

## Systems Approach to Analyse Agri-Business in Developing Countries : Central American Example

SION RAVEED, WILLIAM RENFORTH, DOUGLAS NORVELL

*The "systems approach" is very useful in analysing agricultural economic structures found in developing countries. The use of the systems approach for studying agri-business in developing countries was developed at the Harvard University. This study demonstrates the application of the systems approach for analysing agri-business in developing countries. This is done by examining the agriculture systems found in Central American countries*

Production and distribution of food-stuffs has always been an important component of the Central American activity. Agriculture has recently emerged as an especially critical component of the developing plans of most developing countries, especially those in Central America. The economies of most of these countries are closely tied to the production and export of a small number of basic agricultural commodities. The deteriorating terms of trade and price fluctuations of their primary exports led many Latin American economists to advocate in the early 1960s a development strategy that centered on import substitution *via* industrialisation. This approach failed to generate the hoped for "take-off in Central America. Consequently, the planners have recently re-examined the agricultural sector and

agriculture. More stress is beginning to be placed on the development of agricultural based industrial operations that can take advantage of the natural resource endowments and create linkages between the urban and rural sectors. Thus, the development programmes, both those administered by the international agencies and the individual governments, have been designed in such a way as to promote the development of agri-business that will provide a viable domestic food system and a strong export base. The rapid increase in oil import bills makes the development of local export sectors even more important than in the past.<sup>1</sup> These efforts to develop the local agriculture have already met with some success. The world commodity exports amount to over \$225 billion a year, which is equivalent to 15 per cent of the

1. Nake M Kamrang. The Impact of OPEC price increases in the banana industry. *Inter-American Economic Affairs* Winter 1979, 33 (3), p. 47.

third world GNP.<sup>2</sup> This article examines the Central American export-oriented agri-business, a key to economic development by utilising the systems approach.

### Systems Co-ordinating Mechanisms

The systems approach to agri-business grew out of the work by Davis and Goldberg at the Harvard Business School.<sup>3</sup> The systems approach can be used in a descriptive or an analytical manner. As in any system, the critical aspects of the agri-business system are the institutions and arrangements developed by managers and government to control the transfers and exchanges from one component to another within the total complex. The co-ordinating mechanisms that bring the different parts of the system together can be grouped into five areas: ownership forms; marketing arrangements; financial arrangements; public services and investments; and transportation activities.

The ownership mechanisms that are most common are vertical integration, co-operatives and the various forms of joint ventures. The marketing agreements include forward contracts, future markets, long-term contracts, international producer country agreements and bilateral quota agreements. The financial arrangements can take two forms. They can be very passive, merely handling letters of credit, effecting currency transactions, and performing other facilitating functions, or they can be aggressive, bringing together shippers and receivers. The final group of co-ordinating mechanisms comes from the public sector. It consists of government regulatory programmes (for either price or

quality), the activities of regional integration agencies (that commonly lower tariff barriers, or build infrastructure), governmental agricultural development banks and, finally, educational institutions.

### Central American Agricultural Commodities

The Central American agri-business system is composed of individuals and organisations engaged in production or marketing of agricultural commodities. These commodities can be grouped into traditional and non-traditional commodity systems. The traditional commodities, such as bananas, coffee, sugar, cotton and beef cattle, are grown for export. The first three comprise the traditional estate groups, cultivated largely by the multinational fruit companies and the Central American landed gentry, both of whom are well-organised in relation to the world markets. On the other hand, cotton and beef cattle are the domain of venture capital and recently acquired entrepreneurial ability. Correspondingly, they carry a higher return and a higher risk. The non-traditional export crops, which are also high risk, high return operations, are mostly fruit and vegetables, such as fresh pineapples, cucumbers, and melons. Strawberries, artichokes, eggplant and garlic also have good potential to become high risk, high return exports.

