

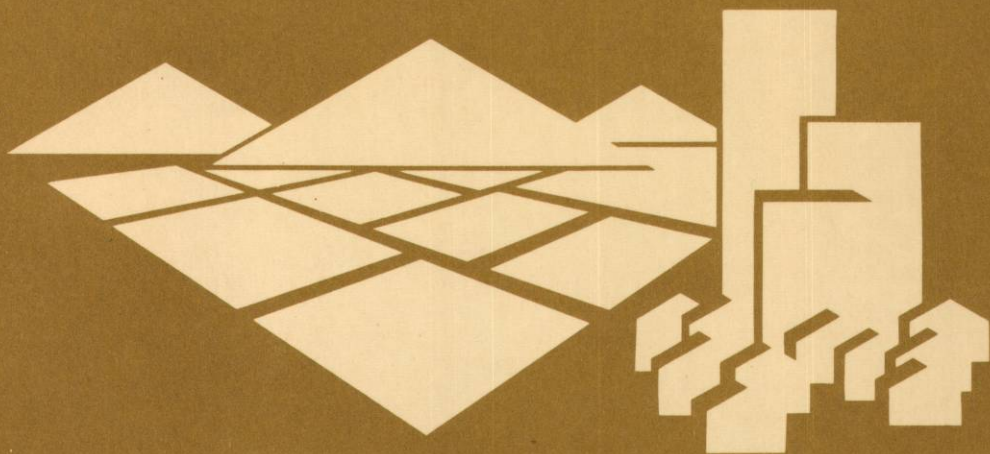


RESEARCH REPORT NO. 4

LATIN AMERICAN STUDIES CENTER Michigan State University

FOOD MARKETING IN THE ECONOMIC DEVELOPMENT OF PUERTO RICO

Harold Riley, Charles Slater, Kelly Harrison, John Wish, John Griggs,
Vincent Farace, Jose Santiago, Idalia Rodriguez



MARKETING IN DEVELOPING COMMUNITIES SERIES

Based upon research conducted by Michigan State University
in cooperation with the University of Puerto Rico and the Department
of Commerce of the Commonwealth of Puerto Rico.

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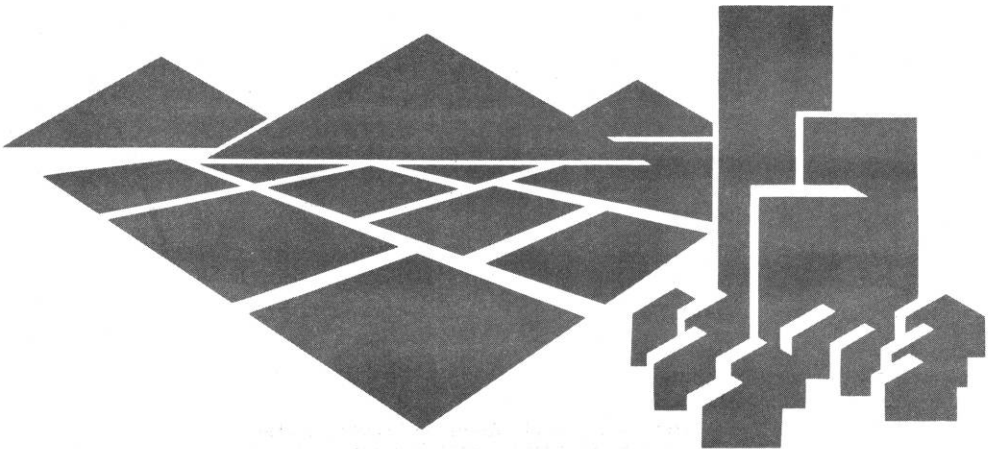


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FOREWORD

This is one of a series of reports on marketing in developing communities that has been published by the Latin American Studies Center at Michigan State University. The other reports in this series are as follows:

Market Processes in the Recife Area of Northeast Brazil

Market Processes in La Paz, Bolivia

Market Coordination in the Development of the Cauca Valley Region -- Colombia

This report on Puerto Rico summarizes the results of the first field study conducted by a Michigan State University group that was organized in 1965 to carry out a contract research program financed by the U.S. Agency for International Development (AID). The Puerto Rican study was the first phase of the contract project, AID/tcr-786, *A Comparative Study of Food Marketing Systems in Selected Latin American Countries*. This project had two interrelated goals: 1) to provide developing countries with information to assist in the design of improved food marketing systems; and 2) to formulate a more adequate conceptualization of the role of marketing in the development process. In 1966, a second AID contract (1a-364) created the Latin American Market Planning Center (LAMP) at Michigan State University and expanded the scope of the program to include not only food marketing but also the marketing of technical farm inputs and industrially produced consumer goods. The Northeast Brazil and Bolivian studies were conducted in 1966-68 and the Colombian study in 1968-70.

At the conclusion of the Puerto Rican field study in 1966, seminars were held in San Juan to review the research results with officials from Puerto Rican agencies and AID, and with representatives from business and academic institutions. A seminar report was published and three doctoral theses were prepared and made available to AID and the cooperating Puerto Rican agencies. This final report represents a more detailed re-evaluation of the Puerto Rican experience after having conducted three other country studies.

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The Directors of this study are deeply appreciative of the assistance and cooperation received from many agencies and individuals in Puerto Rico. Dr. Carlos Lastra, Secretary of the Department of Commerce, and Dr. Rafael de Jesus Toro, Head of the Social Science Research Center of the University of Puerto Rico, were instrumental in bringing the project to Puerto Rico. Both agencies pledged financial support and sponsorship for the study. Dr. Lastra was succeeded by Dr. Jenaro Baquero who, with the assistance of Dr. Nicolas Hernandez, followed through with the project agreement. Dr. Toro administered the agreement which linked the Michigan State University research team with the Social Science Research Center and the Department of Commerce. Less formal but significant support was provided by the University of Puerto Rico Agricultural Experiment Station directed by Dr. M. A. Lugo and the Agricultural Extension Service directed by Dr. Robert Huyke. These agencies provided experienced extension agents to conduct farm interviews and the use of computer facilities for preliminary data analysis. Dr. Salvador Alemany of the University of Puerto Rico, College of Agriculture at Mayaguez was extremely helpful with the relationships involving both the Agricultural Experiment Station and the Extension Service. Mr. Ruben Vilches, Director of the Bureau of Labor Statistics, provided data from household expenditure surveys and technical assistance of his staff in drawing our probability samples of households which were surveyed in San Juan and Mayaguez. Department of Agriculture officials including Pedro Negron, Antonio González-Chapel, Omar Muñoz, Fernando Valls, and Raul Tous, provided us with data, background information and reports on their marketing activities. The Department of Economic Planning made available their newly developed input-output model of the Puerto Rican economy and related data which were then used in developing a more dynamic simulation model. Dr. Jose Herrero of the Department of Economics at the University of Puerto Rico, assisted with the model development task.

We are especially appreciative of the full-time services of Jose Santiago R. and Idalia Rodriguez of the Department of Commerce who ably served as members of our research team. We are also grateful for excellent assistance from three University of Puerto Rico students -- Mario Aponte, Perfecto Santana and Luis Davis and an Agricultural Extension Agent -- José González Casillas -- who worked part-time with our research team.

Space does not permit adequate acknowledgement of the excellent cooperation which our project received from government officials, educators, businessmen and consumers who willingly provided information for this study. However, special appreciation must be expressed to Donald Lemon and Lee Feller both of whom were extremely helpful in our efforts to document and evaluate the Economic Development Administration's Food Distribution Program.

The Directors wish to acknowledge the participation of other Michigan State University faculty in the Puerto Rican operation. Dr. John McNelly, Department of Communication, assisted in the early planning phases prior to his departure for the University of Wisconsin. Dr. James Shaffer, Department of Agricultural Economics, participated in the planning of the field research and in the interpretation of the results; Dr. Vincent Farace, Department of Communication, assisted with data analysis and report writing after the field research was completed; Dr. Herman Koenig, Department of Systems Science, was a valuable consultant on the development of the systems model.

Much of the responsibility for carrying out the field studies was shared by John Wish and Kelly Harrison who resided in Puerto Rico and who later prepared their doctoral dissertations from project materials. John Griggs also prepared a doctoral dissertation using project data. Sam Volard, Al Wilson, David Lindley were graduate students who assisted with some of the data analysis tasks.

As indicated in the Foreword, the major resources for this study were provided by the U.S. Agency for International Development, the Puerto Rican Department of Commerce and the University of Puerto Rico. In addition, the Midwest Universities Consortium provided supplemental support for the preparation of this research report. Earlier, the MSU Latin American Studies Center provided a small grant which assisted the Directors in the preliminary work that lead to the research program of which this Puerto Rican study was a part.

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July, 1970

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CHAPTER 1
INTRODUCTION
The Problem

Since World War II, there has been a surge of interest in accelerating the development of the poorer countries. During this period, there has been a continual evolution in professional views on the development process and means of inducing more rapid growth. Several development strategies have been advanced, some placing emphasis on industrialization, others on agriculture, education, or infrastructural build-up. Recently there seems to be greater acceptance of more balanced and comprehensive approaches to development which recognize the interrelatedness of the various sectors, such as agriculture and industry.¹

The argument for balanced growth strategies stresses the mutual interdependence of the agricultural and industrial sectors.² Increases in agricultural output frequently require the widespread adoption of modern technologies. These modern technologies involve the purchase and use of industrial products, such as fertilizers, pesticides, tools, and machines. Unless these industrially produced inputs are available at reasonable prices in the rural trading centers, farmers will be unable to modernize their operations. On the other hand, industrial employment in urban centers is necessary to generate the consumer income needed to purchase increased agricultural output.

In some Latin American countries there are high rates of urban unemployment and serious problems with inflation. This is symptomatic of sectoral distortions and, in most instances, it appears that inadequate coordination of the agricultural and industrial sectors has contributed to these conditions.

Walt W. Rostow has proposed a national market integration strategy to break down the structural distortions between rural and urban areas of developing countries and to create a self-reinforcing agricultural and industrial expansion. He identifies four tasks that should be carried out simultaneously:

¹See L.W. Witt, "Role of Agriculture in Economic Development -- A Review," *Journal of Farm Economics*, February 1965, pp. 120-31; Max F. Millikan and David Hapgood, *No Easy Harvest*, Little Brown and Company, Boston, 1967; A.T. Mosher, *Getting Agriculture Moving*, Praeger, New York, 1966; The President's Science Advisory Committee, *The World Food Problem*, Vol. II, The White House, 1967; H.M. Southworth and B.F. Johnston, *Agricultural Development and Economic Growth*, Cornell University Press, 1967.

²Millikan and Hapgood, *loc. cit.*, Chapter 1. See also Hla Myint, *The Economics of the Developing Countries*, Praeger, New York, 1964, p. 136.

1. A build-up of agricultural productivity.
2. A revolution in the marketing of agricultural products.
3. A shift in industry to the production of simple agricultural equipment and cheap consumer goods for the mass market.
4. A revolution in the marketing of manufactured goods, especially in the rural areas.³

Given this beginning outline for a comprehensive approach to agricultural and industrial development, there are many specific problems which must be resolved if marketing improvement programs are to be devised and implemented. The Michigan State University-USAID research program reported in this publication examined the role of marketing in the development of Puerto Rico, with the objective of developing more empirically based and theoretically sound strategies for market improvements. Other publications report on marketing systems serving Recife, Brazil; La Paz, Bolivia and Cali, Colombia. All of these studies were focused on the role of food marketing in economic development. However, in Brazil and Colombia all four of Rostow's tasks were considered.

The emphasis on food marketing seems justified by the high proportion of incomes spent on food by urban households in the poorer countries. Furthermore, in most of the less developed countries, more than one-half of the population is engaged in agriculture. Hence, improvements in food marketing, which could lower costs to consumers, increase the amount, quality and variety of food available, and raise farm income, would have widespread effects on human welfare.

The purpose of the study in Puerto Rico is further elaborated as part of the research plan described in the last section of this chapter. We turn now to a review of the theoretical concepts and disciplinary viewpoints we found useful inputs to our thinking during this study.

Towards a Theory of Marketing's Role in Economic Development

Since the days of Adam Smith, economists have been concerned about the causes of economic growth. Recently, scholars from other disciplines and applied academic fields have been active participants in the complex task of explaining and fostering economic development. Considerable empirical research and theorizing have taken place on problems related to development. However,

³Walt W. Rostow, *View from the Seventh Floor*, Harper and Row, New York, 1964, p. 136.

within each of the specialized areas of study, there is a strong and justifiable tendency to emphasize a particular disciplinary viewpoint; e.g., economists have tended to ignore social variables as determinants of development, while other social scientists have tended to ignore the economic variables in development.

In this study we have made at least a partial effort to identify and apply the theories and viewpoints of different academic disciplines. Staff members from the Department of Marketing and Agricultural Economics shared a common background of training in economics, although there were significant differences in viewpoints on some aspects of application to marketing problems. Other staff from the Department of Communication came with a background in the role of communication and information in maintaining or changing social systems, and in the application of social science, knowledge and techniques to the processes of modernization. Other project personnel brought specialized skills in mathematical modeling and systems analysis to enable us to conceptualize and make empirical estimates of important interactions within the production-marketing system.

Some of the theories and disciplinary viewpoints shared by the research group are summarized below. However, the systems analysis discussion will be found later in another chapter.

Economic Theories and Viewpoints

Adam Smith

An early attempt at a systematic description of the economic growth process was made by Adam Smith in his famous work, *An Inquiry into the Nature and Causes of the Wealth of Nations*.⁴

Smith believed that, within a society organized around the *laissez faire* principle, the key to increased productivity was division of labor. He felt that greater division of labor and specialization lead "(1) to an increase in dexterity among workers; (2) to a reduction in the time necessary to produce commodities; and (3) to the invention of better machines and equipment."⁵

Smith believed that the initial impetus toward specialization among men was a natural tendency "to truck, barter, and exchange one thing for another."⁶

⁴Gerald M. Meier and Robert E. Baldwin, *Economic Development Theory, History, Policy* (New York: John Wiley and Sons, Inc., 1957), p. 21.

⁵Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations*, ed. Edwin Cannan (New York: The Modern Library, Random House, 1937).

⁶*Ibid.*, p. 13.

However, a pre-condition to specialization was some minimum accumulation of capital. Although Smith is not clear as to the method of this accumulation process, he does point out that an agricultural surplus is necessary to start the development process:

When by the improvement and cultivation of land the labor of one family can provide food for two, the labor of half the society becomes sufficient to provide food for the whole. The other half, therefore, or at least the greater part of them, can be employed in providing other things, or in satisfying other wants and fancies of mankind.⁷

According to Smith, accelerated development could occur only as capitalists were willing to save and invest in new and improved methods of production. Their investments yielded jobs for the surplus workers from the agricultural sector. He emphasized that the propensity to save was an important determinant of development:

Parsimony, and not industry, is the immediate cause of the increase of capital. Industry, indeed, provides the subject which parsimony accumulates. But whatever industry might acquire, if parsimony did not save and store up, the capital would never be greater.⁸

He warned that economic development may be limited not only by the slow rate of capital accumulation, but also by the size of the market. He argued that if the market is very small, the principle of division of labor cannot be carried to its fruition and productivity gains will be limited.

Neo-Classical Modifications

Adam Smith and his followers emphasized the importance of economic specialization, accompanied by increasing capital savings for investment in improved production techniques. Capitalists were assumed to be the only source of capital savings.

Alfred Marshall and others modified the classicists' theory of capital accumulation by redefining the role of investors and savers. Contrary to classical views, investors and savers did not have to be the same persons. The capital market was the institutional arrangement facilitating the flow of savings into productive investment.

Under the neo-classical model, economic development was viewed as a gradual, harmonious process whereby all groups would eventually reap the benefits of growth. Marshall's concept of "external" economies illustrates the ways in which investments by one entrepreneur may eventually benefit others.

⁷*Ibid.*, p. 163.

⁸*Ibid.*, p. 321.

Schumpeter's Theory of Disharmonious Growth

In his book *The Theory of Economic Development* J.A. Schumpeter rejected the classical and neo-classical belief that economic growth is usually a gradual harmonious process. He argues that real economic advances come in leaps and spurts as a result of "great innovations". Consequently, he placed a great deal of emphasis on the entrepreneur as the central figure in the development process:

He is the one who undertakes new combinations of the factors of production. Innovations may occur in the following forms: (1) the introduction of a new good; (2) the use of a new method of production; (3) the opening of a new market; (4) the conquest of a new source of raw material supply; and (5) the reorganization of any industry.⁹

Schumpeter argued that businessmen can seldom evaluate the economic risks in their environment or readily compare the rate of return to the interest rate in order to make investment decisions. In Schumpeter's view of economic reality, "a high degree of risk and uncertainty exists."¹⁰ The entrepreneur, then, is the particular type of individual who is willing to operate in an uncertain environment and make innovations successful. It is this kind of environment which leads Schumpeter to conclude that great spurts of development, while requiring capital accumulation, are centered around and ignited by significant economic innovations. Some of his ideas have been supplanted by later economists, but his emphasis on the "entrepreneur" and on the importance of innovations as the agent of economic growth, continue to receive a great deal of attention. In later sections of this chapter we will examine more closely some of the current thinking on entrepreneurial development and the spread and utilization of innovations.

Keynesian and Post-Keynesian Contributions

In 1936, John Maynard Keynes stimulated a revolution in the economic theory of income and employment. He sought to explain the causes of (and remedies for) the great economic depression which then gripped the developed nations.

Keynes pointed out that unemployment and economic stagnation could be an equilibrium condition in a capitalistic economy. Two factors were pinpointed as the cause of this equilibrium at less than full employment: (1) the investor's perception of the relationship between the cost of capital (interest rate) and the probable return to investment could make him unwilling to provide

⁹Meier and Baldwin, p. 87.

¹⁰*Ibid.*, p. 87.

productive investments in an amount sufficient to insure full employment; and (2) if the economy's interest rate fell below some minimum level, the demand for money would cause many persons to hold cash rather than purchase securities at a low return. Either condition could create a shortage of investment which prevents full employment. A continuation of a low propensity to invest would lead to idle plant capacity, greater unemployment and less consumption. Therefore, a lack of effective demand was postulated as a main factor preventing full employment. Keynes argued that the only way to alleviate the problem was through heavy government spending with deficit financing. Such spending would provide additional employment and foster confidence in the economic future, which would in turn encourage private investment. This cycle would lead to greater employment and greater income.

Most development economists now argue that even though Keynes' analysis has considerable appeal in more developed economies, his solution is not directly applicable to countries in the early stages of development. These economists argue that even though low income, low employment, and low investment are the same conditions postulated by Keynes, his remedies do not apply in less developing nations, because:

unemployment, though extensive, is usually confined to unskilled workers. In addition, excess capacity prevails only in particular industries and sectors. Because of shortages and bottlenecks elsewhere, deficit financing is most likely to result in a rise in the price level without any increase in real output.¹¹

However, some economists are now arguing that Keynesian analysis can and should be used to a much greater extent in diagnosing and treating the development problems of the poor nations. Two main proponents of this viewpoint are Ensey Domar and R.F. Harrod. Working separately, these two economists developed similar economic growth models based upon Keynesian theory. Their major contribution is in viewing capital accumulation in a dual role: investment generates income and also increases the productive capacity of the economy by increasing its capital stock. Harrod and Domar were concerned with determining the conditions required for smooth growth in real income.¹² Even though their growth model was designed for developed economies, it has been widely used for forecasting growth rates and determining savings rates for income growth targets in developing nations.

¹¹ *Ibid.*, p. 42.

¹² R. Harrod, *Towards a Dynamic Economics* (London: Macmillan and Company, Ltd., 1948), and E. Domar, "Expansion and Employment," *American Economics Review*, March, 1947.

Economic Features of Developing Economies

A review of current research studies in developing nations provides a preliminary diagnosis of conditions which partially explain the low levels of economic performance. These conditions include the following:

Atomistic competition is present in most aspects of commodity production and marketing in developing nations. On the other hand, factor ownership is frequently concentrated in the hands of relatively few. In some cases, large land holdings create a feudalistic economic structure. A heavy concentration of capital holdings in the hands of few wealthy families is also a common occurrence. Nevertheless, the domestic food production and distribution sector is usually made up of large numbers of business units competing atomistically.

Low consumer per capita incomes are a characteristic of all developing nations, by definition. In fact, the most frequently expressed goal of economic growth is to increase per capita incomes.

Low absolute levels of labor productivity are evident in virtually all underdeveloped nations. Some economists argue that the marginal productivity of certain workers is negligible, especially in the agriculture and trade sectors. If such were the case, these workers would be withdrawn from their jobs without affecting total output. The issue of zero marginal productivity is being debated, but most economists agree that low labor productivity is a widespread condition in underdevelopment.

Underemployment of economic resources is a frequently cited condition in developing nations. Here the reference is to all factors of production, including land, labor, capital, and management. The argument states that, for a variety of reasons, entrepreneurs do not utilize an optimum combination of resources in production of goods and services, *i.e.*, existing factors of production could be re-allocated to increase total output. Schultz,¹³ Welsch,¹⁴ and Coffey,¹⁵ have argued (on the basis of research in various aspects of traditional agriculture in four different countries) that there was relatively little or no inefficiency in the allocation of available resources for farming. Their explanation for low productivity was the lack of availability and use of more productive techniques. However, these studies were only meant to examine resource allocation within the agricultural sector. They did not consider the

¹³T.W. Schultz, *Transforming Traditional Agriculture*, New Haven: Yale University Press, 1964.

¹⁴Delane E. Welsch, "The Rice Industry in the Abakaliki Area of Eastern Nigeria, 1964" (unpublished Ph.D. dissertation, Department of Agricultural Economics, Michigan State University, 1964).

¹⁵Joseph D. Coffey, *Transforming Peru's Traditional Agriculture* (unpublished Ph.D. dissertation, North Carolina State University, 1966).

possibility of total resource allocation in the economy. The possibility still exists that certain resources (capital) should be transferred into agriculture with labor being removed to other, more productive uses.

Capital deficiencies are regarded by most economists as the single most critical problem in the underdeveloped world. Adam Smith stressed the importance of saving for investment in improved production techniques. And the emphasis on capital has continued through current writings on development economics. The reality of existing capital shortages in developing nations coupled with the existence of atomistic competition suggest that capital formation in the private sector is inhibited by a low level of equity capital prevailing in business units and the resultant low absolute returns to each individual firm. Capital accumulation for investment in productive innovations is difficult for such business units, because of the necessity of using a high percentage of the low absolute returns for family survival. For the typical businessman, capital savings for a specific investment is slow and seemingly hopeless.

Unused productive capacity is frequently a problem in spite of the previously mentioned shortage of equity capital in developing nations. The situation arises as a result of a basic misallocation of resources. Hence, if an inordinate amount of capital (in relation to other industries) has been allocated to the production of a given commodity, then the capital equipment will not be used to its capacity, since consumer demand will not be sufficient. A preoccupation with large capital-intensive industrial development projects has often resulted in a poor allocation of productive resources in the light of effective consumer demand.

Coordination of Economic Activity

In any economic system where there is specialization in production, there must be institutional arrangements to determine *who* will produce, what *products* will be produced, what *resources* will be used, *where* products will be produced, who will *consume* them. The *exchange system* is the basic institution for coordinating the production-distribution process.

By definition, the exchange system is that subset of the social system governing transactions between individuals and groups which result in the exchange of property rights.¹⁶ Exchange rules define the content of property rights.

¹⁶Allen Schmid and James Shaffer, "Marketing in Social Perspective," Chapter 2 in *Agricultural Market Analysis*, edited by Vernon Sorenson, Bureau of Business and Economic Research, Michigan State University, East Lansing, 1964.

The *marketing system* is defined to include the *exchange system* and the *physical distribution system*. The latter consists of the institutions and physical facilities involved in the physical movement of goods over time and through space, and in the physical transformation of products through processing activities. When applied to the food industry, it is argued that *marketing* does not begin at the farm gate and end with the consumer purchase. Rather, it is involved in decision-making activities at *all* stages of production, processing, distribution and consumption.

Market Coordination may be defined as the complex and dynamic process by which producers, distributors and consumers interact by exchanging relevant information, establishing conditions of exchange and accomplishing the physical and legal exchange of economic goods.¹⁷

There are at least three basic organizational models for exchange systems. They are:

1. Status exchange
2. Administrative exchange
3. Bargained exchange¹⁸

In most societies, all three models are likely to be employed, but the relative importance of each type of exchange system varies with the cultural, political, and economic environment.

In a status exchange system, transactions tend to be governed by social custom. Tribal systems of production and distribution utilize this exchange principle. Gift-giving is another example of status exchange which occurs in all societies.

An administrative exchange system is one where transactions are governed by political authority. The most extreme form would be a centrally controlled economy where exchange rates and products flows are set by government officials. Almost all societies have some transactions affected by administration.

The bargained exchange system is one in which transactions are governed primarily by a set of impersonal rules, within which exchange rates are established by a bargaining process. Individuals in the system are coordinated by market price and the related informational flows. Theoretically, this is a self-regulating system; but in practice, market participants usually establish social rules and regulations to constrain individual behavior. Market rules may become established through custom and tradition or formalized

¹⁷Kelly Harrison, *Agricultural Market Coordination in the Economic Development of Puerto Rico*, (unpublished Ph.D. dissertation, Michigan State University, 1966).

¹⁸*Ibid.*, Schmid and Shaffer.

into the political-legal system. Thus, exchange systems become firmly imbedded in the social, cultural, and political framework of bargained exchange economies.

Classical economic theorists conceptualized an abstract model of a "perfect market" to demonstrate the workings of a bargained exchange system.¹⁹ Although useful for explaining some aspects of adjustments in a market economy, most of the dynamic aspects of economic growth were assumed to be exogenous to the system. For example, changes in consumer preferences, the development of new production technologies, and market rule changes are not explained within the system. In attempting to understand the role of marketing in the economic growth process, it has been necessary to seek theoretical concepts which deal more directly with the process of economic and social change. Some of these concepts are described next in this chapter.

Other Social Science Theories and Viewpoints

Modernization and Economic Development

One of the important ingredients in the economic development, as described by the economist Max Millikan, is that producers, consumers, and other market participants, must shed many of their traditional ways of thinking and acting and adopt the knowledge, attitudes, and behaviors consonant with the aims of development.²⁰ For example, new occupational skills, and the knowledge these require, must be acquired as new demands and opportunities confront the labor force. Passive acceptance of the *status quo* must be replaced by yearnings and desires for a better life, and the willingness to work harder to achieve these goals. Apathy must yield to a motivation to strive and to achieve. More favorable attitudes toward mutual assistance and cooperation must be fostered to enable joint attacks on problems larger than an individual can hope to conquer alone. New perceptions and evaluations of economic opportunities, and the risks and rewards they imply, must replace reliance on tradition only. And in some cases, the risks and rewards themselves will need to be changed.

The study of personality variables and their relationships to economic development is termed *modernization*. No value judgment is implied by the term (e.g., "more modern" is not be equated with "better"); rather it is the analysis of socio-psychological variables which facilitate or hinder the evolution of an increasingly complex, technologically sophisticated society, a society whose members are capable of performing the tasks demanded by industrialization and who show the initiative and entrepreneurial drive which contribute to sustained levels of economic growth.

¹⁹For a description of this market concept, see Richard H. Leftwich, *The Price System and Resource Allocation*, Holt, Rinehart and Winston, 1960.

²⁰Max Millikan and Donald Blackmer, *The Emerging Nations*, Boston: Little Brown, Inc., New York, 1961.

One issue raised in the literature on this topic is whether economic incentives are sufficient to overcome factors inhibiting modernization characteristics, or whether "more modern" persons are needed *before* economic progress can be realized. Economic development is commonly viewed as an on-going process; any society has at least some members who are relatively more modern than are others at a given point in time, and who are potentially more receptive to economic development programs. Thus, economic and modernization variables are *interactive over time*; e.g., increments in income may lead to greater desire and striving for economic returns, or greater work efforts may lead ultimately to greater per capita income. This incremental or "spiraling" phenomenon does not give the role of *cause* to one set of variables and *effect* to another; instead, they are interactive. The key point, however, is that neither economic nor psychological factors can become significantly at odds with each other without hampering economic progress.

What are the major characteristics of the very traditional person? E.g., the typical rural farmer, atomistic urban retailers, rural food assemblers, etc.? Rogers' summary and synthesis points out they tend to:

1. Show a high degree of mistrust in their relations with other persons.
2. View the world as containing a very finite, limited amount of "good", such that betterment of any one individual by definition means that others are worse off.
3. Be hostile toward government authority and its programs, even while being dependent on the government to solve major problems, such as roads, health, or employment.
4. Be oriented primarily toward the nuclear family and view it as the logical organizational unit for fending off the hostile world.
5. Lack innovativeness and conversely rely on tradition to guide them in problem solving.
6. Be fatalistic; *i.e.*, believe that their life is completely determined by powerful forces which are well beyond their ability to control or even understand.
7. Possess low aspirations toward a better life, particularly one with material improvements such as nutrition, housing and education.
8. Prefer not to delay gratifying their desires if the opportunity arises; hence, the notion of savings for future greater return is alien to them.

9. Possess a very limited view of the world; their horizons and thoughts are restricted to their immediate environment.
10. Lack in empathy, the ability to understand and operate in social roles which are not directly a part of their daily life.²¹

However, there are a number of forces at work in developing societies which serve to shift persons away from these positions. One major influence is the mass media of communication, which literally "brings the outside world" to the traditional peasant. Through the media he learns much more intimately of the economic features of the larger society, of the life-style of urban areas, or the rich and powerful, of the "haves" in the world. Most research indicates that the main effect of exposure to mass media messages is to raise an individual's aspirations; with this increase typically comes a greater striving for achievement. The media provide a psychological "anchor point" by which the individual can compare what he *has* to what he *wants*. Furthermore, he can learn *where* his desires can be satisfied, and also learn something about *what* he must do in order to satisfy them.

The other type of communication activities which have promodernization consequence are contacts with other persons, especially extension agents, teachers, certain religious workers and other "change agents". These persons may come to the individual, or he may travel to urban centers to experience direct contact with different life-styles. The effects of such direct contacts are apparently much deeper and more extensive than are effects yielded by the mass media.²² Rao makes the obvious point that the presence of a road is apparently a necessary condition for extensive contact with urban areas, and that individuals with higher degrees of modernization are much more prevalent near such roads than removed from them.²³

Research in developing countries on modernization variables suggests many regular and profound changes "go together" in what Lerner calls "the transition to a modern, participant life-style."²⁴ One of the most central changes is the development of the skill of literacy. Literacy has been defined in various

²¹Rogers, E.M. *Peasant Modernization: The Impact of Communication*, New York: Holt, Rinehart and Winston, 1968, Chapter 2.

²²Some writers feel that the mass media serve an easing or *transitional* function by preparing the individual for a full-fledged, often bewildering, entry into urban centers. In this way negative outcomes of initial contacts with urbanity are minimized.

²³Rao, Y.V.L.K., *Communication and Development: A Study of Two Indian Villages* (Stanford: Stanford University Press, 1966).

²⁴Daniel Lerner, *The Passing of Traditional Society* (Glencoe: Free Press, 1958).

ways, but one of the most useful is "the degree of reading and writing ability sufficient to meet the demands of the social system". This allows the exact *level* of literacy to be pegged to a specific social system (e.g., a factory vs. agricultural production) and hence, to pinpoint the level of resources required to meet the literacy requirements. In any event, literacy is fundamentally important to the economic system as a means of shifting it from an oral communication system to a "print" system where the individual can preserve the information he needs to function in an economically sensible fashion. The skill of literacy enables him to break down complicated instructions into smaller units, return to the instructions and refresh his memory whenever necessary, etc.

Another primary ingredient of modernity is the achievement orientation of the individual.²⁵ This variable acts as a motivating influence which drives the individual on to greater performance; possession of higher achievement levels is a commonly reported finding where levels of media exposure and direct contact with a variety of "modern world" experiences are also relatively high. As might be expected, high achievement orientation tends to be associated with innovativeness and a willingness to take somewhat greater risks -- both characteristics which imply seeking rewards which, although higher than those to be found in "safe" courses of action, also *carry the risk* of relatively high losses.

Achievement motivation among farmers has been found to relate closely to a number of economic measures, such as farm acreage and labor intensity, the ownership of land and the desire to gain more land, levels of productivity, and general levels of living.²⁶

The concept of risk-taking is tied closely to the broader modernization concept. Persons who are willing to take higher risks, not blindly out of desperation but in a calculated manner on the basis of the best available evidence, stand a much greater chance of efficiently utilizing the economic incentives available to them.

The Diffusion of Innovations in Economic Development

Earlier in this chapter, the prominence Schumpeter gave to the role of innovation in economic growth was pointed out. To Schumpeter, "innovations"

²⁵Hagen, an economist, presents the argument that achievement orientation is a learned ability, fostered in families where the father has lost the status and respect once afforded by the larger society. The children are, in effect, encouraged to "get out there and fight." See E.E. Hagen, *On the Theory of Social Change* (Illinois: Dorsey Press, 1962).

²⁶Rogers, *op.cit.*, Chapter 11.

included: (1) the construction of new plants and equipment; (2) the emergence of entirely new firms and industries; and (3) the evolution of new types of persons who conducted economic activities. Other economists have stressed the importance of a continual flow of innovations throughout the economic sector of a society; without such a flow, the economy would continue to react in its traditional fashion even if external or internal forces were altered.

In many developing societies, the first step toward economic growth involves the building of a development program, financed from within the country or from external sources. Once the political leaders and economists have set up the program, typically it involves the dissemination of some new idea or practice to the selected audiences; e.g., innovations such as new seeds, fertilizers, and other agricultural inputs, credit programs, industrial equipment, market information systems, etc.²⁷ Yet without widespread *awareness* of these innovations, their *acceptance*, and their efficient *utilization* by the relevant public, little impact on the economic sector is possible. Thus, one of the key elements in achieving economic growth is the process of generating, diffusing, and fostering the acceptance of innovations.

There are four steps which can be distinguished in the process by which innovations are generated. First, some problem must be perceived, such as the need for a type of seed which will give greater yield for the same amount of inputs. Second, the potentially relevant "ingredients" to a successful problem solution must be assembled. These can include special intellectual competencies, machinery, and bits and pieces of currently used practices. Third, alternative solutions must be devised and evaluated on a preliminary basis. Finally, the most promising solution must be evaluated on a large-scale basis and made ready for wide dissemination.²⁸

Many of the innovations introduced in developing societies originate from institutions in more developed countries. Often, more developed countries (typically located in temperate climates) do not possess innovations which can be directly transferred to tropical developing countries. Hence, a fairly rigorous program of experimentation is usually necessary in order to assure the success of the innovation in its new setting. The development of research and experimental stations located within less developed societies offers a major opportunity to generate and select innovations from the actual socio-economic system in which they will be used.

²⁷A broad definition of an innovation is "anything perceived as new by a member of a particular social system." See E.M. Rogers, *The Diffusion of Innovations* (Glencoe: Free Press, 1962), p. 159.

²⁸See A.P. Usher, *A History of Mechanical Inventions* (Cambridge: Harvard University Press, 1954).

Research in the United States has begun to explore the process of innovation generation in industrial settings. Large firms in industries are often considered the most likely to generate innovations, because the costs of developing innovations are often quite high. This further requires a scale of innovation research large enough so that a few failures cannot eliminate the program or the sponsoring firm. Also, large firms are more likely to be able to reap the benefits from their innovations due to their penetration and control of the market. However, as Mansfield indicates, there seems to be little corroborative evidence on this point.²⁹

From an economic viewpoint, the relevant question is "How do innovations affect the overall productivity and resource allocation of an economy?" This obviously depends on the nature of the innovation and the success it has in coping with the problem it is intended to handle. For example, if modern packaging techniques reduce spoilage by some (known) percent, yet do not recover the costs of employing them, the innovation makes no net contribution to the operation of those firms. It could, however, make a contribution to the economy if food is short and alternative methods of getting more food cost more. However, if a seed raises productivity beyond the cost of using it, then the innovation can be considered successful, from the producer's immediate viewpoint as well as that of the economy.

Once innovations have been selected, attention shifts to the process by which they spread, or diffuse, among the relevant units in a social system. Customarily, there are three steps in describing this sequence. First, the population of units relevant to the innovation is established (at least conceptually) and the individual units within it are identified. If the innovation is a new cotton seed, for example, then the relevant population might be cotton producers in a certain geographic region--not just all producers in that area. Once the population has been defined, the second step is to ferret out which of the units adopted the innovation, and when it was adopted. This search usually reveals that adoption has been far from complete, and hence it becomes necessary to take the third step--to ascertain the variables which facilitate and retard the diffusion process.

Research on the diffusion of innovations among agricultural producers indicates that typically, the innovation is accepted slowly at first. Then, more and more farmers adopt the practice; *i.e.*, the rate of adoption increases rapidly. Near the close of the adoption process, the rate of adoption begins to decline until relatively few new adopters come into being. This has been described as the "S" shaped curve of the normal distribution.³⁰

²⁹E. Mansfield, "Size of Firm, Market Structure, and Innovation," *Journal of Political Economy*, Vol. 21 (1966), pp. 556-576.

³⁰Rogers, *op.cit.*, p. 159.

In the limited research on diffusion in industrial settings, the suggestion is that an analogous curve of innovation adoption takes place. Mansfield's study of the coal, iron and railroad industries reports a "bandwagon" effect: the greater the proportion of firms adopting an innovation at one time period, the relatively *greater* proportion adopt it at a later time period.³¹ Shen describes the diffusion process as:

. . . a 'trickling down' process. Plants tend to follow the footpath of another, slightly more advanced technologically, while the leading plant probes into the unknown and comes up with marginal innovations.³²

Empirical research on the diffusion of innovations has largely focused on the reception to new ideas and practices afforded by agricultural producers, both in the U.S. and in developing countries as well. A bibliography of some 1,250 studies in the field indicates that agricultural producers have served as the respondents of interest in an overwhelming majority of investigations.³³ Almost no studies have dealt with innovations, their diffusion, or innovators in the marketing or exchange sectors of economies, particularly in research settings outside the United States.

Innovators are persons who are relatively early among members of their social system to adopt a new idea or practice.³⁴ Summaries of the characteristics of innovators (primarily in the agricultural setting) report several common findings about them.³⁵ Persons who are early to adopt innovations are more likely to own larger farms and to have a higher level of personal wealth. They come into contact more with various change agents, *e.g.*, extension workers, and use these change agents as sources of information about innovations. Innovators travel more to other villages and to urban centers, thus exposing themselves more directly to a variety of modern experiences. The mass media of communication entertain and inform them more often; innovators are more likely to possess the skill of literacy and, thus, be able to use print materials for economic information as well as other purposes. The personality of innovators

³¹E. Mansfield, "Technical Change and the Rate of Imitation," *Econometrica*, Vol. 29 (October, 1961), pp. 741-766.

³²T.Y. Shen, "Innovation, Diffusion, and Productivity Changes," *Review of Economics and Statistics*, Vol. 43 (1961), p. 171.

³³Half of these studies have been conducted by rural sociologists; other major contributors are from the fields of education and communication. See E.M. Rogers, *Bibliography on the Diffusion of Innovations*, Research Report No. 6, Department of Communication, Michigan State University, July, 1967.

³⁴*Ibid.*, p. i.

³⁵See Rogers, E.M., *op.cit.*

is more likely to include strong desires for higher occupational status, further education, and more achievement in general. If the community in which they dwell tends to be favorable toward innovations, then innovators are apt to be leaders on opinion topics; if the dominant value of the community opposes innovation, the innovator is likely to stand out as a more economically successful "deviant."

The innovators located in the marketing sector of the economic system tend to be persons who are relatively more advanced on the various attributes of modernity--such as relatively greater economic success, exposure to the mass media of communication, and modern, achievement-oriented personality attributes. Such persons would be "key" respondents to attempts to introduce output-increasing innovations into an economic system. Furthermore, they should be the individuals most likely to perceive the barriers operating in the market sector, and to break through these barriers, thus achieving greater coordination of the market.

Communication, Information, and Economic Development

In many models of economic growth, one of the customary "givens" is that perfect communication exists throughout the economic system. Under such an assumption, a number of potential impediments to perfect communication can be ignored. It can be assumed that there are no distortions or omissions in the information passing within the system, and that no bottlenecks create information "surpluses" in one area and information "deficits" in another area. Furthermore, the flow of information can be assumed to be very rapid, and that each item of information is accurately perceived and interpreted by participants in the market. The basic premise of perfect communication, then, is that information about economic affairs creates no impediments by itself to the rational functioning of market participants. The coordination of supply and demand, therefore, can be analyzed without requiring much attention to the processes by which economic information flows throughout the system.

While the assumption of perfect communication has been useful in studying economic phenomena, the actual *implementation* of economic programs is often drastically influenced by the communication process linking development planners and their audiences or producers intermediaries and consumers, etc. There are numerous instances of development programs which were only marginally successful, if not failures--not because the programs themselves were inferior, but because of inadequacies in the ways the target audience became *aware* of the program, were persuaded to adopt the program, and transmitted their reactions and feelings back to the program's operators. Similarly, in many instances the decisions implemented by market participants prove to be erroneous because of a lack of correct and timely information. In many situations, the information

system does not act "perfectly" but proves influential in the outcome of a development program, or in on-going market coordination activities. Previously, the concepts of modernization and of innovation and diffusion were drawn on to augment our view of the preconditions to build a more powerful array for economic development. Similarly, the structure and functioning of the communication and information system in an economy should be treated as a potentially important ingredient in the success or failure of economic development activities.

Communication is simply defined as the transmission of *messages* along some *channel* from the *source* to the *receiver*. Strictly speaking, "effective" communication occurs only when the receiver becomes *aware* of the message and elicits some *meaning* or interpretation from it. Successful communication occurs when the receiver's interpretation of the message is quite close to the source's original intent. Obviously, then, many communications produce "effects" but are unfortunately not "successful". If the receiver decides to return a message, this response is often labeled *feedback*. The messages themselves can deal with a wide variety of topics, but here economic messages are of principal concern. The term *information* refers to the component of messages which add something *new* to a receiver's existing repertoire of knowledge--such as new alternatives and opinions, a more up-to-date awareness of prices, availability, etc.

There are two major classes of communication channels along which economic information can flow. One is face-to-face or interpersonal communication, and the second is the *mass media* of communication; *i.e.*, communication where some mechanical device is interposed between the source and receiver, allowing one source to reach many--perhaps millions--of persons.³⁶

There are several important differences between mass and interpersonal communication which have important implications for the functioning of economic information systems. These differences are described to emphasize some of the communication factors which can facilitate or impede the functioning of economic systems. Messages flowing through the mass media are primarily one-directional rather than two-directional. Hence, the messages disseminated in an advertising campaign or through a market news service tend to be aimed out rather blindly toward the audience. The personal conversation between a change agent and his client, however, is usually two-way, and this enables face-to-face communicators to use feed-back as a means of reframing their messages in an effort to secure their intended results. (We say "usually" because such barriers as status differences, political pressures, economic considerations, or language problems can affect the meaningful interplay of face-to-face conversation.)

³⁶Radio, television, cinema, newspapers, and books and magazines are usually included in definitions of "mass media."

Mass media messages can reach their audience very rapidly. In comparison with transmitting a message on a face-to-face basis among many persons, the mass media interject very little distortion into the message. It is usually less costly to reach an audience through the mass media; and, of course, the question of scale economies is frequently important in creating widespread awareness and adoption of development programs.

The mass media, while relatively inexpensive as a means of disseminating messages, do not give the communicator much opportunity to select his audience. Literally, the audience selects itself--individuals choose to attend or not attend to his messages for their own reasons. As a communicator, it is possible to capture the attention of the audience by creating messages which are distinctive, interest-arousing, or which are encapsulated by "entertainment". But there is little control over the composition of the audience, analogous to the potential influence which face-to-face communicants can exert.

Thus, the selection of mass versus interpersonal channels as a means of communicating economic information requires a careful balancing of alternative advantages and disadvantages against desired outcomes. The communication strategy employed is an important aspect in determining the outcome of a development program as we have noted. Of course, combinations of mass and interpersonal channels can be utilized effectively together. Radio forums (linking broadcasts of agricultural information to group discussion at the site of radio reception) have been used in India to teach remote villagers new agricultural and health practices. Television "schools" in Italy have multiplied the talents of a few excellent teachers to reach millions of persons. And throughout Latin America, radio is being employed to teach literacy as well as the use of various innovations in agricultural practices and daily living habits.³⁷

Like research on the diffusion of innovations, the bulk of research on the economic and psychological consequences of exposure to the mass media has been conducted primarily on peasant farmers in developing countries. In these countries, radio is most accessible to a broad spectrum of the population. Print materials are also available but require either the skill of literacy to interpret them or the opportunity to listen to the reading of print material (in families, younger children with literacy skills often read to others in the family). Cinema is also frequently available, usually at a nominal cost, but often consists of imported films rather than locally created materials with development themes. Television is available in many urban areas and is often viewed in public places, such as bars, cafes, etc.

³⁷Rogers, E.M., *op.cit.*, Chapter 6.

Research on exposure to the mass media indicates that in developing countries there is a fairly strong tendency for exposure to be strongly inter-related--persons who are "linked" to one mass media channel tend also to be linked to other media channels as well. Conversely, however, if a person tends *not* to use one medium, he tends not to use *any* of them.³⁸ Hence, heavy users of the mass media are much more likely to be reached one or more times by economic information, because of the number of channels to which they attend.

What are the relationships between extensive use of the mass media and economic and socio-psychological characteristics of agriculturalists in developing countries? Persons with high literacy skills and with schooling tend to use the mass media more: they use more different channels and spend relatively greater amounts of time with the media. Older persons are less likely, in general, to be heavy users of mass media. But more economically wealthy persons, and persons with relatively high social status, are likely to be extensive users of the media. The acceptance and use of innovations, both agricultural and personal home innovations, are much more common among persons who are relatively high users of the mass media.

The extent of exposure to the mass media is also related to a number of socio-psychological variables involved in modernization. Persons who are exposed extensively to mass communication are much more knowledgeable about the political life of their country. They are much more likely to express strong aspirations for greater education (particularly for their children) and occupational status. Finally, they are much more motivated toward achievement, toward maximization of income and social status quo.

Several authors have explored the extent to which mass media exposure acts as an *intensifier* of relationships among these variables, rather than just a correlate.³⁹ For example, more educated persons (who are also more exposed to the media) are more likely to innovate in their economic behavior. The important question to be explored, then, is whether persons of a given educational level are even *more* innovative if they are *also* relatively high users of the mass media. If higher media exposure levels add to an individual's likelihood

³⁸Research in the United States gives less support to this "all-or-nothing" notion. But in the U.S. the almost universal penetration of the media throughout the public has brought about considerable differentiation in content and function of the media and hence tends to make selection of one medium independent of selection of other media.

³⁹See R.F. Keith, D.P. Yadav, and J.R. Ascroft, "Mass Media Exposure and Modernization Among Villagers in Three Developing Countries. Towards Cross-Cultural Generalizations," in *Mass Communication and the Development of Nations*, East Lansing, Michigan State University, International Communication Institute, 1967.

Also see E.M. Rogers, "Mass Media Exposure and Modernization Among Colombian Peasants," *Public Opinion Quarterly*, Vol. 29, pp. 614-625.

of being innovative, beyond the increased likelihood of innovativeness due to high education, then it can be argued that media exposure acts as an intensifier of innovativeness in its own right.

In general, research on this topic among peasants in Colombia, India, and Kenya indicates that mass media exposure does, in fact, act as an intervening force between such variables as literacy, education and social status on the one hand and innovativeness, aspirations and achievement orientation on the other. The amount of sheer exposure to media, then, seems to serve the role of speeding and sharpening the processes of peasant modernization, including certain economic behaviors.

Other evidence relating mass communication to economic variables is given in studies of the factors or dimensions which underlie the process of development at both the national and individual level of analysis. One series of investigations has explored the aggregate, national-level relationships among measures of economic development, extent of communication facilities, levels of health and nutrition, political structure, socio-cultural characteristics, and other features of national societies.⁴⁰ Comparison of the results of these studies indicates that the primary determinants of a nation's overall level of development are its economic level and its ability to communicate among its people. In other words, as a country's level of industrialization, per capita income, agricultural productivity, etc. grow, its mass media facilities tend to grow closely along with it.

Similar studies have been conducted using individual respondents as the unit of analysis, rather than entire nations.⁴¹ Many of the variables used in these individual-level studies are closely analogous to the aggregated national-level analyses; e.g., family income vs. gross national income, individual media exposure vs. national level of media development, personal literacy and education vs. national levels of these variables, etc. The results of these studies indicate that at the individual level, modernization is not primarily a one-dimensional phenomenon, as suggested by the aggregated, cross-national analyses. Rather, at the individual level, a multi-dimensional set of underlying factors is observed. However, the first and clearest of these factors is highly analogous to the cross-national economics--and--communication--system factor. On the individual level, the major trend consistently shows

⁴⁰For a summary of this research, see R.V. Farace, "Mass Communication and National Development: Some Insights from Aggregate Analysis," *Mass Communication and the Development of Nations*, East Lansing, Michigan State University, International Communication Institute, 1967.

⁴¹See Rogers, *Peasant Modernization*, Chapter XV, "The Web-of-Modernization: Inter-relations Among Conceptual Variables."

that economic variables (such as respondent income and level of living) and communication variables (e.g., exposure to the mass media) "go together" very closely. Other variables closely interconnected in this factor are education, literacy, innovativeness, political knowledgeableability, and extent of personal mobility.

However, the research completed to date, while suggestive of the interdependence of economics and communication in development, leaves a large number of questions unanswered. Further exploration is clearly needed of the communication variables involved in the successful spread of important innovations--not only among rural producers, but in urban settings among processors, wholesalers, retailers and consumers. But much of the importance of a communication system in economic development is not only due to its importance to broad-scale acceptance of innovations, but to its functioning in the day-to-day, decision-to-decision operations of the market system itself. In the remainder of this section, we will sketch some of the major notions involved in studying communication systems in marketing where the focus is on effective maintenance of the *existing* economic system, rather than the introduction of change in that system.

First, a distinction should be made among several different analysis levels for communication systems in an economy. We can study the system of communication systems in an economy. We can study the system of communication in operation in (a) a single firm in a sector (e.g., the "largest food retailer"), (b) among all the firms in that sector, (c) between sectors (e.g., in the interface between consumers and food retailers, or between extension agents and agricultural producers), (d) between sectors within the total society (e.g., between government and various marketing agencies), or (e) between societies (e.g., as in the use of international trade and information flows).

What are the main functions performed by the communication system at each of these levels?⁴² One of the most fundamental kinds of information which the system transmits is *price*. This includes prices of goods and services at their final consumption point and all the intermediate steps as well. "Price maps" are representations of a cross-section of an economic process; the maps show, at each stage from initial production throughout all other stages, what the price levels of that product or service are. Price information is frequently broken down by specific points among a set of similar points, e.g., price by supermarkets vs. public "open-air" markets in developing urban areas.

⁴²See Daniel Lerner and Wilbur Schramm, *Communication and Change in Developing Countries* (Honolulu: East-West Center Press, 1967).

Other types of economic information conveyed by the communication system deal with the *quality* of certain items, their *abundance*, and their *mixture* with other products. Information is communicated about the sites where exchange takes place (e.g., the "service" offered, the "class" of the establishment, etc.). Producers and intermediaries learn about supply *sources* and the items and services they offer. Transportation channels, the costs of employing them, and the efficiencies and opportunities they provide are part of an economy's communication system content.

