IICA

Workshop Proceedings

THE AGRICULTURE MODERNIZATION PROCESS IN LATIN AMERICA AND THE CARIBBEAN

July 4-6, 1989
San Jose, Costa Rica

PROGRAM I:
AGRICULTURAL POLICY ANALYSIS AND PLANNING

¿QUE ES EL IICA?

El Instituto Interamericano de Cooperación para la Agricultura (IICA) es el organismo especializado en agricultura del Sistema Interamericano. Sus orígenes se remontan al 7 de octubre de 1942 cuando el Consejo Directivo de la Unión Panamericana aprobó la creación del Instituto Interamericano de Ciencias Agrícolas.

Fundado como una institución de investigación agronómica y de enseñanza de posgrado para los trópicos, el IICA, respondiendo a los cambios y a las nuevas necesidades del Hemisferio, se convirtió progresivamente en un organismo de cooperación técnica y fortalecimiento institucional en el campo agropecuario. Estas transformaciones fueron reconocidas formalmente con la ratificación, el 8 de diciembre de 1980, de una nueva convención, la cual estableció como los fines del IICA estimular, promover y apoyar los lazos de cooperación entre sus 32 Estados Miembros para lograr el desarrollo agrícola y el bienestar rural.

Con un mandato amplio y flexible y con una estructura que permite la participación directa de los Estados Miembros en la Junta Interamericana de Agricultura (JIA) y en su Comité Ejecutivo, el IICA cuenta con una amplia presencia geográfica en todos los países miembros para responder a sus necesidades de cooperación técnica.

Los aportes de los Estados Miembros y las relaciones que el IICA mantiene con 12 Países Observadores Permanentes, y con numerosos organismos internacionales, le permiten canalizar recursos humanos y financieros en favor del desarrollo agrícola del Hemisferio.

El Plan de Mediano Plazo 1987-1993, documento normativo que señala las prioridades del Instituto, enfatiza acciones dirigidas a la reactivación del sector agropecuario como elemento central del crecimiento económico. En función de esto, el Instituto concede especial importancia al apoyo y promoción de acciones tendientes a la modernización tecnológica del agro y al fortalecimiento de los procesos de integración regional y subregional.

Para lograr esos objetivos el IICA concentra sus actividades en cinco Programas que son: Análisis y Planificación de la Política Agraria; Generación y Transferencia de Tecnología; Organización y Administración para el Desarrollo Rural; Comercialización y Agroindustria; y Sanidad Agropecuaria.

Los Estados Miembros del IICA: Antigua y Barbuda, Argentina, Barbados, Bolivia, Brasil, Canadá, Chile, Colombia, Costa Rica, Dominica, Ecuador, El Salvador, Estados Unidos, Grenada, Guatemala, Guyana, Haití, Honduras, Jamaica, México, Nicaragua, Panamá, Paraguay, Perú, República Dominicana, St. Kitts y Nevis, Santa Lucía, San Vicente y las Granadinas, Suriname, Trinidad y Tobago, Uruguay y Venezuela.

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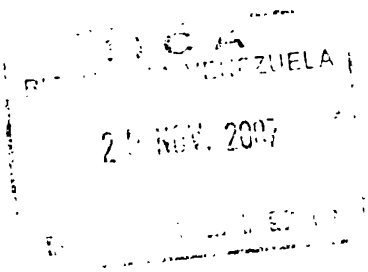
INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE/
CANADIAN INTERNATIONAL DEVELOPMENT AGENCY PROJECT

The general objective of the IICA/CIDA Project is to strenghten the conceptual and operational development of IICA's five Programs of action, in the technical areas having high priority in the Institute's Medium Term Plan and the PLANLAC. Through the IICA Programs, the IICA/CIDA Project, with the collaboration of Agriculture Canada, supports the efforts of the countries to reactivate and modernize their agricultural sectors, in a framework of ever-improving relations between Canada and the countries of Latin America and the Caribbean.



In memorial

To Brian B. Perkins, deceased on August 20, 1989, with the most sincere recognition for his professional qualities, support, and friendship.

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INTRODUCTION

The accomplishment of agricultural modernization within an equitable framework has been proposed as one of the main elements for an agricultural development strategy in Latin America and the Caribbean. It is thus important to know the factors that contribute to the agricultural modernization process. This motivated the Inter-American Institute for Cooperation on Agriculture (IICA) to organize, within the Rural and Agricultural Development Strategies Project, a series of studies which would help understand those factors which contribute to facilitating the agricultural modernization process. Economic incentive policies, local and external markets, technology, industrial organization, and management, have been identified for further research.

With the aim of discussing the case-study results, and carrying out the first stage of the project, the Workshop focussed on three aspects:

- a discussion of the methodological used for the analysis of the agricultural modernization process and its multiplier effects on the whole economy;

- an analysis and discussion of eight case studies dealing with about the determinant factors in the agricultural modernization process in specific sub-sectors of Latin American countries; and

- proposals for future research work within the project's terms of reference.

The studies to be discussed in the Workshop are part of an IICA research program designed to assist countries in generating strategies and policies that contribute to an equitable agricultural modernization process. The Workshop is to generate proposals for a second stage of the study which focus on the multiplier effects of the modernization process and how to make these effective. A possible third stage, currently under consideration, is the evaluation of the environmental impacts associated with the modernization processes.

The conceptual and methodological framework is original and different from the typical economic analysis, in that it concentrates on the important interaction of five selected factors.

Regarding the eight case studies selected (fruits in Chile, poultry in Peru, dairy products in Costa Rica, vegetables in Mexico, grains in Argentina, soybean in Brazil, flowers in Colombia, and shrimp in Ecuador), it must be emphasized that the success achieved by the productive units and by the agriculture-agroindustry system, or sub-sector, was tempered by economic difficulties, policy changes, market instability, and frequent technological innovations. All cases were successful in attaining sustained growth as the productive units and the respective systems developed the growth capacity, adapting themselves to the circumstances.

Project activities in the immediate future, as widely discussed in the Workshop, will be oriented towards the analysis of the multiplier effects of the modernization process achieved in the selected cases, through the direct effects on employment and income, and indirect effects through backward (inputs and services industry) and forward linkages (agroindustries, transport, services, etc.). The importance of considering the environmental impact of these modernization processes was also discussed.

The opening session began with the words of Dr. L. Harlan Davis, IICA Deputy Director General; it continued with a methodological introduction by Dr. Carlos Pomareda, Director of the Agricultural Policy Analysis and Planning Program; and with a welcome on the part of Dr. Brian B. Perkins, Canadian Coordinator of the IICA/CIDA Project.

The Workshop was able to meet its goals thanks to the dedication and valuable contributions of the participants, and through support received from IICA personnel, and particularly by the country Representatives and Program I Directorate personnel. Jorge Torres Zorrilla was responsible for organization and management of the Workshop, with the support of Zaida Granados, Leda Avila and Helen Clark.

Carlos Pomareda
Director of the Agricultural
Policy Analysis and
Planning Program

AREA I
CONCEPTUAL AND METHODOLOGICAL FRAMEWORK

(Sessions 1 and 2)

REFERENCE FRAMEWORK FOR THE WORKSHOP
WORKSHOP TERMS OF REFERENCE

Speaker: Carlos Pomareda

The modernization process is identified as that through which sustained increases of productivity and net income at the level of enterprise units [1/] have been attained, and for which the existence of "significant and increasing protection" on behalf of the State is not a necessary condition. In this context, the modernization process should be interpreted as the development of a capacity for autonomy, increased production and growth in conditions of financial, supply and market risk, and in the face of technological change.

In the political and social context, it is desirable that the agriculture modernization process be attained within an equitable framework, contributing to a better sectoral income distribution. It is important to point out, however, that this can be accomplished in at least three ways, which are not necessarily mutually exclusive.

