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RELEVANCY OF THE SOCIAL SCIENCES IN THE POLICY ARENA: IMPLICATIONS FOR AGRICULTURAL ECONOMICS

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For decades this society has underinvested in the social sciences relative to the biological and physical sciences. In partial consequence, today the changing agenda of problems of the society falls increasingly into the domain of the social sciences. Ironically the cumulative effect of this underinvestment is now creating a unique window of opportunity for the social sciences.

Many of today's problems are the consequence of pursuing technological change without concern for external effects. Most of our environmental and many of our structural problems in the United States today arise from this source. Over seven to eight decades, we have created great productivity plus many unanticipated and undesired side effects. In addition, both agriculture and society have changed greatly. What we value as a society has changed. We now face needs for technology assessment, new institutional innovations, and related investments in human and conventional capital, plus research on ethics and values. These fall in good part into the domains of the social sciences, as well as some of the humanities, for which we have failed to provide adequately.

THE NEW RURAL AGENDA

Let me list a few of the diverse issues on the current rural and agricultural agenda for which the social sciences have some major responsibility.¹ We have been experiencing the largest financial crisis in agriculture since the Great Depression. Farmers and rural businesses are in trouble as are rural financial institutions and the agricultural credit system. We face

complex and as yet poorly understood macro-economic impacts on agriculture and rural communities. We still need to understand the impacts of national deregulation of finance, banking, energy, and transportation on agriculture and rural communities and their welfare.

Globalization of agricultural markets and growing international economic and political interdependence have created a new policy context and severely constrained national policy options. We face international issues ranging from protectionism and an immense trade deficit to the impact of obsolescent international monetary institutions on exchange rates and market stability. Indeed, the excess capacity, retaliatory protectionism, and competition in export subsidies have turned the agricultural policy crises of individual industrial nations into a single worldwide international trade crisis—which is now beyond the reach of the policy actions of any nation acting alone. Only international cooperation and the creation of new international institutions holds much promise. These problems all fall primarily in the domain of social science knowledge.

The agenda goes on. The institutional structure (i.e., organizations and rules) supporting science in agriculture and for society generally is in transition to some new configuration with almost no research on the issues involved, such as alternative research funding systems or the means for interlinkage and coordination of the various R & D actors and users. U. S. science policy is in disarray and contest. Public support has declined. Except in agriculture and medicine, U.S. science policy has been shaped to support basic science and national defense. The university and academic science

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are now being asked to sustain national economic development, a goal that academic research in agriculture has long addressed (Bonnen, 1986a).

The new genetic technologies are beginning to change the way agricultural science is funded and managed. It is raising new issues in property rights to genetic material as well as to processes for genetic manipulation. New institutions are necessary for social acceptance and effective use of new genetic technologies.

The nation's farm policy is obsolete in a global competitive economy but continues without the political will to constrain either its costs or the chronic excess capacity that gave it rise. The issue of the structure of agriculture must be faced, including the future social performance of a farming and agribusiness sector that will be much more highly concentrated and vertically integrated.

Information-age technologies are changing the way we receive, process, store and use information, not only in farm and agribusiness decision making but in government and general business. Near real-time interactions and consequences are changing our problems and social options (Dillman; Bonnen, 1986b). Adapting agricultural and rural social institutions and policies to these and other new technologies presents a substantial research and education challenge in the social sciences.

The fragility of the ecosystem and related environmental issues cry out for new institutions and policies. Both groundwater contamination and air pollution are serious and growing problems. Waste disposal and toxic chemicals affect health, degrade the environment, and threaten the biosphere. Conflicts over natural resource use and conservation grow more contentious.

Poverty in the United States has increased at record rates since 1978 (Porter and Greenstein). Rural poverty has increased faster than that of central cities. As a consequence, the incidence of rural poverty is now as high or higher than that of central cities (O'Hare). Rural homelessness is growing. Problems of rural community decline and development have accumulated largely untended (Barkley). Rural development, however, now appears to be a growing political issue in Congress and in many states.