Both the traditional and non-traditional export commodity systems have basically the same type of participants. In Central America the participants are usually input suppliers, producers, processors, wholesalers, or exporters. The input suppliers provide labour, seed, fertiliser, farm equip-

2. Nirpalani V H. Commodities: Importance, market power and feasible solution. In 1977 *Proceedings of the Academy of International Business*. Sion Raveed, Yash Puri, Eds. p. 156.
3. Davis J D, Goldberg R A. *A Concept of Agri-business*. Boston, Harvard Business School Division of Research, 1975.

ment and chemicals for the production process. The production is then processed in operations, ranging from simple labour-intensive processes, such as cleaning vegetables for export, to capital-intensive factories that produce coffee solubles. The exporters move goods to the ports of entry in the importing countries, where brokers move them to the wholesalers, then to the retailers and consumers. Of course, one individual or organisation can carry out the function of several participants, thus becoming a co-ordinating mechanism.

The systems approach focuses on examining these co-ordinating mechanisms.

Determining which co-ordinating mechanisms exist to bring each major agricultural product to market, and how extensively they are used, reveals a great deal about the level of development of the agri-business system in a country or group of countries. This analysis not only underscores the level of agricultural development in each country, but highlights the possible bottlenecks in the marketing system as well.

Table 1 lists some of the more important co-ordinating mechanisms used in Central American agriculture. The table also provides the authors' estimates of their level of use in the economic exploitation of

Table 1: Co-ordinating Mechanisms Commodity Systems Activity Matrix in Central America

Co-ordinating Mechanisms/ Commodities	Rice	Cotton	Coffee	Beef	Sugar	Bananas	Fruits and vegetables
1 Vertical integration	0	0	×	×	×	×	+
2 Joint ventures	×	0	×	×	+	0	+
3 Co-operatives	×	×	0	0	+	0	+
4 Forward contracts	0	+	+	×	+	×	0
5 Future markets	0	+	+	×	+	0	0
6 Long-term contracts	×	+	×	×	×	+	×
7 International producer country agreements	0	×	+	0	+	×	0
8 Barter agreements	×	×	×	0	×	0	0
9 Bilateral quota agreements	0	0	×	+	+	0	+
10 Financing from private financial institutions	×	×	×	+	×	+	×
11 Transportation intermediaries	×	×	×	×	×	+	+
12 Government agricultural development programmes	+	+	×	×	0	×	×
13 Government regulatory agencies	×	+	+	+	×	×	0
14 Regional integration agencies	0	0	×	0	0	0	0
15 Public development banks	×	0	×	0	0	0	×
16 Education institutions	×	×	×	+	×	×	×

Note: 0 Little or no activity  
 × Moderate activity  
 + Significant activity

seven major agricultural products of the area.

The rest of the paper provides examples of the use of the co-ordinating mechanisms in Central America. Vertical integration, one of the co-ordinating mechanisms that involve ownership forms, has been used extensively in connection with the traditional exports. Coffee producers have integrated the coffee production process into the processing of coffee into solubles. Sugar mill owners have integrated backward into production to supply part of their milling needs and forward by making rum.<sup>4</sup> The cotton industry has experienced a similar integration.<sup>5</sup> The banana industry has complete integration extending from production to delivery to wholesalers in the US and other industrialised countries.

Among the recent developments has been the gradual integration of Central American beef cattle processors into the US market. One Costa Rican processor has successfully opened his own brokerage firm in the US to overcome the marketing problems.<sup>6</sup> Another recent example of integration back to the source has been a US supermarket company setting up okra farms in Costa Rica. Also, the US companies have integrated into beef production in several Central American countries.<sup>7</sup>

In integrating, some farms have employed the joint venture mechanism. An exceptionally good example of this is the case of the Latin American Agri-business<sup>8</sup>

Development Corporation (LADD). It is a private development bank that funds agri-business projects with special emphasis on those involving non-traditional exports. Using its own capital, which comes from the private investors and AID loans, LADD has taken equity positions and has issued convertible and straight debt in ventures involving traditional exports, such as beef cattle and a number of non-traditional exports, such as flowers. LADD also aids the firms in which it has an interest by providing marketing and other management assistance upon request.