In addition to these types of fairly specific information, the communication system transmits the desires and demands of producers and consumers among each other. Producers advertise, through the mass media and word-of-mouth channels; consumers respond by purchasing or not purchasing specific products, and by conveying somewhat broader desires for modification of existing producer offerings, or substitution of new ones. The mass media, in particular, play a central role in fostering desires and aspirations for consumption throughout the public. In fact, one of the major problems with the media in developing countries is that it can intensify consumer demands widely among the public, much more rapidly than the economic system can develop to fulfill their demands.⁴³

Other types of information conveyed in the economic system deal with laws and regulations governing economic activities, with the availability of employment and the wage levels connected to the labor market. Broader economic trends and long-term changes in market conditions form an important part of economic message content, for they allow participants to become apprised of important influences outside their customary sphere of activity. This aspect of economic information, then, serves a *surveillance* function.⁴⁴

From the individual's point of view, economic information serves several important functions. Given that he has already produced something (e.g., harvested a crop, completed handicraft items, constructed a set of widgets, etc.) it enables him to orient toward the economic system's offerings and make the best he chooses to of his economic efforts. The information system can tell him where to sell his products or whether to hold some for later sale. At the next point in his economic activities, the information system can provide the inputs to his own *plans*: help decide what and when to produce, what new practices or techniques (if any) to use, etc.⁴⁵

⁴³ Lucien W. Pye, ed., *Communications and Political Development* (Princeton: Princeton University Press, 1963).

⁴⁴ Wilbur Schramm, *Mass Media and National Development* (Stanford: Stanford University Press, 1964).

⁴⁵ Information about the potential profitability of new practices or products would seem most useful at the planning stage. Some authors argue that the perceived profitability, at least for agricultural producers, has to be on the order of 1/4 to 1/3 above current levels for adoption to occur. Poor numerical abilities, crude accounting schemes, risk and uncertainty as well as general reluctance to change in traditional ways are possible reasons for this.

In the following section, we will turn to some observations made on developing economies which attempt to link some of the economic, modernization and communication concepts we have reviewed.

Studies of Developing Economies

The existing conditions in many poor countries have been described along several relevant dimensions. The development problem is how to stimulate these economies so that productivity and incomes increase at a satisfactory rate. The observations made below refer to some interesting community studies which point up the importance of approaches which extend beyond traditional economic considerations into other social sciences.

Sol Tax's study of an isolated village in Guatemala indicated that the economic system of the village and surrounding region was marked by considerable specialization and exchange. He also found that the marketplace could be characterized as "perfectly competitive",⁴⁶ insofar as it tends to be (a) atomistic, (b) open, (c) free, and (d) based on rational behavior.⁴⁷ In this "purely competitive" system, he found that living standards were extremely low. The people were only able to produce the basic necessities to maintain life. Moreover, he found that, in spite of increasing specialization and exchange, the economy had been stagnant for some time at this low level of economic life. He asked the question: "Why does not the fact that everybody works hard for himself alone, and seeks to maximize his own rewards, have the effect of creating wealth for all?"⁴⁸ Pure competition, which is frequently posited as a stimulus to efficient allocation of resources and economic growth, seemed to prevail in the economy, but there were no evidences of economic advancement. In answer to his own question, Tax concluded: "What seems to be lacking in Guatemala is the beginning of the accumulation of technical knowledge that eventually results in improvement in the material standards of life."⁴⁹ He argued that the communication system's failure to transmit new technological knowledge was the primary barrier to economic expansion and concluded:

If economists had been living in western Guatemala the past two hundred years, they could not have credited to free competition the glory that progress in technology has deserved.⁵⁰

⁴⁶ A more accurate term might be "purely competitive," since there is no indication that perfect information was available to all traders and producers.

⁴⁷ Sol Tax, *Penny Capitalism* (Chicago: The University of Chicago Press, 1963), p. 15.

⁴⁸ *Ibid.*, p. 28.

⁴⁹ *Ibid.*

⁵⁰ *Ibid.*, p. 29.

Edward Banfield's study in southern Italy gives an indication that small-scale atomistic competition tends to go closely with pessimism and a lack of trust for one's fellow man.⁵¹ Banfield spent nine months studying the culture and economy of Montegrano, an extremely impoverished village. From his description of the economy, it is obvious that a considerable degree of specialization and exchange existed. Yet the people lived just at the level of subsistence. He also found that atomistic competition was common and that it was accompanied by a very strong feeling of self-preservation. The rule prevailing in all social and economic relationships was to "maximize the material, short-run advantage of the nuclear family (the most prevalent form of business organization); assume that all others will do likewise." He labeled this phenomenon "amoral familism," which is further evidenced by a complete lack of cooperation among the villagers in achieving social improvements.

His findings suggest that many generations of atomistic competition and poverty, with little advance in technical knowledge, resulted (perhaps justifiably so) in the destruction of any real hope for the individual to improve his position through new and risky methods of cooperative ventures. Banfield describes the "peasant":

"Getting ahead" and "making a good figure" are two of the central themes of the peasants' existence. But he sees that no matter how hard he works, he can never get ahead.⁵² Other people can use their labor to advantage, but not he.

Banfield concluded that the modernization factor of amoral familism was the primary factor preventing economic development in Montegrano and generalized this to other developing nations:

Lack of such association (*i.e.*, political and corporate) is a very important limiting factor in the way of economic development in most of the world. Except as people can create and maintain corporate organization, they cannot have a modern economy. To put the matter positively: the higher the level of living to be attained, the greater the need for organization.⁵³

Cyril Belshaw observed peasant markets in Fiji and New Guinea and concluded that agricultural producers there were emerging on the foundation of specialized production. There were large numbers of traders competing atomistically:

The large numbers, the strength of the competition, the relative weakness of the prestatory links which should create monopolistic frictions, combine to keep capital accumulation to the minimum. This in turn limits the internal growth dynamic of the system.⁵⁴

⁵¹ Edward C. Banfield, *The Moral Basis of a Backward Society* (Chicago: The Free Press, 1958), p. 85.

⁵² *Ibid.*, p. 65.

⁵³ *Ibid.*, p. 7.

⁵⁴ Cyril S. Belshaw, *Traditional Exchange and Modern Markets* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965), p. 82.

He noted that, for the situation to improve, several conditions seemed to be necessary. "One would be for a reduction in number of traders relative to the volume of trade, giving a trader a chance to achieve economies of scale."⁵⁵ He mentions that "advantages to the alert can accrue through the sudden widening of the transportation network."⁵⁶ Finally, he points to a limitation of market activities due to the "absence of deficiency of communication institutions."⁵⁷ Thus, Belshaw noted that in Fiji and New Guinea, the economic development process appeared to be hindered by excessive numbers of very small traders competing in a market with inadequate transportation services and poor communications. He diagnosed the difficulty as too much peasant competition in the face of extremely imperfect markets, a diagnosis similar to the ones given by Tax in Guatemala and Banfield in southern Italy.

Each of these three studies points to a market exchange system where economic growth is directly inhibited by small-scale atomistic competition, or by factors directly related to atomistic competition. The inference that might be drawn is that the conditions in an atomistic, competitive economic system are not sufficient to bring about economic growth and rising levels of living.

Marketing and Economic Growth

Economists oriented to the workings of the perfectly competitive market model have tended to attribute a passive role to "marketing" as a part of the economic development process. In development planning, investments in industry, agriculture, and basic infrastructure have been emphasized. Most aspects of marketing have been relegated to a secondary and adaptive role rather than an active or leading role.

In the early 1950's, Richard Holton observed that the marketing system was being neglected by planners who seemingly did not believe it was possible to increase real per capita incomes simply by improving the marketing system.⁵⁸ Holton pointed up the incentive role of marketing and suggested that, if market channels were less tortuous and costly to navigate, more goods might flow through them.

Peter Drucker has asserted that marketing is the most effective engine of economic development. Among several reasons given to support this view, he stressed that marketing contributes to the foremost need of underdeveloped

⁵⁵*Ibid.*

⁵⁶*Ibid.*

⁵⁷*Ibid.*

⁵⁸Richard Holton, "Market Structure and Economic Development," *Quarterly Journal of Economics*, Vol. 67, August 1953, pp. 344-61.

countries: the rapid development of entrepreneurs and managers for mobilizing latent economic energy.⁵⁹

J.C. Abbott has argued that national planning techniques for improvements in marketing is a neglected subject.

Getting integration of the expansion of market facilities with expansion of production is vital for sustained momentum. In part, this neglect may reflect a traditional reluctance to enter into the details of marketing on the part of general economists who still carry over the classical view that production is what matters--consumption is mainly a question of income distribution.⁶⁰

Collins and Holton likewise question the validity of assuming that marketing firms will automatically spring up in response to price incentives and provide effective linkages between producers and the ultimate consumer.⁶¹ These authors contend that distribution can play an active role in economic development by changing demand and cost functions in both agriculture and manufacturing in a way favorable to expansion. They advance several reasons to explain why the distribution sector may not respond to market incentives. These reasons, which are summarized below, tend to encompass many of the viewpoints discussed in this chapter:

1. The absence of grading systems, standard weights and measures, and an adequate legal code covering contract rights and obligations complicate negotiations between buyers and sellers. This limits the scale attainable by a firm with a given amount of managerial resources.

2. The price mechanism alone may not induce the individual firm to establish certain auxiliary services, such as the provision of market information, because the benefits diffuse among the entire industry. Hence, the profit account of the initiating firm may not accurately reflect the gains from the service.

3. Private entrepreneurs may be blocked from adopting significant innovations because either the initial investment required is too large relative to their credit sources, or they may prefer the status quo to the uncertainties of innovation.

4. A shortage of managerial resources may cause successful merchants to invest not in changes in distribution but in real estate, foreign securities, or other investments. Not only do these investments make more limited demands on their managerial time, but also risks are diversified.

⁵⁹Peter F. Drucker, "Marketing and Economic Development," *Journal of Marketing*, Vol. 22 (January, 1958), pp. 252-59.

⁶⁰J.C. Abbott, "The Development of Marketing Institutions," Chapter 10 in *Agricultural Development and Economic Growth*, edited by Herman Southworth and B.F. Johnston (Cornell University Press: Ithaca, New York, 1967), p. 393.

⁶¹N.R. Collins and R.H. Holton, "Programming Changes in Marketing in Planned Economic Development," *KyKlos*, Vol. 16, January, 1963, pp. 123-134 (reprinted in *Agriculture in Economic Development*, edited by Carl Eicher and L.W. Witt, McGraw-Hill, 1964).

5. Potential innovators may be discouraged because imitators may enter the industry and quickly beat down margins before the innovator can recoup his initial investment or outlay. In addition, the innovator may have control only over a limited portion of the distribution channel, while, for his innovation to be effective, it must be coordinated with changes in other stages of the marketing process.

6. Complicated licensing procedures and closed socio-economic groups collectively resist competitive intrusion by firms such as supermarkets, which represent a significant and threatening innovation.

7. The automatic transformation of the marketing system may be impeded if distribution enjoys greater economies of scale than production. In this event, the proper kind of distributive system may not develop until the new pattern of production has already been established. In turn, the establishment of a new production pattern may depend on the existence of the right kind of distributive sector.

Collins and Holton suggest that public policy may need to provide the necessary devices to transform an interrelated production-distribution system. Development plans which do give attention to agricultural marketing problems too often emphasize simple cost-reduction devices or call for improved physical distribution facilities. (New buildings for central wholesale activities have been a favorite target.) While the really critical need is a change in the *organization* and *operation* of the distributive sector.

After a careful review of the literature, Reed Moyer provides some additional broad perspectives on the ways marketing can contribute to development:

1. The marketing system can reduce risks by providing more adequate information flows among participants in the system.

2. It can provide the organizational framework necessary to coordinate production and consumption and to ration the supply of commodities to consumers in response to their expressed needs and wants.

3. The marketing system may generate pecuniary and technological economies, both internal and external, for producing firms as a result of the extension of their markets.

4. Marketing institutions can be a major source of entrepreneurial talent and capital for other sectors of the economy.

5. The marketing system may draw subsistence producers into the exchange economy.

6. Marketing institutions can increase the elasticities of supply and demand by making available new or improved products which buyers may find desirable.

7. Marketing institutions can lower consumer costs by improving distribution efficiency through technological innovation, more intensive resource use and less spoilage.

8. The marketing system can reduce transaction and exchange costs between producers and consumers.⁶²

⁶²Reed Moyer, *Marketing in Economic Development*, Occasional Paper No. 1 (East Lansing: Institute for International Business Studies, Michigan State University, 1965), pp. 7-19.

The authors quoted above have stressed that "marketing" consists of a vital set of activities which serves to coordinate production and consumption. But they argue that marketing is not a passive element in the development process. Indeed "marketing" may be one of the more dynamic forces in facilitating technological change and more productive institutional arrangements for organizing and coordinating economic activity. Nevertheless, much of the theoretical framework of economics tends to assume away the dynamics of institutional and technological innovation which is central to the process of economic growth. This suggests the need for greater understanding of the complex role of marketing in development planning and programming. But, the role of the market is a complex one because it deals with the interrelationships among the various components of increasingly sophisticated production-distribution systems.

The Research Approach

This study of food marketing in Puerto Rico was an attempt to obtain insights into the role of food marketing in economic development and to evaluate the efforts to foment changes in food marketing as part of a more general economic development program. The Puerto Rican study was a pilot undertaking that served as useful background and as a training activity for a research team that later conducted further studies in other Latin American communities. (The Michigan State University research group subsequently carried out related studies in Northeast Brazil, Bolivia and Colombia.)

Puerto Rico was chosen as the site for the initial field research because: (1) there had been a rapid rate of economic and social change, with real per capita income increasing nearly three-fold, in a period of 25 years; (2) before these rapid changes began, the socio-economic and cultural conditions were, in many ways, similar to those now existing in several other Latin American communities; (3) there had been a systematic effort to foment change, which included activities to modernize the food marketing system, (4) published reports from food marketing studies made around 1950 provided excellent benchmark observations, and there existed a substantial amount of other information and secondary data for the interim years.

There were four specific objectives for the Puerto Rican study:

1. To measure and analyze the changes that took place in the Puerto Rican food marketing system over the 15-year period, 1950-1965.
2. To make recommendations for further improvements in the Puerto Rican food marketing system.
3. To develop research methodologies useful in appraising marketing problems in other Latin American countries.
4. To draw inferences and to formulate hypotheses concerning the role of food marketing in economic development.

The following list of questions was drawn up to guide the research activities:

1. What were the political, social, demographic and economic conditions that were associated with the rapid changes in food marketing between 1950 and 1965 in Puerto Rico?
2. How did food expenditure patterns and the percent of income spent for food change with the substantial rise in levels of consumer income?
3. How did the political commitment to foster changes in food marketing emerge in Puerto Rico and how did this get translated into an action program?
4. What was the general strategy for modernizing the Puerto Rican food marketing system and how was this implemented through public programs?
5. What were the characteristics of the innovators and early adopters of new techniques and methods of doing business in the Puerto Rican food marketing system?
6. What means of communication were utilized in introducing new ideas to different segments of the food marketing system?
7. How readily did consumers accept new food retailing institutions and practices and what public and private efforts were made to modify consumer buying behavior?
8. To what extent did food marketing modernization affect food prices, the quality and variety of food products available to consumers and the convenience of food shopping?
9. How were the benefits of the changes in food marketing distributed between lower and higher income consumer groups?
10. What were the employment effects of the shift toward larger scale, fuller product line, self-service retail food outlets?
11. What were the most important barriers to the introduction of more modern urban food marketing institutions and the full realization of the potential benefits of these changes?
12. What can be done to further improve the performance of the Puerto Rican food marketing system?
13. What is transferrable from the Puerto Rican food marketing experience to development planning and programming in other communities?
14. What analytical methods can be used to examine some of the more complex secondary and tertiary effects of food marketing changes that create interactions among components within the economic system?
15. What are some of the issues and hypotheses about food marketing processes in economic development that emerge from this study and which should be further examined in subsequent studies?

16. What suggestions can be offered for the development of food marketing reform programs in other communities?

The different disciplinary backgrounds of the MSU research group were reflected in the formulation and evolution of our approach to the problem. Those with a background in economics brought concepts of the exchange system as a coordinator of economic activity. Price theory, the principles of production economics and market organization were familiar tools, although most of us shared some deep-seated views about the inadequacies of traditional economic theories in dealing with the complex processes of economic development. We recognized that exchange activities are deeply imbedded in social and cultural patterns of behavior. We believed that socio-economic changes were greatly influenced by the attitudes, perceived market uncertainties and other psychological features of market participants. We also viewed the exchange system as being linked together by an information network which served as the source of data for decision making, and thus as an integral aspect of market coordination. An amalgamation of these viewpoints led us to conceptualize marketing as a dynamic process, vitally involved in the overall coordination of the economic system and in the fomenting of change associated with economic growth.

The field research task force was composed of three MSU faculty (part-time), two doctoral candidates, two Department of Commerce staff members, and three University of Puerto Rico graduate students. Additional personnel were used for field surveys. The project was sponsored locally and partially financed by the Department of Commerce, the Social Science Research Center, and the Agricultural Experiment Station and the Extension Service of the University of Puerto Rico. The Departments of Labor, Agriculture, and Economic Planning also cooperated in the study.

The study began with a review of previous investigations, an inventory of available secondary data on food marketing, and a series of personal interviews with key people in government, industry and the University. This provided an overview of the pattern of economic development and the efforts that had been made to foster changes in food marketing. Subsequently, more detailed case studies of selected market development activities were made drawing on records of particular government agencies and the personal experiences of key individuals.

A series of field surveys of food marketing participants in the San Juan and Mayaguez areas were conducted. Personal interviews ranging one-half to one and one-half hours in duration were administered to samples of 387 consumers, 91 retailers, 64 wholesalers, 33 processors, 65 truckers and 172 farmers. The questionnaires included four related sets of questions: (1) economic information about the market participant's business and marketing activities, (2) personal data about the respondent, (3) the respondent's communication behavior, (4) respondent attitudes toward modernity and their economic

environment.

The structured surveys provided descriptive information about the existing food marketing system which were used in gauging the changes since the benchmark studies made in the early 1950's. The survey data were also used to explore some of the dynamic aspects of market processes and economic growth, e.g., innovative behavior and attitudinal barriers to modernization. The field survey instruments and procedures were also being tested for subsequent adaptation for use in other country studies.

The survey data were coded and punched on IBM cards in Puerto Rico. The tabulation and analysis was conducted at the Michigan State University Computer Center in East Lansing.

From the beginning of our research and advisory program, we recognized the need for analytical techniques to evaluate the economic consequences of alternative marketing reforms. The income and employment effects become important criteria for development planners considering recommendations coming from diagnostic studies such as ours. Although traditional cost-benefit analyses continue to be widely used, there is increasing interest in the application of systems simulation models to the analysis of dynamic processes such as economic growth. An MSU doctoral candidate trained in systems science developed a "first generation" simulation model of the Puerto Rican economy which included explicit marketing components. This model was used to gain insights into the possible secondary and tertiary effects of changes in food marketing.

Near the end of the one-year field operation in Puerto Rico, two seminars were conducted to communicate preliminary results of the study. A small seminar was held with officials from several agencies of the Puerto Rican government to review the research findings and to discuss the implications for further marketing reforms. Specific recommendations were presented and discussed. A week later, a three-day seminar was held in San Juan to review the research results and discuss them with a larger group representing businesses, government agencies, and universities. Also attending were officials from the Washington office and the field staff of the U.S. Agency for International Development. A project Advisory Committee participated in the seminar and offered reactions to the work reported.

This research report is a final summary of the Puerto Rican phase of the AID project, *A Comparative Study of Food Marketing in Selected Latin American Countries*. It is organized into nine chapters. The introductory chapter has provided a statement of the problem, a review of relevant literature, and an explanation of the research approach. Chapter 2 provides an overview of the Puerto Rican economy, with a summary review of efforts to bring about changes in food marketing. In Chapters 3 through 5, changes in urban food marketing during the period 1950-1965 are reviewed and evaluated. In Chapter 6, three case studies of vertical coordination in the production-marketing systems for

eggs, milk and fruits and vegetables are presented. Chapter 7 examines the diffusion of innovations in the Puerto Rican food system and the role of communications in stimulating change. The development of a simulation model to evaluate the consequences of marketing reforms is reported in Chapter 8. The final chapter provides summary observations and conclusions concerning the changes that have taken place in the Puerto Rican food marketing system and the measures taken to foment change. Some suggestions are offered for further efforts to improve the performance of the Puerto Rican system. The relevance of the Puerto Rican experience to other developing communities is evaluated and some issues and hypotheses concerning the role of food marketing in economic development are advanced.

CHAPTER 2

AN OVERVIEW OF THE PUERTO RICAN ECONOMY AND THE EFFORTS TO IMPROVE THE FOOD MARKETING SYSTEM

The Geographic Setting

Puerto Rico is the eastern-most island of the Greater Antilles. It is located about 1,100 miles southeast of Miami, Florida, and 1,600 miles from New York City. (Fig. 2.1.) The maximum length of the island is 113 miles, and its maximum width is 41 miles. The total land area is about 3,435 square miles. Extending all around the coast of the island is a narrow fertile plain which rises gradually to a mountainous interior. The mountainous and hilly terrain occupies a major portion of the land area of the island.

The climate of the island is sub-tropical. The mean daily temperature ranges from 73 degrees Fahrenheit in January to 79 degrees in July. Tradewinds, blowing almost constantly from the northeast, serve to moderate the temperatures of the island.

As a result of the central mountain range, rainfall varies tremendously from the northeastern part of the island to the southeast. Annual rainfall varies from a maximum of 200 inches on the mountain of El Yunque (elevation 3,500 feet) in the northeast to a minimum of 30 inches along the southwestern coast. Generally, rainfall ranges from 30 to 80 inches in the fertile coastal plains and from 60 to 100 inches in the highlands. In most areas of the island, the rainfall is sufficient to support a wide variety of agricultural enterprises. Irrigation systems have been developed in the drier areas to the south and in a small area in the northwest where yearly rainfall is light or poorly distributed through the year.

Puerto Rico, with a total population of some 2.6 million (1964) on a total land area of 3,435 square miles, is one of the more densely populated areas of the world. About one-half of the population is urban (by census definition, those living in villages or cities with populations greater than 2,500). The largest cities are San Juan, with a population of 700,000; Ponce, with 150,000; and Mayaguez, with 85,000.

Political and Economic History

Colonial Rule

Puerto Rico was discovered and claimed for Spain by Christopher Columbus in 1493. In the early 1500's the island was colonized. It soon became an important link in the defense and trade pattern of the Spanish Empire. The main natural resources of the island were agricultural land and a plentiful

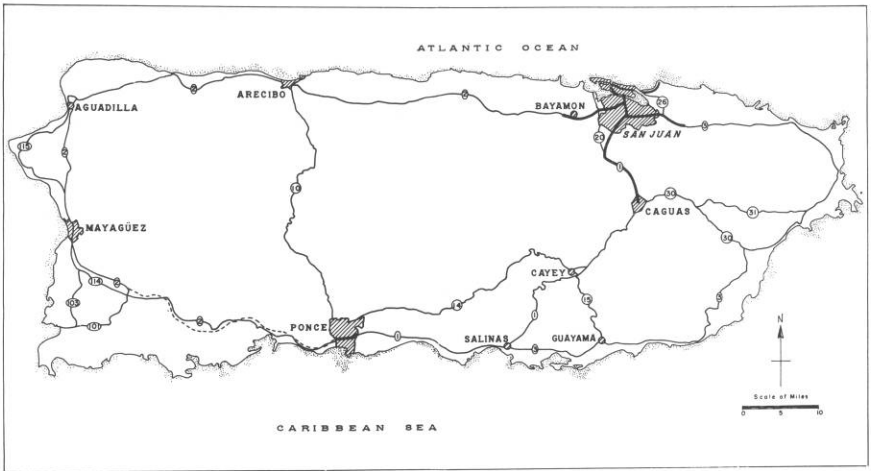
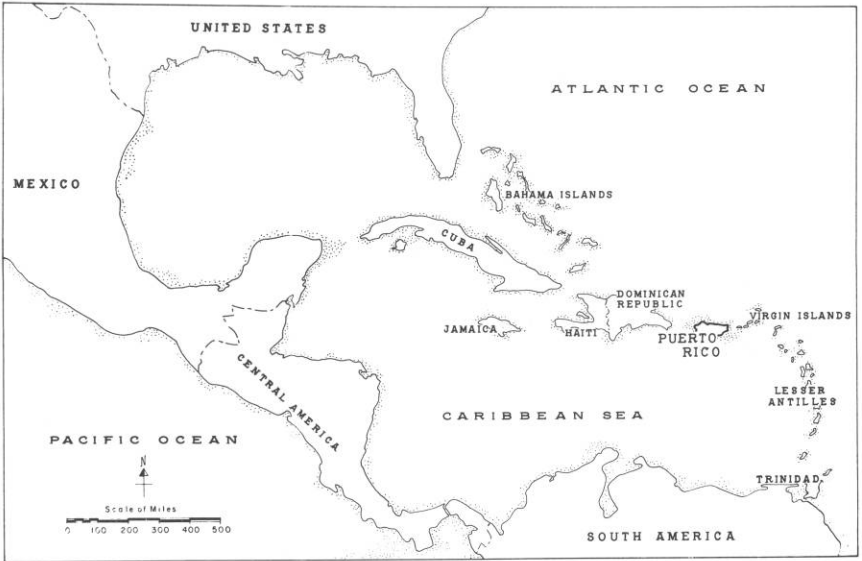


FIGURE 2.1 GEOGRAPHIC SETTING AND CHARACTERISTICS OF PUERTO RICO.

supply of water; and until the 19th century, the primary products of the island were coffee, ginger, sugar, molasses and hides. The Spanish exported most of those products and thus drained most of the wealth from the island. In 1765 an island-wide census indicated a population of 44,883. Most of this population lived in extreme poverty, with little formal education, on farms controlled by absentee owners.¹

In 1898, during the Spanish-American War, the United States took possession of Puerto Rico. The island was already heavily dependent upon external trade. Its main exports were coffee, and sugar, while food products made up the bulk of its imports. Sugar production expanded rapidly after the American take-over and soon became the dominant economic product of the island. During the period from 1898 to 1927, there was a tremendous influx of American capital, principally in the production and processing of sugar and tobacco. The economic stimulus provided by this flow of capital contributed to a rapid increase in the gross product of the island and precipitated a build-up in the island's economic infrastructure, but did little to alleviate the poverty of the average Puerto Rican.

Self Government

The appointment of Governor Rexford G. Tugwell in 1941 signalled a new era in Puerto Rico's struggle for economic and social advancement. The appointment of this reform-minded governor, coupled with the creation and popular support of a new political party headed by Luis Munoz-Marin, indicated a new concern both in Washington and in Puerto Rico for economic and social reform. During the period from 1941-1948, Tugwell and Munoz moved rapidly to build the legislative and administrative foundation for self-government of the island. In 1948 Munoz became the first popularly elected governor of Puerto Rico and swept his Popular Democratic Party into complete control of the Legislature. Munoz accepted the election as a mandate to continue the program of economic reform which he had begun during his earlier years in the legislature. He moved ahead with a program which became known as "Operation Bootstrap." The reform program received additional impetus with the granting of Commonwealth status in 1952.²

¹Harvey S. Perloff, *Puerto Rico's Economic Future* (Chicago: The University of Chicago Press, 1950), p. 13.

²Under the Commonwealth political status Puerto Rico was given complete local autonomy under a constitution ratified in a referendum of the people of Puerto Rico. Puerto Rico was thus granted the same rights and responsibilities as any state with two exceptions--Puerto Ricans do not have voting representation in Congress, and they are not allowed to vote in the election of the United States President and Vice President.

The Economic Development Administration (EDA), the government agency which became the action center for Operation Bootstrap, was created in 1950. It is known in Spanish as "Fomento". The administrator of the agency was given the responsibility "to direct and supervise all of the programs whose objectives are closely related with the economic promotion of Puerto Rico."³

The main thrust of the EDA has been toward promotion of industrial development and tourism. It provides assistance to firms or individuals interested in establishing new plants in Puerto Rico. It also does general promotional work for the island through a number of branch offices in major cities of the United States. As of December 1965, the industrialization program had helped to promote some 1,211 plants with a total employment of 82,175.

Measures of Economic Growth

The economy of Puerto Rico has experienced an amazing rate of growth since 1940. During the decade of the 1940's gross domestic product increased from \$499 million to \$879 million, in constant 1954 dollars. The average annual rate of growth in net real per capita income for the period from 1940 to 1950 was 4.2 percent, one of the highest in the world. By 1960, the gross domestic product had increased to \$1,484 million in constant 1954 dollars. The average annual rate of growth of net real per capita income between 1950 and 1960 was even higher than in the preceding decade--5.1 percent. Table 2.1 shows the gross domestic product and per capita income for Puerto Rico in selected years between 1940 and 1964.

Between 1940 and 1950, much of the growth in the economy took place in the agricultural sector (especially sugar cane) and also in commerce and services. However, manufacturing was by far the largest growth component between 1950 and 1960. This reflects the emphasis placed on industrialization by the government after 1950. Table 2.2 shows that during the decade between 1950 and 1960 agricultural gross output increased by 32% compared to a 76% increase for the whole economy and 212% increase for the manufacturing sector.

Table 2.3 contains employment figures which reflect the changes in the Puerto Rican labor force during the decade of the 1950's. In 1950 the total employment in Puerto Rico was 596,000, of which 36 percent was agricultural employment and 9 percent manufacturing. By 1960, employment in agriculture had fallen to 24 percent and manufacturing had risen to 16 percent. Unemployment during that ten-year period changed very little, declining from 13 percent to 12 percent of the labor force.

³William H. Stead, *Fomento--The Economic Development of Puerto Rico* (Planning Pamphlet Number 103; Washington, D.C.: National Planning Association, 1958), p. 26.

TABLE 2.1 GROSS DOMESTIC PRODUCT AND PER CAPITA INCOME FOR PUERTO RICO--
SELECTED YEARS (1954 Dollars)

Fiscal years	GNP (millions of dollars)	Gross Income Per Capita (Dollars)
1940	a	269
1950	844.1	399
1960	1,488.8	639
1964	1,960.0	776

^aNot available

SOURCE: *Ingreso y Producto*, Junta de Planificacion de Puerto Rico, 1965.

TABLE 2.2 GROSS DOMESTIC PRODUCT, AGRICULTURE AND MANUFACTURING GROSS
PRODUCT AND PERCENTAGE INCREASE FROM 1950 TO 1960 FOR PUERTO RICO
(1954 Dollars)

	Millions of Dollars		% Increase
	1950	1960	
Gross Domestic Product	844.1	1488.8	76
Agriculture	132.1	173.8	32
Manufacturing	110.2	343.34	212

SOURCE: *Ingreso y Producto*, Junta de Planificacion de Puerto Rico, 1965.

TABLE 2.3 EMPLOYMENT IN PUERTO RICO BY INDUSTRY, 1950 and 1960

	1950		1960	
	Thousands	%	Thousands	%
Total Employed	596	100	564	100
Agriculture	216	36	133	24
Manufacturing	55	9	93	16
Other	325	55	338	60
Unemployed	88	13	75	12

SOURCE: *Statistical Yearbook of Puerto Rico*, Puerto Rico Planning Board

The comments given previously illustrate the magnitude of economic changes which occurred in Puerto Rico during the brief span of ten years. A large amount of investment funds were needed in order to accomplish the shift from an agricultural economy to an economy with considerable emphasis on manufacturing. Gross fixed domestic investment increased from \$111 million in 1950 to \$348 million in 1960, an increase of more than 200 percent. Between 1947 and 1960 about 43 percent of all Puerto Rican investment funds came from external sources, mostly private investors from the U.S. mainland. Undoubtedly, a high proportion of that external investment was for new plants and equipment since most of the internal investment was depreciation and public saving.

From 1950 to 1960 gross income practically doubled, manufacturing became a real economic factor, tourism blossomed and agriculture began to decline in relative importance. Puerto Rico's rapid growth was thus based on two factors: (1) a strong political unity centered around achieving better levels of living for all the people; and (2) a well-planned industrial development program designed to make the most of Puerto Rico's unique relationship to the United States under Commonwealth status.

Important Features of Commonwealth Status

Both of the factors mentioned above as critical in Puerto Rico's economic growth are closely related to the unique political relationship between the United States and the Commonwealth. The special features of Commonwealth status and their importance will be discussed briefly in this section.

One of the biggest hurdles which developing nations face is the achievement of political stability. Puerto Rico has not displayed the political instability characteristic of many other Latin American nations. One reason for this may be that Puerto Rico has never been completely independent. In 1952, at a time when they appeared ready to accept it, the Puerto Ricans were given most of the advantages of independence without many of the disadvantages. This occurred after a period of territorial rule by the United States with a locally elected legislative assembly. During that period the people of Puerto Rico and their political leaders were given practical experience in the operation of a democratic society. When the Puerto Rican governor and his administrators took over, most government agencies were staffed by well-trained individuals and organized for relatively efficient operation. Moreover, the continuing loose political tie to the United States seemed to lend a considerable degree of economic and social stability that encouraged rapid growth. In addition, private citizens of the United States have been able to invest freely in Puerto Rico without fear of government confiscation.

Economists have often noted that economic growth can be drastically retarded by "limitations of the market". That is, if the market for a given product is

quite small, it may be impossible to achieve all the economies of scale which exist in production and distribution of that product. It is, therefore, significant that Puerto Rico under territorial and Commonwealth status has had, with few exceptions, the same trade status as any state in the union. Under this arrangement the United States has long purchased the bulk of Puerto Rico's primary product--sugar. In fact, Puerto Rican sugar producers operate under the same government price support and quota program as United States sugar producers. In exchange, the Puerto Ricans have historically purchased from 40 to 50 percent of their food supply from United States producers and processors as well as significant proportions of other items ranging from consumer to producer goods. More recently the vast United States market has served as an outlet for the diverse products of manufacturing plants established under the assistance and encouragement of the Economic Development Administration. In many cases the free access to United States factor markets, cheap Puerto Rican labor, and access to the huge United States finished product market were critical factors in making manufacturing investments in Puerto Rico feasible for prospective investors.

A factor which is closely related to the free trade arrangement is the official use of United States currency. This means that Puerto Ricans do not have currency exchange problems when trading with the mainland. It also means that they are not bothered with balance of payments difficulties or currency devaluation decisions. Finally, it means that Puerto Rican entrepreneurs have greater access to United States capital markets.

Federal assistance and unilateral transfers have been extremely important to Puerto Rico in its rapid economic development. Practically all federal government programs available to state or municipal entities on the mainland are available in Puerto Rico. In agriculture this includes all the service agencies such as the agricultural extension service, experiment station research, soil conservation service, etc.; it includes credit agencies such as the Farmers Home Administration and certain federal price support programs such as the sugar program mentioned earlier. Other federal agencies such as the Small Business Administration, the Federal Housing Administration, the Urban Renewal Administration, the Federal Communications Commission, and the Federal Aeronautics Administration provide services to the people of Puerto Rico. The unilateral flow of funds from the United States into Puerto Rico through these federal programs (without a return flow of revenue since Puerto Ricans do not pay federal taxes) amounts to a significant portion of the gross product of the economy. In 1965 transfer payments from the U.S. Treasury made up about 8 percent of the gross domestic product for the island.

In summary there is little doubt that Puerto Rico's special relationship to the United States does provide significant economic advantages. Political

stability, free trade, common currency and access to federal programs have undoubtedly contributed greatly to the rapid rate of economic growth which Puerto Rico has achieved in the past twenty years.

Efforts to Improve the Food Marketing System

Political Concern

The political, economic and social revolution which began in Puerto Rico in the late 1930's with the organization of the Popular Democratic Party was one expression of concern over the widespread poverty which existed at that time.⁴ High food costs, poor nutrition and ill health were recognized as major interrelated problems by Luis Munoz Marin, a principal leader of the reform movement. The party slogan, "Pan, Tierra y Libertad" (Bread, Land and Liberty) reflected the role of food as a part of their political concern. After his election to the legislature in 1940, Munoz and the Popular Democratic Party pressed for reforms that would bring rising levels of living for the Puerto Rican people. Over the years, several studies were undertaken to provide guidance to the reform movement. One of the more significant studies was an evaluation of Puerto Rican development problems by Harvey Perloff.⁵

Perloff's Study

In this study Perloff analyzed Puerto Rico's economic potential and identified programs that would facilitate economic growth. Within this broad framework he offered several observations regarding the food situation. He noted that Puerto Rico was importing about one-half of their food supply (42 percent of the volume and 54 percent of the value consumed).⁶ Since grains were a major import item, he recommended improved port handling and processing facilities as a means of reducing prices to consumers on these staple food items. He also recommended several improvements in the local food marketing system as a way of stimulating agricultural production. Perloff wrote:

The important point is that improvements in Puerto Rican agriculture are virtually dependent on the improvements in the agricultural distribution structure which would narrow the gap between farm price and consumer price, reduce waste and spoilage, and generally increase the amount of food reaching the consumer in good condition and at a reasonable price.⁷

⁴For an account of Munoz's concern over the food problem, see Thomas Aiken, Jr., *Poet in the Fortress* (New York: Signet Books), 1965.

⁵Harvey Perloff, *Puerto Rico's Economic Future* (Chicago: University of Chicago Press), 1950.

⁶*Ibid.*, p. 9.

⁷*Ibid.*, p. 276.

His suggestions included expansion of public market facilities in urban areas and the establishment of cooperative produce centers in rural regions which could provide grading, packaging and storage facilities at strategic shipping points.

The USDA Market Facilities Study

Early in 1949, Governor Luis Muñoz-Marín requested the assistance of the Marketing and Facilities Research Branch, Production and Marketing Administration, U.S. Department of Agriculture, in undertaking a study of the marketing facilities and distributive system of Puerto Rico, with special emphasis on the needs of metropolitan San Juan. The study began in the fall of 1949. A preliminary statement covering the major marketing facility problems of the San Juan area was presented to the government of Puerto Rico at an informal meeting during July 1950. In December 1950, a preliminary report was presented in a series of meetings to government agencies, private individuals and firms interested in the market. This report noted that:

The primary defects in the San Juan facilities for handling food and related products are: (1) the lack of sufficient warehouse facilities at shipside; (2) the splitting of market operations among several market areas; (3) the excessive costs of cartage, deterioration and spoilage; (4) the absence of a suitable livestock market with the necessary slaughtering and processing facilities for the proper handling of animals, particularly of heavier weights; (5) the lack of grain storage, feed mixing, and milling facilities for the efficient handling of imported grains and the lack of utilization of the various commodities produced on the island that could be used in mixed feeds; and (6) the need for vegetable oil extracting facilities.⁸

To correct these deficiencies, the report recommended that facilities be constructed for a wholesale produce market, that a slaughtering and meat processing plant be established, and that grain storage, feed mixing, and vegetable oil extracting facilities be established in the same area as the produce market and livestock slaughtering plant.

The Koenig Study of Puerto Rican Agriculture

In mid-1950 Governor Muñoz requested the assistance of the U.S. Department of Agriculture in the development of a comprehensive agricultural program for Puerto Rico. Nathan Koenig, Assistant to the Secretary of the USDA, was designated to direct a two-year study of Puerto Rican agriculture. The study

⁸U.S. Department of Agriculture, *Marketing Facilities for Farm and Related Products at San Juan, Puerto Rico*, Agriculture Bulletin No. 60 (Washington, D.C., June, 1951), p. 1.

was carried out by a large task force compound of 100 technicians from various Puerto Rican agricultural agencies and the USDA. The report, published in 1953, was widely accepted as an authoritative and definitive policy statement. It has subsequently served as an important guide to agricultural development planning.⁹

The report provided a comprehensive overview and evaluation of the agricultural industry--the people, the natural resources, and the institutional organization. Recommendations were elaborated for strengthening the activities of the agricultural agencies such as the Department of Agriculture, the Agricultural Experiment Station, the Extension Service, and the College of Agriculture. A major recommendation was to create an Agricultural Development Council to facilitate interagency coordination. The Council was to be composed of the heads of various agencies directly concerned with the agriculture of the island and would be chaired by the Secretary of the Puerto Rican Department of Agriculture. The function of the Council was to act as a coordinating body to consider overall planning and policy-making problems, and to establish priorities and designate responsibilities to various agencies.

Chapter Two of the Koenig report provided an excellent overview of the marketing system for farm products. In the report summary, Koenig wrote:

Of paramount importance to the development of agriculture in Puerto Rico and increasing the local food supply are the improvement of the marketing system and the establishment of adequate facilities for handling and utilizing farm products. The study points out that, except in the case of the island's sugar industry, the functional aspects of marketing and the organizational structure needed to serve both producers and consumers have received scant attention. A properly functioning marketing system should act like a suction in drawing production off the farms into the various channels of use and consumption. By giving full expression to the demand that exists for the various products in the different outlets, such a marketing system would provide the incentive for maximizing local production and afford facilities for complete utilization and orderly distribution of the total output. Instead, however, the many shortcomings that prevail have had the opposite effect. The limitations inherent in the present marketing system have not only narrowed the opportunities for farmers but also deprived consumers of large quantities of food and other agricultural commodities which could be produced locally. The resulting lack of those incentives which a properly functioning marketing system could provide has prevented desirable diversification of agriculture in Puerto Rico and actually resulted in a level of production lower than that which is warranted by the available resources.

⁹Nathan Koenig, *A Comprehensive Agricultural Program for Puerto Rico*, U.S. Department of Agriculture, Washington, D. C., in cooperation with the Commonwealth of Puerto Rico, 1953.

The study proposes a number of measures for improving the marketing and utilization of farm products and for increasing the efficiency of distribution. It urges that the central market facility recommended by an earlier study be constructed in the San Juan area without delay since existing facilities in this hub of marketing and distribution are wholly inadequate. Unless improved facilities are provided, there is little hope for increasing the efficiency and lowering the cost of food distribution on the island, or for attaining the market incentive that farmers need to produce more for local consumption. Private individuals and groups should be stimulated to invest in improvements or construction that will modernize and increase the efficiency of such enterprises as retail food outlets, processing plants, slaughterhouses and packing plants, and provide other facilities needed for properly utilizing agricultural products and by-products. Strengthening cooperative organizations and developing new cooperatives with able management to provide marketing and other services to farmers are listed as urgent needs. Among the necessary improvements in marketing practices and methods are establishing grading and packing standards for farm products, standardizing containers, extending market news, crop reporting and inspection services, and improving communication and transportation facilities. The study emphasizes the importance of developing new and improved uses for Puerto Rican farm products and suggests the establishment of an agricultural processing pilot plant for such developmental work. In terms of specific commodities, a number of suggestions are made for improving the marketing of milk, livestock and meat, sugarcane and sugar, pineapples, and tobacco.

While industrial development in Puerto Rico is being helped by various forms of tax incentives, the study points out that no such attention or treatment has been accorded to agriculture. Tax policy in Puerto Rico must recognize the island's need for building up its agricultural plant and allied facilities and services required to process, handle, and distribute the various products from the time they leave the farm until they reach the consumer. The tax policy in effect for so many years has been of little help to the development of a diversified agricultural industry on the island. The study suggests a number of changes in the present tax structure, including a system of income-tax credits, and tax exemptions to encourage investments in construction, improvements, or installations for developing the production, processing, or handling and distribution of agricultural products. Also suggested is the removal or modification of certain excise and other taxes which in one way or another have the effect of restricting production, or retarding consumption of Puerto Rican agricultural products.¹⁰

The Harvard University Marketing Study

In 1949, an important complementary study of retailing and wholesaling was undertaken by a group from Harvard University who were invited by the Social Science Research Center of the University of Puerto Rico to make a comprehensive analysis of the distribution system.

The study was motivated by a belief that marketing was unduly costly, and that these costs were a heavy burden on the Puerto Rican consumer. The objectives of the study were: (1) to provide a broader knowledge of reliable

¹⁰*Ibid.*, pp. 6-7.

indicators of how the marketing system might be improved; (2) to compare the present organization of market activity with what it might be; and (3) to identify measures by which the government and the people of the Commonwealth could make progress toward a more efficient organization of market activity.¹¹

The study included detailed surveys of 171 food wholesalers and 470 food retailers. Much of the field work was carried on concurrently with the USDA market facilities study described above. The results of the food distribution surveys were reported by Robert Branson in a doctoral dissertation submitted to Harvard University and summarized into chapters two through five of the book, *Marketing Efficiency in Puerto Rico*, referred to above.¹²

The surveys served to emphasize that, "the outstanding characteristic of Puerto Rican food retailers is their great number and small size."¹³ The most common retail food outlet was the *colmado*, a small neighborhood store selling processed foods and dry groceries, although some perishables might also be carried. Most of the meat, milk, bakery products, and fruits and vegetables were being sold through specialized retail outlets, many of which were located in public market facilities. The 1950 census of distribution listed 14,139 grocery stores (*colmados*) or *one* for every 156 people living on the island. In the Harvard survey, only stores with sales greater than \$1,000 were enumerated (according to the census, nearly 30 percent of the 14,139 grocery stores had sales below \$1,000 per year). The mean average annual sales of the sample stores was \$24,000, but the median was less than \$12,000. Three percent of the stores had sales greater than \$100,000 per year and, as a group, accounted for 24 percent of total store sales.

The average gross margin of retail food stores was 23 percent, as compared with 13 to 16 percent in food stores in mainland U.S.¹⁴ Net margins varied widely but were generally lower in the larger stores, reflecting scale economies in store operations.

It was estimated that the net returns to well over one-half of the stores listed by the census would average only \$28 a month or less. Such returns, plus some food obtained at wholesale prices, are sufficient to maintain the large number of retail food stores in business.¹⁵

¹¹ John K. Galbraith and Richard Holton, *Marketing Efficiency in Puerto Rico* (Cambridge: Harvard University Press), 1955.

¹² Robert E. Branson, *The Structure and Efficiency of Food Marketing in Puerto Rico* (unpublished Ph.D. dissertation, Harvard University), 1954.

¹³ Galbraith and Holton, *loc. cit.*, p. 3.

¹⁴ *Ibid.*, p. 31.

¹⁵ *Ibid.*, p. 31.

The survey of food wholesalers also revealed a large number of small firms, but a few large firms were handling most of the sales volume. Twenty-nine percent of the firms accounted for 73 percent of the sales. Gross margins averaged between 12 and 15 percent, as compared to about 9 percent for mainland U.S. wholesaling functions.¹⁶ Some firms were "exclusive agents" for manufactured food products imported from the mainland. This traditional arrangement was one of the reasons for the large number of small wholesaling firms, which required retailers to purchase from many suppliers.

Credit was found to be an important feature of the marketing system. Retailers relied on credit to attract and hold customers; wholesalers did likewise. The wholesaler's credit practices plus the general absence of retail price competition permitted easy entry into food retailing. This resulted in a steady flow of untrained personnel into the grocery business. Methods of modern management were unknown to most of these entrepreneurs. Considering price competition to be unethical, they adopted a live-and-let-live attitude toward competition. Their attitude reflected an attempt partly to protect themselves and others from failure and partly to avoid "spoiling the market".¹⁷

The buying habits of the Puerto Rican people seemed to control many characteristics of the distribution system. Many families had only seasonal employment; consequently, they received no income during certain periods of the year. During these periods, they relied on their grocer for credit. The retailer, then, had to buy on credit from his wholesaler.

Using the Puerto Rican survey data and more detailed cost information obtained from a smaller group of stores, Richard Holton developed a model food distribution system consisting of optimal-sized wholesale and retail units. The model contained less than 20 percent as many stores as were in existence in 1949 and would have required only 35 to 45 percent as many employed persons. The minimum potential annual savings were estimated to be \$20 to \$25 million--an 11 to 14 percent savings on the estimated total consumer food bill of \$175 million.¹⁸

Recognizing the restraints imposed by the existing environment, the Harvard group offered several policy proposals to bring about changes toward lower-cost distribution methods.

Their recommendations included the following:

1. Consumer and retailer education--Modification of existing programs to give greater emphasis to making the consumer more price and quality conscious in their shopping. Price competition would become more profitable to the retailer

¹⁶*Ibid.*, p. 54.

¹⁷*Ibid.*, Chapter 5.

¹⁸*Ibid.*, pp. 110-124.

and would encourage large scale, lower-cost operations. It was suggested that retailer education should be aimed at improved management practices and changes in attitudes toward competitors, employees, potential partners and even toward making money itself.

2. Chain store operations--The development of enterprising chain stores was seen as an effective means of lowering food costs and as the most important single step toward rationalization of the distribution system in the immediate future.
3. Consumer cooperatives--Continued and vigorous encouragement of the consumer cooperative movement in the rural areas was seen as an effective means of reducing food costs to the rural consumer.
4. Central warehouse and dock facilities--Support was given to the completion of the government project already being considered for a central dock and warehousing facility in the San Juan Bay as a means of reducing handling costs on imported foods.
5. Credit policy--It was recommended that the Development Bank alter its policy of lending only for industrial purposes and extend credit to firms engaged in distribution.¹⁹

The Food Advisory Commission

In early 1953, Governor Luis Munoz Marin appointed the Puerto Rican Food Advisory Commission to evaluate the existing problems of food production, processing, and distribution, and to offer their recommendations. The motivation for the appointment of the commission was the belief that food prices were too high and Puerto Rican diets were inadequate. Recent interviews (1966) with some of the Commission members indicate that the Governor had hoped that the Commission would help overcome political opposition to changes in food distribution. The findings of the Harvard University study had been challenged by prominent local merchants. Some of these critics were members of the Food Commission.

The Commission first convened in May, 1953. Twenty members had been appointed to be broadly representative of the Puerto Rican food industry with others drawn from the mainland U.S. food industry, Harvard and Cornell Universities, and the U.S. Department of Agriculture. Lansing Shields, the President of Grand Union, a mainland retail food chain operator was asked to chair the Commission.²⁰

¹⁹*Ibid.*, pp. 177-198.

²⁰Other members included: Frank Ballester, Frank Besosa, Maurice C. Bond, Ramon Colon-Torres, William Crow, Hugh J. Davern, Francisco Frieria, J. K. Galbraith, Millard Hansen, Bretton Harris, Austin Iglehart, William G. Kannes, James McGowan, Jr., Candido Oliveras, John Paton, Beardsley Ruml, Charles F. Seabrook, Ramon Seneriz, and Francis Whitmarsh.

The Commission identified two primary problems:

1. How can the quantity and quality of food grown in Puerto Rico be increased?
2. How can the best features of the mainland food distribution system be adapted to the economy of Puerto Rico?²¹

The results of the special studies described earlier were made available to the Commission. Four sub-committees were organized within the Commission to facilitate team work: (1) Education; (2) Food Products and Processing; (3) Food Transport and Export Facilities; and (4) Retail and Wholesale Operations.

Among the various recommendations submitted to the Governor in April, 1954 were the following suggestions on transforming the food distribution system:

1. Establish large modern markets in urban areas and smaller modern outlets in rural and neighborhood areas. Consumer cooperative stores should be encouraged in rural areas.
2. Establish an educational program to train retailers in store management and food handling and to educate consumers on food buying.
3. Construction of a central market complex in the bay area, local farmers market centers, and strategically located farm commodity concentration points in other parts of the island.
4. Intensify efforts now being made to diversify and expand agricultural production through crop experimentation, information dissemination, credit, improved roads and new processing plants.²²

The Commission also provided suggestions on implementation procedures which stressed the role of government as a stimulator and facilitator of private initiative in the food industry through research, education, technical assistance, supervised credit, tax incentives, and appropriate regulations.

The Food Distribution Program

As a follow-up to the Governor's Food Advisory Committee report, the Economic Development Administration (EDA) initiated an action program to implement the Committee recommendations. In the fall of 1954, the EDA engaged a food marketing specialist, Lee Feller, to organize a food distribution program.²³

²¹Report of the Puerto Rican Food Advisory Commission to the Governor of the Commonwealth of Puerto Rico, San Juan, 1954. Copies were reproduced by the Department of Commerce in 1964.

²²*Ibid.*

²³"A Brief History of the Economic Development Administration's Food Distribution Program, Its Conception, Initial Work Plan, Accomplishments, Current Activities and Recommendations," unpublished mimeographed report, Economic Development Administration, Commonwealth of Puerto Rico, San Juan, January 10, 1957.

In February, 1955, Feller submitted a program proposal to the EDA and to a three-man legislative committee which had been appointed by the Governor to advise him on the implementation of a food distribution program. This committee was appointed after Mr. Teodoro Moscoso, head of EDA, had delivered to the legislature an address entitled "The Food Distribution Problem--Lines Along Which It Can Be Attacked." The purpose of the address was to convince political leaders of the potential economic benefits of such a program, knowing that it would create negative reactions from some of the existing food merchants.