As a consequence of the rising economic value of time, issues in human capital formation have become more important determinants of local community and national welfare.

In the past, most human capital has been formed in the family, not in the education and health systems, as the conventional view assumes. But increasing disorder and instability in the American family suggest a reduced capacity for the formation of effective human beings. Social and economic issues surrounding the family and its institutional substitutes are increasingly urgent problems. Low-income blacks and Hispanics will constitute an astonishingly high and rising percent of the entrants to the labor force over the next generation. Unless the society invests in their human capabilities, the productivity and competitiveness of the society will be at hazard.

The window of opportunity for the social sciences is problematic. That is, there are many problems that require social science knowledge, but public support for such research and professional activity will not be automatic. We must overcome a skepticism of the social sciences by demonstrating that we have a useful contribution to make. The social sciences constitute an important part of society's capacity for understanding social problems, but we often find ourselves in a "prove-it drill," despite past major contributions.

Investing in the social sciences is predominantly a public responsibility, especially in those matters that deal with public policy. The private sector cannot be expected to invest in this sort of research to any great extent since it has little capacity to recover any returns from such investments.

It is worth noting that the increased need for social science research is occurring at somewhat different levels of government than in the past. The international interdependence and integration of capital and commodity markets, which erodes national sovereignty and policy capacity, is pushing the possibility of effective policy action for many economic sectors (1) out of product markets and into factor markets and (2) from national levels of decision to international and to state and local levels of public decision making. The need for new international institutions and policy and for the coordination of those institutions to maintain economic stability is urgent. State and local needs create a major opportunity for the universities, if they will grasp it.

Today the U.S. agenda of rural problems is dominated by unanticipated externalities and the consequences of obsolescent and failed institutions, including failed policies that need modification or replacement, and by the need for new institutions and new human capital.

Ethical issues abound. We have failed to achieve an appropriate balance in the complementary investments necessary for effective development of a sustainable agriculture and a viable rural community. More than technology-oriented research is necessary to solve these kinds of problems. More than disciplinary knowledge is necessary if societal problems and issues are to be addressed effectively. A better balanced investment is necessary. What does that mean?

FORCES THAT CHANGE SOCIETY'S CAPACITY AND PRODUCTIVITY

As the development literature clearly demonstrates, there are four primary sources of increased societal capacity. These prime movers include not only technological change (only some of which is science based) but institutional improvement, increases in human capability (human capital formation), and the growth of biological and physical capital both natural and man-made (Bonnen, 1987). The social sciences share with the other sciences and the humanities responsibility for creating knowledge about these primary sources of change in societal capacity. But, as Ruttan points out, it is the social sciences that have primary responsibility for providing knowledge for modifying institutions or developing new institutions (Ruttan). This is our primary domain.

THE SPECTRUM OF RESEARCH

One may do different kinds of research about these prime movers. For our purposes, it is useful to distinguish between disciplinary, subject matter, and problem-solving research (Johnson, 1986, pp. 11-29). The term "basic research" I take to refer to *disciplinary research*, which is the theory, empirical measurements and measurement techniques, and methods used to explain a fundamental class of phenomena of concern in a discipline such as physics, botany, economics, or philosophy. Increasing this knowledge improves the capacity of a discipline.

Other types of research are of an applied, multidisciplinary nature. There are two forms. *Subject matter research* generates multidisciplinary knowledge useful to a set of decision makers facing a common set of problems. Agriculture is not a discipline but a subject matter, as are agronomy, agricultural economics, farm management, animal husbandry, and biotechnology. Only rarely can one go directly

from general subject matter knowledge to a practical decision. Before disciplinary or even multidisciplinary subject matter knowledge has direct relevance for someone with a specific problem, it must usually be fashioned into multi-disciplinary *problem-solving knowledge*. That is, it must be developed into a contextually specific form that is relevant to a single decision maker (or a set of decision makers) with a specific practical problem.