First, modernization should occur in all production units, each one of which being dependent on management, investments, and the most convenient combination of factors according to its structure and risk management strategy. Second, that through the modernization process it is possible to increase labor productivity, and that this be reflected in salaries, increasing levels of employment and income for salaried workers. And third, that multiplier effects can be created as a result of the modernization process, mainly in the form of employment generation, through backward and forward linkages.

These observations should make it clear that even though the modernization process can be favored by land reform or rural education, these processes should not be included in the explicit concept of modernization. However, it is also clear that it is an equitable modernization process which is being sought.

The studies carried out in eight countries emphasized sub-sectors in each country which showed evidence of sustained growth over several years, and which have been associated with a modernization process.

1/ The reference to "enterprises" means that this analysis refers not only to farms, but also —when the case merits— to agroindustrial complexes or systems with some kind of vertical organization.

Agricultural Modernization in Eight Latin American Countries: Dynamics of Production and Export

	Production Growth (Annual Rate)			Export Growth (Annual Rate)
Sub-sector	Sector	Agriculture	Economy	
Fruits (Chile)	12.2%	3.3%	2.2%	17.7%
Poultry (Peru)	6.7%	0.9%	0.7%	-----
Dairy products (Costa Rica)	3.7%	2.3%	2.0%	-----
Vegetables (Mexico)	5.1%	2.8%	1.1%	5.6%
Grains (Argentina)	3.9%	1.7%	-0.7%	10.3%
Soybean (Brazil)	15.0%	3.9%	2.7%	16.0%
Flowers (Colombia)	18.3%	3.4%	4.0%	18.3%
Shrimp (Ecuador)	18.8%	3.0%	2.1%	24.9%

Source: Sub-sector production and export growth rates from case studies of the agricultural modernization project, referring to the 1970-87 period; agricultural growth rates from the IICA statistical data base, referring to the 1970-86 period; and growth rates for the economies, from "The recent economic evolution of Latin America and the Caribbean," LC/L. 492 (CEG. 15/3), January 30, 1989, corresponding to the 1981-1988 period.

It is possible that the methodology used in the studies might be interpreted as simplistic for the analysis of a process as complex as modernization; however, there are at least three reasons for its use. First, because an evaluation of the factors interacting in this process considered is important; second, because there are no previous studies which have rigorously analyzed the interaction of these factors, so as to allow the identification of policies to follow in order to encourage this process; and third, because resources available do not permit the assumption of a long-term, high-cost engagement.

Having made reference to the eight cases which will be analyzed for different products or systems, it is appropriate to stress that multiple cases were chosen instead of just one product because, since this is the first research on the subject, it was considered valuable to compare different country situations as well as product systems. In this way, hypotheses which would probably not arise if research were limited to one product, even if several countries were considered, would emerge. In the studies to be presented, it has been proposed that the following factors be taken into consideration:

Process dynamics: a description of the indicators which show that a sub-sector has been going through a modernization process, making reference to global indicators during the analyzed period, as for example, global production, productivity, net income (nominal and real)

by unit of area (or by enterprise), number of participant enterprises, etc. It is also important to chart the relative stability or instability of growth over the years.

Incentive policies: a description of the policies followed, both sectoral and global, and of the indicators reflecting the application of such policies. In policy analysis, a reference to "policy stability" is necessary, as it helps to induce private investment, which frequently shies away from perceived instability or frequent changes in the "rules of the game."

Markets: market characteristics are pointed out, as well as the practices which have been adopted to win and maintain markets.

Technology: this basic element in the modernization process requires special attention, to identify those technological elements which, through time, have been crucial in the modernization and growth of the sub-sector under analysis.

Organization: we must understand the role of organizations that generate demand, credit and marketing cooperatives, and consortiums or "groups," that seek political and economic protection through lobbying mechanisms. Also, their role in the generation of economies of scale for some processes must be analyzed; for example, packing and labelling of export products, poultry processing plants, milk industrialization, etc.

Management: the practice of dealing with agricultural units independently of their size, as simple "areas of land," estates, farms, ranches, or any other denomination, always skirts the notion of enterprise and the need for managerial skills, so important for agriculture.

Erroneously, the "enterprise" concept has been applied only to the industrial and service sectors. However, in the agricultural and agroindustrial sector, the entrepreneurial capacity, especially the ability to make decisions in high-risk situations, as well as managing risks and investments, have always distinguished good farmers from unsuccessful ones.

The studies that will be discussed in the Workshop constitute the first stage of research program and exchange of experiences, being carried out by IICA, with the purpose of assisting the countries in generating strategies and sectoral and global policies which will enable an equitable agricultural modernization process.

Given the special emphasis on the equitable aspect and the hypothesis that agriculture can contribute, significantly in some cases, to the economic recovery of Latin American countries, a second stage of the study will focus on the multiplier effects that the modernization process could have, and how these multiplier effects can be increased. Proposals on how to undertake the work of the second stage must be generated in the Workshop.

A possible third stage, which is being considered, is the evaluation of the likely environmental impacts associated with modernization processes.

SUBJECT 1.
MACROECONOMIC AND SECTORAL POLICIES AND AGRICULTURAL MODERNIZATION PROCESSES IN LATIN AMERICA AND THE CARIBBEAN

Speaker: Jorge Torres Zorrilla
Commentator: Brian B. Perkins
Moderator: Mario Kaminsky

INTRODUCTION

The most relevant macroeconomic policies for agriculture include: Monetary and exchange rates, commercial and protection, and fiscal policies. Exchange policy is particularly important and its general tendency in Latin America and the Caribbean has been oriented to keep national currencies overvalued, with negative effects on real agricultural prices. However, the current tendency is an increase in real exchange rates. Commercial policy (tariffs, quotas, and export incentives) shows three tendencies: greater protection for industry than agriculture, protection of import-substituting industries, and very scattered protection among products. Fiscal policy is a powerful arm of the price policy. Here, it is necessary to restructure the agro-export tax system; the alternatives include taxing the basic factors. Likewise, production subsidies create distortions in resource allocation; a reasonable tariff is an alternative to the subsidy, but it must be accompanied by compensatory subsidies for agricultural exports.

Considering the usefulness of a study on the determinant factors of successful agricultural modernization processes in Latin America and the Caribbean, IICA carried out eight studies on specific sub-sectors in eight countries already mentioned. It is especially important that these studies establish a correlation between production growth, productivity and net income on the one hand, and macroeconomic policies applied in those countries on the other, to determine if the policies were stimulating or limiting factors for the modernization processes.

The initial results of the modernization research follow. The eight case studies show high production growth, and six of the products show considerable export dynamism. Production and export growth is higher than total agricultural sector growth, and much higher than growth in the general economies. Exchange policy is an important factor in the modernization processes. The exchange rate policy analysis shows that four countries (Brazil, Chile, Colombia, and Mexico) have followed a policy of real exchange rate (RER) increase during the present decade, this having been a key factor in the greater exports of soybean, fruits, flowers, and vegetables respectively. Two countries, Argentina and Ecuador, show a certain degree of overvaluation. However, other compensatory factors were export subsidies, natural comparative advantages, and subsidies for technology generation and transfer. In two other countries, Costa Rica and Peru, exchange rate overvaluation favors imports of key inputs (balanced feed components), helping to keep production costs low.

COMMENTS

Modernization covers much more than technological change or economic growth. It also includes transformation of linkages with other sectors, which usually involves the evolution of new institutional structures that contribute to the permanency of the changes.

The hypothesis supporting this work is that correction of policy distortions makes the stimulation of economic reactivation possible in those sub-sectors showing comparative advantages. This hypothesis assumes a series of questions regarding the role of the state in the modernization process, and particularly, in relation to economic incentives and public services that complement those of the private sector.