The Feller proposal was approved by the legislative committee and the EDA. An Office of Food Distribution was created within the EDA to initiate the program with assistance from several other government agencies.

The basic strategy of the action program was to foster a competitive interaction among different elements of the food distribution system. A lead element was to be the introduction of supermarkets with vertical integration linking the retailing and wholesaling functions. It was believed that competitive pressures generated by aggressive pricing and merchandising practices of larger and more modern food distribution units would generate countervailing adjustments among the smaller, more traditional food distributors.

The EDA Food Distribution Program which got under way in 1955 centered around five main objectives:

1. The promotion of supermarkets in Puerto Rico with a goal of establishing a chain of ten stores operating on an integrated basis.
2. *The promotion of a voluntary group, full-line wholesale operation, similar to the IGA or Red and White stores which operate in mainland U.S.*
3. *The promotion of a retailer-owned wholesale operation.*
4. The providing of both financial and technical assistance to the consumer co-op stores in the rural sections of the island. Experiments were to be made with "rolling stores" sponsored by the co-op groups to service areas where it would not be practical to establish fixed stores at that time.
5. Basic to the other four objectives was the establishment of an educational program aimed at training store manager-owners and employees in the most modern efficient methods of food distribution.²⁴

Four food marketing specialists from the mainland and two staff members of the Department of Education were assigned to initiate the actual program, under the direction of Lee Feller.

²⁴Annual Report of the Food Distribution Program, 1954-1955, Economic Development Administration (unpublished).

One of the major accomplishments of the program was an education and technical assistance effort. Classroom and on-the-job training was provided for store owners and employees (cashiers, meat cutters, produce handlers). This program emphasized the transfer and adoption of mainland methods of food distribution. Staff members provided technical advice to individual store owners on remodeling and store modernization projects.

In his first annual report, Feller indicated that during the year four supermarkets had been established or remodeled and over 100 retailers had shifted to self-service operations.²⁵

During 1955 and 1956, the EDA tried to stimulate local businessmen to invest in supermarkets but without much success. However, a few modern, medium-sized stores were being established.

One of the first modern, U.S.-style supermarkets was established in San Juan in May, 1955, by Harold Toppel, who came to the island with a small amount of capital and considerable technical knowledge acquired while a store manager in a three-store food chain in New Jersey. Although he received advice and assistance from Lee Feller, the EDA Food Distribution Program Director, he did not receive financial support from the EDA in establishing his first supermarket. Toppel's *Pueblo* supermarket with 5,600 square feet of sales area, achieved an average sales volume of \$63,000 per week during the first year. (It had been planned for \$30,000 per week). To achieve this volume, Toppel cut prices below those generally prevailing in the San Juan area. The gross margin of the *Pueblo* store during the first year was 17 percent. In May, 1956, a second and much larger *Pueblo* supermarket (21,000 square feet) was opened with loan assistance from the EDA.²⁶ The growth of *Pueblo* to the leading food distribution organization in Puerto Rico is further described in Chapter Four.

In late 1956, the International Basic Economy Corporation (IBEC) opened the first of four supermarkets (Todos) located in shopping center locations. Their entry was encouraged by the EDA. By 1958 the four Todos supermarkets owned by IBEC were experiencing financial difficulties. The stores were purchased by Grand Union, whose president, Lansing Shields, had served as chairman of the Puerto Rican Food Advisory Committee described earlier. Again, Grand Union's entry was encouraged by the EDA to foster a competitive, low-cost food distribution system. With a mainland wholesale warehouse, Grand Union was able to by-pass the relatively high-cost wholesaling system in San Juan.

Another interesting dimension of the EDA program was its effort to promote a local cooperative-based supermarket organization. The objective was to develop a chain of 26 supermarkets and an integrated wholesale warehouse. In 1955, the

²⁵*Ibid.*, p. 2.

²⁶Information obtained through personal interviews with Mr. Lee Feller.

Borinquen Consumer Services, Inc., was formed with financial support from the government through the Puerto Rican Industrial Development Corporation (PRIDCO). Capital shares were to be sold to local investors with the intent that ownership and control would, over time, be shifted to consumer cooperatives organized around the retail outlets. The Borinquen Consumer Services contracted for the management services of Greenbelt Consumer Services of Greenbelt, Maryland. Nevertheless, this particular effort got off to a slow start and never achieved the original goal. Two co-op supermarkets were put into operation in San Juan and Mayaguez. A warehouse operation was initiated to service these supermarkets as well as several small cooperative stores.

From the beginning of its food distribution program, Fomento supported the creation of a buying group of small retailers called the Independent Stores, Inc. (ISI). The group began with 15 merchants located in various parts of the San Juan metropolitan area; each member contributed \$1,500 to the organization and officers were elected. Some members were sent to observe operations in the United States. Tentative financing arrangements were made with local banks and also with the Government Development Bank.

Financing for expansion proved a real problem because the operators did not have operating statements to support their loan applications. The Government Development Bank would not accept loan applications without adequate financial records so there were few funds for expansion available to these retailers. The bankers had many alternative outlets for profitable loans in the booming Puerto Rican economy. They did not feel it necessary or desirable to loan money to "high risk clients". Through programs such as ISI, Fomento tried to "get the retailers out of debt to their suppliers, get them out of credit sales, and then upgrade the stores to self-service."²⁷ In the late fifties ISI failed because of the lack of aggressive group spirit. However, the technical advice and management training programs continued for individuals.

In 1956 the EDA recognized the need to expand its commercial program beyond food establishments and created a Department of Commercial Development. This new department assumed responsibility for coordinating with the Planning Board and the Puerto Rican Industrial Development Planning Department (PRIDCO) on the planning of urban shopping centers and the construction of the Central Market in the San Juan bay area.

In 1961, the Food Distribution Program in EDA was shifted to a newly created Department of Commerce. Certain units from the then-existing Department of Agriculture and Commerce were also shifted to this new Commonwealth Department.

²⁷Explanation by Don Lemons, long-term consultant to the Puerto Rican government and former employee of EDA.

The Central Market Project

The need for more modern facilities for handling food arriving at the San Juan Port was recognized in the major marketing studies made in the late 1940's and early 1950's.²⁸ In spite of the general support for such a market improvement, new facilities were not constructed until the mid-1960's. A Puerto Rican government official expressed the opinion that the long delay was due to bureaucratic jealousies and frictions among some of the agencies involved in the project. Beginning in the early 1950's, the responsibility was centered in the Department of Agriculture and Commerce. The Puerto Rican Port Authority became more active in acquiring land and re-evaluating the project in the mid-1950's. In 1958 the Economic Development Administration commissioned another study of the project. In 1961 the central market project was shifted from the Department of Agriculture to the newly-created Department of Commerce and was assigned to a government corporation, the Commercial Development Company. At this stage, the project moved into the construction phase; but more feasibility studies were still to be made. A USDA specialist was brought in to restudy the situation and offer further recommendations. A local Puerto Rican consulting firm was then asked to evaluate the USDA study and offer alternative recommendations. The substantive elements of this continuing controversy centered around the location of the market area and kinds of facilities to be constructed.²⁹ Some observations on those parts of the project facilities that were completed and operating by early 1966 appear near the end of Chapter Six.

The Commercial Development Company

The Commercial Development Company (CDC) was created in 1962 as a government corporation attached to the Department of Commerce. The purpose of the corporation is to promote the development of the commercial sector through direct participation in the planning, the construction, and rental of market facilities, such as the central market discussed above. The Company also has the power to grant loans to individuals for the commercial facility construction.

The Commercial Development Company represents a relatively new dimension of the overall market development program. It is further evidence of the

²⁸See recommendations of studies summarized earlier in this chapter.

²⁹The most recent studies of the central market project are the following: Robert L. Holland, "Improved Wholesale Food Distribution Facilities for San Juan, Puerto Rico," USDA Research Report, 1964.

"Analysis of Recommendations for the Development of a Central Market in San Juan, Puerto Rico," a report to the Puerto Rican Commercial Development Company by Passalacqua and Co., Santurce, Puerto Rico, 1964.

recognized need for government stimulation of the commercial sector. In addition to the multi-million dollar central market project in San Juan, the CDC has moved ahead with shopping centers in other island cities. Within the San Juan metropolitan area, plans were going forward in 1966 for a new "Plaza Mercado" and commercial shopping center in Rio Piedras. This latter facility would replace the old *plaza mercado* and would serve as a new wholesale-retail trading center for domestically produced fruits and vegetables.³⁰

Efforts to Stimulate Food Processing

The USDA studies offered several recommendations for food handling and processing facilities.³¹ During the 1950's the Economic Development Administration was able to set aside land on the west side of San Juan Bay for grain handling facilities. By 1965 two feed mixing plants and modern rice importing facilities were located in this area. The EDA fostered these developments by making preliminary feasibility studies, providing access to adequate building sites, making facility construction loans, and covering the costs of U.S. training of key employees. In addition, tax exemption privileges were extended by the Puerto Rican government.

Various government agencies have been involved in efforts to expand the processing of fruits and vegetables. The Department of Agriculture provided assistance in the organization of the producers' cooperative and the construction of a canning plant for the Villalba Vegetable Growers' Association. Also, with the support of several agencies, a food processing research laboratory was established at the Agricultural Experiment Section in Rio Piedras. The purpose of the laboratory is to develop new products and processing technologies that will encourage private investment in the food industry.

In the late 1950's, PRIDCO financed the construction of a modern livestock slaughtering and meat processing facility in Caguas, just a few miles outside of San Juan. The initial cost of the plant was \$2.6 million. The plant has not achieved the operational goals as planned; in 1965 it was operating at less than 25 percent of capacity.

The Department of Agriculture has initiated grading and labeling regulations for canned pigeon peas and fruit nectars to improve the products' acceptability in the U.S. market. Irregularities in product quality had damaged the reputation of these Puerto Rican products in the export market.

By the mid-1960's the EDA was stepping up their efforts to encourage local food processing enterprises. The usual bundle of incentives extended to industrial investors were being offered--feasibility studies, loans for purchase of facilities, technical assistance, and tax incentives.

³⁰"Third Annual Report," The Commercial Development Company of Puerto Rico, 1965.

³¹U.S. Department of Agriculture, Agriculture Bulletin No. 60, *op. cit.*

Agricultural Research and Extension

The Agricultural Experiment Station and the Extension Service function in Puerto Rico along the same lines as in mainland U.S. Several research studies have been made by the Experiment Station on various aspects of agricultural marketing. Most of these studies have dealt with specific commodity marketing problems. The results have been published in Experiment Station bulletins.

The Extension Service has had an active adult education program in three areas related to food marketing. First, there have been substantial efforts to support the cooperative movement which is described more fully below. Second, there have been programs to educate farmers and food handlers on improved methods of marketing. Third, a sizable consumer education program has attempted to develop food buying skills of both rural and urban families. Much of the information has been disseminated through mass media, although special training classes have also been conducted and pamphlets distributed.

Cooperative Development

Cooperatives among farmers and sugar cane workers existed in Puerto Rico before 1900. However, cooperatives did not become important in the economy until after 1920. In that year a law was approved in the legislature to facilitate the organization and operation of consumer and producer cooperatives. The usual tax exemptions were approved under the law, provided the cooperative followed the rules of one member, one vote, return of profits to members on a patronage basis and less than 50 percent of total business carried on with non-members.

Between 1920 and 1945 the cooperative movement expanded rapidly, especially among farmers. During the period, several large cooperatives were organized; they remain a potent force in the agricultural economy (*e.g.*, a coffee marketing and supply cooperative, a tobacco marketing cooperative and two cooperative sugar mills). The Agricultural Extension Service was quite active during this period in assisting farmers to organize and operate cooperative enterprises.

A visit by Father Joseph McDonald, one of the cooperative leaders in Nova Scotia, to the Catholic University in Ponce started a move that completely altered the nature of cooperativism in Puerto Rico. His philosophy of cooperativism was that it should serve not only as a tool of economic improvement but as a tool of social reform.³² This philosophy was soon accepted by other cooperative leaders on the island, partially as a result of a series of seminars

³²Victor M. Valcarcel, "El Movimiento Cooperativo en Puerto Rico," Instituto de Cooperativismo, Universidad de Puerto Rico, unpublished manuscript, undated, p. 37.

given by Father McDonald at the University of Puerto Rico in the summer of 1945. Moreover, the philosophy infiltrated political circles through a personal interview between Father McDonald and Luis Munoz-Marin, then President of the Senate of Puerto Rico. As a result of that interview, a committee was appointed in the Senate to travel to Nova Scotia and study their cooperative movement for the purpose of making recommendations to improve the laws and policies governing cooperatives in Puerto Rico.

The committee recommended that the legislature approve a new law which would provide for: (1) the organization of credit cooperatives; (2) the creation of a Department of Cooperatives in charge of assisting in the organization of cooperatives and responsible for promoting cooperative education; (3) the development of a curriculum for cooperative education in the University of Puerto Rico and in public schools; and (4) the creation of a credit agency for cooperatives. This law reflected the new cooperative philosophy on the island. The Department of Cooperatives was given the task of fomenting cooperative development and providing cooperative education. There is little doubt that after 1947 (when the law was approved) there was a great deal more emphasis on the social objectives of cooperatives than had been evidenced before.

In 1957 Fomento Cooperativo was created as the high-level government agency responsible for the intensification of the cooperative movement. The philosophy of social reform carried over to this new agency.

Significant growth has occurred since 1947 among credit, consumer, and housing cooperatives. In 1962 there were 255 credit unions, 92 consumer cooperatives and 34 housing cooperatives on the island. Membership in these cooperatives had grown rapidly to over 100,000. On the other hand, agricultural cooperatives experienced very little growth after 1945. In 1962 there were 29 agricultural cooperatives with about 42,000 members. This represents about 13 percent of the island's rural population.³³

In 1966 a new government emphasis on cooperative development was initiated. A new administrator was appointed for Fomento Cooperativo who has expressed a great deal of interest in boosting the number and quality of agricultural cooperatives. The Federal Agricultural Extension Service, Puerto Rico Agricultural Extension Service, Cooperative League of Puerto Rico and Fomento Cooperativo are currently cooperating in an intensive educational program for cooperative members and leaders. The emphasis is upon modern management techniques for effective cooperative business firms.

³³ *Socio-Economic Development of Cooperatives in Latin America*, A report to the Government of the United States by the Cooperative League of the United States, San Juan, Puerto Rico, 1963, p. 281.

Development and Coordination of Agricultural Programs

Throughout the period since 1950 the Department of Agriculture has played an important role in the development of Puerto Rican food marketing system. Some of the major activities include the following:

1. The establishment of quality grades for several commodities. The contribution of an egg grading regulation to improved market performance is discussed in Chapter Six.
2. The development of an agricultural statistics and market information program that provides valuable assistance to farmers and market operators.
3. Active promotion of three rural assembly-markets for farm products. One of these was a washing, grading and packaging facility for fruits and vegetables.
4. Collaboration with other agencies in the planning of the central market for San Juan.
5. The establishment of a milk regulation program to bring stability to the industry and to increase the availability of high-quality fluid milk. This is described in Chapter Six.

The Department of Agriculture is a focus for the efforts of several other agencies concerned with agricultural development. An Agricultural Council was created in 1957 as a follow-up to the recommendation of Nathan Koenig.³⁴ It is composed of representatives from 14 agencies and is chaired by the Secretary of Agriculture. An executive secretary and a staff of technicians conduct studies at the direction of the Council. The council serves as an advisory body to the Governor. The Council has directed considerable attention to agricultural marketing problems. One of their most recent investigations was focused on the slaughtering and processing of meat. The Council's recommendations for action programs typically involve the coordinated efforts of several government agencies. The Agricultural Council attempts to facilitate this type of joint action.

In 1960 the Rockefeller Foundation sponsored a study which proposed a new plan of organization and operation for the Puerto Rican Department of Agriculture and related agricultural agencies.³⁵ In that study it was recommended that the Secretary of Agriculture divide the island into five regions. Each region would have a resident agricultural director who would be coordinator

³⁴Koenig, *op. cit.*

³⁵Guillermo Irizarry, *Las Operaciones y Relaciones de los Servicios Agrícolas en Puerto Rico* (San Juan: Negociado del Presupuesto, 1961).

for all agricultural programs in that geographical region. Such decentralization, it was argued, would permit greater emphasis on coordinated efforts of all agricultural agencies in each region of the island toward the solution of relevant agricultural problems. The reorganization recommendation was adopted by the government of Puerto Rico. An outline of the present organization of the Department of Agriculture is shown in Chart 2.1. In this plan of organization, all island-wide services such as disease control, market regulations and crop insurance are either headed by an individual reporting directly to the secretary or by the Assistant Secretary of Services and Centralized Operations. All programs pertaining to agricultural development in a given geographical area are under the auspices of the specific regional director and the assistant Secretary of Operations.

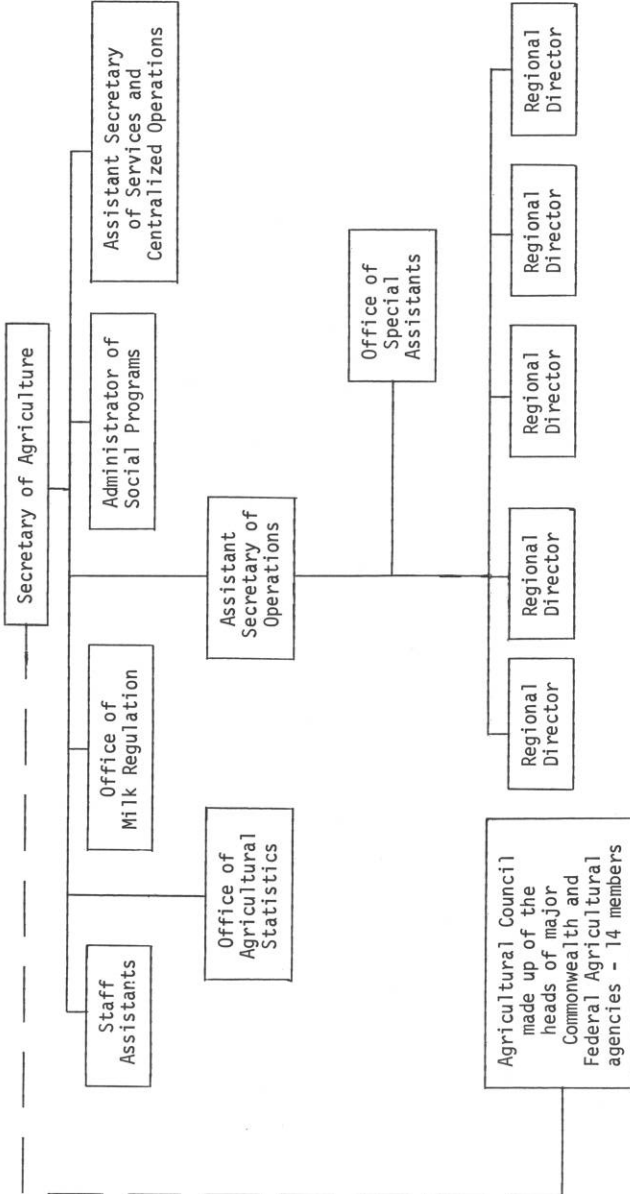
Under his supervision, the Assistant Secretary of Operations has specialists in individual areas such as marketing and production. These specialists are asked to work closely with regional directors in developing programs that will contribute to the region's agricultural development.

The responsibility of each regional director is to coordinate the work of all agricultural agencies in his region (including semi-autonomous commonwealth agencies and autonomous federal agencies). The objective is to see that these agencies are working together toward more efficient agricultural production in the region.

To accomplish the job, each director has a coordinating committee made up of the appropriate heads of all agricultural agencies in his region. And through this committee, the regional director is theoretically able to mobilize, toward a common cause, the resources of the Department of Agriculture, the Agricultural Extension Service, the Agricultural Experiment Station, Vocational Agriculture workers, the Soil Conservation Service, the agricultural credit agencies, and any other agricultural agencies in his region. The logic of such an approach is that all of the agricultural agencies have contributions to make and that a coordination of their efforts will provide mutual help among the agencies, avoid duplication and increase the overall efficiency and effectiveness of their agricultural development activities.

One of the first duties of each regional director after the department's reorganization was to make a comprehensive development plan for his region. In order to prepare such a plan, each regional director conducted an inventory of all farms in his region. That information was tabulated and used to indicate the existing structure and problems of the farmers. Employing that data, the director and his staff were able to move ahead with the identification of specific farm problems and the formulation of a broad regional plan for attacking these problems. At the present time, two of the five regional plans have been completed.

Chart 2.1: Organization Chart for the Puerto Rican Department of Agriculture



The Mayaguez region was the first to complete a development plan and has generally served as the pilot region for the new approach. Work has now been completed there, going beyond the broad, long-range development goals to establish shorter term objectives to be used in achieving the long-range goals. In most cases, objectives have been narrowed to such a degree that each agricultural agent in the region has certain objectives for the coming year. The objective may be to work with a certain specific group of farmers to encourage them to improve drainage, to adopt a new sugar cane variety or to join a marketing cooperative. In this way, each agricultural worker in the region, whether he be a Department of Agriculture employee, an extension agent, a vocational agriculture teacher, etc., is assigned certain specific objectives to be accomplished in the coming year. Thus, duplication of effort is avoided and a direct line of responsibility is established toward achievement of certain regional goals aimed at improving agricultural productivity in the region.

Summary

In this chapter we have presented a brief overview of the Puerto Rican economy, focusing primarily on efforts made between 1950 and 1965 to improve the island's food marketing system. Overall, Puerto Rico's economy grew at about five percent per year, in net real per capita income. Both the agriculture and manufacturing sectors grew, along with the entire economy. However, agricultural gross output was increased by 32 percent while manufacturing rose by 212 percent. Much of the increase in manufacturing was due to an intensive industrial development program utilizing the benefits derived from the island's Commonwealth relationship to the United States. Political stability, actively fostered government development programs and the availability of mainland U.S. capital and federal government services have all contributed to the island's progress.

Food marketing became one focus for development activities as early as the late 1930's, when high food costs, poor nutrition and ill health were recognized as a major reform need. Luis Munoz-Marin and the Popular Democratic Party took the lead in food marketing reforms. In order to develop guidelines for such reforms, several research studies were commissioned. Studies by Perloff, the U.S. Department of Agriculture (the Marketing Facilities study and the Koenig Report), and by Galbraith, Holton and Branson of Harvard University, each pointed to specific reform needs in the island's food marketing system. Needed reforms included the construction of more efficient wholesaling and dock facilities, the fostering of aggressive food retail outlets aimed at modernizing food retailing and lowering food costs, and programs of technical assistance to improve the managerial characteristics of the market participants.

Governor Muñoz-Marin organized a Food Advisory Commission in 1953 to further develop food marketing reform recommendations, and in 1954 the Economic Development Administration (EDA), through its office of Food Distribution, began implementing a program with introduction of supermarkets with vertical integration linking the retailing and wholesaling function as its lead element. In the next few years the program made some progress, but a major new thrust in the development of supermarkets came from Harold Toppel, an entrepreneur whose first *Pueblo* outlet was successful without financial assistance from EDA. Financial assistance from EDA was provided in funding the second *Pueblo* store, and from that point these retail outlets became Puerto Rico's leading food distribution outlet. A second group of supermarkets operated by IBEC were attracted to the island by the EDA. These IBEC owned stores were later purchased by Grand Union, a mainland food chain. First as the *Todos* outlets, these institutions were purchased and further developed by Grand Union. It is important to note that access to mainland U.S. food suppliers provided an important alternative food supply source when local supply conditions were unfavorable.

Other food marketing development programs by EDA included an effort to promote local cooperative based supermarkets. These achieved only limited success. A buying group of small retailers (Independent Stores, Inc.) was successful, largely because of insufficient credit availability, although technical advice and management programs were conducted. A multi-million dollar central market facility was studied and discussed, and portions of it were completed by 1966. A program to encourage food processing was promoted by the Puerto Rican Industrial Development Planning Department (PRIDCO). Finally, the Department of Agriculture has made contributions to food marketing by establishing quality grading, market information programs, rural assembly-market facilities, and a milk regulation program. In addition, the Department has been centrally involved in efforts to coordinate a variety of agricultural and marketing programs on a regional basis.

CHAPTER 3
THE URBAN CONSUMER

Introduction

Any attempt to describe and analyze the changes in the Puerto Rican food marketing system requires a combination of longitudinal as well as cross-sectional studies of the different stages in the market process. Chapters 3 through 6 will provide a descriptive analysis of the food system beginning with the urban consumer and moving back through retailers and wholesalers and finally to the farm production of some of the major commodities that are produced on the island.

Chapter 3 begins by identifying some of the major changes in the characteristics of urban consumers and their food buying patterns over the 1950-65 period. The second part of the chapter presents a cross-sectional analysis of survey data collected in 1965-66 from a sample of 387 households in San Juan and Mayaguez. Food buying behavior is described and the attitudes of consumers toward market conditions is assessed as a basis for obtaining a better understanding of the dynamics of the food distribution system and to identify opportunities for further improvement.

The Changing Urban Consumer: 1950-1965

Demographic Changes

Population expanded only 14 percent in Puerto Rico during the 1950-65 period or less than 1 percent per year. Declining birth rates and outward migration to the U.S. mainland served as checks on population growth. Between 1950 and 1965 the crude birth rate declined from 39.6 to 29.7 per thousand inhabitants.¹ Between 1950 and 1954 net outward migration averaged 51,000 persons per year and was sufficient to hold total population constant at about 2,211,000 persons. From 1955 to 1965 migration slowed, averaging only 9,000 per year between 1961 and 1965. During the early sixties the relative gap in employment and income opportunities had narrowed between the U.S. mainland and the island.

The 1960 Census² showed that 44 percent of the population of Puerto Rico were urban dwellers (residing in urban centers having 2,500 or more inhabitants). This compared with 30 percent urban in 1940 and 41 percent in 1950.

¹Demographic data on population growth, birth rates and migration were obtained from *Selected Indices of Social and Economic Progress*, Puerto Rican Planning Board, Commonwealth of Puerto Rico, 1966.

²*Census of Population, 1960*, U. S. Bureau of Census.

Although a large percentage of the population is still classified as rural, it must be recognized that the entire island has become substantially "urbanized" in terms of modern transportation and communication linkages.

There are three principal metropolitan areas in Puerto Rico: San Juan (population of 589,000 in 1960), Ponce (146,000) and Mayaguez (84,000). The population growth of the island has recently been centered in the San Juan and Ponce metropolitan areas. Between 1950 and 1960 the San Juan population increased nearly 30 percent; Ponce increased 15 percent while the population on the rest of the island actually decreased slightly.

In spite of the reduced birth rate, 43 percent of the Puerto Rican population was less than 15 years of age in 1960. This compared with 31 percent in the corresponding age range in the U.S. The percentage of population under 15 years remained nearly unchanged between 1950 and 1960. The median age in the urban areas in 1960 was 21.3 years as compared to 16.6 years in the rural area. These data emphasize the relative importance of the younger segment of the population. As indicated below, these younger people tend to be better educated than their parents and have grown up under the influence of a more modern socio-economic system. Hence, it would be expected that their demand and consumption characteristics might reflect more modern attitudes than the older segment of the population.

Between 1950 and 1965 the percent of the Puerto Rican population over 10 years of age who were "literate" increased from 75 percent to 86 percent.³ By 1960 the literacy rate in the San Juan metropolitan area was about 95 percent among young people in the age bracket 20 to 29 years. The median number of years of school completed was 8.0 for male San Juan residents over 25 years of age and 10 1/2 years for male residents between 25 and 35 years of age. The years of school completed by females were slightly lower than for males, but again younger females had more education than older females.⁴ Another indication of the high value which Puerto Ricans are putting on education was the rapid rise in university enrollment from 12,639 in 1950 to nearly 37,000 in 1965.

Income

Disposable income per capita in Puerto Rico rose from \$279 in 1950 to \$900 in 1965. When adjusted for changes in the consumer price index, there was a 116 percent increase in real purchasing power over this 15 year period.⁵

³Puerto Rican Planning Board, Bureau of Economic and Social Analysis.

⁴Data on education levels were obtained from the U.S. Census of Population, 1960, Puerto Rico.

⁵Data obtained from the Puerto Rican Planning Board

Detailed estimates of family income and expenditure relationships have been made by the Puerto Rican Department of Labor based upon cross-sectional household surveys conducted in 1953 and 1963.⁶ These studies show that the mean annual real income in Puerto Rico increased 55 percent from 1953 to 1963 (Table 3.1). The mean and median levels of family income in San Juan were nearly twice as high as on the rest of the island.

By 1963 the median family income in San Juan (in current dollars) was \$3,620 (Table 3.2). The mean annual income was much higher, \$4,902, reflecting unequal distribution among families. For example, the data in Table 3.2 show that the richest 9.5 percent of all families in San Juan receive about 30 percent of total income received by all families. At the lower income levels, 20 percent of the families receive less than 6 percent of the total income. By way of comparison, the lower income half of the households on the U.S. mainland receive slightly more than one fourth of the total disposable family income. In contrast, the lower income half of Puerto Rican households had slightly less than one fifth of the disposable income in 1966.

Consumer Expenditure Patterns

During the rapid rise in incomes of San Juan families the percentage spent on food and clothing decreased while increased percentages were spent on transportation, personal care, medical care, recreation, reading and education (Table 3.3). In San Juan food expenditures declined from 33.6 to 29.4 percent of total expenditures during the 1953-1963 period (Table 3.3). For the island as a whole, the percentage of family income spent on food declined from 42.5 in 1953 to 32.8 in 1963.

A detailed cross-sectional analysis of 1963 expenditure patterns among families classified by level of income gives further insight into the changing percentage distribution of expenditures as incomes increase (Table 3.4). San Juan families with less than \$1,000 in annual income were spending 48.2 percent of their income on food as compared to 21.8 percent by families with incomes above \$7,500. Again as incomes increased the major shifts in percentage distribution of expenditures were away from food and toward transportation, medical care, education and recreation, personal insurance, gifts and donations.

⁶The 1963 survey included 2648 households. For explanations on survey procedures see: *Income and Expenditures of the Families, Puerto Rico, 1963*, Bureau of Labor Statistics, Department of Labor, Commonwealth of Puerto Rico, February, 1967.

TABLE 3.1 NUMBER OF FAMILIES, MEAN AND MEDIAN ANNUAL REAL INCOME^a, PUERTO RICO, 1953 AND 1963

Item and Year	San Juan Metropolitan Area	Rest of the Island	Entire Island
Number of Families:			
1953	87,000	333,000	420,000
1963	139,000	321,000	461,000
Percent Change	+59.8	-3.6	+9.8
Mean Income:			
1953	\$2,864	\$1,416	\$1,717
1963	3,976	2,082	2,655
Percent Change	+38.8	+47.0	+54.6
Median Income:			
1953	\$1,932	\$1,144	\$1,287
1963	2,936	1,550	1,896
Percent Change	+52.0	+35.5	+47.3

^aReal income computed on the basis of the Consumer Price Index for Wage Earners' Families (1953 = 100).

SOURCE: Department of Labor, The Commonwealth of Puerto Rico, Income and Expenditures of the Families, 1963, Report 1A - Income of All Families, February 1967, p. 2.

TABLE 3.2 PERCENTAGE DISTRIBUTION OF FAMILIES BY INCOME GROUPS AND PERCENT OF TOTAL FAMILY INCOME RECEIVED BY EACH GROUP, SAN JUAN, PUERTO RICO, 1963

Income Group	Percent of Families	Percent of Total Income
Less than \$1,000	4.9	0.7
\$ 1,000 - 1,999	15.3	4.9
2,000 - 2,999	21.8	11.0
3,000 - 3,999	12.8	9.0
4,000 - 4,999	11.8	10.9
5,000 - 7,499	16.3	20.2
7,500 - 9,999	7.6	13.1
10,000 - 12,499	4.3	9.7
12,000 - 14,999	1.9	5.3
15,000 and over	<u>3.3</u>	<u>15.2</u>
TOTAL	100.0	100.0
Mean Income		\$4,902
Median Income		\$3,620

SOURCE: Department of Labor, The Commonwealth of Puerto Rico, Income and Expenditures of the Families, Report 1A - Income of All Families, February 1967, p. 6.

TABLE 3.3 PERCENTAGE DISTRIBUTION OF AVERAGE FAMILY EXPENDITURES BY PRINCIPAL EXPENDITURE ITEM, SAN JUAN METROPOLITAN AREA, 1953 AND 1963

Expenditure Item	1953	1963	Change 1953 to 1963
All Items	100%	100%	----
Consumption expenditures	93.8	93.3	-0.5
Food	33.6	29.4	-4.2
Alcoholic beverages and tobacco	2.2	2.2	----
Clothing	13.8	10.2	-3.6
Housing, furnishings and equipment	23.1	23.5	+0.4
Transportation	8.2	11.9	+3.7
Medical care	3.1	3.6	+0.5
Personal care	2.2	2.5	+0.4
Recreation, reading and education	4.6	6.3	+1.7
Other consumption expenditures	3.0	3.7	+0.7
Personal insurance, gifts and donations	6.2	6.7	+0.5
Average Expenditure	\$2,841	\$4,793	+\$1,952

SOURCE: Department of Labor, The Commonwealth of Puerto Rico, Income and Expenditures of the Families. Report 1A - Income of All Families, February 1967, p. 1. Report 4A - Expenditures of All Families, November 1967, p. 1.

TABLE 3.4 PERCENTAGE DISTRIBUTION OF AVERAGE FAMILY EXPENDITURES BY PRINCIPAL EXPENDITURE ITEM AND INCOME GROUP, SAN JUAN METROPOLITAN AREA, 1963

Principal Expenditure Item	TOTAL Percent	I N C O M E G R O U P									
		Less than \$1,000 Percent	\$1,000 1,999 Percent	\$2,000 2,999 Percent	\$3,000 3,999 Percent	\$4,000 4,999 Percent	\$5,000 7,499 Percent	\$7,500 and over Percent			
All items	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Consumption expenditures	93.4	98.5	97.1	96.4	89.8	94.4	93.6	90.6			
Food	29.4	48.2	41.9	41.1	31.6	31.6	27.9	21.8			
Alcoholic beverages and tobacco	2.2	4.7	3.0	2.8	2.7	1.8	2.2	1.8			
Clothing	10.2	7.5	11.0	10.4	11.3	12.1	11.5	8.6			
Housing, furnishings and equipment	23.5	23.6	25.3	22.1	21.6	23.3	24.7	23.6			
Transportation	11.9	4.3	4.1	6.5	9.2	10.2	11.7	16.2			
Medical care	3.6	1.5	2.8	3.6	4.8	3.2	3.3	3.6			
Personal care	2.6	4.5	3.1	3.1	2.5	2.7	2.7	2.1			
Recreation, reading and education	6.3	1.8	3.6	3.9	4.1	6.5	6.5	7.9			
Other consumption expenditures	3.7	2.4	2.3	2.9	2.0	3.0	3.1	5.0			
Personal insurance, gifts and donations	6.6	1.5	2.9	3.6	10.2	5.6	6.4	9.4			
Average Total Expenditure	\$4,793	\$ 824	\$1,714	\$2,652	\$3,741	\$4,683	\$6,189	\$10,980			

SOURCE: Department of Labor, the Commonwealth of Puerto Rico, Income and Expenditures of the Families, Report 1A - Income of All Families, February 1967, p. 6. Report 4A - Expenditures of All Families, November 1967, p. 6.

Food Consumption Patterns

As incomes have increased in Puerto Rico there have been substantial changes in the kinds of foods consumed. Large increases in consumption of high protein foods have occurred, especially dairy products, poultry and eggs (Table 3.5).

The only major decline in consumption was in starchy vegetables which have been a major component of the diet. Consumption of other vegetables and fruits have increased. In percentage terms, beverage consumption made the greatest increase from 1939 to 1959, however, there was very little commercial activity in this product line in 1939.

The increase in total per capita food consumption along with the shifting from a starchy diet to one including more protein and other higher valued foods has greatly improved the quality of the Puerto Rican diet over the past 25 years (Table 3.5).

TABLE 3.5 PER CAPITA CONSUMPTION OF SELECTED FOODS, PUERTO RICO

Product	1939-40 Lbs.	1953 Lbs.	1959-60 Lbs.	Percent Change 1939-40 to 1959-60
Total animal protein products	206	346	521	+153
Meat products	40	51	72	+ 80
Fish products	19	20	15	- 21
Dairy products	143	267	420	+194
Eggs	4	8	14	+250
Total other food products	894	949	981	+ 9
Vegetables: starchy	392	322	255	- 35
other	84	94	123	+ 46
Fruits	102	83	147	+ 44
Grains	187	224	211	+ 13
Fats and oils	31	37	39	+ 25
Nuts	---	---	4	+ 25
Coffee, cocoa, tea	11	12	12	+ 9
Sugar products	76	97	97	+ 27
Beverages	11	80	93	+745
Total per capita food consumption	1,100	1,295	1,502	+ 37

SOURCE: "Food Consumption in Puerto Rico for the Fiscal Year 1959-60", mimeographed report. Economic Development Administration, Commonwealth of Puerto Rico.

Food Subsidy Programs

The initiation of a food subsidy program in 1956 has added significantly to the nutrition level of low income families. Without this type of program the percentage of family income which low income families spent for food in 1963 would have been greater than reported in Tables 3.3 and 3.4.

The public records indicate that about 20 percent of Puerto Rican families participated in these food subsidy programs in the mid-1960's. Needy families were able to obtain U.S. Department of Agriculture surplus foods through the Puerto Rican Department of Health. In 1957-58, over \$8 million of food (valued at its cost to the government) was distributed. The program was expanded to include a school lunch program and a program to make high protein foods available to pregnant women. The eligibility requirements have been reduced so that today no Puerto Rican needs to go hungry. In 1965, rice, flour, butter, powdered milk, dried eggs, and lard were given to needy families. In fiscal 1965, the food given to needy Puerto Ricans cost the federal government nearly \$25 million. The retail value of this "free" food was considerably above the purchase cost to the government.

Implications of Change

This brief historical perspective emphasizes that rapid social and economic changes were associated with the modernization of the food marketing system in Puerto Rico during 1960-65. Rising levels of income were associated with increasing demand for food and food marketing services. As would be expected, the percentage of income spent for food actually declined as income levels increased. Within food groups there were large increases in demand for meat, poultry and dairy products with actual decreases in per capita consumption of starchy vegetables. Thus, there have been significant shifts in demand that influenced the mix of food products moving through the food system. In addition, rapid population growth in San Juan has provided an expanded base for new food retailing outlets. The high percentage of young people in the population, their higher levels of education, as compared to their elders, the increasing exposure to mass communication and promotion efforts of business firms have all had some influence on the changing patterns of living and the increasing acceptance of a more modern food distribution system. These relationships will be further examined later in this chapter.

Before turning to the cross-sectional analysis of urban consumers, we should like to remind the reader of two conditions which existed in the Puerto Rican situation which differentiates it from many other developing communities. One condition was the outward migration which held overall island population growth to a very low level during the 1950's. The second condition has been the consumer welfare programs subsidized by the federal government which included a substantial food donation program for low income families.

The Latin American Food Study (LAFS) Sample Survey

A household survey was carried out in San Juan and Mayaguez to obtain descriptive information on existing patterns of food buying. These buying patterns were examined and related to socio-economic characteristics of the household and the person responsible for most of the food buying decisions. This cross-sectional analysis was designed to provide insights into the dynamics of food marketing which might be useful in planning food marketing changes in other developing communities. An attempt was also made to assess attitudes toward market conditions and public efforts to improve marketing.

Interviews were conducted with individuals representing 387 households; 246 of these were in San Juan and 141 were in Mayaguez. An area sampling procedure was used to obtain a representative group of households. The sample was designed and drawn by the Division of Special Economic Studies in the Bureau of Labor Statistics within the Puerto Rican Department of Labor. A sub-sample was actually taken from a larger master sample maintained by the Department of Labor for their periodic sample surveys. The field interviewing was carried out between December, 1965 and February, 1966.

San Juan was selected as the principal urban center to be studied. Mayaguez was included in the study to examine shopping patterns in a smaller urban center with a more traditional set of food marketing institutions, but where large supermarkets had been recently introduced.

The interviewers were instructed to interview *only* the female head of the household and if there was no female head they were to interview the person that made the majority of the decisions on food purchases for home use.

Household Characteristics

The number of persons who lived and ate regularly in the sample households ranged up to 16 with a mean of 4.89 in San Juan and 4.18 in Mayaguez. San Juan had a higher percentage of households with 7 or more members (Table 3.6).

The composition of households varied widely with about one-half of the sample being married couples with children (Table 3.7). The proportion of households composed of women with children (no male head) varied from 7 percent in the San Juan sample to 11 percent in Mayaguez. The "other" category in Table 3.7 includes households where there are adult members present other than the married couples, e.g. grandparents. It also includes households composed of unrelated adults.

In 1964, median family income, before taxes and social security deductions, was between \$2,000 and \$3,500 in both the San Juan and Mayaguez household samples. However, the percentage of families with annual incomes above \$5,000 was significantly greater in San Juan as compared to Mayaguez (Table 3.8).

TABLE 3.6 NUMBER OF PERSONS WHO LIVED AND ATE REGULARLY IN SAMPLE HOUSEHOLDS IN SAN JUAN AND MAYAGUEZ

Number of Persons in Household	San Juan		Mayaguez	
	No. H.H.	% H.H.	No. H.H.	% H.H.
1 or 2	38	15	28	20
3 or 4	91	37	57	40
5 or 6	68	27	42	30
7 or more	<u>49</u>	<u>21</u>	<u>14</u>	<u>10</u>
TOTAL	246	100	141	100
Mean Household Size	4.89	---	4.18	---

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.7 COMPOSITION OF SAMPLE HOUSEHOLDS, SAN JUAN AND MAYAGUEZ

Composition of Household	San Juan		Mayaguez	
	No. H.H.	% H.H.	No. H.H.	% H.H.
Married couple with no children under 18.	51	21	35	25
Married couple with children.	138	56	64	45
Women with children.	16	7	15	11
Other	<u>41</u>	<u>16</u>	<u>27</u>	<u>19</u>
TOTAL	246	100	141	100

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.8 DISTRIBUTION OF SAMPLE HOUSEHOLDS BY LEVEL OF 1964 FAMILY INCOME^a
SAN JUAN AND MAYAGUEZ

Annual Income of Family	San Juan		Mayaguez	
	No. H.H.	% H.H.	No. H.H.	% H.H.
Less than \$500	31	13	14	11
\$ 500 - \$ 999	31	13	15	11
\$1,000 - \$1,999	40	17	28	20
\$2,000 - \$3,499	46	20	40	30
\$3,500 - \$4,999	30	13	20	15
\$5,000 - \$9,999	32	14	15	11
\$10,000 - \$19,000	16	8	2	2
\$20,000 or more	<u>4</u>	<u>2</u>	<u>0</u>	<u>0</u>
TOTAL	230	100	134	100

^a Respondents were asked, "Before paying taxes and social security, in what category did your 1964 family income fall including all sources of income?" The respondents were shown a card on which the above income class intervals appeared.

SOURCE: Consumer Survey, LAFS, 1965-66.

The income distribution of the 1965-66 LAFS household survey in San Juan differs somewhat from the Department of Labor's 1963 estimates presented earlier in Table 3.2. The LAFS survey had a higher percentage of households who reported annual incomes of less than \$1,000 annually and a lower percentage of households with incomes greater than \$5,000. This was somewhat surprising since the LAFS household sample was designed by the Department of Labor as a sub-sample drawn from their larger sampling frame for their periodic household surveys. It is possible, of course, that there was underreporting of income in the LAFS survey.

As a check on household income levels interviewers were instructed to classify sample households by the observed wealth level of the residential area. This was carefully worked out by project supervisors so that each interviewer had photographs of representative houses in each of four wealth level categories. The results of this classification scheme (Table 3.9) seemed to be reasonably consistent with the income distributions reported in Table 3.8 and serve as additional evidence concerning the characteristics of the sample households.

TABLE 3.9 DISTRIBUTION OF SAMPLE HOUSEHOLDS BY OBSERVED WEALTH LEVEL IN RESIDENTIAL AREAS, SAN JUAN AND MAYAGUEZ

Wealth Level of Residential Area ^a	San Juan		Mayaguez	
	No. H.H.	% H.H.	No. H.H.	% H.H.
High	11	5	3	2
Medium	124	50	56	40
Low	69	28	65	46
Very Low	<u>42</u>	<u>17</u>	<u>17</u>	<u>12</u>
TOTAL	246	100	141	100

^aDetermined by interviewers and supervisors based upon instructions by project directors and photographs of representative houses in the four wealth level categories.

SOURCE: Consumer Survey, LAFS, 1965-66.

Personal characteristics of the female head of the household such as age, education, travel and migration experience, and work outside the house are likely to have important influences on food buying practices. The median age of household survey respondents was between 35 and 44 years with two-thirds between 25 and 55 years of age (Table 3.10).

Household survey respondents had completed an average of eight years of education but there was wide variability among the group (Table 3.11). One-fifth had completed less than three years of education while one-seventh had more than twelve years of schooling. There was a significant negative correlation between age and level of education.

TABLE 3.11 NUMBER OF YEARS OF FORMAL EDUCATION COMPLETED BY HOUSEHOLD SURVEY RESPONDENTS, SAN JUAN AND MAYAGUEZ

Number of Years Education	San Juan Percent	Mayaguez Percent
0	11	4
1 to 3	11	16
4 to 6	22	21
7 to 9	17	26
10 to 12	23	20
13 to 15	11	8
16 or more	<u>5</u>	<u>5</u>
TOTAL	100	100

SOURCE: Consumer Survey, LAFS, 1965-66.

As a check on ability of the respondents to read, the interviewers were able to observe whether the individual could read the material on cards which provided alternative response categories for questions on place of food purchase. In San Juan, 12 percent of the respondents could not read at all, while 21 percent could read a little. A relatively higher percent of the Mayaguez respondents could read well (Table 3.12).

TABLE 3.12 ABILITY OF HOUSEHOLD RESPONDENTS TO READ, SAN JUAN AND MAYAGUEZ

Ability to Read	San Juan Percent	Mayaguez Percent
Not at all	12	8
A little	21	17
Well	<u>67</u>	<u>75</u>
TOTAL	100	100

SOURCE: Consumer Survey, LAFS, 1965-66.

In both San Juan and Mayaguez about 15 percent of the female heads of households were working outside the home. Nearly all of these individuals reported that they were working full-time. This represents a significant proportion of the households where convenient access to easily prepared foods is a matter of some importance to the homemaker who has limited time for household food preparation.

Fifty-three percent of the Mayaguez respondents had always lived in that city as compared to 43 percent of the San Juan respondents who had never

lived elsewhere. Of those who had migrated to San Juan, 60 percent had moved in from a small town on the island and 22 percent had moved from another of the larger cities (Mayaguez, Ponce, Arecibo). Nearly one-half of the respondents in both San Juan and Mayaguez had traveled outside the island. About 10 percent had lived in the Continental United States just prior to moving to their present location. Thus, it appears that there has been considerable mobility of families within the Island of Puerto Rico and that a high percentage have traveled outside the island. These experiences have no doubt had some influence on food consumption habits and shopping behavior, especially for those who have lived in the Continental U.S.

The surveyed households represent a wide variation in size, composition and level of income. The female heads of these households exhibit a wide range of characteristics with respect to age and level of formal education. It would be expected that these differences in household characteristics might be associated with shopping behavior and attitudes of homemakers toward more modern food marketing institutions and practices.

Food Buying Decision-making

Eighty-three percent of the San Juan respondents indicated that the female head of the house decides what foods are to be purchased. Men played a relatively small role in both deciding what to buy and in the actual food purchases, although in Mayaguez men were more likely to do the food buying than in San Juan (Table 3.13).

TABLE 3.13 HOUSEHOLD MEMBER DECIDING WHAT TO BUY AND ACTUALLY PURCHASING FOOD, SAN JUAN AND MAYAGUEZ

Person or Persons	Questions			
	(1) Who decides what to buy?		(2) Who purchases the food?	
	San Juan Percent	Mayaguez Percent	San Juan Percent	Mayaguez Percent
Female head	83	75	77	56
Husband and wife	10	12	9	16
Man	<u>7</u>	<u>13</u>	<u>14</u>	<u>28</u>
TOTAL	100	100	100	100

SOURCE: Consumer Survey, LAFS, 1965-66.

In San Juan only 2 percent of the households had maids, compared with 4 percent in Mayaguez. In none of the surveyed households were maids responsible for the major food buying decisions or the actual purchases.

Durable Goods Ownership

Whether a family owns a refrigerator can be a critical factor in their food buying practices. Likewise, ownership or access to automobile transportation affects the feasibility of shopping at large supermarkets, especially

those located at some distance from the family residence.

The number of motor vehicles per 1,000 people in Puerto Rico increased from 27.5 in 1950 to 122 in 1965.⁷ In a household survey conducted in 1965-66 it was found that about one-half of the households in San Juan and Mayaguez owned cars (Table 3.14). In the high income residential areas, about 70 percent of the families reported owning cars.

The 1965-66 survey also revealed that more than 90 percent of the households contacted in San Juan and Mayaguez owned refrigerators. However, there was no way of comparing this with the extent of refrigerator ownership in 1950. Nevertheless, it appears that refrigerator availability and access to motor vehicle transportation has facilitated the development of modern food marketing methods although lower income families are still largely dependent upon public transportation.

TABLE 3.14 PERCENT OF FAMILIES OWNING AUTOMOBILES AND REFRIGERATORS, SAN JUAN AND MAYAGUEZ STANDARD METROPOLITAN AREAS, 1965-66

Item	Percent Owning	
	San Juan	Mayaguez
Automobile	48	50
Refrigerator	96	92

SOURCE: Consumer Survey, LAFS, 1965-66.

Shopping Behavior

Consumers in San Juan and Mayaguez buy most of their food for home consumption from the following types of retail outlets:

Supermarkets - This includes large supermarkets (over 3,000 square feet) handling a complete line of the major food products (dry groceries, produce, fresh meats, dairy products) as well as a wide selection of non-food items. In the consumer surveys the supermarket category also includes smaller self-service stores (superettes) handling a more limited assortment of products but usually handling all of the major food categories and some non-food items.⁸

Colmados - A small food store, usually less than 500 square feet, handling the more popular dry groceries, beverages and a very limited assortment of non-foods. These stores are scattered throughout the residential areas and are frequently operated by families using a garage or part of their residence as a retail food store.

⁷*Selected Indices of Social and Economic Progress*, Puerto Rican Planning Board, Commonwealth of Puerto Rico, 1966.

⁸In the retailer studies reported in Chapter 4, the supermarkets and superettes were established as separate categories.

Cafetins - A small neighborhood retail outlet handling beverages and a limited line of food products. On-premise consumption of food and beverages tend to differentiate the *cafetin* from a *colmado* although the distinction is not clear-cut.

Plaza Markets - A public market facility where small, specialized retailers rent stalls from a municipal agency. A wide range of food products are available, but fresh fruits and vegetables make up a large percentage of the total sales volume. During the early morning the area around the *plaza* market serves as a wholesale trading center for local produce.

Specialized Food Stores - This includes stores that specialize in special product lines such as meat, poultry and eggs, dairy products or bakery goods. These stores may carry a limited line of other products.

Household Sales and Delivery - Milk is the most important product sold and delivered directly to households. Some bread delivery occurs and a few street peddlers circulate through the neighborhoods with fruit and vegetables.

Supermarkets were the most important single type of food outlet in the San Juan area accounting for 42 percent of the average household food purchases at the time of the consumer survey (1965-66). The *colmados* and *cafetins* accounted for another 33 percent of total purchases with the balance distributed among other outlets as indicated in Table 3.15. The *plaza* markets were relatively unimportant food sources although 36 percent of the homemakers said they had shopped there during the previous two week period.