In addition, philosophic distinctions between value, value-free, and prescriptive knowledge of the four prime movers are relevant. Problem-solving research differs from disciplinary and subject matter research in that it seeks prescriptions (i.e., it necessarily produces "should" or "ought" statements that depend on value as well as value-free knowledge). One may hold all three types of knowledge, value-free as well as value knowledge and prescriptive knowledge about disciplinary and subject matter categories. Problem-solving knowledge comes in prescriptive form. To get to prescriptive knowledge, one must process knowledge about values plus (relatively) value-free knowledge through a decision rule (or set of decision rules) to make an "ought" or "should" statement about action. Ought or should statements are the form toward which problem-solving knowledge moves (Johnson, 1986, pp. 14-16).

PHILOSOPHIC VALUE POSITIONS

Different epistemological positions may be held with respect to knowledge. Indeed, the distinctions I have just made arise in good part out of the clash of different philosophic value positions that inform different epistemologies. The concept of value-free knowledge is that of the pure and the logical positivists who argue that the only descriptive knowledge that can be objective and therefore scientific is value-free knowledge. Other supposedly descriptive knowledge is subjective, metaphysical, and unscientific to logical positivists. Philosophers discredited extreme forms of positivism decades ago. Sophisticated physical scientists, while often philosophically positivistic, no longer confine themselves to logical positivism. Nevertheless, logical positivism persists among some biological scientists but, paradoxically, is much more evident in the social sciences. This is paradoxical because the social sciences must directly confront the problem of values in treating human behavior, which is

central to their domain. The extreme forms of positivism, pure positivism and logical positivism, do not completely meet the needs of social scientists. Philosophers have demonstrated that there is no such thing as completely value-free knowledge or a value-free science. It is possible, on the other hand, to produce knowledge that is relatively value free (positivism) or where the values are clearly identified (assumed) that condition otherwise positive knowledge (conditional normativism).

Descriptive knowledge is partially acquired through the five senses and is analytic (logical and conceptual) as well as synthetic (descriptive). It combines axiomatic or tautological, analytic (theory) statements with undefined primitive terms known through experience and interaction to produce contingent synthetic (descriptive) statements about the perceived reality of nature, human, and other behaviors, etc. The analytic statements constitute formal science or the theoretical content of the disciplines, while the synthetic statements constitute what is called empirical or factual science. In positivism, truth depends on the tests of correspondence (experience), logical coherence (internal consistency), and clarity (the proposition to be tested is not ambiguous or vague) (Johnson, 1986, pp. 41-53).

Another set of major philosophic value positions can be described as normativism. There are many philosophic orientations that structure the treatment of values, but in normativism pursuit of knowledge about goodness or badness dominates the epistemology. Statements about goodness and badness can be regarded as contingent synthetic (empirical) statements. As with value-free knowledge, value knowledge can be viewed as experiential and thus acquirable through the five senses. In this view, the tests of truth in positivism can be applied to knowledge of goodness and badness to support the claim of objective descriptive knowledge of values that is subject to the tests of correspondence, coherence, and clarity (Johnson, 1986, pp. 54-64).

Both positive (value-free) and normative (value) knowledge ultimately depend on a leap of faith that the five senses reflect something real in nature and are not perceptual illusions. Thus both depend on philosophic "primitives," undefined terms known from experience (e.g., good/bad, hot/cold). Neither value nor value-free knowledge may be regarded as knowable with certainty. In science all knowledge is contingent, and thus subject to revision. For man-

kind, there is no such thing as final or perfect knowledge.

