Agricultural Trade Research And Information Needs: Conditions And Challenges

A Report Prepared
by the
American Agricultural Economics Association
Trade Policy Task Force

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PREFACE

In recent years it has become increasingly apparent that agricultural economists need to take a global approach to research on economic and policy problems of food and agriculture. With the expanded involvement of American agriculture in world markets, interdependence and uncertainty have become dominant themes leading to a wide range of domestic and international policy issues. In any attempt to understand the problems that the U.S. and other nations face in developing effective policies for food, agriculture and agricultural trade, these issues must be analyzed.

In view of these needs, the Executive Committee of the AAEA established a Policy Task Force on International Trade at its summer 1982 meeting. The motive for establishing the task force stemmed from the concern that the members of the American Agricultural Economics profession were not effectively bringing their activities to bear on the policy issues of the day. The specific mandate stated in the charter for this (and the other task forces that were created) was as follows:

The general objectives of the Policy Task Forces are (a) to provide a means of developing additivity in the collective activities of members of the agricultural economics profession, and (b) to provide a means of effectively bringing together research from widely scattered members of the profession to bear on important policy issues. It is expected that such task forces will raise the productivity of the profession and give the activities of members of the profession a greater sense of thrust and direction.

The individuals who served on the task force were selected to represent universities, the U.S. government and private industry. Each has a wide range of experience and breadth of knowledge on agricultural trade and policy issues. The task force consisted of:

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The objective of the task force was to identify key issues, suggest needed research directions, and suggest approaches to making results of research and analysis both meaningful and available to users in government and in the business community. As mandated by the Board, policy recommendations have been avoided.

SUMMARY

The underlying thrust of this report is that the economic and policy variables that affect performance in the U.S. food system have expanded phenomenally in recent years. Increased commercialization and the internationalization of American agriculture have resulted in greater interdependence with other sectors of the American economy and with world markets. As a result, agriculture's sensitivity to domestic economic policy and to a wide range of public policy and other changes that occur around the world has greatly increased.

Events of the 1930s and the two decades following World War II pushed commodity policy into a position of such preeminence that many other issues were neglected. But this changes significantly during the 1970s. While traditional concerns with farm commodity policy continue, the future of American agriculture will also be shaped by trade policy, monetary policy, foreign policy, macro-economic policy and changes in the institutional setting within which policy is formulated.

This has created an environment within which numerous conflicts occur and in which a

broadened policy agenda has emerged. These can be viewed in the following framework.

Conflicts and Conditions in the Agricultural Sector

Increased worldwide interdependence in agricultural markets has over the years resulted in extensive conflict among major trading nations. Each of these nations intervenes in its domestic market to protect farm income, assure an adequate food supply and achieve other ends. At the domestic level, conflicts arise because links within the food and agricultural sector are such that change which benefits a given group almost always creates costs for someone else. Objectives conflict at both the domestic and international level, and conditions facing nations or subgroups within the food system differ. Efforts to adjudicate international conflicts in past rounds of trade negotiations or in numerous ongoing bilateral discussions have made little progress, and a broad set of issues remains unresolved.

Linkages to Other Domestic Sectors

A multiplicity of linkages between the food system and other sectors of the economy affect outcomes such as productivity, costs, income distribution and the international competitive position of American agriculture. Post World War II changes in American agriculture have resulted in a closer linkage between agriculture and the industrial sector of the U.S. economy. Agricultural purchases of nonfarm produced inputs approximately tripled during the 1970s. This means that changes in industrial productivity and efficiency and price and cost distortions that arise from inefficient pricing, wage bargaining and government regulation have an increasingly important impact on the food system.

Another very important link comes about through capital markets. During the decade of the 1970's there was a phenomenal increase in farm gross capital expenditures and debt. These changes, associated with high interest rates and inflation, have had a significant effect on farmers' direct interest costs and on prices of farm machinery and other capital inputs.

These impacts, plus the drive in some important industries to increase protection from foreign competition, can affect the longer term comparative advantage of American agriculture in world markets. The increasing links between American agriculture and other sectors has thus resulted in increased policy conflicts and has created uncertainties concerning the framework within which agriculture must operated in the future.

Impact of National Economic Policy and International Financial Systems

Domestic monetary policy impacts on interest rates, foreign exchange rates, inflation rates and growth rates, which in turn affect international capital markets and, through them, international commodity markets. International financial markets have shifted erratically since the early 1970s for at least three reasons: (1) the shift to flexible exchange rates following the collapse of the Bretton-Woods monetary agreement, (2) the significant expansion of international capital markets based on vast amounts of Eurocurrencies and petro dollars, and (3) the inability of national macro/monetary policy to control vacillations in the U.S. business cycle, which in turn have been transmitted to other countries.

Because the U.S. dollar plays a special role in international financial markets, U.S. policies are crucial to U.S. agriculture, both domestically and through their impact on international commodity markets. At different times during the past decade U.S. agriculture has both benefited and lost from these impacts. Overall, however, it is evident that the increasing importance of these macro effects has generated a new element of instability in farm commodity and input markets. And this instability needs to be taken into account in making production and marketing decisions and in formulating farm policy.

Trade, Development and Meeting World Food Needs

Another important area of conflict and policy determination that affects the U.S. food and agricultural economy stems from our relations with developing economies. Two

major conditions underlie U.S. trade and aid policies toward third world countries. (1) The United States has a political interest in maintaining good relations with third world countries, and (2) the United States has an economic interest in encouraging growth in third world economies. These countries are both suppliers to, and markets for, the United States. Without them the U.S. economy as a whole, and agriculture in particular, would be smaller and less prosperous.

Concurrently, developing countries have become increasingly dependent on the U.S. and other developed countries for their food supply. They must also rely on industrial countries as markets that permit them to sell their products, earn foreign exchange to buy food, and acquire the capital and expertise they need for development. This increasing interdependence creates conflict in that many of the policy interventions that affect international trade and monetary relations do not have a positive effect on developing countries. For example, macro policy that generates high interest rates exaggerates their debt burdens, restrictive trade policy can directly reduce their exports and agricultural policy can generate higher cost, competitive production that in the long run has a detrimental effect on their growth rates. These conditions, coupled with the fact the developing countries represent the largest potential growth market for U.S. farm products, suggest a broad policy agenda of prime interest to American agriculture.

Implications

This changing economic framework and broadened policy agenda suggest that if agricultural economists are to maintain relevance and contribute to policy analysis in today's complex world, they must expand both their conceptual and empirical horizons. The American Agricultural Economics Asssociation (AAEA) needs to assume both leadership and responsibility in generating this change. A broader approach to the research and education that deals with the economic, social and political issues involved in policy for the farm and food system, as well as with macroeconomic and trade policy that impacts on the system, is needed. Agricultural economists can be observers while policy practitioners, often guided by inadequate information and heavily weighted by short-term political concerns, formulate farm and food policy and the macroeconomic policies that affect society through their impact on the food system. Alternately, the profession can prepare to provide useful information and analysis that helps in dealing with these broader economic and policy issues.

Much scope for this kind of research and analysis exists in areas such as:

1. assessing the impact of change in economic and technical factors and resource endowment on demand, supply and comparative advantage in agricultural production,

2. assessing the impact of institutional relationships and policies on trade patterns and opportunities,

3. analyzing the impact of monetary phenomena and policies on trade and capital flows, and

4. analyzing the nature of linkages among domestic sectors and their impact on international markets.

These areas all represent basic underlying information that would appear to be relevant to analysis and to decisions undertaken by business firms and by those reponsible for formulating and carrying out government policy.

Whether agricultural economists can achieve greater and better input will depend partly on their attitudes, partly on whether there is a willingness to invest the intellectual capital required to deal with problems of this kind and partly on whether the appropriate operational links can be established to implement the needed research and educational programs. Clearly, more can be done. An increasing amount of data is becoming available from international organizations and USDA, making possible quantitative analyses of economic and policy factors that affect production, consumption, prices, development and trade flows. We should keep in mind that not all good analysis requires sophisticated

modelling. Good descriptive-diagnostic analysis with simpler techniques is a necessary, and often more appropriate, first step.

A recent ESCOP paper entitled Research and Agricultural Trade identified the factors necessary to bring the Agricultural Economics profession into a position to deal with the international dimensions of policy analysis (ESCOP, 1984). Work of this kind will require increased cooperation among universities, the government and the private sector. Little has so far been built into USAID programs. Other institutions such as the World Bank and private foundations could probably contribute significantly if appropriate initiatives were forthcoming. In any event, it is clear that the effective implementation of research and education programs in this broader economic and policy framework will require substantial, long term commitments from individuals and institutions who wish to become effectively involved.

I. INTRODUCTION

U.S. agriculture has become an integral part of the world food system. Growth in trade has had a profound impact on the U.S. food system as a whole and has resulted in a phenomenal increase in interdependence within and among nations. This fundamental transformation, which has occurred over the past dozen years, has far-reaching implications on how farm commodity and input markets function and on emerging policy issues. Like the internal markets, international markets function in a changing dynamic context. Changes in foreign demand, production and government policies, as well as in weather, continually work to alter the set of constraints and opportunities facing U.S. agriculture.

The link between domestic and international markets is reflected in price formation, degree of market instability, the rate at which markets for different products grow, how income is distributed within the sector, and a number of other functional aspects of the economy. The policy consequences of increased international interdependence are extensive. Interdependence means that policies in foreign countries influence U.S. agriculture and also that U.S. policies affect international markets. These links and the dynamics involved between them present an important challenge to those engaged in foreign trade and in developing related international or domestic policy.

Formulating agricultural trade policy is particularly difficult and frequently subject to conflict. This is because most major trading countries have developed extensive domestic farm price and income policies, and agricultural trade policy is almost always forced into the role of supporting domestic policy. A change in trade policy impinges on the freedom of governments to maintain farm policies that reflect exclusively their domestic interests. In almost every case a change in trade policies will affect income distribution and create gainers and losers within countries involved. This creates conflict and makes it difficult for governments to accept concessions aimed at the improved functioning of international markets.