Shopping patterns in Mayaguez differed from those in San Juan with *colmados* being considerably more important than supermarkets (Table 3.15). At the time of the consumer survey, Pueblo (the largest food retailing firm in Puerto Rico) had recently opened a large supermarket in a new Mayaguez shopping center. Prior to that time a cooperative supermarket had been the principal outlet of this type in this urban area. Mayaguez food shoppers also make relatively greater use of the *plaza* market and less use of milk deliverymen as compared to San Juan.

There were significant differences in shopping patterns associated with age, income levels and education of homemakers.⁹ Low income families and homemakers with less education were more likely to be shopping at *colmados*, while better educated and higher income homemakers made greater use of supermarkets. (See Tables 3.16, 3.17 and 3.18.) High income families were more likely to buy milk from deliverymen than were low income families. Middle and upper income families were more likely to shop at *plaza* markets as compared to low income families.

⁹Based upon cross-sectional analysis of the combined data from both San Juan and Mayaguez. Chi-square, contingency tables were constructed to test shopping behavior differences among homemakers grouped by age, education and income characteristics.

TABLE 3.15 RELATIVE IMPORTANCE OF DIFFERENT TYPES OF RETAIL FOOD OUTLETS, SAN JUAN AND MAYAGUEZ

Type of Outlet	S A N J U A N			M A Y A G U E Z		
	Percent of Households Buying	Average Weekly Expenditure ^b	Percent of Weekly Expenditure	Percent of Households Buying	Average Weekly Expenditure ^b	Percent of Weekly Expenditure
Supermarket	67	14.07	42	49	7.50	27
Colmado or Cafetin	65	11.03	33	82	12.14	44
Plaza Market	36	1.73	5	57	2.94	11
Meat Store	42	1.94	6	31	1.26	5
Poultry-egg Store	25	.28	0.8	12	.20	1
Bakery	46	.64	0.2	54	.64	2
Milk delivery-man	56	2.63	8	28	1.10	4
Street peddler	23	.44	2	25	.75	2
Other outlets ^c	n.a.	.80	3	n.a.	1.16	4
TOTAL	----	33.56	100	----	27.69	100

^aPercent buying during two-week period prior to household survey.

^bBased upon two-week recall by respondents and thus subject to some error of estimation. When these data are compared with data presented in Table 3.4 it appears that there was probably some upward bias in the expenditures reported by LAFS survey respondents. Therefore, the data in Table 3.15 should be used primarily as an indication of the relative importance of different types of retail food outlets.

^cIncludes roadside stands, truckers, purchases at farms and other sources.

SOURCE: Consumer Survey, LAFS, 1965-66.

San Juan homemakers were asked to indicate the most important reasons why they shopped at the different outlets where they had actually purchased food during the previous two weeks. As might have been expected, the major reason given for shopping at small neighborhood stores (*colmados* and *cafetins*) was the convenience of going to outlets located near their homes, while credit was the reason given by 18 percent of the homemakers (Table 3.19). Fifty percent of the supermarket shoppers gave convenient location as the principal reason for buying food there, but fresh, quality products and low prices were also important reasons.

Two-thirds of the San Juan homemakers said there was a *colmado* within a block of their home and 9 out of 10 were within one-half kilometer of such

TABLE 3.16 PERCENT OF CONSUMERS SHOPPING AT DIFFERENT RETAIL FOOD OUTLETS BY INCOME LEVELS, SAN JUAN AND MAYAGUEZ

Type of Outlet ^a	Percent Buying by Income Level ^b		
	Low	Middle	High
Supermarket	46	60	80
<i>Colmado or Cafetin</i>	81	74	46
Plaza Market	34	43	44
Bakery	41	45	57
Milk Deliveryman	44	43	72
Street Peddler	15	29	30

^aIncludes only those percentage distributions where there was a significant difference based upon a chi-square test and using a five percent level of significance.

^bIncome levels are based upon annual family income: low is less than \$2,000; middle is \$2,000 to \$2,499; and high is \$3,500 or more.

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.17 PERCENT OF CONSUMERS SHOPPING AT DIFFERENT RETAIL FOOD OUTLETS BY AGE OF HOMEMAKER, SAN JUAN AND MAYAGUEZ

Type of Retail Outlet ^a	Age of homemaker - years		
	Under 35	35-54	55 - over
		Percent	
Supermarket	69	63	46
Plaza Market	32	47	35
Meat Shop	39	45	34
Bakery	43	52	44
Milk Deliveryman	43	56	60
Street Peddler	16	28	24

^aIncludes only those percentage distributions where there was a significant difference based upon a chi-square test and using a five percent level of significance.

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.18 PERCENT OF CONSUMERS SHOPPING AT DIFFERENT RETAIL OUTLETS RELATED TO EDUCATIONAL LEVEL OF HOMEMAKER, SAN JUAN AND MAYAGUEZ

Type of Retail Outlet ^a	Consumers' Education		
	(1-6 yrs.) Low	(7-9 yrs.) Middle	(10 yrs. or more) High
		Percent	
Supermarket	44	54	84
<i>Colmado or Cafetin</i>	77	78	52
Plaza Market	35	38	45
Poultry-egg Store	23	8	31
Bakery	40	40	59
Milk Deliveryman	39	44	72

^aIncludes only those percentage distributions where there was a significant difference based upon a chi-square test and using a five percent level of significance.

SOURCE: Consumer Survey, LAFS, 1965-66.

an outlet (Table 3.20). Eighty-eight percent of them walked both ways when shopping at *colmados* (Table 3.21). Supermarkets were much less accessible and modes of travel to shop there were predominantly by private automobile, bus and taxi. About one-third of the homemakers lived within one-half kilometer of a supermarket and could walk both ways when shopping (Tables 3.20 and 3.21). *Plaza* markets were long distances from most consumers although 30 percent of the homemakers shopping there said they walked both ways.

TABLE 3.19 PERCENT OF HOMEMAKERS GIVING DIFFERENT REASONS FOR SHOPPING AT PARTICULAR RETAIL OUTLETS, SAN JUAN

Reasons Given	Percent of Homemakers	
	Supermarket	<i>Colmado</i> or <i>Cafetin</i>
Close by, convenient	50	70
Fresh, quality products	24	6
Low prices	13	2
Gives credit	0.6	18
Large variety of products	6	0.6
Clean store	5	2
Will deliver	0.6	0.6
Attentive, friendly store	0.6	1
TOTAL	100	100

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.20 DISTANCE FROM HOME TO RETAIL OUTLET WHERE FOOD SHOPPING IS DONE, SAN JUAN

	Percent of Households			
	Supermarket	<i>Colmado</i>	<i>Plaza</i> Market	Meat Shop
In same block	3	65	-	20
Less than 1/2 kilometer	31	26	12	30
1/2 to one kilometer	17	8	16	16
One to two kilometers	18	1	14	15
Two to five kilometers	19	-	58	19
More than five kilometers	12	-	-	-
TOTAL	100	100	100	100

SOURCE: Consumer Survey, LAFS, 1965-66.

Use of Communication Media and Food Marketing Information

Communication plays a critical role as a coordinator of economic activity and as a means of introducing social and economic change (see pages 17 to 24 Chapter 1). Information about nutrition, food preparation and availability of foods in local markets can have a substantial influence on consumer food buying behavior. Attitudes toward new products and new retailing institutions can be affected through both interpersonal and mass communication media.

TABLE 3.21 METHOD OF TRANSPORTATION USED TO TRAVEL TO RETAIL OUTLETS ON LAST SHOPPING TRIP, SAN JUAN

Method of Travel	Percent of Households		
	Supermarket	Colmado	Plaza Market
Walked both ways	35	88	30
Walked to; returned by taxi	3	-	1
Bus and/or public auto	15	1	36
Taxi both ways	1	-	1
Private auto	46	9	31
Other	-	2	1
TOTAL	100	100	100

SOURCE: Consumer Survey, LAFS, 1965-66.

The LAFS household survey revealed that radio was the most important source of local news for homemakers with lower incomes and/or those with less formal education (Tables 3.22 and 3.23). Newspaper and television were relatively more important media for homemakers with higher incomes and higher levels of education. Interpersonal communication channels were relatively unimportant as a source of local news except for lower income, less educated homemakers.

TABLE 3.22 NEWS MEDIA CHOICE AND EDUCATIONAL LEVEL, SAN JUAN AND MAYAGUEZ HOMEMAKERS

Main Source of Local News	Consumers' Level of Education		
	(1-6 yrs.) Low	(7-9 yrs.) Middle	(10 yrs. or more) High
Newspaper	12	21	48
Radio	49	43	22
Interpersonal	9	3	1

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.23 NEWS MEDIA CHOICE AND INCOME LEVEL, SAN JUAN AND MAYAGUEZ HOMEMAKERS

Main Source of Local News	1966 Gross Family Income		
	Low under \$1999	Middle \$2000 to \$3999	High over \$3500
	Percent		
Newspaper	17	22	46
Television	22	34	33
Radio	52	37	20
Interpersonal	9	3	1

SOURCE: Consumer Survey, LAFS, 1965-66.

More than one-half of the homemakers read food ads in newspapers and many felt the ads influenced where they shopped for food (Table 3.24). The percentage of homemakers that look for specials when shopping in food stores was much greater in San Juan than in Mayaguez where most of the buying is done in *colmados* and the traditional *plaza* market.

TABLE 3.24 PERCENT OF CONSUMERS READING AND USING FOOD MARKETING INFORMATION, SAN JUAN

Reading and Use of Information	San Juan	Mayaguez
Reads food ads in newspaper each week	52	55
Believes these ads influence where they shop	39	36
Looks for specials when shopping	69	43
Reads a food shopper's column prepared by Extension Service home economists and published weekly in newspaper	22	21

SOURCE: Consumer Survey, LAFS, 1965-66.

Slightly more than one-fifth of homemakers said they read the weekly food shopping column prepared by a University of Puerto Rico Extension Specialist and published in a local newspaper (Table 3.24). This column provides current information on prices and availability of food with suggestions on food preparation and economical ways to provide interesting and nutritious meals. Nearly all who read this column felt it provided useful information.

Consumer Attitudes Toward Market Conditions

In appraising the performance of the Puerto Rican food system it is useful to examine consumer attitudes toward the changes that have been occurring and to assess their views on how the system could be further improved. With this in mind several attitudinal questions were included in the consumer survey questionnaire.¹⁰

Three-fourths of the surveyed consumers agreed that the quality and variety of food is better now than 10 years ago (Table 3.25). This response pattern was very uniform among the various sub-groupings of the sample. Older homemakers (over 45 years) and those with less education were less inclined to agree but the difference was not statistically significant.¹¹ The high degree of concurrence with this statement indicates a strong consumer belief that there have been major improvements in the food system.

¹⁰ Homemakers were asked whether they agreed or disagreed with several statements about marketing conditions. A five point scale, ranging from strongly agree to strongly disagree, was used to record responses. Only three responses -- agree, disagree or indifferent -- are summarized in this report.

¹¹ The response patterns were tested for statistical significance using a chi-square procedure.

TABLE 3.25 CONSUMER ATTITUDES TOWARD CHANGES THAT HAVE OCCURRED IN THE FOOD SYSTEM AND SOME OF THE EXISTING RETAILING PRACTICES

Statement and Respondent Categories		Response Percent			Total
		Agree	Disagree	Indifferent	
1. The quality and variety of food is better now than ten years ago.					
City	San Juan	77	18	5	100
	Mayaguez	77	16	7	100
Age	44 yrs. or less	79	18	3	100
	45 yrs. or more	75	16	9	100
Education	6 yrs. or less	71	22	7	100
	7 yrs. or more	81	14	5	100
2. It is more enjoyable to shop in a large supermarket than in a small <i>colmado</i> .					
City	San Juan	81	4	15	100
	Mayaguez	81	7	12	100
Age	44 yrs. or less	83	6	11	100
	45 yrs. or more	78	4	18	100
Education	6 yrs. or less	76	5	19	100
	7 yrs. or more	84	5	11	100
3. The scales in supermarkets are adjusted to favor the store owner.					
City	San Juan	29	39	32	100
	Mayaguez	21	45	34	100
Age	44 yrs. or less	26	42	32	100
	45 yrs. or more	26	41	33	100
Education*	6 yrs. or less	41	30	29	100
	7 yrs. or more	15	50	35	100
4. The scales in <i>colmados</i> are adjusted to favor the store owner.					
City	San Juan	26	35	39	100
	Mayaguez	26	42	32	100
Age	44 yrs. or less	25	38	37	100
	45 yrs. or more	26	38	36	100
Education*	6 yrs. or less	34	35	31	100
	7 yrs. or more	20	40	40	100
5. It is risky to buy prepackaged fruits and vegetables.					
City	San Juan	65	25	10	100
	Mayaguez	54	35	11	100
Age	44 yrs. or less	61	31	8	100
	45 yrs. or more	60	27	13	100
Education	6 yrs. or less	67	23	10	100
	7 yrs. or more	56	34	10	100
6. I don't have confidence in the specials advertised by the supermarkets.					
City	San Juan	49	38	13	100
	Mayaguez	49	39	12	100
Age	44 yrs. or less	49	41	10	100
	45 yrs. or more	48	36	16	100
Education*	6 yrs. or less	55	29	16	100
	7 yrs. or more	44	46	10	100

* Chi-square significant at one percent level of probability.

SOURCE: Consumer Survey, LAFS, 1965-66.

Four-fifths of the consumer sample agreed that it was more enjoyable to shop in a large supermarket than in a small *colmado* (Table 3.25). The older and less educated homemakers were slightly less in agreement with the statement and as noted earlier (Tables 3.17 and 3.18) they are less inclined to shop in supermarkets.

Only about one-fourth of respondents felt that they couldn't trust the scales for weighing food in supermarkets and *colmados* and their trust or lack of trust was about the same for both types of retail outlets (Table 3.25). Homemakers with less education were significantly more suspicious of weighing practices than those with more education.

Between one-half and two-thirds of the consumers felt that it was risky to buy prepackaged fruits and vegetables. Presumably, these individuals would prefer to personally select many of these items even when shopping in supermarkets.

Nearly one-half of the homemakers indicated that they didn't have confidence in the specials advertised by the supermarkets. Homemakers with more education were less distrustful of food ads than homemakers with less education. We noted earlier in Table 3.24 that about one-half of the homemakers read food ads and nearly 40 percent believe these ads influence where they shop.

The survey indicated that consumers strongly agree that the egg handling and milk industry regulations have been beneficial (Table 3.26). (These regulations are described in greater detail in Chapter 6 of this report.)

In general, most Puerto Ricans have a high degree of trust in their government. Only about one-third of the homemakers surveyed thought that government programs usually end up benefiting only a select group of politically influential businessmen. Homemakers with less education had less confidence in government programs than those with more education.

The consumer survey revealed that about two-thirds of the San Juan homemakers were shopping at supermarkets while in Mayaguez about one-half were supermarket customers (Table 3.15). Nevertheless, a high percentage (68 percent in San Juan, and 74 percent in Mayaguez) agreed that large supermarkets should be regulated by the government before they eliminate all the small food retailers (Table 3.27). There was no significant difference in views on this issue when consumers were grouped by age or education. The results on this attitude question may not indicate strong disapproval of supermarkets. Perhaps it reveals a basic view that the government should provide assistance and protection to small retailers. It is interesting to note that more than 40 percent of the homemakers felt that supermarkets had all the business they were going to get. Homemakers with seven or more years of education were less likely to hold this view.

TABLE 3.26 CONSUMER ATTITUDES TOWARD PUBLIC REGULATIONS OF FOOD MARKETING ACTIVITIES

Statement		Response Percent			Total
		Agree	Disagree	Indifferent	
1. The mandatory grading and refrigeration of eggs has proved to be a wise regulation.					
City	San Juan	78	4	18	100
	Mayaguez	79	9	12	100
Age	44 yrs. or less	80	5	15	100
	45 yrs. or more	76	7	17	100
Education	6 yrs. or less	74	8	18	100
	7 yrs. or more	82	4	14	100
2. The Milk Regulation has benefited the industry and consumers.					
City	San Juan	84	4	12	100
	Mayaguez	84	8	8	100
Age	44 yrs. or less	84	5	11	100
	45 yrs. or more	84	6	10	100
Education	6 yrs. or less	80	7	13	100
	7 yrs. or more	87	5	8	100
3. Government programs usually end up benefiting only a select group of politically influential businessmen.					
City	San Juan	36	44	20	100
	Mayaguez	30	39	31	100
Age	44 yrs. or less	30	44	26	100
	45 yrs. or more	38	39	23	100
Education*	6 yrs. or less	44	31	25	100
	7 yrs. or more	26	50	24	100

* Chi-square significant at one percent level of probability.

SOURCE: Consumer Survey, LAFS, 1965-66.

TABLE 3.27 CONSUMER ATTITUDES TOWARD ADDITIONAL PUBLIC EFFORTS TO IMPROVE FOOD MARKETING

Statement		Response Percent			Total
		Agree	Disagree	Indifferent	
1. The large supermarkets should be regulated by the government before they eliminate all the small food retailers.					
City	San Juan	68	11	21	100
	Mayaguez	74	14	12	100
Age	44 yrs. or less	70	12	18	100
	45 yrs. or more	71	11	18	100
Education	6 yrs. or less	66	14	20	100
	7 yrs. or more	74	10	16	100
2. Supermarkets have all the business they are going to get.					
City	San Juan	43	19	38	100
	Mayaguez	45	23	32	100
Age*	44 yrs. or less	38	23	39	100
	45 yrs. or more	51	17	32	100
Education	6 yrs. or less	50	18	32	100
	7 yrs. or more	39	21	40	100
3. More strict regulation is needed for the slaughter and distribution of meat.					
City	San Juan	84	4	12	100
	Mayaguez	84	5	11	100
Age	44 yrs. or less	84	4	12	100
	45 yrs. or more	84	5	11	100
Education	6 yrs. or less	80	6	14	100
	7 yrs. or more	87	3	10	100
4. Consumers need more and better information on prices and qualities of products to aid her in shopping.					
City	San Juan	90	2	8	100
	Mayaguez	89	7	4	100
Age	44 yrs. or less	91	3	6	100
	45 yrs. or more	88	5	7	100
Education	6 yrs. or less	87	5	8	100
	7 yrs. or more	92	3	5	100

* Chi-square significant at 5 percent level of probability.

SOURCE: Consumer Survey, LAFS, 1965-66.

There were two problem areas where a very high percentage of the homemakers wanted additional public efforts in food marketing. More than 80 percent wanted more strict regulation of meat slaughtering and distribution. This has been a matter of public concern but most of the locally produced meat still moves through relatively unsanitary local slaughterhouses. Nine out of ten homemakers felt that they needed better information on prices and qualities of food products as an aid in shopping. Since a publicly supported consumer information program is already operating this may suggest further efforts be made to expand or modify this educational activity. As noted earlier in Table 3.24, more than 20 percent of homemakers were reading a newspaper food shoppers' column prepared by a University of Puerto Rico consumer information specialist.

Summary

The household surveys in San Juan and Mayaguez revealed wide variations in the socio-economic and personal characteristics of homemakers and their families. Of central importance was the wide range in levels of family income and the disproportionately large percentage with relatively low incomes. In San Juan, 46 percent of the families had annual incomes of less than \$2,000 while 24 percent had incomes of more than \$5,000 per year. The mean size of family in San Juan was 4.89 persons, but 21 percent of the households had seven or more members. Homemakers had completed an average of eight years of formal education, but 12 percent of those interviewed were unable to read. Older homemakers had less education than younger homemakers.

The female head of the household was the principal decision maker on food buying and actually did most of the food purchasing. Men had a much more important food buying role in Mayaguez as compared to San Juan.

Over 90 percent of the households surveyed had refrigerators and about one-half had automobiles. However, automobiles were mostly found in the middle and upper income households.

By 1966, supermarkets had become a major force in food retailing. At the time of the survey, two-thirds of San Juan households were buying food in supermarkets. Forty-two percent of the total food expenditures by sample households in San Juan were being made in supermarkets as compared to 27 percent in Mayaguez. In both cities, the small neighborhood store (*colmado*) continued to be an important source of food. Homemakers' main reasons for shopping at these small stores were "convenience" and "availability of credit". A cross-sectional analysis indicated that supermarket shoppers are, on the average, younger, better educated and have higher incomes than those who do most of their shopping at the more traditional retail food outlets. Convenience, quality products and low prices were the principal reasons given by those who prefer to shop at supermarkets.

About one-half of the homemakers were sufficiently price conscious to read food ads each week and to look for price specials when shopping. One-fifth said they regularly read a weekly newspaper column by a University of Puerto Rico consumer information specialist, which provides current information on food buying and preparation. However, the survey data indicate that lower income families are less likely to be reached by newspaper information. Radio and interpersonal channels of communication are relatively more important ways of reaching these lower income families.

Most of the homemakers held favorable attitudes toward larger, more modern retail food outlets. Also, three-fourths or more of the respondents were favorably disposed toward the existing government regulations to improve egg and milk handling practices. However, homemakers with lower levels of education exhibited less confidence in government programs and were more likely to suspect that food retailers engage in dishonest practices.

A high percentage of the homemakers felt that there was a need for much stricter regulation of local system for slaughtering and distributing meat. They also expressed a desire for additional information on prices and qualities of food as an aid to food buying.

On the basis of the household surveys it appears that a high percentage of the San Juan and Mayaguez consumers have been willing to shift their food buying patterns. However, the older, less educated and lower income families have been more reluctant to take on new buying habits. Also, on the basis of other information sources it appears that supermarkets have been less available to low income families as compared to those in high income areas who have greater access to the shopping centers where most supermarkets are located.

CHAPTER 4
FOOD RETAILING

Introduction

Changes in urban food distribution have been an important part of the modernization process in Puerto Rico. These changes are particularly evident in food retailing. Large supermarkets have become increasingly important as retail food outlets in the large urban centers and many of the *colmados* have become more modern self-service neighborhood stores. By 1965, two-thirds of the San Juan consumers were shopping in "supermarkets" and over two-fifths of the retail food sales were being made through these newer outlets.

In this chapter and the next there is an attempt to describe and analyze the changes that occurred in the Puerto Rican urban food distribution system over the period 1950-1965. During this period there was a substantial public effort to foment improvements in urban food marketing through a combination of programs to stimulate the establishment of large, modern retail food stores and to assist small food retailers in expanding and modernizing their operations. The broad strategy that emerged from the public concern over food marketing problems has been sketched in Chapter 2 and the changes in consumer shopping patterns was presented in Chapter 3. We now turn to a more detailed examination of actual public and private efforts to change food distribution methods. This chapter gets underway with a brief description of food retailing as it existed in the early 1950's. The structural changes between 1954 and 1963 are then examined using secondary data. This is followed by a brief historical recount of public and private efforts to effect changes in food retailing with emphasis on the food distribution programs of public agencies and the establishment of large supermarkets by mainland operators. In the later half of the chapter an attempt is made to assess the effects of food retailing changes on selected performance attributes such as level of consumer prices, product variety and quality, relative convenience to the consumer and relative efficiency of the older and newer methods of operation. There is a short discussion near the end of the chapter on the effects of supermarket competition on small retailers.

The early part of this chapter draws heavily on the Galbraith and Holton study and statistical data compiled by government agencies. Information on public and private efforts to change food distribution was obtained through public agency reports and a series of personal interviews with selected individuals who played key roles in this change process. Semi-structured interviews were also carried out with managers of the existing supermarket organizations. A stratified random sample of 91 medium-sized stores (annual sales greater than \$12,000) was interviewed in San Juan and Mayaguez to obtain in-

formation on current operations and factors affecting the adoption of new retailing methods (much of this material is presented in Chapter 7). Finally, near the end of the field research activity a special survey of 40 small retailers (*colmado* operators) was conducted in San Juan to assess some of the effects of supermarket competition on their operations.

The reader is reminded that the urban food distribution program in Puerto Rico was a coordinated effort to transform both retailing and wholesaling functions. Hence, Chapters 4 and 5 of this report are highly interrelated.

Food Retailing in the Early 1950's

According to Galbraith and Holton, food retailing in the early 1950's was done almost entirely in small shops with living quarters in the rear and many family members participating as workers in the store.¹ Most outlets sold staples, canned goods, and beverages, with small capitalization and limited volume. Most people walked to their food stores and many shopped several times per day. A description of the various types of retail food outlets is given by Galbraith and Holton, as follows:

"Of the 16,746 retail firms listed by the Census of Distribution as selling food, 14,139 are described as grocery stores. The Census describes such a store, known in Puerto Rico as the *colmado*, as primarily engaged in selling processed food and dry groceries, although fresh meat, vegetables and fruits may also be carried. It is these stores which are the backbone of the retail marketing system -- these are the stores that distribute the imported staple foods throughout the island.

After the grocery stores in importance come four groups of specialized food stores. They are defined, in terms of their principal sales, by the Census as fruit stores and vegetable markets, meat and fish (seafood) markets, milk dealers and milk stands, and miscellaneous food stores. . . . Except for 8 milk dealers and 9 miscellaneous food stores, none of these outlets had sales exceeding \$50,000 a year. The majority of the fruit and vegetable markets and of the candy, nut and confectionery stores had sales of less than \$3,000 a year, while in most of the meat stores sales were between \$5,000 and \$25,000 a year.

The miscellaneous food group included 11 small bakeries, some house-to-house distributors of vegetables and fruits, and some *lechonerias*. These last sell roast meat, commonly pork, and are classified as retailers if more than 50 percent of their sales are for consumption off the premises. Other specialized stores in the category include retailers grinding and roasting coffee for sale.

The stalls in the *mercados* or markets are not all enumerated in the Census. Those rented on a more or less permanent basis -- either to farmers who bring bananas, mangoes, or other fresh produce frequently to the market or to retailers who buy from farmers every day -- were counted by the Census and most of the

¹J.K. Galbraith and Richard Holton, *Marketing Efficiency in Puerto Rico*. (Cambridge: Harvard University Press), 1955.

very small firms listed as 'fruit stands and vegetable markets' in the Census are probably such market stalls. The temporary stands of the farmers who sell intermittently, or of the truckers who fail to dispose of their loads to the usual customers were not enumerated.

Two other types of retail outlets should be mentioned, both peculiar to the Puerto Rican environment. These are the *reposterias*, classified by the Census as manufacturers, which do a sizeable volume of retail business, selling ice cream, sandwiches, their own bakery products, soft drinks and coffee, and other light lunch items. (If this latter part of their business is dominant, they may be classified as eating places.) Many of them also sell canned goods, cold meats, and prepared foods, and in this respect they resemble American delicatessens. Secondly, there are *cafetines*, or bars. They sell canned goods, coffee, sugar and other staples as well as rum and beer, but are classified as grocery stores if sales of grocery products amount to 50 percent of their volume.

There are no data to suggest what proportion of total food supplies move through these last two types of outlets, but two features of their operations should be noted. The *reposterias* and *cafetines* are not subject to closing hours which affect other types of retailers. Hence, food may be purchased on Sundays, holidays, evenings, or while drinking beer or coffee. Conventional retailers, particularly in small villages or towns, may suffer considerably for this advantage of the *cafetines* and *reposterias*.²

The operating characteristics of food retailing in the early 1950's were briefly summarized in Chapter 2 of this report (pp. 45 to 48) and a more detailed exposition is presented in the book by Galbraith and Holton.³

Changes in Food Retailing 1950-65

The changes between the mid-1950's and the mid-1960's in Puerto Rico's food marketing system were substantial. The reader will recall from Chapter 2 that the efforts of government research and fact finding groups led to a series of policy recommendations.⁴ Beginning in 1955, the Economic Development Administration (EDA) initiated a series of activities to carry out a food distribution modernization program. The changes in food retailing institutions will be described and some of the effects will be examined, but it will be useful first to have an overview of the changes in numbers and sizes of outlets.

Number, Size and Types of Food Outlets

A general impression of the structural changes in retail food distribution can be derived from Census of Business statistics. It is worth noting

²*Ibid.*, pp. 14-15.

³*Ibid.*, Chapters 3 and 5.

⁴See particularly the April 1954 recommendations of the Food Advisory Commission cited in Chapter 2, pp. 48-49.

changes in the relative importance of specialty food stores. As seen in Table 4.1, the market share of outlets specializing in meat and fish and fruits and vegetables have declined, although absolute dollar volumes have not. These products are apparently being merchandised increasingly through superettes and supermarkets. On the other hand, sales volume and share of market for confectioneries and dairy stores have increased, perhaps indicating greater demand for certain specialty items as incomes rise.

TABLE 4.1 CHANGES IN SALES VOLUME OF FOOD RETAILING ESTABLISHMENTS AND SPECIALTY FOOD STORES, PUERTO RICO - 1954, 1958, 1963

	1954		1958		1963	
	Thous. Dollars	% Total	Thous. Dollars	% Total	Thous. Dollars	% Total
All Food Retailing Es- tablishments (grocery stores, eating and drinking places)	\$201,687	100.0	\$276,232	100.0	\$382,969	100.0
<u>Specialized Food Stores</u>						
Meat and Fish Markets	6,543	3.2	9,090	3.3	8,752	2.3
Fruit and Vegetable Markets	5,402	2.7	6,301	2.3	6,739	1.8
Confectionery Outlets	671	0.3	553	0.2	2,912	0.8
Dairy Product Stores	1,275	0.6	1,631	0.6	3,636	0.9

SOURCE: Census of Business, Puerto Rico, 1954, 1958, 1963.

Analysis of size distribution statistics helps to identify more fully the structural changes in food retailing. The data in Table 4.2 show that the major changes between 1958 and 1963 were in the largest volume outlets. While outlets selling less than \$10,000 per year stagnated in total sales and lost substantially in market share, outlets with over \$1,000,000 annual sales more than doubled in total volume and increased market share substantially. Indeed, approximately one-third of the growth in total food retail sales between 1958 and 1963 is accounted for by the largest outlets. Virtually all store size categories lost market share during the five-year period to the outlets with sales of \$1,000,000 or more.

The larger outlets are generally of the supermarket type. Growth of sales through these outlets has been substantial with sales volume rising sharply between 1955 and 1964 (Table 4.3). Approximately three-fourths of supermarket sales were concentrated in the San Juan metropolitan area.

Total *paid* employment in food retailing increased 39 percent between 1958 and 1963 (see data in Table 4.2). The major increase was in the largest outlet category, with outlets of over \$1,000,000 annual sales absorbing some 25 percent of the total increase in paid employment. The reader is reminded that there was a substantial amount of unpaid family employment in the low volume outlets that were declining in relative importance. The Galbraith-Holton study

TABLE 4.2 SALES VOLUME, EMPLOYMENT AND OWNERSHIP PATTERNS OF PUERTO RICAN GROCERY RETAILERS - 1958 and 1963

Outlet Size (& sales/year)	Number of Establishments		Sales Volume (millions of \$)		Percent of Total Volume		No. of Paid Employees		Unpaid Family Workers	
	1958	1963	1958	1963	1958	1963	1958	1963	1958	1963
Less than \$10,000	13,214	12,445	\$ 54.6	\$ 54.7	20.3	14.3	620	575	n.a.	5,950
\$ 10 - 24,999	3,824	4,768	56.7	71.4	21.1	18.6	1,712	1,846	n.a.	3,072
\$ 25 - 49,999	1,011	1,686	34.7	56.5	12.9	14.7	1,973	2,596	n.a.	1,043
\$ 50 - 99,999	390	643	27.0	43.2	10.1	11.2	1,376	2,124	n.a.	320
\$100 - 249,999	231	314	35.2	45.7	13.1	11.9	1,380	2,054	n.a.	116
\$250 - 999,999	72	106	30.8	42.8	11.4	11.2	1,095	1,456	n.a.	24
Over \$1,000,000	16	29	29.8	68.7	11.1	17.9	862	1,865	n.a.	2
TOTAL	18,758	19,991	\$268.8	\$383.0	100.0	99.8	9,018	12,516		10,527

SOURCE: Census of Business, Puerto Rico, 1958, 1963.

suggests that the number of unpaid workers was probably an even more significant factor in the early 1950's than in 1963. Without better data on unpaid family labor in food stores it is impossible to draw definitive conclusions on the changes in "total employment" in food retailing during the period of rapid change in this activity. However, it does appear that there was no significant decline in the actual number of persons gainfully employed in food retailing during this period.

TABLE 4.3 SUPERMARKET SALES IN PUERTO RICO - 1955-64

Year	(Thousands of Dollars)	
	Puerto Rico	San Juan SMSA
1955	\$ 7,314	\$ 6,048
1956	14,010	12,411
1959	38,260	34,945
1960	49,835	40,920
1961	56,042	45,237
1963	77,005	60,363
1964	85,398	65,198

SOURCE: *La Industria de Comercio al por menor*, Estado Libre Asociado de Puerto Rico, Departamento del Trabajo, mimeographed, various years.

Public and Private Efforts to Effect Change

The EDA Food Distribution Program, which began in 1955 as a follow-up to the recommendations of the Governor's Food Advisory Commission, placed high priority on efforts to modernize food retailing along the lines of the U.S. system. Large scale, self-service retail stores (supermarkets) were seen as a lead element in bringing about lower food prices and improved services to consumers and as a strong force in rationalizing supply channels.

As far back as 1945 the Puerto Rican government had attempted to introduce supermarkets into the urban food system. This effort was part of a program of government intervention into a number of business endeavors by the Puerto Rican Agricultural Development Company. Sixteen "Praco" food stores were established, but by 1951 they were discontinued and sold as separate units to local individuals.⁵ These stores introduced large-scale, self-service operations and demonstrated that a cash market for food did exist in the larger urban centers. The lack of effective management policies and practices has been identified as the main cause of failure of the Praco stores.⁶

In the early 1950's a mainland resident without previous food retailing experience moved to Puerto Rico and established three modern superette stores

⁵Galbraith and Holton, *op.cit.*, p. 197.

⁶*Ibid.*, p. 198.

in the high income residential area of San Juan. These stores had average weekly sales of about \$10,000 and reportedly operated with very high margins.⁷ Meanwhile, across town a local Puerto Rican established a high-volume, low-markup, self-service food store that achieved weekly sales of as much as \$40,000 per week. This latter store was described by Feller as being very dirty, with poor meat and produce sections, but with low prices on grocery items. The observed experience of these more modern food stores indicated that many Puerto Rican consumers would shift their purchases away from the traditional food outlets in response to lower prices, the greater convenience of a wide range of products in one store location and cleaner, more attractive retail outlets.

When the EDA Food Distribution Program was organized in early 1955, there was an immediate attempt to stimulate the establishment of supermarket type food stores as one of the agencies' early activities. Credit and technical assistance was offered to local retailers and wholesalers to encourage entry into this type of operation. However, there was little response to the opportunity. Meanwhile, efforts were also being made to interest mainland firms in opening supermarkets in San Juan. Teodoro Moscoso, Director of EDA, felt that more modern food stores would help attract mainland personnel needed to accelerate the industrial and tourist development programs.⁸ The EDA offered to select and develop supermarket sites and through the Puerto Rican Industrial Development Company or the Development Bank to finance the construction of facilities that could be leased to supermarket operators.

While this EDA effort was underway, Harold Toppel, a U.S. citizen, visited Puerto Rico in late 1954 and became interested in opening a supermarket. He returned to open his first store in May, 1955, and to establish the Pueblo Supermarket chain. Toppel did not have direct financial assistance through the EDA program when he started. He brought a small amount of investment capital from the U.S., where he and other members of his family had had a life-long background in food retailing. Toppel's first store was a tremendous success. In a sales area of less than 6,000 square feet, weekly volume jumped to approximately \$60,000. The store was clean, well lighted, had a wide product line with prices below those available in other retail outlets. From the beginning Toppel kept a close working relationship with a large mainland food warehouse which supplied him with most of his merchandise at prices generally below those available through local wholesalers. This supply arrangement was an important factor in the success of the Pueblo Supermarkets that have since expanded to become the leading food retailing firm in Puerto Rico.

⁷Personal correspondence with Mr. E. Lee Feller, former Director of the EDA Food Distribution Program.

⁸Information obtained in a personal interview with Mr. Moscoso in 1966.

Several other factors appear to have contributed to the relative success of the Pueblo operation. From the beginning, Toppel tried to foster an image of being a local business entity. Also, special efforts were made to develop a personnel program that provided for careful selection and training of staff and a system of incentives to encourage effective performance. The Pueblo training program undoubtedly contributed to the "local" image and thereby strengthened consumer acceptance. There can be little doubt that over a period of ten years Pueblo Supermarkets became the principal leader among the large scale food retailers in Puerto Rico. By 1965, Pueblo's annual sales had risen to over \$47 million. The firm was operating 12 supermarkets and had vertically integrated into food wholesaling, baking, trucking and cattle feeding operations.⁹

Meanwhile, another outside group, the Rockefeller-backed International Basic Economy Corporation (IBEC), opened four supermarkets in San Juan shopping center locations beginning in late 1956. These stores were taken over by a stateside supermarket chain, Grand Union, in 1958 when they were not performing as well as planned. The acquisition of the IBEC stores by Grand Union was an action of Lansing Shields, the Chief Executive Officer of Grand Union. Shields had been a member of the Food Commission and long an advocate of retail modernization in Puerto Rico.

In 1956-57 two local cooperative supermarkets were established, one in San Juan and another in Mayaguez. A wholesale warehousing activity was organized to service both the supermarket and a group of smaller cooperative food stores. This cooperative activity is more fully described in Chapter 5.

By 1966 there were approximately 40 large supermarkets operating in Puerto Rico and most of these were in the San Juan metropolitan area. One-half of these units were operated by two food chains, Pueblo Supermarkets and Grand Union. The other stores were operated by the Cooperative Federation and other local firms.

The success of both Pueblo and Grand Union has been due, in part, to their purchasing arrangements. They have been able to ship containerized truck load lots of both dry groceries and perishables by "trailer ships" from stateside warehouses to San Juan, where the trailer units are then moved directly to their stores. In this way they can by-pass the traditional wholesale system in the San Juan port area. These arrangements are further elaborated in Chapter 5.

From the beginning the EDA Food Distribution Program was oriented toward the strategy of creating a balanced, competitive food distribution system composed of supermarkets, viable groups of affiliated independent retailers with full-line wholesaling operations and a strong federation of cooperative stores

⁹Annual Report of Pueblo Supermarkets, Inc., 1965.

with its own warehouse.¹⁰ (The EDA efforts to promote the organization of retailer groups and voluntary chains are described in greater detail in Chapter 5.)

In order to implement the EDA strategy a great deal of effort was directed toward educational programs aimed at training store managers and employees in modern methods of food distribution. The Director of the Food Distribution Program, Mr. E. Lee Feller, organized a staff of seven people, five of whom were to develop and carry out training and related technical assistance for food retailers.¹¹ The training effort was worked out in coordination with the Vocational Education Section of the Puerto Rican Department of Education and the Extension Service of the University of Puerto Rico. EDA food marketing specialists from the mainland took the lead in organizing training activities which included short, extension-type programs for store managers and special sessions on handling perishables (produce and meat) for other store employees.¹² Concurrently with the training program the EDA staff were assisting individual retailers in store modernization.¹³ One of the larger stores in the San Juan area was also used as a training and demonstration store.

As time went by, the educational program continued to expand through the collaboration of the University of Puerto Rico's Agricultural Extension Service and the Commonwealth Department of Education. In 1959, Grand Union became an additional collaborator in the retail store management training program.

Without a doubt the EDA educational program was an important element in the modernization of the Puerto Rican food distribution system. This educational program was reinforced by the demonstration effects of the large supermarkets, such as Pueblo and Grand Union, which ran their own training programs. Thus, in a period of slightly more than five years there was a substantial spread of knowledge about modern methods of food distribution enabling many of the local merchants to improve their operations. These governmental efforts to assist local retailers helped smaller retailers meet the competition of the new supermarkets and alleviated some of the political tension that might have developed as supermarkets took over a larger share of the market.

There were other important public efforts to stimulate and facilitate the development of a modern distribution system. The Puerto Rican Planning Board

¹⁰ *Annual Report of the EDA Food Distribution Program, 1955-56.*

¹¹ *Ibid.*

¹² During the 1958-59 fiscal year, 578 persons representing 308 food stores received training through formal workshops and training schools. Detailed information on these activities are found in the Annual Reports of the EDA Food Distribution Program.

¹³ An EDA report dated March 25, 1960 listed 91 individual food stores that had received direct technical assistance from the EDA on store organization and operations during 1956 to early 1960. These stores were located throughout the island, but a high proportion were in the San Juan area.

gave direction to the rapid growth of urban residential areas and attempted to provide for adequate retailing facilities. The Board required that space be reserved for shopping centers in new urbanizations, and rules were set down for the establishment of retailing facilities within these centers. These rules included minimum sizes for food stores. Private urbanization and shopping center developers were required to submit their plans to the Department of Commerce for approval. Also there were licensing requirements for food stores to prevent the establishment of small *colmado* type operations within the new residential areas. In spite of this licensing arrangement there were some clandestine food retailing operations that operated in garages or other portions of family residences.

In 1961 the Department of Commerce was created as a new government entity of the Commonwealth. This signaled greater public commitment to commercial activities as part of the overall economic development effort. The EDA Food Distribution program was shifted to this new department. In 1962, the legislature created a public corporation, the Commercial Development Company (CDC) to facilitate the development of commercial facilities in urban centers. As indicated in Chapter 2, this company took over the San Juan Central Market project and then undertook the planning and construction of commercial centers in various cities across the island. In addition to building and leasing commercial facilities the CDC also has limited authorization to extend credit to private businessmen. The Secretary of Commerce serves as president of the CDC and is assisted by a consulting board of directors.

Some Measures of Performance

From the consumer's viewpoint, the performance of the food retailing system can be judged on the basis of the final price of the product, the variety and quality of the product, and the convenience of shopping. From a more macro point of view, public policy makers may be concerned about the effectiveness of resource use in the retailing activity, especially if public funds are being used to facilitate changes in the retail system.

Several efforts at measuring the price spread between supermarkets and the traditional *colmado* reveal that supermarkets have, in the main, lower prices for those high volume items important in the diet of low income people.

In 1956, a limited price comparison was made between "supermarkets" and the smaller stores. The report prepared by the manager of Independent Stores Incorporated (ISI) for the EDA Industrial Development director was probably a self-serving document but useful in this context (Table 4.4).

In December 1958, the EDA attempted to compare food prices in six supermarkets with those found in a larger group of smaller stores that were part of the Bureau of Labor Statistic's regular sample for monthly price

the small outlets. On balance, it appears that prices in supermarkets are slightly lower than in the small stores for the range of food items checked in the survey. This does not necessarily mean that the supermarkets operate on narrower overall gross margins than the small stores since the large food chains follow "mixed margin" pricing and merchandising policies. Thus, the chains may sell certain products at narrow margins and low prices to attract customers, while counterbalancing these lower margins with higher price margins on other products. In this way the chains, with their wide range of merchandise, can put downward pressure on prices for staple food products which make up the bulk of the sales of many small food stores. Although operators of these small stores may dislike this type of price competition there may be some favorable benefits to certain consumer groups. If the low margins are centered on staple foods, the poorer families will have access to lower priced food while higher income families, who probably purchase more of the

TABLE 4.5 PRICE COMPARISONS ON BASIC FOODS -- SUPERMARKETS AND SMALL STORES, SAN JUAN, PUERTO RICO, MAY 1966

Item	Pueblo Stores	Lucky Seven Stores	Grand Union Stores	Average Price for Supermarkets N=11	Average Price for Small Retailer N=40	Average Price Difference
Rice (packaged) (1b.)	13.0¢	13.0¢	13.0¢	13.0¢	13.0¢	0
Dried cod fish (1b.)	27.0	33.0	32.0	30.6	35.1	+4.5¢
Flour (1b.)	12.3	11.3	8.0	10.9	14.1	+3.2
Lard (1b.)	20.0	16.3	20.0	18.5	22.9	+4.4
Evaporated milk (Carnation)	17.0	17.3	18.0	17.2	18.3	+1.1
Plantains (1b.)	7.3	8.0 (2 stores)	8.0	7.1	5.5	-1.6
Dried beans (packaged) (1b.)	21.0	19.6	20.5	20.5	19.3	-0.9
Tomato sauce (8 oz.)	8.7	10.0	10.0	9.2	10.0	+0.8
Corn meal (packaged) (1b.)	10.3	10.3	10.0	10.2	10.1	-0.1
Rum (1/5th gallon) (Don Q. Llave)	\$2.06	\$2.09 (1 store)		\$2.07	\$2.36	+29.0

SOURCE: Special Price Study, LAFS, May, 1966.

higher margin merchandise, will carry a disproportionate share of the costs of food store operations. In short, it is an income redistribution in favor of low-income families.

There appears to be little doubt that the variety and quality of foods available in Puerto Rican retail food stores has improved substantially since the early 1950's. Part of this improvement is due to the pull of increased demand as consumer incomes have increased. But, the fact remains that the supermarkets have been able to assemble and offer a vastly greater variety of food products, most of which are imported from the mainland U.S. In addition, both Pueblo and Grand Union have attempted to stimulate the development of local supply sources for eggs, poultry, fresh fruits and vegetable products. Thus, the entry of supermarkets has served as a stimulant to improvements in the quality and variety of products now being handled in modern retail food outlets.

TABLE 4.6 TREND TOWARD CASH SALES IN FOOD STORES, EATING, AND DRINKING PLACES, 1954, 1958 1963

Item	Establishments Reporting Some Credit Sales ^a		Establishments Reporting Credit 61-80% of Total Sales	
	Establishment	Total Sales ^a	Establishment	Total Sales ^a
<u>Puerto Rico</u>				
1954	16,299	162,204.9	4,021	48,352.7
Percent of total ^b	93.3%	78.2%	23.3%	23%
1958	17,204	178,472.5	4,952	58,336.9
Percent of total	80.3%	62%	23%	20%
1963	17,862	248,062.3	4,651	63,399.2
Percent of total	80%	60%	20.7%	15.4%
<u>San Juan Standard Metropolitan Area</u>				
1954	3,093	49,476.3	795	13,947.3
Percent of total	74%	66%	19%	19%
1958	3,031	48,908.6	734	12,565.4
Percent of total	70%	47%	17%	12%
1963	3,558	74,023.0	524	11,543.0
Percent of total	66%	42%	10%	6%

^aAll sales figures in \$1,000.

^bAll percentages refer to total food stores or food store sales.

SOURCE: Census of Business, Puerto Rico
 1954 Census Table I-6 and Table II-6;
 1958 Census Table I-6 and Table II-6;
 1963 Census C-5.

Supermarkets and large self-service stores are less conveniently located than the small neighborhood *colmados* for those who must walk to the store or use public transportation. However, for the shopper with an automobile, the large store with a parking lot is more convenient than the typical neighborhood *colmado* where parking is often limited or non-existent. The other major convenience advantage of the supermarket type outlet is the wide range of merchandise making possible one-stop shopping. For these reasons and others it was no surprise to find that many consumers had readily shifted their shopping to the supermarket type outlets (see Chapter 3 for details on consumer shopping patterns and attitudes toward different types of food stores).

With the shift toward supermarket outlets, there has been a noticeable reduction in the sales of food on credit. Galbraith and Holton reported that 94 percent of the retail food stores were offering credit in the early 1950's and that one-half of the stores were extending consumer credit on 60 percent of their total sales.¹⁵ The more recent *Censuses of Business* indicate a growing trend toward cash sales, especially in the San Juan area (Table 4.6). While the shift away from credit sales may be an inconvenience to some customers, the principal advantage is the reduction in the cost of providing retailing services.

The relative efficiency of resource use among different sizes of outlets is difficult to measure in an aggregative way since there are differences among store services performed and variations in the relative proportions of inputs used such as labor and capital. Nevertheless, some partial measures of input-output relationships will illustrate the extent to which the effectiveness of resource use varies among different sizes of outlets and how the average relationship changes over time for all food stores as a group.

Between 1949 and 1963, U.S. annual food sales per food store worker doubled, rising from \$24,216 to \$48,631.¹⁶ During this same period, Puerto Rican food store sales per worker rose from \$970 annually to \$8,990, or a ninefold increase.¹⁷ Nevertheless, sales per store worker in Puerto Rico were still only about one-fifth of the U.S. level. It should be noted that the shift to large-scale retail outlets had largely occurred on the U.S. mainland by 1963 whereas the Puerto Rican transition to larger scale retailing was still occurring.

The average annual sales per employee in a 1965 sample of San Juan stores varied from \$3,500 for the smallest category (annual sales less than \$12,000)

¹⁵Galbraith and Holton, *op.cit.*, p. 20.

¹⁶National Commission on Food Marketing, *Organization and Competition in Food Retailing*, Technical Study No. 7, U.S. Government Printing Office, June, 1966, p. 15.

¹⁷Galbraith and Holton, *op.cit.*, p. 17.

to \$48,764 for the largest size store group (Table 4.7). Part of this difference in sales per employee can be associated with the wide differences in average size of customer transaction with relatively greater sales per customer in the larger stores (Table 4.7).

Sales per square foot of selling space was also much greater in the large San Juan stores as compared to smaller operations (Table 4.8). Inventory turnover was relatively high in the smallest store category and then appeared to be much lower (5 to 8 times per year) in the next three size categories with the higher turnover (14.6 times per year) in the largest store category.

TABLE 4.7 AVERAGE SALES PER EMPLOYEE AND PER CUSTOMER, FOOD STORES, BY SIZE OF STORES, SAN JUAN, 1965

Size Category as Determined by Municipal License	Average Annual Sales Per Employee 1965	Median Sale Per Customer 1965
	dollars	dollars
Annual Sales		
Less than \$12,000	3,500	.48
\$ 12,000 - 47,999	13,550	1.55
\$ 48,000 - 119,999	11,825	1.39
\$120,000 - 479,999	22,550	4.33
\$480,000 or more	48,764	7.24

SOURCE: LAFS Retailer Survey, 1965-66.

TABLE 4.8 AVERAGE ANNUAL INVENTORY TURNOVER AND AVERAGE SALES PER SQUARE FOOT OF SELLING SPACE BY SIZE OF STORE, SAN JUAN, 1965

Size Category as Determined by Municipal License	Annual Inventory Turnover 1965	Median Weekly Sales Per Square Foot of Selling Space 1965
		dollars
Less than \$12,000	10.5	1.09
\$ 12,000 - 47,999	4.7	1.05
\$ 48,000 - 119,999	6.4	1.21
\$120,000 - 479,999	8.3	2.88
\$480,000 or more	14.6	8.68

SOURCE: LAFS Retailer Survey, 1965-66.

Thus, it appears that large stores achieve much greater sales per unit of labor and space and much higher turnovers of their capital investment in inventories as compared with medium and smaller sized stores. Therefore, a

shift to larger food stores should make possible more productive use of these resources than would occur if food retailing remained in the hands of smaller store operators. The relative increase in sales of large scale retail food stores is further evidence of their competitive advantage (Tables 4.2 and 4.3).

It is difficult to trace the changes in gross margins in food retailing as the transition toward larger, more modern outlets occurred. Galbraith and Holton had reported average gross margins of 23 percent among retail food stores in Puerto Rico in 1950. This compared with gross margins of 13 to 16 percent in mainland foodstores during the same time period.¹⁸ In 1959, Pueblo Supermarkets, Inc. reported a gross margin of 17 percent on sales. This margin included their retailing operations and some wholesaling activities.¹⁹ At that time, this represented a significantly lower margin than those reported by Galbraith and Holton for the early 1950's. Since 1959, Pueblo's gross margin has increased and in 1966 was 22 percent (Table 4.9). This paralleled similar increases in gross margins realized by supermarkets in the mainland U.S.²⁰

TABLE 4.9 SALES AND COST OF GOODS SOLD BY PUEBLO SUPERMARKETS, FISCAL YEAR ENDING JANUARY 31, VARIOUS YEARS

Fiscal Year	Gross Sales	Cost of Goods Sold	Gross Margin	Net Profit After Tax
	Thousands of Dollars		Percent	
1959	13,830.9	11,472.4	17	3.3
1960	17,663.8	14,549.9	17	3.9
1961	21,867.8	17,793.0	18	4.1
1963	31,370.7	25,335.4	19	4.4
1964	38,413.5	30,975.6	19	4.2
1965	47,659.7	37,206.0	21	3.9
1966	55,787.8	43,189.9	22	4.2

SOURCE: Annual reports, Pueblo Supermarkets, Inc., San Juan, Puerto Rico.