SUBJECTS DISCUSSED

In the discussion, participants referred mainly to the lesser relative importance given to agriculture in the macroeconomic context of the Latin America countries; the inconvenience of using variable tariffs to stabilize local prices; and the importance of wage policy and exchange-rate management.

SUBJECT 2.
THE ROLE OF AGRICULTURAL MODERNIZATION IN ECONOMIC DEVELOPMENT

Speakers: Mary Lynch, Keith Hay
Moderator: Mario Kaminsky

INTRODUCTION

Historically, agriculture has been perceived as only a support to the industrialization process. Today, however, agriculture can and should be seen as a one of the most important parts of the economic development process. This new agricultural role is based on the need to increase rural production so that agriculture constitutes a dynamic force in the economic reactivation of Latin America and the Caribbean. Also, this increasing importance of agriculture requires changes in its structure. Limitations and incentives to agricultural modernization include national macroeconomic and sectoral policies, new technologies, expanding markets, industrial organization, and an improvement in inter-entrepreneurial administration and capacity.

The changes in macroeconomic policies have adversely affected the region's agricultural structure. It thus becomes increasingly important for governments to place higher priority on the design and implementation of policies to promote greater efficiency, and a gradual elimination of agricultural subsidies. Although in the past macroeconomic and sectoral policies

have been at odds, this must change into a joint effort to reach the same objectives of efficiency to ensure success.

In addition, those who support technological change —the public and the private sector— must work together. Technology needs to change continually to keep up with growth because of rapidly changing comparative advantages.

The role of the market is critical in agricultural development. There are problems outside Latin American and Caribbean countries that affect exports negatively due to an excessive concentration on the North American market, which increases vulnerability and thus requires greater market diversification. Also, sanitary restrictions and transport limitations have forced agricultural producers to use foreign-controlled distribution channels, while increased competition has caused a frequent use of non-tariff barriers which have harmed exports.

A problem which has existed in industrial organization is that it has emphasized only large-scale production. This is not always the most effective system as large companies do not always respond promptly to market changes. On the other hand, small-scale production suffers from an inadequate access to resources. A relatively successful compromise has been reached in Argentina with medium-sized and family farming.

In the past, it was assumed that market identification and access to resources was all that was needed to assure economic success, with no need for specialized administration. However, in practice, administration is most important for decisions regarding crop patterns, crop selection, technology use and inputs, and therefore a vital aspect for agricultural modernization.

Finally, it is important to look at linkages generated within and without each agricultural sub-sector. These must be broken down into two parts: observed links which are quantifiable, and potential links which can be evaluated through the analysis of the multiplier effects of agricultural changes, factors, the latter being more difficult to estimate due to dynamic factors. It is also necessary to evaluate the magnitude of these linkages, and examine the development of both aspects, so as avoid to growth differences and a reduction in efficiency.

SUBJECTS DISCUSSED

In discussion, participants referred to the contradiction between "inward" and "outward" development models; the importance of the macroeconomic and commercial policies of the countries receiving Latin American exports (northern protectionism); the exhaustion of Latin American internal markets (poultry in Peru, dairy products in Costa Rica); the limited role assigned to private enterprise; and the expectation that international free trade will improve conditions for agricultural development.

AREA II
CASE STUDIES

(Sessions 3 to 10)

SUBJECT 3.
DECISIVE FACTORS IN THE MODERNIZATION OF THE CHILEAN FRUIT SUB-SECTOR

Speakers: Fernando Silva Véira, Gastón Bruna Day
Commentator: Alberto Perdomo
Moderator: Mario Kaminsky

INTRODUCTION

Economic policies have played an important role in the modernization of the Chilean fruit sub-sector, resulting in the guaranteed and facilitated development of private enterprise, high profitability, and the definition of comparative advantages.

As a necessary condition, or "starting point" for modernization, a series of factors must be considered. These include physical ones, such as weather, soil, and irrigation availability; human resources, such as the amount and quality of labor and the level and experience of professionals and technicians; and land tenure systems, which provoke intensive agriculture.

Development of private enterprise has been attained through respect for property and free enterprise, and through a subsidiary role for the State. High profitability is the result of a high real exchange rate, low and equitable tariffs, availability and low cost of credit, low wages, and low taxes and export subsidies. State cooperation to help create comparative advantages is mainly evident through the simplification of export rules and regulations, export promotion through PROCHILE (promotion of Chilean exports), and better conditions for sea and air transport.

Research and technology transfer have played an important role in the modernization of the Chilean fruit industry. Technology has been adopted by producers thanks to public and private efforts. The main actors in the public sector have been the Instituto Nacional de Investigaciones Agropecuarias (INIA) (through development and promotion of new species and varieties); Fundación Chile (new technology diffusion); Corporación de Fomento (CORFO) (technical-credit support). The private sector plays an outstanding role in adapting Californian and New Zealand technologies to Chilean conditions (high technology irrigation, fertilizers and pesticides, productive and intensive management, post-harvest management using "hydrocooling," cold storage rooms with remote sensors, controlled atmosphere, etc.).

Regarding the development of the external fruit market, the "off season" unsatisfied demand in the United States and countries of the European Economic Community has

coincided with Chilean commercial efforts, and an appropriate trade action developed by PROCHILE.

The institutional organization of Chilean fruit entrepreneurs has facilitated modernization. In this organization, a concerted effort among producers (FEDEFRUTA), exporters (ASOEX) and the Comisión Nacional de la Fruta has been seen.

COMMENTS

In general, it can be affirmed that the incentive policies applied to Chilean fruit industry development have been coherent, in addition to forming part of a dynamic process which is adaptable to the changing export situations towards external markets.

It is important to point out that there is still a certain dependence on some export markets such as the U.S., but it must be recognized that there is an effort to diversify them.

It is impressive to observe how the training of professionals and improved technological research has parallelled the fruit industry development. Those hired for labor in the fruit sub-sector have been shown to have a relatively high level of education.

SUBJECTS DISCUSSED

In the session, participants referred to the encouraging character of Chilean export product standardization; the emergence of a new entrepreneurial class; the convenience of a low agricultural and land property tax; impacts on employment, especially for women; the diversification of Chilean fruit production; and current non-tariff barriers in some fruit markets, such as Japan.

SUBJECT 4.
DECISIVE FACTORS IN THE MODERNIZATION OF THE PERUVIAN POULTRY SUB-SECTOR

Speaker: Víctor Palomino
Commentator: Rodolfo Quirós
Moderator: Gastón Bruna Day

INTRODUCTION

The impact of macroeconomic policy on poultry production in Peru has been significant. The sub-sector grew at a rapid rate, while the real price of poultry deteriorated. This caused the substitution of beef by chicken in the basic food basket for that period. National per capita poultry consumption increased from 3 kg/person/year in 1970 to 12 kg/person/year in 1987.

The above-mentioned process was helped by a large increase in corn-sorghum and soymeal cake imports, which was stimulated by currency overvaluation during most of the analyzed period and by a significant reduction of international quotations in real terms. Another important factor in the consolidation of the poultry sub-sector was an intensified use of preventive veterinary products, which substantially decreased the death of one-day-old chicks.

Another key factor in this process was the great technological step forward as seen in the evolution of four main indicators. The balanced feed conversion rates (feed/poultry) went from 4 to 2 kg between 1954 and 1987; death rate decreased from 15% to 4%; weekly growth rate decreased from 13 to 7; and chicken live weight increased from a 1 kg to a 2.2 kg average over the same period.

Finally, when analyzing the rapid growth of the poultry industry, institutional development stands out, particularly the role played by the Asociación Peruana de Avicultura in technical assistance and as a pressure group at the political level.