Any effort to deal with the many domestic and international interdependencies and conflicts existing in world agricultural markets must of necessity come up short. We have sought, therefore, to contribute to understanding by explaining the conflicts and basic conditions that affect the environment within which trade occurs and policy is formulated. These explanations are followed by suggestions for needed research thrusts and for developing professional links both for developing research efforts and making the results available to users.

The specific purposes of this paper are:

- to indicate the nature of recent policy evolution and to explain conditions in the agricultural sector that generate economic and policy conflict,
- to understand the effects that other domestic sectors have on agriculture's trade position,
- to examine the impact of national economic policy and financial systems on the functioning of agricultural commodity markets,

- to examine how trade is related to development, meeting world food needs and the policy conflicts that arise,

- to suggest needed research thrusts as well as strategies for effectively communicating both research findings and information needs to interested researchers and users.

Our overall goal is to encourage members of the AAEA to increase their involvement in developing the research and information required for better understanding of both the economic factors and the policies that affect an interdependent world agricultural and food system.

II. POLICY EVOLUTION AND INTERDEPENDENCIES

The increased internationalization of U.S. agriculture over the past dozen years has had far-reaching implications for U.S. farm, trade and general economic policies. A policy agenda that for many years was anchored in domestic and commodity-specific concerns will be considerably broader in the future.

A. Commodity Policy

For the first twenty-five years after World War II, agricultural policy focused essentially on commodity concerns. Farm programs orbited around price supports and supply management. Commodity policies were designed primarily to offset differences between production costs and market prices.

These traditional policy concerns remain, but, their predominance in American farm policy discussions has clearly diminished. American agriculture today sees its future as also being shaped by trade policy, monetary policy, foreign policy and macroeconomic policy. This growing complexity in agriculture's agenda of issues is also focusing attention on the institutional setting--both domestic and international--that affects the production and marketing of agricultural commodities.

B. Trade Policy

Trade policy concerns were perhaps the first to emerge as important. During the 1970s, foreign consumption of U.S. agricultural products grew from 10 percent to 30 percent of production. Though their pace was somewhat slower, food imports also grew. Competition for U.S. farmers from agricultural imports intensified in a number of sectors.

This internationalization of farm-product markets promoted trade policy questions to the top of agriculture's agenda. Access to foreign markets became more important. A series of export controls in the early 1970s also focused attention on access to supplies. The emergence of the European Community as a major competitor increased U.S. concerns about export subsidies.

Growth in trade coincided with increased price instability and supply uncertainty. A return to abundant supplies and increased competition from other grain exporters in recent years has restored the traditional downward trend in real grain prices, but future world demand trends cannot be predicted, and it is uncertain whether trade will follow lines of comparative advantage or reflect a stronger push for self-sufficiency.

Trade-offs between commercial demand and concessional needs also emerged in the early 1970s. More importantly, the costs of trade distortions became more obvious, especially when they shifted the burden of adjusting instability onto world markets. This intensified the debate over the relative roles of physical commodity reserves, food aid commitments, international commodity agreements, insurance schemes and foreign exchange stabilization funds in offsetting the adjustment burdens placed on poor countries.

More than half the growth in U.S. grain exports during the 1970s was accounted for by the centrally planned economies of Europe and Asia. Managing trade with these communist countries first increased the importance of bilateral agreements and, later, led to emphasis on political tensions and "ability-to-pay."

Another third of the increase came from newly-industrializing developing countries. Growth of their demand was linked to their own ability to earn foreign exchange, underlining U.S. agriculture's stake in liberalizing trade rules for the LDCs.

C. Monetary Policy

Though they were not perceived as quickly or as clearly, monetary issues also became more important for agriculture. The devaluations of the dollar in the early 1970s stimulated demand for U.S. farm products and made them more competitive in world markets. Similarly, the increase in the value of the dollar in the early 1980s played a role in the current stagnation in world grain trade and U.S. exports. During the intervening years, rising and differential rates of inflation brought new stresses to international commodity markets.

As a result, it is now clear that monetary policy exerts enormous influence on agriculture's prosperity. The effects are felt not only by farmer-borrowers through debt-servicing costs, but also in the trading arena, where exchange rate adjustments can redirect, amplify or retard trade flows.

D. Foreign Policy

U.S. agriculture has long had ties to American foreign policy, but events during the the 1970s altered those links. For example, cutbacks in food aid shipments and modifications in U.S. sugar legislation changed U.S. agriculture's relationship with much of the Third World.

At the same time, the European Community's Common Agricultural Policy made Western Europe less a customer and more a growing, subsidized competitor in a variety of farm products. Foreign policy interests in the Atlantic alliance have traditionally made a direct challenge to these policies unattractive, but the resultant costs to the farm economy have risen.

Export controls on sales to the Soviet Union and Poland triggered a new debate about "food as a weapon." Though the United States is the world's largest grain exporter, it found that its foreign policy leverage from grain exports was minimal. Nevertheless, the traditionally important role that trade in food products, (like trade in medicine), had enjoyed was undermined, and prospects for restoring relative independence from foreign policy interests remain clouded.

E. Macroeconomic Policy

Most recently, it has become evident that macroeconomic policies are of crucial importance to U.S. agriculture. U.S. grain exports, for example, increased 250 percent in volume during the 1970s by capturing three-fourths of the doubling in total world grain trade during that period. Since 1980, the trend in world grain use has levelled off, world trade has stagnated and U.S. exports and market share have declined. Just as the strong economic growth of the 1970s fueled agriculture's prosperity in those years, a pronounced, widespread recession in the early 1980s is a major cause of the collapse in prices and farm income.

Macroeconomic policy also has a more direct impact on U.S. agriculture. Though taxpayer costs for commodity programs were always thought to be restrictive at some point, budgetary pressures have emphasized those restrictions and made them harder to circumvent.

F. Institutional Setting

Finally, changes during the 1970s have made agriculture's institutional setting more important. Capital markets have become internationalized. U.S. commodity futures markets have become the price reference points for world trade. Some of the major post World War II economic institutions have either collapsed (e.g., Bretton Woods) or been severely strained (GATT).

Both these trends--the evolution of new capital markets and the need for renovation in certain public institutions--have taken on great importance for agriculture. For example, debate over how quickly and by how much to increase International Monetary Fund resources bears directly on the ability of many developing countries to pay for current food imports, let alone expanded ones.

III. CONFLICTS AND CONDITIONS IN THE AGRICULTURAL SECTOR

The consequences of increased worldwide interdependence in agricultural markets are important. Changes in trade patterns or policy can affect economic growth and the distribution of income among and within nations. At the international level, this has resulted in extensive conflict among major trading nations, each of which intervenes in its domestic market to protect farm income, assure an adequate food supply and achieve other ends. At the domestic level, conflicts arise because links within the food and agricultural sector are such that change which benefits a given group almost always creates a cost for someone else. At both levels, objectives clash and conditions facing nations or subgroups within the food system differ. It is thus within a framework of broadly divergent objectives and impacts that extend throughout and beyond the food system that the effects of trade and trade policy must be evaluated. This section discusses the nature and implications of these interactions at both the international and domestic levels.

A. Commodity Trade and Policy

Trade can only take place when those party to it perceive that they will be better off with it than without it. In a multilateral trading framework, however, competition for markets and the potential for conflict abounds among trade competitors and trading partners. The following paragraphs are focused on recent commodity trade and on the real and potential areas for conflict in such trade. The present trade problems between the United States and the European Community and between the United States and Japan are used to detail the major areas of conflicts and trade issues and their causes.

Growth in world trade outpaced the growth in economic output during the 1960's and 1970's. This rapid growth in trade paralleled the rising affluence in many countries and was facilitated by liberalized trading rules. Successive rounds of trade negotiations resulted in lower tariffs and led to international agreements between major trading nations on rules governing nontariff barriers to trade. Consequently the economies of major trading nations have become increasingly interdependent. One measure of this interdependence is the share of national output accounted for by exports. Data for selected countries are shown in Table 1.

Trade has enabled countries to specialize in providing the goods and services which they produce efficiently, and to import those they produce less efficiently. The law of comparative advantage, first propounded by 18th Century English economists, that specialization and trade lead to higher income and consumer well-being, has been amply demonstrated during the past two decades. Rising global affluence appears to be not only a

Table 1. Export Share of GNP for Selected Countries

Country	1960	1970	1980
		(Percent)	
United States	4.1	4.4	8.5
Japan	7.7	9.8	12.2
Fed. Rep. of Germany	15.8	18.4	21.8
South Korea	0.8	9.6	30.4
Netherlands	35.7	37.1	37.9

Source: IMF data cited by the Office of the USTR.

cause of increased trade but also, perhaps more significantly, the result.

Yet the lesson of the benefits of trade is today partially obscured by the worldwide economic slowdown. Global recession at the start of the 1980's, changing currency relationships and obsolete industries in developed nations have all renewed political pressures for protectionism and heightened tensions and conflicts between trading partners.

Nowhere are these tensions and conflicts more evident than in trade in agricultural commodities. Over the past decade agricultural commodities, along with high technology manufactured products and service and investment earnings, have been the most significant contributors to the U.S. current account. Petroleum, low technology manufactured products, consumer goods and automotive products, by contrast, have been in the deficit column of the U.S. trade account.

From the U.S. perspective, tensions over trade in agricultural commodities have been most pronounced with the European Community and Japan, which rank respectively as the largest collective market and the largest single importing country for U.S. farm products. Many economists and some policymakers have finally recognized that agricultural trade policy, whether intended or by default, is an extension of a country's domestic agricultural policy at any given time. Most countries, and certainly all those of any importance in international agricultural trade, provide some support for their agricultural sectors. The nature of the policy mechanisms used to provide that support will, in the end, determine the way through which trade policy and other measures of any given country will interact with the international market.