A third philosophic value position is that of pragmatism. The pragmatist argues that value-free and value knowledge are interdependent in their consequences and that attempts to establish a clear distinction between them are arbitrary and mistaken. The truth of knowledge is viewed as dependent on its practical consequences. Thus, truth is instrumental and dependent on the use of knowledge. The ultimate test of truth is workability, although coherence and clarity are relevant *ante* tests of pragmatic prescriptions, the form in which most pragmatists frame any inquiry. This philosophic value position tends to be held by most long-experienced policy makers and, within the colleges of agriculture, by most extension staff and some resident instructors. Indeed, it is the typical philosophic value position or epistemology of problem solving (Johnson, 1986, pp. 65-75).

There is a fourth philosophic position that is epistemologically relevant to policy. This is an eclecticism that argues that the epistemological ground on which one chooses to stand to address a particular inquiry not only should depend on the specific purposes of the inquiry (*à la* pragmatism) but that different philosophic positions and epistemologies may be combined as appropriate to address various parts of complex inquiries (Johnson, 1986, pp. 22-27, 221-235).

This is a vastly oversimplified view of a very difficult set of problems on which philosophers continue to differ. I will not explore it further other than to assert that unless one has some grasp of these elements from modern logic, philosophic value theory, and epistemology, one will soon get lost in most methodological and epistemological arguments central to any area of scientific or humanistic inquiry.

NATURE OF POLICY ANALYSIS

Having defined a few essential terms, let me turn to policy and distinguish between policy analysis and economic analysis. We have a tendency to equate them, which is erroneous and leads to great confusion among economists. Policy decision making is essentially a problem-solving matter and has to be described as multidisciplinary and prescriptive. That is, societal problems do not come arranged and delimited by discipline. They are not based

solely on economics or on any other single discipline; they are multidisciplinary. Different kinds of knowledge are needed with the mix of relevant fields depending on the nature of the problem domain. One analyst may do demographic modeling, another economic analysis, and another toxicological research to address a public policy problem involving food chain poisoning. The decision maker or his/her staff of policy analysts must then combine these applied, disciplinary research outputs with knowledge about the specific context of the decision to be made. This includes such matters as politics, the actors' motives who are involved in the policy decision, and constraints imposed by prior policy decisions. Only then are practical information evaluating a problem and realistic policy options available. Finally, when a decision maker chooses between those options, a prescription about which option "should be" acted on has been formed. Since policy analysis is multidisciplinary and prescriptive, it makes no sense at all to talk about applied economics or the application of any one discipline as policy analysis. Economic analysis is often a necessary input, but it is never sufficient for good policy analysis.

There is another characteristic of policy analysis that needs to be understood; that is, the decision process is dynamic. One cannot accept one-shot static or comparative static analysis as if it were adequate for policy analysis. When working to support policy makers, you are likely to have to redo analysis with different assumptions and variables several times before a policy decision is final. Thus, in policy making one is involved in a process that is an iterative and interactive process of learning (Johnston and Clark, pp. 9-35). Usually the policy analyst and even policy makers have only a partial command of what the context for the decision is and what the facts are. Consequently, faced with unavoidable uncertainty an analyst does the best he or she can, but must stand ready to modify the analysis from day to day and week to week in any policy process focused on a specific major decision.

Policy analysis involves a process of sequential inquiry. Without going into a lot of detail, let me break that down into two subsets. The first step, or inquiry set, is addressed in a series of questions beginning with "What is the problem?" "What should we do about it?" "Who is involved as a stakeholder?" The stakeholders typically will include the policy makers, the analysts who support them, and

the direct stakeholders; that is, the individuals or groups that will be affected by the decision, some subset of whom are part of the distribution of power and in whom some degree of influence or power over the policy process resides. This inquiry must produce a policy prescription (i.e., prescriptive knowledge). This prescription (Z) will depend on:

1. some normative (evaluative) presumption that a policy goal is ethically or morally justified (N);
2. some relatively value-free (descriptive and analytic) presumption that in a given context a specific set of policy actions will efficiently achieve the policy goals (P); and,
3. some set of decision rules accepted by participants in the policy-making process as legitimate (R).