COMMENTS

A high degree of management concentration and a dependence on imported inputs must be recognized in the case of Peru's poultry sub-sector. It is worth emphasizing that part of the poultry industry's success is due to modern distribution systems and consumption incentives. This case reveals how world meat marketing has evolved, eliminating the traditional producer-wholesaler-retailer-consumer system.

The existence of a new class of entrepreneurs in Peru (investors and professionals), whose traditional activity was not the poultry industry, was pointed out.

An industry with enormous economies of scale has appeared and collusion among enterprises and producers is therefore not surprising. Likewise, fixed capital and operation requirements are high in the poultry industry, thus being an additional incentive for integration. However, financial and administrative diseconomies of scale are tending to decentralize management of production within integrated systems of processing and marketing.

On the other hand, it can be stated that in real terms the price of balanced feed based on imported grains and oleaginous products has decreased, thus stimulating poultry industry development.

It was pointed out that in Costa Rica, unlike Peru, egg and chicken production and commercialization are totally separate, being distinct enterprises with different managerial organizations.

It was commented that, in spite of the success attained, the possibilities for growth of the industry through export markets are probably limited by strong competition from large producers such as Brazil, USA, France and Thailand.

SUBJECTS DISCUSSED

During the session, participants referred to the permanence of a downward trend in international grain prices; current dependence on imports of basic components for balanced feed; indirect credit subsidies for the poultry industry in Peru; and the level of protection given to the poultry industry.

SUBJECT 5.
DECISIVE FACTORS IN THE MODERNIZATION OF THE COSTA RICAN DAIRY PRODUCTS SUB-SECTOR

Speaker: Arnoldo Camacho
Commentator: Luis Villegas
Moderator: Gastón Bruna Day

INTRODUCTION

The dairy sub-sector in Costa Rica grew rapidly in the 1970s with an increase in the number and size of dairy farms (transformation of beef farms to milk or double-purpose farms). Only since the 1980s has there been a significant increase in production brought about through the adoption of improved technology.

A strong expansion of operating capacity through better technology, industrialization and diversification of the product line was also observed in the 1970s. The introduction of new technological processes in the industrialization took place in the 1980s. However, recent analysis shows that the technology and equipment used in part of the industry are now obsolete, with serious implications for the sub-sector's competitiveness and growth potential.

Economic policies have conditioned the sub-sector's growth rate and level of modernization, although a revision of established criteria has recently been made in order to avoid harming the producer, while still protecting the consumer.

Technical assistance, mainly through cooperative organization involving production and industrialization, is currently oriented to promote greater yields and lower cost through herd improvement, use of improved pastures, and fodder for silage. The greatest restriction is the limited coverage and extent of this technical assistance.

COMMENTS

The participation of the cooperative sector in industrialization is most important, this sector accounting for 92% of the total of processed milk. An encouraging factor has been the establishment of a cost model which has made it possible to offer fair prices to producers, in addition to stimulating the production of processed goods, rather than raw milk. For some

time, powdered milk imports for processing plants have been prohibited and milk donations not accepted.

The milk program showed that milk production is not only feasible at higher latitudes but also at sea level. Likewise, the program emphasized support for the transportation of fluid milk from producers to dairy industry areas through the development of storage centers. The program also proposed a minimum dairy farm size of 20 milk cows per producer.

SUBJECTS DISCUSSED

In the session, participants referred to the tendencies of decreases in international prices for balanced feed components (corn, sorghum, soybean) in the 1980, and the promotion of imports as a means of maintaining low production costs of milk and poultry; the current tendency of rising prices for dairy products (powdered milk) on the international market; the difficulty encountered in trying to be internationally competitive in processed dairy products; and the level of protection for dairy products in Costa Rica.

SUBJECT 6.
DECISIVE FACTORS IN THE MODERNIZATION OF THE MEXICAN FRUIT AND VEGETABLE SUB-SECTOR

Speaker: Carlos Vidali
Commentator: Fausto Jordán
Moderator: Jaime Harris

INTRODUCTION

Mexico's fruit and vegetable exports represent 44% of total agricultural exports, in spite of the fact that production uses only 1.4% of the total agricultural area. This shows that the modernization and expansion of production are based on increased productivity. The activity's main products are tomato, onion, melon, watermelon, garlic, cucumber, pumpkin, eggplant, strawberries and pepper, which together contributed to 90% of sales. Ninety-six percent of fruit and vegetable exports go to the United States of America and Canada. Exports take up 30% of total production and local consumption the remainder.

Mexico's main producer is the State of Sinaloa, where horticultural activity takes place in irrigated areas using modern and efficient techniques. Women and young people work in the harvesting and packing tasks, receiving lower salaries than those prevailing in the production areas of the United States. Thus, Mexico is really exporting cheap labor.

Mexican exchange rate policy has had a stimulating effect over the last few years. It is important to point out that in the past, when there was a significant differential between the free market and the official exchange rate, national export sales used indirect channels. This is demonstrated when we note that imports registered by the United States are greater than

exports registered by Mexico for these products. Moreover, when the exchange differential disappears, official exports of vegetables and fruits increase automatically.

The agricultural sector has lacked an integrated policy for technological development. Initially, improved seeds were developed, and then intensive technologies were used with modern inputs. Biotechnological research is a newly-developed area. Research in fruit and vegetable activities has been basically conducted by Mexican producers, but is also an adaptation from other countries.

The government's goal has been to promote agricultural production of basic products. Financial resources channelled by the development banks toward fruit and vegetable production have been minimal. Most of the credit offered during the last few years comes from foreign private financing, which is oriented to support agriculture through export contracts. These contracts usually state that financing and support are granted to the producer under the condition of handing their production over to the financing bodies.

As far as target markets are concerned, labor for foreign commercialization has been minimal because Mexico became accustomed to exporting to its neighbor country where exports repeatedly suffered restrictions, because of quality and sanitary requirements. Other additional conditions imposed are those related to the use of fertilizers and pesticides with adverse environmental effects.

COMMENTS

The contribution of this sub-sector to the balance of trade is revealing. However, it is important to point out that national agents control only the productive activities of selection, packing and dispatching to the border, but not distribution in the United States.

Even though the percentage of land used by this sub-sector is low, it has all the advantages for development: irrigated areas, investment, infrastructure, machinery, and a nearby market.

The concentration of benefits is worrisome, especially those for direct exporters and investors. That is to say, modernization is not a direct result of economic development, which takes into account the socialization of benefits, but is rather a concentrating element. Another concern is to what extent the recurrent use of imported inputs involves a desired agricultural modernization only during a period of crisis of foreign currency limitation.

Given the capital-intensive character of horticultural production, and the lack of internal credits, it is desirable that foreign capital be the founding source. This creates a dependence - especially in distribution and marketing- with possible high-profit margins based on access to foreign capital.

Finally, it is pointed out that the concentration of power has undesirable effects. For example, the influence exerted by the modern producers' organization of Sinaloa State can result in policies that negatively affect other producers outside this power structure.

SUBJECTS DISCUSSED

In the session, participants referred to the importance of market proximity to exporting countries; the commercialization and export control by international groups; quality requirements and sanitary restrictions in export markets for Mexican vegetables; and indirect export to other markets (Canada) because of deficiencies in the commercialization infrastructure.

SUBJECT 7.
DECISIVE FACTORS IN THE MODERNIZATION OF THE ARGENTINE GRAIN SUB-SECTOR

Speaker: Edith S. de Obschatko
Commentator: Carlos Santana
Moderator: Jaime Harris

INTRODUCTION

Evolution of the grain sub-sector in Argentina, and its modernization in the production, marketing, and industrialization stages, has been a subject of great interest.