Most countries today have border policies that buffer their domestic agricultural economies from the vagaries of the international market. As these buffering policies become more widespread and intense, they in turn impose a greater instability in the international marketplace. Price signals are unable to pass through to the domestic economies to cause the producers and consumers to reallocate resources and adjust their production and consumption decisions on the basis on international market supply and demand conditions. The world has long searched for mechanisms which can simultaneously maintain both greater stability in the international commodity markets and internal policies designed to isolate, in varying degrees, the domestic sectors from the international market.

For example, many members of the U.S. agricultural sector share the fundamental belief that the Common Agricultural Policy (CAP) of the European Community has led to an "unfair" situation in commodity trade. The basic mechanisms of the CAP, which have been in effect since 1962, are (1) high support prices for agricultural products, (2) variable import levies to protect EC products from third country competition, and (3) export subsidies to dispose of surplus production. As a result of these mechanisms the Community has become self-sufficient in all temperate zone agricultural products except oilseeds and some fruit and vegetables. In recent years the EC has changed from a net importer to a major exporter of grains, beef, poultry and sugar. It is also a major exporter of dairy products. There is little evidence that the EC will revert to a more open agricultural trading posture (Table 2).

High European intervention prices have led to production surpluses that have been sold on international markets at subsidized prices. For some commodities such as dairy products the export subsidy approached, and, in the case of beef sometimes, exceeded the value of export earnings. In 1980 export subsidies overall amounted to nearly 29% of the value of EC agricultural exports (Table 3).

The EC argues that the solution to the dispute is some kind of market sharing arrangement, preferably a series of international commodity agreements. The U.S. view is that this would create economic inefficiency and malallocation of resources, that they be difficult to negotiate and almost impossible to police, and serve as just another form of protectionism. Finally, the track-record of such arrangements shows that few, if any, of them have ever been successful.

Table 2. EC Intervention Prices Compared to World Prices
Selected Commodities
($ per Metric Ton)

Commodity	1967/68 EC	1967/68 World	Percentage EC Price Above World Price	1980/81 EC	1980/81 World	Percentage EC Price Above World Price
Wheat	$118	$74	+58	$362	$195	+86
Barley	85	44	+93	217	152	+43
Corn	77	50	+54	217	152	+43
Rice	181	139	+30	568	452	+34
Nonfat Dry Milk	413	382	+8	1,689	1,410	+20
Cheese	1,248	1,195	+4	4,026	2,934	+37
Beef	680	395	+72	2,235	1,212	+84

Source: USDA, Foreign Agricultural Service data cited by USTR.

Table 3. EC Exports Subsidies
as a Percentage of Agricultural Sales to Non-EC Countries
1980

Sector	Agricultural Exports Total	Agricultural Exports to Non-EC Countries	Export Refunds	Refunds as % of Export Sales of Non-EC Countries
	($ in Millions)			(Percent)
Grains and preparations	10,054.0	4,545.1	1,697.4	37.3
Milk and milk products	9,977.8	4,065.7	3,823.1	94.0
Agricultural oil and fats	2,696.0	1,008.6	5.2	0.5
Sugar and preparations	3,635.1	2,606.2	398.5	15.3
Beef and veal	4,458.8	901.1	996.2	110.6
Mutton and lamb	299.4	17.4	N/A	N/A
Pork	2,382.1	232.6	127.5	54.8
Eggs and poultry meat	1,690.5	549.1	119.0	21.7
Fruits and vegetables	7,837.0	1,581.0	57.5	3.6
Wine	3,138.7	1,279.1	36.8	2.9
Tobacco, unmfg.	207.7	64.4	6.3	9.8
Fish and preparations	2,514.5	720.9	15.9	2.2
Processed agr. products not specified above	15,278.6	6,080,9	308.1	5.1
Other (residual)	10,217.3	2,777.9	N/A	N/A
Total	74,387.5	26,433.0	7,591.4	28.7

Source: USDA data cited by USTR.

The U.S. position is that export subsidies are costly, not in the interest of any exporter, and in the longer term, not in the interest of the importer. The U.S. approach is that it is in the interest of all countries, including the EC, to renegotiate the GATT subsidies code (and GATT Article 16) to bring agricultural trade under the GATT rules, restricting the use of export subsidies. Only in this way will the GATT be relevant to agricultural trade.

Such an approach would move the international trading system in the direction of market competition on comparative advantage grounds. This might provide the basis for the U.S. to compete more effectively across the board, including in the high value product export markets where the EC still continues to dominate. The unit value of all U.S. agricultural product exports in 1980 was $260 per ton, while for the EC it was about $1,200 per ton. The issue of high value product export, however, is complex; trade and development objectives may conflict in this area.

The tensions over U.S.-Japanese agricultural trade stem from a somewhat different underlying situation. With scarce land resources, Japan is still far from achieving self-sufficiency in food. Its powerful agricultural lobby effectively limits imports of a variety of agricultural commodities. Quotas are decreed for a number of agricultural commodity items, and these are reinforced by a variety of licensing, certification and pricing regulations, all of which serve to restrict access.

Overshadowing restrictions in the agricultural trade area is the fact that Japan has had a growing overall trade surplus with the United States. More and more political attention has focused on the trade imbalance. In certain sectors of the U.S. economy, notably automobiles and consumer electronics, Japanese penetration is perceived as an additional threat to American employment. Political pressure to restrict Japanese imports has mounted in the U.S. and this in turn has intensified pressure on Japan to make concessions in the agricultural trade area.

Part of the issue here is strictly protecting domestic producers. But another part of the issue (however thin the argument) is food security. Japan is representative of the many other countries concerned about becoming dependent on external sources of supply which, in their view, may not be reliable in times of shortage.

The answer for many developing countries has been to strive for a higher degree of self-sufficiency in food. In the past, the Agency for International Development has been inclined to accept a country's self-sufficiency goal as given. In a recent agricultural development policy statement, however, AID switched emphasis from self-sufficiency to self-reliance, which translates to an open economy approach to development rather than a closed one. A major set of issues now revolves around how this new policy can be used to achieve compatibility between trade and development interests.

B. Trade and Interaction Within the U.S. Food System

The relationship between changes in American agriculture, international markets, trade and trade policy should be viewed in the context of the economic adjustment process. The expanding international dimension of U.S. agriculture has affected both the direction and the pace of technological and structural changes in agriculture and the food system. It has been the primary engine of growth in recent years, permitting new levels of investment and output expansion. It has helped foster specialization in agricultural production. It has helped further the scientific industrialization of U.S. agriculture, which reinforced the existing links within the food system and between the food system and other components of the American economy, and has created new links.

While often seen as a single unit, the U.S. farm and food system is made up of a number of distinct subsectors. Compared with the relatively homogeneous, comparably-sized steel and automobile sectors, the farm and food system's heterogeneity is one of its key distinguishing characteristics. However, the links tying the different components of the farm sector together are strong enough to ensure that trade or trade policy developments

affecting any one subsector affect others as well.

The dynamics of adjustment are such that change in one place has an impact elsewhere. A policy change or a change in markets is generally transmitted throughout the system and creates gainers and losers. The distribution of gains and losses will be affected by structural conditions (competitive or oligopolistic) within individual components of the system, by the kinds of protective institutions (unions or PACs) that have been generated and by the kinds of policy initiatives that have been developed.

Despite basic structural and marketing differences, the commodity subsectors are linked horizontally through their competition for natural resources and other basic inputs. Crop and livestock producers compete for the same land and water resources, capital and, to a lesser extent, inputs such as seed and fertilizer. In cases where the factors of production are mobile and their supply limited--as in the capital market--or in the case of nationally or regionally financed infrastructure development, this commodity competition for resources can expand to include a geographic dimension.

The farm sector is also marked by a number of vertical links. The most obvious example is in the feed-livestock economy, but vertical integration is at work in the seed and feeder animal areas as well. The farm sector is also linked vertically to the food and fiber processing and distribution sector through its role as supplier of the unprocessed or semi-processed products ultimately sold to consumers. This link is both competitive and complementary: competitive in that farmers and food processors/distributors compete for larger shares of a price and income inelastic consumer food dollar, and complementary in that they try to expand demand for their common product.

These vertical relationships ensure that trade or trade policy development--or almost any national development--can have an impact on each of the system's subsectors. These impacts touch off a dynamic that works overtime. In this kind of setting, increases in trade or changes in trade policy in a single area can affect the direction and pace of structural and technological change throughout agriculture.

For example, the trade growth of the 1970's was led by grains and oilseed. While livestock export volume grew at 2 to 3 percent per year, grain and oilseed exports expanded 6 to 9 percent per year. Growth in gross receipts followed a similar pattern, with returns to livestock producers growing appreciably slower than returns to crop producers. The result was increased income, capital expansion, firm growth, and scale economies for the crop sector shared elsewhere in agriculture--particularly not in the livestock sector.

This change in relative positions worked to strengthen crop producers' capacity to bid land, water and capital away from alternative agricultural uses. By shifting feedstuffs away from domestic uses for sale abroad, trade resulted in higher costs to livestock feeders. In this, the 1970's contrasted sharply with the situation in the 1950's when limited crop export opportunities and unwanted government held stocks ensured a stable supply of low-priced feed. This supply worked to the advantage of feeders and the disadvantage of feed producers and traders.

Trade also helped generate a decade of unusually strong growth in consumer food prices. Hence, on balance, while the trade gains of the 1970's worked, at least initially, to allow many crop farmers to improve their income positions, their benefits came in part at the cost of losses elsewhere in the system.

The costs of the trade expansion and reduced stock levels in the 1970's also worked their way through the system. In retrospect, perhaps the greatest costs were the short-term disruption of feed supplies noted above and the exposure of the system over the longer term to increased instability. This instability appears at first glance to be a cost borne by crop producers, but actually it worked through horizontal and vertical links to leave virtually no part of the system unaffected. Given the federal crop programs in place at the time and the differences in the structures of the feed and

livestock sectors, the latter may ultimately have borne more of this instability cost than the crop sector.