In an effort to obtain more bargaining power for small suppliers or producers operating in export markets, a number of co-operatives have been formed. In El Salvador, the cotton industry has a strong cotton marketing co-operative. In Honduras, a co-operative has been formed to purchase inputs, gin cotton, and sell in international market.<sup>9</sup> It is also found that co-operatives have been particularly successful in carrying out the marketing of Mexican fruits and vegetables supplying the US West Coast market.<sup>9</sup>

The first marketing mechanism to be used extensively in the Central American agri-business for co-ordination was the use of forward contracting. Coffee, bananas, and sugar are often sold forward on thirty to ninety day contracts. Forward contracting in cotton is widely used and has been the focus of great attention in the recent past. Many Central American cotton pro-

4. Austin J, Roman J. *Racho San Antonio*. INCAE, Managua, Nicaragua, 1972.

5. Austin J, Ganitsky G, Atha R, Ross B. *Nota sobre la Industria del Algodon en Nicaragua*, 1971.

6. Hoadley K. *Ganaderia Industrial*, S. A. INCAE, Managua, Nicaragua, 1974.

7. Wenstram, Tom. *Dannenberg Farms*. Harvard Business School, Boston, Massachusetts, 1973.

8. Austin J, Meza G. *Co-operative Algodonera del Sur, Ltd.* INCAE, Managua, Nicaragua, 1972

9. Austin J. *Confederacion de Asociaciones Agricolas del Estado. Sinaloa*, INCAE, Managua, Nicaragua, 1974.

ducers were caught in a cost squeeze with contracts that were made at a relatively low price in 1973. When the world price of cotton doubled, producers were faced with the prospect of losing money by fulfilling contracts or making large sums by not fulfilling them. Many producers failed to carry through their contractual obligations. This had a disastrous effect on the worldwide cotton industry's confidence in Central American producers, and restoration of the order in the industry is still being sought.<sup>10</sup> The Japanese, who especially prize dependability, are very wary of buying cotton from Central America again.

International producer country agreements have been tried as a means to regulate the supply of coffee, bananas and sugar. The coffee producing nations in Central America have participated in the International Coffee Agreement. The experience is that the supply control agreements are not relevant when the price is low. The recent attempt at forming a cartel of banana producing nations did not meet with success. The present efforts to negotiate a 1979-sugar supply control agreement, however, hold some hope for the future, although the results are not yet final.<sup>11</sup>

Bilateral quota agreements have been used frequently in traditional exports. Both Central American beef<sup>12</sup> and sugar<sup>13</sup> have historically been allotted quotas to supply the US and other industrialised countries' markets. A development in non-traditional exports has been the voluntary quotas proposed for Mexican fruit and vegetable pro-

ducers who dominate the US West Coast winter market and thereby threaten the US producers.

Barter agreements, which are an important facet of trade with the Soviet bloc, have not been used extensively in Central America. Costa Rica negotiated a barter agreement with the Soviet Union to supply agricultural products in return for manufactured goods. Also, Nicaraguan cotton has been considered as a barter item for Czechoslovakian farm machinery. However, these cases have been the exception, not the rule in Central America.

Private financial institutions have been important co-ordinating mechanisms in all of the Caribbean countries. Not only have the financial institutions provided the facilitating functions of letters of credit, currency operation, etc, but they have also provided financing and market information to their clientele.

Transportation intermediaries have also been active in all of the industries. A notable example of the transportation industry playing an innovative role was in the case of non-traditional exports. In a direct response to an air marketing seminar put on by the Pan American Airlines in co-operation with USAID, Hondurian melon producers began an export operation to the US.<sup>14</sup>

The final group of co-ordinating mechanisms consists of those stemming from

10. Hoadley K. *El Mercado del Algodon Nicaraguense: Ano Agrícola 1973-74*. INCAE, Managua, Nicaragua, 1974.

11. Valentine John. Sugars price support plan welcomed as end to a key uncertainty. *Wall Street Journal*, Wednesday, Feb. 21, 1971, p. 24.