Thus, a prescriptive statement as to what the policy goal (Z) should or ought to be is derived from normative (N) and positive (P) knowledge processed through a decision rule (R). Implicit in any set of decision rules is the existing distribution of power. Policy has often been described as the art of the possible, which clearly implies that the holders of power in any given context have a lot to say about both what the rules are and the policy outcome. Keep in mind that each primary actor participating in this debate may come to a different initial conclusion as to what the policy goal (Z) should be, since each begins with different views of P, N, and even R. Thus, the policy goal that finally results is a negotiated one strongly influenced by each actor's perception of the power distribution and his or her self-interest.

The second step involves a rather different kind of inquiry. Given the policy goal Z, the question becomes what action(s) should be taken to achieve that goal? Thus the policy implementation prescription depends on:

1. some set of resources to use in implementation (e.g., human resources and political trading material);
2. some specific policy and political context, which would include such matters as the relevant power distribution (e.g., actors for and against to be dealt with), past policy actions that constitute support for or constraints on the current policy goal, other matters on the policy agenda that may impinge on this policy goal, national and international events external to the policy process, and the state of

public opinion;

3. the persuasiveness of one's normative presumptions (N) involving such matters as political and economic equity;

4. the completeness and certainty of one's value-free presumptions (P); and

5. the possibility of modifying the effective distribution of power (e.g., with side trades).

Out of these elements, one fashions a specific strategy or strategies that have the best probability of achieving the policy goal Z. This too is never a one-step process. Rather it is an iterative, interactive, trial and error or learning process that generally ends in some compromise achieving only a portion of one's original goal.

Thus, every policy decision involves values and prescriptions; there is no such thing as a value-free decision, despite some silly statements by a few economists and other social scientists that draw contempt from policy makers and politicians. Every policy decision inevitably involves problem solving in which there is a compromise of goals and values in a learning process that is iterative and interactive. This is a process in which organized interests are in conflict and which is influenced by existing political institutions, the stakeholding actors, the prior decisions and political commitments that the responsible decision maker(s) have already made—all of which condition what is possible at any point in time.

What are some of the implications of this for an economist who is a policy analyst? Since policy decision making involves problem solving, the implication for the profession's research and for the policy analyst's work suggests a very different kind of enterprise from the disciplinary orientation of much of the profession. Another implication very frequently is that economics is not the dominant element even when the problem is primarily economic, although something is being optimized even if, from an economic point of view, it is only the 14th best solution that evolves. Another implication is that, even though one finds it distressing or even repugnant, one must deal with the legitimate actors and institutions, whoever they may be, if one is to play in the real game. The legitimate actors are those holding power as well as others affected by the outcomes. Only the latter may safely be ignored, and often, if major moral wrong is involved, they may not be ignored with impunity (Cairncross, Nelson).

The policy analyst should never expect the process to be neat or follow a formal organizational pattern as is often implied in textbooks and by the media version of events. The intended results of policy decisions are often swamped by the unintended consequences. That is, uncertainty and lack of knowledge dominate both the policy decision and the implementation processes. For example, the initial PIK budget costs of the farm program astonished OMB, whose idea it was and whose goal was reduction of budget exposure! Finally, the reality is that the policy process is so uncertain and messy that the common notion that outcomes arise from the collusion and plotting of the powerful is almost always wrong. They certainly try. But they rarely, if ever, succeed. Rather, disasters and undesired outcomes are dominated or explained most frequently by greed, incompetence, stupidity, and ignorance, the four horsemen of the policy arena.