These different experiences with trade work to shape trade policy views. The more balanced costs and benefits from trade enjoyed by the crop producers tend to strengthen their commitment to liberalizing trade. The livestock sector's experience with alternatively high- and low-priced, abundant and scarce feedstuffs, however, has colored its perception of trade policy. Beef and dairy producers are among the most protectionist in the sector; they see trade as a source of disruption and unfair competition. The impact of this tendency toward livestock protectionism not only extends backward to feed producers, who enjoy greater demand for their products, but also forward to consumers, who pay higher meat prices.

Market structure is also a major determinant of the strength and the competitive versus the complementary nature of the intrasectoral food and farm links. For example, livestock producers want to export hides while the leather goods industry wants to restrain imports of shoes and other finished products--at least some of which are made overseas from U.S. hides. Similarly, cotton farmers want to export cotton but the textile industry favors tight control on textile imports. The views of processed product exporters and bulk exporters tend to differ substantially with regard to the optimal mix of exports and the appropriate distribution of trade gains across farm subsectors. These are only a few examples of vertically linked subsectors which have conflicting market interests and goals.

IV. LINKAGES TO OTHER DOMESTIC SECTORS

We now turn to the interface between agricultural trade, trade policy and the conditions and policies that prevail or are sought in other components in the economy. A multiplicity of links between the food system and other sectors affect efficiency, productivity, income distribution and the kinds of gains and losses that arise from economic and policy changes. Cause and effect run both ways--from the food system to other sectors and from other sectors to the food system.

A. Linkage to the Industrial Sector

Post World War II changes in American agriculture have resulted in a closer link between agriculture and the industrial sector of the U.S. economy. As shown in Table 4, agricultural purchases of nonfarm produced inputs increased rapidly during the 1970's, but declined somewhat in 1983, due in part to the idling of acreage under government programs.

The links to international markets have two dimensions. One arises through raw material markets and the increased reliance of U.S. industry, and in some cases agriculture, on internationally purchased inputs. This is clearly the case for oil but other important raw material inputs (e.g. bauxite, tin) are involved as well. This subjects these markets to increasing uncertainty when governments restrict and/or manage the flow of exports. The most striking example of this is OPEC, but there have been numerous other cases as well, such as for instance, Canada's management of raw materials exports through legislation enabling it to apply export controls.

The reasons for restricting exports are numerous. They include avoiding price increases and controlling inflation, reinforcing various domestic policies, conserving resources and avoiding shortages, retaining resources to develop domestic processing industries, improving terms of trade and trade balances (including the extraction of monopoly rents in some cases) and restrictions as a tool of foreign policy.

The implications of export controls are profound. They can be used as a strategy by countries with scarce resources to seek assurances of supply. For example, restrictions that reflect importer concern with establishing supply assurances can be built into international commodity agreements. There are situations under which export management to promote infant industry, prevent undue market disruption and curtail undue depletion of resources, can be economically justified. Export controls to wage economic warfare and

serve political ends transcend evaluation on economic grounds, though economic consequences can be assessed. The phenomena of export management, however, is not an active component of trade policy formulation, and little research has been done in the recent past on its implications (Bergesten 1974).

A second international market link arises through the cost effect of productivity changes and pricing in industries that serve agriculture and the food system. Through much of the 20th century, U.S. industry demonstrated a capacity to innovate and remain internationally competitive. As a result, major gains in liberalizing industrial trade were made. Presently the U.S. appears to be on the verge of a significant change. As our competitive position in a wide range of industrial products has deteriorated, the demand for industrial protectionism has intensified (Sorenson and Rossmiller 1983). This has led to a strong protectionist position on the part of labor unions--an obvious political force--and to the call for import restrictions by a number of industrial and commodity groups.

The source of this problem is the challenge which is being presented to American technological leadership. Signs of a competitive decline in relation to other industrial countries and some emerging LDCs have appeared. A recent Cabinet level review listed several reasons for this decline (Malmgren 1982).

1. The overall sluggishness of the domestic economy in the U.S.

2. The relative costs and availability of capital for new technology in the U.S. as compared with other key nations.

3. The relative degree of research and development efforts between the U.S. and its principal competitors.
4. The ease of global technology transfer.

5. The relative shortage of new graduates in the sciences and engineering, particularly in comparison to Japan.

6. The effects of industrial policies that are targeted on technological development in other nations.

Table 4. Selected Purchased Inputs
(In Millions of Dollars)

Item	1970	1980	1983
Fertilizer and Lime	2,435	9,922	7,427
Petroleum and Fuel Oils	1,711	7,876	7,652
Repair and Operation of Capital Equipment	2,584	7,683	7,877
Building Upkeep and Land Improvement	2,373	6,884	4,256
Motor Vehicle and Machinery Upkeep	2,030	5,813	4,959

Source: Economic Indicators of the Farm Sector, USDA, ERS, ECIFS3-3, 1983.

If these trends continue, they will profoundly affect U.S. capacity for leadership in international negotiations, and could reverse the thrust toward liberalized access for U.S. agricultural products in other countries.

In the long run competitive pressures from foreign producers will affect the rate of modernization and improvement in a wide range of industries. Costs will be reduced in transportation, processing and farm input industries, all of which require continued growth in productivity to help maintain U.S. agriculture's comparative advantage in foreign markets. If extensive industrial protection is achieved, it will directly affect agricultural production costs and adversely affect demand for U.S. exports with differential impact among subsectors. Income will be redistributed, affecting the cost structure of U.S. agriculture. Agriculture's stake in the deteriorating competitive position of the industrial U.S., and the policies this position engenders, is great.

B. Linkage to Labor Markets

A second element of concern arises in labor markets. Price and cost distortions that arise from wage bargaining and government regulations have a direct impact within the food system. A 1982 study of 397 collective bargaining agreements in food industries reached the following conclusion: "Productivity is adversely affected by contractual provisions that restrict output, often in an effort to preserve employment, (e.g. many contracts have provisions restricting output of workers or limiting tasks that can be performed)" (McEowen 1982). Protective institutions seek to increase labor compensation and protect employment. In this process they tend to resist change that can improve productivity and welfare. These kinds of activities in the food system are of particular importance to the question of value added exports versus bulk commodity exports. There is only limited unionization in the handling of bulk farm commodities, while in the processing sectors which produce value added products unionism is common.

There is also the question of labor impact on value added imports such as textiles and leather goods. In some cases, U.S. wage costs are at a level where we would probably not have a comparative advantage even at the established minimum wage. In other cases, domestic production may simply be priced out of existence due to wage rates and restrictive covenants in collective bargaining agreements. Equally important is the effect of protective labor institutions in input markets. Wage costs are central in determining the cost structure of farm input industries.

The question is, what parts of the food system are most affected by protective wage agreements and regulation and what is the effect on comparative advantage? In the short run, protective institutions seek to capture a bigger part of the pie and maintain employment even in the face of declining needs. This increases the price of inputs to farmers and increases marketing margins in the food system. The long run consequence can be that change and growth in productivity is inhibited through unfair pricing practices and outright resistance to innovation.

C. Linkage to Capital Markets

Another important factor that affects costs and the long-term trade position in agriculture is the link to capital markets. Tables 5 and 6 show phenomenal change in farm gross capital expenditures, farm debt and interest costs since 1970.

The increased farm debt reflects in part major changes in land values and substantial consolidation of farms into larger size units. Operating debt reflects the move toward higher proportions of nonfarm produced inputs and the pricing in these industries. Pricing in these industries reflects the general inflation rate, which in turn is tied to rates of productivity, wage levels and pricing practices throughout the economy. Interest costs reflect both increased levels of debt and changes in monetary policy that occurred during the period. Further, agriculture no longer has its own semi-insulated capital markets and must compete with other sectors of the economy and government for funds.

Volatile interest rates caused by monetary policy affect agricultural production costs and

Table 5. Farm Gross Capital Expenditures
(In Millions of Dollars)

Item	1970	1980	1983
Buildings	2,373	6,884	4,256
Motor Vehicles (tractors, trucks, automobiles)	2,030	5,813	4,959
Machinery and Equipment	2,888	6,956	4,851
Total	7,291	19,653	14,066

Source: Economic Indicators of the Farm Sector, USDA, ERS, ECIFS3-3, 1983.

Table 6. Farm Debt and Interest Costs
(In Millions of Dollars)

Item	1970	1980	1983
Farm Debt (Jan. 1)			
Non-Real Estate	23,844	80,382	106, 812
Real Estate	29,183	85,421	109,507
TOTAL	53,027	165,803	216,319
Interest Costs			
Non-Real Estate	1,618	8,717	10,367
Real Estate	1,763	7,544	10,875
TOTAL	3,381	16,261	21,242

Source: Economic Indicators of the Farm Sector, USDA, ERS, ECIFS3-3, 1983.

storage costs for agricultural commodities. When short-term interest rates reach high levels, private traders are reluctant to store even on a seasonal basis because of the heavy cost involved, and this element of market adjustment is lost. Volatile interest rates have placed the risk of storage on the farmer who must hold the commodity if he wishes to avoid low harvest time prices. These rates have affected production costs of farmers and in particular may have negatively affected U.S. livestock production where large amounts of credit over a longer period of time is required.

Inflation and the volatility in interest rates and commodity prices during the 1970's had a significant impact on land prices, created major increases in the prices of farm machinery and other capital inputs and, in turn, affected the long term comparative advantage of American agriculture in world trade. Market uncertainty has increased greatly and has affected operations throughout the system. Unless action is taken to reduce massive future government deficits and reduce the role that monetary restraint and high interest rates play in controlling inflation, volatility in financial markets and foreign exchange markets will continue to create instability in both domestic and international commodity markets. This, is thus a central area where policy conflict arises, creating major uncertainties about the framework within which agriculture must operate in the future.