Pueblo's net profits after taxes have been relatively high as compared to the returns realized by stateside food chains. During the 1959-66 period Pueblo's profit rate after taxes has ranged between 3.3 and 4.4 percent. During the corresponding period, mainland U.S. food chains were realizing an overall average net return after taxes of 1.2 to 1.4 percent.²¹ This suggests that if the competitive situation warranted it, Pueblo could further reduce

¹⁸Galbraith and Holton, *op.cit.*, p. 31.

¹⁹Pueblo became a public corporation in 1959. Information on their financial operations is not available for their operations between 1956 and 1958.

²⁰National Commission on Food Marketing, *op.cit.*, pp. 215-26.

²¹*Ibid.*, p. 15.

retail food prices and still achieve an acceptable net profit. However, one might observe that Pueblo may not have cut retail prices as much as they might have for fear of appearing to be overly aggressive and, therefore, subject to retaliation by other retailers through politically supported action. It is also likely that no competitor has been able to put effective pressure on Pueblo to cause them to reduce prices.

Effects of Supermarket Competition on Small Retailers

During the 1955-65 period of rapid expansion of large scale supermarkets in San Juan, there was relatively little organized opposition by traditional, small scale food retailers.

In 1961 there was vigorous discussion in the Puerto Rican legislature concerning the proposed extension of Grand Union supermarket operations into some of the secondary cities on the island. The pressures that developed apparently discouraged Grand Union from going ahead with the planned expansion.²²

It is interesting to examine some possible reasons why the shift to larger scale retailing occurred as smoothly as it did in Puerto Rico. It appears that continued growth of the total market provided an opportunity for large supermarkets to take over an increasing share of the market without rapidly displacing a large number of small store operators. Many of the supermarkets were placed in new shopping center locations designed to serve new urbanizations where small stores had not yet become established. Also, concessions were made to permit small retailers (family operations) to remain open evenings and weekends while supermarkets were restricted to a shorter period of operation. This enabled small retailers to gain some relative advantage as convenience outlets. Then too, there had always been a continuous process of easy entry and exit of *colmado* type outlets with relatively rapid turnover in ownership. Hence, it was not considered unusual for these small store operators to experience financial difficulties and go out of business. Since many of these outlets occupied a portion of a family residence the space used could easily be shifted to other uses. Moreover, the more aggressive *colmado* operators also had opportunities to receive technical assistance from the EDA food marketing specialists. This enabled some of them to modernize their operations and become larger, self-service neighborhood stores. It seems likely that all of these factors contributed to a relatively orderly shift from a traditional, small scale food retailing system toward supermarkets and modern self-service neighborhood stores.

A special survey of 40 *colmado* operators²³ was made early in 1966 to further examine some of their reactions and adjustments to the increasing

²²Annual reports and memorandum of the EDA Food Distribution Program.

²³The survey was limited to stores with annual sales of less than \$12,000 annually.

competition from supermarkets. Seventy-five percent of these small retailers said their sales had been declining and that supermarket competition was one of the principal causes of this decline. A few had experienced sales increases of liquor for on-premise consumption (7 percent) or liquor to take out (4 percent). About 80 percent of these small operators said that without beverages and liquor sales they would not be able to remain in business. Thus, it appears that many of the existing *colmados* have been able to survive supermarket competition by continuing to serve as convenience food outlets, while some have shifted greater relative emphasis to the sale of beverages (including beer and other liquors).

Some Summary Observations

There was a rapid change in the Puerto Rican food distribution system beginning about 1955. By 1965, supermarkets were handling approximately 40 percent of total food store sales in the San Juan area and more modern food retailing practices were spreading to other urban centers on the island. These changes in food retailing were part of a broader shift toward a higher income, mass consumption society.

In 1954, the Economic Development Administration of the Commonwealth of Puerto Rico instituted a program of technical assistance along with credit incentives to stimulate the modernization of food retailing. This was part of a more general program of fomenting economic growth and development on the island. The EDA food distribution program was preceded by several studies and the related recommendations of a high-level advisory committee appointed by Governor Muñoz-Marin. This generated strong political commitment for a food marketing program that had grown out of a rather careful and comprehensive analysis of the existing food system.

Although several of the existing food retailers expanded and modernized their food stores in response to the EDA program, none successfully established large supermarkets at the beginning of the food distribution modernization program. It remained for outsiders to successfully introduce supermarkets to Puerto Rico. The most successful supermarket entrant was Harold Toppell who opened his first outlet without direct financial assistance from the EDA. Another early entrant into supermarket operations in the San Juan area was IBEC who opened stores in new shopping center locations and later sold out to the U.S. mainland food chain, Grand Union. The Cooperative Federation opened two supermarkets, one in San Juan and another in Mayaguez.

There was no sudden displacement of small retailers with the growth of food sales through supermarkets in the San Juan area. The supermarkets gained much of their market share by taking over the overall growth in total food sales due to increased population and rising incomes. During this period of transition there was a significant increase in the number of paid employees

in food retailing but the number of unpaid family workers probably declined. It appears that modernization of food retailing in San Juan did not add to a continuing unemployment problem and that traditional retailers did not organize to solicit politically sanctioned protection from the large supermarkets.

From the consumer's viewpoint the introduction of large supermarkets has brought lower food prices, a much greater variety of products, improved product quality, and increased shopping convenience for those with automobiles or easy access to the large food stores. Nevertheless, the smaller and now more modern neighborhood *colmados* continue to handle more than one-half of the total retail food sales in the San Juan area.

From a more macro-economic viewpoint, it appears that the larger scale retail units are achieving much greater sales per employee and a higher rate of inventory turnover than the smaller retail food outlets. But, much of the relative economic advantage of the larger food retailing firms is achieved through more efficient organization for buying and delivering goods to the retail outlet (see Chapter 5).

A great deal has been accomplished in the modernization of food retailing in Puerto Rico. However, the potential for reducing food costs, especially to low income families, has not been fully realized. The possibilities for further improvements will be considered in Chapter 9.

CHAPTER 5
FOOD WHOLESALING

Introduction

The wholesaling function is a critical element to the performance of any modern food marketing system, but it is particularly important in Puerto Rico. Approximately 60 percent of the island's food supply is imported from mainland U.S. and nearly all of the shipments pass through the port facilities and wholesaling operations in San Juan.¹ The local assembly wholesale system handles a wide variety of perishable commodities for which it has been difficult to organize an orderly, low-cost marketing system. The leaders of the Puerto Rican government recognized the relative importance of food wholesaling activities in their initial efforts to improve food marketing. Studies were carried out to identify problems and various proposals were made to improve wholesaling functions.²

This chapter describes the food wholesaling situation as it existed in the early 1950's and points up the major changes that occurred during the period 1950-65. Although several changes had occurred by the time this study was conducted in 1965-66, it was apparent that food wholesaling activities were still in a state of transition and certain conditions were serving as barriers to change. A short epilogue appears at the end of this chapter to report on some important food wholesaling developments that occurred after the field work for this report had been completed.

Food Wholesaling in the Early 1950's

The Galbraith and Holton study provides a useful benchmark description of food wholesaling operations as they existed in 1950. They observed that:

"Since the bulk of Puerto Rican food supplies are imported and reach consumers through a large number of small retailers, the position of the food wholesaler is one of strategic importance. In relation to the physical volume of foodstuffs handled and to its limited variety, the number of wholesalers, like the number of retailers, is strikingly large."³

In a sample survey of 171 wholesalers, Galbraith and Holton found 11 large firms with sales of over \$2,500,000 annually. These 11 firms accounted for 25

¹Robert L. Holland and Don L. Long, *Improved Food Handling Facilities for San Juan, Puerto Rico*, Marketing Research Report No. 722, U.S. Department of Agriculture, Washington, D.C., 1965.

²Otten, C.J., G. Serra and B.M. Morell, *Marketing Facilities for Farm and Related Products at San Juan, Puerto Rico*, U.S. Department of Agriculture, Agr. Bul. No. 60, Washington, D.C., 1951.

³John K. Galbraith and Richard Holton, *Marketing Efficiency in Puerto Rico*, (Cambridge: Harvard University Press), 1955, p. 36.

percent of the total sales by all wholesalers in the sample. At the other end of the size range, 71 percent of the firms handled only 27 percent of sales. The average annual sales volume for all firms was \$57,427.⁴

More than half of the firms carried what was then considered a "full line" of goods -- canned goods, cereals and staples. One-half of the remaining firms carried a limited line of either canned goods and staples or cereals and staples. The rest specialized in meats or vegetables or dairy products or other items of a non-food nature. Canned goods and staples accounted for nearly 90 percent of the sales of surveyed wholesalers.

Sales between wholesalers were common. The 140 wholesalers in the Galbraith-Holton sample reported that one-fourth of their customers were wholesalers, the remainder being retailers.⁵ Limited-line firms often served as exclusive agents and therefore served the other wholesalers and the retailers with their brands. The large wholesaler supplied the smaller ones who could not take advantage of large volume purchasing, direct buying and importing.

In 1950 there were many small importers who also acted as wholesalers for many products. These importers were in effect equivalent to jobbers, serving both a brokerage function as well as a warehousing or wholesaler's function. Usually the importers carried a few non-competing lines and other importers carried complementary and competing goods. It is important to note that these importers often collected both a broker's fee and a wholesaler's mark-up.

Some wholesalers also acted as brokers or agents, in which case the goods were delivered directly to the customer from the dock area without passing through the warehouse of the wholesaler. Some of the full-line operators sold less than three-fourths of their products through their warehouse, but the practice of by-passing the warehouse was more common among the limited-line operators.

The extension of credit by wholesalers to retailer clients was a nearly universal practice. Eighty percent of the wholesalers in the Galbraith and Holton sample granted credit on over two-thirds of their sales and 25 percent sold everything on credit.⁶ A large majority of the wholesalers offered cash discounts. One-third of the respondents charged a higher price for delivery. Buying in quantity frequently entitled the buyer to a discount. However, there did not seem to be a fixed basis for discounts even within the same firm. On the contrary, the discount and terms were usually arranged by bargaining with the buyer, and such agreed upon terms might not apply to a similar transaction sometime in the future.

⁴*Ibid.*, p. 37.

⁵*Ibid.*, p. 40.

⁶*Ibid.*, p. 43.

Wholesalers had three general sources of supply: direct purchase from the manufacturer, shipment to the wholesaler from local manufacturer's agents or purchases from other wholesalers. Import agents, who themselves sold to retailers, were the most important source of supply for most wholesalers. Even the large wholesaling firms were dependent to a significant degree upon such importers. Direct purchase from the manufacturer accounted for less than one-third of the supplies of the smaller firms selling less than \$100,000 worth of merchandise per month.

Smaller operations were staffed largely by the working owners, but as the size of the operation increased so did its hired staff. Generally, the picture from the point of view of the wholesaler in Puerto Rico was not nearly so bleak as it was for the small retailer in 1950. The smaller wholesale firms selling less than \$20,000 a month returned only about \$200 to \$300 monthly to their owners. But considering the relatively small investment required to enter the business the occupation was attractive. The average initial capital investment was \$23,000 and many began with less.⁷

The average gross margin for all wholesalers surveyed by Galbraith and Holton was 14 percent. The so-called "full-line" wholesalers had average margins of 15.5 percent of sales while "limited-line" wholesalers had average margins of 11.8 percent. It was observed that food wholesaler's margins on the mainland were from one-half to two-thirds of those in Puerto Rico.⁸

Changes in Food Wholesaling 1950-65

Proposed Program of Change

The various food marketing studies commissioned by Governor Muñoz-Marin repeatedly pointed up the inadequacies of the food wholesaling system (see Chapter 2, pp. 43 to 45). The study by Otten, *et.al.* in 1949 strongly recommended a series of investments in marketing facilities to include a central wholesale market and grain handling facilities in the San Juan port area.⁹ The need for a central wholesale market facility was reiterated and amplified in studies by Koenig¹⁰ and the Harvard University group.¹¹ The Governor's Food Advisory Commission subsequently (1954) recommended the construction of a central market complex in the San Juan bay area. Shortly thereafter (1955), the EDA initiated an action program to modernize food distribution based upon

⁷*Ibid.*, p. 50.

⁸*Ibid.*, p. 54-56.

⁹Otten, Serra and Morell, *op.cit.*

¹⁰Nathan Koenig, *A Comprehensive Agricultural Program for Puerto Rico*, U.S. Department of Agriculture in cooperation with the Commonwealth of Puerto Rico, 1953.

¹¹Galbraith and Holton, *op.cit.*, p. 191-92.

a strategy of fostering a competitive interaction among different groupings of integrated food wholesaling and retailing organizations. These groups were to include a corporation supermarket chain, a voluntary chain with a full-line wholesale warehouse, and a retailer-owned wholesaling unit. It was hoped that new, more modern wholesale-retail operations would reduce costs and improve the overall performance of the food distribution system. As noted in Chapter 2, not all of these proposed changes had been successfully carried out by 1966 when this study was conducted.

The key changes in food wholesaling activities involve the adoption of a major technical change -- the use of trailer ships and a group of related efforts to institutionalize a large scale multi-product wholesaling function including retailer cooperatives and a cooperative federation to serve supermarkets, medium sized urban outlets and smaller rural retail outlets. Each of the major changes is treated here as a more-or-less episodic event; hence, the reader should realize that there were important overlaps of time and interaction among these changes.

The Trailer Ships

A technological change that has had a major impact on the food importing and wholesaling activities in Puerto Rico is the trailer ship. This came into being quite apart from the planned program of change described above. Beginning in 1958, large, specially designed ocean vessels began to ferry loaded truck trailers between docks in the U.S. and the San Juan port. Some of the trailers were equipped with refrigeration units. As explained in Chapter 4, the trailer ships enabled the larger chain store organizations (Pueblo and Grand Union) to buy food products through large wholesale warehouses on the mainland and have the trailers unloaded in San Juan for direct movement to their supermarkets. In this way these firms could by-pass the local wholesaler-importers and avoid some of the brokerage fees. There were also other cost advantages due to reduced physical handling, lower spoilage and pilferage rates and the use of trailers as temporary storage units at the store locations, thus reducing the need for a central warehouse facility and storage space within individual stores.

Although trailer ship service became generally available and widely used for the movement of all types of merchandise, large wholesaler-importers and the larger supermarket organizations had definite advantages over their smaller competitors in using this method of acquiring products. Since trailer ship service required that orders be in large trailer load units it was virtually impossible for small food retailers and wholesalers to utilize this service.

The trailer ship has facilitated the importation of large quantities of uniformly, high-quality perishable products (fruits and vegetables, meats, poultry, eggs and dairy products). This has placed strong competitive pressures

on Puerto Rican producers. In some instances this has probably served to discourage local production. On the other hand it may also have stimulated local producers to improve their production and handling practices so as to deliver higher quality products.

The Central Market Project

One of the key recommendations of the Governor's Food Advisory Commission was to build a new central market facility which would make it possible to transfer the principal wholesaling activity from the crowded dock area in old San Juan to a new location across the bay. As indicated earlier in Chapter 2 (p. 53), there were several frustrating attempts to move ahead with the Central Market project. The project was restudied at least three times and the responsibility for implementation was shifted from the Department of Agriculture and Commerce to the new Department of Commerce in 1961, and was later assigned to the Commercial Development Company (CDC), a public corporation related to the Department of Commerce.

The last feasibility study for the project was conducted by a team from the U.S. Department of Agriculture. In reassessing the need for the Central Market they offered the following statement:

"The facilities used in wholesaling food are scattered throughout the metropolitan area. The largest single concentration of operators is in the old San Juan area adjacent to the piers and contains about half of all the food wholesalers in the city. Much smaller groups are located in Rio Piedras, Santurce, and Bayamon. Others are scattered throughout the city."

"The inefficiencies and other unsatisfactory conditions have been known for years. The major inadequacies are inefficient facilities, narrow and congested streets and service areas, poor parking areas and locations, poor working conditions, lack of proper wharf facilities, lack of a concentrated market, lack of market regulation and enforcement, poor facilities for truckers and farmers, poor handling methods, poor working conditions, unsanitary facilities, and fire hazards. All of these have contributed to high costs of operation and have made it difficult for many operators to remain in business under competitive conditions."¹²

Holland and Long recommended that the \$11.9 million center be constructed on a 48 acre tract of land in the Puerto Nueva section of San Juan. The 588,675 square feet of buildings were estimated to cost \$4.2 million while land costs were estimated at \$7.7 million. They projected annual rentals to finance the project at \$1.60 per square foot if constructed by an authority of the Commonwealth of Puerto Rico and \$2.60 per square foot if privately financed. All cost relationships were in terms of 1964 conditions.¹³

¹²Robert L. Holland and Don L. Long, *op.cit.*, p. ii.

¹³*Ibid.*

The first stage of the Central Market facilities (two large warehouses) were completed in late 1964 at a cost of \$1.8 million of which 30 percent was provided by a legislative appropriation and the other 70 percent was financed through the Development Bank (Banco Gubernamental de Fomento).¹⁴ By 1968, the facilities had been expanded to 626,000 square feet of warehouse space and the total facility costs had climbed to about \$4.1 million.¹⁵ At that time (1968), the CDC estimated that the total demand for food warehousing space for the San Juan metropolitan area to be around 1.5 million square feet or more than twice the area in the Central Market.¹⁶

By 1966, there were nine wholesaling firms operating in the new Central Market facilities. Among these firms was the Cooperative Federation (Federación Puertorriquena de Cooperativas de Consumo)¹⁷ with a large warehouse handling a full line of groceries, non-foods and a limited line of frozen foods. The warehouse space was at dock height and was designed for fork-lift materials handling. However, since the Cooperative found it necessary to purchase most of their supplies from limited-line importer wholesalers and to fill orders for many small retail stores it was not possible to achieve high levels of efficiency for materials handling.

Other Food Wholesaling Facility Projects

The efforts of the EDA to foment private investment in food processing and grain handling facilities in the San Juan bay area were described in Chapter 2 (p. 54). By 1966, the grain handling facilities were operating successfully whereas the large livestock slaughtering and meat processing plant at Caguas had never achieved a satisfactory level of utilization. The Agricultural Council, an inter-government agency coordinating body, were undertaking a re-evaluation of the livestock slaughtering and meat distribution situation in 1966.

Locally produced fresh fruits and vegetables, eggs and milk tend to move through specialized marketing channels. Detailed case studies of vertical coordination in these specialized sub-systems of the Puerto Rican food system are presented in Chapter 6. The wholesaling functions are described and analyzed as part of the overall production-distribution process for these commodities. However, it should be mentioned here that the Commercial Development

¹⁴ *Annual Report 1964-65*, Commercial Development Company, Puerto Rico.

¹⁵ *Annual Report 1967-68*. Commercial Development Company, Puerto Rico.

¹⁶ *Ibid.*, p. 7.

¹⁷ A cooperative food wholesaling organization serving a small group of supermarkets, several small consumer-owned cooperative retail stores, and other unaffiliated independent stores.

Company had embarked on a program to design, construct and operate new, more modern *plaza mercado* and shopping center type facilities in the larger urban centers on the island. One of the first such facilities to be planned was a commercial center in Rio Piedras. This was to replace the old *Plaza Mercado* which had served for many years as a center of both wholesaling and retailing activity for local produce. The new facility was being designed primarily as a retail shopping center and would likely force the wholesaling functions to be relocated in other areas such as the new Central Market.

As indicated later in the epilogue (p.128), the Central Market did not achieve all that had been anticipated in terms of modernizing the food wholesaling functions in the San Juan area.

Attempts to Foment Wholesaling Organizations

From the outset, the EDA food distribution program had as a major goal the establishment of a competitive set of integrated food wholesaling and retailing units (see page 49, Chapter 2). The specific objectives of the program included the promotion of a "retailer-owned, full-line wholesaling operation", and a "voluntary group, full-line wholesaler".¹⁸

The retailer-owned wholesaling operation would be formed by bringing together a group of retailers to form a cooperative buying organization. Each retailer would invest a specified amount of capital and then buy his products through the wholesaling firm. Any savings on the operation would be returned to retailer members as patronage refunds.

A voluntary group is similar to the retailer-owned operation described above, but is organized by a wholesaler who selects a group of retailers and enters into contractual relationships with each operator. The retailer agrees to buy specified product groupings from the wholesaler, to identify his store by a group name and usually receives management assistance.

Retailer-owned Wholesaling Units - Several attempts were made to organize integrated retailer-wholesaler groups as a means of rationalizing the wholesaling function and improving the efficiency of the food distribution system. However, early efforts to establish viable retailer-owned wholesaling units were relatively unsuccessful. The experience with the group known as Independent Stores, Inc. (ISI) provides an interesting case example. In 1955, the EDA technical staff began contacting local independent food retailers to interest them in organizing a group that would enter into a joint buying operation and eventually operate their own full-line wholesale warehouse. The promotional material promised a four dimensional program:

1. Purchasing, warehousing and selling to its retail store members

¹⁸E. Lee Feller, *A Food Distribution Program for Puerto Rico*, unpublished report to the Economic Development Administration, Commonwealth of Puerto Rico, February 7, 1955.

a full-line of merchandise at the lowest possible price.

2. Developing and carrying on a cooperative advertising program for the members.
3. Assistance to the store members on store management practices.
4. Store engineering services for members who wish to remodel or construct new facilities.

Through such a program it was anticipated that independent stores could compete favorably with corporate food chains and offer a viable countervailing force to the large supermarket organizations. Each member of ISI was asked to purchase a \$1,500 share of stock and deposit an amount equal to expected weekly purchases to help the organization accumulate working capital. All sales to retailer members were to be on a cash basis. Preprinted order forms were to be distributed and orders delivered weekly. Transportation from the warehouse to the store would be arranged by the wholesaling unit. The organization was to operate as a cooperative, non-profit organization with patronage dividends of any savings that were realized.

The EDA agreed to assist with the initial financing of ISI through the purchase of preferred stock on an equal basis with retailer owned stocks, but not to exceed \$300,000. The Puerto Rican Industrial Development Company had agreed to build and lease a modern warehouse to ISI as soon as the group was firmly established. It was also hoped that the Economic Development Bank would make small loans to retail members of ISI to help them make the change-over from credit buying through traditional wholesale outlets to cash buying through ISI.

Retailers were told that by participating in this group program they could greatly reduce their total cost of grocery items. One piece of promotional material projected a gross margin of 5 percent for the retailer owned wholesale operation.

During the initial stages of organization and operation the affiliated retailers were being serviced through a contract with Borinquen Consumer Services, a wholesaling unit organized to serve consumer cooperative retail outlets. Also, the Government of Puerto Rico provided a legislative appropriation of approximately \$55,000 to assist the ISI during the first two years of operation, 1956-58.

By late 1957, it was apparent that the ISI group was far from being a viable organization. A special report to the EDA in late 1957 indicated ISI's average monthly sales were only \$48,000. Fifty-five retail stores were listed as clients, nearly all of which were very small operations with estimated weekly sales volumes of between \$1,000 and \$4,000. Only six stores had paid for a \$1,500 share of common stock in ISI. During 1957, the ISI group attempted to work out a relationship with Associated Food Stores, a retailer-

owned food wholesaling organization in New York City, as a means of getting the Puerto Rican operation on a firm economic footing. After a brief attempt to operate with ISI, the Associated Food Stores group decided to withdraw their support and the ISI finally disbanded.

It may be useful to speculate on the reasons for the failure of the EDA's efforts to promote the organization of the retailer-owned, full-line wholesaling operation. In a review of some of the EDA materials and through interviews with some of those involved in this program the following observations have been formulated. First, it should be recognized that this was a very difficult organizational undertaking. The prospective member retailers were small operators unaccustomed to working together and often distrustful of other businessmen. Each retailer had very little accumulated capital and was highly dependent upon credit from wholesalers to carry them along. Second, many of these small retailers did not have adequate accounting records and other manifestations of management skill to qualify for loans from private banks or even the Economic Development Bank. Consequently, many retailers were unable to obtain the necessary financial backing to get themselves out of their credit tie-ups with traditional wholesalers or to modernize their store facilities. Under these conditions these small operators were having difficulty acquiring the capital needed to become a cash customer of the retailer cooperative and at the same time to modernize and expand the size of their businesses. A third factor contributing to the failure of the ISI group was probably the overly optimistic projection of potential benefits of the organization to its members. In order to generate retailer interest and enthusiasm the promoters were claiming cost advantages and the provision of services that were beyond realization, at least in the early stages of the operation. A fourth factor that proved to be very critical to the possible success of a retailer cooperative was identified by a former EDA official as "deeply rooted business practices" in Puerto Rico's food distribution system both at retail and wholesale levels. These practices included alleged price discrimination against Puerto Rican distributors by food manufacturing firms on the mainland who tended to treat Puerto Rico as an export market and to price their products accordingly. Then too, there were high charges by local wholesaler-importers who had somewhat monopolistic, exclusive rights to handle certain branded products. This latter issue will be further considered later in this report.

The EDA continued their efforts to promote a retailer-owned wholesaling operation. In 1959 several food retailers who had been participating in management training programs at the University of Puerto Rico met to discuss the possibilities of organizing a retailer buying group. The EDA staff assisted in a series of organizational meetings which lead to the establishment of a group known as Comerciantes Unidos. A staff member from the EDA food distribution program became general manager of this new retailer group. A small

wholesale warehouse (4,000 square feet) was placed into operation in 1959 to serve 50 retail members. The warehousing activity was moved to the new Central Market in 1964 to occupy a 9,000 square foot area and at that point they were handling an annual volume of \$1 million. This was much below the capacity of the facility. The organization was still receiving financial assistance from the Department of Commerce through salary payments to the manager of the retail group warehouse. The manager indicated in 1965 that the organization was operating on a cost-plus operating margin which at that time was about 5 percent plus a 1 percent delivery charge.

Voluntary Chains

The difficulties experienced by the EDA food distribution staff in promoting successful retailer buying groups appears to have stimulated interest in the promotion of voluntary chains. The voluntary chain had been a part of the general strategy laid out by Feller in his 1955 report to the EDA.¹⁹ Although the EDA had approached selected local wholesalers to interest them in establishing a voluntary chain, there was no positive response during the first five years of the food distribution program.

In his termination report, Donald Carlson, the second director of the EDA Food Distribution Program, made several interesting observations regarding the need for further efforts to promote voluntary chain operations.²⁰ Some of his comments were as follows:

"Although the technical assistance program for retail modernization has been relatively successful, the follow-up necessary for each store assisted is impossible to accomplish *tending* to reduce the effectiveness of the program. . . . The best possible assistance could be given by a wholesaler who has weekly contact with the retailer through sales to the retailer."

In his recommendations Carlson goes ahead to state:

"In any event, the technical assistance to retailers should continue with constant efforts to form and stimulate group activities. The uncooperative nature of the merchants plus their lack of capital and management skill indicates that more success could be achieved via the voluntary group with a good wholesaler. The two principal factors are: 1) the wholesaler already has the basic organization and management (although assistance and technical advice is necessary), 2) the wholesaler is in a better capital position."

Carlson's 1960 report indicated that EDA efforts were then going forward to establish voluntary chains through two wholesalers located in urban centers other than San Juan. There was no subsequent evidence that these efforts were

¹⁹E. Lee Feller, *Ibid.*, p. 2.

²⁰Donald A. Carlson, *Terminal Report to the Director of the Economic Development Administration*, June 29, 1960. (Carlson was in charge of the EDA food distribution program from early 1958 through mid-1960.)

successful although considerable organizational effort was invested in at least one of these wholesaler situations. (See the epilogue, p. 128, concerning the organization of the Almacen Central voluntary chain.

The Cooperative Federation

Concurrently with the early efforts to organize the retailer buying groups, the EDA food distribution program staff were promoting the development of a wholesaling operation to serve existing consumer cooperative food stores and a new group of consumer cooperative supermarkets which were to be established in the large urban centers. Most of the existing cooperative food stores were located in smaller urban centers outside the San Juan metropolitan area and had been organized as local consumer cooperative associations.

At the time the EDA food distribution program began in 1955 there was strong political support for the development of cooperatives as a means of improving the delivery of food and other services to consumers. Hence, the EDA's effort to promote a cooperative food wholesaling operation and a related group of supermarkets was part of a larger effort involving other public agencies such as the University of Puerto Rico Agricultural Extension Service, the Department of Agriculture, a special government agency to promote cooperatives (see Chapter 2, page 55), and a group known as the Cooperative League of Puerto Rico.

In 1953, forty local consumer cooperative associations had joined together to form the Puerto Rican Federation of Consumer Cooperatives to establish and operate a small wholesale warehouse in the San Juan area. This warehouse handled about 400 items and had an annual sales volume of about \$ 1 million.²¹

In early 1955, just after the Governor's Food Advisory Commission had filed their report, Mr. Sam Ashelman, Jr., the General Manager of Greenbelt Consumer Services²² of Greenbelt, Maryland, was brought to Puerto Rico to give advice on the organization of cooperative supermarkets and a related wholesale warehouse that would also serve the members of existing Federation of Consumer Cooperatives.

The Ashelman report called for setting up 26 cooperative supermarkets, 10 of which were to be in metropolitan San Juan. The report was approved by the Puerto Rican government and an organization called Borinquen Consumer Services, Inc. (BCS) was formed. The initial financing included a small amount of capital from the Federation of Consumer Cooperatives, some additional capital from local investors and a substantial set of commitments by the Puerto Rican

²¹ Modesto Ortiz, *Las Pequeñas Cooperativas de Consumo Han Logrado Subsistir Por Medio de la Cooperación*, a presentation to the San Juan Chamber of Commerce, May 11, 1959.

²² A consumer cooperative organization operating a wholesale warehouse and several retail food stores in the Washington, D.C. area.

Industrial Development Corporation, PRIDCO. PRIDCO agreed to assist the BCS by doing the following: (1) invest \$200,000 in preferred stock in the BCS; (2) to lease a 30,000 foot warehouse facility to BCS at very reasonable terms; (3) to build a shopping center and lease space to BCS; (4) to disburse \$150,000 to the BCS for developmental training programs. The Puerto Rican legislature also promised an additional \$150,000 to BCS for development activities.

In December 1955 the BCS entered into a three year contract with Greenbelt Consumer Service, Inc. to manage the BCS developmental program. At the same time, the EDA food distribution specialists were also giving technical assistance to the BCS.

A 32,000 square foot warehouse was put into operation by the BCS in 1956 and efforts were undertaken to establish new supermarkets, first in Mayaguez (1956) and then in the San Juan area (1957). Meanwhile, in order to increase utilization of the warehouse facility the BCS contracted to provide wholesale services to the new retailer group, Independent Stores, Inc. (ISI), and to other independent food retailers.

In spite of the very substantial public support given to this "cooperative" endeavor it experienced many difficult growing pains. Initially, one of the more serious problems centered around the organization and control of operations. Before the end of the first years' operation, some of the Puerto Ricans became dissatisfied with the way Greenbelt Consumer Services were managing the operation and also felt that this external management service was too costly. More basically, it was a struggle for control and it was finally decided that the general manager should be a Puerto Rican, but it was agreed that a somewhat reduced level of consulting help from Greenbelt Consumer Services should be continued. Subsequently, in 1958 the Federation of Consumer Cooperatives took over the BCS and the operation became more completely Puerto Rican.

The volume of business continued to expand, but at a much slower rate than had been planned. The anticipated rapid establishment of "cooperative" supermarkets in larger urban areas was not being realized. A successful supermarket was established in Mayaguez in 1956 and a second market was opened in San Juan the following year. The Mayaguez market was the first supermarket in a city of about 85,000 population. The San Juan cooperative supermarket was competing with several other outlets of this type in medium to higher income areas and for this reason, among others, had greater difficulty than the Mayaguez store in achieving satisfactory sales performance. Later, a third supermarket was established in a medium to low income section in the San Juan area. By 1965, a total of nine supermarkets had been established, three of which were in the San Juan metropolitan area and the other six were in smaller cities across the island.

In 1964 the Federation of Consumer Cooperatives organized a special division for supermarket operations and a management committee was established. The operations manager of the new supermarket division had been trained by and was formerly employed by Pueblo Supermarkets.

For a number of years the cooperative supermarkets had been purchasing most of their supplies through the Federation Wholesale Warehouse at essentially the same prices being charged the small cooperative stores located throughout the island. As the new cooperative supermarket groups began to analyze their situation they decided to break their close procurement ties with the Federation Warehouse and to buy selected merchandise wherever they could get lower prices. This action led to a revised working relationship with the Federation under which the supermarket groups were given terms that reflected the lower cost of larger volume buying as compared to the lower volume orders of the small cooperative stores.

Under the supermarket management arrangement instituted in 1964, there was an attempt to organize operational supervision much along the lines of a corporate chain, such as Pueblo or Grand Union. A store planning activity was pushing ahead and by 1965 had made detailed plans and location commitments for five additional outlets, one of which was to be in the San Juan area.

Another activity of the Federation was a joint effort with the EDA (and subsequently the Department of Commercial Development of the New Department of Commerce) to establish a voluntary chain of 15 superette sized stores in mid-1961. The Federation was the wholesale supplier for the group which became known as the Lucky Seven Stores. This retailer group went on to become reasonably successful due in no small part to the technical assistance from the Federation staff as well as the EDA food distribution specialists.

In 1964, the Federation of Consumer Cooperatives moved their warehousing operation to the new Central Market where they obtained 86,000 square feet of space. During 1964 the annual sales volume of the Federation reached \$13 million. However, more than one-half of this volume was with retailer customers other than the consumer cooperative stores and the cooperative supermarkets. The Federation reported a gross margin of 5.76 percent during the first three quarters of the year. During the last quarter a new sales system was initiated to improve services and to assess differential changes to customers based upon services provided and competitive conditions.

At the time of the LAFS study (1965-66) the Federation of Consumer Cooperatives was a viable commercial activity. However, it had not become a strong competitive element in the urban food system serving the San Juan metropolitan area. The LAFS Consumer Survey indicated that only 1.2 percent of the San Juan households were using the cooperative supermarkets as their principal place of food purchase. However, in Mayaguez, 19 percent of the sample households were making their principal purchases at the cooperative supermarket.

It appears that the Federation has made its greatest contribution to improving food distribution in the secondary urban centers on the island rather than in the San Juan area. The full-line wholesale warehouse operated by the Federation of Consumer Cooperatives did provide a valuable service to many independent retailers as well as the cooperative stores. However, the potential cost savings over traditional wholesale sources were not being achieved because it was impossible for the Federation to by-pass the wholesaler-importers and brokers who held exclusive rights to the importation of certain branded merchandise from the mainland.²³

Changes in the Structure of Food Wholesaling

This chapter has briefly described the food wholesaling system as it existed in 1950 and some of the major changes that occurred in the ensuing 15 year period. Major attention has been given to the attempts to foment changes in wholesaling facilities and institutions. We now turn to a short assessment of the structural changes that had evolved by the early 1960's. Between 1954 and 1963 the number of food wholesalers in the San Juan metropolitan area increased from 158 to 188 according to the Census of Business (Table 5.1). In both time periods there was a significant concentration of sales volume among the largest firms. In 1954, there were 33 firms with annual sales of more than \$1 million who were handling 72 percent of the total sales volume by food wholesalers in the San Juan area. The 28 firms in the next sales volume category (500,000 to 999,999) accounted for an additional 14 percent of the total volume. In 1963, there were 66 firms in the San Juan area with sales greater than \$1 million annually who handled 84 percent of the total sales. In both time periods roughly one-third of the firms were handling 70 to 85 percent of the total wholesale transactions in the San Juan metropolitan area.

On the basis of census data for 1954 and 1963 there appears to have been a shift toward larger food wholesaling firms and somewhat greater sales concentration by the largest firms in the San Juan area. Also, there has been a significant spatial relocation of food wholesaling activities with the opening of the new Central Market. Several of the larger wholesalers have moved into the new Central Market facilities. Nevertheless, at the time of the LAFS study in 1965-66, a large number of wholesalers were still occupying facilities in the old San Juan port area. In 1966, Pueblo Supermarkets had begun construction of a large wholesale warehouse in the Carolina area, which is a considerable distance from the new Central Market. It was reported by Pueblo organization that adequate space could not be obtained in the Central Market.

²³Based upon a series of interviews with Modesto Ortiz, General Manager of the Puerto Rican Federation of Consumer Cooperatives.

TABLE 5.1 NUMBER OF FOOD WHOLESALING FIRMS^a IN THE SAN JUAN METROPOLITAN AREA BY VOLUME OF SALES CATEGORIES, 1954 and 1963

Annual Sales Volume (Thousand Dollars)	Number of Firms	Total Sales Thous. Dollars	Percent of Total Sales	Number of Firms	Total Sales Thous. Dollars	Percent of Total Sales
Less than 50,000	11	289.9	0.2	19	495	0.2
50,000 - 99,999	16	1,148.3	0.8	16	1,131	0.5
100,000 - 249,999	28	5,041.7	3.4	27	4,685	2.0
250,000 - 499,999	42	14,763.7	10.0	29	10,868	4.5
500,000 - 999,999	28	20,312.2	13.8	31	20,958	8.7
1,000,000 or more	<u>33</u>	<u>105,770.0</u>	<u>71.8</u>	<u>66</u>	<u>202,392</u>	<u>84.1</u>
Total	158	147,325.8	100.0	188	240,529	100.0

^aIncludes merchant wholesalers and manufacturers' sales branches for groceries and food specialties. It does not include wholesalers of farm products for immediate consumption or merchandise agents and brokers.

SOURCE: Census of Business, U.S. Department of Commerce and the Puerto Rican Planning Board, 1954 and 1963.

Although there was some consolidation of wholesaling activities into full-line operations through the Federation of Consumer Cooperatives, other retailer buying groups such as Comerciantes Unidos and the Lucky Seven Stores, the wholesaling system serving the small *colmados* remained relatively unchanged during the period 1955-1965. Thus, the modernization of the food system serving the San Juan metropolitan area was still far from complete with the wholesaling function continuing to be a major area for further changes.

The *colmado* described in the previous chapter still did half of all food sales in San Juan and probably over two-thirds of the sales of food elsewhere on the island in 1966. A 1966 LAFS survey of 91 small stores in San Juan and Mayaguez showed they were using an average of 15 wholesale suppliers. Since importer/wholesalers typically have exclusive distribution for particular brands, retailers restricted to local buying still find it necessary to get their products from several wholesalers.

The typical practice is for each large wholesaler to have salesmen call on the small *colmados* in his sales territory. Orders with each wholesaler are only for the products that they import or distribute. On the promised day of delivery independent truckers are retained by the wholesaler. The trucker may attempt to assemble products from several wholesalers going to retailers in the same area. Thus, early in the morning on the day of delivery the independent truckers collect the orders from several wholesalers, both in the old San Juan wholesale district and in the new Bayamon wholesale area.

The system of many small wholesalers serving many small stores leads to substantial competition among wholesalers for sales to *colmados* of those

products where several brands are sold. While this may have some desirable effects on the wholesale prices of these few products, it seems to result in unnecessary costs associated with logistical problems of assembling and delivering orders. Costs of safety stocks could be reduced with consolidation of stocks. Material handling technology could be improved and uncertainty could be reduced with greater regularity of channel usage. Located in the old San Juan dock area, the food wholesalers face severe traffic congestion and poor material handling conditions. Costs, therefore, appear to be higher than necessary.²⁴

Some Regulatory and Trade Practice Problems

The Galbraith and Holton study in the early 1950's identified and attempted to examine policy complications of the exclusive dealership arrangement under which much of the canned goods and processed cereal products were entering Puerto Rico. It had been a common practice for mainland food manufacturers to establish these exclusive dealer relationships with Puerto Rican agents or brokers.

As indicated in Chapter 4 and earlier in this chapter, the exclusive dealership arrangement still exists in the movement of food products from the mainland. In fact, many food manufacturers still handle their Puerto Rican accounts as if they were exports to a foreign market rather than to an integral part of the U.S. market.

The following description and analysis of the exclusive agent arrangement appeared in the Galbraith and Holton report and is still relevant to the existing situation.

"Branded food products produced on the mainland are usually marketed in Puerto Rico through an exclusive agent who has the distributor rights for the product for the whole island or, on occasion, for some part of it. In return for a commission on all shipments of the product into his territory, the agent handles advertising, collections, and claims as well as sales. The agent commonly is also a wholesaler in his own right, that is, he not only acts as an agent in his principal's sales to island firms but also buys on his own account from the principal and resells to wholesalers and retailers. The exclusive agent is also an important source of credit to his customer.

The exclusive agency arrangement is advantageous to the agent and to his principal for many reasons. The principal is relieved of the details of doing business on the island. The mainland producer's sales in Puerto Rico are usually a very small percentage of his total sales and naming the agent is a convenient way to enjoy a small amount of extra business without incurring undue expense. The agent, in return, is given what amounts to a brand monopoly over the distribution of the particular branded product. On the mainland if a buyer does not like dealing with the agent in his territory he can frequently buy from the agent in the next district; this obviously is not possible in Puerto Rico. As a result of this quasi-monopolistic nature of the

²⁴For a more detailed analysis of this problem see Robert L. Holland and Don L. Long, *op.cit.*

franchise, the exclusive distributorships have been the basis for a number of the very large incomes on the island.

Certain practices of the exclusive agents and their principals are conceivably, though not certainly, illegal under the Robinson-Patman amendment to the Clayton Act. Section 2(c) of the Clayton Act, as amended, forbids the payment of any commission or brokerage fee except for services rendered in connection with the sale of the goods. Firms in Puerto Rico can and occasionally do order goods direct from the mainland producer, bypassing the agent. In such cases the agent collects a commission on such sales as if he had handled the order himself. This practice would not be in violation of Section 2(c) of the Clayton Act if the agent is viewed as providing certain services, such as advertising, for his principal even on sales not handled through the agent.

Yet another aspect of the exclusive agent operations might violate the Clayton Act. Section 2(a) of the Act, as amended, prohibits price discrimination, direct or indirect, between different purchasers of a commodity where the effect of such discrimination may be substantially to lessen competition "with any person who either grants or knowingly receives the benefit of such discrimination. . ." When the exclusive agent is a wholesaler in his own right, selling to retailers, he is competing with wholesalers who buy from his principal, using him as an agent. Thus the agent perhaps might be thought of as enjoying a kind of rebate on his principal's sales to his competitors. If the agent receives a commission on his own purchases from his principal, a practice which would seem illegal in itself,^a the agent's advantage would be even greater because of his commission on his own purchases plus the commission on those of his competitors.

Objection has been raised in several quarters that the exclusive agents operate a toll gate through which the island's imported food must pass and that they are expensive middlemen for the system to support. The exclusive agents could be abolished or at least restricted by either of two methods. The Federal Trade Commission, charged with enforcement of the Clayton Act, might be requested to investigate and determine whether cease and desist orders should be issued. On the other hand, the Commonwealth might enact legislation minimizing the agents' monopolistic power and income. But the crucial question is, what will be the effect of either of these two steps? Will the resulting change in distribution methods really effect a reduction in costs or will the income now enjoyed by the agents simply be shunted into other hands? Unless a proposal really promises to reduce the expenses of distribution, it is not worth implementing."²⁵

^aSee *Southgate Brokerage Co., v. Federal Trade Commission*, Circuit Court of Appeals of the United States, Fourth Circuit, 1945; 150 F. 2d 607, certiorari denied 326 U.S. 774, 66 Sup. Ct. 230, in which the court upheld the FTC's cease and desist order directing the company to stop accepting brokerage or any commission or compensation on purchases made for its own account.

Galbraith and Holton suggested that possibly the best means of eroding away the monopoly positions of the exclusive dealers was for retail food chains

²⁵Galbraith and Holton, *op.cit.*, pp. 194-95.

to become large enough and strong enough to buy directly from mainland sources.²⁶ This, of course, has been happening as Pueblo Supermarkets and Grand Union have by-passed local wholesaler-dealers or have used their market position to bargain for favorable terms from local wholesaler-dealers. Nevertheless, the exclusive dealer arrangement continues to be a barrier to the establishment of full-line wholesale warehouses. The lengthy experience of the Federation of Consumer Cooperatives is testimony to this reality.

During 1964 the Puerto Rican legislature enacted two pieces of legislation that have some bearing on the exclusive dealership arrangement. The first act was to prohibit monopolistic practices and protect fair and free competition in trade and commerce.²⁷ Section 6 of the Act is directed specifically toward "exclusive dealing" where it may substantially lessen competition or tend to create a monopoly. Section 7 of the same Act deals with price discrimination and makes it unlawful for sellers to discriminate in price between purchasers where the effect of such discrimination may be substantially to lessen competition or tend to create a monopoly. The same legislature concurrently took action to protect local dealers (exclusive agents) against termination of their distributor contracts without just cause.²⁸ Perhaps more crucial was the provision which requires a manufacturer who terminates such a contract without just cause to indemnify the dealer for damages which include not only the investments in facilities and inventories but also additional payment for the estimated value of the good will for the product that had been generated by the dealer and the amount of profit realized by the dealer during the past five years. The administration of both acts was assigned to the Office of Monopolistic Affairs of the Puerto Rican Department of Justice.

The effect of Act No. 75 has been to perpetuate the existing exclusive dealerships of food wholesaler-dealers serving Puerto Rico. Mainland food manufacturers have been reluctant to initiate actions which would make them liable to a damage claim by the limited-line wholesaler-dealers, brokers or commission agents who have been their representatives in the Puerto Rican market for many years. In most instances the sales volume in the Puerto Rican accounts are a relatively small part of the food manufacturers total sales. Hence, the manufacturers probably prefer not to become involved in legal difficulties in the Puerto Rican environment over relatively small accounts.

²⁶*Ibid.*, p. 196.

²⁷Act No. 77 of June 25, 1964, Commonwealth of Puerto Rico.

²⁸Act No. 75 of June 24, 1964 as amended June 28, 1965, Commonwealth of Puerto Rico.

Some Summary Observations

The early studies of food distribution problems in Puerto Rico identified wholesaling operations as a major area for improvement. There were many relatively small wholesaling firms; most were handling limited lines of products and several had exclusive rights to serve as brokers or commission agents on imported processed foods. Small retailers were tied to wholesalers through the use of credit to finance their purchases. Wholesale margins were quite high as compared to mainland food wholesaling operations. Dock handling, warehousing, order filling and delivery to retail stores tended to be highly labor intensive and the crowded, inadequate facilities in the old San Juan area added to the costs of physical distribution.

After much study and re-study a new Central Wholesale Market was finally constructed and placed into operation in 1964 and 1965. However, much of the wholesaling activity still remained in the old San Juan area in mid-1966. The largest supermarket chain had decided to build a large warehouse at another location.

The EDA, with support from PRIDCO and other government agencies, made substantial efforts to foment the development of retailer owned wholesaling operations and voluntary chains. These new institutions were seen as a means of rationalizing the urban food distribution system and as a competitive element to pressure the corporate food chains to pass their cost savings along to consumers. Consumer cooperative supermarkets and an integrated warehousing operation was also seen as a leading element in bringing cost reductions and improved services to consumers.

The EDA accomplishments with retailer buying groups, voluntary chains and cooperative supermarkets fell considerably short of the hopes of the market reformers and public officials. Nevertheless, these efforts appear to have been beneficial in fostering desirable changes in both wholesaling and retailing. Also, certain lessons can be learned by others who attempt similar programs in other countries. Among these is that the organization of existing small-scale retailers into buying groups is a difficult task and much educational effort is required. It might be suggested that the voluntary chain operation may offer significant advantages over a retailer group if a progressive wholesaler (or wholesalers) can be encouraged to undertake such a venture.

A major barrier to the modernization of food retailing in Puerto Rico appears to have been the exclusive dealerships granted by mainland food manufacturers. This was reinforced by a Puerto Rican law which tended to discourage manufacturers from discontinuing these arrangements because of legally sanctioned claims from these exclusive dealers for indemnification.

An Epilogue

A considerable period has elapsed since the LAFS field study was carried out in Puerto Rico. Because of this the directors of this project returned to Puerto Rico in early 1970 to briefly review ensuing developments. Special attention was directed to the wholesaling of food since several changes had occurred in this area of distribution.

The 200,000 square foot full-line warehouse of Pueblo Supermarkets was in full operation in the spring of 1970. Large-scale frozen foods, produce and meat operations now complement the dry grocery warehouse. The warehouse is almost totally supplied by trailer-ship with only a limited amount of local tropical produce and local dairy products being supplied from island sources. Beverages, locally bottled and imported, are usually provided through local channels. In addition to serving their own supermarkets the Pueblo Warehouse also offers a "cash and carry" service to other food retailers. This makes available a full-line of products to small retailers or can be used as a supply source on selected items where prices are particularly favorable as compared to other wholesale sources.

At the time of the February 1970 visit to the island, a new food wholesaling warehouse (Almacen Central) had just opened. This warehouse was under the general management of E. Lee Feller, the same man who served as the initial director of the EDA Food Distribution Program and who had urged the organization of a voluntary chain operation. Almacen Central has a 112,000 square foot dry grocery warehouse designed for efficient material handling with supply coordination programs using trailer-ships. The company is owned in part by a few of the larger local importer-wholesalers of processed food products. Their voluntary chain program is designed to assist medium-sized retailers in becoming more efficient buyers of dry groceries and to more efficiently display and market self-service foods. Thus, the Almacen Central may provide an impetus to foster further improvements in wholesaling efficiency. The program is aimed at a potentially aggressive retailer group. The question is whether Almacen Central can develop a large enough group of loyal and effective retailer customers to sustain the costs of operating the large, capital-intensive, dry grocery supply system. If they can, this operation could become a viable competitor to Pueblo Supermarkets and might exert some downward pressure on wholesale-retail margins and thus effect some further reductions in retail food prices. This was the strategy element introduced by Mr. Feller in the food distribution program which he proposed to the EDA in 1955 but which was not fully achieved during the early years of the program.

Interviews in February 1970 with Modesto Ortiz, the Manager of the Federation of Consumer Cooperatives, indicated that the efforts of the Federation to achieve buying efficiency comparable to those enjoyed by corporate chains

still had not been fully successful. Large mainland manufacturers and processors of food continue to treat Puerto Rico as an "export market", and exclusive dealerships are still being honored. The Federation continues to have difficulty in getting some merchandise without paying brokerage or commission fees to local importers even though the goods may move directly to the Federation warehouse.

The modernization of food wholesaling in Puerto Rico has proven to be a stubborn problem. The combination of constraints on achieving cost reducing, volume increasing changes has been extremely frustrating. Early efforts to foster retailer cooperatives failed due, in part, to the lack of capital and the existence of credit ties between retailers and wholesalers selling limited lines of products. The Cooperative Federation puzzlingly has not been able to sustain direct trailer load purchases of mixed dry groceries from mainland warehouses. The Cooperative remains the captive of the limited-line wholesaler barricaded behind the brokers law (Act No. 75, June 24, 1964).

The chain food companies, Pueblo and Grand Union, have been able to achieve retailing modernization and a route around the island's limited-line wholesaler. Thus, the full modernization of food wholesaling remains for the future, although U.S. direct supply systems by-passing the traditional wholesalers have provided an important competitive force.

CHAPTER 6

VERTICAL COORDINATION OF PRODUCTION-DISTRIBUTION SYSTEMS FOR SELECTED FOOD COMMODITIES

Introduction

It was noted in Chapter 3 that there had been significant shifts in the demand for food products associated with the rapid rise in the incomes of Puerto Rican consumers. This provided a stimulus for increased output and improved quality of such foods as milk, eggs, meat and some fruits and vegetables. The extent to which these increased demands have been satisfied by local production rather than mainland imports is affected by how well the vertical production-distribution is organized and coordinated.

This chapter begins with a brief overview of Puerto Rican agriculture and the adjustments that occurred from 1950 to 1965. The main body of the chapter consists of case studies of vertical market coordination for three commodities -- eggs, milk and fruits and vegetables. Eggs is an interesting example of how the needs of large retail food stores reached back up the market channel and linked up with producer organizations that were seeking more certain markets for their products. The milk case shows how a publicly regulated commodity system can create a more orderly market which better serves the interests of all participants -- producers, processors and distributors and consumers. Fruits and vegetables illustrates the shortcomings of a poorly coordinated system of production, processing and distribution.

