POLICY OPTIONS FOR FACILITATING CHANGE AND MAINTAINING COMPETITION UNDER CONDITIONS OF FREE TRADE WITHIN NAFTA

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INTRODUCTION

The first six workshops in this PDIC series have described existing policies and programs in the NAFTA countries, and analyzed their contributions to trade disputes (Loyns, et al.editors, *Workshop Proceedings, 1995-2000*). This workshop has taken the opposite approach and projects how agriculture and food would be organized under a genuinely free trade environment, then indicates what trade stress and disputes might arise. The first five papers and discussion comments in this workshop were designed to produce that information.

This paper examines the policy, program and institutional changes that would be required to achieve "free trade" in the agriculture and agri-food industry within the NAFTA region. Three basic questions are addressed:

- what agricultural policies would the three NAFTA governments pursue if they were starting over under conditions of free trade?
- how do the current policies, programs and institutions of the three countries compare with this norm?

- what actions would be required in each country to achieve harmonization with free trade principles?

Much of the discussion is directed toward cattle/beef, hogs/pork and grains, although it can be generalized to the broader agri-food sector. The discussion is limited to policies that are closely related to agriculture and, due to space limitations, is not designed to be all encompassing. For example, monetary and fiscal policy impact agriculture and arguably require harmonization across the NAFTA countries, but are not discussed in this paper.

AGRICULTURAL POLICIES UNDER FREE TRADE

The most basic role of government involves providing the framework for achieving and maintaining order as the ultimate authority for conduct of the states business. Order and authority are basic to the smooth operation of markets. Regardless of the level of competition, rules of the game are required for markets to perform well. Trade associations, voluntary agreements and convention contribute to rules of the game for conduct of business but, in the end, government must set the basic rules and enforce them. In addition, government is responsible for establishing overall social objectives and priorities, and for ensuring that conduct of business fits within fundamental public goals.

Free trade agreements (FTAs) are interesting in this context. This role of government encompasses the issue of national sovereignty. Entering a free trade agreement is both the exercise of national sovereignty and the transferring of some sovereignty in the belief that economic gains will exceed the domestic costs. This point is important in the debate about free trade being above international and domestic law. A FTA does not usurp sovereignty, as growing numbers of anti-free traders argue. A FTA extends the authority of government to terms of trade covered by the agreement throughout the region. In practical terms, a FTA plays an important role in standardizing conditions of trade within the FTA area, and in providing adjudication of dispute resolution mechanisms at both the micro and the macro level of business conduct. These contributions are important to the maintenance of competitive market functions. In fact, it will be argued that a true free trade agreement may be absolutely essential to the maintenance of competitive market functions within the free trade region.

There are two other basic rationales that justify government involvement in market-oriented economies, derived from economic theory of market externalities:

- provision of public goods; and
- prevention of market failure.

Public goods are those products or services for which use/consumption by any one market participant does not reduce the amount available to other participants (Samuelson, 1954). Included are socially desired goods that would not be available unless provided by government. Examples of public goods include much basic and applied farmer-oriented agricultural research, extension, economic information, grades and standards, plant and animal protection, and food safety standards.

Market failure means that prices and quantities are not established in a manner that takes into account all of the factors considered important by society as a whole (Bator, 1958). In part, government intervention to reduce market failure can be viewed as a process of moving the market in the direction of achieving the advantages of purely competitive markets. Examples include competition policy and improved information on markets. Some would argue that the protection provided by intellectual property rights induces innovation. On the other hand, there are monopoly elements associated with intellectual property rights. Certainly there are externalities which occur because purely competitive markets do not match marginal costs to social values in production or distribution. The usual example for this form of market failure is environmental degradation.

POLICIES CONSISTENT WITH FREE TRADE

The above rationales lead to a set of agricultural and food policies that can be made to be consistent with concepts of free trade. While no taxonomy is completely pure or mutually exclusive, this set of policies can be classified into the following three categories:

- ***policies that facilitate progress, growth, trade and commerce*** are basically public goods in that they would not be available unless the government provides them. Included are agricultural research and

extension, economic information and outlook, grades and standards, and trade policies;

- ***policies that regulate how business is conducted.*** These policies are a mixture of public goods and a result of market failure. Included are competition/antitrust policies, food safety policies, plant and animal protection policies, and environmental policies; and
- ***policies that intervene with the functioning or distribution of returns*** among market participants to achieve social or economic objectives on the basis of either public goods or perceived market failures. Included are disaster payments and subsidized insurance, government sponsored credit arrangements, price supports, marketing boards and orders, safety nets, and food assistance programs.

Policies that Facilitate Progress, Growth, Trade, and Commerce

Agricultural Research and Extension. An effective agricultural research and extension system is an important public good for maintaining the competitiveness of modern agriculture. It is also important to maintaining a level playing field across farmers of different sizes having different resources. Conducting most production and marketing research is beyond the means of the majority of farm and small agribusiness operations. A research and extension system must focus on the current and future needs of the nation's agriculture, including a widespread understanding and acceptance by farmers of the relevance of the research and extension system to their economic health (Knutson 1986; Knutson and Outlaw, 1994).

In developed economies, the public agricultural research component needs to be a combination of basic and applied activity. In an era of increased private sector involvement in research, with the conference of private property rights for the discovery of new processes and life forms, it is important that the public sector maintains its independence, objectivity, and neutrality as a research body. While intellectual property rights are expected to foster research and development, they also confer limited monopolies to the private sector. Public support for basic and applied research that is diffused across universities and government reduces the potential for the development of monopolistic/monopsonistic conditions by continuously infusing new technological in-

novations. This process also deals with the wide diversity in agriculture by making innovations more readily available to all segments of a highly diverse agriculture. To take advantage of these innovations both research and extension must have production, marketing and management components to serve the needs of an increasingly business-oriented agriculture. In this regard, the role of extension is twofold:

- to improve farmers productivity and profitability, through the use of science-based knowledge; and
- to reflect the researchable problems facing farmers back to the research community (Knutson, 1986; Knutson and Outlaw, 1994).

Economic Information. One of the basic requirements for competitive, well-functioning markets is accurate and timely information, uniformly available to all market participants. Like usable research results, information generation is costly. Consequently, the value of information may exceed its costs for all but large farmers and the agribusiness sector. This situation in itself is a form of market failure, and asymmetry of information may be a source of market power (Henderson et al., 1983).

The key information concerns prices and production (historic, current and outlook), availability of supplies/stocks, and conditions such as weather, income, global demand and supply likely to affect the production and distribution of agricultural products. Information on market conditions, such as local bid prices or basis, are also important to decision making but the diversity of this information makes its provision much more costly and, therefore, more responsibility is placed on the capability of individual decision makers.

Grades and Standards. Agricultural products are not homogeneous in quality. Therefore, competitive agricultural markets require a system of established product standards based on use value or quality. Price reporting is meaningful only if product quality is known, and transactions costs are reduced when established, dependable product standards are available (Nichols, 1983).

Standards of quality should be determined by the factors that would be rewarded in a competitive market. A grading system can fulfill this need if it is

well designed and if all market participants know its terms. Therefore, meaningful standards must be drafted in a manner that reflects the needs of market participants, allows inspectors to accurately and consistently determine grades, and provides for effective communication of this market information. To participate in international markets, grades and standards must also be consistent with the terms and conditions established by Codex Alimentarius, which is designed to facilitate and encourage trade by avoiding the establishment of sanitary and phytosanitary barriers to trade.

In establishing a product standards system, it is important to know and reflect the purpose for which standards are being developed. Grades and standards may be developed for commercial market transactions (among farmers and merchants), between retailers and consumers or both. Ideally the grading system nomenclature should be a simple Grade A, B, and C or 1, 2, and 3 that is understandable to all market participants. "Extra" and "Fancy" and similar promotional nomenclature is typical of some commercial standards such as fruits and vegetables, and masks more than it reveals to producers and consumers (Nichols, 1983). The terminology must also be consistent with Codex Alimentarius convention in order for products to be accepted in international markets.

The other form of standardization involves conditions of trade-the legal framework of contracts, weights and measures, labeling, licensing, bonding, recourse, etc. This form of standardization is important because it provides for contract enforcement and reduces transaction costs. This function is often taken for granted in domestic markets because it is part of business convention. However, when trade occurs in other countries, conventions change and transaction costs may rise. (Burfisher, 2000; Furtan, 2000; and Thompson, 2000)

Trade Policy. An important role of government is negotiating trade agreements to move national and international policies in the direction of freer trade. As indicated above, by entering a trade agreement some of a nation's authority is transferred to the rules of trade defined by the agreement. Therefore, the agreement governs some of the country's policy options and responses to internal and external forces. Nations do this willingly with the expectation

that the aggregate gains in economic activity, incomes and citizen welfare will exceed adjustment costs and losses. Economic policy principles suggest that this trade-off could involve compensation to those who would be clear losers from freer trade.

Expanding exports is a goal for most counties because it provides a means by which governments can raise prices (without providing direct farmer subsidies) and earn foreign currency. To the extent that international markets are dominated by state trading competitors and multinational trading companies, one might assert that there is a market failure. Maintaining production at a level that assures products are available for export might also be asserted to be a food security strategy, although it is inconsistent with free trade if exportable production results from price and income subsidies.

Infrastructure. Governments provide infrastructure and services in many ways and for many reasons. Roads and highways, bridges, port facilities, canals and internal water systems, irrigation and railways are examples of infrastructural public goods at some or all points in the economic development of the NAFTA countries. Their role as public goods may change with the level of economic development; consequently, what was not a subsidy may become one if public funding continues when alternative services become available. Services and facilities for grading, health and safety responsibilities including inspection, customs, export certification, and the legal system are required for the market to function. Like bridges and highways, these facilities and services may not be available without government support.

Economists tend to treat transportation as "just another fixed cost." However, an outdated and low-capacity transportation infrastructure in a country can lead to excessive transaction costs, defeating in this way the benefits of freer trade. When dealing with international trade transactions, a harmonized transportation system, expeditious border inspection, and seamless regulations across the countries should facilitate and enhance trade by diminishing administrative and transaction costs.

In dryland areas, a public interest may exist in developing and maintaining irrigation infrastructure. There may also be a public interest in the allocation of water rights and establishing mechanisms to encourage water conser-

vation, all of which may impinge on highly-valued private property rights. Other land and water reclamation activities may be justified for government as a public good where it is in the national interest to expand arable land, and where reclamation expenditures are so large they are beyond the means of private farmers or even groups to acquire and maintain. How the public services are priced out in use is important to market neutrality of the services. Of course, all of this may be in conflict with conservation and environmental objectives; hence this function will usually overlap with environmental regulation.

Regulatory Policies

Competition/Antitrust Policy. Agricultural markets are frequently characterized by imperfect competition. Input markets typically include only a few sellers and product markets, a few buyers (MacDonald, 2000). Commodity and product markets not only tend to be highly concentrated horizontally, but also are increasingly characterized by vertically integrated structures. Free trade supposedly fosters competition by broadening the market and introducing import competition, but that may have a limited effect because multinational firms dominate many agricultural input and product markets. Marketing boards, orders, and cooperative enabling legislation were originally introduced to provide countervailing power to the imperfect competition faced by farmers in input and product markets (Armbruster and Jeese, 1983; Babb et al., 1983). In particular instances, agricultural markets are sometimes dominated by marketing boards and orders which may also limit competition. Free trade implies a less intrusive role for such institutions and, perhaps, their elimination. With this confluence of opposing forces, assessment of the need for competition/antitrust intervention has become increasingly apparent.

Intellectual Property Rights. Another role of government, justified by its contribution to technical progress, is the provision of proprietary rights to innovation via intellectual property rights (IPRs). Patents, plant breeder rights, copyrights and industrial design are the major IPRs, and recently the issue of patenting life forms has become a major social debate. Like many other forms of government intervention, IPRs can be a double-edged sword. While they may stimulate innovative effort (the economic evidence on this proposition is far from definitive), they also provide limited monopolies on

processes and products dependent on the patented process. Therefore there are issues of competition underlying application of IPR policy.

Plant and Animal Protection, Public Health, and Food Safety. Protection against diseases and pests is an accepted regulatory role of government. In the agri-food sector this role extends to plant and animal diseases, public health, and food and water safety. This function includes specification of the rules, administration and inspection procedures for control, treatment, and eradication of potentially epidemic-communicable plant and animal diseases, especially those involving human health hazards. To be effective, these regulations must include an inspection/quarantine system for animal and plant imports, particularly those intended for breeding purposes. A single common set of regulatory rules could be applied across the three NAFTA countries.

