an absentee owner treat the land differently? One study suggests that with respect to short-term conservation practices, there really is not much difference in how rented and owned land is farmed. For long-term practices such as terraces, tiling, etc., there does appear to be a reluctance to implement or install them on rented land.

These are some of the chronic farmland ownership problems that have been identified. The current boom is coming at a time when the chronic problems facing land ownership have not abated. It also comes at a time when changing demographics portend many significant changes that would have occurred even without the bioeconomy boom.

We have entered yet another golden age for agriculture. This raises some fundamental questions. How long will it last and what will be the aftermath when it ends? How it will impact land ownership and farmers in general remains to be seen. No one knows if we will pursue paths that help to alleviate ownership problems or exacerbate them? Regardless of the direction taken, these are exciting times offering tremendous opportunities.