D. Other Dimensions That Affect Agriculture's Trade Position

Other important factors have short and long-term implications for future developments in American agriculture, affect its world trade position and generate important policy questions. Though these are numerous, we consider here three that are of central importance--transportation, information, and research and education.

Transportation: Agriculture's transportation needs have grown exponentially over the last decade in response to sharp increases in output and an even sharper increase in the volume of products marketed off-farm, particularly in the export market. Equally important, the volume of inputs used by farmers has tended to increase in tandem with output gains, and farmers have become more dependent on purchased inputs rather than inputs of farm-origin. In this setting, the transportation links become a two-way tie. First, $25 billion in production inputs from the rest of the economy must be moved from geographically dispersed manufacturers to commodity production areas and must then be distributed to even more widely dispersed farmers. Secondly, the $125 billion in farm products marketed off-farm have to be transported to processors and ultimately to wholesale/retail distribution or export centers.

These movements involve many different modes of transportation, including rail, barge, truck, ship, pipeline, and airplanes. They may involve long hauls, such as moving Great Plains wheat to Europe, or may have to cover only short distances, for example, moving grain from farms to local elevators. It is difficult to measure the importance of transportation because of the complex marketing systems involved, the multiple movements, and the problem of generating comparable data. But researchers estimate that agricultural transportation is a $20-25 billion industry domestically, involved in moving 700 million tons of products each year.

The importance of transportation to agriculture goes beyond keeping the sector operational. The availability of dependable, low cost transportation to ensure input supplies and to serve as a means to market output is a key determinant of gains and losses within the farm sector. It is essential to maintain the U.S.'s competitive position in the world market. During the tight supply years of the mid-1970's, the availability of transportation to deliver inputs and move farm products to market and into export position was correctly identified as setting the upperbound on agriculture's short and medium-term capacity to produce.

Internationally, transportation links become even more important. The transportation margin involved in moving food, feed, and fiber from U.S. farms to major markets abroad--such as Rotterdam--often ranges from 25 to 35 percent of the final market price of the product. Given the extremely competitive nature of world

commodity trade, the efficiency of the transportation system can make the difference between expanding or contracting trade that affects the U.S.'s market share. During occasional periods of high prices and tight supplies, having an efficient, flexible transportation system in place to respond to sharp changes in volume can become equally vital.

In this highly competitive environment, the question arises as to whether agriculture is well served by a U.S. merchant marine which depends on direct government support to overcome a serious cost disadvantage. While the rationale for supporting a maritime transportation industry touches on many broader issues, it is clear that U.S. agriculture needs a competitively priced international transportation system to maintain its position in the world market. The cost of U.S bottoms is high enough without direct government subsidies to weaken, and in some sectors eliminate, the U.S. cost advantage in the world market.

Information: The importance of information--defined as the collection of market intelligence, its analysis, dissemination and application in economic decision making--in the day-to-day operation of the agricultural sector has increased steadily over the last decade. This expansion relates in part to the increased availability of information and the competitive nature of the commodity markets, putting a premium on the effective use of timely intelligence. It is also due to the changing structure of the major commodity markets and to increasing market instability--both of which tend to increase the importance of market information. With the sharp expansion in output and exports of the 1970's, the U.S. market for farm products became essentially a world market subject to a widening range of price enhancing or depressing supply and demand fluctuations here and abroad. In this kind of setting, information becomes an even more important hedge against risk and uncertainty for all involved in producing, buying, or selling U.S. farm products.

While the analysis done over the last decade is not conclusive, recent (1970's) increased emphasis on information collection and analysis appears to have significantly improved market operation. This is particularly true of the Futures Market where price signals appear to have facilitated short and medium term adjustments to shocks as severe and unprecendented as the 1973 and 1975 Soviet purchases, the 1980 embargo, and the 1980 droughtin the U.S.

But while society as a whole has benefitted from these improvements in market operations, the structure of the market is such that a limited number of actors have captured most of the gains possible from market fluctuations resulting from supply and demand changes.

Two factors are among the most critical in skewing distribution of the gains from information. The resources needed to establish and maintain a worldwide information system have increased severalfold to become all but prohibitively expensive. Equally important, the structure of the major commodity markets is such that relatively few participants are in positions favorable enough to allow them to act on current intelligence before market adjustments occur.

Weather is probably the most important determinant of fluctuations in agriculture prices. Collecting and analyzing weather information has become increasingly expensive, due both to the technology used and the need for expanded collection. It is also expensive in that its analysis often requires a parallel system of information on weather impacts on agricultural production and prices. The increased involvement of governments in market decision making makes policy intelligence both difficult and expensive to obtain. More important, the costs involved in collecting and analyzing this information tend to price it out of the range of most small and medium-sized operations.

Although there are many the producers and consumers of agricultural product marketing of several of the important commodities is concentrated in a relatively small number of companies. This is especially true of the export trade. Few governments and only a small number of private organizations can match these large trading companies' investments in information collection and

processing; even fewer are in a position to act as rapidly on current intelligence.

Governments are often at a disadvantage in collecting information, particularly the detailed information of interest to a firm. Furthermore, organizations with substantial resources invested in information systems are likely to be in a position to analyze and act on information collected by the government more rapidly than other actors.

This question of the distribution of gains from information is critical, but it does not overshadow the larger gains the farm sector and society as a whole enjoy as a result of information-related improvements in the operation of the market. The limited empirical investigations of market operation done to date suggest that despite the increasingly severe fluctuations in supply and demand major commodity markets have been subjected to since the early 1970's, the market has worked well enough to send appropriate signals to decision makers both in government and the private sector.

Research and Education: Research and education underlie advances in technology and productivity. A long history of publicly supported research and education has been increasingly supplemented by private research. Private research has tended to concentrate on mechanical and chemical technology with public research being more heavily concentrated in biological areas. However, private firms have shown increasing interest in genetic engineering and appear to be moving rapidly into this field.

This will surely have an impact on how the gains and costs in these kinds of developments are distributed. Since public support for research appears to be waning, the proportions between public and private research may become greater.

The relevance of research in generating an increasingly productive agricultural plant in the U.S. is evident. Most studies attribute a return at the margin of 30 to 50 percent on funds spent for research--well above other inputs. Maintaining viable, effective research and educational inputs thus becomes a crucial component of the long-term trade position of U.S. agriculture.

V. IMPACT OF NATIONAL ECONOMIC POLICY AND INTERNATIONAL FINANCIAL SYSTEMS

A large nation's macroeconomic policy, particularly monetary policy, influences international agricultural markets in two ways. First, monetary policy influences the agricultural production sector and therefore affects net export supply and/or net import demand. This link, discussed in Section IV, has a long history and is generally well understood. The second influence comes about through the effects of domestic monetary policy on interest rates, exchange rates, inflation rates and growth rates which, in turn, impact on international capital markets and through them, on the international commodity markets. This influence has risen greatly since 1970 for at least three reasons: (1) the shift to flexible exchange rates following the collapse of the Bretton-Woods monetary agreement; (2) the significant expansion of the Eurocurrency and international capital markets; and (3) the inability of national macro/monetary policy to control domestic inflation that is transmitted to other countries through capital and currency markets (McCalla 1982). The 1970s and early 1980s have, therefore, been characterized by bursts of international inflation (73-74 and 79-80) and global recessions (75-76 and 81-82-83).

This international turbulence has direct and indirect implications for international commodity markets and the major participants therein. The special role of the U.S. dollar as an international currency of exchange in primary commodity markets and as a reserve currency, coupled with U.S. dominance in the global economy in GNP and trade, means that domestic U.S. policies are crucial to U.S. agriculture, both domestically and through their impact on commodity markets. This vital, growing and little understood set of links is outlined more fully in the following paragraphs.

The U.S. is a very large exporter of agricultural products--particularly grains and oilseeds. The U.S. dollar is the currency of primary commodity transactions. These two

facts, coupled with the relative openness of U.S. markets, (both capital and commodity), mean that the value of the U.S. dollar is crucial to both domestic U.S. prices and world prices denominated in dollars.

The period 1979-1983 illustrates these links well. Basically, this was what happened: In an attempt to slow inflation, the Federal Reserve Board implemented a tight money policy by targeting a relatively slow and steady growth of the money supply. Interest rates rose significantly, both increaseing unemployment and attracting capital into the U.S. from nearly fully integrated international (Eurocurrency) markets. Capital inflows were also induced by the federal government borrowing heavily to offset rapidly rising fiscal deficits. These capital inflows increased foreign investors' demand for dollars, which appreciated the value of the U.S. dollar relative to other currencies. Other nations which had exchange rate targets relative to the dollar began buying their own currencies with dollars in foreign exchange markets in order to stabilize their currencies. This had the effect of contracting their money supplies while at the same time the Federal Reserve, by its steady growth policy, passively sterilized the dollar inflow, thus contracting world money supply. The result has been deflation and recession on a global scale (McKinnon, 1982).

Similar scenarios could be constructed for previous periods of both inflation (the opposite case) and recession. The implications of these monetary impacts for agriculture and agricultural trade are important. Dollar appreciation increases the foreign currency cost of U.S. exports, resulting in a shift to the left in international demand for U.S. agricultural products, resulting in falling commodity price in U.S. dollars (price effect). High interest rates increase the costs of production and storage, which in the short run decrease stocks and increase supplies (supply effect). Global recession reduces growth in per capita income, which reduces demand for high income elasticity goods (e.g., meats) and reduces global aggregate demand (demand effect). Portfolio and asset adjustments cause portfolio holders to move out of commodities (portfolio effect). All of these effects currently are moving in the same direction, which, added to U.S. dominance in world grain markets, causes U.S. and world (denominated in dollars) grain prices to decline. A similar scenario could also be constructed for commodity price escalation in 1972-73 and 1979-1980.

