

## **The Impact of Trade Liberalization and Globalization on the Agricultural Sector: Implications for Agricultural Extension<sup>1</sup>**

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### **Introduction to Trade Liberalization and Globalization**

The landscape of the world economy is undergoing considerable change, as international trade moves towards the elimination of national borders. Trade liberalization, or the removal of impediments to competition, is a dominant component of the new free market economic policy; it is also characterized as the phenomenon of “globalization.” Trade liberalization includes the removal of both border barriers, such as tariffs and exchange controls, as well as internal restrictions, such as directed credit and preferential purchasing. By the late 1990s, no economically significant country still had “government-committed” protectionism. Further, the flourish of international institutions including the World Trade Organization (WTO), the EU, the North American Free Trade Agreement (NAFTA), and the World Bank have underpinned cooperation among states and helped global integration (Wolf, 2001).

The move toward trade liberalization and globalization have been facilitated by continuing advances in technology and infrastructure that have reduced the costs of transportation and communication between different parts of the world. During the last fifty years, technical revolutions have occurred in the collection and dissemination of technical information, and in the cost of moving physical objects (Buelens, 1999). Diminishing costs of communication and transport are increasing the pace of international economic integration, which has become the primary “driver” of globalization. The opportunities represented in these trends are having a profound impact on agricultural development, in both the industrially developed and less developed countries.

There are other factors, which are also contributing to agricultural globalization. Much of the recent technology has been developed from private sector investments in research and development (R&D). To maximize their returns on these R&D investments, multi-national firms have transferred these improved technologies, with appropriate modification, to the commercial farm sector worldwide. As a result, world prices of many agricultural commodities are steadily falling, especially in real terms, giving larger, more integrated producers a distinct competitive advantage in supplying major urban markets and large end-use processors. This latter phenomenon, known as the *industrialization of agriculture*, is closely tied to globalization.

### **Diversification and Specialization of Agricultural Production**

There are other important developments within the global food and agricultural system that offer new growth opportunities in agriculture. As the market forces of globalization gain strength, there is an increasing demand among end-use processors for farm products with specific traits, consistent quality, and timely delivery to increase their production and/or processing efficiency. If built on the comparative advantage of an eco-region, farmers can achieve increasing returns through product differentiation. This emerging demand structure is

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the primary factor driving the current trend toward value-enhanced commodities in North America and Europe. In addition, food safety and quality control management, both of which require traceability, are becoming important features of this emerging food system. Large-scale producers have a comparative advantage in producing and marketing some value-enhanced commodities, since they are able to spread these new “identity preservation” (IP) and “traceability” costs over a larger production base.

Another important dimension in the movement toward value-enhanced farm products is the direct result of consumer demand for farm products with different traits. Many well-educated, high-income consumers are willing to pay substantially higher prices for food products with a preferred set of traits. For example, some consumers are concerned with a variety of food safety issues and are willing to pay more for either organic or other types of “natural” food products that have been produced without the use of chemical inputs, hormones, antibiotics, and/or crops that have not been contaminated by genetically modified organisms (GMOs). The question here is not whether these organic or “natural” food products are safer; rather, the issue is whether a growing number of consumers are willing to pay a sufficient premium to induce the production, marketing, and processing of specialized farm products to meet these emerging consumer demands. Current trends in Europe and Japan, and emerging trends in North America suggest that the demand for high quality, *natural* food products will continue to increase during the foreseeable future. These trends could open new opportunities for small and medium-scale producers, since it is more difficult to “scale-up” these more extensive production systems.

As this structure of demand continues to diversify, it appears that an older *commodity production strategy*, implying that many agricultural goods are homogenous products that dominated U.S. agriculture during the 20<sup>th</sup> century is being replaced by a new *differentiated goods and services strategy*. This appears to be a classic paradigm shift where old business models, institutions, and management practices have declining relevance as new approaches and management tools are developed and implemented. If the trend toward increasing product diversification continues, then how are farmers in different countries expected to prepare for and compete in this changing global economy? This issue will be examined briefly in the remainder of this paper, including how one research-extension team has responded to this emerging situation.