An Overview of Puerto Rican Agriculture

Three major crops--sugar, coffee, and tobacco--make up about one-half of the total agricultural output of Puerto Rico. Table 6.1 indicates that sugar alone accounts for 36 percent of the total. Animal products considered as a group comprise 36 percent of total output, with milk being most important within the product group.

TABLE 6.1 COMPOSITION OF AGRICULTURAL OUTPUT, PUERTO RICO, 1963-1964

Product	Percent of Total Output
Sugar	36
Coffee	7
Tobacco	5
Fruits and Vegetables	13
Milk	20
Poultry	8
Beef and Pork	8
Other	3
TOTAL	100

SOURCE: Office of Agricultural Statistics, Department of Agriculture, Commonwealth of Puerto Rico.

Dominance of Sugar

Sugar cane has historically maintained a position of strong importance in the Puerto Rican economy. Except for pastures, more land is used for sugar cane than for any other purpose. In 1965 about 290,000 cuerdas (one cuerda = 0.97 acres), or almost one-half of the island's cropland, was devoted to the production of sugar cane. The dominance of sugar cane in the economy was even more pronounced prior to 1950. According to the Perloff study reviewed in Chapter 2, the sugar-based industries were the source of 20 percent of the island's net income in 1940 and 14.4 percent in 1946. In addition, the sugar industry was by far the largest employer in the economy.

Sugar cane acreage harvested and tons produced generally showed a gradual increase from 1938 to 1951, but has declined since then. During 1938 to 1951, the area harvested almost doubled, increasing from 216,502 cuerdas to 391,763 cuerdas. Since 1951, because of competition from other enterprises (especially dairy), acres of sugar land harvested continuously declined, with total production remaining about the same though fluctuating from year to year. Much of the land taken out of sugar production was less productive marginal cropland. Thus, while sugar is still a major factor in Puerto Rico's economy, its position has become less significant with the rapid expansion of other sectors of the economy.

Relative Stagnation in the Sugar Industry

There is concern in Puerto Rico over the decline in acreage devoted to sugar, and especially over the slow rate of improvement in land and labor productivity. The argument is made that Puerto Rico's economic future is closely tied to the sugar industry and that stagnation may be disastrous for the economy in the long run. It appears this is an exaggerated view. The sugar industry has been experiencing a period of rapid adjustment along with other sectors of the economy. However, there is no reason to believe that sugar production would maintain indefinitely a place of dominance in the Puerto Rican economy. The Puerto Rican sugar industry may well be entering a long period of adjustment like the one experienced by the cotton industry in the southern United States.

A number of factors appear to have contributed to the current situation in the sugar industry. First, prior to and during the Korean War, Puerto Rican sugar producers were in a relatively favorable position compared to other areas producing for the United States market. As a result, production expanded and the industry experienced a kind of boom. By the end of the Korean War, Cuba and Hawaii were well on their way to mechanizing sugar production and increasing productivity through fertilizer use, improved varieties and improved management. Puerto Rican producers did not adopt new technologies to any great extent.

Under the government program established by the Jones-Costigan Act, the price of sugar for the United States is established by a price support plan. Since other sugar producing areas moved fairly rapidly to adopt the latest technologies, the cost of production per ton was held down. As a result sugar support prices did not increase as rapidly as the general price level. Since Puerto Rican producers had not moved to reduce costs of production by adopting new technologies, they were left in a comparatively unfavorable position.

A second factor affecting the sugar industry since 1950 has been the rising cost and shortage of labor. The government's thrust toward industrialization brought an increase in the demand for labor in non-agricultural employment. Higher wages, more steady work, and better working conditions have lured many of the better cane workers into the urban areas. The unionization of sugar cane workers, which was supported by the administration of Governor Munoz-Marin, has been a factor in raising labor costs for cane producers.

A third factor affecting Puerto Rico's sugar industry is the land tenure arrangement and size of farms. The bulk of sugar production in Puerto Rico comes from either very large or very small farms. There appear to be relatively few medium-sized, single-owner operator farms of adequate scale to achieve maximum efficiency. In 1963-1964 almost 11,000 farms harvested something less than 25 cuerdas per farm. (See Table 6.2.) These farms accounted for about 19 percent of the cane acreage harvested but only 15 percent of the total production. The average production per cuerda was 26.4 tons. On the other hand, over half of the total production of cane came from the 192 farms harvesting more than 250 cuerdas per farm. Thus, technological adoptions and accompanying cost reductions may be thwarted by the size of cane-producing units. The owner or tenant with an extremely small farm unit may not have the knowledge about new production technologies; he may not have the training to use them; or he may not be financially able to adopt them. On the other hand, the very large farms are often controlled by absentee owners who spend little time and effort on the farm, leaving it to hired managers who may or may not be progressive.

TABLE 6.2 PRODUCTION OF SUGAR CANE AND NUMBER OF FARMS ACCORDING TO SIZE OF AREA HARVESTED, 1963-1964

Area Harvested	No. Farms	Area Harvested Cuerdas	Cane Produced Tons	Cane Produced Per Cuerda Tons
All Farms	12,317	303,141	9,801,584	-
0-25 cuerdas	10,757	58,208	1,537,613	26.4
26-250 cuerdas	1,368	97,108	2,757,571	28.4
251 or more	192	147,825	5,506,400	37.2

SOURCE: *Facts and Figures on Puerto Rico's Agriculture*, Puerto Rico Department of Agriculture, p. 42.

Shift Toward Livestock Production

The dominance of sugar production in the agricultural economy of Puerto Rico, with its emphasis on exports, has been noted. Moreover, tobacco and coffee have traditionally been important crops for the export market. In 1951 about 63 percent of Puerto Rico's gross farm income went to producers of coffee, tobacco and sugar.

As a result of this emphasis on export crops, relatively little emphasis has been placed on food production, and about half of the island's food needs are imported. Milk has been the most important of the food items produced in Puerto Rico. In 1951 milk sales accounted for approximately 10 percent of Puerto Rico's gross farm income. Other major farm products, in descending order of importance in 1951 were: poultry, beef, pork, starchy vegetables, fruits, eggs, and other vegetables.

The adjustments in sugar production discussed in the previous section have had some impact on the production of some of these food products. Table 6.3 show the percentage change in the production of major agricultural products from 1951 to 1963. These figures indicate that the most significant production increases occurred in milk, eggs, meats and coffee. If we examine gross farm income, we find that by 1963 sugar's contribution had declined to about 37 percent of the total income, while milk sales alone accounted for about 18 percent of the total. Looking at all livestock products, including meats, eggs and milk, we find that their farm value increased from 25 percent of gross farm income in 1951 to 35 percent in 1963.

TABLE 6.3 PERCENTAGE CHANGE IN THE PRODUCTION OF MAJOR AGRICULTURAL PRODUCTS IN PUERTO RICO 1951 TO 1963

Product	Percentage Change
Sugar	-4
Tobacco	+34
Coffee	+130
Milk	+128
Eggs	+128
Meats	+55
Starchy Vegetables	-12
Fruit	+20
Other Vegetables	+52

SOURCE: *Facts and Figures on Puerto Rico's Agriculture, 1965*, Puerto Rico's Department of Agriculture.

Probably the most important factor causing this shift toward livestock production in Puerto Rico has been the rising demand for protein foods in the Puerto Rican diet. Rapidly rising incomes have permitted consumers to eat more of the relatively expensive livestock products. Puerto Rican producers have observed the increasing demand and moved to fill the need rather than allowing imports to absorb the increase. Another factor contributing to the increase has been the adjustment occurring in the sugar industry. Those producers finding it difficult to produce sugar cane profitably have found livestock production to be a feasible alternative. Much of the land which has been shifted out of sugar cane since 1951 was marginal land that is best suited for pasture production rather than cultivation. It has been estimated that between 1955 and 1965 some 55,000 cuerdas were shifted from sugar cane to pastureland.

Three Studies of Commodity Market Coordination

Introduction

Three commodity groups were chosen for detailed case studies. The basic purpose of the commodity studies was to describe and analyze, for the period from 1950 to 1965, the important changes occurring in the market organizations relevant to the commodities, and to relate these changes to specific economic performance criteria. A second purpose of the commodity studies was to provide a description of the evolution of certain types of government marketing policies and institutional forms and to evaluate their contribution to more orderly and efficient markets and greater farm output. The final purpose of the commodity studies was to provide evidence on whether a production and marketing system, characterized by small-scale, unorganized and atomistic business units, will evolve a set of conditions inhibiting the development of more efficient techniques. The lack of such efficiency gains will result in relatively higher production and distribution costs and lower product quality.

The particular commodity groups--milk, eggs, and fruits and vegetables--were chosen primarily because of the diversity they represented, in terms of market institutions, government regulations and assistance, structural characteristics, behavior of competitors and performance of the industries. Marketing developments in the three commodity groups provide an excellent opportunity to examine the economic impact of various degrees of government marketing assistance and the effect on economic performance in the industry.

Government programs assisting producers and/or distributors in the three industries reflect three different strategies. The marketing program developed for milk producers and distributors has regulated practically every phase of the industry, including pricing. Government egg marketing assistance has been less intensive, centering on facilitative regulations and technical assistance

to cooperative groups. For fruits and vegetables, government policy has reflected less urgency and has placed more emphasis on programs to inform producers and improve the competitive structure of the market.

The discussion is divided into four parts. Each of the first three parts is devoted to one commodity group. Within each of these three parts there is first an introductory section discussing general commodity conditions during 1950-1965. Next there is a section centering on market conditions existing *prior* to 1957, and followed by a review of the basic changes in production and market coordination from 1957 to the present.¹ Finally, for each commodity group there is an analysis of market performance changes since 1957. The fourth part of the discussion summarizes the results of the three commodity studies and suggests conclusions from the analysis.

Eggs

The island of Puerto Rico has experienced rapid economic growth since 1950, as we noted in Chapter 2. Needless to say, the impact of such growth on egg production and distribution has been significant.

Rising consumer incomes have been accompanied by a stronger demand for animal products. Per capita consumption of eggs has more than doubled since 1950. At the same time, retail marketing facilities have undergone rapid change. The expansion in sales of modern self-service retail stores has greatly affected the quality of eggs required from producers. Moreover, production and marketing structures have undergone significant change during the period. Those changes are examined below.

Production and Marketing Conditions, 1950-1957 - In 1950, egg production was widely scattered among a large number of subsistence farms. Most of the farms on the island kept a small flock of hens to supply family needs, with occasional sales to local *colmados* or neighbors.² There were very few commercial egg farms.

The Census of Agriculture in 1950 indicated there were 47,241 farms reporting hens in production. These farms made up 88.3 percent of all farms in Puerto Rico in 1950. Thus, a large percentage of the farms were either producing eggs for home consumption or for both home consumption and sale. The average number of hens per farm reporting in 1950 was 16.9.

The widely scattered nature of egg production made marketing both difficult and expensive. Eggs were marketed by individual producers through truckers,

¹This break was chosen because a concerted government effort to improve food distribution started to bring about coordination changes in the system at that time.

²The term used in Puerto Rico to designate small retail food stores.

local *colmados* or directly to consumers. Eggs were sold through market plazas to a limited extent. In 1950 the five principal markets of Puerto Rico handled an estimated 287,416 dozen eggs with a total value of \$177,000. This represented only about 3 percent of the domestic egg production. Eggs sold in the plazas were largely produced on very small farms and were assembled by truckers in relatively small quantities and marketed through retailers in the plazas.

Facilities for handling the eggs were poor and spoilage rates were high. Consumers purchasing the eggs did so with the risk that a high percentage might turn out to be spoiled. The Perkins' Study in 1956 stated:

There is no careful handling and storage by farmers and dealers; transportation and maintenance expenses are high. Eggs are not refrigerated or graded, and marketing may take well over a week. They are, therefore, usually of poor quality when they reach the consumer, especially in the large cities. In the smaller towns, people purchase eggs from peddlers who buy at the farms and therefore usually get fresher eggs.³

Perkins found that even under existing marketing conditions there was a decided consumer preference for locally produced eggs against imports. He found that in the five year period between 1950 and 1955 the average wholesale price for locally produced eggs was 57 cents per dozen, which was about 12 cents more per dozen than the average wholesale price of imported eggs. Nevertheless, egg imports made up a large percentage of the total egg consumption in Puerto Rico in the early 1950's. Table 6.4 shows the quantity of both imported and locally produced eggs in 1950.

TABLE 6.4 TOTAL EGG CONSUMPTION IN PUERTO RICO: VOLUME IMPORTED AND VOLUME PRODUCED IN PUERTO RICO, 1950-1951

	Imported (dozen)	Produced on Puerto Rican Farms (dozen)	Total (dozen)	Imports as a Percent of Total Consumption
Eggs in shell	4,139,847	9,123,768	13,263,615	-
Dried ^a	1,180,942	-	1,180,942	-
Frozen ^a	444,369	-	444,369	-
TOTAL	5,765,158	9,123,768	14,888,926	39%

^aShell egg equivalent for eggs imported as dried or frozen.

SOURCE: *Statistical Yearbook - Puerto Rico, 1950-1951*.

³Maurice F. Perkins, *Agricultural Credit in Puerto Rico* (A Special report published by the Department of Fomento and the Puerto Rican Development Bank, Commonwealth of Puerto Rico, 1958).

It also indicates that two-fifths (39%) of the eggs consumed in Puerto Rico in 1950 were imported. Perkins noted that the poorly coordinated and inefficient marketing system for domestically produced eggs would probably prevent the future substitution of Puerto Rican eggs for imports.⁴

In 1950 there were no government regulations to encourage grading or to establish the minimum requirements for the storage and handling of eggs. In the absence of such regulations, it was difficult even for progressive farmers to practice grading, refrigeration and efficient handling.

In general, egg production and marketing in Puerto Rico in 1950 was characterized by a large number of producers and small egg dealers working on a part-time basis. The result was an ineffectively coordinated marketing system which involved a high degree of risk for all concerned. The producer, in addition to bearing the risks associated with disease and weather, was constantly faced with price uncertainties and demand fluctuations. Even the few existing commercial producers remained small and were faced with considerable uncertainty in the marketing of their production. Most were unable to achieve the necessary economies of scale either in the production or marketing of their eggs. Because of the lack of large-scale commercial egg producers, there were large numbers of egg dealers who collected eggs and either retailed them directly to consumers or passed them along to other retailers to sell. These dealers added their margins to the price of eggs and often contributed to the uncertainties and risks associated with marketing eggs.

As a result of the risk and inefficiencies mentioned above, Puerto Rican consumers continued to purchase large quantities of imported eggs which were also of low quality owing to the length of time required in shipment. The waste and spoilage in the handling both of imported and locally produced eggs helped to maintain high prices and discourage consumers from increasing consumption. Thus, in 1950 there was a definite need for improvements in egg marketing methods and coordination in Puerto Rico. The consumer preference for local eggs, in spite of poor handling, lack of refrigeration and high prices, indicated that consumption of locally produced eggs could be readily expanded if producers were willing to adopt improvements in the production, classification, transportation and storage of their eggs. The system was ready for improvements which could benefit all parties concerned, especially the Puerto Rican consumer.

Market Coordination Activities, 1957 - 1965 - Between 1957 and 1965 there were significant changes in the characteristics of egg producing units. Similarly there were important developments in the marketing of eggs on the

⁴*Ibid.*, p. 256.

island. As we have noted as late as 1956, egg production was still carried on primarily as a "barnyard flock" enterprise and egg marketing consisted of assembling eggs from many small independent producers and distributing them to small retailers.

Perhaps one can attribute some of the rapid egg production and marketing changes from 1957 to 1965 to the introduction of modern self-service retail stores in Puerto Rico. These supermarkets sought a stable supply of consistently high quality products. They tended to seek out and encourage those suppliers who met their quality standards with large supplies in order to lower transaction and exchange costs. These factors have undoubtedly had significant in Puerto Rico. But it should be recognized that conditions were ripe in the imperfectly competitive egg markets for basic changes that would improve the coordination of the system and lead to better performance of the market. Some of the resulting market institutions are discussed below.

It was noted earlier that prior to 1956 there were very few well organized and large scale egg producers on the island. Two reasonably large producers (around 5,000 hens) began operation in the San Juan area in the early 1950's. These producers were able to develop their own marketing program with delivery to larger *colmados* and direct farm sales consumers.⁵

Vertically Integrated Private Producers - The rapid expansion in supermarket sales since 1956 has been accompanied by a similar increase in large-scale integrated egg production and/or marketing firms. By 1965 there were at least six large scale producer-distributors (including two cooperatives) catering especially to supermarkets, and to other large retailers under their own brand names or with private label sales. The two privately owned producer-distributors had expanded to 15,000 and 25,000 hens and had been joined by a third producer in 1958 who had 80,000 hens in production by 1965. The latter firm is now the largest single producer on the island and is the only one vertically integrated (either by ownership or contract) from the feed manufacturing stage through egg marketing. A fourth privately owned firm is primarily a marketing organization, which purchases eggs from small scale producers on the basis of a simple written or verbal agreement. The eggs are then graded and packaged for distribution through supermarkets under the firm's own brand name.

In order to meet the special quantity and quality demands of large retailers, these privately owned firms, along with other smaller scale units,

⁵Information obtained in personal interviews with Manuel Santana, Extension Poultry Marketing Specialist, University of Puerto Rico, Manuel Rodriguez, Dairy Supervisor of Pueblo Supermarkets, and Edwin Betancourt, Manager, Granja Country Club Egg Farm.

have broken from the traditional pattern of egg production and distribution in Puerto Rico. Their market contacts are directly with retailers, providing more effective market information and lowering market instability arising from uncertainty and erroneous market intelligence.

Cooperatives - A second major development in egg marketing has been the organization of several marketing cooperatives. Many of these have experienced some difficulty in maintaining good member relations and in stabilizing supplies and sales. As a result, most of them have either ceased operations or remained quite small. However, one marketing cooperative remains as a major producer-distributor. This is the egg marketing cooperative organized as a separate arm of Cafeteros de Puerto Rico. (A very large coffee marketing cooperative which has become quite diversified.) The egg marketing arm of the cooperative was originally organized to assemble, grade, package and distribute eggs for its small scale egg producer members in the South Central part of the island. Initial interest and patronage in the cooperative was high, and it was necessary for the cooperative to purchase a large amount of grading, packaging, storing and distributing equipment. Contract prices to producers had to be reduced in order to pay for the new equipment. Also, in order to market a consistent quality product, it was necessary for the cooperative to include quality control clauses in producer contracts, *e.g.*, requiring farm refrigeration and specifying certain management practices. In protest against these cooperative requirements and due to growing alternative sales outlets, many producers withdrew their support from the cooperative. Consequently, the cooperative found itself with insufficient and unstable egg supplies. In order to stabilize its supply and utilize existing equipment, the cooperative entered into egg production operations. In 1965, the cooperative maintained about 23,000 hens in production and continued to provide marketing services for its members.

Egg marketing cooperatives have been somewhat successful in Puerto Rico as a means of bringing together small scale producers for the purpose of grading, packaging, and distribution of eggs at an economical level of operation. They have also permitted producers to enjoy more accurate marketing and technical information and more stable relations with retailers.

Non-profit Producer Associations - A third type of marketing institution arising in response to the changing retail structure in Puerto Rico since 1956 are producer owned non-profit egg marketing corporations. The purposes and advantages of these associations are basically the same as those

listed above for cooperatives.⁶ They are discussed separately, however, because of the unique conditions which preceded the organization of the first such association and because the whole approach of planning and implementing production and market coordinating institutions may have some applicability for other developing areas.

The Lajas Valley Egg Producers Association was the first of three such associations to be organized. It grew out of a plan by the Lajas Valley Development Office (a government agency) to encourage egg production in the Lajas Valley. That office hired a full-time poultry specialist and gave him the responsibility of interesting farmers in egg production and then helping them to start production. He was fairly successful and soon had farmers producing and marketing eggs in Lajas and surrounding towns. As these commercial producers gradually expanded their flocks, they experienced greater difficulties in finding market outlets. The government agent began to consider a marketing cooperative. At that time the owner of the largest supermarket chain on the island (Pueblo Supermarket) made a \$5,000 grant to the Agricultural Experiment Station for the purpose of encouraging agricultural production. The Lajas Valley Development Office requested that the money be loaned to local egg producers for the purpose of organizing an egg marketing cooperative and buying necessary grading equipment. The request was granted and Pueblo Supermarkets agreed to purchase eggs from the association to be marketed under the Pueblo label. At this point two other government agencies stepped in to provide assistance. The Economic Development Administration (Fomento) provided a building rent-free for six months, and the Agricultural Extension Service provided management training and guidance to the members of the association.

The association has been quite successful. Production has increased from 311,000 dozen in 1963 to 546,000 dozen in 1965. The association, through its Pueblo supply contract, has given its members a stable and steadily expanding outlet for their production. Records of the association show that prices paid to producers have not changed since 1963. The policy of the association is to maintain a stable price to producers and handle any resulting deficits or surpluses through feed sales and patronage refunds. In this way, the policy has permitted producers to make long-run expansion plans on the basis of stable, expected prices. Each producer has a full supply contract so all his production goes to the association. Moreover, the contract states that expansion of

⁶These associations were incorporated as non-profit corporations rather than cooperatives only because the cooperative law in Puerto Rico requires that certain conditions be fulfilled before the government can grant a cooperative charter. Among the conditions are cooperative education for all members and leaders. The process usually requires 6-12 months. The association members were not in a position to accept such delays.

flock size by an individual producer will only be approved if a profitable market outlet can be obtained for the added supply. Yet the association has been quite successful in marketing added quantities of eggs as indicated by the rapid growth in volume. As a result the average flock size of its member has increased from about 2,000 birds in 1963 to 2,857 birds in 1965.

The marketing margin for the association has remained fairly stable. The following example is illustrative of recent prices. In May, 1966, association members were receiving 51 cents per dozen for Grade A large eggs at the farm. The eggs were collected by the association, candled, graded, cartoned and delivered to retail stores at a price of 64 cents per dozen. This provided the association with a margin of 13 per dozen. Retail prices during the same month were about 77 cents per dozen for Grade A large eggs in Pueblo Supermarkets. Though the 13 cent retail margin appears high, it may be partially justified by the fact that Pueblo provides a very large and stable outlet and gives special promotion to its private label eggs purchased from the association.

Basically, the exchange price on private label eggs between the association and Pueblo is determined by subtracting 3 cents from the prevailing price of other major brands. Then Pueblo usually prices its private brand at 1 to 3 cents less than the major brands, depending on supply and demand conditions. Occasionally, the associations and Pueblo cooperate to lower prices even more in order to clear a surplus through the market. One of the most unique features of this association is the degree of cooperation which occurred between the farmers, the Lajas Valley Development Office, the Extension Service, Pueblo Supermarkets and Fomento. Each played a vital role in this market coordination effort. But perhaps the most significant feature in the development of this marketing institution is the active planning, organizing and coordinating role taken by the Lajas Valley Development Office. This government agency was charged with the responsibility of fomenting agricultural development in the Lajas Valley. The encouragement and assistance in egg production and marketing is but one phase of the over-all agricultural program of the development office. Other aspects of the agency's program were equally as successful in the egg production-marketing phase described above.

In 1965 the director of the Lajas Valley Development Office published an experiment station bulletin describing the agency's program and its achievements. In part he concluded: "The direct and indirect benefits now derived, or which may be derived from the Lajas Valley Development Program in a relatively short time in the future, fully justify government investments."⁷ He also noted: "The procedures followed in planning and implementing an

⁷Antonio Gonzalez Chapel, *Planificación e Implementación de un Programa de Desarrollo Agrícola en el Valle de Lajas*, Boletín 192 (Estación Experimental Agrícola, Universidad de P. R., Río Piedras, 1965), p. 32.

agricultural development program for the Lajas Valley are also applicable to other areas of Puerto Rico."⁸

When the Department of Agriculture was reorganized along the lines described in Chapter 2, Mr. Gonzalez was appointed director for the Mayaguez region. He began to apply the basic procedures developed in the Lajas Valley Development program to the entire Mayaguez region. Two other egg marketing associations have been organized in the region. The three producer groups have been federated for the purpose of carrying out a joint marketing program and purchasing supplies jointly. Moreover, the procedure is being used in the promotion of coordinated production-marketing associations for other agricultural products such as milk, oranges, sugar, papaya and pineapple. Early indications suggest that the integrated government planning and marketing approach will yield significant results in the next few years.

Before moving to the discussion of other government egg marketing programs, two general observations are offered concerning the benefits of the production-marketing regional planning approach described above:

1. It helps government agricultural workers and farmers alike to recognize the important relationship between agricultural production and marketing. That is, production and marketing can be more effectively coordinated to the benefit of farmers and the economy in general. Specific benefits of the producer associations are:
 - a. It permits small producers to cooperate in lowering production and marketing costs.
 - b. It gives each producer a stable market outlet.
 - c. It provides retail buyers with a stable supply of consistent quality products.
 - d. It reduces risk and uncertainty which arise in a situation where producers and distributors have limited knowledge of technical and marketing developments and where factors of production are highly immobile due to poor communication.
2. The regional planning approach provided one centralized agency with at least a basic knowledge of farm units and farmers in a given region for the purpose of long-range agricultural development through planning and technical assistance to individual farmers.

The regional agricultural planning approach being pioneered in the Mayaguez region in Puerto Rico is a good example of a practically-designed government program oriented toward the improvement of resource productivity in agricultural production and distribution.

⁸*Ibid.*, p. 33.

Grading Regulation - The effectiveness of the egg marketing institutions just described has been enhanced by the passage of several market regulations since 1956. Marketing literature abounds with examples of the benefits of effective market grades and standards. The first government egg regulation was approved in 1956.⁹ It provided for the creation, within the Department of Agriculture, of a continuously supervised egg grading and inspection service. The grading system adopted was identical to the grading system of the United States Department of Agriculture. The market regulation also made provisions for container labeling and on-farm refrigeration requirements for all graded eggs.

In 1958 a second egg marketing regulation was approved by the Secretary of Agriculture.¹⁰ The intended purpose of this regulation was basically to protect Puerto Rican egg producers from unfair and harmful competitive practices such as "dumping" by U.S. competitors. It was also designed to upgrade the quality of imported eggs as a protection to consumers. A third purpose of the regulation was to provide specific requirements for refrigerating and storing eggs during the marketing process.

The most recent egg market regulation was approved in 1964. The purpose of the law was to prevent the practice whereby "eggs from foreign countries have been and are being sold as if they were from Puerto Rico."¹¹

The Act states that "this is a bad practice, prejudicial to the Puerto Rican consumer."¹² It therefore provides for the labeling of each egg before sale in Puerto Rico. Eggs must be stamped indicating the place of origin-- Del Pais (locally produced), U.S. or imported (foreign country). The Act does not apply to eggs:

produced in Puerto Rico and packed in one-dozen containers, or eggs produced in Puerto Rico and supplied in containers of any type, capacity or size to private institutions, and to government . . . institutions; nor to eggs produced at home, when directly sold to the consumer.¹³

By and large these government regulations represent an attempt to enhance competition in egg markets and improve the quality of eggs available to the Puerto Rican consumer while holding egg prices constant. Our field interview data among farmers in the Mayaguez region, and our other field surveys, indicate that farmers, retailers, wholesalers and consumers generally believe that

¹⁰"Market Regulation Number 3A," Department of Agriculture and Commerce, Santurce, Puerto Rico, June 26, 1958.

¹¹Commonwealth of Puerto Rico, Act. No. 118, San Juan, Puerto Rico. Approved June 29, 1964, p. 1.

¹²*Ibid.*

¹³*Ibid.*

these regulations have been beneficial. From 60 to 90 percent of the individuals in these various groups expressed the belief that egg grading regulations have proven helpful to producers *and* consumers.

Production and Marketing Performance - The changes described above in egg marketing institutions since 1950 have been accompanied by some significant improvements in production and marketing performance. These changes will be discussed below under the headings of: (1) costs of production and marketing, (2) progressiveness, and (3) product quality.

Costs of Production and Marketing - The most significant performance changes in egg production and marketing have taken place in the realm of production efficiency. It appears that costs of production have been reduced substantially since 1950. Table 6.5 summarizes a study by the Experiment station on the costs of production of six commercial egg producers in 1951. These farms were selected from a census of farms with annual egg sales of more than \$200. The table indicates that the average number of hens per farm ranged from 85 to 1,392. It also shows that average cost of production per dozen ranged from about \$0.66 for the largest producer, to \$1.04 for the smallest producers. The raw data indicate that larger producers had lower costs of production. This may have been due to economies of scale and/or to improved production techniques on the larger farms. Perhaps the latter was a more important reason since the data in Table 6.5 reveal that the larger producers had greater output per hen and more efficient feed conversion ratios than smaller producers. These production costs included marketing costs ranging from about six to ten cents per dozen for three of the six farms studied. The three which reported no marketing costs apparently sold directly to consumers.

Data are not available on current costs of production for commercial egg producers, but some general comparisons can be drawn using prices paid to members of the Lajas Valley Egg Producers Association in 1965. Such a comparison shows that even after excluding the marketing costs of the most efficient producer in the 1951 study, costs of production were \$0.60 per dozen while members of the Lajas Association were paid prices ranging from \$0.41 for Grade A small to \$0.57 for size Grade A jumbo in 1965. For the most efficient producer, the cost of production in the 1951 study exceeds by 3 cents per dozen the price received for jumbo eggs by association members in 1965. This difference appears even more significant when one considers the fact that the consumer price index for Puerto Rico, based on 1957-59 = 100, went from 79.6 in 1950-51 to 116.1 in 1964-65. Thus, if egg prices had risen in step with the general price level, the farm price of jumbo eggs in 1965 would have been about \$0.86, rather than

TABLE 6.5 PRODUCTION AND COST COMPARISONS FROM A STUDY OF SIX COMMERCIAL EGG PRODUCERS IN PUERTO RICO, 1951

	Individual Producer					
	A	B	C	D	E	F
Average # of hens in production	1392	835	402	178	132	85
Average annual production/hen	226	116	135	153	123	67
Average production cost/dozen	60.0	76.3	78.8	76.1	104.1	102.4
Average marketing cost 1 dozen	5.9	-	6.3	10.1	-	-
Average total cost per dozen	65.9	76.3	85.1	86.2	104.1	102.4
Feed cost as % of total cost	48	61	60	67	55	58
Labor cost as % of total cost	5.3	10.9	13	7.1	16.8	21.9
Pounds of feed consumed per dozen eggs	5.5	8.7	9.8	10.5	9.8	10.6
Average monthly mortality per 100 hens	1.7	3.0	1.9	2.3	3.7	2.5

SOURCE: Manuel Pinero and Hector Bayron Montalvo, *Estudio Sobre los Costos para Producir Huevos en Puerto Rico*, 1951 Boletín 122, Río Piedras, Puerto Rico: Estación Experimental Agrícola, Universidad de Puerto Rico, September, 1954.

\$0.57. This analysis suggests that real per-unit production costs of commercial egg producers have been reduced considerably since 1951.

Several additional comparisons support the conclusion that egg production costs have been lowered in Puerto Rico since 1950. Table 6.6 summarizes those comparisons. Column 1 in that table shows that the number of commercial egg producers had increased from an estimated 38 in 1950-51 to 195 in 1963-64. This indicates greater specialization in production which, according to Department of Agriculture personnel and Agricultural Extension workers, has resulted in improved production practices and greater efficiency of resource use. Columns 2 and 3 indicate that while the number of hens held on commercial egg farms has only slightly more than doubled since 1956-57, the quantity of eggs produced on commercial farms has almost quadrupled. Column 4 shows that average yearly production per hen on commercial farms increased from 168 in 1956-57 to 232 in 1964-65.

In summary the limited data available for comparing egg production efficiency for 1950 with 1965 suggest the following: (1) the size of producing units has been increasing; (2) the growth of specialized commercial producers has been accompanied by better management practices and greater production per hen; and (3) real production costs have been reduced significantly.

Very little data are available for evaluating changes in the cost of marketing eggs in Puerto Rico. One of the reasons is that significant changes have taken place over the past 15 years with respect to the marketing and coordination arrangements. Currently available data are not comparable to earlier data because the production and marketing phases have been vertically integrated through private firms and cooperative associations. The importance of truckers and other middlemen in the exchange processes has declined. Our farmer survey in the Mayaguez region pointed out that none of the eggs produced by farmers in the sample (which included about 71 percent of all commercial producers in the region) were marketed through truckers. About 20 percent were sold directly to retailers and 75 percent to cooperatives or marketing associations. Egg marketing specialists in Puerto Rico argue that this vertical integration has lowered exchange costs by eliminating excessive transaction costs and duplication of marketing services, by reducing market information gathering costs, by lowering uncertainty and by permitting more accurate scheduling of production, grading and distribution to the satisfaction of consumer demand. The atomistic and imperfectly competitive markets of the early 1950's, in comparison to the present marketing structure appears to have fostered higher exchange costs.

Progressiveness - This measure of performance is based on the degree to which available innovations have been adopted. Egg producers in

TABLE 6.6 PRODUCTION CHARACTERISTICS OF COMMERCIAL EGG FARMS
IN PUERTO RICO FOR SELECTED YEARS

Year	Number of Commercial Farms ^a	Total Number of Hens on Commercial Farms	Annual Production Commercial Farms (1000 dozen)	Yearly Production per Hen Produced on Commercial Farm (eggs)	Percent of All Eggs Produced on Commercial Farm
1950-51	38 ^b				
1956-57	60-65	180,000	2,500	168	20.7
1957-58	79	-	-	-	-
1958-59	108	-	-	-	-
1959-60	121	285,997	-	-	-
1960-61	136	278,000	4,704	203	32.3
1961-62	178	394,494	6,758	205	41.1
1962-63	192	-	8,818	-	46.9
1963-64	195	482,831	8,844	220	45.6
1964-65	-	448,330	8,682	232	46.5

^aCommercial egg farms are defined by the Puerto Rico Department of Agriculture as those farms having more than 200 producing hens.

^bThe 1951 cost study by Pinero and Bayron indicated that a Department of Economics and Rural Sociology census of commercial egg producers in Puerto Rico found 38 farmers with annual egg sales of more than \$200.00. It would seem more likely that there were 38 farms having more than 200 hens in production. Manuel Pinero and Hector Bayron Montalvo, *Estudio Sobre los Costos para Producir Huevos en Puerto Rico*, 1951 Boletín 122, Rio Piedras, Puerto Rico: Estacion Experimental Agricola, Universidad de Puerto Rico, September, 1954. (See Table 5.2, p. 129.)

SOURCE: Puerto Rico Department of Agriculture and estimates by Nathan Koenig, *A Comprehensive Agricultural Program for Puerto Rico* (Washington, D.C.: U.S. Department of Agriculture, 1953); and Maurice Perkins, *Agricultural Credit in Puerto Rico* (A Special Report published by the Department of Fomento and the Puerto Rican Development Bank, Commonwealth of Puerto Rico, 1958.

Puerto Rico by and large were quite slow to adopt available innovations prior to 1957. One innovation example which stands out is the enterprise of commercial egg production itself. In spite of the fact that a few commercial producers did exist, the adoption of the innovation came fairly slowly and only after other marketing coordination changes. From 1957 to 1964 the number of commercial egg producers more than doubled (see Table 6.6).

Another important egg production innovation, which was slow to be adopted, was improved breeds of laying hens. The value of baby chick imports (for both broiler and laying stock) was \$249,188 in 1950, \$505,420 in 1957 and \$951,843 in 1965. Indications are that most of the imports in earlier years were dual purpose breeds rather than the more specialized and efficient strains of layers and broilers. The farm survey in the Mayaguez agricultural region, which included 57 commercial egg producers, indicated that of all those farmers now using improved laying breeds, only 20 percent had begun doing so prior to 1957. As a result of the slow adoption of improved and specialized strains from the U.S., production per hen remained fairly low until 1957. At that time the adoption process speeded up, and average production per hen moved from 168 on commercial farms to 232 in 1964-65.

Similarly, the innovation of scientifically mixed and controlled feed rations, after having limited acceptance in the early 1950's, has been rapidly adopted since 1957. Total commercial poultry feed sales (including broiler feeds) almost doubled from 1958 to 1964.

The fact that at least 25 percent of all domestically produced eggs are candled, graded, cartoned and delivered in refrigerated trucks to retailers shows the rapid improvements in marketing methods. In 1950 all eggs were marketed without such quality control and effective handling methods. All of these innovations are closely related to the first innovation--organization for efficient commercial production. Adoption and improvement with respect to that innovation is still very much in process in Puerto Rico. And indications are that the adoption process is moving ahead rapidly.

It is significant that almost half of the commercial egg producers on the island are members of some kind of economic organization for the encouragement of egg production. The types of organizations include a highly integrated corporate firm, a marketing firm using producer contracts and a non-profit marketing and supply corporation owned by producers. Since members of these groups are generally believed to be the most progressive on the island, it appears that for egg production in Puerto Rico the displacement of atomistic competition in egg production and distribution by the various institutional forms mentioned above has stimulated production and encouraged technological innovation.

Product Quality - As noted earlier in this chapter, the quality of eggs available to the Puerto Rican consumer was low and quite variable before 1957. Since there were no government grading regulations, consumers could not be sure that they were buying a consistent quality and size of egg from one purchase to the next.

In contrast to this situation, it is estimated by the author that about 25 percent of all eggs produced in Puerto Rico in 1965 were graded, packaged, and distributed under quality regulations specified and enforced by the Department of Agriculture.¹⁴ This means that the eggs were candled, graded, sized and placed in one-dozen cartons with the date of packaging indicated and the inspection seal of the Department of Agriculture applied. The bulk of these eggs were distributed through supermarkets, superettes and large *colmados*. However, the competitive effect of better quality eggs in supermarkets and larger *colmados* has improved the quality of eggs sold directly to consumers and distributed through various combinations of producers, truckers and small retailers. Distributors of eggs through these channels have been forced to deliver better quality eggs in order to compete with the larger retailers handling only consistently fresh graded eggs. The length of time from production to consumption has significantly reduced. Finally, the quality of imported eggs has been improved as a result of changes in domestic production and marketing practices and government regulations. At one time Puerto Rico was used as a dumping ground for surplus and low quality U.S. eggs. More effective coordination and improved handling methods of local producers, in conjunction with government import regulations, has brought a marked improvement in the overall quality of imported eggs.

Milk

Production and Marketing Conditions, 1950-57 - By 1950 dairying had developed as one of the major agricultural enterprises in Puerto Rico. In 1950, the total value of milk production was 21.8 million dollars--second only to sugar cane in the value of farm output. Thus, milk production accounted for more than 10% of the gross value of agricultural output in 1949-50. Koenig points out that from 1940 to 1950 considerable progress was made toward improving the production methods and sanitation requirements of dairy farms in Puerto Rico.¹⁵ Moreover, Perkins notes that during the years between World

¹⁴This figure was obtained by estimating, from personal interviews, the yearly production of the six major egg producers who grade and package virtually all their production; summing that figure and dividing by the total domestic production.

¹⁵Nathan Koenig, *A Comprehensive Agricultural Program for Puerto Rico*, U.S. Department of Agriculture, Washington, D. C., in cooperation with the Commonwealth of Puerto Rico, 1953.

War I and World War II, outstanding progress was achieved in the control of cattle diseases such as Texas fever, brucellosis and bovine tuberculosis.¹⁶ The immediate impact of effective control of these diseases was to improve dairy profits and increase milk production on the island.

Conditions in the Early 1950's - Perkins classified dairy farms in 1950 into three broad categories: (1) commercial dairy farms--medium to large land owners milking 50 cows or more, (2) family farms--a comparatively small group where the family provides all or most of the labor, (3) subsistence farms--a large number of unspecialized mixed farms maintaining a very few animals; these farms do not generally market their milk.¹⁷ The third category mentioned above apparently accounted for the largest number of milk producers, but by far the smallest amount of milk was produced on such farms. The second category, family farms, apparently also included a relatively small number of commercial milk producers. Most of the farms in these two categories who reported having dairy cows in 1950 used the cattle only to produce milk for home consumption and were not producing for sale. Table 6.7 illustrates the relative importance of the different size farms in milk production during 1950.

TABLE 6.7 MILK PRODUCTION BY FARM SIZE, 1949

Size of Farm	Farms Reporting Cows Milked	Expressed as a Per Cent of all Farms Reporting Cows Milked	Quarts of Milk Sold (Millions)	Per Cent of Total Production of Different Size Farms
3-29 cuerdas	19,890	72.4%	7.85	13.6
30-69 cuerdas	4,290	15.7%	6.61	11.6
70-259 cuerdas	2,454	8.9%	15.92	27.7
260 or more	836	3.0%	27.10	47.1

SOURCE: U.S. Census of Agriculture - 1950. Puerto Rico, Vol. 1, Part 34, Chapter 5, U.S. Department of Commerce, 1951.

As shown in Table 6.7 the farms with less than 30 cuerdas, which would include the majority of family subsistence farms, made up 72 percent of all farms reporting cows milked during 1949. Yet they produced only 14 percent of

¹⁶Perkins, *op. cit.*, p. 308.

¹⁷*Ibid.*, p. 310.

all milk sold in that year. At the other extreme farms with more than 260 cuerdas made up a total of only 3 percent of all the farms reporting cows milked in 1949, but they produced a total of 47 percent of all milk marketed. If we combine the two largest size categories, almost 75 percent of the milk was produced on farms of seventy or more cuerdas. These farms accounted for less than 12 percent of all farms reporting cows milked. The statistics indicate that most of the milk produced for sale in 1950 was marketed on relatively large farms.

Koenig estimated that "considerably less than one-half of all the milk produced actually enters into the marketing system that is governed by the sanitary regulations of the Department of Health."¹⁸ It is therefore apparent that many of the 27,470 farms reporting cows milked were either marketing their production through distribution methods other than normal commercial firms or were producing only for home consumption.

In spite of the fact that many improvements were made in the ten years prior to 1950, milk processing and distributing still lagged behind developments in production. Koenig estimated that about one-fourth of the milk produced in 1949-50 was handled by relatively modern marketing techniques. The other three-fourths was produced for home consumption or distribution by producers under relatively uncontrolled conditions as unpasteurized raw milk.¹⁹ The Department of Health had developed sanitary regulations by which they classified dairy farms as first class or second class. A first class dairy was defined as one that, "among other things, has the necessary facilities to sterilize the containers, to cool the milk, to store and to bottle it in accordance with the conditions required by the Secretary of Health."²⁰ A second class dairy was one which had been exempted from any of the requirements which, in the Secretary's opinion, were not absolutely necessary for the protection of public health. The Department of Health reported that in 1951 there were 296 first class dairies which produced the 46 million quarts of milk processed by pasteurizing plants on the island. Of the total only 35 million quarts were sold as pasteurized milk. There were 660 second class dairy farms selling milk to some 22 raw milk bottling plants and 402 Grade D raw milk dealers selling milk to a large number of milk stands over the island and delivering directly to consumers.

Since, as Koenig noted, only about one-fourth of all milk produced in Puerto Rico was handled by modern marketing techniques, there were certain

¹⁸Koenig, *op. cit.*, p. 231.

¹⁹*Ibid.*, p. 230.

²⁰*Ibid.*

inefficiencies in the production and processing of milk in Puerto Rico. At that time, there was no milk market regulation to establish a classified pricing plan for assuring smooth coordination of supply and demand both in the surplus season and in the season of production deficiency. Producers and their buyers were completely free to bargain and establish milk prices throughout the year. As a result, milk dealers were careful not to purchase more milk than they were absolutely sure they could sell, since any surplus milk would have to be sold at a loss. Therefore, to reduce risk, milk dealers bargained with producers for an even supply of milk throughout the year, based primarily upon milk production during the season of lowest output. Since most of the milk was produced and sold on this basis, much of the excess production in the flush season was left for the farmer to sell at whatever price he could obtain or feed to livestock. Aside from a small amount of chocolate milk, the only other outlet of any significance for surplus milk was in the production of native cheese. However, this outlet was not sufficient to handle the fluctuations of milk surplus.

Under such a system neither the processor nor the producer could be free of considerable risks in his business. The producer was faced with the possibility that production increases might be difficult to market either to his normal buyers or to others in the market. He might be forced to accept an extremely low price, or he might not find a buyer at any price. In addition he was exposed to the possibility that his buyer might even refuse to take delivery of his normal production. On the other hand, the milk dealer or processor faced a similar type of risk. He was forced to estimate his sales from day to day and make purchases on the basis of fluid milk price in order to fulfill those demands. If he purchased more milk than he was able to sell, then he was forced to take a loss on the surplus. The risk and uncertainty characterizing the marketing system was a major factor limiting the expansion of the dairy industry in spite of low per capita consumption in 1950.

Another factor which gives an indication of the ineffectiveness of the milk production and marketing complex is the quantity of milk and milk products imported. In 1950 Puerto Rico imported about 29.5 million quarts of evaporated, dry and condensed milk (converted to fluid milk equivalents). Hence, in that year Puerto Ricans imported and consumed almost as much milk in the form of evaporated and dry milk products as was produced and pasteurized for local consumption. It is entirely possible that during the surplus production season of 1950, Puerto Rican producers were forced to use their milk for livestock feed while consumers were importing at considerable expense milk products from the United States and other foreign countries. The production-marketing system was not able to meet the needs of Puerto Rican consumers for fresh milk at competitive prices. As a result consumers turned to the nearest substitute.

The fact is, however, that fluid milk prices were higher than they might have been under a more orderly marketing system. It appears that market uncertainty and poor coordination helped to keep local production at low levels by keeping marketing costs high, by inhibiting technological innovations and by distorting the consumer demand signals of the price system. The possibilities will be examined later in this chapter.

Evolution of Market Control Scheme - As stated above, the distribution system for milk was highly disorganized and quite risky for producers, distributors and processors. There were no government regulations outside of health regulations. Producers and processors occasionally used contracts, but these were frequently disregarded by one party or the other when it appeared advantageous. Coordination problems became particularly acute as the quantity of milk entering the marketing system began to increase rapidly during the first few years of the decade between 1950 and 1960.

A rapid shift from second class dairies to first class dairies contributed to the difficulties. It meant that more producers were competing for stable processor outlets and were willing to make deals or arrangements with processors in order to obtain a buyer for their milk. The number of first class producers increased from 296 in 1951-52 to 400 in 1954-55. By 1957-58 there were 465 first class dairy farms in Puerto Rico.

In 1954 several processors made an attempt to stabilize their milk supplies by establishing an arbitrary production quota system with their producers. This base quota system consisted of an arbitrary determination by the milk dealer of the amount of milk that he would be able to take from each producer at fresh milk prices. The producer was then notified that the balance of his milk would be purchased at surplus milk prices. The surplus milk was used in price wars between dealers during the periods of excess supply, and producers became quite disenchanted with this arbitrary and in their view unfair system of price determination.²¹

Therefore, in August 1954, a group of dairy farmers petitioned the Economic Stabilization Administration of the Commonwealth Government requesting that the administration establish and enforce a production quota system for the milk industry including minimum producer prices for fluid and surplus milk. The petition was denied at that time because the government believed that pricing methods were satisfactory under competitive market forces.

The market relations among producers, processors and distributors continued to deteriorate. And it became apparent that steps would have to be taken to

²¹George E. Pringle, "The Puerto Rico Milk Industry" (unpublished manuscript dated January 19, 1959).

stabilize the market. To that end several meetings were held in the early part of 1955 between producer representatives, milk dealers and processors. The result of those meetings was an agreement between milk dealers and producers to establish a milk processing plant for converting surplus milk into dairy products. Furthermore, Fomento agreed to grant a loan toward the financing of the plant. The final agreement was that producers and dealers would provide \$146,000 and Fomento would loan \$250,000. This would furnish the \$396,000 required to build the size of plant deemed necessary to handle expected milk surpluses for the island.

The plant was constructed and agreement was reached between producers and dealers whereby each producer would be assigned a quota based on his average daily production during the months of August through November. The farmer was to be paid the fluid milk price for all milk within the quota and would be paid the surplus milk price on any output above that quota. Apparently the arrangement was a pragmatic and effective solution to market coordination problems in the dairy industry of Puerto Rico.

But basic weaknesses in the arrangement and other problems resulted in continuing difficulties in the industry. To begin with, only about one-half of the milk distributors finally agreed to go along with the plan. This left the manufacturing plant with a heavy debt and only limited working capital when it opened in December, 1955. To make matters worse the volume of surplus milk had been seriously underestimated, and the size of the plant erected was not large enough to handle the volume of surplus delivered in the first few weeks of operation. The fact that the plant was not fully completed when it began operations compounded the difficulty. When the plant was first opened, milk receipts were over three times its rated capacity. As a result large quantities of skim milk were destroyed or sold as hog feed.²² Additional problems arose as a result of efforts by noncooperating milk processors to bid producers away from cooperating processors by offering fluid milk prices for their total output. These difficulties occasioned a great deal of animosity among producers, processors and distributors. The net effect was a serious deterioration of market relations by 1956.²³

In 1956 a group of producers, processors and milk dealers asked the Senate of Puerto Rico to conduct a study of the dairy industry for the purpose of determining the need for a milk regulation. A Special Senate Committee was appointed to study the situation, and they held four public hearings during April and May of that year. The testimony in the hearings by producers, processors and dealers alike favored a milk industry regulation. At the end of

²²*Ibid.*, p. 9.

²³*Ibid.*

the study the commission concluded that the dairy industry was indeed in a chaotic situation and that direct government action was necessary to bring about an improvement in relations between milk producers and distributors. They recommended that a regulatory agency be created to: (1) implement such regulations as will permit the disposing of the surplus, (2) launch educational drives directed to increase fresh milk consumption, (3) organize the processing and distribution of fresh milk while taking into account the most effective method of lowering costs.²⁴

On June 28, 1956, the Legislature of Puerto Rico approved a law providing for the regulation of the milk industry and creating an Office of Milk Regulation. The law empowered the Secretary of Agriculture and Commerce to appoint an administrator for that office. The administrator of the Office of Milk Regulation was authorized to: (1) fix minimum fluid and surplus milk prices to producers and maximize prices at other distribution levels, (2) hold public hearings, (3) grant operating licenses to producers, dealers and processors, (4) carry out such other actions as are necessary to assure compliance with the law. This included such things as cancellation of license, auditing of the records of producers and milk dealers, requiring regular reports from processors and/or producers and subpoena power. An administrator was immediately appointed who supervised the preparation of a specific dairy industry regulation. On June 11, 1957, the Legislature approved the regulation and it became Public Law #34. The expressed purpose of the law was to insure that:

all endeavors should be directed towards having the public interest adequately served through the production of enough pasteurized milk by a strong industry, operating efficiently, which can supply the consumer with milk and its products at just and reasonable prices.²⁵

The major provisions of the regulation were: (1) a base-surplus pricing plan, (2) maximum and minimum prices at various levels of distribution, (3) a milk promotion fund, (4) operation of the surplus milk processing plant previously established by producers and distributors and (5) establish conditions governing producer, processor and distributor relations.

The regulation provided that each producer would be paid 16 1/2 cents per quart for fluid milk and 10 cents per quart for all milk designated as surplus. In order to define "surplus" milk, the regulation required that each producer should establish a milk production base during the months from August to

²⁴Act No. 34, Legislative Assembly, Commonwealth of Puerto Rico, Approved June 11, 1957, English Translation, p. 2.

²⁵Office of Milk Regulation, *Milk Industry Regulation No.1* (Department of Agriculture, Commonwealth of Puerto Rico, as amended July 26, 1962).

November. The regulation offered a specific means of calculation so that each farmer would share equally in the fluid milk market according to his base production.

The second major provision of the regulation was that prices were to be fixed at a specific level for all channels of distribution. For example, the maximum sale price for all home delivered fresh milk in glass containers was set at 25 cents per quart and for cardboard containers at 27 cents per quart. This was a maximum price which could not be exceeded for any reason. Similar prices were established for other outlets such as milk agents, restaurants, retail stores, etc. In addition the law provided that no discriminatory price reduction could be made at any level of distribution. Any price reduction on milk made to one purchaser had to extend to all customers.