A widely accepted and increasingly important mechanism that has been developed for food safety is the hazard analysis and critical control point (HACCP) procedures in the production, marketing, and processing of agricultural products. A farm-to-table HACCP system provides a basis for improved confidence in the food supply both domestically and in trade. Plant and animal disease prevention, and HACCP procedures, are justified as a government function because competitive pressures, buyer beware cautions, and legal remedies have not been sufficient to avoid incidents of market failure. At the same time, country regulations in the disease/inspection/HACCP arena have become a major focal point for sanitary and phytosanitary barriers to trade. Assuring food safety is becoming increasingly complex in a more complicated world. Research and inspection to assure food safety at all levels is part of this function. Public and consumer confidence will exist only if compliance is known to be effective. Science-based rules may prevent build up of undesirable trade barriers.

Conservation of Natural Resources and Management of the Environment. The basic resources of soil, water and air are essential for agricultural production. As recognized in the last quarter of the twentieth century, these resources have competing uses and are fragile. Left to the market, profit-maximizing incentives exploit these resources to the point where current, private marginal costs and revenues tend to equate regardless of any adverse public consequences. This is a classic case of market failure. Research

has indicated that changes in the value of land seldom compensate for reductions in its productive value due to the lack of sound resource conservation practices (McConnell, 1983; Gardner and Barrows, 1985). Neither the effects on the environment nor the right to use these resources in the public interest are protected without government involvement.

In addition, modern agriculture uses both chemicals and fertilizers as a means of maintaining and expanding yields to feed and clothe an increasing population having higher incomes and expectations (Smith et al., 1991). Modern animal agriculture produces odor and effluent in large volumes[1]. Because of the toxicity of some chemicals and effluent, and the water and air quality considerations associated with crop and livestock production, governments develop, administer, and enforce environmental standards for agricultural production. Monitoring, compliance, and prosecution in relation to environmental standards are probably among the highest of public priorities in agriculture today.

As in the case of soil erosion, market incentives to pollute result from the reality that externalities are not considered in market prices and/or costs. Government programs may prohibit the use of certain products, regulate the quantities used, compensate farmers for the regulatory costs imposed (often referred to as green payments), and/or internalize the cost to society into farmers' cost structure through taxes or prescribed management practices. Whereas in the agribusiness sector government policies have generally favored the internalization of externality costs, farm programs have leaned in the direction of regulation of management practices (which may have some of the same effects) or green payments.

MARKET INTERVENTION

The role of government in price stabilization and income transfers is the most controversial of the functions performed by agricultural policy. There

[1] Readers should understand that we do not intend to imply that only crop and animal agriculture, and only large-scale producers, create environmental risks. Most of agriculture, like most of human behavior, has some potential for air, water and soil degradation if activity is not managed in a sustainable manner.

are two general forms of subsidization - indirect and direct. Market intervention is often justified on three grounds (Knutson et al., 1998):

- the structure of agriculture is highly diverse. With substantial economies of size, smaller and moderate size farms find it very difficult to compete and survive. Price and income stabilization programs are recognized to help larger farms more than smaller farms, but governments find it difficult to effectively target benefits. Therefore, assistance is provided to all farmers, regardless of size;
- agricultural production involves high risks, many of them uncontrollable by producers. The vagaries of nature combined with the highly inelastic supply and demand result in an unacceptable level of price volatility. Farmers, particularly small and moderate size farmers, find it difficult to cope with these high levels of risk, thereby justifying programs to protect and stabilize farm income; and
- there is an overriding public interest in food security that translates to assured domestic supplies of certain commodities and products. This rationale denies that international sources of food can be relied upon to fulfill all gaps between domestic needs and domestic production, and that a FTA, properly designed, reduces food security risks. Domestically, the food security objective is designed to ensure that vulnerable segments of the population receive a sustainable level of nutrition.

To be consistent with free trade, price and income programs must not be production nor trade distorting. In reality, achieving market neutrality is very difficult.

Disaster Assistance. Because agricultural production is highly subject to vagaries of weather and other natural conditions, some disasters occur for which there is no, or inadequate, private coverage. As a consequence, government assistance is provided in several forms to make up for the lack of protection on farm production and assets from adversities like floods, drought, pests, fire or disease. Coverage/compensation is often arbitrary (as in animal slaughter for disease outbreaks, or crop land flooding), or predetermined by rules such as payments sufficient to cover their cash (variable) production costs, if their production falls below some percentage (say, two-thirds) of “normal”

levels. Three main options for financing this form of indirect subsidization include:

- payments can be provided out of the national treasury. This alternative can lead to market distortions, such as uneconomic production on marginal lands, and is subject to various forms of abuse;
- insurance programs, on either a voluntary or mandatory basis, can be provided to cover the risk of natural disasters. Crop insurance programs are operated by government agencies with producers covering part of costs, by private insurers with government underwriting and contribution to costs, or through government participation/cooperation with private insurers; and
- financial inducements to set aside a certain percentage of their net or gross incomes in normal years. These funds plus government contributions may be held in interest-bearing accounts from which farmers may draw out funds in adverse years, or cash-out at retirement.

Agricultural Credit. Modern farming requires large amounts of purchased inputs as well as investment in land, buildings, and animals. Agricultural production is characterized by time lags, and product sales may require carrying significant unsold inventory. If commercial markets fail to provide dependable, reliable agricultural credit at reasonable interest rates, governments step in to assure adequate credit for agriculture. If government pays part of the costs of agricultural lending, this is another form of indirect subsidization. This may be accomplished by four general approaches including:

- the government may provide credit, at market or subsidized interest rates;
- the government may guarantee repayment of loans made by the private sector to farmers who would not otherwise be able to borrow from commercial sources. The default rate on such guaranteed loans is frequently high with substantial political pressure being exerted not to foreclose against farmers who are in arrears;
- the government may assist in the establishment of a farmer-owned cooperative credit system having borrowing authority and a credit rating that is comparable to that of the government or only slightly above; and

- the government may provide appeal mechanisms, debt review, and alternative repayment mechanisms to prevent immediate dissolution of farm enterprises.

Public disaster insurance and agricultural credit usually involve public contribution to defraying administration costs. These programs often underwrite risk, which is another form of subsidization.

Price Supports and Safety Nets. These are the direct forms of public support received by producers when prices fall below politically acceptable levels. Price supports, income enhancement, and the 1990s term for these programs, safety nets, come in many shapes, sizes and political flavors (Knutson et al., 1998). In this discussion, marketing boards and orders with significant regulatory powers are included in this category since they are different only in the mechanism and delivery of support. The major forms include:

- price raising mechanisms which include classic forms of price support achieved by limiting production, diverting product to alternative markets, or storage, government loan or buy-up activities, and product disposal;
- direct government payments made to farmers when market prices do not achieve program targets (deficiency payments);
- commodity insurance-type programs that combine producer and government contributions, used to supplement returns when market prices fall below threshold levels, often paid out at retirement. Commodity insurance programs may be applied at the aggregate level but they may also be tailored to individual farm accounts. Because they are commodity specific and involve public expenditures,
  they are likely to be production and trade distorting to some extent, and are not likely to pass the trade-green test; and
- whole farm stabilization funds combine producer and government contributions and are drawn on when farm revenue falls below a threshold or at retirement. Whole farm stabilization is farm (not commodity) specific and should be the least resource and trade distorting of available programs.

The latter two forms may perform dual roles as disaster programs. They may also act as a safety net. Price supports and deficiency programs create several

economic problems including production and trade distortions. In addition, they are blunt instruments in that they are not effectively targeted. Despite these characteristics they exist in NAFTA country policies.

Food Assistance Programs. Food assistance programs have their origin in the dual objectives of expanding the demand for domestically produced food and dealing with issues of hunger, malnutrition and poverty. Child nutrition has been determined to be an important factor in the development of a healthy adult population. An important dimension of child development is prenatal nutrition and health care. These needs leads to the extension of food assistance programs to low income and single parents.

OVERVIEW OF CURRENT POLICIES

This section reviews the status of agricultural policy in the three NAFTA countries according to the categories identified above. The purpose of this review is two fold:

- to identity major policies and determine the extent to which they are in harmony across the three NAFTA countries. Stated differently, this purpose involves determining if the agricultural playing field is reasonably level; and
- to determine if policies are consistent with principles of free trade.

POLICIES THAT FACILITATE PROGRESS, GROWTH, TRADE AND COMMERCE

Agricultural Research and Extension

United States. In the United States, agricultural research and extension is a cooperative federal-state program. USDA's Agricultural Research Service (ARS) operates agricultural research stations located throughout the country. These stations emphasize basic and applied research that is of national importance. The federal government also supports land grant university research through a system of formula funding. In addition, it manages a competitive grants program that is open to scientists within and outside the land grant system, including USDA scientists. Generally, federal support accounts for 20-30 percent of land grant universities' agricultural experiment station budget, the remainder is from state and private sources (OTA, 1986, 1992).

Private source funding of state programs has increased in recent years since the conference of patent rights on the discovery/development of new life forms.

There is no USDA extension counterpart to ARS, although formula funds are provided to land grant universities to support 20-30 percent of extension activities at land grant universities (OTA, 1986). Again, the states provide the bulk of funding for their extension activities, which includes agents at the county level and specialists at the state/regional level. In real terms there has been some slippage in the level of federal funding for agricultural research, with an increased proportion coming from state and private sources.

Canada. Education, including extension, is a responsibility of provincial governments in Canada. The federal government conducts and commissions about twice as much agri-food research as the provinces, some of it through universities. Consequently, there is a jurisdictional gap between much of the research conducted and educational/extension activities. This situation is partly addressed by federal-provincial agreements and other institutional arrangements but it remains a weakness of Canadian agri-food research and extension. Further, agricultural research, education and extension in Canada do not receive the priority that they do in the United States, and there has not been federal support like the land grant system in the United States. There are few, if any, extension positions in universities in Canada. Federal and provincial support in real terms for research at universities has declined substantially over the past decade, and since 1995 federally sponsored research must be matched by private funds (the Matching Investment Initiatives program).

The federal government has a network of agricultural experimental stations across the country that conduct basic, applied and some development research, targeted at regional commodities and practices. These research stations are the source of many of the innovations in crop and livestock genetics and practices, and they undoubtedly have some 'demonstration' impact for production technology. Provincial governments have a limited role in experimental research. Partnerships between federal research entities and the private sector are promoted by federal/provincial research and development policy. Federal research entities, in some circumstances, now compete for public and private research funds. Klein's paper earlier in this publication provides more

detail on the status of agricultural research in Canada. Another summary (Agri-food Research and Technology Transfer Capacity in Canada, 1998) indicated:

- total research expenditures were C$679 million in 1996, compared with C$560 million in 1991;
- total technological transfer expenditures were C$186 million in 1996 compared with C$190 million in 1991;
- total research and development spending was C$883 million in 1996 of which 35 percent was by the federal government, 24 percent by universities, 22 percent by the private sector, and 19 percent by the provinces;
- universities are the largest research force and remain constant in strength. However, AAFC support has declined but partnering maintains research capability;
- provincial research activity has declined in Ontario and Quebec but increased in the other provinces, especially Alberta; and
- research and technology transfer activities have moved toward enhancing "sector competitiveness".

Mexico. Agricultural research in Mexico has been provided and facilitated mainly by the federal government through the Ministry of Agriculture. Currently, the official organization to carry out agricultural research is the National Institute of Agricultural, Livestock and Forestry Research (INIFAP). This institute works through its own network of experiment stations and, until the last administration, used to depend almost solely on appropriations from the federal government. During the Zedillo administration, following a federalization trend and pressed by shrinking budgets, a new scheme of agricultural research was implemented by incorporating producers into the formula through the state-based PRODUCE Foundations (SAGAR, 1995). These producer-driven foundations consolidate and administer funds from the federal and state sources, as well as some producers' contributions. The objective is to support applied research, which is focused on and directed by producers achieving an automatic extension purpose. This effort has produced uneven results due to its nature and management by different and diverse local administrators across the Mexican states.