### **Determining Comparative Advantage**

Trade liberalization and globalization are having a major impact on the world food and agricultural system by, in effect, picking winners and losers, based on comparative advantage. First, different countries and different agro-ecological zones within countries are beginning to specialize in those crops and other agricultural products in which they currently have a comparative advantage. Factors such as climate, including temperature and rainfall pattern; natural resources, including soils, topography, and water for irrigation; and the transportation infrastructure all play an important role in determining the predominant crop(s), livestock, and farming systems that are competitive in different eco-regions of each country.

The situation becomes more complex when considering other variables, such as factor costs, including land, labor, inputs, and transportation; proximity to local, regional and export markets; the availability of human and social capital, including higher level technical and management skills, and the availability of farmer organizations; and the availability or access to

R&D capacity and informational technology (IT). All of these factors will affect the mix of crop and livestock systems that can operate profitably in different agro-eco-regions of individual countries. Also, national agricultural policy, within the WTO framework, may mitigate the relative impact of these factors as countries seek to maintain some level of food security while taking advantage of new trade opportunities.

These changes and the way that national research and extension systems respond, have major implications for farmers in both industrially developed and less developed countries. A brief comparison of white maize production in Mexico and the U.S. highlights some of these forthcoming challenges and opportunities. First, white maize is the primary food staple crop in central and southern Mexico. However, due to agronomic conditions, seed quality, input costs, management skills and other production factors, maize production costs are about 25% higher in Mexico than in the U.S. Until the passage of the North American Free Trade Agreement (NAFTA) and, more recently, the establishment of the WTO, Mexico was able to restrict white maize imports and, thereby, protect domestic food supplies and the subsistence income of small farm households. Under NAFTA, white maize tariffs are being incrementally phased out; therefore, after 2007 Mexican campesinos will compete directly with more efficient American farmers for the Mexican tortilla market. Without some type of government intervention, the market will determine the winners and losers for this important market. At the same time, commercial farmers in Mexico will have a major competitive advantage over farmers in California and Florida in producing a wide variety of “high value” vegetable and fruit crops for the U.S. market. But, during the winter months in the northern hemisphere, they will also have to compete with well-organized Chilean farmers for the U.S. fruit and vegetable market.

This situation is juxtaposed when considering the growing competition between maize and soybean farmers in the U.S. and Brazil. Brazil is rapidly increasing its share of the world's maize and soybean market as it expands into the large undeveloped land area of states such as Mato Grosso. As its transportation infrastructure improves over the next 10-20 years, Brazil is expected to bring an area that is larger than the Midwestern Corn Belt under intensive maize and soybean production. Given that land costs are from 10—25% of current land prices in the U.S., Brazil has a major competitive advantage in producing and exporting maize and soybeans to major world markets, as well as in establishing industrial-scale pork and, possibly, beef operations. In short, over the next two decades, Brazil is expected to become the world's dominant exporter of low-cost commodity maize, soybean, and pork. U.S. farmers are already searching for alternative, value-enhanced crops where they would have a comparative advantage over producers in other states and countries, such as Brazil. Others are buying land in Brazil and Argentina!

These examples illustrate the types of impacts that trade liberalization may have on the world's food and agricultural system. The role of government policy in maintaining domestic food security and, thereby, protecting inefficient producers will be gradually phased out as WTO rules are implemented. As a result, there may be important shifts in agricultural production within and between countries due to economic, technological, and infrastructural factors. The result will be exposure of products to intense competition across different eco-regions, states, and countries. Only by establishing longer-term strategic alliances with processors, other end users, and consumers can producers avoid some of the price volatility and manage the risk associated with these dynamic market changes. In the process, the *free market economy* will, in effect, identify those farmers and production areas that can produce high quality products for the

lowest cost. However, it will likely be urban consumers in the high-income countries of the North who will gain the most from trade liberalization and globalization.

Given these anticipated changes, an increasingly important question is what role public research and extension will play in assisting farmers to select those crop and livestock systems that will make their overall farming systems more competitive in this global economy. Alternatively, in the case of less efficient producers, does extension have a role in assisting them (or encouraging their children) to exit out of farming altogether. The following approach, which is being implemented in Illinois, suggests one strategy that can help at least some farmers prepare for a highly competitive future.