The third major provision of the regulation was for a milk industry promotion fund. The purpose of this fund was to maintain a source of support for advertising fresh milk in Puerto Rico. The regulation required that producers and processors each contribute one-fourth of a cent per quart on all milk produced and processed as non-surplus milk. That money was to be used to promote the sale of fresh milk and milk products on the island.

The fourth major provision of the regulation dealt with the milk products factory. It established the rules under which surplus milk would be transferred from processor to the milk products factory and provided for the payment of transportation subsidies in some cases.

The final provision contained basic rules for the conduct of business between various participants in the milk marketing system. It made certain provisions for coordination of the exchange system. For instance it provided that once an agreement was established between a producer and a processor, neither the producer nor the processor could abstain from fulfilling the terms of that agreement without the consent of the Administrator. It also created similar provisions for processor-distributor contracts.

Market Coordination Activities, 1957-65

Milk Industry Developments - Since 1951 there have been some very significant changes in the dairy industry in Puerto Rico, one of the most striking of which is the rapid growth in output. Since fiscal year 1951-52 total milk production in Puerto Rico has more than doubled. Table 6.8 shows total production for selected years. And since 1951, domestic output has gone from 150 million quarts to more than 358 million quarts. A high percentage of that production is consumed as fresh milk. Thus, per capita consumption has increased rapidly in the past 15 years.

A second surprising feature of the dairy industry in Puerto Rico has been the rapid rise in the production of milk for pasteurization. Since the

Department of Health requires that only those farms possessing a first class license may sell milk to pasteurizing plants, the increase in production of first class dairies illustrates the increase in pasteurization. Table 6.8 shows that production on first class dairies has increased from a total of 45 million quarts in 1951-52 to more than 251 million quarts in 1964-65. Milk production on second class and non-commercial dairy farms increased only slightly to 127 million in 1963-64 and then fell back to 106 million quarts in 1964-65. Stated in percentage terms, first class milk production has grown from 30 percent of the total domestic supply to over 70 percent. Thus, virtually all of the increase in milk production on the island has taken place on first class dairies producing milk primarily for pasteurization and fresh consumption.

TABLE 6.8 MILK PRODUCTION IN PUERTO RICO BY TYPE OF PRODUCING UNIT, FISCAL YEARS 1952-65

Year	Total Production	Production on First Class Dairies	Production on Second Class and Non-Commercial Dairies	First Class Milk Production as a Percent of Total Production
1951-52	150,998	45,638	105,360	30.22
1952-53	163,960	56,542	107,418	34.48
1953-54	180,493	70,974	109,519	38.37
1954-55	191,717	80,051	111,666	41.75
1955-56	207,077	93,239	113,838	45.02
1956-57	220,405	104,344	116,061	47.34
1957-58	232,797	114,471	118,326	49.17
1958-59	249,525	128,916	120,609	51.66
1959-60	280,976	151,556	129,420	53.94
1960-61	289,219	165,018	124,201	57.05
1961-62	311,020	183,354	127,666	58.95
1962-63	332,781	206,504	126,277	62.05
1963-64	353,018	285,269	127,749	63.81
1964-65	358,286	251,794	106,492	70.3

SOURCE: Office of Milk Regulation.

The rapid increase in milk production has moved the dairy industry into a place of special importance in the agricultural economy of the island. Table 6.9 indicates that in 1951-52 sugar cane supplied more than 50 percent of the gross farm income of the island while milk production made up only 9.9 percent. By 1964 the percentage of gross farm income derived from sugar cane production had declined to 30.1 while the percentage derived from milk production increased to 20.7 percent. In a period of less than 15 years, milk production had risen to seriously challenge the dominance of sugar cane on the island. This has been accomplished largely as a result of direct substitution of dairy pasture for sugar cane fields. The shift out of sugar cane production has been especially obvious in the north central part of the island around Arecibo. Within that area much of the flat and fertile sugar cane land of medium-sized farms has been shifted to the production of grass and other products necessary for the operation of dairy farms.

Total milk production, in addition to being increased through the use of additional land and other resources, has been bolstered by improvements in production techniques. The Puerto Rican Department of Agriculture has developed an incentive program for improving pasture lands. Commercial dairy farmers on the island have responded quite readily. Interviews with first-class dairymen in the western agricultural region of the island indicated that about 93 percent of the farmers in the sample had established new or improved pasture under the program. Moreover, commercial dairymen on the island appear to have rapidly adopted high output rations and improved methods for handling feed products in order to achieve greater efficiency in the number of acres available for feed production.

TABLE 6.9 PERCENTAGE OF GROSS FARM INCOME DERIVED FROM CANE, MILK AND ALL OTHER PRODUCTS IN SELECTED YEARS

Year	Percent of Gross Farm Income Derived From:		
	Sugar Cane	Milk	All Other
1951-52	50.1	9.9	40.0
1955-56	44.3	14.6	41.1
1960-61	38.6	17.9	43.5
1963-64	33.9	20.1	46.0
1964-65	30.1	20.7	49.2

SOURCE: *Ingreso Agrícola de Puerto Rico, 1950-51--1963-64, Facts and Figures on Puerto Rico's Agriculture, 1965*, Puerto Rico Department of Agriculture, Office of Agricultural Statistics.

In the survey mentioned, 76 percent of the dairymen reported that they were using green chop as a part of their ration. While the above survey was applied only among farmers in the western part of the island, there is no reason to believe that dairymen there are any more progressive than milk producers in the rest of the island. This indicates that Puerto Rican dairymen in general have been willing to adopt sound production practices.

Processing - In 1951 more than two-thirds of all the milk produced in Puerto Rico was sold in raw form or consumed at the farm level without further processing. In 1957 there were nine pasteurizing plants on the island, seven of which were in the San Juan Metropolitan area. These nine plants handled all of the 45 million quarts of milk produced by first class dairies. By 1965 there were thirteen pasteurizing plants on the island who handled the 251 million quarts of first class milk produced domestically. There was only a slight increase in the number of pasteurizing plants on the island, and most of the new ones were set up in cities other than San Juan. There was, however, a striking increase in the capacities of pasteurizing plants on the island. Rising consumer incomes along with stable price and supply situations encouraged dairy processors in Puerto Rico to invest in pasteurizing facilities. Since processing margins are fixed by the milk regulation, processors have been encouraged to adopt the most efficient methods of operation in order to reduce costs and thereby raise profit margins. A survey conducted among milk pasteurizers on the island shows that a high percentage have adopted the same milk processing practices that are used by progressive stateside pasteurizers.

Price competition among fresh milk processors has not been a significant factor even though it would be permitted under the industry regulation if the processor were willing to grant a lower price to all customers. It is apparently because of this latter qualification and the oligopolistic nature of the industry that processors have not chosen to practice price competition. Each processor realizes that any price reduction would simply mean that others would quickly follow suit and none would be better off. Neither is there a significant amount of advertising competition. Because the fresh milk produced by all pasteurizing plants is quite homogeneous, there seems to be little advantage in advertising other than institutional promotion. Competition among processors has been limited to competition on the basis of service to the customer. There is apparently a significant amount of competition among consumer route salesmen for home delivery customers. In general the milk processors on the island have shared in the tremendous rise in milk consumption on the island. They have contributed to the milk industry promotion fund and have received the benefits of that industry-wide advertising as well as the benefits accruing individually from the rapid rise in consumption.

Processor gross margins under the milk regulation are quite low in comparison to similar processing-wholesaling margins on the mainland. A study in the United States indicates that the average processing-wholesaling price spread was 13.6 cents per quart in the twenty largest metropolitan areas of the United States.²⁶ In comparison the spread in Puerto Rico is seven cents per quart. This illustrates the low gross margins decreed under the regulation for milk processors on the island.

In spite of the fact that gross margins have been quite low since 1957, milk processors have evidenced a fairly steady gain in profits as a percent of gross sales. In 1958 net profits as a percent of sale ranged from -2.4 to 3.0 among the island fluid milk processors. By 1963 all but three of eleven processors had made an increase in profits and six indicated profits of more than three percent of gross sales (see Table 6.10). The fact that prices and supplies are stable and that the processor does not have to handle surplus milk seems to permit pasteurizing plants to operate fairly efficiently.

TABLE 6.10 NET RETURN AS A PERCENT OF GROSS SALES FOR MILK PASTEURIZING PLANTS IN PUERTO RICO, SELECTED YEARS

Processing Firm	Net Return on Sales (Percent)				
	1963	1962	1960	1959	1958
A	-(0.9)	-(0.2)	0.6	2.8	3.0
B	6.6	4.2	2.5	3.0	0.3
C	1.1	1.3	-(1.0)	3.0	2.1
D	0.1	0.9	1.1	a	1.0
E	5.2	5.3	-	-	-
F	6.2	4.8	1.8	4.7	4.6
G	3.4	2.9	3.0	3.1	2.6
H	3.3	1.0	1.6	3.3	-2.4
I	2.0	-0.2	2.3	2.3	0.1
J	-1.9	-5.5	-4.5	-3.6	1.2
K	4.2	3.5	1.5	2.3	1.2
L	2.8	2.8	1.2	0.4	1.1
Average	2.3	1.8	1.4	2.8	2.0

^aData not available.

SOURCE: *La Industria de La Leche y de la Ganaderia*, Junta de Salario Mínimo, Department del Trabajo, Estado Libre Asociado de Puerto Rico, December, 1964.

²⁶D.A. Clarke, Jr., *Economic Aspects of Milk Price Regulation*, Agricultural Experiment Station, Information Series in Agricultural Economics No. 63-64, November 1963, p. 21.

Effects of the Market Regulation - Dairy industry development in the past fifteen years is one of the bright spots in the agricultural sector of Puerto Rico. Producers and processors during that short span of time have accomplished a changeover from a system of production and distribution characterized by small farms, unsanitary conditions and disorganized distribution to one utilizing modern production and processing methods. They have requested and received a government regulation which has contributed greatly to the stability of the industry. While it is impossible to determine the specific effect of the milk regulation upon total consumption, dairy farm productivity and processor efficiency, one can speculate that the dairy industry regulation, which was established in 1957, contributed to the improvement of the dairy industry in at least five different ways: (1) It provided a guaranteed price for producers and an equitable payment plan so that producers could share equally in the fluid milk market. With a guaranteed price, producers have been willing to make long range investments and to expand production facilities and improve production efficiency. (2) It offered an incentive for the improvement of sanitation practices. The guaranteed farm price for milk produced on first class dairies and marketed as fluid milk was 16.5 cents per quart. This encouraged second class dairymen to upgrade sanitation equipment and practices in order to obtain a first class license. The net effect of the regulation was to improve significantly the quality of milk available to the Puerto Rican consumer. (3) The milk regulation stabilized supply arrangements between producers and processors by requiring a producer to sell all his output to a single pasteurizing plant. Hence producers had guaranteed outlets and processors had guaranteed supplies. (4) The regulation provided for the processing of and fair payment for surplus milk. (5) The dairy industry regulation made provision for advertising and promotion of fresh milk consumption on the island. Through a united effort, producers and processors were able to encourage consumers to substitute fresh milk for imported dry or evaporated milk and to increase consumption of fresh milk. That the milk regulation has been regarded as a significant improvement in the industry is illustrated by the fact that 86 percent of the farmers, 80 percent of the consumers and 75 percent of the processors in the surveys mentioned earlier indicated a belief that the milk regulation had benefited producers, processors and consumers alike.

Although the dairy industry regulation has significantly improved milk marketing in Puerto Rico, it has several characteristics which may cause long-run difficulties in the milk marketing structure of the island. The most important of these are the structural rigidities brought on by the regulation. One of the difficult features of an administered price system is that the price established must be realistically related to production and distribution costs

and to consumer demand. To avoid the difficulty, prices should be set only after production cost studies and demand studies indicate proper prices.

A second factor is the rigidities imposed by fixed maximum prices at various types of retail outlets. Several processors argue that as a result of the homogeneity of the product and the restraints imposed by the regulation, the only area of competition is in home delivery sales. Because of the same intensive competition, all processors in Puerto Rico make home deliveries six days a week. Conclusions from research studies in the United States have suggested that home deliveries on a three day basis permit more efficient use of resources without significantly reducing sales volume. The consumer survey of this project revealed that about 98 percent of the homes in San Juan and Mayaguez samples had refrigerators. Thus, refrigeration is no longer a barrier to three day delivery in Puerto Rico as it once was.

A third rigidity caused by the regulation arises from the requirement that a given producer or processor can break supply agreements only with the permission of the market administrator. The policy of the administrator has been to grant such changes infrequently and only under very urgent circumstances. As a result both producers and processors are deprived of the opportunity to seek more satisfactory agreements. Because the regulation specifies a processor pool payment plan, the producer who is bound to a processor whose milk sales are declining will receive a lower blend price as a result of the processor's higher surplus designations. To date, the process of switching processors (which would provide a competitive solution to the problem) has been difficult enough, so that it has created certain inequities in payments to producers and inhibited overall processor marketing efficiency.

A fourth major weakness of the Puerto Rican regulation is its omission of any quality incentives. The pricing scheme does not include a method of paying for milk on the basis of total milk solids. This fosters indifference among producers toward the quality of milk produced, and opens the door to possible adulteration practices. The pricing scheme also penalizes those producers who incur the extra costs of producing milk high in butter fat. One may argue that since a significant percentage of Puerto Rican production is utilized for fluid consumption (which even the U.S. is usually standardized to fairly low butterfat levels), the omission of an incentive payment for butterfat content does not create significant problems. Encouragement of production of milk with lower butterfat content may lead to the best allocation of resources anyway. Still, there are certain advantages that could be achieved with at least a minimum incentive plan without fostering any resource allocation problems. Moreover, provisions are needed for controlling bacteria count and foreign material in the milk delivered to processors.

Finally, the milk regulation permits no quantity discounts. Even in those cases where a distributor can demonstrate cost justifications, he is required to maintain one price for all buyers. Distribution costs are seldom the same for all outlets and all sales quantities. The inflexible pricing structure produced under the current regulation lowers the effectiveness of the competitive price system in allocating milk supplies to consumers through the most efficient market channel. Admittedly, this difficulty, in conjunction with the problem of setting price levels that are "in harmony" with the rest of the economy, is to be expected when prices are determined administratively by a political entity rather than through the impersonal competitive price mechanism. But, the administered price system should be able to utilize certain aspects of the competitive price system where they encourage greater productivity and lower consumer prices. There is no reason why a more flexible pricing policy could not be devised which would permit price discounts adjusted to reflect differences in distribution costs. Such a plan would incorporate some of the benefits of the competitive price system while eliminating the disadvantages discussed earlier.

Production and Marketing Performance

Costs of Production and Marketing - The foregoing discussion has described some drastic changes in the dairy industry since 1950, both in competitive structure and in overall coordination of the marketing system. These changes have been accompanied by some significant improvements in production efficiency. Puerto Rican dairy farmers have been fairly successful in lowering real costs of production over the fifteen years since 1950. Several indicators of the improvements in production efficiency are discussed below.

Data from an unpublished manuscript by Placido Acevedo can be used to demonstrate the change in the real cost of milk production on first class dairy farms between 1953 and 1963.²⁷ He utilized cost studies of the Puerto Rico Minimum Wage Board. Acevedo found that production costs were 13.60 cents per quart in 1953 and 16.50 cents per quart in 1963 as determined by the minimum wage studies. Net returns per quart were 2.4 cents in 1953 and 1.3 cents in 1963. His analysis thus indicates that the absolute cost of producing milk on first class dairy farms in Puerto Rico increased by 2.9 cents per quart from 1953 to 1963 while net returns declined from 2.4 cents to 1.3 cents per quart. If the 1953 cost of production per quart is inflated by the consumer price index, the cost of production for that year stated in 1963 dollar values

²⁷From an unpublished manuscript by the Administrator of the Office of Milk Regulation, Placido Acevedo, undated.

is 18.25 cents per quart. Hence, the real costs of production in 1963 were 1.75 cents per quart less than in 1953-54.

It should be emphasized that the foregoing discussion was concerned only with first class dairies. No attempt is made here to evaluate the production efficiency of second class or non-commercial producers. Their production generally remained constant over the period under consideration while first class production increased by over 500 percent. This in itself is somewhat of an indication of improvements in production efficiency. The shift from a second class license or from a non-commercial producer usually involves an investment in additional sanitation equipment. Frequently, the farmer realizes that to make the changeover to first class production profitable, he must increase the scale of output and adopt more efficient production techniques. Hence, the producer who obtains a new first class license is likely to invest some additional capital in up-grading or increasing the size of his herd, purchasing milking machines or other equipment and improving feed production or handling facilities. These kinds of improvements have been shown to be cost reducing or output increasing innovations among dairy farmers in the U.S. and in Puerto Rico. Thus, one may argue intuitively that the rapid changeover to commercial first class production has probably been a positive factor toward greater overall production efficiency.

Table 6.11 contains four series of statistics on first class production of milk in Puerto Rico. These statistics give some indication of possible changes in production efficiency since 1950. The first column shows the number of first class dairy farms in operation at the end of fiscal years 1952 through 1965. The number increased from 296 in 1953 to 747 in 1965. The percentage increase in first class dairy farms was 38 percent during the five year period from 1952 to 1957. But during the first five years that the milk regulation was in effect (1957-62), the number of first class dairy farms increased by 56 percent.

It was mentioned earlier that most dairy specialists in Puerto Rico are convinced that first class milk producers make more efficient use of their resources than second class or non-commercial producers. During 1953-54 Perkins made a comparison between the average production of cows on first class dairy farms and average production for all other dairy cows. He found that the average production per cow on first class dairies was more than twice the average production of all other dairy cows.²⁸

Column 4 in Table 6.11 indicates that average daily production per cow on first class dairy farms has increased from 8.10 quarts in 1953-54 to 11.20 quarts in 1964-65. Going back to 1949-50 the average daily production was

²⁸Perkins, *op. cit.*, p. 311.

TABLE 6.11 STATISTICS OF FIRST CLASS DAIRY FARMS IN PUERTO RICO, 1951-65

Year	Number of First Class Dairy Farms	Average Number of Cows Per Farm	Total Production (Thousand Quarts)	Average Daily Production Per Cow in Production (Quarts)
1951-52	296 ^a	73	45,635	
1952-53	330 ^a	71 ^a	56,542	
1953-54	360 ^a	72 ^a	70,974	8.10
1954-55	400	73	80,051	
1955-56	400 ^a	82 ^a	93,239	
1956-57	410	90	104,344	
1957-58	465	89	114,471	8.98
1958-59	521	89	129,916	
1959-60	566	93	151,556	
1960-61	588	100	165,018	
1961-62	639	99	183,354	10.53
1962-63	691	97	206,504	10.49
1963-64	718	103	225,269	10.68
1964-65	747	107	251,794	11.20

^aEstimated

SOURCE: Office of Milk Regulation and Bureau of Agricultural Statistics, Department of Agriculture, Commonwealth of Puerto Rico.

only 7.07. It is evident that first class dairy farms have made significant improvements in productivity per cow since 1950.

Finally, column 2 in Table 6.11 shows the average number of cows per first class dairy farm for fiscal years 1952 through 1965. The number has increased almost yearly from 73 in 1951-52 to 107 in 1965. This figure may or may not be an indicator of improvements in production efficiency. The relevant average cost curves for different size dairy farms have not been determined by research studies in Puerto Rico. While the average number of cows per farm has been high throughout the period under consideration, this might be due to the fact that economies of scale do in fact exist, or it might be caused by the fact that first class milk producers in Puerto Rico have historically been large landowners who may not have known much about cost at various herd sizes but who did have an abundance of capital and land to invest in dairying. It is probably more likely that some economies of large scale production do exist since the trend toward larger herds has been quite pronounced and steady.

The data summarized in this section suggest that production efficiency in the dairy industry has increased significantly. Production costs in real terms were about 1.75 cents less per quart in 1963 than in 1953-54. Factors contributing to this improvement appear to have been increasing numbers and production of first class dairy farms, higher average production per cow and increasing herd size.

Prior to the passage of the milk regulation in 1957, the dairy industry was completely dependent on a bargained price system for allocating available supplies in the market place. Producers were free to sell their milk to the highest bidder, and processor-dealers were also able to bargain for the best deals. In such a system daily supplies and demands established the price of milk.

Exchange costs in a competitive price system are frequently somewhat high, especially for perishable commodities. There are several reasons for this. Supply agreements between buyers and sellers are often quite unstable. There is always the possibility that either the buyer or seller will find a more attractive offer and terminate the arrangement. This means that the other party has to find and come to terms with another buyer or seller. In such a search process, the individual must incur certain costs associated with gathering and evaluating information, bargaining with possible buyers or sellers and making the final decision. In the event that a buyer is not immediately available, the seller may incur financial losses due to a spoilage of the product. Finally, indirect costs may be present in a competitive exchange system on account of the necessity of financial hedging against risks and the abandonment of business investment opportunities because of price or supply uncertainty.

These factors, in addition to a pronounced seasonal production pattern, combined to make exchange costs fairly high in the milk industry prior to 1957. There are no data available to indicate the magnitude of such costs, but undoubtedly they were regarded by producers, distributors and processors alike as being too great to tolerate since a government regulation was requested and supported by the industry.

The result of that request was a regulation which provided for a marketing system in which most exchange relations were administered by a government agency. Exchange costs under such a stable arrangement were probably reduced significantly. Moreover, price and supply arrangements became completely stable under the regulation. The administered price system almost completely eliminated information gathering, bargaining and market risks. Of course, the elimination of these costs would have done producers and distributors little good if the administered prices had not been sufficiently high to cover production and distribution costs with an acceptable margin of profit. It appears

that the industry has been satisfied with the operation of the regulatory system since, as noted earlier, a high percentage of farmers and processors surveyed in this research project indicated a belief that the regulation had been beneficial to producers, distributors, processors and consumers.

Progressiveness - The review in Chapter 1 of research findings in several different countries by Tax, Banfield, Belshaw, Schultz and others suggested that technological progressiveness is one of the critically important factors for improving agricultural productivity. The rate at which proven technological innovations can be diffused among agricultural producers is a critical variable in determining the rate of agricultural output of a given commodity. Of the writers mentioned above, Tax, Banfield and Belshaw imply that the structure and coordination of the marketing system may have a significant effect on technological progressiveness among agricultural producers. Data on the Puerto Rican dairy industry indicate first of all that producers have readily adopted improvements in production techniques since 1950 and secondly that market stabilization through government administration has been a positive factor in the adoption process.

The contrast between the two following statements points up the magnitude of technological changes on dairy farms in Puerto Rico since 1950.

This industry is only slightly mechanized. As a result, the man-hours needed to produce 100 pounds of milk is from 3 to 4 times as great as the number required on the mainland. Only a few dairies in Puerto Rico used milking machines. Few use power mowers or cutters. Still fewer have silos. Farm and barn layouts are poor. Production is low. There can be little doubt as to the important role that mechanization and related technology could play in the improvement of dairying on the island.²⁹

In this dramatic development (rapid change-over to first class dairy farms and rapid increase in output since 1953), the adoption of new technology has played an important role. At the present time such innovations as artificial breeding, pasture improvement, better feeding methods, better breeds, farm records, mechanization, and disease and parasite control are widespread. It is apparent that the rapid growth of the dairy industry has been influenced by favorable farmer predisposition toward the adoption of new technology.³⁰

The first statement was excerpted from Koenig's study of the Puerto Rican agricultural economy in 1950, and the second was drawn from a doctoral dissertation on adoption of innovations among first class dairy farmers in 1965.

²⁹Koenig, *op. cit.*, p. 180.

³⁰Otis Oliver Padilla, "The Role of Values and Channel Orientations in the Diffusion and Adoption of New Ideas and Practices, A Puerto Rican Dairy Farmers Study" (unpublished Ph.D. dissertation, Michigan State University, 1964), p. 57.

Koenig's statement makes it clear that the adoption of improved production techniques in the dairy industry as a whole had been slow and inadequate prior to 1950. But Oliver found that in 1964 first class dairy farmers were quite progressive in terms of innovations adopted.

In his study, Oliver gave farmers a list of specific innovations and asked them, among other things, if they had ever used the practice and if they were now using it. Table 6.12 includes a list of the innovations he used and the percentage of the 233 farmers in the sample who had (1) used the practice and (2) permanently adopted it. At least a majority of producers had permanently adopted six out of the ten innovations suggested by Oliver. The percentage of adoption among farmers sampled for such important innovations as fertilizers, use of artificial breeding and pasture improvement was over 70 percent. The interviews discussed in Chapter Seven of this report included a set of questions on technological innovations. The sample of 54 included a high percentage of all first class dairy farmers in the Department of Agriculture's Mayaguez region. Of the 54, 99 percent had permanently adopted fertilizers, and 89 percent had permanently adopted insecticides. In addition, officials at the Office of Milk Regulations have indicated that virtually all first class milk producers now have bulk storage tanks (since all pasteurizing plants use bulk tank pickups) and milking machines.³¹ And Oliver noted that an estimated 95 percent of all first class dairy farms now have milking machines. It is evident that Puerto Rican producers have made great improvements in production methods over the past fifteen years.

TABLE 6.12 PERCENT OF FIRST CLASS MILK PRODUCERS IN A SAMPLE OF 233 WHO USED AND PERMANENTLY ADOPTED SPECIFIC INNOVATIONS, 1964

Innovations	Percent of Sample Who Had Used the Practice	Percent of Sample Who Had Permanently Adopted the Practice
Fertilizers	99.1	98.7
Internal Parasite Control	92.7	90.9
Artificial Breeding	84.1	68.2
Pasture Rotation	80.7	78.5
Pasture Renewal	77.2	71.2
Herbicides	57.5	50.6
Insecticide	48.1	40.8
Sale Stations	44.6	35.6
Record Keeping	18.0	14.6
Silage	8.6	6.4

SOURCE: Otis Oliver Padilla, "The Role of Values and Channel Orientations in the Diffusion and Adoption of New Ideas and Practices, A Puerto Rican Dairy Farmers Study" (unpublished Ph.D. dissertation, Michigan State University, 1964).

³¹ Personal interview with Mr. Placido Acevedo, Administrator of the Office of Milk Regulation and his economic assistant, Felix Roman, on July 30, 1965.

The impact of government market regulations on the rate of adoption of innovations is demonstrated by the data in Table 6.13. Here the rate of adoption of certain innovations is indicated. Perhaps one of the most important innovations in dairy production has been the changeover to mechanical milking. Puerto Rican farmers purchased only \$62,529 worth of new dairy farm equipment in fiscal year 1951 (bulk of which was for milking machines). While the amount purchased increased each year through 1957 when purchases amounted to \$222,931, purchases dropped off in 1958 only to rise again in 1959. A second type of production innovation which has been important in improving productivity is pasture improvement. The number of cuerdas of pasture established as well as the number of cuerdas improved increased steadily from 1954 through 1959--reducing a combined total of 50,800 cuerdas in the latter year. Both dropped off a bit in 1960 but remained fairly high through 1964. Finally, government incentive payments to producers for the purchase or construction of new equipment or facilities followed the same pattern. Payments rose steadily through 1956 with a sizeable decline in 1957 followed by a jump upward in 1958. And payments fluctuated between \$40,000 and \$140,000 per year after 1958.

The general pattern for the innovations mentioned above seems to be a rapid increase during the years prior to 1959 and followed by either continued less significant expansion or relative stability. The milk regulation was first passed in 1956 and became effective in 1957. The market stability created by the law may have been a factor in the decisions of producers to make capital investments in modern production techniques at a rapid rate after 1955. There are, of course, any number of other factors which undoubtedly affected those decisions. One can only speculate as to the positive effect of the market regulation and the possible negative effect of poor market coordination had it not been granted by the Puerto Rican government.

In summary Puerto Rican dairy farmers have made significant improvements in the use of modern production techniques over the past fifteen years. The passage of a government regulation for the dairy industry appears to have stabilized market relations and reduced investment uncertainties sufficiently to provide some impetus to the technological adoption process.

Product Quality - Previous discussion has established the fact that the quantity of milk produced and sold to pasteurizing plants increased rapidly after 1950. This is probably the best indication of quality improvements in milk production. To review, in 1950 only 35 million quarts out of a total production of 146 million quarts were pasteurized (about 25 percent) as compared to pasteurization of 225 million out of a total production of 358 million quarts in 1964-65 (about 63 percent). The Department of Health requirements on sanitation practices and refrigeration in producing, transporting, processing

TABLE 6.13 VALUE OF DAIRY EQUIPMENT IMPORTS, NEW AND IMPROVED PASTURE, AND INCENTIVE PAYMENTS TO DAIRY FARMERS IN PUERTO RICO, 1951-64

Year	Import Value of Dairy Farm Equipment (dollars)	New Pasture Established ^a (cuerdas)	Pasture Improved ^a (cuerdas)	Cash Payments to Producers For New Equipment and Facilities ^b (dollars)
1950-51	62,529	-	-	-
1951-52	23,847	-	-	-
1952-53	29,644	-	-	-
1953-54	73,653	5,300	4,700	4,500
1954-55	162,582	12,000	5,500	23,965
1955-56	213,899	14,800	4,900	39,596
1956-57	222,931	22,300	5,300	18,722
1957-58	63,792	19,200	16,200	22,815
1958-59	124,988	32,200	18,600	40,871
1959-60	126,174	18,900	6,900	84,978
1960-61	164,689	23,500	7,100	108,691
1961-62	201,584	27,287	9,656	139,830
1962-63	307,287	30,000	8,200	120,357
1963-64	228,365	-	-	91,424

^aRefers to the amount of new pasture established and cuerdas improved with assistance from the Commonwealth government's pasture improvement program.

^bRefers to government incentive payments to producers for purchasing new equipment or facilities, e.g., silos, molasses tanks, stables, milk rooms, etc.

SOURCE: *External Trade Statistics*, Puerto Rico Planning Board and *La Industria de al Leche y de la Ganaderia*, Junta de Salario Minimo, Departamento del Trabajo, Estado Libre Asociado de Puerto Rico, December, 1964.

and distributing pasteurized milk have been sufficiently strong to assure adequate quality. Sanitation regulations earlier in the period were somewhat inadequate but significant improvements have been made. Some problems of enforcement of sanitary regulations among producers still exist but, in general, the quality of processed milk in Puerto Rico is quite satisfactory. There can be little doubt that since 1950 consumers have benefited by a substantial improvement in the quality of milk available to them.

Fruits and Vegetables

Production and Marketing Conditions, 1950-57 - Production of fruits and vegetables in Puerto Rico in 1950 was dispersed over a large number of small subsistence type farms. In most cases fruit or vegetable production was not the main enterprise of the farm. Puerto Rican farmers have traditionally regarded fruit and vegetable production as secondary to major crops. The bulk of the production came from farms where the major enterprise was sugar cane, coffee, or tobacco or from part-time or subsistence farms.

Banana production illustrates the interrelationship between coffee production and other tree crops. In the 1950 census of agriculture, more than 31,000 farms reported production of bananas. On virtually all of those farms, bananas were produced as a by-product of coffee production. The trees were planted to provide shade for the coffee trees, and the bananas produced were considered as supplementary to the principal cash enterprise of coffee. The situation was the same for several other tree crops (*e.g.*, plantains and oranges).

The same type of complementary production arrangements existed for such starchy root crops as yams, taniars, potatoes and casava. These crops were planted under the coffee trees or on small vacant plots on the coffee plantation. They were mainly produced for home consumption, but the excess was marketed when buyers were available. There were a few producers who specialized only in the production of starchy vegetables in certain parts of the island, but such specialized producers most commonly used small plots on hillsides where little else could be produced and followed primitive production practices.

The situation was much the same in the production of other vegetables mentioned above. In the 1950 census, 2,294 farms reported having produced tomatoes, while 1,535 reported the production of peppers. Included in the census were only those farm units having 3 or more cuerdas, so additional production of these products could have been accomplished on smaller garden-type plots. Very little of the production of such plots was marketed, however. Of the farms reporting tomato or pepper production in the census, the average number of cuerdas harvested per farm was .69 and .41 respectively. While tomato production was generally regarded as the most commercialized of all vegetable production, there were several pockets of specialized commercial producers of scattered subsistence or part-time farms.

Table 6.14 reveals the value of production of fruits and vegetables for Puerto Rico in 1950-51. The group labeled starchy vegetables made up more than one-half of the total value of \$17,539,000 for all fruit and vegetables. Fruit production was valued at \$4.6 million and other vegetables \$3.0 million. It is interesting to compare the total value of local production with the value

TABLE 6.14 VALUE OF FRUIT AND VEGETABLE PRODUCTION AND NUMBER OF FARMS REPORTING SALES IN 1950-51

Description	\$ Value of Production \$000	Number of Farms Reporting Sales
Starchy Vegetables	9,917	-
Sweet Potatoes	1,377	25,552
Bananas	4,101	12,214
Plantains	1,717	7,804
Dasheens	190	12,499
Yams	500	12,506
Breadfruit	908	553
Taniers	992	21,009
Casava	132	8,069
Other Vegetables	3,007	-
Pumpkins	398	2,158
Peppers	364	1,535
Cabbage	370	992
Tomatoes	893	2,294
Others	973	-
Fruit	4,615	-
Avocados	638	10,200
Oranges	631	9,618
Coconut	1,380	3,578
Mangos	167	1,173
Pineapple	1,290	140
Grapefruit	210	1,135
Others	299	-
Total Fruit and Vegetables	17,539	-

SOURCE: U.S. Census of Agriculture for Puerto Rico-1950.

of imports of fruits and vegetables. Most of the production mentioned above and listed in Table 6.14 was consumed as fresh produce. In 1950 Puerto Rico imported large quantities of fresh, frozen canned and dried fruits and vegetables, and significant percentage of Puerto Rico's consumption of processed fruits and vegetables was supplied by imports. Moreover, as indicated in Table 6.17 Puerto Rico imported a large amount of fresh fruits and vegetables. The total value of all fruit and vegetable imports in 1950-51 was over \$14 million. Thus, in 1950 some 40-45 percent of the total consumption of fruits and vegetables on the island was imported.

In 1950 virtually all the fruits and vegetables marketed in Puerto Rico were purchased by merchant truckers buying at farms or at concentration points in rural areas. These merchant truckers then transported the products to consuming centers where sales were most often made to retailers in the market

plazas or occasionally to consumers. Truckers seldom had an established place of business, for their truck bed served as a grading, packing and storage warehouse. Yet these truckers performed (though frequently inefficiently) the important marketing function of assembling food products from large numbers of small producers, transporting the products to urban areas and distributing them to other middlemen or to consumers. They provided the necessary link between small geographically scattered producing units and small retailing, wholesaling or consuming units. The service provided by merchant truckers was a necessary part of the coordinating mechanism of the highly competitive bargained exchange system for fruits and vegetables. Unfortunately, their handling methods had significant influence on the marketing methods of their buyers and on the practices of farmers as well.

Neither producers nor merchant truckers were able to understand the nature of consumer demand sufficiently to perceive the need or profitability of washing, grading and carefully handling perishable commodities. Nor was there a clear understanding of the importance of such practices on marketing efficiency and hence industry profits.

As a result, there was little protection of fruit from the tropical heat, and products were ordinarily transported in bulk. Nathan Koenig observed that:

the movement of products from the farms to the marketing centers of Puerto Rico is a costly process. This is due to the inefficient methods that are employed. All the fruits and many other products that move in the market are sold by count. Although some of the products are placed in sacks, their handling is as costly as handling bulk shipments. Since there is no grading to promote buyer confidence, the practice of the trade is to inspect each item that is received.³²

He also observed that the bulk transportation of fruits led to a great deal of spoilage and waste as a result of bruising and mashing and due to the lack of protection while in transit.

A high percentage of locally produced fruits and vegetables were marketed through Municipal Market Plazas. A study in the San Juan Metropolitan Area by the Puerto Rico Department of Agriculture noted that during a sampling period in 1952-53 the destination of about 39 percent of the fruits, 78 percent of the starchy vegetables and 93 percent of the other vegetables were market plazas. Table 6.15 summarizes the results of that study. Since the market plazas consisted of individual stalls provided to retailers for displaying their products, they had no facilities whatsoever for grading, storing or efficiently handling produce. Perkins noted that parking around market plazas was generally limited and that there were no unloading platforms or

³²Koenig, *op. cit.*, p. 221.

areas provided for sorting or grading products. Both wholesale and retail operations were carried on in the market plazas, often by the same individual.

TABLE 6.15 PERCENTAGE OF VARIOUS PRODUCTS DELIVERED TO SPECIFIC DESTINATIONS IN METROPOLITAN SAN JUAN--1952-53 (PERCENT OF TOTAL DOLLAR VALUE)

Description	Market Plazas	Colmados	Consumer Sales	Wholesaler	Processor	Restaurants and Institutions	Other
Green, Yellow and Leafy Vegetables	93.07	1.86	1.55	.90	.34	2.16	.12
Fruit	39.07	.86	54.21	1.50	1.59	2.44	.33
Starchy Vegetables	78.00	2.93	11.45	2.20	1.08	3.39	.95

SOURCE: Louis Nazario, Bartolome Morrell, Carlos Jimenez de la Rosa, and Guillermo Gonzalez, *Estudio de los Abastos de Productos Agricolas de Puerto Rico a la Zona de San Juan*, Departamento de Agricultura y Comercio, San Juan, 1956, pp. 98-99.

The most prevalent type of market price and supply information was market observation or word of mouth reporting. Merchant truckers obtained price information by direct observation in the various market plazas where they visited. Since most of the trucker's purchases were at small concentration markets where farmers most frequently delivered products by hand or on mules, trucker-buyers were in a somewhat favorable bargaining position. The poorly educated farmer with small amounts of produce, poor market information and few if any alternative buyers was unable to bargain for "fair" prices. As a result producers were given little incentive to invest additional inputs (*i.e.*, labor, capital or land) to attempt increasing output or improving quality.

The absence of a dynamic and orderly marketing system had the effect of maintaining the status quo of small scale production, atomistic and unbalanced competition (in the relationships between buyers and producers) and low levels of productivity. Koenig's recognition of the important effect that the poorly coordinated marketing system was having on farm management decisions and resource allocation is illustrated in the following statement:

Farmers have had to plant, not the type of crops for which their soils are best suited, but a crop such as sugar cane that can be marketed with some certainty of a return for the investment and labor . . . As a result, (of the inadequacies of the marketing system), farmers are inclined to follow extensive production practices, whereas virtually all farming should be on an intensive basis.³³

³³*Ibid.*

Basic marketing inefficiencies such as selling by count, packaging in odd containers, poor handling methods, and lack of refrigeration add to distribution costs. Eventually, these added costs must be borne by the consumer either through higher prices or through lower quality or partially satisfying products. In 1950 Puerto Ricans were spending over 40 percent of their income for food. The poorly coordinated marketing system for fruits and vegetables placed additional burdens on food budgets by adding the costs of marketing inefficiency to consumer prices. Moreover, there is evidence that even at high prices consumer tastes and preferences were largely ignored. Koenig pointed out that the ways in which fruits and vegetables were produced and marketed satisfied neither high income nor low income consumers.

The low income consumers cannot get a satisfactory second-grade product to meet their needs with the limited purchasing power available to them. On the other hand, the high-income consumers are unable to find the first-class products they can afford to buy.³⁴

Perhaps such a situation was caused by an inability of producers, distributors and even consumers to understand their proper roles in relation to others in the marketing system. Koenig comments that producers "tend to regard production and marketing as being widely separated functions."³⁵ This suggests that Puerto Rican farmers had not yet "learned" that the whole purpose of production is to fill the needs and wants of people. It thus becomes important to know something about the preferences of the people for whom one is producing. The problem is less critical in a subsistence economy where producers and consumers are the same people, but in an economy where exchange is necessary the matter becomes quite important. The same applies to distributors. They too may overlook the importance of gearing their marketing services to the real needs and wants of consumers. Maybe their oversight is even less understandable than the farmer's. Marketing middlemen are at least one step closer to the consumer, and of course retailers are in contact with consumers daily. It would seem that one of the critical roles of such middlemen, in addition to facilitating the flow of goods and services *to consumers*, should be to provide a flow of accurate consumer preference signals or messages *back to producers*. In a bargained exchange system where producers, middlemen, and consumers understand these relationships and act accordingly, independent decisions at all levels will have a central purpose resulting in an effectively coordinated and efficient production and distribution system. The Puerto Rican fruit and vegetable marketing system in 1950 apparently lacked this basic orientation.

³⁴*Ibid.*

³⁵*Ibid.*, p. 222.

In summary fruit and vegetable market organization in 1950 was detrimental to the Puerto Rican economy in several respects. The marketing system with accompanying risks and uncertainties prevented producers from expanding and diversifying fruit and vegetable production enterprises. Koenig and Perkins imply that consumer prices were kept high through inefficient handling methods, excessive wastes and unnecessary instabilities and uncertainties. Finally, consumers were deprived of the opportunity to purchase food supplies at "reasonable" prices (relative to other goods) and were unable to adequately satisfy their needs and wants for specific types and qualities of products.

Market Coordination Activities, 1957-65

Changing Market Conditions - The impact of a rapid rise in per capita incomes has already been observed with respect to milk and eggs. Table 6.16 summarizes the changes in per capita consumption of several major food items since 1950. The table indicates that green and leafy vegetables have shown a sizable percentage increase since 1950. Even though fruit consumption is not included in the table, it is quite likely that its consumption has increased significantly. It should also be noted that per capita consumption of starchy vegetables decreased by 21 percent--from an extremely high total per capita consumption of 316.7 pounds to 261.7 pounds.

TABLE 6.16 PER CAPITA CONSUMPTION AND PERCENTAGE CHANGE SINCE 1950 OF SELECTED FOOD COMMODITY GROUPS IN PUERTO RICO

Product	1950 (pounds)	1964 (pounds)	Percent Change 1950-1964
Dairy Products	161.5	342.4	+112
Meats	47.1	99.0	+110
Eggs	8.3	16.4	+98
Fish	19.3	35.9	+86
Green and Leafy Vegetables	28.3	50.9	+80
Coffee	9.2	6.5	-41
Starchy Vegetables	316.7	261.7	-21
Sugar	69.7	61.7	-13

SOURCE: Puerto Rico Planning Board.

The changes in eating habits reflected in Table 6.16 are typical of the changes which have normally occurred in developing countries with rising incomes. Higher incomes in Puerto Rico have thus been accompanied by greater consumer demand for animal products, fruits and green and leafy vegetables (both fresh and processed), with lower demand for the less expensive starchy products. This change in consumer demand has created special problems for traditional fruits and vegetable producers.

In the first place Puerto Rican farmers have traditionally emphasized the production of starchy fruit and vegetable products. Historically, Puerto Rican consumer incomes have been such as to require large quantities of those items. Prior to 1950 producers saw little demand for such items as lettuce, tomatoes and cucumbers. Though most urban consumers could not afford to purchase such products, as incomes began to rise, there was a growing demand for products not normally produced by Puerto Rican farmers. At the same time consumer demand for starchy vegetables was declining. Puerto Rican fruit and vegetables producers have had difficulty in adjusting to these changes in consumer demand.

Secondly, the nature of fruit and vegetable production and distribution as described above made it difficult for producers and distributors to fully account for changing consumer wants. Production (as a secondary enterprise) on widely dispersed sugar, coffee or tobacco farms with few specialized commercial producers has resulted in limited interest in changing consumption among fruit and vegetable producers. Then, too, the conditions in the distribution system for traditional fruits and vegetables were such that adjustments were also difficult to effect there.

These two factors combined to result in a production and distribution system for fruits and vegetables showing little change and improvement from 1950 to 1965. Virtually all production continued to be derived from sugar, coffee or tobacco farms or from part-time or subsistence units. There was only a slight change in the composition of fruit and vegetable output, *i.e.*, green and leafy vegetables or fruits vs. starchy products. The marketing system continued to center around merchant truckers.³⁶ Marketing methods and practices remained virtually the same.

While conditions in domestic fruit and vegetable production largely remained static, significant changes were taking place in food retailing on the island. The introduction of the first supermarket on the island in 1955 and

³⁶The farmer survey discussed in Chapter Seven indicated that for the Mayaguez region farmers making up the sample about 42% of all fruit and vegetable sales were made to truckers. Produce wholesalers purchased only 19%, retailers 14%, cooperatives 11%, processors 7% and "others" 7%.

the growing acceptance of the marketing institution since that time has already been discussed. In 1965, supermarket sales accounted for about 22 percent of retail food sales on the island and the percentage has been increasing rapidly.

Because the marketing system prevailing for fruits and vegetables in Puerto Rico does not satisfy the demands of supermarkets, the new supermarkets and many larger scale self-service grocery stores competing with them have turned to the mainland for a stable supply of consistent quality produce. It has remained necessary for them to purchase many specialty items locally. These have mostly been the starchy vegetables in largest supply on the island, such as bananas, plantains, yams, taniens, casava, etc. Table 6.17 indicates the farm value to domestic fruits and vegetables in comparison to the value of imported fruits and vegetables alongside ship at the port of embarkation in the U.S.. While value of imports have remained equal or slightly larger than

TABLE 6.17 VALUE OF DOMESTIC AND IMPORTED FRUITS AND VEGETABLES, PUERTO RICO FISCAL YEAR, 1951-1965

Year	Domestic ^a Production \$1,000	Imports ^b \$1,000
1950-51	19,986	14,294
1951-52	24,082	19,895
1952-53	22,397	22,487
1953-54	23,543	20,849
1954-55	23,190	23,199
1955-56	23,749	23,697
1956-57	20,577	24,697
1957-58	23,929	27,270
1958-59	22,806	25,889
1959-60	26,975	27,166
1961-62	30,193	
1962-63	31,852	33,499
1963-64	33,967	34,999
1964-65	36,034	39,582

^aThe value figures represent farm value of starchy vegetables, green and leafy vegetables, legumes and fruits.

^bThese figures represent only imports from the U.S. (since foreign shipments are quite small) and reflect values of products "free alongside ship" at the port of embarkation on the mainland. These import values include processed fruits and vegetables as well as fresh.

SOURCE: *External Trade Statistics*, Puerto Rico Planning Board and *Foreign Trade Reports*, U.S. Department of Commerce.

domestic production throughout the past 15 years, the most recent trend has been for imports to capture a slightly larger proportion of total supplies.³⁷

Reasons for Slow Improvement - The conclusions from the foregoing discussion are that production and marketing of the bulk of fruits and vegetables produced in Puerto Rico has changed very little over the past 15 years. As a result rapidly expanding supermarkets and other self-service retailers have continued to depend heavily on U.S. shipments. Several significant factors have accompanied and may have contributed to this situation.

First, production continued to be carried out on extremely small specialized farms or as a secondary enterprise. Table 6.18 shows some of the characteristics of farms classified as minor crop and fruit and nut farms in the Census of Agriculture. These are farms having gross farm sales of more than \$150 during the year for which more than 50 percent of all sales were in products classified as minor (*e.g.*, rice, pigeon peas, dry beans, sweet potatoes, yams, taniers, etc.) or fruit and nuts (all tree fruits, nuts and pineapples). The table illustrates that there were relatively few such specialty farms although there was a slight increase in their number between 1950 and 1959. It also shows that the average number of cuerdas in cropland on minor crop farms was 9.5 in 1950 and declined to 7.0 in 1959. Similarly, the average number of cuerdas in cropland on fruit and nut farms declined from 14.5 to 9.5. While data were not available to classify these farms on the basis of size (total acreage in farms including cropland and pasture) in 1950, such a classification for 1959 reveals that the majority of both minor crop and fruit and nut farms has less than nine acres per farm. Thus, during the ten-year period from 1949 to 1959 census data give no indication of a trend toward the development of specialized fruit and/or vegetable producers.

Second, there was no significant improvement in production methods. Table 6.18 also gives the value of fertilizers purchased by minor crop and fruit and nut farms in 1958 and 1959. Fertilizer purchases were extremely low for minor crop producers in 1950 (\$39,800) and declined slightly in 1959 to \$39,137. Fertilizer purchases by fruit and nut farms sizably increased from \$399,138 in 1950 to \$437,538 in 1959. This increase may be due to a few new specialized pineapple and papaya producers who started commercial production during the period. Moreover, Table 6.18 indicates that in 1959 tractors and trucks were practically non-existent on minor crop farms while fruit

³⁷ Since these are total value figures, imports undoubtedly do reflect somewhat higher values than domestic production because they include some processing and inland transportation charges on the mainland. These differences are not significant enough to alter the conclusions regarding trends over the period from 1950-65.

and nut farms had a total of only 74 tractors and 136 trucks. Admittedly, these census data do not completely reflect the production situation for fruits and vegetables since some progressive, efficient producers could be classified elsewhere because they have over 50 percent of their sales in some other commodity. But they should suggest that those who glean the majority of their income from fruit and vegetable production have made relatively few production improvements.

TABLE 6.18 CHARACTERISTICS OF MINOR CROP AND FRUIT AND NUT FARMS IN PUERTO RICO, 1950 AND 1959

	Minor Crop		Fruit and Nut	
	1950	1959 ^a	1950	1959 ^a
Number of Farms	961	1,082	1,651	3,547
Cropland in Farms (cuerdas)	9,132	7,588	23,914	33,763
Average Cropland Acreage per Farm	9.5	7.0	14.5	9.5
Number of Farms by Size				
1 - 9	-	875	-	2,955
10-29	-	197	-	430
30-99	-	7	-	130
100 or more Cuerdas	-	3	-	32
Fertilizer Purchased (dollars)	39,800	39,137	339,130	437,538
Tractors	-	1	-	74
Trucks	-	34	-	136
Irrigated Land in Farms (Cuerdas)	-	4	-	110

^aThe 1959 data were derived from a sample of producers on the island, and they may include sampling errors.

SOURCE: *Census of Agriculture*, 1950 and 1959.

Third, fresh produce wholesaling and processing has shown little improvement since 1950. Assembly of products is still largely performed by merchant truckers buying at concentration points or more often directly at the farm. The products are then transported to one of the municipal markets on the island or occasionally directly to retailers or even consumers. The municipal markets, however, remain as the single most important marketing institution for fruits and vegetables. In 1964 about 34 percent (in terms of value) of all starchy vegetables produced on the island were marketed through one of the seven largest market plazas. Similarly, about 30 percent of all fruits and

43 percent of all green and leafy vegetables passed through those markets. These high percentages in and of themselves give no cause for alarm since it is common even in the U.S. for large municipal markets to serve as a meeting place for buyers and sellers of fruit and vegetables. But the conditions and facilities of most municipal markets (and especially the larger ones) are far from satisfactory. They are generally the same kinds of markets that existed in 1950; they provide no unloading wharfs, no sorting areas, no cleaning facilities and generally no area for the operation of wholesalers or brokers. There is usually only a limited amount of parking for trucks. About all they do provide are small cubicles for the operation of retail businesses.

There are only a few (four to eight) specialized fruit and vegetable wholesalers on the island, and there are no wholesalers who handle a wide variety of fresh produce. A few firms organized in the last few years specialize in a narrow range of commodities (e.g., a potato wholesaler and a wholesaler handling only tomatoes, peppers and cucumbers). But individual truckers still provide the bulk of producer wholesaling services. Similarly, fruit and vegetable processing facilities on the island have expanded slowly. A high percentage of the canned and frozen fruits and vegetables consumed on the island are imported. There are three fairly large canning plants on the island--one was established in 1949 and the other two about 1955 and 1961--whose main products are pigeon peas, tomato paste and beans. In addition there are several smaller processing plants specializing in fruit juice, nectar and paste. Because of their limited number and size, these processing plants have had only a small effect on the total production and distribution system for fruits and vegetables in Puerto Rico.