Although Argentine agriculture represents only 15% of the GDP, when the agroindustry complex is considered this percentage increases to 35%. Likewise, agricultural product exportS and agroindustry by-products account for close to 75% of total exports. At the same time, grains are the most important export items in agriculture, representing 63% of agricultural GDP, 85% of agricultural exports, and 50% of total exports.

Grain production had a sustained growth in the 1970s and 1980s, regaining Argentine positions in world markets until 1985 when the world grain crisis developed, resulting in a considerable decrease in Argentine production.

Approximately 80% of production increase has been the result of enhanced productivity, and 20% is due to an increase in land devoted to agriculture. Modernization has had a direct impact on exports, which have grown more in volume than value, because of the trend in international prices.

Another impact of modernization has been the substitution of cattle for agriculture, cattle area decreasing by 5% in the period.

Technological change has basically affected five crops: wheat, corn, sorghum, soybean, and sunflower. The process has been changing the productive structure with a greater share of oil-bearing plants, with effects on soil deterioration and greater crop mobilization.

The axis of modernization is the technological change which occurred in four stages: agricultural techniques, mechanization, improved seed, and agrochemicals. Agricultural

technology was stimulated with the organization of the Instituto Nacional de Tecnología Agropecuaria (INTA). Mechanization implied an increase in the number of tractors, an increase of the unitary and per hectare power, and incentives to produce and sell tractors. Improved seeds were promoted by government action and incentive policies within the private sector, and agrochemical use was prompted by the adoption of the soybean, the new "star" of Argentine agriculture.

The cooperating factors of this process were categorized as determinant, facilitating, or discouraging.

The main decisive factor is a sustained process of generation and incorporation of technology in the productive stage. The policy was oriented towards encouraging the development of the national machinery and seed industries, and towards favoring technology adoption through incentives such as tax reduction and credit with subsidized interest rates.

Among the facilitating factors are the market conditions and the land tenure structure. Grain characteristics, Argentina's traditional presence in world markets, and the large size of the market were facilitating factors which made a promotion policy unnecessary. The land tenure structure, with a predominance of medium-sized enterprises, made mechanization and the incorporation of successive innovations within the entrepreneurial organization possible.

With regard to the discouraging factors, the one that stands out is the macroeconomic policy followed during most of the period. The exchange and tax policy resulted in lower prices received by producers, and decreased profitability. The sub-sector's expansion was thus less than it would have been with an alternative price policy.

The modernization process brought about some undesirable effects, the main one relates to the state of conservation of resources. The search for more profitable options, double wheat-soybean crops, elimination of the mixed livestock-agricultural production structures, and the leasing system have conspired to trigger soil erosion of consequence in some areas.

COMMENTS

This analysis, which is characterized by its depth and technical rigor, is not limited only to aspects related to the transformation of the agricultural production process, but also considers the important role played by certain economic policies, local and external markets, the marketing system, the social organization of production, the agriculture-industry relationship and finally by entrepreneurial organization. It can thus be stated that an ample modernization concept has been applied in this study, and the discussion of some points involved would appear to be in order.

First of all, we have the level of aggregation of the analysis. Since the study is centered on the modernization of grain sub-sector the analysis concentrated on the ensemble formed by wheat, corn, sorghum, soybean, and sunflower. The following questions from the study: How has the modernization process been considered for each product? When did modernization

become more significantly evident for each product? What was the impact of each stage of the modernization process on the yield per area unit, and on the production of each product?

After examining the data shown in Table 1, included in the summarized version, a graph was prepared, successively adding the production of corn, sorghum, sunflower, and soybean to that of wheat. This procedure was followed for each year during the 1961-1988 period and generated five curves.

As already pointed out, the five grains together shows a clear growth trend; the same occurs with the production of corn, sorghum, sunflower, and soybean. However, in the case of wheat, the production trend during the analyzed period does not show the expected growth, taking into account a modernization process. This result led to examining the yield behavior by area unit for each one of the five crops. For this purpose, the data included in Table 5 of the study's complete version were used. At least two interesting observations can be made from the analyzed data.

First, the yield per unit area of corn, sorghum, soybean, and sunflower shows a relatively accentuated growth trend in the 1970-1989 period. However, in the case of wheat, growth was very moderate. Why is it that data do not show the same impact of modernization as in the case of the other products? Or is it that the impact was felt prior to the analyzed period? Could it be that the modernization effect was felt prior to the period under analysis?

Secondly, regarding yield, it is worthwhile mentioning the significant increase registered in this variable for soybean after 1976, when there was a positive and drastic change in its yield trend. Why did it happen and what were the factors were behind this change?

It is important to explore these questions, as well as explain what happened in the case of wheat. Then, it would be desirable to break up the analysis into more detail.

Another comment refers to the fact that market conditions perhaps played a more important role in the modernization process than that indicated in the study. At least in the case of soybean, the market conditions should appear in the group of the modernization determinant factors, rather than among the facilitating ones. This is probably the case because market conditions at the end of the 1960s and during the 1970s created an extraordinarily favorable environment in which to initiate the modernization process. Evidence of this fact is that the Argentine soybean boom coincides with the same period studied here.

As to the classification of the factors responsible for modernization, it would be desirable to include credit granting and subsidized interest rates among the facilitating factors.

Finally, it would be useful to mention two points regarding the study's general conclusions. The first refers to the observation that the lack of funds available for investment or current capital expenses, with low or negative real interest rates, can present serious obstacles, or bottlenecks for the modernization process. The final part of this conclusion -the need for credits to be granted at low or negative real interest rates- deserves a more detailed analysis, since recent experiences by the countries which are reformulating their credit policies through the reduction of implicit subsidies in the interest rates seems to indicate that there is no

significant correlation between subsidized credit and the adoption of modern techniques. The really important factor here is the appropriate supply of credit.

Finally, it would be convenient to expand the theme which says that the existence of ample markets is of a fundamental importance to successful modernization. It is important to point out that when ample markets are mentioned, we refer to two aspects. First: that the product is linked, or can be easily linked, to the international market, which does not mean that the internal market is not an important element; and second: that the product has, or may have, various alternative uses. With reference to this latter point, it could be affirmed that modernization and the perspective of its continuation are very much associated to the alternative uses that the product has, or may have. This is perhaps because the larger the number of alternative uses of an agricultural heading, the higher its demand and its interrelation with other industries.

SUBJECTS DISCUSSED

In the session, participants referred to the convenience of developing traditional export products with decreasing real prices in the world market (like wheat); the negative effects of agricultural grain subsidies in developed countries; the effects of overuse of land in the resource's deterioration in Argentina; and the initial thrust of the public sector on the technological development of the Argentine grain sub-sector.

SUBJECT 8.
DECISIVE FACTORS IN THE MODERNIZATION OF THE BRAZILIAN SOYBEAN SUB-SECTOR

Speaker: Ivan Sergio Freire de Sousa
Commentator: Carlos Luiz de Miranda
Moderator: Jaime Harris

INTRODUCTION

Over the past 20 years, the soybean sub-sector in Brazil has gone through a quite significant experience. Not only did soybean grain production expand considerably, but important transformations also occurred in the industries related to the sub-sector. This sub-sector has experienced an overall modernization.

The following factors, among others, are linked to this modernization process: increase and diversification of urban demand; growth in external trade; general and sectoral economic policy; technological innovation; land availability and price; and development of domestic production of industrial inputs for agriculture.

As to the macroeconomic policy, it can be pointed out that the different measures that were adopted favored the setting up and strengthening of domestic industries for soybean

processing, production of inputs, machinery and equipment. In addition, the general macroeconomic policies favored the export of soybean byproducts, in detriment of grain exports.