### **Trends Toward Agricultural Diversification and Specialization in Illinois**

Since the mid-1970s, there has been a slow but growing trend in Illinois, and elsewhere in the Midwest, toward the production and marketing of value-enhanced farm products. Examples of value-enhanced or specialty crops include: white and yellow food-grade corn, waxy and high amylose corn for industrial uses, and high oil corn as a *natural, high energy* livestock feed. These crops are directed toward smaller, more demanding markets, which pay farmers a premium over and above what conventional markets pay. As seed companies have become more closely integrated with agricultural processing firms, private sector plant breeders have begun developing new hybrids/varieties that are designed for specific end-use markets. For example, new value-enhanced soybean crops include such types as low saturated fat, high sucrose, low linolenic, high oleic, and high isoflavone soybeans, each being developed for specific end-use markets.

Similar changes are underway within the livestock industry, but the pace of change is somewhat slower due the time, complexity and expense involved in farmers shifting from commodity to value-enhanced livestock production. Some examples of value-enhanced livestock in the U.S. include Berkshire Gold pork (for export to Japan), Certified Angus Beef, Neiman Ranch pork, Laura's Lean Beef, and so forth. Again, each of these products is destined for a limited segment of the livestock market and result in higher prices for the producers. Both Neiman Ranch and Laura's Lean certify that their meat products are produced without the use of hormones, antibiotics, GMOs, etc. Also, these "branded products" require that animals be produced using humane and environmentally friendly production methods. These value-enhanced livestock production systems have considerable potential for smaller, low resource farmers but, because of space and data limitations, only value-enhanced crops will be discussed in the remainder of this paper.

An additional trend is seen in the groups of Illinois farmers who are pursuing new business models and practices, such as organizing producer alliances to market these new value-enhanced crops, or organizing new generation cooperatives to pursue value-added processing. In the process, farmers who are interested in these new opportunities are becoming more "demand," rather than "supply driven." It appears that in the foreseeable future both domestic and global markets will demand and contract for a growing array of differentiated agricultural products. Those producers or groups of producers who can identify these markets early and who have a comparative advantage in producing these crops, may be able to capture and hold onto these new and emerging markets. With the proper direction, public sector research and extension can play an important role in (1) helping farmers identify these new markets, (2) determine their

comparative advantage, and (3) assist them in producing and marketing these new value-enhanced crops for the global economy. These are substantially different roles for extension, and they will require different skills on the part of the extension staff.

### **Experience of the Value Project**

The movement toward value-enhanced crops (and livestock) is challenging Illinois producers to discover new ways of creating value within this changing agricultural structure. To assist them in this process, the Illinois Council for Food and Agricultural Research (C-FAR) created a special research initiative (SRI) to investigate alternative crops and other means of improving farm incomes and strengthening rural communities. One of four projects funded under this SRI was the Value Project, which was designed to investigate the production and marketing of value-enhanced commodities, as well as value-added processing. This project became operational in October 1998 and initially had four components (specialty crop marketing; specialty crop technology; pilot projects, which involved farmer surveys and the development of an intervention strategy; and the study and development of producer groups). A fifth component on value-enhanced livestock was initiated during the second year of the project. Using primary and secondary data sources, the project seeks to expand the development of a value-enhanced production and marketing system for Illinois farmers. The research approach and intervention strategy utilized by the Value Project in addressing each of these *system elements* will be briefly described in the following sections.

#### Value-Enhanced Crop Market Identification

The first element examines market opportunities for value-enhanced crops. The project's marketing component began by identifying new value-enhanced market opportunities in Illinois. A telephone survey was carried out and reached 95% of 1,100 Illinois grain handlers to identify those who were handling value-enhanced crops. If so, they were then asked which value-enhanced crops they were handling, the premiums being paid, the additional costs of handling specialty grain, and the final market destination for each value-enhanced crop. This survey revealed the scope of specialty crop marketing in the state, the location of these markets and other information. To increase the transparency of the value-enhanced crops marketing system, a specialty crop-marketing directory and a comprehensive marketing report were published and distributed to farmers and grain handlers. Given the highly dynamic nature of value-enhanced crop markets, the location of specialty corn and soybean handlers must be identified annually and this information is published on the Internet, including a searchable database. Figure 1 and 2 show the location of different value-enhanced corn and soybean markets in Illinois during 2001. These figures illustrate the type of information being presented to farmers. Prior to this information farmers either had to search out markets on their own or rely on selling to a contractor.