The agricultural development plan includes extension and training in agriculture, preferably directed toward small producers. However, there is not a specific agricultural extension organization other than isolated government programs (SINDER, PEAT, GGAVATT, etc). Similarly, there is no coordinated research-extension system so that there is no domestic parallel to the U.S. land grant system. As a result, few state universities have a solid funding base for a continuous research effort, and their involvement in extension has been non-existent. With the new producer-oriented research scheme, state universities are playing a more important role in local research while participating in the modest competitive research grants established by the local Produce Foundations. This approach should lead to more producer-oriented results that facilitate technology transfer.

INIFAP continues supporting mid-level basic agricultural research through a handful of discipline-oriented research centers. International research institutes, such as the International Center for Improvement of Maize and Wheat (CIMMYT), have made important contributions to agricultural research in their commodity areas.

Economic Information

United States. Domestically, cooperative federal-state programs provide monthly forecasts/estimates of crop production throughout the cropping season, targeting accuracy within 2 percent. These programs also provide estimates of inventories of livestock and poultry, placements, and slaughter of all livestock and poultry. Milk production estimates are aided by mandatory reporting through the federal order system. Many fruit and vegetable orders provide flow to market information on a mandatory basis. Price reporting for central spot and futures markets is extensive, although local market reporting is less impressive. Likewise, there has been historic controversy associated with the reporting of meat and poultry prices. There is no reporting of increasingly important contract production prices.

Internationally, USDA maintains an extensive market intelligence network, the core of which is the agriculture counselors located in the major agricultural producing, exporting and importing countries throughout the world.

Mandatory reporting of export sales of grain was instituted following large purchases by centrally planned economies in the 1970s.

A Task Force of the American Agricultural Economics Association (AAEA) indicated two basic weaknesses in much of the economic reporting in agriculture (Commodity Costs and Revenue Estimation Handbook, 1993):

- differing definitions, measurement, and reporting of the same phenomena. A central purpose of the Task Force was to provide a Handbook which information compilers and reporters could use to reduce this problem; and
- cash versus forward and contracted pricing of inputs and commodities was identified as a central concern.

Canada. A combination of federal and provincial agencies report agricultural information. Agriculture and Agri-Food Canada (AAFC), Statistics Canada (Agriculture Division), the Canadian Grain Commission (CGC), and Canadian Dairy Commission (CDC) are the primary federal agencies that provide historical and current data. Official outlook information is a scarce commodity in Canada with periodic, limited releases from AAFC (mainly near term forecasts), and limited annual outlook meetings in some provinces. What outlook analysis is done now appears to be more a policy/public administrative tool than a contribution to private decision-making. The Canadian Wheat Board (CWB) appears to be the most significant analyst of international conditions, however, this function relates directly to the Board's role in wheat/barley sales. Statistics Canada (Census of Agriculture) and AAFC analyses of taxfiler data are available for broad performance assessments of the sector. Much of the information in Canada is now available only on a cost-recovery basis, also a 1990s development.

The absence of information on current selling prices of CWB grains, hog prices in some provinces, the increase of forward contracting in grains, oilseeds, hogs and cattle, and lack of sound, publicly available outlook information represent significant deficiencies in availability of agricultural market information in Canada.

Mexico. Production information (yields and total production) became more prevalent in the agricultural sector in Mexico throughout the Zedillo administration. At farm level, there is an effort by FIRA (the agricultural arm of the Bank of Mexico) in collecting cost of production data from its clients in the main producing areas. This effort is carried out mainly for the staple or basic crops (FIRA, 2001). After the elimination of CONASUPO, marketing mechanisms were locally implemented by the agricultural development program through the ASERCA program to allow improved collection of marketing data (SAGAR, 2000). ASERCA is intended to provide economic information on:

- futures markets for the main agricultural commodities;
- domestic prices for wheat, corn, sorghum and soybeans;
- hedging costs for wheat, corn, sorghum, soybeans, cotton, and orange juice;
- transportation costs;
- international market price for fruits, vegetables, livestock and cut flowers;
- weather conditions; and
- other market news.

Although there is no mandatory price-reporting program, implementation of a complete marketing information system would provide more accurate and reliable information for producers' decision-making process. Available economic and production information does not reflect any trends or future projections of the economic and financial behavior of the agricultural activities. As in Canada, there is a lack of outlook information which would facilitate producer decision-making and support agricultural policy analysis.

Grades and Standards

United States. The United States has an extensive grade standard system that, except for beef, is largely designed to facilitate trade at the farmer, wholesale and international market levels. Beef grades are the only ones that are legitimately consumer-oriented. Grain grades have been subject to substantial criticism because they do not consider protein content and are based largely on inert material and damaged grain. Fruit and vegetable grades are largely based on external appearance as opposed to their internal quality.

Canada. There is no grade equivalency in beef grades between the United States and Canada, although Canadian grades have moved toward those of the United States in recent years. There are even greater differences between grades and standards on Canadian and U.S. grains, especially wheat and barley. These differences reflect Canadian rules on crop diseases and purity requirements (kernel bunt and other diseases, admixtures of other wheat and grain), kernel visual distinguishability (kvd) and licencing requirements, all of which have the effect of restricting potential movement of grains from the United States into Canada. The Canada Seeds Act (CSA), the Canadian Grain Commission (CGC) and the Canadian Food Inspection Agency (CFIA) are the authorities under which grain imports into Canada are regulated and inspected. They also significantly influence the nature of exports, and many domestic production and marketing practices. The rationale for the regulation, initiated in the early 1920s, is to differentiate Canadian wheat (and other grains) in export. There are stringent grade standards with strict licensing of varieties (kvd), and rules to prevent mixing of grain[2], and spread of disease which are used to protect the integrity of Canadian grains. One result of this regulation is a very high cost marketing system in Canada. Another result is that reciprocal access does not exist for Canadian and U.S. wheat and barley (US/Canada Joint Commission on Grains, 1995).

Mexico. The government of Mexico has been responsible for setting product standards, labeling and certification policy although the private sector has had input into the development and implementation of these standards. Mexico revised and upgraded its Federal Law on Metrology and Standardization in 1997. In general, Mexican standards are based upon, and follow, general international standards. In fact after signing the NAFTA agreement, some Mexican standards have incorporated U.S. and Canadian standards when there was disagreement with international benchmarks (USDS, 1999). In adopting international agricultural standards, the State of Sonora (immediately south of

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[2] A recent example illustrates this point. A fusarium resistant wheat variety was developed by AAFC scientists at the Winnipeg research station. It could have replaced conventional wheat and barley, subject to serious fusarium damage in the south east region of the prairies, especially for hog feed providing a major economic benefit. The variety was refused licencing in 2000 because it was not visually distinguishable from HRS samples.

the Arizona border) is probably the most advanced in establishing a beef grading system similar to the one used in the United States.

A debated issue on Mexican grades and standards is that only Mexican producers or importers are eligible to obtain a NOM certificate (the official certification that a certain product complies with a specific standard), which prevents any foreign entity from obtaining the same level of certification for its exported goods. The Secretariat of Commerce has initiated a process to revise the existent certifications and standards policy in order to make the official certification accessible to partners in other countries with which Mexico holds trade agreements (USDS, 1999).

Trade Policy

United States. There are five basic dimensions to U.S. trade policy that are not necessarily internally consistent:

- the United States provided leadership for the establishment of the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO) and the goal of moving in the direction of freer trade;
- the United States maintains two programs having the effect of curbing imports under specific circumstances. The International Trade Commission (ITC) under the auspices of the Trade Act of 1974 provides "temporary protection for import sensitive industries" including the levying of countervailing duties (CV). This Act also prohibits unfair trade practices such as dumping with the demonstration of injury to the affected industry, in which case the President may limit imports;

In 1998/99, a U.S. cattleman's association (R-CALF) initiated an anti-dumping (AD) action through ITC against Mexico, and AD and CV actions against Canadian live cattle exports (Loyns et al., 2001). These were serious and expensive applications of TRL. The existence of these actions did not fit either the level of market integration that has been achieved in cattle/
beef under NAFTA or the economic evidence presented by R-CALF to support the allegations. In addition, there have been eight separate actions against the Canadian Wheat Board since 1988. On the basis of the use of these powers over many years, Stiglitz (1997) concluded that misuse of TRL enables counterpro-

ductive harassment, rent seeking, and protection of domestic producers by limiting trade;

- of lesser importance is the Agricultural Marketing Agreements Act, which allows application of the same grade, size, maturity and quality requirements for imported fruits and vegetables covered by marketing orders as for domestic products under the so-called golden rule of marketing orders;
- imports of dairy products and sugar are severely restricted by tariff rate quotas for the purpose of protecting the operation of price support programs.

While the 1996 Farm Bill would have eliminated the dairy price support program in 1999, this provision was subsequently rescinded. The sugar program is mired in controversy with the Commodity Credit Corporation (CCC) acquiring stocks that cannot be readily stored under a program traditionally touted as having no government cost. With high U.S. sugar price supports, candy imports from Canada, and the threat of sugar imports from Mexico, have been a persistent irritant, caused by the sugar program; and

- the United States has a number of programs designed to promote and expand exports.

The most robust of these is the Export Enhancement Program (EEP) and the Dairy Export Incentive Program (DEIP), which provide export subsidies to protect market shares in traditional U.S. markets targeted by other exporting countries. Mexico has been a primary beneficiary of the DEIP program. These programs, which run counter to the principles of free trade, have been limited by WTO both in terms of amount of subsidies and quantities exported. U.S. food aid programs under P.L. 480, established after World War II, and the Food for Peace program are designed primarily as a humanitarian food aid program. However, P.L. 480 sales at concessionary prices and repayment terms frequently are criticized for being subsidized exports that undermine the competitive position of other countries. USDA's Commodity Credit Corporation provides export credit to potential country buyers of agricultural products both directly on a short-term (six month to three year) basis and guaranteed for longer time periods. USDA also operates a number of market development, education and promotion programs through its embassies and consulates. Producer and agribusiness organizations generally are cooperators in these programs with the costs being shared.

Canada. Before NAFTA, Canada protected its fruit, vegetable, wine production, and associated processing sectors. These sectors that were opened to freer trade have fared very well (Sporleder and Martin, 1998). The field crops sector (grains, oilseeds and 'special crops' in Canadian parlance) has been open except for the large component (about sixty percent of all Canadian field crop production) represented by wheat and barley controlled by a federal marketing board, the CWB[3]. There is a provincial producer wheat marketing board with restrictive selling powers in Ontario, but it is gradually deregulating from within. Prior to NAFTA, processors using board regulated grains enjoyed significant protection but most of that protection has been eliminated. The cattle/hog/meat industries have always been relatively open except for health standards.

Supply management in Canada operates what are fundamentally self-sufficiency, cost-of-production pricing schemes with mandated trade levels and high domestic prices for milk and poultry products. As a result, imports of milk, poultry and their products are severely limited (but at the same time assured) by tariff rate quotas. In sugar, Canada for decades has welcomed raw sugar at world prices into a highly concentrated processing sector. Canada's trade remedy law, the Special Import Measures Act (SIMA) is administered by Canada Customs and Revenue Agency, and the Canadian International Trade Tribunal. The legal framework is very similar to that in the United States but it does not have the Presidential intervention counterpart (section 301), and it appears to be applied much less aggressively in the agri-food industry. Finally, except for supply management, the federal government and most provinces have reduced support to agriculture, particularly on programs that may be trade distorting, since NAFTA was implemented.

Identifying a trade negotiating position out of this melange could be difficult. The policy position historically put forward in world trade negotiations is the so-called "balanced approach." In effect this position means low

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[3] The Canadian Wheat Board does not control imports and is not, a priori, a form of subsidization as so many U.S. critics are prone to argue. Prairie grain farmers who deliver Board grains finance its operation and in terms of trade with the United States, if any trade limitations occur, they are almost certain to reduce exports to the United States. (Loyns and Kraut, 1995; Loyns, Knutson and Ochoa, 2000).

protection and low support for all but the supply-managed sectors for which high protection is provided today in the form of multi-stage tariff rate quotas. The position, enhanced by extremely strong rent-seeking activity and national unity considerations, has been justified on the basis that supply management is allowed by WTO, and on the argument that these sectors do not contribute to agricultural surpluses or trade. This position appears to reflect current trade policy.

Mexico. The federal administration directs programs to support and enhance exports. These programs are carried out directly by the Ministry of Agriculture or jointly with BANCOMEXT, an export supporting and development bank (Claridades Agropecuarias, 2000). The components of these programs in 1999 included:

- an export support and enhancement program for fruits and vegetables;
- providing advice and awareness of exportable opportunities for fruits and vegetables;
- promotion at international events; and
- agricultural and commercial sector linkage programs for buyers and sellers of products and services for the agricultural sector.