With regard to sectoral policies, the rural credit policy encouraged the use of inputs, machinery and equipment. In turn, the minimum-price policy did not guarantee domestic prices since these were determined by the international market. In practice, minimum prices only functioned as internal parameters in government loans for soybean marketing.

The technical-scientific research has been playing an outstanding role in the process. When the soybean production and modernization process began in Brazil, it had already been consolidated in the United States of America. The characteristics of technological development attained in the latter country played an important role in the establishment of technological development patterns in Brazil.

As of 1980, Brazil starting growing soybean varieties which gradually became less dependent on the latitude, known as long-youthful-period varieties, which made it possible to grow soybean in the country's tropical regions.

The market has been a facilitating and decisive factor in the modernization of the soybean production in Brazil; the external market was, in its turn, the initial factor for the development of this phenomenon.

With regard to the sub-sectors's organizations, the modernization that is taking place in cooperatives linked with soybean production stands out. Some important aspects of this modernization include the search for an increasing autonomy from the State; management more closely resembling the model of private enterprise; struggle for rights to develop self-owned financial institutions, similar to commercial banks; search for international markets; increasing use of computer systems; diversification of basic activities; and investments in agricultural research.

As regards management of grain producing units, combined soybean-wheat production is an efficient system of agricultural activity, providing an appropriate soil utilization, reduction of fixed costs, and an increase in the rate of return of invested capital.

In conclusion, and without lessening the importance of external markets, this study shows that the growth of the agroindustrial sectors and the task of national agricultural research are factors that cannot be forgotten when explaining modernization.

Likewise, the study suggests that integration of the soybean sub-sector's modernization process with the rest of the economy is an indicator of its future continuity and growth. The complementarity and extent of this process cover different but interconnected interests.

COMMENTS

The agricultural modernization process in Brazil is more extensive and is not limited to soybean. This process involved all sectors of the Brazilian economy, and it was included in a

national strategy for economic development supported by several governmental plans carried out in the 1970s until the beginning of the 1980s.

Modernization policies were projected for and affected the whole of Brazilian society, gaining more importance and depth in the southern central region of the country.

Particularly in the agricultural sector, policies have not been specific for soybean, because other crops such as sugar cane, citrus fruits, coffee, etc., also benefitted.

It is also important to point out the role played by the Brazilian State in the application of the modernization policies.

On the other hand, it is worthwhile pointing out that in the same way that modernization is projected in the overall development of the southern Brazil, it is also necessary to study some modernization consequences and effects. It favored the concentration of wealth; large sums were expended in subsidies; a land ownership concentration process was encouraged, expelling large population groups; and a process of deterioration of natural resources resulted.

SUBJECTS DISCUSSED

In the session, participants referred to the importance of the development of an integral-technology including production and marketing stages; incentives for the processing of basic agricultural products and generation of agroindustries for processed products; entrepreneurial concentration and appearance of consortiums and power groups; the role of the Brazilian State in the sectoral development of the soybean and its byproducts.

SUBJECT 9.
DECISIVE FACTORS IN THE MODERNIZATION OF THE COLOMBIAN FLOWER SUB-SECTOR

Speaker: Luis d'Avila
Commentator: Enrique Alarcón
Moderator: Carlos Vidali

INTRODUCTION

Flower exports began in the mid-1970s in Bogota's plains, taking advantage of the region's climatic conditions and proximity to the airport, this latter item being important due to the highly perishable nature of the product. There was also surplus labor, particularly women.

Technology was imported from elsewhere and adapted to local conditions. A production and investment critical mass was constituted, government support was sought and ASOCOLFLORES was organized, thus representing the activity's institutionalization. Flower export included three development stages: in the first there was a rapid development up until

1973 when the mentioned critical mass was reached; then came the expansion period, and afterwards, a stable growth stage.

Production currently amounts to 87 thousand metric tons, and exports US$205 million. The main products are carnations and roses. There are 400 companies cultivating a total of 3,000 hectares.

The minimum scale is estimated to be 3-4 hectares. The plants' productive life is variable depending on the type of flower, with biannual production peaks. Production costs are high and technology is complex. Fixed investment is about US$100,000 per hectare. Labor requirements are between 16 and 30 workers per hectare, of which 70% is female. The greenhouse technology has been progressively improved. A demand and domestic production of inputs and services was developed for the sub-sector.

Of the total production, 95% is exported and the main market is the United States. The main enterprises have commercial agents in Miami. Each market has a different consumption peak, depending on holidays, which causes a high variability in prices. Lately, the demand has been increasing during off-season periods. During the demand peaks, up to 30 daily flights leave for the United States. Air freight expenses are an important component of the costs.

Colombia holds second place in world flower exports after the Netherlands. The natural markets for Colombian flowers are the United States and Canada. Protectionism in these markets will limit the development of Colombian flower exports.

The North American market has 8% tariffs on FOB values. However, new protectionism pressures have arisen. Thus, the safeguard clause has been applied at certain times, and the application of compensatory taxes has threatened the access of Colombian flowers to the North American market. Colombian supply popularized flower consumption in the eastern United States.

In the beginning, flower production and export did not have government support, but depended rather on private initiative. Once a critical mass was created, government support began: the Department of Floriculture was created at the National University; PROEXPRO started granting credit for working and investment capital; CERT subsidies (Tax Reimbursement Certificates) were granted; and the Vallejo Plan for flowers exports was applied. This coincided with an advantageous exchange rate policy.

Flower growth tends to stabilize due to competition and protectionism limitations. Some actions which would help to reverse this trend would be cost reduction, investment in cold-storage chambers, orientation towards other exotic goods, and a Colombian-North American growers' association. It is important to begin negotiations at the governmental level to face the problem of protectionism.

The modernization of Colombia's agriculture is not limited to the flower sub-sector. There are similar experiences with bananas, tropical fruits and the dairy industry.

COMMENTS

Modernization of the flower sub-sector is developed in areas with urbanizing potential close to the capital and with high costs per hectare. The development took place thanks to imported technology.

In the Colombian case, the exports are not exactly food products, but rather commodities such as coffee, bananas, flowers, sugar, and cotton.

On the other hand, the flower growers have a clear exporting vocation. Their main concern is not to export surpluses but to export all of the production.

Foreign technology was adopted with success and rapidly, which can be useful as an example for other crops.

Another important point to be mentioned is the difficulty in penetrating external markets; in addition, when competition is evident, protectionism appears.

With reference to this subject, it would be useful to ask: What was the trigger that activated the process? What is the effect of the process on the Colombian society's welfare? Are the main benefits for an elite class? Why have some products been displaced? How are we to continue with the successful experience of flowers without its disadvantages?

SUBJECTS DISCUSSED

In the session, participants referred to current protectionism trends in the North American market and their relation to the Colombian export subsidies; financing sources granted for developing the flower sub-sector in Colombia; the problem of decision-making under risk; the transfer of urban entrepreneurs to agriculture; and the importance of international transport in marketing perishable goods.

SUBJECT 10.
DECISIVE FACTORS IN THE MODERNIZATION OF THE ECUADOREAN SHRIMP SUB-SECTOR

Speaker: Rafael Ríos
Commentator: Víctor Palma
Moderator: Carlos Vidali

INTRODUCTION

The main indicators show that during the 1977-1987 period the shrimp area increased to 120,000 hectares, that production increased to 115 million pounds in 1988, and that the export value went from US$21 to US$381 million.

Shrimp are currently the second most important export product in Ecuador, doubling the value of coffee exports. Growth is very dynamic and accounts for 184.000 direct jobs.

As to the markets, world supply is two million metric tons. Production by fishing is stagnant, but production by farming is expanding. Ecuador is the second largest world producer by farming after China.

The main buyer is the United States, which imports 77% of its consumption; another is Japan with an 87% consumption, and a per capita consumption higher than that of the United States. There are no major restrictions to exports to the North American market, but protection measures have been requested.