#### Bridging the Knowledge Gap

When the Value Project was initiated, very little was known within the public research and extension system about value-enhanced maize and soybeans. After specialty crop markets had been identified, the next step was to assess farmer knowledge about these different crops. First, a survey of farmers in 5 pilot project counties carried out during the winter of 1999 revealed that fewer than 5% of all respondents had "sufficient information" on most value-enhanced crops (except for high oil corn), and most said they wanted more information. As shown in Figures 3 and 4, most Illinois farmers wanted more information on most types of value-

enhanced corn and soybeans. Therefore, the next step was to generate a set of “fact sheets” on each type of value-enhanced corn and soybeans.

Very little public research had been carried out on most value-enhanced crops, both in Illinois and throughout the Midwest. Therefore, the Value Project team compiled information from a variety of sources, mainly from private seed companies that were selling some types of specialty-crop seed, and innovative farmers who were already growing these crops. Since some of these crops had not yet been introduced into Illinois, farmers in surrounding states were interviewed to capture their experience and knowledge. Farmer interviews on each crop were carried out on each crop until a common set of production and post-harvest practices had been identified.

By compiling the experiences of many farmers, it was possible to develop a set of *best management practices* for both the production and post-harvest handling of these different value-enhanced crops. The resulting “fact sheets” were then distributed widely through normal Extension channels (meetings, conferences, and the mass media), through commercial seed company field representatives, and through direct mailings to farmers that were carried out under the auspices of the corn and soybean commodity associations. In addition, these fact sheets were available via the Internet. As a consequence of expanding markets and widely distributed information, between 1998 and 2000 the percentage of Illinois farmers who were producing value-enhanced crops increased from about 15 to 24% or a 60% increase in just two years. At the same time, the average area of value-enhanced corn and soybeans per farm more than doubled.

The overall magnitude of these value-enhanced crop production and marketing increases is substantial. First, value-enhanced corn production in Illinois increased from 5.5% of the total maize crop in 1998 to about 15.5% in 2000. In volume terms, this was an increase from about 2.1 million metric tons (MMT) in 1998 to over 5.8 MMT in 2000. Value-enhanced soybeans showed a similar increase from 4% in 1998 to over 14% by 2000 or from about .7 MMT in 1998 up to 2.3 MMT in 2000. In addition, the mix of value-enhanced crops changed substantially during this same period two-year period. For example, between 1998 and 2000, five new types of value-enhanced soybeans were introduced into the state and by 2000 farmers were commercially producing these new crops.

#### Determining the Profitability of Value-enhanced Crops

In addition to developing fact sheets to provide general production and post-harvest management information on each type of value-enhanced crop, the third element of value-enhanced crop production/marketing system was to determine the performance and profitability of these different crops in comparison with conventional elite hybrids or varieties. These comparisons were made by carrying out a series of on-farm research trials in various eco-regions of the state. By design, these trials were to be farmer managed strip plots that are spatially replicated within different eco-regions of the state. During 1999, 19 trials were successfully completed, primarily in the west-central part of the state. In 2000, this number was increased to 71 trials that covered most of the northern two-thirds of the state that is well suited for corn and soybean production.

The results of these on-farm trials reveal that some value-enhanced crops are more profitable than conventional crops and some are far less profitable, with significant eco-regional differences. These findings are available on the project’s web site and are being used by

prospective value-enhanced crop producers. During the 2001-growing season, 75 on-farm research trials are being carried out throughout the state to further validate these preliminary research findings.

#### Integrating Analytical Data Using an Asset Mapping Methodology

The project team has developed a unique “asset mapping” methodology to determine the comparative advantage of different eco-regions<sup>2</sup> within the state to produce and market different types of value-enhanced crops. This analytical framework analysis is based on the SWOT analysis (strengthens, weaknesses, opportunities and threats) that is commonly used in strategic planning. The first part of the SWOT analysis is to identify the important strengthens and weaknesses in each eco-region of the state with respect to specialty crop and livestock production. In general, we refer to these strengthens as “strategic assets.” These factors include agronomic conditions, proximity to existing markets, transportation infrastructure, on-farm resources (e.g. storage, low temperature drying), human and social capital, and so forth. Weaknesses, on the other hand, may imply the absence of specific assets or certain conditions might be considered as “strategic liabilities.”