In 1993, legislation eliminated most non-tariff trade regulations and established trade remedy laws to face unfair trading practices, such as export subsidies and dumping. Together with the elimination of import licenses, the Mexican Customs Service was also automated and modernized to eliminate inconsistencies at different border crossing points in an effort to expedite trade (USDS, 1999).

Since 1992, Mexico has actively pursued the development of trade agreements with a number of countries. The expected benefits of these trade agreements include (Topicos Empresariales, 2000):

- to gain preferential access to the most important world markets through the gradual elimination of tariffs;
- to simplify imports and exports procedures;
- to increase the availability of high-quality inputs and raw materials at better prices in order to increase the competitiveness of products manufactured in Mexico;
- to increase job availability in Mexico; and
- to promote the transfer of leading-edge technology and strategic alliances.

In this commercial expansion effort, trade agreements have been established with Chile (January 1992), Canada and the United States (January 1994), Venezuela and Columbia (January 1995), Costa Rica (January 1995), Bolivia (January 1995), Nicaragua (June 1998), European Union (July 2000), Israel (July 2000), and Honduras, El Salvador, and Nicaragua (January 2001). Currently, Mexico is negotiating trade agreements with the Mercosur bloc (Argentina, Paraguay, and Brazil) in South America and Singapore in Asia. The trade agreement for a European Free Trade Area (EFTA), negotiated and authorized last November, is pending certification and final authorization by the Mexican Senate and the legislative bodies of the EFTA countries.

In its initial days, the new Fox administration has shown an even greater commercial expansion and open markets approach. During his campaign and after his election, President Fox proposed very ambitious social and commercial integration to the NAFTA countries. He also proposed a common development and commercial bloc extending from Central Mexico to the whole Central America region in his PPP (Puebla to Panama Plan) program.

Infrastructure Policy

United States. Roads have historically been a shared federal, state, local responsibility. The interstate highway system, initiated in the 1950s, provides an efficient system for transporting agricultural products by trucks to Canada and Mexico. However, restrictions on Mexican trucks and drivers entering the United States constitute an antagonistic barrier to trade (Harrison, 2000; Prentice and Wilson, 1998; Prentice et al., 2000).

The delivery of utilities to farms has been facilitated by rural electric cooperatives that were established with highly subsidized credit. Likewise, the federal and state governments have been involved in a series of large water projects that have provided electricity, irrigation water and fertilizer at highly subsidized prices. Of particular note is the western states water and irrigation projects as well as those of the Tennessee Valley Authority (TVA) in the southeast. However, increased competition for urban uses has resulted in more competitive pricing of these important agricultural inputs.

Canada. The two national railways in Canada are, today, fully privatized subject to limited regulation except in the grains area (Prentice et al., 1998). Subsidized freight of export grain was removed in 1995, but much of the regulation related to CWB operation and the Canadian quality system persists in grain transportation. Highways in Canada are provincial responsibilities. Federal involvement in highways is limited to transfer grants in some provinces, and limited contributions to the Trans-Canada highway, a continuous highway from sea-to-sea. There has not been a federal presence in highways in Canada like that in the United States, which produced and maintains the Interstate Highway system. With the exception of the United States/Canada jointly funded Seaway System (of declining importance to trade for both countries), waterways in Canada are of significance only in the case of the Great Lakes. Similarly, publicly supported irrigated land in Canada is found only in southern Alberta and a small amount in Saskatchewan. Pockets of irrigated production exist across the country because of the ready availability of water in Canada but they are components of individual farmer production systems and usually receive no direct public support. Overall, irrigation is a very small factor in Canadian agricultural and food production affecting mostly some grain and livestock production in southern Alberta.

Telephones and electric power were originally developed in many provinces as public utilities, and elsewhere as regulated private monopolies. For much of their life, these utilities practiced urban-rural, business-private, and long distance-local cross subsidization in rates and service. Some of that remains but most of these utilities have now been privatized and operate on commercial principles.

Mexico. The transportation infrastructure in Mexico is outdated. Both road and rail transportation systems in Mexico present the characteristics of century-old systems. The railroad was an important source of transportation until the rapid growth of the trucking systems, starting in the 1950s. Since then, the importance of the railroad system has been left to handling the cargo that cannot be moved by trucks, such as U.S. grain imports. These systems have been overloaded with the expanded trade resulting from the NAFTA agreement (Link and Zahniser, 1999; Harrison, 2000; Prentice et al., 2000). During the last two administrations, Mexico has made major efforts to upgrade the

transportation infrastructure, through building and improvement of the highway systems and through privatizing the government-operated railroad system. Also, expanding and upgrading seaports has been a priority, under the expectation of expanded ocean trade with NAFTA countries and the European Community (Link and Zahniser, 1999; USDA/ERS, 2001).

For NAFTA trade, specific problems are the bottlenecks created at the U.S./Mexico border on both the railroad and highway systems. The railroad system faces logistics and equipment challenges. Potential economic savings with the increased southbound grain trade will not be fully realized until more cargo is shipped back north to avoid the cost of moving empty cars. On the other hand, containerized cargo handling should make the transportation of agricultural commodities more efficient and economical (Prentice et al., 2000).

Modifying and updating the whole country's railroad infrastructure will take a great effort in terms of time and financial resources. Following the privatization of the Mexican railroad system, private investment should help the upgrading process of this transportation system. Truck transportation is affected by differences on weight and length regulations between the United States and Mexico and by the reciprocal bans of trucks on both sides of the U.S./Mexico border, justified by claimed excessive road deterioration and safety issues. Other issues creating border bottlenecks and transportation backlogs are the short-haul or drayage requirements for moving trucks across the border and the inadequate facilities to handle drug and INS inspections. A major trade irritant has been the U.S. unilateral postponement of the NAFTA agreement, allowing free transit of Mexican trucks in the U.S. territory (Harrison, 2000).

There are opportunities to lower transaction and administration costs by expediting border crossing. Changes to expedite current border traffic and to accommodate future growth suggested by Harrison (2000) and USDA/ERS (2001a) include: expansion of crossing facilities, expansion of personnel and working hours, application of new cargo-checking technologies, automation of import/export paperwork, and the creation of free trade/buffer zones into the countries, as far North as San Antonio and as far South as Monterrey and Chihuahua City.

REGULATORY POLICIES

Competition/Antitrust Policy

United States. Farmers have played an important role in fostering U.S. government antitrust intervention from its implementation over 100 years ago (Knutson, 1983). Then the major concern was the market power of railroads. Subsequently concerns arose over the market power of milk processors and meat packers, the latter resulting in the enactment of the Packers and Stockyards Act administered by the USDA. In addition to restrictions on monopoly and monopolistic practices provided by the Sherman Antitrust Act, the Clayton Act placed tight restrictions on mergers, and the Robinson-Patman Act placed restrictions on price discrimination among competitors. In the 1980s, merger and price discrimination concerns gave way to a primary emphasis on price fixing and overt use of monopolistic market power. Recent concerns revolve primarily around the market power of meat packers, food retailers, seed/biotechnology companies, and multinational grain companies. Particular concern has arisen over the amount of control exercised by market integrators over producers.

There are serious questions about how much has been achieved by U.S. antitrust policy. In the food industry, this concern arises from the apparent inability of antitrust policies to deal with the development of concentrated-integrated structures that are common in the industrial sector of the U.S. economy. This stems, in part, from the reality that antitrust policy deals primarily with market conduct and has little direct authority to deal with structure.

Canada. The Competition Act is the basis of competition policy in Canada (Robertson et al., 1997). Historically there has not been much analytical strength in the Competition Bureau in relation to the food industry and less in agriculture reflecting government attitudes toward competition issues. For example, all marketing boards in Canada are excluded from competition policy except for 'intervention status' in public hearings. Most of the Bureau's recent activity in agri-food has been in relation to mergers and acquisitions but the overall impact is likely small. Neither has there been much academic interest nor research output on competition in Canada's food industry.

There is a cross-border impact of U.S. antitrust action which is worth noting. Two years ago when the Case-IHC and Ford NewHolland merger was under investigation in the United States, large-tractor production was identified as a competition bottleneck. There were only three large- tractor manufacturers in the western world, and annual sales are in the low thousands of units in good years. The Ford NewHolland tractor plant was the original Versatile plant in Winnipeg, Manitoba. The FTC imposed takeover requirements which included selling off the plant. A local entrepreneur purchased the plant, ostensibly to provide competition for Case-IH (Fargo N.D.) and John Deere (Iowa). A protracted labor-management dispute has severely altered the viability of the plant and virtually removed the competition potential created by the FTC.

Mexico. The widespread Mexican privatization movement that followed the signing of NAFTA made it necessary to establish a regulatory agency to prevent monopolistic and other trade-distorting practices among the many firms that resulted from the process. Mexico introduced legislation to improve competition conditions in 1993. The Mexican Federal Competition Commission (Comision Federal de Competencia-CFC) was created by this legislation in an effort to promote fair competition by limiting monopolistic behavior and to restrict unfair trading practices (CFC, 1998; USDS, 1999). Since its inception, Mexico's CFC has researched and handled approximately 500 cases per year. One of the most important steps taken during the time of operation has been the issuing in 1998 of the Code of Regulations which allows the implementation and application of the Federal Law on Economic Competition (CFC, 1998).

Intellectual Property Rights

United States. The United States was one of the first countries to extend patent rights to new life forms. Prior to this policy change, much of the plant and animal technological improvement was the result of land grant university genetic breeding research that was made available to the private sector without cost for development and introduction. While seed producers and seed companies captured rents, the fact that the genetic stock was freely available resulted in low barriers to entry and a large number of competitors with relatively little market power.

The conference of property rights to new life firms substantially changed these relationships. Both private firms and universities immediately began to patent the results of their genetic research. Contractual research agreements were signed giving private firms proprietary rights to the results of university research that they financed. Seed companies became the target of buyouts and mergers leading to a rapid consolidation of market power within the industry. As the pace of technological change accelerated, vertical contractual relationships between producers and seed companies increased in importance. These structural changes and the resulting redistributions of rents were unanticipated by policy makers. Only recently have serious questions arisen about the monopolistic effects of these policy changes. However, it is generally assumed that the pace of technological change will be sufficiently rapid that innovation will dissipate monopolistic rents.

Canada. Canada has been an outsider on the development and application of IPR for decades. Canada has historically been backward in R&D, dependent upon foreign parent companies for innovation. This approach to R&D had its drawbacks but it did save public money and provided for reasonable technological progress because of heavy foreign ownership. The Canadian patent system for years had "compulsory licensing," which allowed domestic manufacturers to "work" patents in Canada if the patent holder was not producing the product in Canada. That was a primary reason for lower cost pharmaceuticals in Canada for many years. Canada's IPR legislation was changed with CUSTA, but still 'lags behind' developments in the United States. For example, Canada passed its first Plant Breeders Rights legislation in 1991; there is no definitive policy on patenting life forms, and policy and rules on application of genetically modified (GMO) materials and testing are far from clear.

A recent court decision, similar to the Harvard mouse case a decade ago in the United States, appears to allow life form patenting, but policy and regulations are not clearly defined. In the grains sector, genetically modified canola has been accepted (promoted) and is produced in significant volume with no rules beyond variety registration; and it is widely used commercially and exported. On the other hand, as efforts to distribute genetically modified wheat become a reality, there appears to be considerable system resistance. In

neither case is there science or agri-food policy to assess which way to go. There are no labeling requirements in Canada for GMO products.

Mexico. Trade-Related Aspects of Intellectual Property Rights (TRIPs) is an advanced and comprehensive IPR agreement from WTO that supplements the basic World Intellectual Property Organization (WIPO). The implementation of the policy guidelines has become a challenge for developing countries, requiring enabling legislation in new areas, such as biotechnology and origin specification (IATP, 2001a). Mexico is a member of the main international organizations that regulate the protection of IPRs including WIPO, the Paris Convention for the Protection of Industrial Property, and the International Convention for the Protection of New Varieties of Plants (USDS, 1999). Mexico also adopted a regional standard based on the North-American style IPR legislation because of its linkage to NAFTA. Upon signing the NAFTA agreement, the Mexican Government changed its patent law allowing patenting plant varieties to provide plant, animal, and micro-organism protection. This policy prohibits patents on biological processes for production, reproduction, and propagation of plants and animals (IATP, 2001b).