For exporters whose currency moves with the U.S. dollar, the domestic impacts of reduced prices and contracting exports are the same as for the United States. For members of the European Economic Community (EC), where currencies have depreciated vis-a-vis the dollar, export competitiveness should be enhanced. For grain importers whose currencies are pegged to the U.S. dollar, the exchange rate impact is neutralized vis-a-vis U.S. exports, and therefore, given declines in nominal commodity prices, imports are cheaper. However, exports from competitive exporters whose currency has depreciated (e.g., Canada) become cheaper relative to U.S. exports. In countries where the currency is pegged to other depreciating currencies, dollars become more expensive while prices are lower, which produces an ambiguous result. Finally, in inconvertible currency countries that use primary exports to finance food imports or sell gold to buy U.S. exports, import demand contracts with the rising dollar.

The scenario sketched above is not a complete general equilibrium analysis, serves to illustrate the complexity of the interrelationships in agricultural trade when macro dimensions are introduced. Clearly, commodity markets are going to be made more unstable by monetary (macro) instability; and, given the dependence of U.S. agriculture on exports, fluctuations in the U.S. dollar create price and income instability for U.S. agriculture.

The above discussion shows clearly that interdependencies between monetary and fiscal policy, the international financial system, world commodity markets and U.S. agriculture have important consequences on the income of U.S. farmers. But these interconnections are not well understood in general, particularly not by agricultural trade and policy economists. Further, economic turbulence is likely to continue unless and until stable monetary policies are pursued by major actors (including the U.S.) which recognize international

interdependence. These interconnections, therefore, raise additional issues of policy trade-offs and potential conflicts crucial to agricultural policy development. This set of interdependencies has emerged as a crucial component of the policy framework and will probably continue to impinge on international agricultural trading relations and policy development in the foreseeable future.

VI. TRADE, DEVELOPMENT AND MEETING WORLD FOOD NEEDS

Underlying conditions governing U.S. trade and aid policy vis-a-vis the Third World and the effects of economic policies and institutions upon the food supply in Third World countries are of two kinds. First, the United States has a political interest in maintaining good relations with Third World countries, and for this reason provides them with both economic and military assistance, help which has important effects on world trading conditions. Second, the United States has an economic interest in encouraging growth in Third World economies, and helping to maintain this growth during periods of business cycle downturns. But not all policy interventions that affect international trade have positive effects upon low income countries.

These countries are both suppliers to, and markets for, the United States. Without them the U.S. economy as a whole, and agriculture in particular, would be much smaller and less prosperous. (The importance of Third World economies as markets for U.S. agricultural products is shown in Table 7.) For cereals alone, developing countries now account for over 40 percent of total U.S. exports, and their total quantity of imports has tripled during the past two decades.

Developing countries are becoming more dependent on the U.S. and other developed country exporters for agricultural imports. This increasing dependence creates conflicts, since many countries view it as a mixed blessing. While it has permitted many countries to increase the amount of food available and keep prices low for consumers, particularly in urban areas, it also makes them vulnerable to world market conditions which they have not previously experienced. Dependence on cereal imports and imports of other food-stuffs has made stability in food prices and in export earnings more important to them. Further, their dependence on developments in the industrialized world with respect to monetary policy, inflation, interest rates etc. has increased their sense of vulnerability with respect to the supply of basic staples.

A significant part of the policy agenda between the developing countries and the industrial countries has been set by the proposals made by the United Nations Conference on Trade and Development (UNCTAD). Policy discussions that have centered on issues raised by UNCTAD have focused primarily on the trade and financial relationships between the developing and developed countries. Issues related to food and food security have been dealt with separately by the World Food Council and the governing bodies of the FAO, where the discussions have focused more on specific measures that could be taken to strengthen world food security. However, national policies have not had an important place on the agendas of either of these bodies; both the South and the North seem reluctant to discuss them, for political and other reasons.

In 1975 UNCTAD presented its Integrated Programme for Commodities. While there have been numerous conferences and negotiations on the Integrated Programme, very little has so far been done. The objectives of the programme, as outlined by the UNCTAD secretariat, were as follows: "(i) to encourage more orderly conditions in general in commodity trade, both with regard to prices and the volume of trade, in the interest of both producers and consumers; (ii) to ensure adequate growth in the real commodity export returns of individual developing countries; (iii) to reduce fluctuations in export earnings; and (iv) to improve access to markets in developed countries for developing country exports of primary and processed products" (UNCTAD, TD/B/C. 1/193, October 1975, in Huddleston, 1977). The heart of the programme was the proposal that international stocking arrangements be negotiated for ten

Table 7

Major Destinations of U.S. Agricultural Exports, Percentage Distribution

	1973/74	1974/75	1981/82	1982/83
Total Exports (Value)				
Developed	59	57	52	53
Less Developed	32	37	35	40
Centrally Planned	9	6	13	7
Wheat (Quantity)				
Developed			17	17
Less Developed			50	69
Centrally Planned			32	14
Coarse Grains (Quantity)				
Developed			55	48
Less Developed			23	40
Centrally Planned			21	13
Grains and Feeds (Quantity)[a]				
Developed			50	38
Less Developed			35	50
Centrally Planned			24	12

Source: U.S. Department of Agriculture, ERS, U.S. Foreign Agricultural Trade Statistical Report, various years.

[a] Excludes oilseeds; includes products such as corn gluten feed.

"core" commodities[1] and that a Common Fund be created for the financing of such stocks. Seven other commodities were also identified as warranting inclusion in the integrated programme, but they were either not considered suitable for stocking arrangements or were not covered by the final Common Fund proposal.[2]

In addition to buffer stocks, several other measures were suggested for inclusion in various commodity arrangements. These included building up systems of multilateral purchase and supply commitments; improving compensatory financing arrangements; and taking measures to secure rapid development in processing raw materials in producing countries, including improved market access and export promotion assistance. Despite acceptance in principle of the Common Fund idea, the Fund has not yet begun operating due to the lack of a sufficient number of signatories. Without U.S. participation, which seems unlikely, this approach holds little promise for the future.

With the apparent stalemate in the commodity agreement approach to trade issues of importance to developing countries, other approaches, in particular reform of the International Monetary Fund and measures to promote trade among developing countries, have received increasing attention. The recent difficulties of several developing countries with their large international indebtedness raises several important issues. While the amounts of the indebtedness were to a very considerable degree within the control of the developing countries, subsequent events made the real cost of servicing the debts much greater than anticipated. The developing countries believe that a large part of this problem arises because of monetary and fiscal policies in OECD countries, particularly the U.S. Such policies caused worldwide recession, overvaluation of the dollar, and a sharp reduction of both the quantity and the value of primary commodity exports from developing nations. This prompted them to call for reform of the IMF, to allow it to respond more flexibly to balance-of-payments problems created by external factors.

The current crisis also raises longer-term issues. One is the role that growth in external debt had in promoting economic growth. Another issue is how agricultural productivity will be affected by the loss of the capacity to borrow at the same rate in the future as in the past, given the probability that future net increases in international lending will be small.

Since many developing countries will probably have little net international capital flow for the rest of this decade, the importance of improving access to international markets for the exports of these countries takes on increased significance. In fact, the ability of many countries to service their external debt will be significantly affected by their ability to increase their exports of agricultural products and labor intensive manufactured products, including processed agricultural products. If the current policies of industrial countries are not modified, access to export markets for agricultural products competitive with temperate zone products is likely to decline rather than increase over the next few years.

As developing countries plan strategies for exporting their agricultural commodities, an essential factor to consider is the generally negative trends in the real prices of their major agricultural exports. On one hand, these trends mean that larger quantities must be exported in order to maintain real foreign exchange earnings. On the other, if the export product is an important source of food in the exporting

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[1]The ten core commodities are cocoa, coffee, tea, suffar, cotton, hard fibers jute, rubber, copper and tin.

[2]These seven additional commodities are bananas, wheat, rice, meat, wool, iron ore and bauxite.

country and the reason for the decline in the real price is a general reduction in the real cost of producing it, then the decline in real price may come at no loss in real income for producers while transferring a substantial gain to all consumers (including the producers as consumers). Of course, if a particular country does not share in the cost reductions, there is no net gain from the real price declines unless it is a net importer. Clearly, there is room for research on the distribution of gains and losses from declining real food prices among the Third World countries.

An important issue related to the functioning of international institutions is the failure of the GATT to play an effective role in liberalizing agricultural trade. Even with the GATT being minimally effective, world trade in farm products since World War II has increased at a much faster rate than has world agricultural production. But the rate of export growth in developing countries has been far below that of the industrial countries, though some of the difference in growth rates may be due to developing countries' policies that encouraged domestic consumption and discouraged domestic production. But part of the difference in growth rates was also certainly due to the agricultural and trade policies of the industrial countries. These countries generally followed policies that expanded output beyond domestic demand and used either explicit or implicit export subsidies to dispose of the excess output. The competitive use of export subsidies has become an increasingly contentious issue affecting trade relations between the United States and the European Community, though countries most seriously affected by such subsidies are likely to be competitive exporters. The GATT has been unable to implement a code of conduct defining what constitutes subsidies and what circumstances justify their use. For example, do the deficiency payments that result from the U.S. target price policy constitute export subsidies? Nor has the GATT been able to play an effective role in mediating disputes between the U.S. and the EC. Institutional reform which would respond to the new and more complex set of interdependencies in the field of trade and monetary policy therefore offers considerable scope for investigation. Possibilities for such reform were suggested in a recent address to the American Association of Agricultural Economists (Hillman, 1984).

Various initiatives to promote Economic Cooperation among Developing Countries (ECDC) have been taken within the UN system. At a recent FAO Workshop on Trade among Developing Countries, various alternatives such as regional integration schemes, bilateral trade agreements and barter trade were discussed (FAP, 1984).

While the previous topics have been relatively neglected as research subjects, food security has been the subject of a considerable amount of research. That research has indicated that reserve or buffer stocks are a very high cost method of achieving a rather limited degree of food security; international trade provides the opportunity of meeting reasonable levels of food security at a much lower cost (Reutlinger and Bigman, 1981). At least one author attributes the major impetus for creating the IMF special facility for financing excess cereal imports to the results of research on food reserves, food insurance, trade and the financing of varying levels of cereal imports (Adams, 1983).