#### Identifying Strategic Opportunities in Domestic and International Markets

The second part of the analysis is to examine strategic opportunities (and threats) to current and potential value-enhanced markets. Initially, the research team identified local or regional market opportunities for each eco-region within the state. However, given the growing impact of trade liberalization and the changing structure of agriculture, this part of the analysis is being expanded to include global opportunities and threats. This expanded focus will be a primary research thrust during the next two years of the project.

In examining these strategic opportunities, there will be two major research thrusts. First, through structured interviews with processors and other end-users, we hope to determine the specific quality traits or attributes required to increase processing efficiency and/or to improve product quality. In most cases, the focus will be on identifying and assessing the needs of small to medium scale processors or end-users and firms that may be interested in developing a strategic alliance with one or more cooperatives or a producer alliance.

The second area of research will concentrate on a supply chain analysis. In this type of analysis, alternative types of transportation and routes will be compared, including cost and capacity for identity preservation (IP) and traceability. In both types of analysis, the goal will be to make the demand for different types of value-enhanced farm products more transparent, and to systematically outline the most cost-efficient and effective means of shipping these products to different end-users from different eco-regions within the state. In many cases, having access to the most cost effective transportation system can largely determine comparative advantage.

#### Social Capital Formation: Getting Farmers Organized to Pursue Value-Added Opportunities

To effectively serve different niche markets for value-enhanced farm products, producers may need to get organized in some type of cooperative or marketing alliance. One way of

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<sup>2</sup> Eco-regions reflect both the ecological or agronomic conditions in different parts of the state that affect the production of different value-enhanced farm products, plus the economic factors (existing markets, processors, transportation costs, and so forth) that affect the profitability of different crop or livestock enterprises.

mobilizing farmers, within an eco-region with a comparative advantage for some type of value-enhanced products, would be to work through an experienced manager of a grain cooperative or group of cooperatives. In addition, grain cooperatives have the facilities and capacity to consolidate and transport value-enhanced grain efficiently.

At the same time, producing value-enhanced crops to specification generally requires more involvement and commitment on the part of the producers themselves. Therefore, getting producers organized within an eco-region to serve specific markets can help to motivate, educate and mobilize farmers to play a more active role in supplying these end-use markets with high quality, value-enhanced farm products. In short, if producers expect to capture more value from their specialty farm products, then they may have to play a more active role in producing what the market demands, marketing their products and/or in reducing transaction costs or “shortening the value chain.” In short, producers cannot rely on private grain merchandizing firms, especially multi-national firms, to look out for the farmers’ interest, nor to share more of the “value” of specialty farm products with them.

## **Conclusion**

Trade liberalization and free market economic policies have created a relatively new phenomenon commonly referred to as globalization. It has and will continue to have a major effect on agriculture in most countries. Simultaneously, the structure of agriculture in the United States is changing as input suppliers, producers, and processors become more integrated. These trends are having a major impact on the agricultural economy of most nations.

Traditionally, farmers have traditionally produced for local markets and have not been involved or concerned about where their crops or livestock products were eventually used or consumed. Presently, new market opportunities are emerging based on the specific demand requirements of consumers and/or end-use processors. These expanding niche markets, both domestic and international, provide opportunities for family-size farmers to exploit their comparative advantage in producing some types of value-enhanced products to specification.

To take advantage of these new opportunities, farmers may need to become more active participants in the value chain. First, they need know what products are needed, including specific quality traits or attributes. Second, they need to know whether they have an inherent comparative advantage in producing these products in relation to other potential suppliers. Third, they need to learn the most efficient and effective means of supplying these niche markets. Fourth, they may need to achieve economies of scale by getting organized into some type of marketing alliance or to work through an existing cooperative so they can provide processors or consumers with a consistent supply of high quality product.

Public research and extension can play a more active role in assisting farmers to participate more effectively in this emerging global economy. Research and extension teams can help to identify and assess the relative comparative advantage that small and medium-scale farmers might have in supplying value-enhanced products for specific niche markets. To carry out this analysis, they need to first systematically assess the strategic assets that farmers in different eco-regions may have in producing different value-enhanced crop and livestock products. Second, they will need to assess emerging market opportunities for value-enhanced farm products. Where research and extension organizations take on these new responsibilities



and challenges, they may be able to play an instrumental role in assisting their farmers to become more competitive in the emerging global economy.

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