Even under strong controversy over the use of transgenic corn, research institutions in Mexico, such as INIFAP, Center for Research and Advance Studies (CINVESTAV), and CIMMYT are carrying out biotechnology research. This research is focused on improving plant and animal productivity in an effort to enhance producer competitiveness. However, the use of transgenic seeds and other GMOs do not seem to benefit the small producer whose production system is based on the use of native germplasm that can be used year after year.

Another controversial issue has been the use of transgenic corn for human nutrition. However, reports show that up to 34 percent of the tomatoes produced in the country are transgenic. There are some indications that both corn and soybeans in the market may contain a large amount of GM material and that as much as 100,000 hectares may have been planted with transgenic cotton, soybeans and tomato (Carlsen, 2001). Under these findings, issues such as biodiversity preservation, food security, public health, and international trade will tend to heat the political environment even more.

Plant and Animal Protection, Public Health and Food Safety

United States. The United States has extensive regulations of imports of live plants and animals that are designed, primarily to protect against the spread of pests and diseases that have the potential for jeopardizing production. Within NAFTA, the main concerns have existed with respect to the spread of pests and diseases in fruits, vegetables and livestock from Mexico.

One of the major disease and pest concerns has been protecting livestock herds from the threat of diseases such as bovine tuberculosis, brucellosis, and hoof and mouth disease. The incidence of diseases like these is a serious threat to the U.S. livestock industry, as recent outbreaks of disease in Europe demonstrate. For example, in 2000, five U.S. beef herds were under quarantine for brucellosis (McLeod, 2000). Since 1985 numerous tuberculosis cases have been confirmed in dairy herds (3,000 to 10,000 cows per herd) in the El Paso milkshed. The Texas Animal Health Commission reports testing more than a million animals and the elimination of more than 2,000 head of cattle. Many of these positives come from the El Paso area (McLeod, 2000). In 2000, an outbreak of bovine tuberculosis in U.S. dairies near El Paso has resulted in a U.S. government mandate for the depopulation of herds at an estimated cost of $42 million (USDA/APHIS, 2000). Bovine tuberculosis is known to exist in Mexico, Texas, and Michigan. U.S. livestock herds were scheduled to be declared free of bovine tuberculosis in 2003 (USAHA, 1999). U.S. authorities continue to concentrate their eradication efforts in farmed cervidae and wildlife populations.

The U.S. tuberculosis eradication programs was established in 1907 (Essey and Koller, 1994). This surveillance program was based on skin testing surveillance procedures, herd depopulation, and the provision of indemnity for owners of animals destroyed. During the first 50 years of the program, the incidence of tuberculosis decreased from 5 percent to less than 0.3 percent. At this level of incidence, the skin test-based surveillance programs are of limited effectiveness (Bleem et al, 1993). After the 1960s, the eradication programs turned their emphasis to slaughter surveillance and backgrounding of positive individuals. Despite these efforts cases such as those in Michigan and Texas from time-to-time erupt. The main deterrents to tuberculosis eradication in the United States have been the cost of indemnity and the incidence of this disease

among wildlife and zoo species (Bleem et al, 1993; Essey and Koller, 1994; Walker, 1996).

Following the Jack in the Box *E. coli* hamburger contamination incident in 1992 and several subsequent incidents, since 1996 HACCP procedures have been required for all meat and poultry packing and processing operations (Knutson et al., 1998). Comparable procedures are now being considered for fresh fruit and vegetable packing operations. While the inevitability of HACCP for processed products have existed for a long time and now appears to be generally accepted for fresh products, the issues of traceback to the farm level and the use of irradiation are much more controversial. Irradiation encounters the same set of issues as GMOs in that there are both phytosanitary and labeling concerns that potentially impede free trade, although these concerns appear to be greater outside NAFTA than within.

Canada. The Canada Food Inspection Agency (CFIA) was created in 1997 to combine the activities of four departments and many regulatory functions as Canada's federal food safety, animal health and plant protection enforcement agency. CFIA is responsible for border inspections for foreign pests and diseases. CFIA promotes the implementation of HACCP certification for most forms of food processing in Canada, and reasonable progress is being made in that objective. It is claimed that the Agency allows Canada to meet its commitments to science-based trade regulation. Some, if not most, of the Agency's activities are self-financed.

Some plant diseases are quality factors in the grain grading system. The Canadian Grain Commission and CFIA are involved in monitoring, testing and enforcing these disease standards. Other plant diseases are monitored by CFIA alone. Livestock diseases are also the responsibility of CFIA. Canada was declared free of bovine brucellosis in 1985, and is near complete eradication of bovine tuberculosis in cattle and farmed bison (CFIA-ACIA, 1999). Brucellosis and blue-tongue risks have been used by Canada to keep feeder cattle out of Canada for several years but a new program, initially known as the Northwest Pilot Project, has allowed feeder cattle from specific western U.S. states into western provinces since 1998. Hogs are allowed into Canada only from pseudo-rabies free states.

Wild game breeder stock, mainly buffalo and elk, are usually sourced in the United States and are also subjected to CFIA health testing. Discovery of a BET (the elk form of mad cow disease) positive animal in an elk herd in Saskatchewan in early 2001 lead to slaughter of the herd and animals that had been sold outside the herd. There is an ongoing case of a water buffalo herd on Vancouver Island that will either be sent back to Denmark or slaughtered due to the same risk. On balance, Canadian animal health standards have a small effect on imports of U.S. animals and a larger impact on European sourced animals. HACCP procedures are at a reasonably advanced state in cattle and meat and poultry processing, and initiatives are underway to develop traceback procedures in grains and oilseeds.

Mexico. Both brucellosis and bovine tuberculosis exist in Mexico. There have been a few cases of bovine tuberculosis positives among slaughter cattle that have been traced to imports from Mexico. This has led to some proposals for banning importation of Mexican steers by the United States. However, there is no evidence suggesting that Mexican cattle have played a substantial role in transmitting this disease to the U.S. domestic cattle (Bleem et al, 1993; Essey and Koller, 1994; USAHA, 1999). Mexico instituted a national bovine tuberculosis eradication program in 1993, which included veterinary training, surveillance and skin testing. Currently the Northern States of Mexico (along the Mexico/U.S. border) and a few other states in the Central and Southeast part of the country have achieved significant levels of eradication.

Fish-processing is the only activity that is currently required to operate under HACCP standards and regulations in Mexico. The livestock and crop subsectors are in the process of implementing Best Management Practices (BMPs) programs in their pre-harvest operations. However, more pressure on these sectors to adopt HACCP standards will result as Mexico's trade increases within NAFTA.

Conservation of Natural Resources and Management of the Environment

United States. Under the Clean Water Act, the U.S. manufacturing/processing sectors (including food processing) have been under a zero or near zero water pollution discharge policy since 1972 (Knutson et al., 1998). The

effect of this requirement is to internalize the cost of externalities. Recently announced Environmental Protection Agency (EPA) regulations have much the same effect for control of animal wastes from confined animal feeding operations. Crop and range agriculture have received a reprieve in that they are treated as "nonpoint" sources of pollution. Crop and range agriculture are facing increasingly severe constraints on the use of pesticides. There is intent expressed by EPA to eliminate the use of all inorganic chemicals in crop production, most of which fall into the category of organophosphates and carbamates. Generally, these chemicals are farmers' most effective means of controlling the major pests in crop production.

Population pressures have reduced the availability of water to agriculture from major rivers and water projects, particularly in the West and Southwest. In an increasing number of cases, farmers have sold all or a portion of their water rights to cities and development projects. While water rights have traditionally been a state policy issue, it is easy to see the federal government becoming more involved in the establishment of water policy, an issue that should be anticipated by NAFTA.

Canada. The federal government has three recent legislative instruments which are designed to conserve environmental resources and minimize public health risks caused by environmental degradation and pollution. The Canadian Environmental Assessment Act was implemented in 1995; within AAFC, the Environment Bureau has responsibility for coordinating with the overall agency in charge. The Canadian Environmental Protection Act (2000) emphasizes pollution prevention and sustainable development. A Species-At-Risk Act is expected to be passed in 2001 to protect and maintain species deemed to be at risk.

Much of the agricultural environmental regulations on animal waste, use and transport of hazardous products and waste disposal are provincial jurisdiction. Local governments often have jurisdiction over site requirements including location. As intensive agriculture increases in importance, these jurisdictional issues take on increased significance, and conflicts among local and provincial or interest group goals become issues in economic development. Similarly, regulations are not consistent across provinces. Quebec ap-

pears to have been an early, and probably the most stringent in regulating environmental aspects of agriculture.

Mexico. During the last administration, the Secretariat of Environment, Natural Resources and Fisheries (SEMARNAP) managed the issues of environmental and natural resources. The focus of this secretariat was set on preservation of natural resources and wilderness. Major achievements were the growth in budget (approximately 14 times in real terms from 1995 to 2000) and the growth in national protected areas, from 10 to 14 million hectares in the same period. (SEMARNAP, 2000). Although there has been some enforcement of environmental laws through this administration, a more voluntary approach was followed by programs such as Conservation and Regional Sustainability where soil management was involved. Water quality, utilization and conservation programs were administered from this agency through the National Water Commission (CNA). Again, monitoring and awareness development of water utilization and quality was more prevalent than enforcement of environmental laws.

The functions of the federal administration have been shifted and changed with the recent political changes in Mexico. The Fox administration has moved fisheries to the new Secretariat of Agriculture, Rural Development, Fisheries and Nutrition (SAGARPA, formerly SAGAR). According to an announcement by the Fox administration, a large reduction in personnel is planned for the National Water Commission. The role of implementation, surveillance, and compliance on new and existing environmental programs is still uncertain.

A multi-ministerial commission, Intersecretariat Commission for Registration, Control and Use of Pesticides and Toxic Substances (CICOPLAFEST), is in charge of registration, control, transportation, and management of pesticides and other toxic agricultural inputs. The commission involves the ministries of agriculture, commerce, environment, communications, health and labor. However, there is no specific entity that deals with enforcement of the SPS regulations. The private sector, through those companies involved in the marketing of pesticides (Mexican Association of the Phytosanitary Industry - AMIFAC), has joined the government efforts in its promotion and awareness of BMP's. Greater improvements have been achieved in Mexico's SPS regula-

tions and standards since the inception of the NAFTA bloc. Currently, all registered pesticides in Mexico are approved for use in the United States.

MARKET INTERVENTION

Disaster Assistance

United States. Government crop insurance costs averaged $1.4 billion over the period 1995-99 (FCIC, 2000) but some of these costs are not subsidies to farmers. To a degree, crop insurance is a public good that would not be provided in the absence of government support. Moreover, there are issues of distribution of benefits of these expenditures between the insurance providers and the farmers (GAO, 1997). However, to the extent that premiums are not actuarially sound and substantially eliminate producer risk, government assisted crop insurance has price and trade distorting effects like other subsidies. To emphasize this point, the U.S. government also has a history of providing direct disaster assistance to farmers in the event of widespread crop failure, which most frequently occurs in high-risk areas.

Canada. Comprehensive government crop insurance has been in place for Canadian farmers since the early 1960s. Originally this protection was low-end coverage, shared between producers and the Canadian government, with the provinces covering the cost of administration. The crop insurance program remained largely unchanged until 1990 when it was tied to GRIP (the Gross Revenue Insurance Program, a combination of market and production risk coverage) for five years. That connection was terminated by 1996, but some of the federal money from GRIP was used to increase coverage, and decrease producer costs of crop insurance. Today crop insurance is in transition to increased coverage with somewhat more federal and provincial contribution. On the prairies this transition was reflected in producers paying about 28 percent of the total premium in 2000 (Manitoba Crop Insurance Corporation, 2000). The percent of cropped acres insured was 81 percent in Manitoba, 61 percent in Saskatchewan, 49 percent in Alberta, and just over 50 percent in Ontario and Quebec. Hail insurance is available from private firms on a commercial basis or, in some provinces it can be added on to crop insurance.