Another area that has received significant research attention is the effect of domestic farm and food price policies upon international price instability (Johnson, 1975). Most of the research has emphasized the policies of the industrial countries, yet the developing countries follow similar policies and also contribute to the price instability that is of concern to UNCTAD. It would seem appropriate to determine how much of the international price instability for important farm commodities originates in governmental policies, including the policies of the developing countries, and how much is due to variations in supply and demand in the major producing and consuming countries.

Even though aid has now been given to developing countries for more than three decades, much remains to be done to asses the effectiveness of that aid, in particular food aid and aid designed to improve agricultural productivity. The effectiveness of food aid, for instance, remains in considerable dispute. It should perhaps be noted that more and more of

the emphasis upon the value of food aid is apparently as a transfer of purchasing power and not upon the food as such. A recent FAO estimate that particular development projects can use no more than five to six million tons of grain supports this contention (Huddleston, 1984).

A context within which future debate about world food security is likely to take place is the broadened concept encompassing issues related to production strategies and consumer access as well as market instability, which the FAO endorsed in 1983. Within this concept, many of the issues which have been relatively neglected in the past can be brought to the forefront.

VII. INFORMATION AND RESEARCH NEEDS--THE ROLE OF THE PROFESSION

Trade policy research is carried out, in the main, in academic institutions, private firms and government departments. Each of these entities has its own priorities, as well as its own constraints, strengths, timetables and evaluation criteria. Each exchanges ideas, personnel, issues and information with the others. This section deals with the present state of these links with an eye to identifying how agricultural trade policy research can be made more effective by taking advantage of the complementary resources of the institutions involved.

This discussion emphasizes research activity as producing an output (research results) of use to consumers of research (decision makers) by means of applying professional time (research personnel) to the organization, analysis and interpretation of data (information). If it is functioning correctly, the market for research results should indicate the usefulness of those results (correct specification of the issues) and their quality and timeliness (usability). In addition, as with all such economic activities, the production process itself yields greater or less satisfaction to the personnel involved to go along with the system of financial rewards. Information flows and the personnel and production environment are considered in the following discussion. It then moves to what the users of research require in terms of correct specification and usability.

A. Information Flows

One characteristic of producing research results in applied areas such as agricultural trade policy is the extensive use of information at almost all stages of research. Even those working on the analytical or theoretical aspects of trade policy must have a feel for the nature of the policy process and of trade flows in agricultural products. Without such an understanding, research invariably becomes sterile. Information must be collected, screened, evaluated, tabulated and disseminated. Individual researchers in this area of analysis commonly rely on others to collect such data, hence information flows become an important part of the system. One can visualize the three production locations of trade policy research interacting in transmitting information as shown in Figure 1. Nine directional flows are indicated. Putting aside for the moment the questions of issue specification and research usefulness, the main data flows at present can be summarized as follows:

- information on trade data (quantities, prices) and government policies from government research establishments to universities (flow b in Figure 1) and to private firms (flow d);
- information on private sector activities from private firms to governments (flow e), either as required by law or voluntarily given;
- information circulated within each locality, such as that contained in university libraries (flow i), government data-bases (flow c) and usually more specific data files in private firms (flow f);
- information, usually in a semi-processed form, from universities to research agencies (rather than decision makers) in the public sector (flow a) and the private sector (flow h);
- specific information, often linked to requests for specialist advice, from private sector researchers to universities (flow g).

Though this information network undoubtedly works, the spread of new technologies for transmitting data at high speed presents an opportunity to reevaluate data needs and access. The danger is that without careful consideration of data quality, the improved ease of acquiring data will lead to indiscriminate use by researchers. The suppliers of data will need to ensure full documentation of sources and provide qualitative assessments of reliability; the receiver of data will need to be equally critical and selective in employing the information acquired. It is unlikely that one data base can ever fill the needs of researches in different institutions. However, developing accessible pools of data of high quality as a method of improving the timeliness and usefulness of the research output should be a priority of the profession.

B. Personnel Interchange

The three types of research location are distinguished by different work environments, each calling for different skills. However, within this differentiated structure, interchange of personnel helps greatly in producing useful research output. Figure 1 can be used to show personnel flows as well as data exchange. The major flows at present can be summarized as follows:

- Trained personnel flow from universities to the government sector and the private sector. The degree of training can range from a general undergraduate education to experienced senior researchers with Ph.D. degrees.
- Government research staff move fairly freely into private firms, either because of higher salaries or changed interests, and occasionally to universities.
- Private research personnel move to government posts less frequently and rarely take up university appointments.
- Within each location, most personnel movement is initiated by promotion related to performance norms appropriate to the respective institutions.

Some consideration should be given to the reasons for the lack of mobility within research institutions. Universities and government departments, in particular, tend to exclude immigration of research personnel from the other sectors. People who move take with them

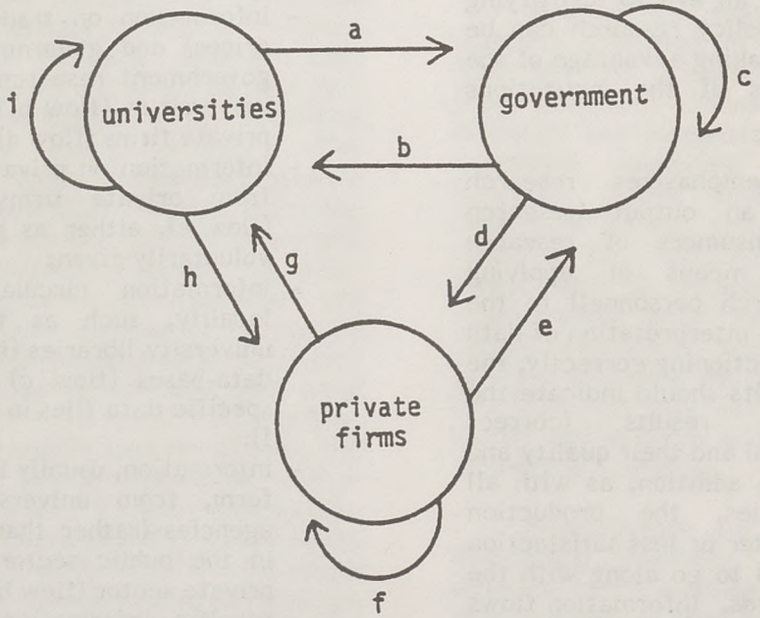

Figure 1: Potential information flows among different research localities (see text for interpretation of information flows).

their experience, information, and knowledge of sources of information; greater mobility might improve the relevance of research output. The private sector, with less restrictions on mobility--and a less structured career ladder--benefits from personnel interchange. Short-term exchange can bring some advantages but it cannot be a substitute for new career choices.

C. The Research Product

To be of use, research activity must generate a product capable of being transmitted to others and understood by them. Effective working relations must exist between producers and users of research. The major flows of research results at present include (1) university research acquired by governments or research done by private firms as a result of work initiated independently or under contract, (2) government research fed directly into the decision making process of operating agencies, and (3) private research requested by private decision makers from the same or another private firm.

Relatively little work is commissioned by public decision makers directly from universities, though private research firms often deal directly with public decision makers. Private decision makers make use of government and university research on occasion but this usually serves as are background for their own "in house" analyses. The reasons for these predominant links are not difficult to list. Usable research results have to be credible and specific to the problem at hand. Government agencies naturally tend to trust their own research staffs and put their faith in the reliability of data collected internally. By using its own staff, an agency can control the timing of the research more closely; contracting with other research personnel takes time and involves the risk of a tardy performance. University researchers working within the constraints of the academic calendar are not always able to adhere to a rigid timetable. Public decision agencies also require the results in a usable form. This form may be very different from that favored in a university system, which incorporates rewards and promotions for research based on internal academic considerations as distinct from "usefulness" to decision-makers. Indeed, the link between the usefulness of the results and the action taken may itself be obscure to outsiders, thus preventing this criterion from being useful for performance evaluation in universities. The private research sector has the more definable criterion of financial success to guide promotion and reflect the acceptability of its product. It also tends to have a clearer grasp of the need to present results in a way which clarifies choices and makes less demands on the reader's time in digesting the research output.

Private decision makers have similar concerns to those mentioned above for a public agency. Timing is often more crucial: decisions may have to be made quickly. Research is usually specific, focused, and often not analytically rigorous, though timely and well presented. Personal identification with a product is not important.

The case against the present high degree of differentiation in research products is essentially that these differences represent weaknesses rather than strengths--a failure of the research establishment rather than a constructive division of labor. Universities are less productive than they might be because they fail to address key issues, because they do not appreciate the importance of timing in decision making, and do not organize data well or worry enough about its reliability. Researchers in academic institutions often fail to present material in a user-friendly way; they tend to emphasize theory or methodology rather than useful results.

Government and private sector research establishments also have their weaknesses. As a result of the inflexibility of large-scale research organizations with compartmentalized and specialized efforts that are often unable to shift resources among problem areas, government research is less than perfectly responsive. As academics devote time to following the rules of university life, government researchers' own bureaucratic processes restrict their efforts. Their need for timely results on specific issues clashes with a broader understanding of the underlying context

of research issues. Tight deadlines make it difficult to benefit from the work of others, just as relaxed deadlines in academic life lead to the problem of delayed or untimely output.

Private sector research is less easily characterized. The research department in a large firm may exhibit some of the weaknesses of government research departments; the small consultancy with one or two people from government or a university may in part overcome such problems. On the other hand, the flexibility of the small firm may be at the cost of proper integration with the aims of the research and with the data and background needed for the project. The result may be well presented and on time, but still too superficial for good decision making.