THE LIMITATIONS OF CONVENTIONAL ECONOMIC THEORY IN POLICY ANALYSIS

Public policy deals frequently with a mixture of market and non-market equity and efficiency problems, often in situations of incomplete markets or market failure involving public goods. It involves policy instruments imposing positive and negative private incentives (taxes, subsidies, transfers, regulation, etc.). Policy also involves public and quasi-public good investments (and their coordination with private investments) in the four forces that alter the capacity of society: human capital, institutions, technology, and conventional biological and physical capital. Thus, the appropriate assumptions for policy analysis will more often than not differ from the assumptions of the perfectly competitive neoclassical model. This will depend on the nature of the markets involved as well as the nature of the commodities, the motives, and the policy issues that are central to the problem domain. In addition, as I have pointed out, all problem solving is multidisciplinary and economics is only one subset of the universe of knowledge that is needed. Let me be a little more specific.

Atomistic Markets

Conventional neoclassical theory makes the assumption that markets are atomistic structures of many buyers and sellers in which all

actors are price takers and cannot influence the market as individual participants. This may or may not be true in the real world, so one must pay close attention to the structure of any product or factor markets involved in one's problem set.

Divisibility of Goods and Services

Another assumption is that all goods and services are divisible; that is, there is no lumpiness in either the output or input of the production process. Lumpy inputs for example, if extreme enough, can create high fixed costs and declining average costs that lead toward fewer, larger firms and greater concentration in a market. In the extreme case a single firm or monopoly results.

No External Economies and Diseconomies

It also is assumed that there are no external economies or diseconomies in production or consumption in the perfectly competitive model. This is to say that there is no divergence between social and private costs in either production or consumption. Where this is true, there is no justification for public intervention. But it is often untrue.

Perfect Knowledge

Perfect knowledge of markets and production possibilities is assumed. This implies that no uncertainty exists and thus information has zero value and the decision maker has no need for or demand for information. The moment uncertainty characterizes a decision environment, information is necessary to reduce that uncertainty and, therefore, may have substantial value. Uncertainty is characteristic of most markets, and, consequently, information becomes an economic good that is essential for the efficient functioning of those markets.

Perfect Mobility

The assumption of perfect mobility of all commodities and resources means there are no institutional impediments to the movement of resources and, in the simplest model, no transaction costs. The consequence is that all adjustment is costless. In reality, we know that there is immobility, and therefore adjustment is lagged and costly. An important implication of the perfect mobility assumption is that there are no specialized assets. Asset

fixity is not possible in the simplest neoclassical model, since salvage values will always equal acquisition prices (Johnson, 1972).

Perfect Rivalness

Closely related to the divisibility assumption is the assumption of perfect rivalness, which means that the consumption by one precludes or is incompatible with consumption by any other consumer. However, in many cases, such as national defense or some types of information, consumption by one individual does not reduce the supply for others. This opens up the potential for someone to use a good who has not paid for it—and raises the question of cost sharing and fairness. These are nonrival or joint impact goods (Schmid, pp. 75–94).

Low Exclusion Costs

Here a second characteristic comes into play. This involves the ability of producers to exclude from use of their product those who do not pay for it. This creates a situation in which, if exclusion costs are high and free riders cannot be excluded, the cost of producing the good cannot be recaptured out of the market. Thus, one has an imperfect market in which a social investment is required if the good is to be available. The question then is how feasible is it for the producer to exclude those who do not pay (i.e., is the cost of exclusion high or low)? The answer depends on the nature of the product and its uses. If exclusion costs are high, the producer cannot fully appropriate the returns, for example, once an information product is disseminated. Where exclusion costs are high, even producer patents and copyrights will not prevent others from using information without paying for it. For an information product to be privately provided, the producer must be able to recover his costs through appropriation of returns from its sale. This assumes low exclusion costs. When exclusion costs are high, this is difficult to achieve (Schmid, pp. 35–61).

The libertarian assertions that the private sector can solve all problems are quite as indefensible as the idea that the public sector can efficiently provide any good. Both propositions are simple minded and have been well tested in this century. Clearly, the real world is more complex, and economists can do better than start from "flat earth" assumptions when the earth is obviously round.