In response to low grain and crop prices, and severe flooding in southwestern Manitoba/ southeastern Saskatchewan in 1998, the federal government

and some of the provinces instituted the Agricultural Income Disaster Assistance Program (AIDA) in late 1999. The program, funded 60 percent by the federal government and 40 percent by the provinces, targeted farmers who suffered a severe drop in their farm income for reasons beyond their control. The program was not intended to affect capital purchase or production decisions. The total amount of funds paid out for 1998 and 1999 was $1.78 billion. Like most other Canadian disaster programs, AIDA paid out until September 2000 for losses in 1999, suggesting that there would be little or no production response in applicable years. This program has been extended for three years under the name Canadian Farm Income Program (CFIP) with $5.5 billion of federal and provincial support over the three years. These funds are applied across provinces by formula and not by injury. With these and all other public programs, Canadian grain producers receive between 10 and 12 percent of their returns from public sources.

Mexico. Crop and animal production disaster assistance is administered through the government National Agricultural Insurance System (Agroasemex) and other private insurance companies. This insurance works with a wide array of protection mechanisms. Insurance coverage includes life, investment expenses, transportation, livestock and other risk factors. The federal government provides a subsidy by directly paying up to 30 percent of the cost of the insurance premium. For the fiscal year 2000, the working budget for Agroasemex was about 400 million pesos or $US40 million (Diario Oficial, 3/15/2000). Similar to many other government programs, there are limitations on general use of these funds, i.e., provisions exist to apply at least half of the appropriations towards the insurance of basic or staple crops and giving preference to low-income producers.

Use of agricultural insurance has recovered since the 1994-95 financial crisis. The amount of cropland insured has increased from 905 million hectares in 1995 to 1,698 million hectares in 1999. In the livestock subsector, the number of animals insured grew from 847 thousand to 5,168 thousand, during the same period. The total subsidy amount grew from 237 million pesos to an estimated 400 million pesos 2000 (SAGAR/CEA, 2000).

FONDEN is a fund that is designated for national disaster assistance. Although this fund is intended to provide aid to the general population under natural catastrophes, it has provisions for minimal aid to small farmers, defined as less than 20 hectares or less than 25 animals on dryland operations only. This fund is applied in the event of natural catastrophes such as floods, hail, severe drought. Under FONDEN provisions, in the event of a natural catastrophe, the federal government would pay up to 70 percent of the indemnity to affected producers, the rest would be provided by state or local governments (Diario Oficial, 2/29/2000).

Agricultural Credit

United States. The U.S. government has a history of providing credit directly to farmers, but in recent years it has reduced these programs. During the Great Depression, the Farmers Home Administration (FmHA) was established to supply subsidized credit directly to farmers and to serve as a lender-of-last-resort. Today, FmHA is largely a credit-guarantee agency. The U.S. government, as another post-depression program, underwrote the Farm Credit Administration (FCA), and the farm credit cooperative banks that it regulates. While the FCA banks enjoy interest rates that approximate those obtained by the U.S. Treasury, this does not involve a direct outlay from government. Of course, if U.S. agriculture were to again experience the sharp decreases in land prices, as in the early 1980s, there would be substantial outlays in support of both FmHA and FCA.

Canada. Farm credit in Canada rose from C$ 30.3 billion in 1997 to C$ 35.2 billion in 1999 (Statistics Canada, 21-603E). The private sector (banks, credit unions and input suppliers) provides about 73 percent of this amount; the federal Farm Credit Corporation (FCC) and provincial agricultural lending agencies provide about 24 percent, and government guaranteed advance payment programs provide about 2 percent. In 2000, there was an increase of advance payments funding made available to facilitate spring seeding credit needs. Advance payment loans represent a small level of subsidization, far less than their share of overall lending because public support usually applies to only part of the advance payments. All lending policy in Canada (private and public) treats quota value in the supply managed sector as an asset for lending purposes. Consequently, in addition to its market value determined by eco-

nomic rent accruing from regulated prices, quota has asset value for credit purposes, which facilitates quota accumulation. This is one of the deterrents to eliminating supply-management programs.

In general in Canada, the level of public financial contribution to agricultural debt service costs is small, and much of the public contribution is to ensure accessibility of credit to farmers. Except for some limited provincial credit and commodity advance payments schemes, lending is at market rates. FCC and the provincial agencies may have a small borrowing advantage in some instances because they have government backing. However, when the size of Canadian banks is considered, it is an open question as to whether the private or public institutions (excluding credit unions which tend to be small and local) have borrowing advantage. Transfer from the public to private sources to producers may occur on loans that are in trouble or default where debt review agencies have postponed dissolving the specific operation. But this is the small tail of the lending curve, and the cost would most often come out of lender reserves. In Canada, farm credit does not deviate much from the competitive norm even though public institutions are involved.

Mexico. Agricultural credit has been provided by private banks and from the government development banks such as National Bank of Rural Credit (Banrural) and FIRA (a second-tier development bank and the agricultural arm of the Central Bank-Banco de Mexico). Private banks and the agricultural development bank were the main customer-service banks, while FIRA had been supporting the credit lines through discounts and credit guarantee until the financial crisis in Mexico. Since the 1994-95 financial crisis, the level of agricultural credit has been depressed in Mexico. Loan defaults, debt restructuring and refinancing were major problems that plagued most of the Zedillo administration. The severity of the problem has caused a severe reduction in direct investment from the private banks in agriculture. Otherwise even when resources have been available through government development banks, producers are very reluctant to borrow money under the ghost of past crises and under the tight monetary policy kept by the federal government in an effort to control general inflation (Banco de Mexico, 2000a,b).

According to information from Banco de Mexico (2000c), loan defaults for the agricultural sector (including crops, livestock, forestry and fisheries) rose from 5,681 million pesos in January 1994 to as high as 27,593 million pesos in September 1998. Loan default levels have decreased since then to 13,291 million pesos in August 2000. The interest rates for 28 day Treasury Certificates have decreased from 40.99 percent in January 1996 to 15.88 percent in October 2000.

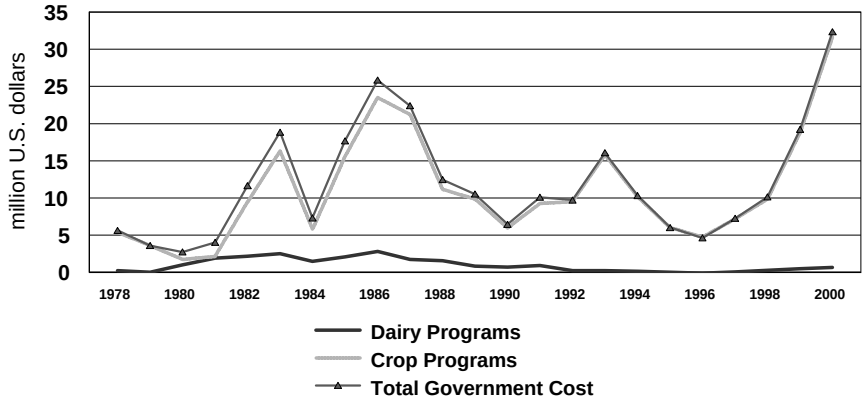
Price Supports and Safety Nets

United States. Figure 1 indicates the level of aggregate farm program subsidies to U.S. farmers from 1978 through to the latest ERS estimate for 2000. At the time of its enactment, the 1996 Farm Bill was viewed by its political proponents as providing a transition of government out of agriculture. It provided for lump-sum decoupled payments that were not tied to price, eliminated set-aside production controls, and gave farmers virtually complete flexibility to produce alternative crops. The 1996 Farm Bill turned out to be neither decoupled nor a transition of government out of agriculture. When implemented the policy was modified to include a combination of lump-sum payments, production flexibility, marketing loan, market loss supplemental payments, disaster payments, price supporting commodity purchases, and Conservation Reserve Program (CRP) payments[4]. In the context of this paper, these subsidies have had three primary economic impacts:

- they have maintained the aggregate level of U.S. farm income at or near the 10-year average of $45.3 billion over the period of 1991 to 2000. In the process, they have helped foster record levels of production of corn and soybeans, which has been a contributing factor to low commodity prices;
- they have maintained the level of production and the volume of exports in the face of a strong U.S. dollar; and

[4] It can be argued that CRP payments should not be included in this set because CRP retires marginal and environmentally sensitive lands. While this is the case, these lands represent direct payments to farmers by the government to keep land out of production, which has much the same effects on variables such as land values as other Farm Bill subsidies.

Figure 1: Cost of U.S. Government Programs, FY 1978-2000 (millions of U.S. Dollars).



Source: Economic Research Service, USDA, Agricultural Outlook, AGO-275 (October 2000) p.49 and back issues.

- their benefits have been capitalized into the price of land, which has increased in both nominal and real terms since 1992 (USDA/ERS, 2000). As a result, both agricultural land prices and rental rates likely are above the levels that can be sustained under current commodity market prices. The effect has been to increase U.S. production costs relative to both Canada and Mexico (Karst, 2001; States, 2001; Stone, 2000).

Canada. Safety net protection has evolved through several stages since 1976. The Western Grain Stabilization Program was replaced by the Gross Revenue Insurance Program (GRIP) in 1991. GRIP was abandoned by 1996 and now only the Net Income Stabilization Account (NISA) and the three year CFIP program (replacement for AIDA discussed above) remain. NISA is an all-farm program whose costs are shared by the federal and provincial governments and producers. NISA is designed to achieve some long term income stability rather than provide traditional farm price support. Producers can deposit up to 3 percent of eligible sales (to a maximum $250,000 of sales) into an individual account, which is matched by the federal government and by participating provinces. Account limits are set at 1.5 times five-year average eligible sales. Withdrawals are triggered by gross margin or family income failing to

meet specified threshold values. Supply-managed production does not qualify for financial support under NISA or AIDA.

The value of NISA accounts nationally at the beginning of 2000 was approximately C$3.0 billion, of which about 50 percent was public money. The limits on NISA accounts are restrictive to large farmers (a good 1500 acre prairie grain farm will sell more than C$250,000 in a good year especially if it has livestock, and grain farms are quickly moving beyond this size). Payments are not tied to commodities unless the operation is a one or two commodity operation, which is very unusual in Canadian agriculture. Finally, like most Canadian stabilization and safety net programs for decades, NISA payouts are not accessible until after probable revenue can be measured; for most production that means even longer after production resources are committed. Consequently, program effects on production are likely highly diluted or non-existent.

There does not appear to be any empirical evidence on the production effects of crop insurance on the prairies, and the AIDA program is too new to have been analyzed. Because of the ex poste nature of AIDA, effects on production are likely small. In the last half of the 1990s, as the PSE's show, farm support in Canada overall, and to the crops sector particularly, have dropped significantly. Excluding supply management, level of public support in Canada is well under fifteen percent of farmer receipts, and less than ten percent of cattle and hog receipts. What remains should have little impact on overall resource allocation or trade. Supply management production maintains much higher levels of support.

Mexico. Immediately following the signing of NAFTA, the Mexican government observed the need to establish income and price stabilization support programs to protect its agricultural sector from the strong competitive forces imposed by the NAFTA trading bloc. These programs were intended to offer an adjustment period for the less competitive sectors in the country. The main subsidy programs used by the Mexican government in agriculture are Procampo and Aserca.

Procampo direct payments are an income support subsidy administered by the department of agriculture, SAGAR. Payments are directed, preferably to small producers, on a cropland utilization basis. Eligible crops for this support are corn, dry beans, wheat, sorghum, safflower, soybeans, cotton and barley, although this program is also applied to some livestock, forestry and conservation activities (Avalos-Sartorio, 1998; Casco, 2001). Because of its nature, Procampo has become a social program used to support the lower-income-end of agricultural producers. For 1999, it provided payments to 77 percent of the cropland planted with 24 annual and perennial crops. It supported 4.2 million production units, of which 63 percent were smaller than two hectares. In nominal terms, the payments have increased from 400 to 700 pesos per hectare from 1995 to 1999. Direct payments to producers are generally used to purchase inputs, to finance the investment on facilities and machinery, and to pay for labor. Another modality has been the transfer of payment rights to financial institutions to obtain early financing, and to input suppliers for the exchange of goods and services (Claridades Agropecuarias, 2000). For fiscal year 2001, the program will extend payments to those producers with less than one hectare. Also, for those producers who plant less than 5 hectares and have been in the program for the last three years, no proof of crop planting will be required to receive the program payments (Diario Oficial, 31/12/2000).