The large Ecuadorean producers have their own packing plants; the small ones sell their production to the packing plants.

International prices increased between 1950 and 1970, but stabilized thereafter. Between 1980 and 1987 price growth has been only 13%. Domestic prices depend on exchange rate levels and on compensatory subsidies to exports; internal prices have been favorable to growers.

As to land, there are 120,000 hectares producing, and there are no land transfer limitations concerning mangrove swamps; this constitutes an important ecosystem and its use is forbidden, even though this restriction has not stopped its deterioration. With reference to the Guayaquil estuary, it is adaptable to shrimps. However, there is a deterioration process due to chemical discharges, red algae, and sewage disposal.

As to labor, 65% of the workers are employed in larvae fishing and the rest in shrimp landing activity.

Investment has been very high and it has come basically from the national private sector, although there is some foreign investment. The estimated investment per hectare is US$12,700.

The main inputs are larvae, which are caught by small fishermen and marketed by intermediaries. The natural larvae supply is insufficient for the amount of hectares with production capacity. Laboratory larvae are more expensive, grow less, and have a higher death rate.

The natural food for shrimp is plankton, but it is complemented with balanced feed. The use of fertilizers improves phytoplankton production. Technology has been developing rationally. Foreign technology has only been transferred in laboratories.

There are three production systems: extensive, semi-extensive, and semi-intensive. The extensive system uses neither fertilizers nor balanced feed, and is economically more feasible due the low investment needed per hectare. The semi-extensive system uses pumping systems to handle water, fertilizers, and balanced feed. The semi-intensive system is the predominant one in large farms, using more laboratory larvae, fertilizers, and balanced feed; there is a biomass control.

One quarter of the shrimp industries are located in mangrove swamps, and a large number in the highlands with some agricultural and forestry aptitude. It is important to consider that a large part of the growers are also banana producers with export experience.

The average cost of shrimp is US$2/lb, which when compared to the international price of US$3.50/lb offers a high level of profitability. In general, there are no taxes on shrimp production activities.

Mariculture has been successful due to access to the markets and natural resources. However, some tendencies which may cause the process to lose dynamism have been observed, such as the lack of larvae, and also competition from the Peoples' Democratic Republic of China.

COMMENTS

The shrimp industry's development is impressive: Ecuador's current production represents 16.5% of world production.

Decisive factors in this process are exogenous and endogenous. The exogenous factors include the fast growth of world demand, derived from income increase in the developed world, which caused a rapid increase in international prices.

The endogenous factors include the existence of an export tradition of the producing agents, as well as the ecological resources of the Ecuadorean coast; the existence of entrepreneurial capacity in the banana activity which was partially transferred to the shrimp sub-sector; the exchange overvaluation which was compensated through tax reimbursements.

What kind of strategy can be followed to generate a sustained development in long-term production? Average productivity is around 700 kg/ha and is higher than the average world productivity, but there is still room to increase this figure.

An aspect of technological nature is that related to feed. It seems that it is possible to use cassava as a substitute for balanced feed. A concern is the potential competition by the Peoples' Democratic Republic of China, which could generate a world oversupply and a consequent drop in international prices. Another factor is training of human resources in this industry, which is a basic factor for the attainment of sustained development.

Finally, another concern is the maintenance of the environmental quality and productive capacity of the natural resources for shrimp production, especially the use of agricultural land for these activities.

SUBJECTS DISCUSSED

In the session, participants referred to obtaining financing sources for investments in new export activities; excessive differences between export FOB prices and prices in the commodities' markets; a stronger competition in the international market due to the appearance of new competitors, and the continuously growing development of other third world countries that export shrimp; dependence of international transport on foreign-flag ships; dependence on imported inputs for the shrimp activity.

AREA III

ROUND TABLE

The round table discussed three subjects: the identification of common elements explaining the modernization process; considerations of the socioeconomic and ecological effects of modernization; and transfer of the agricultural modernization experiences. For this purpose, three working groups were formed which developed the main ideas and presented them to the plenary session for final discussion. The subjects that were discussed are detailed below:

A Definition of common elements in the eight case studies, within the framework of the five determinant or decisive factors of modernization; and identification of elements that, not being explicit, have arisen during the discussion.

In this latter case, some of these new elements are: the role of the government; the complementary nature of the actions between public and private sectors; the financing mechanisms; and the intersectoral organizational relations.

B Considerations for the second stage of the IICA project which will deal with the analysis and discussion of the multiplier effects, and with equity over time and the environmental impacts associated with the modernization process.

As to the multiplier effects, the present and potential linkages were underlined, as well as how the latter can be increased through adequate policies; the geographical location and dimension of the modernization experiences and impact at national and regional

levels; the professional attraction towards the sub-sector in modernization processes; the direct effects through backward and forward linkages and through employment; the social impact; and in all cases the public policies (economic and other) which should be considered so as to attain the greatest positive multiplier effects.

With reference to the environmental impact and equity over time, it is desirable to present ideas about how to use the case-studies for an initial environmental impact study, as well as opinions on the interest observed in the countries regarding this matter.

C Transfer of experiences on agricultural modernization

Regarding this subject, special attention should be granted to technological transfer, management capacity skills, group organization, etc., within a country among producers devoted to the same or different activities; the transfer between countries, for the same sub-sector or for different sub-sectors.

With reference to all cases, the political feasibility of the transfer must be discussed, as well as the role of the state and that of international technical cooperation.

The development of the exposed topics will be presented below:

SUBJECT A: IDENTIFICATION OF COMMON ELEMENTS OF MODERNIZATION

A superficial analysis of the common elements in the eight case studies of modernization processes in Latin America and the Caribbean leads us to the hypothesis that modernization should be basically concentrated on the enterprises and the economic agents within specific sub-sectors.

Moreover, entrepreneurial modernization responds to an increasing need to confort a changing world economy. In this aspect, the post-war Japanese experience represents an appropriate example to be considered; from a country in ruins, Japan has become a major First World industrial power.

Entrepreneurial modernization implies the search for an optimum-size production unit and the use of modern techniques of communication and computer science. It is a catalytic element for the use of modern production techniques, and an incentive to a greater linking of agriculture and agroindustry. Moreover, it enables the generation of investment projects in fields with clear comparative advantages, the search for new foreign markets and diversification of its own production.

To orient the analysis, the following classification of the eight experiences of agricultural modernization processes in Latin American and Caribbean countries, in four different categories, is proposed:

a. Modernization of the traditional export sub-sectors, such as grains in Argentina and soybeans in Brazil.

b. Modernization of products with a high income elasticity, such as fruit-growing in Chile, and fruit-growing and horticulture in Mexico.

c. Modernization of products basically oriented towards domestic markets, such as dairy products in Costa Rica and poultry in Peru.

d. Development of new sumptuary products oriented to satisfy external demand, such as flowers in Colombia and shrimps in Ecuador.

The hypothesis we are presenting is that there were factors facilitating entrepreneurial modernization which also explain the development of the four previously mentioned types of processes. Thus, in the modernization of grains in Argentina and soybean in Brazil (traditional export products), technological development and large productivity increases were probably the decisive elements in modernization.

In the cases of Chile and Mexico (products with high elasticity), the governments' dynamism and economic policies supported the entrepreneurial modernization of these sub-sectors.

Finally, in the case of Colombia and Ecuador (new sumptuary products) market dynamism seems to be the decisive factor in explaining the development of these sub-sectors.