The policy analyst must be alert in the use

of economic theory to the sensitivity of conventional assumptions to the facts of the real world, which often diverge from those of the simple neoclassical model. About this time somebody will say this is an attack on neoclassical economics. Far from it! "Occam's razor" is not repealed. One uses what one has. And often there are not too many good alternatives. But some very interesting things are happening in economic theory that hold real promise for both economic analysis and policy analysis. The younger generation of economists is now focused to a substantial degree on what happens when one modifies the traditional assumptions of neoclassical theory. This has been described as the "new institutional economics," a tent that covers a rather diverse set of activities ranging from developments in the economics of information, risk and uncertainty, and public choice theory, through studies of incomplete markets to the economics of transaction costs ("New Economists").

I have time only to point out the implications of transaction cost analysis. Oliver Williamson has identified those modifications of the neoclassical assumptions that create a situation in which, as he puts it, institutions become important. That is, when do you substitute alternative institutions for the market, and, when you do, what kind of institutions? My point is that Oliver Williamson and others are extending the neoclassical model making it much more useful, as well as more complex (North, Bromley).

Briefly put, transaction costs do not arise in the economists' assumed neoclassical world of perfect knowledge, perfect rationality, and perfectly mobile resources. Transaction costs arise in the real and uncertain world of imperfect knowledge, which Oliver Williamson refers to as limited cognitive competence, where bounded rationality dominates. For transaction costs to arise also requires imperfect rationality, that is, where opportunistic behavior (self-interest seeking with guile) intrudes to take advantage of the imperfect knowledge of others. Finally, neither of these conditions create insurmountable difficulties except when they combine with the imperfect mobility of resources where specialization of assets (or asset fixity) immobilizes resources in production (Williamson, pp. 43-67). This creates the potential for significant asset (quasi-rent) losses when the expectations under which the original investment in specialized assets was made subsequently fail to hold. This helps explain why chronic excess capacity plagues

agriculture, while the simpler neoclassical model is helpless to explain it (Johnson, 1972).

Transaction costs include: (1) the costs of information necessary to reduce uncertainty about the problems at issue, (2) the costs of negotiating a specific agreement or new policy, and finally (3) the cost of enforcing the terms of any new agreement or policy (Williamson, pp. 20-22). Enforcing agreements is high risk in policy because of the unforeseen consequences that invariably flow from policy decisions as well as out of the uncertain future effects from today's integration of commodity and capital markets internationally and their feedback on policy. There are also the unanticipated effects of policy decisions made elsewhere in the world.

The cost of negotiations can be very high because there are often three sets of negotiations going on simultaneously. Within any organization, one must establish an agreement on the negotiating posture of that organization, compromising internal conflicts. Then there is the need to negotiate with one's partners in some coalition of organizations with shared interests to establish a negotiating position for the coalition as it pursues its goals in the policy process. Policy making is inevitably an activity of coalition formation in a democratic society. Finally, once you have a coalition you must negotiate with other organized interests and entities in the policy arena external to your coalition in order to achieve some specific policy action.

The transaction cost concept illuminates much of the behavior of the major interests and the formal governing entities that participate in the policy process and whose quasi-rents are threatened by proposals to make major changes in existing policy (Browne and Bonnen). For example, decoupling and targeting or complete elimination of subsidies are very destabilizing goals politically in the sense that the transaction costs are very high assuring a very costly political brawl, if pursued relentlessly. The new institutional economics makes it clear that a major obstacle to fundamental change in institutions and policies even in the face of strong pressure and persuasive reasons for such change can be traced to various types of transaction costs. Thus, I find transaction costs analysis to be very useful in thinking about the problems of policy.