Aserca is a series of marketing support programs to compensate agricultural producers during adverse economic conditions and to enhance and support the modernization of the supply chains in agriculture. The ultimate goal is to integrate agricultural producers to the marketing systems in the country (Claridades Agropecuarias, 2000). The programs provide support to cotton, wheat, sorghum, corn, soybeans, safflower, and rice producers. The program pays these producers the difference between the target price and market price. This mechanism was modified to include the process of regional commodity auctions setting the market prices. Rice producers have been receiving direct payments from this program. The plan encourages and supports crop contracting and hedging as part of its risk management program options to reduce volatility and uncertainty in commodity prices (Claridades Agropecuarias, 2000; Casco, 2001).

Overall, the level of public support to agriculture is small in relative terms to that in the United States, and state trading has been terminated since the creation of NAFTA.

Food and Nutrition Programs

United States. In the United States, a major social initiative has been linked to the agriculture and post-farm sectors to increase demand for farm and food products. The Food Stamp Program which began in 1961 provides food and nutrition to needy families. Food Stamp allocations peaked in 1995 with 26.6 million participants receiving an average $71.26 in benefits per month, from total outlays of $24.6 billion dollars. In 1999, the outlay was $17.7 billion on 18.1 million participants (USDA/FNCS, 2000). The School Lunch Program was initiated in 1946 and continues to increase in use, measured by outlays. In 1999, 6.8 million school lunch, breakfast and special milk allocations were registered, for a total federal outlay of $7.38 billion (USDA/FNCS, 2000).

The most effective of the U.S. food assistance programs is the Women, Infant, Children Supplemental Food Program (WIC) which integrates health care, nutrition education, food distribution, and food stamps into a comprehensive health and nutrition program (Knutson et al., 1998). Emphasis is placed on providing high-quality protein to pregnant and nursing mothers, and young children.

Canada. There has been intense debate over "food policy" in Canada since about 1976, and sporadic identification of the need to improve nutrition. However, Canada has produced neither and is no closer to policy on these issues than three decades ago. Agricultural policy is commodity-related and split between relatively open-market philosophy versus supply management. At the federal level, child poverty (a major contributor to nutrition problems) was identified as a national priority in 1994 and again in 2001, but there have been no significant policy developments to date. Provincial governments and local governments are the major welfare donors, and in food, voluntary local food banks are the source of food for needy recipients. Contributions are often voluntary and uncoordinated. There may be limited provincial, local and voluntary "mothers" and school breakfast programs available but they certainly can-

not be identified as significant components of food and nutrition policy. There is no formal nor financial link in Canada between the agricultural sector and nutrition or food programs.

Mexico. Before NAFTA, Mexico used price controls on some agricultural commodities and/or universal subsidization of some others as its social government policy. General subsidization on staple food basket (Canasta Bßsica) items included corn tortilla, eggs, milk, dry beans, rice, sugar, corn flour and some others. The extinct CONASUPO was a major player in the days of universal or general subsidization channeling resources through its subsidiaries LICONSA (milk) and DICONSA (dry goods), created in 1965 and 1972, respectively. Since 1984, FIDELIST, a trust fund for the liquidation of the tortilla subsidy operated several programs targeting nutritional aspects of low-income families. At one point, the Secretariat of Agriculture managed some of these programs. In 1995, the management of some of these programs was transferred to the Secretariat of Social Development (SEDESOL). Another important player since 1972 has been the program for the Integrated Development of the Family (DIF) that provides nutrition programs for low-income families, such as Food Rations Programs, School Breakfast Programs, and Food Assistance to Families Program, among others (Gundersen et al., 2000).

The Zedillo Administration changed the rules and revamped the social government programs in the National Development Plan 1995-2000. The main objective was to help communities under extreme poverty by breaking the vicious circle of intergenerational transmission of poverty. The chief modification to social policy was the move from general or universal subsidization to food assistance programs. LICONSA, DICONSA, FIDELIST, and DIF programs were revamped to focus on direct food assistance to low-income families in the country. The Program for Education, Health, and Nutrition (PROGRESA) was established in 1997 to provide grade-increasing scholarships and financial support for children from third to ninth grade, basic free health, and direct food assistance. This program has achieved an important growth since its inception. In 1997, PROGRESA reached about 400 thousand families in 10 thousand localities and 456 municipalities. In contrast, during 1999, the program served 2.3 million families and its benefits extended to more than 51 thousand locations in 2 thousand municipalities (SEDESOL, 2001).

PROGRESA is an innovative and more efficient program than its predecessors. It considers poverty distribution in the country and it further targets eligible low-income households. It also accounts for gender biases on the distribution of its benefits. Poverty in Mexico is more concentrated in the rural areas, where the native and more economically depressed populations are generally confined. The highest benefits are provided in the rural areas among those states with the highest poverty indexes, which are located in the central and southern regions of the country. Through its educational component, the program provides larger scholarships to girls, because they present the highest dropout rate among youth. On the other hand, the program's benefits are only provided to the female head of the families. Although, by using geographic targeting, PROGRESA presents "undercoverage" problems; this approach has been shown to reduce administrative costs.

Problems arise when trying to assess the effectiveness of these programs. Comparing the effectiveness of these programs to the ones used in the United States, shows that Mexican programs do not reduce the poverty rate in the country. It was found that the benefits as a percentage of income are lower in Mexico. Results also showed a lower participation of eligible households in the Mexican programs than the participation achieved in the U.S. programs (Gundersen et al., 2000).

INSTITUTIONAL AND POLICY ADJUSTMENT FOR FULL FREE TRADE

The leading results of the forgoing analysis, for each of the three policy areas are summarized in Table 1, by country. Conclusions are also summarized in relation to:

- policy areas where major conflicts exist which, in the judgment of the authors, are required to be remedied across the NAFTA countries if free trade is to be achieved; and
- policy changes required to achieve harmonization and free trade under NAFTA.

The remainder of the paper summarizes these results for each of the policy areas.

Agricultural Research. No major conflicts were found to exist, although there are gaps which need to be filled. There is a skewed playing field in terms of resources available and institutional support for conduct of agricultural research. In particular, the relative absence of strong university agricultural research programs in Mexico and, to a lesser extent, in Canada limit research output. This situation results largely because of relative lack of federal support. In addition, there are opportunities for increased specialization in research programs, and more coordination across the region to maximize on resources that are available. In each country, there are doubts and uncertainty, and some negative experiences, regarding how far and how fast to go with biotechnology and genetically modified agricultural and food products. These issues are important to marketability and may have food safety implications. There would appear to be an overriding need and opportunity to collaborate within NAFTA on research in this important area. Collaboration and expanded use of the research instrument have the important and desirable characteristic that they are 'trade neutral'.

Agricultural Extension. No major conflicts were found to exist. However, there is also a skewed playing field here, as well as many opportunities for sharing specialist expertise. Having extension as a federal government function, as in Mexico, runs the risk of losing objectivity in the programs conducted, their content, and reduces delivery capability. On the other hand, having extension divorced from federal research initiatives as in Canada, results in delivery voids. Ties among academics, researchers and extension services are critically important for maximizing progress. Like research, enhancing extension capability and delivery is trade neutral.

Economic Information. There are serious gaps in information availability in several sectors and some of these lead to trade stress. In Canada, lack of selling prices for export wheat and barley is a perennial trade issue with the United States. Hog price reporting is disappearing from Canada and will likely produce similar market problems that have plagued poultry, cattle and hog markets in the United States. Evolution towards more forward contracting and less cash sales in all three countries is reducing publicly available, useful market information and the problem will only grow without concerted federal efforts to reverse the reporting dearth. Market information in Mexico, and out-

Table 1: Comparison of Agricultural and Food Policies for NAFTA Countries, 2001

POLICY AREA	UNITED STATES	CANADA	MEXICO	MAJOR CONFLICTS	POTENTIAL HARMONIZATION
FACILITATE GROWTH AND PROGRESS					
Agricultural Research	Strong federal/state programs Universities well funded	Weak federal/provincial ties Limited university funding	Federal function, producer input	No, but level of activity widely different	Yes Trade neutral
Agricultural Extension	Federal/state and universities	Provincial function, very limited university contribution	Federal, isolated extension programs	No, leveal of activity widely different	Yes Trade neutral
Economic Information	Comprehensive federal/state programs	Limited outlook and policy analysis information	Lacks market, outlook, policy analysis information	No, level of activity widely different	Yes Trade neutral
Grades and Standards	Comprehensive, generally not consumer/market oriented	Reasonably consumer/quality oriented. Grain standards ridgid	Grades limited to Mexico's own products	Yes, particularly in grains and beef	Standardize/Harmonize on market-oriented basis
Trade Policy: WTO	Active conditional supporter. Domestic policy contradictions	Active supporter Domestic policy contradictions	Active supporter, significant moves toward compatability	Yes. Dairy, Sugar, Poultry, Wheat	Implement compatible programs, support guidelines and process
Trade Policy: Trade Remedy Laws	Actively utilized Strong political support	Actively utilized Weak political support	Increasing use. Prohibits unfair trade practices	Source of trade tension and disputes	Replace with NAFTA protocols and process
Trade Policy: Tariff Rate Quotas	Dairy and Sugar	Dairy, Poultry and Eggs	Seldom utilized	Yes Dairy, Poultry and Eggs	Eliminate. Implement compatible programs
Trade Policy: State Trading	None Active	Export Wheat and Barley. Some dairy products	None	Yes, particularly the CWB	Convert CWB to a coop or CCC-type agency
Infrastructure Policies	Strong federal/state support, particularly road and waterways, irrigation; border clearance delays	Primarily provincial roadways	Upgrading, border clearance conflicts	Yes, between US and Mexico	Reduce US support

REGULATORY POLICIES					
Competition/Antitrust Policy	Reduced enforcement. Limited structural remedies	Lacks in enforcement. Limited structural remedies	New instrument, lacks in enforcement and structural remedies	No Some collaboration	More collaboration More structural remedies
Intellectual Property Rights	Major trade policy issue Aggressive application	Policy void, slow to develop Tentative application	Follows international conventions	Not at present, but potential exists	Develop NAFTA protocols
Plant and Animal Protection	Complete program Implementation problems	Extensive programs, some enforcement problems	Lacks effective eradication programs and enforcement	Yes, significant trade stress	Establish harmonized standards and process
Food Safety	HACCP in meats and processing	HACCP in cattle and meat processing. Working on grains.	HACCP in fish processing only	Yes, could be significant	Establish harmonized standards and process
Environment: Livestock	Advanced federal/state programs, CAFO point pollution	Mostly provincial/municipal regulation. Wide variability	Largely voluntary	Not at present, could be significant	Implement harmonized regulations
Environment: Pesticides	Federal testing and registration Advanced compound bans	Federal testing and registration Some compound bans	Follows US, but null enforcement	Yes, expecially registration and prices	Harmonize testing and registration
MARKET INTERVENTION					
Disaster Assistance	Large insurance and disaster subsidies	Significant federal/provincial crop subsidies	30 percent insurance premium subsidy	Yes Unlevel field	Implement compatible insurance programs
Agricultural Credit	Credit guarantees with private risk sharing	Private and public agencies at near-commercial rates	Limited government lending	No	Reduce US support
Price Supports and Safety Nets	Large expenditures Commodity price support	Supply management price support. Whole-farm income protection	Primarily support to small farmers	Yes High US support	Adopt compatible domestic programs and support
Food and Nutrition Programs	Major programs, greater than 50 percent of USDA budget	Provinical/municipal/voluntary contributions. Small impact	Extensive programs, but limited benefits	No, widely different support	Standardize programs Trade neutral
PSE Levels	High: grains, oilseeds, dairy Low: livestock, poultry, fruit and vegetables Overall: relatively high, skewed	High: supply managment Low: all others Overall: moderate, skewed	Overall Low	Yes Supply management, dairy, grains and oilseeds	Standardize support across commodities and countries

Source: Compiled by the authors.

look and policy analysis information in Mexico and Canada are lacking. In more general terms, the reason for these PDIC workshops is to produce economic information to help reduce policy/trade stress and disputes.

In addition, there would appear to be many opportunities for creating common databases, sharing information, and conducting joint and shared studies on important market and policy issues. Again, this is trade neutral activity.