12. Austin J, Barreros C. *Empacador Centroamericana*. INCAE, Managua, Nicaragua, 1971.

13. Austin J, Roman J, *Op. cit.*

14. Austin J, Meza G. *Exportacion de Melones de Saravia*. INCAE, Managua, Nicaragua, 1972.

public programmes. The governmental agricultural development programmes have been active in many areas, though less active in sugar and bananas. The public development bank's activities have closely followed the agricultural development programmes. The public development banks have been active in cotton, beef-cattle, and particularly in non-traditional exports.

The government regulatory agencies have also been an active co-ordinating a mechanism. In Nicaragua, the standards for the cotton industry are set and regulated by the National Cotton Commission.<sup>15</sup> The governments of the coffee producers are responsible for regulating their country's share of the coffee supply. In Costa Rica, a national commission regulates the amount of beef that can be exported from the country.<sup>16</sup> In Nicaragua, the sugar industry has to meet a domestic quota before it can supply the world markets. Only bananas and non-traditional exports are not subject to regulation.

Regional integration programmes have also played a facilitative, but to date not innovative, role in the Central American agri-business. One of the basic reasons is that the administrative body for the Central American common market has built an infrastructure which has enabled producers of non-traditional exports to reach ports and thus reach the world markets.<sup>17</sup> Also, SIECA has designed programme of agricultural diversification, which will be implemented by the Central American Bank for Regional Integration.<sup>18</sup>

The final public sector co-ordinating mechanism, the educational institutions, has played a limited, but growing role in the Central American agri-business. INCAE has done four years of research on agri-business problems. The Harvard Business School has also related to the Central American agri-business community by conducting marketing research on non-traditional exports. The Central American agriculture schools have provided manpower inputs trained in technical agriculture.

### The Future

In the near future, co-operatives will probably be the most promising of the under-utilised ownership forms employed as co-ordinating mechanisms. By coming into co-operatives small businessmen can take advantage of the economies of scale in production, as well as obtain efficiencies in marketing for export. Moreover, co-operatives are a low-cost investment requiring little fixed capital. Other ownership forms that offer promise in the short run are vertical integration and joint ventures. This is particularly true, because the foothold that they already have can be expanded simply and rapidly.

The expansion of long-term contracting and use of futures markets by the Central American producers will also be an important co-ordinating mechanism in the immediate future. Long-term contracting can serve to remove some of the uncertainties inherent in the international commodity

15. Hoadley K. *El Mercado del Algodon Nicaraguense: Ano Agricola 1973-74*. INCAE, Managua, Nicaragua, 1974.

16. Sengleman, Klaus. *Consejo Nacional de Production*. INCAE, Managua, Nicaragua, 1974.

17. Austin J, Meza G. *Exportation de Melones de Saravia*. INCAE, Managua, Nicaragua, 1972.

18. Norvell, Douglas G. *La Pina como un Cultivo para la Diversificacion de Agricultura en Centro America*. INCAE, Managua, Nicaragua, 1975.

marketing due to communication deficiencies.

In the immediate future, the expansion of marketing agreements will also be important. Supply control agreements between the producer countries have been extremely productive for the OPEC nations. The international business scene will likely to find more of these agreement extended to agricultural products. On the other hand, a barter agreement with the US or other traditional market countries would merely be a diversion from the existing market systems.

In the long run, the public co-ordinating mechanisms will probably make the biggest difference. Efficiency in private industry is in part dependent upon the efficiency in the public institutions. The government agricultural development programmes should provide the technological base and part of the impetus for improvements in the agri-business systems. Regional integration programmes can also facilitate the development of international agri-business in the

area. Besides lowering tariff barriers and building infrastructures which are the traditional activities of common market supervisory bodies, SIECA could be-come an effective market development and supply control mechanism for the Central American producers. It could play a particularly strong role in arranging barter agreements with markets that have not been supplied by Central America in the past.

### Conclusion

The major conclusion to be drawn from this review is that there is a strong and developing export oriented agri-business system in Central America. This system incorporates ownership forms, marketing arrangements, financial agreements, transportation facilities and public institutions. This system requires a great number of co-ordinating mechanisms. Handling all these elements introduces a great number of opportunities as well as many potential problems in running this agri-business system. □