ORGANIZING TO DO POLICY RESEARCH

The stability of knowledge is very different as one goes from disciplinary through subject matter to problem-solving research (Johnson, 1986, pp. 195–206, 215–220). The university is devoted to conserving and creating knowledge and to transferring knowledge from one generation to another. The core of the university is organized around basic disciplines. These disciplines, as far as research is concerned, are usually accountable only to their disciplinary peers. Professional schools or institutes, however, are not disciplinary organizations. They are subject matter organizations. Being subject matter in nature, they are multidisciplinary and accountable not just to an appropriate set of peers in various disciplines but to the sponsors of research and to the users of the knowledge generated in research. Problem solving is usually done in the university within consortia that are temporary in nature and focused on a specific problem. They come and go. So the university structure is made up of disciplinary and subject matter organizations.

The reason for this is clear. The rate of obsolescence in disciplinary knowledge is very slow. That is to say, disciplinary knowledge is quite stable. Subject matter knowledge is somewhat less stable, turning over more rapidly as the world changes and as knowledge flowing out of the disciplines changes. Problem-solving knowledge is quite unstable in the sense that it loses its relevance within fairly short periods of time, so as a rule we do not organize around problems. We organize around subject matters, such as agriculture, medicine, engineering, or business, in order to maintain a base from which to do problem solving.

We have a problem today in the land-grant university and indeed, in this profession. We have presidents, provosts, deans, and faculty arguing that the enterprise should be focused exclusively on discipline, while others within some professional schools argue for an exclusive (applied) subject matter and problem-solving focus. Both arguments are in error. The real problem is one of finding an appropriately balanced investment in all three: disciplinary, subject matter, and problem-solving capability. Especially in applied fields such as agriculture, if we do not maintain and coordinate that continuum of knowledge, we will not get an effective movement of new disciplinary output through the subject matters into problem-solving efforts. And the disciplines will be

isolated from the stimulation of society's problems.

Science is strongly criticized today. Since World War II society has invested in basic science accumulating great knowledge, much of which has been applied but relatively slowly. This movement of basic knowledge into practical products and uses has been slow enough that the Japanese and others are taking U.S. basic science knowledge and turning it into products and capturing markets faster than the United States is able to today. Society increasingly views academic science and the university as narrow and self-serving. Our societal support and legitimacy have declined. Thus, the university is under pressure to form consortia and other links with the private sector and to respond to government directives in order to move new knowledge out of the university and professional journals and into the market more effectively and with greater speed. Historically, there have been only two major academic subsets where there has been reasonable coordination of disciplinary, subject matter, and problem-solving efforts. One is agriculture. The other is in medicine where the linkage between the academic research hospitals and the general hospitals that treat the bulk of the patients is a fairly effective one. In both cases there are a set of institutional arrangements and a process that hold together and coordinate the entire continuum of knowledge (Bonnen, 1986b).

In agricultural economics, if we focus solely on disciplinary research, we will at best become second-rate economics departments. In a few cases, some university provosts have already begun to ask why the university needs two economics departments. In many universities, no-win situations have been created for colleges of agriculture where disciplinary standards of peer-reviewed publications are imposed university-wide as the sole criteria for promotion and salary increases. This is quite inappropriate if limited to disciplinary journals. If the colleges of agriculture (and other professional schools) cannot maintain a reward system that allows them to invest in some balanced way in all three forms of research, we are not likely to be very effective in the long run and, indeed, may not survive. Some universities may already be past the point where any reasonable balance is possible without external political intervention.

There are also a few examples of exactly the opposite situation in which colleges of agriculture have focused so completely on the

applied subject matter and problem-solving end of the continuum of knowledge that they have lost effective linkage to the disciplines and are slowly deteriorating in their capacity to sustain first-rate subject matter and problem solving capacity. The accusation of second-rate science is made in general about the colleges of agriculture. But it is a fair criticism in only a limited number of cases.

Most of the time this judgment is based on the quite inappropriate application of disciplinary criteria to an enterprise whose purpose is producing more than just disciplinary, indeed, mostly subject matter and problem-solving, outputs. This is then judged "second-rate science." We should object strenuously to such unfair and inappropriate performance criteria.

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