All the other elements which must be considered for a more complete explanation of the case-studies are given below:

1. **Incentive policies:**

   - Real exchange rate level
   - Emphasis on foreign trade (export promotion strategy)
   - Wage and employment policy
   - Tax legislation
   - Interest rate level
   - Financing availability

2. **Technological development:**

   - Public sector support
   - Import of technology and adaptation by public and private sectors
   - Technological dependency
   - Development of integral technology for production and marketing
   - Strategic components of technology (biotechnology)
   - Investment technology and requirements

3. **Management:**

   - Human resources development: education, training in marketing and technology
   - Transfer of "new entrepreneurs" toward operations on an agriculture scale
   - Role of the university and technical schools in entrepreneurial training

4. Producers' organizations:

- Role of entrepreneurial organizations and of the government in their activities
- Entrepreneurial integration
- Other forms of exporters' and growers' organizations
- Capacity for dialogue with government
- Complementarily among small, -medium- and large-scale producers

5. Market development:

- Diversification of products, byproducts, and derivatives
- Tariff and non-tariff barriers to imports into final markets.

SUBJECT B: MULTIPLIER AND ENVIRONMENTAL EFFECTS OF MODERNIZATION

Development of this issue starts with the following question: what to study and how to do it, with respect to the effects of agricultural modernization on the economy and society as a whole.

First of all, the approach adopted for the analysis can be of a quantitative or qualitative nature. Restrictions to the traditional quantitative approach of the input-output pattern are: rigidity of the technical coefficients; seniority of the input-output tables in Latin American and Caribbean countries; and the high level of sectoral aggregation considered in the existing tables (although for Mexico there is an updated matrix with good sectoral disintegration).

Moreover, the quantitative approach using general equilibrium models has the disadvantage of being a very aggregated tool.

For all the above reasons the quantitative emphasis was left for the second stage of the project, which concentrates on the effects of agricultural modernization.

A second concern that arose refers to the countries where the studies are to be conducted. This proposal states the need to focus on a smaller number of cases than the eight studies considered in the first stage of the project.

As a third concern, the group analyzed what to study for the second stage in each selected country. Here, two alternatives were proposed:

a. to study all the effects (backward, forward, on income and employment, on environment) in all countries to be selected; or

b. to study some aspects in all selected countries.

The first alternative seems to be more natural as an analysis of multiplier effects, because this definition has an impact on the whole economy. However, it was suggested that the second approach, considering the study of one element in every country, would allow a saving of

resources when focusing on the backward effects in some countries and the forward linkages in others. As to the ecological effects, it was suggested that the study be focussed on a case where these impacts are significant and large.

The next point discussed dealt with the reasons why the studies of agricultural multiplier effects are carried out. As an answer, the strategic importance of agriculture on the economy and on society was made evident. This importance is greater than just the proportion of agricultural value added in the national accounts. This is so due to the indirect effects of agriculture on agroindustry, the industrial sectors, the service sectors, and the social effects of agriculture, such as the use of rural labor.

SUBJECT C: TRANSFER OF AGRICULTURAL MODERNIZATION EXPERIENCES

The transfer of experiences is feasible within a country or among countries. At the same time, the transfer within a country can take place among producers of the same item or among producers of different items.

Transfer can be integral or can be limited to technology, management capacity, group organization, management plans, or marketing methods.

In all these cases it is important to consider the political feasibility of the transfer, the role of government, the role of international technical cooperation, and the mechanisms to be taken into account.

In this context, the three main aspects of the transfer of modernization experiences are: what experiences to transfer, to whom these are to be transferred, and how to effect the transfer?

1. Experiences to be transferred

Of the Chilean fruit-growing process, one can transfer the joint production stages of industrialization and marketing; the economic policies favoring exports; the role of the promoter (Chile Foundation); and the adaptation of technologies.

In the grain modernization process in Argentina, one must underline the search for ample markets; search and adaptation of technologies; new ways to organize production and marketing; compensatory sectoral policies; and the development of the legal framework (temporary lease).

From the floriculture process in Colombia, one can transfer the favorable macro policies; the search and adaptation of technologies; new organizations oriented towards generating demand; and the transfer to the field of entrepreneurs and investors.

In the soybean modernization process in Brazil, one can identify the search for ample markets; the search for and adaptation of technologies; the joining of production and

transformation; the experience in cooperatives; and the compensatory sectoral policies.

Of the Peruvian poultry process, the search for and adaptation of technologies, as well as subcontracting experiences, stand out.

For dairy modernization in Costa Rica, one underlines the guaranteed market policy and the fiscal incentives to cooperative organizations.

From the Mexican fruit and vegetable growing activities, one focusses on the foreign capital linkages with the external markets.

Of the Ecuadorean experience in shrimp, one highlights the links between established entrepreneurs and new sectors.

2. Target transfer groups

It is important to emphasize the need for the transfer of successful experiences to small farmers. This is more important after verifying that, in most case-studies, modernization is limited only to medium- and large-scale farmers.

For this transfer it is necessary to consider the following:

- Linkages of the farmers with the modernized sub-sector, through cooperatives or farmer associations.

- Training of appropriate labor.

- Complementing of farm production with the requirements of the modern sector (for example, animal feed).

3. Transfer methods

This report emphasizes IICA's role. In this regard, the following needs arise:

- The joint work of IICA's Programs with regard to a product with an overall view of the modernization process.

- Exploratory studies of areas and fields, the production of which is susceptible to modernization, with participation of representatives of the interested groups, entrepreneurs from countries with products involving a modernization process, and public officials.

- To use, as a strategy, the cooperative action mechanisms created by the Plan of Joint Action for Agricultural Reactivation in Latin America and the Caribbean.

- To take advantage of and extend the experience of CIDA/IICA cooperation in the development of new markets and non-traditional products.

- To link the modernization goal with preparing and managing sectoral programs, for which IICA and IDB will sign a cooperation agreement.

- To cooperate in strengthening the ministries of agriculture for supporting modernization processes.

APPENDIXES

APPENDIX 1
WORKSHOP PROGRAM

DATE/TIME	SUBJECT	SPEAKER
Tuesday 4		
08:00	Registration	
08:30	Opening - L. Harlan Davis, IICA Deputy Director General - Carlos Pomareda, Director of the Agricultural Policy Analysis and Planning Program - Brian B. Perkins, Canadian Coordinator of the IICA/CIDA Project	
	AREA I: Conceptual and Methodological Framework	
09:00	**Session 1:** Macroeconomic and Sectoral Policies; Agricultural Modernization Processes in Latin America and the Caribbean	Carlos Pomareda Jorge Torres Z.
10:15	**Session 2:** The Role of Agricultural Modernization in Economic Development	Mary Lynch Keith Hay
	AREA II: Case Study	
11:15	**Session 3:** Decisive Factors in the Modernization of the Chilean Fruit Sub-sector	Fernando Silva Véira Gastón Bruna Day
14:00	**Session 4:** Decisive Factors in the Modernization of the Peruvian Poultry Sub-sector	Víctor Palomino Ch.

15:15	**Session 5:** Decisive Factors in the Modernization of the Costa Rican Dairy Products Sub-sector	Arnoldo R.Camacho

Wednesday 5

08:30	**Session 6:** Decisive Factors in the Modernization of the Mexican Fruit and Vegetable Sub-sector	Carlos Vidali C.
10:00	**Session 7:** Decisive Factors in the Modernization of the Argentinean Grain Sub-sector	Edith S. de Obschatko
11:00	**Session 8:** Decisive Factors in the Modernization of the Brazilian Soybean Sub-sector	Ivan S. Freire de Sousa
14:00	**Session 9:** Decisive Factors in the Modernization of the Colombian Flower Sub-sector	Luis d'Avila Magalhaes
15:15	**Session 10:** Decisive Factors in the Modernization of the Ecuadorean Shrimp Sub-sector	Rafael Ríos Pintado

Thursday 6

08:00	Round Table
12:30	Closing Session

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APPENDIX 3
REFERENCES

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