Grades and Standards. There appear to be substantial differences across the three NAFTA countries in grades and standards for agricultural and food products, and in their application. The result is an unlevel playing field not only in terms of commodity coverage but also in the criteria used to establish grades. Since comparable standards are critical to trade, price and buyer decisions, decisive moves need to be made to develop more compatible grading systems which facilitate, rather than impair, trade. Canadian grain and U.S. beef grades are the most sensitive in relation to trade stress and are important because of the magnitude of trade. These areas could be a good starting point for harmonization of standards and trade relations. Buyer-oriented grade standards make sense in a market oriented system, and the inspection system must ensure that the grade standards are met.

World Trade Organization. There has been, and there remains, the potential for major conflicts within WTO. While the three NAFTA countries are members of WTO, the fact that there are disputes among the NAFTA partners indicates the need for moving toward policies that are oriented toward freer trade. It would be in the interests of the NAFTA countries to establish a common, agreed-upon agenda for negotiations involving all trade agreements. Reduction in trade stress and disputes within NAFTA would appear to strengthen the NAFTA bargaining position externally. A first step here, as in many other of the areas that we have identified for increased collaboration and analysis, might be to establish a common policy analysis, research, data/information body within NAFTA to work on common issues, problems and procedures, including common negotiating stances for outside-NAFTA consultations.

Trade Remedy Laws (TRLs). TRLs are part of domestic trade policy in each country and are a major sources of conflict within NAFTA. They

were not designed for, nor are they suited to agricultural and food markets. The use of trade remedy law to achieve self-interest or political motives, and as harassment mechanisms, is totally contrary to the spirit and intent of free trade. The transaction costs associated with this vehicle for dispute resolution are often high, the process is extremely disruptive to markets, and all of this should be avoidable if there is a commitment to, or reasonable rules for, free trade. In addition, TRL as it is applied does not account for the inherent volatility of farm prices, nor the fact that prices, at times, fall below cost. Many other of the criteria applied in dumping and subsidization decisions simply do not fit agricultural markets. Consequently, perverse decision are made, and trade disputes are not settled, but are sometimes aggravated.

There are strong reasons for their elimination from within-NAFTA trade, particularly since NAFTA protocols apply only if TRL decisions are appealed by a loser. In a revised format, they might be applied with the same objectives and procedures as competition policy. There is a need for administration of trade remedy instruments to be separated from political pressures, as is competition/antitrust administration, in order to avoid political and interest group influence on selection of cases and outcomes. TRL originated in competition policy, and the CUSTA negotiations included consideration of returning them there but those discussions were suspended pending negotiation of the NAFTA. This step was not taken (Robertson et al, 1997) [5].

An alternative role of TRL was proposed by Loyns, Young and Carter (2001) arising from their review of R-CALF, and separately by Furtan and Fulton (2000)[6] proposal.. Many dumping and subsidization cases go directly to domestic TRL. NAFTA protocols become involved only if a loser uses the appeal mechanism (NAFTA, Chapter 19) or if governments choose to refer issues to

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[5] Another version of this situation is that the United States Congress would not consider giving up TRL, and the compromise was a Chapter 19 provision of oversight for TRL applications. The NAFTA Secretariat which has a unit in each country, administers appeals but only after domestic TRL has worked its course.

[6] Furtan and Fulton (2000) suggested the way to reduce disputes between Canada and the United States was to implement identical programs in the two countries, refer all disputes to a NAFTA panel, and eliminate state trading in wheat and durum. Our conclusions are fully consistent with this.

Chapter 20 of the agreement, both of which are administered by the NAFTA Secretariat. This process appears to be backwards. The suggestion is that disputes should go first to a NAFTA dispute resolution mechanism, then upon adjudication, if the particular country has a strong case to use its own legislation, it should be applied as a last resort. The science-based analogy for SPS disputes might usefully be applied in a economics-science based approach in dumping and subsidization cases. There are currently no provisions within NAFTA that would provide for these forms of dispute resolution.

The Policy Disputes Information Consortium will devote over half of its 2002 workshop to the problems and issues associated with trade remedy law as it is applied within the NAFTA region. Contributors, including officials from the NAFTA Secretariat, will discuss options for reducing trade stress and tensions from this source.

Tariff Rate Quotas. The use of tariff rate quotas, and the institutional framework they support, are a major source of conflict within NAFTA. At a minimum, there should be a near-term leveling of their application across commodities so that TRQs do not effectively act as quotas. Ultimately, they should be eliminated among the NAFTA countries. Accomplishing this objective would require a change in several domestic programs as discussed below.

State Trading. State trading is incompatible with free trade. This incompatibility goes well beyond the matter of transparency in pricing or business conduct. It is an issue of the state being involved in a private enterprise activity competing with other private entrepreneurs within NAFTA. Organizations like the Canadian Wheat Board and the U.S. Commodity Credit Corporation receive much of the state trading enterprise interest but there are many lesser marketing boards, orders and government supported business conducted in all three countries.

At the same time it needs to be recognized that elimination of state trading may produce some unintended effects which may be as unpalatable as the perceived original offense. For example, when the Western Grain Transportation Subsidy was eliminated in Western Canada in 1995, there was increased

pressure to ship prairie grains and oilseeds south. U.S. farmers should not be surprised if more wheat and barley flow into the United States if they get their wish to have the CWB removed from grain markets. The important question then becomes: will the increased volume from Canadian farmers be treated as 'dumping' on the U.S. market?

Infrastructure Policies. Infrastructure, particularly transportation rules and regulations, are a major source of conflict. The focal point of this conflict is between the United States and Mexico as reflected in the incompatibility of truck transportation rules and regulations, and there are major differences in the quality of roads and railroad beds. The railroad issue can probably best be solved by privatization, which is underway. Improved roads will require greatly increased government investments, some of which might be captured through tolls. There is also an important issue of who should pay for the cost of utility connection and delivery in rural areas of Mexico, where required utility investments can be very substantial.

Public sector contributions to irrigation systems, waterways and highways in the United States create an imbalance in terms of trade in agricultural and food products with both its NAFTA partners because these infrastructural components are significant contributors to production and distribution.

Competition Policy. No major conflicts were found to exist although there is serious question about the ability of existing laws to deal with many of the structural issues that are evolving. Free trade should be inherently competition-enhancing in that the size of the market is broadened to include the three countries. To be effective, the antitrust laws would have to be compatible across the free trade region and they have to be consistent with emerging competition conditions that may arise from the free trade environment. It is unclear that existing competition/antitrust laws can deal with the increase in vertical integration, and horizontal and vertical linkages that are occurring in agricultural and food markets. Neither is it clear that freer trade will necessarily provide the market discipline to avoid abuse of market power as firms grow in size and influence within NAFTA. A single NAFTA antitrust body may have merit. There are many research and market questions that a single agency would be best suited to handle. There is also an important link between competition/

antitrust policy and developments in intellectual property rights, especially in relation to the biotech sector.

Intellectual Property Rights. The United States and Mexico appear to be on similar paths in terms of policy and granting these rights. Canada has not as clearly defined it's policy position. There are important issues in relation to enforcement, in the extent to which the structure of agriculture might be affected, and the impacts upon competition. As indicated above, these are closely linked competition policy issues. They are also public policy issues that require serious research effort.

Plant and Animal Protection. Major conflicts can be expected to continue between the United States and Mexico regarding the dangers associated with migration of plant and animal diseases. While the United States and Canada have made substantial progress in eradicating diseases such as brucellosis and bovine tuberculosis, these diseases exist in Mexico. Comprehensive uniform monitoring, testing and eradication programs are essential to protecting plants and animals in the three countries. The EU experience with lack of uniform policy regarding BSE clearly indicated the costs of not establishing a comprehensive uniform policy.

The experiences with BSE and hoof and mouth disease in Europe in 2001 have highlighted the importance plant and animal disease control procedures around the world. As a consequence, the PDIC workshop in 2002 will include a day on the status of control and procedures in animal and plant diseases, and in food safety, within NAFTA.

Food Safety. The application of HACCP is evolving in all three countries. Across the board application to all food handling through at least the wholesale market is an essential goal for the pursuit of free trade. Conflicts can be expected to be prevalent in fresh fruits, vegetables and trace-back. Canada appears to be making more progress on trace-back than the United States, where particularly strong resistance can be expected from cattlemen. The BSE developments in the EU and continued E. coli incidents in the United States spur movement toward increased regulation. Science-based rules appear to be the

strongest means to effective regulation without generating undesirable trade barriers.

Livestock Environmental Regulations. Confined animal feeding operation (CAFO) environmental regulations in the United States have progressed to the point where virtually all such farms are treated as point pollution, although enforcement is still spotty. In Canada, federal policy in agriculture is still searching for direction, and the provinces and local governments have most of the power and rules. In Mexico regulations are pursued largely on a voluntary basis. The range of environmental rules and enforcement have the potential to generate serious trade stress.

Environmental costs can be substantial, and the costs of meeting environmental safeguards can be large. With increasing public awareness and participation in environmental decision making, and considerable scepticism within NAFTA countries and across the region about effects of agriculture, it is important that there be a coordinated NAFTA effort to achieve uniform policies, and to ensure that they are effectively enforced. NAFTA leadership in this important area could facilitate progress in the three countries, and perhaps across the world.

Pesticide Regulations. The United States has moved to eliminate inorganic chemicals such as organophosphates and carbamates from pesticide lists. Canada has followed the same basic path. If Mexico is to export into the United States and Canada, it must do likewise, although the principal problem is that of enforcement. A level field in pesticide regulation is more important to the pursuit of free trade than uniform CAFO regulation. Differences in testing and registration, and probably considerable misinformation, are important sources of conflict between Canada and the United States. These differences need to be worked out.

Disaster Assistance. Internationally, when there is a disaster, governments usually come to the aid of the people, often multilaterally. This principle is recognized under GATT. The risk in relation to free trade is that disaster assistance becomes an umbrella for subsidies. Disaster assistance may also encourage production in high risk areas, disadvantaging producers in the more

productive areas. Therefore the need is for compatible disaster policies across the region which provide acceptable protection without distorting markets. This likely means similar levels of support which may be very difficult to achieve.

Agricultural Credit. No major conflicts were found to exist. However, there is an unlevel playing field, particularly in Mexico, due in part to monetary and fiscal instability. Generally, credit subsidies do not appear to be a significant factor in allocation of this input.

Subsidization and Safety Net Programs. The array of support programs in the three countries produces the most divergence from free trade conditions of all public intervention. Subsidization is the source of much of the policy and trade tension within the NAFTA region producing widely divergent levels of support for producers within and between countries. It is also one of the most costly elements of agricultural and food policy, second to food programs in the United States. If level of public support, directly and indirectly, is a measure of economic disequilibria from the competitive norm, then high levels of public support indicate substantial levels of excess resource use, production, and probable trade distortion. Internal differences in levels of support also indicate domestic distorted markets.

For agricultural public support policies to be harmonized requires the same general programs delivering the same level of support to producers. This is a major departure from the status of subsidization and safety nets as they exist in the NAFTA region today, and within each country. A starting point for consideration could include the following options:

- a whole-farm revenue insurance program designed as a safety net to cover economic (market) and weather (production) adversities;
- individual whole-farm tax deferred savings accounts of the (Canadian) NISA-type designed to encourage voluntary risk management;
- removing compulsory acquisition and selling powers from marketing boards and orders that now have those powers; and
- development by the NAFTA partners of an agenda to standardize support among commodity groups.

It is proposed that the revenue insurance and deferred savings account programs could be modestly subsidized without large production and trade distorting effects. Accomplishing the level of deregulation implied above would not be easy. In particular the special program status held by many commodity groups - dairy producers in each country, supply managed producers in Canada, sugar, tobacco, and peanut producers in the United States, and the Canadian Wheat Board - would have to be modified. In Mexico special consideration would need to be given to the small ejido producers and any poverty alleviation initiatives. The logic of free trade suggests that buyouts of various types may be required to deal with change of this magnitude. Compensation payments were made to U.S. farmers as a result of Farm Bill changes in 1996, to Canadian prairie grain producers when the Crow subsidy was dropped in 1995, and is currently under consideration for tobacco producers in the United States.

Food Assistance and Nutrition Programs. In addition to expanding the demand for food, these programs buy substantial goodwill from the non-farm constituency. They may be particularly useful in dealing with social issues, whether recipients are poor and undernourished in Mexico, United States, or Canada. They can be made to be effective when combined with more comprehensive health care assistance targeted at low-income, single parent families, and pregnant women. The United States and Mexico have a well-established base of these programs. Canada, within the scope that our analysis was conducted, has none. Development and harmonization of programs in food assistance and nutrition could be made trade neutral.

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