This discussion has focused on the choice between maintaining a productive division of labor between short-term, issue-specific research and long-term, more general activities on one hand and improving the relevance of long-term research and the analytical basis for short-term work on the other. Though the distinctions drawn here are far from precise, the issue is of key importance to the profession. Since public decision agencies proclaim the need for policy-relevant research in the area of agricultural trade policy, they must decide the nature of the product or products they require, indicate this information clearly to the research community, and reward those that provide such research. Private decision makers similarly have the capacity to promote the production of the services they need. Given time, the market will respond to such demand signals. Universities need to decide how to respond--by emulating private research firms or by forming and maintaining close public-sector links. Alternatively, they can continue to plow the furrow of academic excellence as a reward in itself.

VIII. PROFESSIONAL LINKS AND COMMUNICATIONS

A final question is whether processes can be established to provide useful information transfer and working links among researchers and between users and producers of information. This involves communication among researchers and between researchers and users in the business community as well as between researchers and users in government agencies.

Developing a process of this sort depends on whether land grant colleges and agricultural economists in academia can successfully to carry out research of the kind needed. This will depend partly on attitude and interest, partly on whether they are willing to invest the intellectual capital required to deal with relevant problems, and partly on whether they can establish the institutional links needed to implement the research.

Increased library research to further general familiarity with conditions, problems and issues is an activity all agricultural economists can undertake. This kind of research can represent an essential component of building the background and expertise required to do the broadly based macro-economic analysis implicit in trade research. Because of the longstanding micro-economic approach emphasized by most unversity agricultural economics departments, individual researcher effort will be required to expand understanding of the macro-economic aspects of economic analysis.

Increased knowledge and expertise also needs to be developed on the agricultural and general economies of foreign countries. Data to do quantitative analysis of the effects of economic and policy factors within individual countries that influence production, consumption, prices and trade flows is increasingly available from international organizations and the USDA. In some cases, analysis of this kind can be extended to a multi-country or even worldwide framework.

Greater difficulty in implementing research arises we try to deal with the intricacies of how policies are formulated, why individual countries act as they do or what kinds of policy changes are needed to achieve a given result. A great deal more insight is needed than can be obtained from available theory and secondary data. There is no way, for example, of assessing the policies Brazil should follow to optimize its export earnings from soyabeans without knowing a lot more about Brazil than is available from secondary sources.

Some basis must be provided for on-site study and research. This can be done only through increased cooperation among land-grant colleges, government, private foundations and foreign institutions. Strengthened links among institutions are required both here and abroad. As suggested in a recently published paper, various dimensions among these links included those: (ESCOP, 1984).

a. among researchers in various U.S. universities doing trade research;

b. between researchers in universities and researchers in non-university research institutions such as the Economic Research Service and the Foreign Agricultural Service;

c. between researchers in universities and professionals in governmental and international organizations such as the State Department, the Trade Representative, the Commerce Department, FAO, GATT, IMF, and so forth; and

d. among researchers in this country and in other countries.

To achieve this kind of collaboration, strong support will be needed from research administrators at the state and national level. This support is likely to be forthcoming only if administrators recognize that macro-economic and international links strongly influence the welfare of farm and rural people and that understanding these relationships is a research endeavor as important as the more traditional research areas in agricultural economics. Politicians, particularly those at the state level, must also be convinced that these relationships are important.

Of central importance to this kind of research is a strong foundation in the Economic Research Service, USDA, and a close working relationship between the ERS and universities. A second dimension of implementing meaningful research is a link between the ERS-University research network and government and private users of research and information. The nature of these linkages can be illustrated as below.

This implies a two-way flow where research users communicate information and research needs to researchers and researchers communicate analytical results to users. In

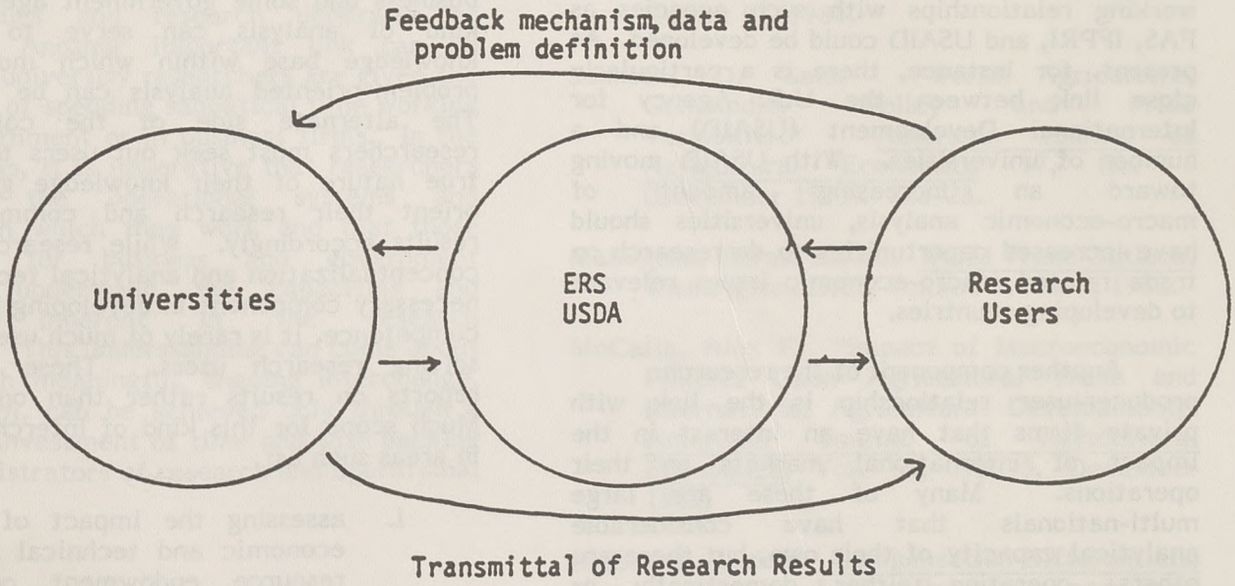

Figure 2: Linkages required to implement USDA-University research and transmit information to users.

some cases research users would provide the basic data and insights about conditions in foreign countries needed as a basis for effective research and analysis. At present the Foreign Agricultural Service, USDA, is the primary assembler of basic statistics on production, consumption and trade that are used internally by the ERS, industry and universities as a basis for understanding conditions and developments in world markets.

The Economic Research Service should play a key role. Its program has a national focus in all divisions, and the International Economics Division contains the nation's largest group of agricultural economists concerned with research on the international dimensions of American agriculture. The ERS also has a close view of policy developments as they evolve and the potential for ongoing liaison with other government departments that deal with trade and macro-economic problems. It must perform a central role in developing relevant data and information on various regions and countries of the world. The ERS can also serve as an important link between universities and the relevant national and international institutions and agencies.

This, however, would not be the only link for universities to maintain. Where feasible, working relationships with such agencies as FAS, IFPRI, and USAID could be developed. At present, for instance, there is a particularly close link between the U.S. Agency for International Development (USAID) and a number of universities. With USAID moving toward an increasing amount of macro-economic analysis, universities should have increased opportunities to do research on trade related macro-economic issues relevant to developing countries.

Another component of the research producer-user relationship is the link with private firms that have an interest in the impact of international markets on their operations. Many of these are large multi-nationals that have considerable analytical capacity of their own, but there are others, operating either domestically or domestically and internationally in markets that are affected by international conditions, with limited ability to evaluate market conditions. Large firms tend to deal effectively with short-term market analysis and build an understanding of market structures and economic conditions in foreign markets where they operate. They need an adequate data base and research that defines fundamental economic and institutional relationships which affect their longer run planning horizons. Small firms can probably benefit from analysis with a short-term applied focus as well as from longer term, more fundamental analysis.

Two major problems exist in developing a research-information network that serves users effectively and provides an opportunity to implement effective research. One is the problem of time horizon. Users are often oriented to short-term needs for direct problem solutions. Researchers, on the other hand, need lead time to fit research commitments into an overall ongoing program. The second problem is to establish the mechanism for a flow of information from users to researcher and vice-versa. These are interrelated problems. Users need to understand the capacity of researchers and learn to transmit inquiries and assist in defining relevant problems that are feasible research topics. This implies a concern with more fundamental analysis, which requires a longer term time horizon than is normal in business and some government agencies. This kind of analysis can serve to build the knowledge base within which more applied, problem-oriented analysis can be undertaken. The alternate side of the coin is that researchers must seek out users to learn the true nature of their knowledge gaps and to orient their research and communicate its results accordingly. While research aimed at conceptualization and analytical techniques is a necessary component in developing professional competence, it is rarely of much use to problem solving research users. These users need reports on results rather than on processes. Much scope for this kind of interchange exists in areas such as:

1. assessing the impact of change in economic and technical factors and resource endowment on demand, supply and comparative advantage in agricultural production,

2. assessing the impact of institutional relationships and policies on trade patterns and opportunities,

3. analyzing the impact of monetary phenomena and policies on trade and capital flows, and

4. analyzing the nature of links among domestic sectors and their impact on international markets.

These areas all represent basic underlying information that would appear relevant to analysis and decisions undertaken by business firms and agencies repsonsible for formulating and carrying out government policy.

The most effective mechanism for interchange in many cases will be collaboration between individual researchers and government or private users who perceive an information gap. But ongoing dialogue in a broader framework would also be useful. One model for such a dialogue is a recently established, informal trade consortium supported by the Economic Research Service and Foreign Agricultural Service, USDA, Agricultural Canada and a number of U.S. and Canadian universities. Government policymakers and government and university researchers meet twice yearly to discuss issues and research underway or proposed. Another important link can be achieved if university researchers are given the opportunity of spending sabbatical time working in the government or in business firms. In the final analysis, it is imperative that researchers understand the operational systems and situations in which they work and that those responsible for business and government operations understand the capacities and limitations inherent in the research community. This understanding can come about only through meaningful, ongoing interchange. This, in turn, can be achieved only through a significant investment of time and with backing from administrators of research and operational programs.

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