Finally, the Puerto Rican government has had little success in improving the condition and efficiency of fruit and vegetables production and distribution on the island. In 1955 the commonwealth Department of Agriculture hired a mainland consultant to study the marketing of fresh fruits and vegetables and make recommendations for improving its efficiency. He found the marketing system to be poorly coordinated and highly inefficient with little progress being made toward improvement. He recommended that the government should take immediate action to fill the following needs, using whatever programs and incentives necessary. (1) Establish at the grower level, through individual producers, cooperatives or specialized firms, organizations for receiving, grading, washing, packaging and delivering fresh produce to retailers or produce wholesalers in urban areas. These organizations would replace to some extent merchant truckers. (2):

Organize and establish a sufficient number of privately owned and operated *service wholesalers* who would secure their

supplies of Puerto Rican grown produce from shippers described in (1) above and would supplement the supply of these products with others needed from the states.³⁸

(3) Encourage the development of supermarkets and other improved retail food stores in the island. (4) Prepare simple and practical grading regulations and provide adequate education and encouragement to assure their use among marketing firms. (5) Adopt standard containers adaptable to specific commodities and require their use in packing for local markets. (6) Provide intensive training programs for produce handlers, demonstrating efficient marketing methods. (7) Improve marketing information and communication methods (especially telephone service). (8) Provide loans and technical assistance for produce handlers interested in improving marketing facilities and methods.

These recommendations undoubtedly were broad and would have required an ambitious program indeed to implement immediately. Day recognized this and suggested that the program should be a long-range (10-15 year) effort. He did feel, however, that the government should start immediately with a fairly intensive effort.

The government of Puerto Rico has enacted programs designed to accomplish at least four of the recommended improvements. Yet, the programs have generally had only a limited effect on the fruit and vegetable marketing system. The Department of Agriculture tried to encourage grading, washing and packaging by constructing facilities in Naranjito to be used by farmers and wholesalers as a rural collection point, but the market has never been used to any extent for the intended purpose.

A second effort to encourage grading and improved handling of fruits and vegetables was the establishment of a government owned and operated wholesaling facility established to supply produce for public institutions. The facility was to serve as a demonstration of the beneficial effects of improved handling methods and facilities on product quality and efficiency. Unfortunately, the business did not make any significant improvements over the handling methods of truckers and other middlemen.

Recently, the assets of this government produce wholesaling facility have been turned over to a central producer cooperative being organized by Fomento Cooperativa. This cooperative plans to collect produce from its members at a central packing facility in San Juan where grading, washing and packaging will be performed. Then the cooperative would deliver produce orders directly to retailers. Results from a short period of operation suggest that the cooperative is having the same management problems as the previous government wholesaling facility.

³⁸ Harry W. Day, "Study and Recommendations for Organization of Channels of Distribution of Fruits and Vegetables Produced in Puerto Rico" (Unpublished consultant's report, Dept. of Agriculture and Commerce, June 30, 1955, p. 16).

Other government fruit and vegetable marketing programs include a market news service and educational programs in produce handling by the Agricultural Extension Service. The market news service collects price information daily in the municipal markets and disseminates it through a radio program. The lack of consistent grades coupled with the combining of retailing and wholesaling operations in the same market seriously reduced the value of the government's price information to producers and distributors. Even though the training programs of the Extension Service have been helpful in some cases, in general they have not attracted the interest of the people most needing the assistance. Limited success has therefore been achieved in four of the eight areas mentioned by Day.

The Department of Agriculture has been interested in the fruit and vegetable marketing system but has not attacked the more critical problems relating to actual changes in marketing institutions and practices. For example, little has been accomplished toward creating effective cooperative or private farm receiving and packing facilities, creating efficient service wholesalers, establishing useable grades or standardizing containers. As a result the marketing system remains basically the same as observed by Day in 1955.

Isolated Marketing Improvements - In spite of the fact that the marketing of fruits and vegetables has remained largely the same since 1950, there have been some recent individual developments that suggest accelerated future improvements. Some of these will be discussed briefly below.

Bananas have traditionally been produced by coffee growers for shade and supplementary income. They were sold to independent truckers who in turn sold them in municipal markets. In 1957 a banana marketing cooperative was organized with government assistance among eleven banana producers. Though the first four years were extremely difficult, and little progress was made toward improving incomes or services to members, by 1961 the cooperative had begun to increase its volume considerably. Between 1961 and 1965 gross annual sales increased from \$241,000 to \$526,000 and during that same period significant marketing improvements were made. The cooperative established a ripening plant in San Juan. They started to assemble, wash, grade and pack bananas at a rural shipping station in Adjuntas. Finally, a well organized merchandising and delivery system was implemented. The effect has been to improve markedly the quality of products marketed while stabilizing prices and incomes for producers. The two large chain supermarkets on the island now make all banana purchases from the cooperative as do many smaller retail stores on the island. Previously, all the cooperative's supply of bananas came from trees interplanted with coffee. But in 1965 several producers began specializing in the production of bananas. It is expected that others will rapidly follow suit.

Tomato paste is a staple in the Puerto Rican diet. Until recently most canned tomato paste was imported from the U.S. Tomato production has (like other fruit and vegetable crops) been relegated primarily to hilly and less productive agricultural land with small family plots of native varieties supplying tomatoes for fresh consumption only. About three or four years ago Libbys, one of the island's major importers of tomato paste, decided to establish a tomato processing plant in Puerto Rico. Since there were few commercial producers available and even fewer who were capable or interested in producing the kinds of tomatoes needed for processing at a price considered realistic by the processor, the decision was made by the plant's management to lease good quality land and produce their own supply. The operation has been quite successful. In addition to producing processing varieties, the firm has expanded to the production of varieties suitable for fresh consumption. The poorly organized market and low quality of other local tomatoes has created a need for a well organized firm producing consistent and high quality fresh tomatoes, especially for sales to supermarkets and other large retailers. The firm started out producing 75 acres, mostly processing varieties, but has now expanded to 150 acres with a significant proportion planted to table varieties. Their success has caused other firms to examine the possibility of producing and processing tomatoes (either through complete vertical integration or producer contracts) on the island.

Since local produce has generally been available only through the market plazas or through independent truckers, the supermarket chains on the island have had great difficulty in efficiently filling their needs. As noted earlier they have often turned to the mainland for supplies. However, many products either are not available from the states or are much more expensive than local products. In those cases the supermarkets have been forced to deal with local suppliers. Until recently the chains made local produce purchases in the municipal markets or from independent truckers. The products were delivered to the individual store where they were washed, graded and pre-packaged. Product quality and handling methods of such product supplier were inadequate to the needs of such retail stores. In an effort to overcome these cost and quality disadvantages, all three major chains have begun programs of direct buying. The purpose is to fill the void created by a complete lack of service wholesalers. The method of procurement varies by product and among retailers, but the main objective is to discover and encourage suppliers who will furnish (at premium prices in some cases) stable supplies of high quality produce. The results have been encouraging. A sampling of such suppliers for the various chains included: (1) a single producer under exclusive agreement supplying graded, washed and sacked yams and potatoes; (2) a loose knit group of producers supplying specified quality and quantities of leaf lettuce, (3) a

marketing cooperative supplying graded, washed, and crated oranges and (4) a trucker specializing in the distribution of consistent quality, graded and crated pineapples. Further efforts by supermarkets to overcome the inefficiencies and poor coordination of the present produce marketing system may lead to other significant improvements in the near future.

Efforts to improve agricultural productivity through regional planning were mentioned earlier. As a result of such efforts in the Mayaguez region, several producer associations have been organized. Egg marketing associations in Lajas, Mayaguez and Isabela were previously described. And a similar association has been organized for orange producers at Maricao whose members are primarily coffee producers who use the native orange tree for shade. The purpose of the association was to organize producers in order to establish an orange processing plant. Organizing methods were similar to those used in the egg marketing associations. Personnel from the regional office of the Department of Agriculture generated interest among producers, initiated a feasibility study with *Fomento*, made arrangements with the Agricultural Development Bank for loans of \$1,000 to each member for investment in the cooperative, later obtained a loan from *Fomento* and generally coordinated the efforts of several interested governmental and private agencies. The plant was completed early in 1966 at about the middle of the orange harvesting season. It began operations immediately, producing canned orange juice for export to the mainland. Producers were receiving an average of \$35 per ton for their oranges as compared to \$25 per ton the previous year. If satisfactory markets (both external and internal) can be obtained, the plant will contribute significantly to the agricultural economy of the region. It will provide a stable market outlet for native oranges, a commodity frequently left unharvested by coffee producers or sold at ridiculously low prices because of overabundance (for fresh consumption) during the short harvest season.

A development which is closely related to the kind of institution just described is the recent organization of a joint committee between Department of Agriculture representatives, *Fomento's* Division of Puerto Rican Industries, and the Food Processing Laboratory of the Agricultural Experiment Station. The purpose of the committee is to study and recommend possible food processing opportunities on the island. *Fomento* carries out feasibility studies including market opportunities, supply dependability and technical feasibility. The other agencies represented on the committee are able to bring special abilities to assist in particular aspects of the preliminary study. Once the study is complete, prospective investors are able to evaluate more accurately the investment potential. Then *Fomento* can offer the usual variety of incentives such as tax reduction, site procurement assistance, loans, etc. The interagency approach is relatively new, but it appears to have advantages because a wide

variety of talents can be brought to bear on a given project while evaluating all aspects of the proposed plant, including supply procurement, financing and marketing.

Production and Marketing Performance - It is clear from earlier discussion that production of fruits and vegetables continues to be regarded largely as a secondary or even tertiary enterprise. The psychological impact of long years of such thinking coupled with the limitations of the antiquated marketing structure have operated together for so long that they have come to be accepted as normal conditions to which the economy has had to adjust itself.³⁹ This slightly altered quotation from Koenig's 1950 study describes the production and distribution system for fruits and vegetables in 1965. When evaluated by most of the performance criteria used in this study, the industry has shown little improvement. In a few cases minor improvements are developing as noted in the previous section. Their impact on various performance criteria will be discussed.

Costs of Production and Marketing - Few improvements have been made in production efficiency as a result of a poorly coordinated marketing system and the prevailing belief that fruit and vegetable production should only be supplemental to more important farm enterprises. Though data are not available to indicate the efficiency of present resource use in fruit and vegetable production, it appears that committed resources are being combined relatively efficiently. As Schulta, *et al.*, noted in other countries, the difficulty does not appear to lie with inefficient management or lack of a profit motive, but rather with insufficient utilization of improved production techniques. Basically, the land, labor and capital resources committed to fruits and vegetables are insufficient and inferior. Puerto Ricans have not yet recognized the opportunity for reaping significant profits by specializing in the commercial production of these food crops using advanced techniques. To illustrate, one of the few produce wholesalers in Puerto Rico was asked by the author why he did not purchase more of his supply from local producers. The answer was that due to perceived market risks and uncertainties "producers are not even interested in vegetable production." This same reason was given time and again in depth interviews with producers, processors and retailers--excessive risk and uncertainty retard producer interest. Results of a question on our farmer survey indicated that 38 percent of the farmers in the sample had never considered tomato production, and 36 percent had never considered producing other fruits and vegetables because of the market risks involved. A few commercial fruit and vegetable producers are making production improvements (*e.g.*, the

³⁹Koenig, *op. cit.*, p. 221.

integrated tomato producing firm, and integrated private producer of starchy vegetables, a papaya producers' association and scattered individual farmers), but the bulk of production is carried out under the same procedures used in 1950.

Since the market structure has shown little change over the past fifteen years, there has consequently been little improvement in marketing costs. The system is still characterized by small scale producers, truckers and retailers competing atomistically. Because of this, information gathering costs, transaction costs and market uncertainty costs are still relatively high. Again the organization of certain marketing institutions (*e.g.*, corporate supermarkets, wholesalers and cooperatives) is just beginning to have an impact on exchange efficiency in fruit and vegetable production and distribution in Puerto Rico.

Progressiveness - Technological change in fruit and vegetable production and distribution has come slowly. The bulk of total production still comes from farms using the same methods used in 1950. Our survey among farmers in the Mayaguez region indicated that fruit and vegetable producers had adopted much fewer of the technological innovations listed than either milk or egg producers. The percent that makes use of various production and marketing innovations varied from a high of 98.5 percent for fertilizers to a low of 18.4 percent for packing products into some kind of protective container.

Only 51 percent had adopted improved varieties of crops. Similarly, only 85 percent had adopted insecticides. When compared to milk and egg producers, fruit and vegetable producers were considerably less innovative. The median percentage of usable innovations which had been adopted by fruit and vegetable producers in the sample was 50 percent while the median for egg producers was 86 percent and for milk producers 81.5 percent. It should be emphasized that the sample included only farmers in the Mayaguez region. The results can be used as an indicator of the progressiveness of producers in other parts of the island since their production characteristics are quite similar.

By the same token marketing firms have been slow to improve distribution methods. The earlier description of prevailing marketing methods suggests that relatively few technological changes have been made among marketing firms.

Product Quality - While the general quality level of Puerto Rican produce is basically the same today as it was in 1950, pressure from expanding supermarkets has caused some improvements in refrigeration and handling, but these have been limited to a few products and primarily to supermarket sales. An experiment station survey in 1964 in the major tomato producing areas suggested that practices in the harvesting, handling, packing, storing and

transporting of tomatoes resulted in an extremely high level of waste and spoilage. Isolated quality improvements have been achieved by the banana marketing cooperative, an orange marketing cooperative, the integrated tomato producer, and a few independent producers.

Conclusions

The conclusions arising from these commodity studies are summarized below:

1. In the production and distribution of eggs and milk, performance has been satisfactory as measured by the three criteria used in this study. Generally, production and marketing costs have been reduced, and the two industries have exhibited significant progress in the adoption of improved production and distribution techniques. Product quality has improved significantly both in milk and egg markets. On the other hand the production-distribution system for fruits and vegetables has shown little change since 1950 (with the exception of isolated cases). When measured by any of the three criteria, industry performance has been below a desirable level. Probably, the difficulty is due to the decline in demand for traditional Puerto Rican fruit and vegetables, coupled with a high degree of marketing risk and ineffective traditional marketing procedures.

2. Production and marketing performance data for the milk and egg industries definitely suggest that rapid industry improvements have coincided closely with market coordination changes. The trend toward improved performance was closely correlated (chronologically) with such developments as government market regulations, cooperative development and private marketing institutional change. But the analysis does not show causality. Impinging variables are far too numerous and complex and data far too scarce to accomplish such an analysis. However, the performance changes accompanying government market programs and private marketing developments in the milk and egg industries, together with the lack of performance change in the relatively unregulated, unassisted and atomistically competitive fruit and vegetable industry, suggest that positive efforts to foster market development may yield significant results in developing countries.

3. Performance results in these three industries support the hypothesis that excessive atomistic competition hampers productivity improvements by stifling technological innovations and inhibits the agricultural and marketing development process by fostering market uncertainty, high transaction costs and excessive market wastes and by preventing the effective transmission of incentives to firms in the production-marketing system. This hypothesis is supported by the fact that marketing developments in the egg and milk industry have revealed a definite trend toward fewer firms and/or cooperation among

existing firms for the purpose of improving market coordination. As noted above, these two industries have shown rapid performance improvements since 1950. On the other hand the competitive structure of the fruit and vegetable industry has remained atomistic with relatively few efforts to organize large scale private firms, cooperatives or institutional forms for the purpose of improving market coordination. Taken as a whole, performance in this industry has not improved significantly since 1950. It is significant, however, that the major performance improvements have come in segments of the industry where specific market organizations have been created to cope with the market coordination problems evident in the atomistically competitive industry.

CHAPTER 7
MODERNIZATION AND INNOVATION IN THE
PUERTO RICAN FOOD SYSTEM

Introduction

It was pointed out in Chapter 1 that an important ingredient of economic development is the process whereby people become aware of new ways of doing things and then motivated to adopt new technologies and new modes of behavior.¹ In addition to the adoption of innovations, several studies were cited in which modernization processes have been examined and various views have been advanced to explain this phenomena. Many of these studies have dealt with peasant societies and their adaptation to new agricultural techniques. Much less attention has been given to the process of modernization among urban residents in developing countries and even less investigation has been made of the innovation process in the distribution of goods and services.

Chapter 2 provided a brief outline of some of the most salient features of social and economic change in Puerto Rico, beginning in the late 1930's with political reforms initiated by Luis Muñoz-Marín and the Popular Democratic Party.² Important aspects of the political reform in Puerto Rico were the rising aspirations and expectations of the poorer segment of the population in response to stimulation by political leaders.³ Over the years the people learned to trust their public leaders as sustained economic and social changes brought real and significant improvements in the level of living. The spread of educational opportunities and the resulting improvement in literacy have tended to break down some of the traditional patterns. Rapid improvements in mass communications have hastened the spread of modern ideas throughout the small island of Puerto Rico. It would be reasonable to expect that the spread of education and mass communications has contributed to the evolvement of a pattern of attitudes favorable to modernization.

This chapter will deal with some dynamic aspects of the process of instituting significant changes in the Puerto Rican food system. We begin by identifying some of the key individuals who played prominent roles in this innovation process. These people broke with tradition and provided the catalytic leadership that changed institutions and stimulated the adoption of new food production and distribution practices.

¹See page 10-17 in Chapter 1 of this report.

²For a more detailed case study of the social and economic changes in Puerto Rico see *Thirty Years of Change in Puerto Rico* by Dorothy Dulles Borne and James R. Bourne, Frederick A. Praeger, New York, 1966.

³Thomas Aiken, Jr. *Poet in the Fortress*, New York: Signet Books, 1965.

The Creative Leaders of Marketing Reform

Few would disagree that the central political leader of the Puerto Rican reform movement was Luis Muñoz-Marín. He envisioned a better society and was strongly committed to changes that would benefit a broad segment of the population, especially the poor who had fared so badly under Spanish and U.S. rule. In a biographical volume, Thomas Aiken, Jr. writes:

"In the forefront of Puerto Rican public life is Luis Muñoz-Marín, on whom so much of the island's recent development hinges. In him are combined many opposites: poetry and politics, toughness and tenderheartedness, idealism and practicality, the colossal energy of the doer and the contemplative nature of the thinker."⁴

During the period of rapid development Muñoz-Marín was a creative and pragmatic leader. He sought advice from qualified experts. He attracted and held competent young people to serve in key public agencies. Where traditional institutions barred change he created new institutions or sought to achieve effective coordination of old ones. In food marketing, Muñoz saw an opportunity to reduce food costs through improved marketing methods. He brought qualified experts from the U.S. mainland to assess the problem and to help formulate and carry out new programs. To precipitate action and to overcome local opposition he created a Food Advisory Commission including representatives of local food businesses, Puerto Rican Government officials and food marketing experts from the U.S.

When the Commission's report reached Governor Muñoz, he saw to it that the recommendations were acted upon. Major responsibility was assigned to a new program division in the Economic Development Administration and to the Department of Agriculture with provisions for inter-agency coordination through committees and task force efforts.

Teodoro Moscoso was one of Governor Muñoz's most effective administrative assistants. Moscoso provided much of the creative leadership for the Operation Bootstrap. He served Muñoz in various capacities and for several years was the Director of the Economic Development Administration. In this role he was responsible for the implementation of much of the Governor's Food Distribution Program, and especially that part concerning the modernization of the food wholesaling and retailing. At a critical point following the Food Commission report, Moscoso made a strong personal appeal to the Puerto Rican Legislature to take action on the Commission's recommendations.⁵ The records indicate that Moscoso was a tough-minded but practical administrator who was willing to try

⁴*Ibid.*, p. xi.

⁵Teodoro Moscoso, *The Food Distribution Problem*, a presentation to the Puerto Rican Legislature in late 1954, reproduced by the Economic Development Administration.

new ideas, especially those that had been carefully explored by competent staff. His views on the use of credit as a developmental tool are noteworthy. It was Moscoso's view that a government development bank, such as PRIDCO, should be willing to undertake some "risky" loans if it was to fulfill its function as a fomenter of new enterprises that might be critical to the development effort, but which could not qualify for loans from traditional credit sources.

There were many other creative public officials in the Muñoz administration. Among those prominent in the efforts to improve the food system was Ramon Colon-Torres, who for several years was Secretary of Agriculture. In this capacity he arranged for various studies, including the study of market facilities by Otten, *et.al.*, and Koenig's comprehensive action-oriented report for Puerto Rican agriculture. Colon-Torres served as a member of the Governor's Food Advisory Commission and chaired a subcommittee on food products and processing. He was an innovator in the promotion of various service and regulatory activities carried out by the Department of Agriculture to stimulate agricultural production and to improve marketing efficiency. Wherever necessary, he facilitated intra- and inter-department coordination of program efforts in food production and distribution. Colon-Torres was a promoter of cooperative organization and after serving as Secretary of Agriculture became director of an agency responsible for fomenting cooperative activity.

In addition to the political leaders and public officials there were a number of outside consultants who made substantial contributions to the modernization of the Puerto Rican food system. Many were effective catalytic agents of change. The personal participation of J. K. Galbraith and Richard Holton in the Governor's Food Advisory Commission illustrates the potential role of the researcher in diagnosing problems of market organization and in assisting policy-makers in assessing the alternative ways of dealing with these problems. Nathan Koenig's close working relationship with a Puerto Rican task force that studied agriculture illustrates how an outside expert can, with the assistance of a local task force, produce a comprehensive program of action.

Governor Muñoz brought in several successful food marketing executives from the U.S. mainland to serve as technical advisors. Probably the most influential was Lansing Shields, President of Grand Union of New York (a retail food chain). Shields served as Chairman of the Governor's Food Advisory Commission and had been a progressive leader in U.S. food marketing circles, having helped establish management training programs in food marketing at both Michigan State and Cornell Universities. In 1958, Shields' Grand Union took over several supermarkets started in Puerto Rico by IBEC. In the early 1960's Grand Union joined with the Puerto Rican Department of Commerce in providing management training programs for other food store operators and their employees.

Another group of change agents was the one assembled by E. Lee Feller who directed the EDA Food Distribution Program. Feller had been trained in the

special food distribution curriculum at Michigan State University and was experienced in the food business. His assistants included several mainland organizing retailer-wholesaler groups. This technical assistance effort was oriented to the introduction of modern food distribution practices already widely used on the mainland.

Among private food marketers, Harold Toppel stands out as having had the greatest impact on the modernization of the Puerto Rican food distribution system. His success story was described in Chapters 2 and 4. It is significant to note that Toppel was an outsider to the system. He came to the island with the technical knowledge and the managerial skill to successfully introduce modern supermarket operations. He was assisted in the effort by his brothers George and Milton who like Harold, had grown up in the food business in the U.S.

Obviously there were many other innovative individuals who contributed to the changes in food marketing. However, the above examples emphasize that a sizeable core of creative leadership is a necessary catalyst to initiate a broad program of change in something as complex and deeply imbedded in traditional patterns as food marketing activities.

The Diffusion of Innovations in the Food System: A Comparison of Early and Late Adopters

Some of these key figures who had such a tremendous impact on the marketing system can also be considered the prime innovators in the island's changing economy. There remains, however, the great majority of retailers, producers and consumers: what was *their* response to alterations in food marketing introduced by innovators? To explore this question, we will turn to a brief examination of the major characteristics of retailers, producers and consumers relative to their innovativeness in the face of crumbling traditions.

The notion of innovativeness as applied to these individuals is much different than that discussed for such men as Harold Toppel. Food retailers may adopt such practices as self-service dry groceries and meats, group purchasing, or special training programs for their employees. For producers, innovation is the adoption of new seeds and fertilizers, or other improved farming practices. For consumers, the major innovation -- one whose adoption was vital to the success of the food marketing innovators -- was purchasing most of their food in supermarkets. In summary, we have shifted the discussion to the responsiveness of food marketing participants. They were not among the few leading innovators, but were faced with the possibility of adopting a number of practices which should have improved their operations and which should have led to improvements in the volume and profitability of their sales.

Food Retailers

Food retailers had been provided a number of opportunities to learn about new operating methods, and direct technical assistance programs had been available. Beginning in 1955, the EDA food distribution group initiated retailer education programs to spread the use of improved food marketing practices. (These were discussed in Chapter 4.) In addition, during the ten-year period following 1955, a large number of extension meetings had been presented, and several small retailers had received direct assistance on store modernization projects.

We interviewed a sample of 91 food retailers who were neither the very smallest establishments, nor the very largest. An annual sales volume of \$12,000 was set as a lower limit for the stores studied. The sample was drawn on a probability basis from the San Juan and Mayaguez areas.

The residential area in which the store was located was most likely to be a low-income area. Nearly three-fifths (57 percent) of the stores were located in areas classed as low-income, or very low-income. About one-third (36 percent) were in areas considered middle-income, and about one store in fourteen (7 percent) was in areas judged as high-income level.

Half the stores had been established since 1957. Seventy-nine percent were legally organized as individual enterprises. The remaining 21 percent were organized in some other legal form, such as a partnership, a corporation, or a cooperative.

The store operators reported they kept their businesses open for an average of 77 hours per week, or about 13 hours a day for a six-day week. Almost all (95 percent) said they kept their stores open more than 60 hours a week. Most stores were operated with family labor plus a little hired help. The number of paid employees varied considerably. The most frequent number of employees (mode) was two; over two-fifths (45 percent) were of this size. The average (mean) number of employees was 4.7 and the range was from one employee to more than 30.

The retail establishments averaged 1,225 square feet of business area, although a few firms were considerably larger. The estimated average value of equipment and furniture, not including the building was \$12,700. Average monthly rents paid (or estimated, if they owned the building) were \$270, and the average inventory at the end of 1964 was valued at \$24,600.

The retail operators reported an average sales volume in 1965 of about \$119,000. Five years earlier, they recalled an average sales volume of \$62,000. However, this figure may understate their 1960 sales volume, since many respondents were unable to give estimates in which they were confident.

Business expansion had been financed primarily from profits. About half (45 percent) said that profits from their own firm had provided their main source of expansion capital since 1950. About one-fifth (22 percent) had

received loans to expand their operation; half of these loans (10 percent) came from commercial agencies, and the other half (12 percent) came from agencies backed by the government of Puerto Rico. About one person in seven (14 percent) said that inheritances or personal savings had been their principal source of expansion capital.

The operators were asked to name the retail food firm which they felt to be the most progressive on the island. One-fourth (27 percent) said they felt that the *Pueblo* stores were the most progressive, and one retailer in seven (13 percent) said that the cooperative supermarkets were the most progressive. Other retail food stores were mentioned by one-fifth (19 percent) of the respondents, and other wholesalers or brokers were mentioned by one-fourth (26 percent) of the respondents.

A series of questions probed their knowledge of food retailers who had moved out of the business. Three-fourths (77 percent) said they knew of food retailers who had left the business. About half (46 percent) of the former food retailers were friends or relatives of the respondents, and about two-fifths (40 percent) were former nearby competitors. Three main reasons were cited to account for the turnover in retail food firms. One-fourth said either old age (26 percent) or "poor management" (26 percent) were the principal reasons for leaving food retailing, and one-fifth (19 percent) attributed it to competition from supermarkets.

The retailers were asked to name some of the kinds of assistance provided by the Puerto Rican Department of Commerce, such as loans, training, technical help, etc. Half (50 percent) were able to name at least one kind of assistance provided by the agency. Of these respondents, one-third (36 percent) said they had taken advantage of at least one service, and that they had been satisfied.

The food retailers in the sample averaged about 47 years of age; four-fifths (88 percent) were between 35 and 65 years old. They had completed about seven years of schooling; seven out of ten (72 percent) had finished between four and twelve years of education. They reported that their family income in 1964, before deductions for taxes and social security, averaged \$4,200. For two-thirds of the respondents (67 percent), their family incomes ranged between \$2,000 and \$10,000.

The key to the development of modern and efficient marketing institutions is the adoption of practices and methods of marketing which, in essence, should improve the ability of the retail institution to operate and grow in the island's economy. The adoption of nine different practices was investigated; these are listed in Table 7.1. Two pieces of information are given about each practice: (1) the percent of retailers who perceived the practice as *applicable* to their business, and (2) the percent who actually were using it at the time of adoption.

TABLE 7.1 ADOPTION OF INNOVATIONS BY PUERTO RICAN FOOD RETAILERS

	(1) Manager-Per- ceived Applicable Percent	(2) In Use Now Percent
Self-service dry groceries	48	43
Self-service meats	21	20
Pre-packaging of fruits and vegetables	21	20
Cash register	86	84
Parking facilities for customers	25	25
Cash sales <i>only</i>	42	40
Advertising by newspaper or handbill	23	23
Participation in employees training program	9	8
Purchasing through group plan	7	7

SOURCE: LAFS Retailer Survey, 1965-66.

The list of practices was generated by studying the two most successful food retailers on the island. The practices were increased customer participation in shopping for food (self-service meats and dry groceries, pre-packaged fruits and vegetables, and parking facilities), increased accounting efficiency and cash flow (use of cash registers, and requiring cash sales only), employee training efforts, group purchasing of commodities, and advertising for greater public awareness of the store and the varieties of its commodities.

The perceived applicability of the innovations varied considerably, as Column 1 indicates -- from 86 percent for cash registers, to 7 percent for group purchasing. There is considerable agreement between perceived applicability and use (compare Columns 2 and 3, Table 7.1).

To distinguish between the more and less innovative firms, on the basis of the practices studied here, a summary index was constructed, and then related to other retailer characteristics.

A retailer was given a score of one point for each of the innovations he was currently practicing. Thus, the possible range of scores on this index is from 0 to 8. (The ninth index, cash registers, was not used since it was

almost fully adopted.) This distribution of total scores was then divided into thirds, such that a low innovativeness score included those retailers who had adopted none of the eight practices; a medium score, those who had adopted one, two or three; and a high score, those who had adopted four or more.

The *more* innovative food retailing establishments were most likely to be located in the less wealthy residential neighborhoods, and the operators of these innovative establishments tend to be younger and better educated. In contrast, the *least* innovative food stores are more apt to be located in wealthier neighborhoods and operated by older retailers with a lower educational level. Table 7.2 shows these relationships in greater detail by presenting the percentages of each of the three innovativeness groups in the demographic subgroups analyzed.

TABLE 7.2 RETAILER INNOVATIVENESS RELATED TO DEMOGRAPHIC CHARACTERISTICS

Demographic Subgroups	Degree of Retailer Innovativeness		
	High	Medium	Low
	- - - - - Percent - - - - -		
<u>Location</u>			
Less wealthy residential neighborhoods	76	66	37
Wealthier residential neighborhoods	24	34	63
<u>Age of Retailer</u>			
Retailer under 45 years old	67	52	22
Retailer 45-54 years old	18	34	29
Retailer 55 years old and over	15	14	49
<u>Years of Schooling</u>			
10 or more years schooling	54	41	22
7-9 years schooling	36	29	14
6 or less years schooling	10	30	60

SOURCE: LAFS Retailer Survey, 1965-66.

The more innovative retail stores are more likely to be organized as partnerships, corporations or cooperatives (36 percent) than are firms in either the medium (24 percent) or low (8 percent) innovative categories. Nevertheless, the majority, even among the most innovative (64 percent), are still organized on an individual or family ownership basis.

No significant differences emerged between the degree of retailer innovativeness and the length of time the firm has been in business, the total dollar volume of sales, the size of the business area, the number of individual sales transactions per week, nor the total value of the store's inventory. However, the more innovative establishments are much more likely to spend their own funds on advertising and promotions, and to purchase their merchandise from a considerably greater number of suppliers than less innovative retailers (Table 7.3).

TABLE 7.3 RETAILER INNOVATIVENESS RELATED TO ADVERTISING AND BUYING PRACTICES

	Degree of Retailer Innovativeness		
	High	Medium	Low
	- - - - Percent - - - -		
<u>Spending on Advertising</u>			
Spend some of own funds	78	38	1
Spend nothing for advertising	22	62	99
<u>Number of Suppliers</u>			
15 or more	73	17	*
7 to 14	20	52	44
6 or fewer	6	31	<u>56</u>

SOURCE: LAFS Retailer Survey, 1965-66.

Nearly one-half (48 percent) of the most innovative retailers purchase more than five percent of their products from the United States, as compared to only one in five (18 percent) of the middle groups and one in fourteen (7 percent) of the least innovative group.

Agricultural Producers

In Chapter 6, we noted that a sample of 172 producers, all located in the Mayaguez area, had been interviewed. They were engaged in the production of milk, eggs, or fruits and vegetables, and included both members and non-members of cooperative associations.

Over four-fifths of the farmers interviewed were owners of their farms; the remainder were tenants or renters. Their average age was about 52 years; three-fourths were 45 years or older. They had completed an average of about seven years of schooling; nearly three-fifths had received between four and twelve years of education. Their farm households averaged 5.1 persons each, with the modal household size being 4.0.

The farms varied in size from less than three acres, to more than 200 acres, including land used for grazing. About one-fifth of the farms were less than three acres, and another one-fifth were more than 200 acres. The average farm size was about 30 acres. As noted in Chapter 6, the largest farmers were mainly milk producers; egg farmers generally had smaller operations and the fruit and vegetable farmers had the smallest operations. Also, in general, cooperative association members were somewhat larger than non-members.

The farmers estimated their 1964 family income, before taxes and social security deductions, at about \$2,800. Over seven-tenths (72 percent) reported incomes ranging between \$1,000 and \$10,000.

The adoption of eight agricultural innovations by the farmers was studied from three perspectives: did the farmer say he could use them, had he ever

used them and were they *currently* in use. Table 7.4 below summarizes the responses to the three questions asked for each innovation.

TABLE 7.4 ADOPTION OF INNOVATIONS BY PUERTO RICAN FARMERS

Innovations	Percent "could use"	Percent "ever used"	Percent "in use now"
1. Fertilizer	86	81	73
2. Insecticides	92	81	70
3. Selection and Classification of Farm Products	71	46	40
4. Packing of Farm Products	54	23	15
5. New Methods/Varieties	82	57	49
6. Buying Groups	74	13	11
7. Contracts with Buyers	68	13	11
8. Selling Groups	81	28	24

SOURCE: LAFS Farmer Survey, 1965-66.

All eight innovations received at least a majority support in terms of whether or not the farmers felt they *could* be used. They were most likely to say they could use insecticides, fertilizer, new methods of cultivation or varieties of cattle and poultry, and groups organized for selling farm products. For several of the innovations, there is a striking difference between the respondent's perception of whether he could use the innovation and whether he had *ever* used it. Thus, for innovations 6, 7, and 8 -- buying groups, contracts with buyers, and selling groups -- there is a difference of 50 or more percentage points. This would suggest a considerable "untapped potential" for the future dissemination of these three innovations.

The figures in the table also indicate a fairly close correspondence between whether the innovation had ever been used, and whether it was in use at the time of the interview. Of course, the "ever used" estimate is inflated since it includes respondents who were using the innovation at the time of the interview; on the other hand, it can be argued that if there had been a high rate of *discontinuance* of the innovation there might have been significant discrepancies between the "ever used" and "in use now" figures.

We attempted to measure the degree of farmer innovativeness, defined as the extent to which they were currently using any of the following four farming and marketing practices.

- The selection and classification of produce
- Packing of produce
- Using new methods of cultivation, or new varieties of cattle or poultry
- Membership in a selling group

These four practices were selected to form the index because they were felt to be the most widely relevant and feasible practices across the different kinds of farmers studied, and because they intercorrelated most highly of the nine practices previously discussed.

A farmer was given a score of one point for each of the innovations he was currently practicing. Thus, the total range of scores on this index is from 0 to 4. This distribution of total scores was then trichotomized, such that a low innovativeness score included those farmers who had adopted none of the four practices, a medium score those who had adopted one or two, and a high score those who had adopted three or four.

High scores on innovativeness are most likely to have higher incomes, to be better educated, younger, to have larger farms, and to be in the middle range of geographic isolation. Low scorers on innovativeness, on the other hand, have low incomes, are least educated, oldest, have smaller farms, and are most isolated geographically.

The most innovative farmers (i.e., those who have adopted the greatest number of these practices) are more likely to be producers of milk, livestock, poultry, or eggs. Least innovative farmers are those who produce starchy vegetables and fruit (Table 7.5).

TABLE 7.5 FARMER INNOVATIVENESS BY MAJOR COMMODITY PRODUCED

Product	Percent in Each Innovativeness Group Who Produced \$200 or More of Each Commodity "Last Year"		
	Low	Medium	High
Milk	14	36	43
Livestock	22	31	39
Poultry	12	18	35
Eggs	20	35	45
Starchy vegetables	69	27	12
Fruit	17	8	14

SOURCE: LAFS Farmer Survey, 1965-66.

The most innovative farmers also tend to feel most concerned with such economic problems as the high cost of farm supplies, labor problems, government intervention, foreign competition, lack of farmer unions, the power of middlemen to control prices, and climatic conditions. The least innovative are much less concerned about these matters.

Urban Consumer

The concern about urban consumers was their readiness to change from traditional shopping habits to the use of modern supermarkets. Furthermore, for the supermarket ventures to be successful, in terms of having any large-scale economic impact, it is imperative that the adoption of supermarket shopping for a principal amount of each family's food purchasing be very widespread. In short, without mass adoption, the economic influence of modern supermarkets would be slight. From the evidence presented in Chapter 3, it appears that widespread adoption of supermarket shopping has, in fact, taken place. About

two-fifths (42 percent) of the household food purchases in San Juan were being made in supermarkets. In Mayaguez, where there were fewer such outlets, the percentage was somewhat lower.

This is not to say that supermarkets have become completely adopted. Considerable differences remain between shoppers who primarily use the supermarket and shoppers who primarily use other outlets, such as the *colmado*. As the results in Chapter 3 indicate, it is the more educated and higher-income shoppers who use the supermarket most heavily.

Summary of Diffusion of Innovations

In the present section, we have turned our attention from the innovative behavior of a few key individuals in the food marketing process to that of other individuals participating in food marketing activities. There was generally low adoption of innovative food retailing practices -- only one practice (cash registers) was being used by more than a majority of retailers, and less than one in ten or less had employee training programs or were participating in group purchasing plans. Within these adoption levels, some differences among the more and less innovative retailers were noted. In particular, the more innovative retailers operated stores located in the less wealthy neighborhoods, and were younger and better educated than were the less innovative retailers.

Among agricultural producers, the adoption of new farming practices was most prevalent among the milk producers, was somewhat less frequent among the fruit and vegetable growers. Such personal characteristics as relative youth, earning higher incomes, and having more years of education accompanied being more innovative. Finally, among consumers, the innovation adopted was that of purchasing a majority of the family's food needs from the supermarket. This was done very widely, by quite sizable numbers of consumers.

A more critical appraisal of the innovative behavior of these three groups -- particularly the retailers and producers -- is that they were a much more passive, slowly responding group than were the more aggressive leaders. The food retailers and producers both reacted to changes going on around them. . . changes which brought considerably different economic conditions to bear. Without the key innovators to provide the impetus, it seems likely that these participants would have changed little if at all from their more traditional food marketing practices.

Attitudes Toward Modernization

In several of the structured LAFS surveys of market participants, a series of questions was asked in an effort to obtain some crude measures of attitudes toward modernization concepts. It was anticipated that a cross-sectional analysis of selected samples of consumers, processors, truckers, farmers, etc.

would provide some indication of their disposition toward modernization. The response by those surveyed to specific statements was summarized on a three-point scale - agree, disagree and no opinion (or don't know). The attitudinal statements were designed to provide some indication of the extent to which the respondent groups held traditional views identified by previous researchers.⁶ The attitudinal statements and the response patterns are summarized in Table 7.6.

TABLE 7.6 ATTITUDES OF SELECTED FOOD SYSTEM PARTICIPANTS TOWARD SPECIFIC STATEMENTS ABOUT MODERNIZATION CONCEPTS

Statement and Respondent Groups	Percent of Respondents			Total
	Agree	Disagree	No Opinion or Don't Know	
1. I'm happy with the changes occurring in Puerto Rico because the new ways are usually better than the old ones.				
Consumers, San Juan	70	25	5	100
Farmers, Assoc. Members	54	42	4	100
Other farmers	58	37	5	100
Truckers	72	28	0	100
Processors	49	36	15	100
2. I believe that things of the past are much better and that changes usually bring problems.				
Consumers, San Juan	48	46	6	100
Farmers, Assoc. Members	14	84	2	100
Other farmers	26	70	4	100
Truckers	37	60	3	100
Processors	12	79	9	100
3. Children should be instructed to follow traditional customs to the letter.				
Consumers, San Juan	41	54	5	100
Farmers, Assoc. Members	22	76	2	100
Other farmers	41	55	4	100
Truckers	49	47	4	100
Processors	30	61	9	100
4. It would be better for us if the scientists left things alone.				
Consumers, San Juan	50	33	17	100
Farmers, Assoc. Members	20	76	4	100
Other farmers	21	68	11	100
Truckers	42	47	11	100
Processors	6	79	15	100

continued

⁶See page 11 of Chapter 1 for a summary of characteristics of individuals in traditional societies.

TABLE 7.6 continued

	Agree	Disagree	Don't Know	Total
5. The most important way to get ahead in life is to be lucky.				
Consumers, San Juan	54	37	9	100
Farmers, Assoc. Members	28	67	5	100
Other farmers	54	43	3	100
Truckers	74	21	5	100
Processors	12	76	12	100
6. Let's eat, drink and be merry for tomorrow we may die.				
Consumers, San Juan	43	53	4	100
Farmers, Assoc. Members	24	74	2	100
Other farmers	26	69	5	100
Truckers	46	49	5	100
Processors	15	73	12	100
7. When a problem arises in the community, it's best to depend on community leaders to decide what must be done.				
Consumers, San Juan	65	20	15	100
Farmers, Assoc. Members	60	33	7	100
Other farmers	63	34	3	100
Truckers	67	30	3	100
Processors	49	36	15	100
8. Government programs are usually beneficial only for a select group of businessmen who are influential in politics.				
Consumers, San Juan	36	44	20	100
Farmers, Assoc. Members	22	73	5	100
Other farmers	26	66	8	100
Truckers	54	37	9	100
Processors	21	68	11	100
9. One can really only confide in the members of one's own family.				
Consumers, San Juan	38	54	8	100
Farmers, Assoc. Members	13	84	3	100
Other farmers	24	72	4	100
Truckers	39	58	3	100
Processors	12	79	9	100

SOURCE: LAFS Surveys, 1965-66.

On the basis of responses to questions 1, 2 and 3, it appears that the majority of those surveyed are favorably disposed to modernization processes as they have been evolving in Puerto Rico. Consumers are less consistent in their views than some of the other subgroups. Food processors and farmer association members appear to be less traditional in their views than consumers or truckers. It should be noted that the processors and farmers have achieved higher levels of formal education and higher levels of income than the other

subgroups. Farmer association members and food processors are also less inclined to rely on "luck" as an important method of getting ahead in life (Statement 5, Table 7.6). This is in sharp contrast to the trucker group which placed great importance on luck and was also more disposed to live for today than to defer consumption in anticipation of greater benefits at some later date (Statement 6, Table 7.6).

Most respondents evidence a high level of trust in their community leaders and believe that the benefits of government programs are not captured by a few influential businessmen (Statements 7 and 8, Table 7.6). Again truckers seem to deviate further in their views on the benefits of government programs.

Most respondents indicate a willingness to trust others outside their own families, with farmer association members and processors having the strongest tendencies in this direction (Statement 9, Table 7.6).

Only limited conclusions can be drawn from the attitude measures presented. However, it does appear that a major segment of the participants in the Puerto Rican food system holds favorable attitudes toward modernization. Their willingness to trust non-family individuals, their support of government leaders and their tendency to reject fatalistic views of life have probably had a favorable effect on programs to modernize food marketing.

Some evidence on this point is provided by the findings, across three groups of food market participants, that more favorable attitudes toward modernization accompany more innovative behavior. For example, among food retailers, over half (55 percent) of the most innovative were also in the group holding the most modern attitudes; 28 percent of the middle-innovative group, and 15 percent of the least innovative group, was in the group having the most favorable attitudes toward modernity. Similar results were obtained for consumers.

Among farmers, the more innovative also tend to score higher on a variety of modernization dimensions. The most innovative farmers had more political knowledge, higher educational goals for the eldest son, and more favorable perceptions of market regulations.

Modernization and the Role of Communication

In Chapter 1 we indicated some of the main aspects of communication systems -- particularly mass communication systems -- in less developed areas of the world. We pointed out that little study had been made of the nature of communication behaviors in urban settings of developing areas, and virtually no studies of food marketing participants. Consequently, one concern in the present study was whether relationships similar to those observed in developing countries would also be found in the Puerto Rican situation. We were also interested in identifying the main channels of information used by retailers, farmers and consumers, including channels which dealt specifically with

marketing information, as well as the more general channels for news and other information. Finally, we were concerned with the relationships between communication channels and the innovativeness of the various groups of food marketing participants: what channels were more or less likely to reach the most innovative individuals.

We sketched some of the differences in the basic mass communication system of Puerto Rico as they existed in the early 1960's in comparison with the United States on the one hand, and the whole of Latin America on the other.⁷ Using a per-100 persons as a base, Puerto Ricans had about one-fifth the number of newspaper copies per day (6.1 vs. 32.6) and radio receivers (21.1 vs. 100.+) as their U.S. counterparts. Television availability was considerably less -- about one-eighth the level of the United States (4.2 vs. 33.2). In comparison with Latin America as a whole, Puerto Ricans had about three-fourths the newspaper copies available (6.1 vs. 8.0), but twice as many radio receivers (21.1 vs. 11.0) and nearly three times as many television sets (4.2 vs. 1.5). Consequently, in terms of the level of development of the communication system, Puerto Rico is intermediate between the United States and Latin America: more like Latin America in terms of newspaper copies per day per capita, but more like the United States in radio and television availability. A more detailed examination of the communication behaviors of each food marketing group follows.

Food Retailing

One of the major communication linkages a food retailer can establish with his actual or potential customers is through advertising. His messages may deal with the products he has to offer, their prices, quality, the nature of his store, etc. In the early 1950's, there was very little if any advertising by food retailers in Puerto Rico. With the introduction of supermarkets there was a sharp break with tradition as these new food marketing outlets began to advertise to attract customers. Smaller retailers were caught up in this competitive situation and began to advertise to retain their business.

There are several channels by which a retailer may distribute messages in hopes of reaching his customers. The respondent's use of several major channels was explored by asking whether he used showcase posters, handout sheets, advertisements in newspapers or on television, or loudspeakers.

The retailers were most likely to use posters in their own showcase windows -- nearly two-fifths (38 percent) used them as their principal means of advertisement. About one-fifth (21 percent) said they used either handout sheets or loudspeakers, and one in six (17 percent) said they used newspaper

⁷These statistics are taken from UNESCO's *World Communications, Press, Radio, Television and Film*, New York, 1964.

advertisements. Very few (3 percent) reported using television as a means of advertising.

Respondents were asked to estimate the total amount of money spent on all forms of advertising and promotion in 1964. On the average, they spent \$665 (standard deviation, \$2,420).

The retailers were asked where they learned about the price of local fruits and vegetables, and general events in the news. Respondents who sold fruits and vegetables were most likely to say that they received most of their price information on local fruit and vegetable products by visiting the market. One-third (36 percent) said they learned most fruit and vegetable prices by this means. About three-tenths (29 percent) learned from other businessmen, and about one-fourth (26 percent) from the radio. One in fourteen (7 percent) said they learned most of their prices from the newspaper. Among those who knew the radio programs which broadcast the prices of minor fruits, two-fifths (39 percent) were able to name its sponsor correctly (the Department of Agriculture), and one-fourth (27 percent) said the program was helpful.⁸

Respondents' main sources of news about local events were primarily the mass media; newspapers were mentioned as the most important source of local news by two-fifths (40 percent) of the respondents, and radio was mentioned by one-fourth (26 percent). Television was mentioned by one person in seven (14 percent). One-fifth (19 percent) of the respondents obtained their news from interpersonal sources, such as family members, business associates, and other friends.

Exposure to Mass Communication

Respondents were asked to indicate their patterns of exposure to the mass media of communication by noting which of four mass media -- newspapers, magazines, radio and television -- they had listened to the day before the interview, and what their normal levels of exposure to these media were.

The respondents were most likely to have watched television (69 percent) the day prior to the interview. Newspaper reading was second most frequent; about half (53 percent) said they had read a newspaper. Over two-fifths (44 percent) had listened to the radio, and three-tenths (31 percent) had read a magazine.

The respondents reported they spent on the average about 12 hours a week listening to the radio. They said they read about 1.5 newspapers and the same number of magazines on a regular basis.

The most innovative retailers are more likely to rely on newspapers as a principal source of local news, while the least innovative tend to rely more

⁸The Department of Agriculture operates a daily market news service on fruits and vegetables. Price quotations are assembled each morning and broadcast over local radios.

on radio. There are no significant differences, by degree of innovativeness, in the use of either television or interpersonal channels for local news.

The most innovative retailers, in addition to spending more on advertising and promotions, use a wider variety of types and/or media for this advertising (Table 7.7).

TABLE 7.7 RETAILER INNOVATIVENESS RELATED TO TYPE OF ADVERTISING USED

Type of Advertising Used	Degree of Retailer Innovativeness		
	High	Medium	Low
	----- Percent -----		
Showcase posters	68	37	21
Handouts	65	15	--
Newspapers	37	21	--
Loudspeakers	69	9	7

SOURCE: LAFS Retailer Survey, 1965-66.

Farmers

At different points during the interview, farmers were asked for their sources of information from several possible channels for each of various market activities requiring price information. Newspapers, radios, visits to the market, truckers, other farmers, and non-farmers were investigated as potential main sources of information on the prices of fruits and vegetables, cattle, poultry, starchy vegetables, and fresh fruits.

Farmers who sold fruits and vegetables were asked for their main source of information about the prices of these products. Seven out of ten (70 percent) said they learned about these prices from the radio and secondarily from magazines; three out of ten (30 percent) said they learned of the prices by actual visits to the market, from truck drivers, or from non-farmers.

Among farmers who reported selling cattle, their main sources of information on prices came from other farmers or from the market itself. About two-fifths (42 percent) said they got their price information from other farmers, while slightly less than two-fifths (37 percent) learned of cattle prices at the market. Newspapers and radio accounted for only one person in fourteen (7 percent) as the major information source, while one in eight (13 percent) used truckers.

Among farmers who sold poultry, visits to the market (45 percent) and other farmers (42 percent) account for nearly nine-tenths (87 percent) of the sources of price information they used. The coops, truckers, and other sources were mentioned about evenly.

For farmers who sold starchy vegetables, two-fifths (42 percent) received their price information directly from the market itself. About one-fifth (19 percent) heard their prices on the radio, about one in seven (14 percent) got

their prices from truckers, and the remaining sources were evenly divided between the farmers, newspapers or coops.

Half the farmers who sold fresh fruits received their information on prices and supplies from other farmers (27 percent) and the market (23 percent). The other half reported obtaining their information from truckers (19 percent, radio (18 percent) and other sources (13 percent).

Thus, the radio is the most frequently mentioned mass media source of price information on agricultural products. In particular, radio was most frequently named for prices on fruits and vegetables. Interpersonal sources, or the actual market site accounted for the main sources of information for prices on cattle, poultry, starchy vegetables, and fresh fruits.

Finally, the respondents were asked to note their major sources of news about economic activities in Puerto Rico, and about the world in general. Radio (88 percent) and newspapers (39 percent) were predominant and about equal as major sources of news. Television was third (16 percent), and interpersonal sources were very infrequent (5 percent).

In terms of having used the media the day prior to the interview, the broadcast media were more heavily used than the print media. About three-fourths (74 percent) of the respondents said they listened to the radio the day before, and seven out of ten (69 percent) said they had viewed television. About three-fifths (59 percent) had read a newspaper, and slightly more than half (55 percent) had read a magazine.

In terms of usual levels of exposure to the media, the respondents reported attending to each broadcast medium on the average of eight to nine hours per week. They reported reading about 1.3 newspapers and 1.8 magazines (both general and farm) regularly.

Newspapers are more likely to be the main source of local news for both high and middle-range innovators. On the other hand, the least innovative are most likely to depend on radio or on interpersonal channels. Farmers scoring highest on innovativeness are also more likely to depend upon television (Table 7.8).

TABLE 7.8 FARMER INNOVATIVENESS RELATED TO SOURCE OF LOCAL NEWS

Get Most Local News From	Degree of Farmer Innovativeness		
	Low	Medium	High
	- - - - - Percent - - - - -		
Newspapers	28	45	46
Television	12	15	26
Radio	46	37	28
Interpersonal	14	3	--

SOURCE: LAFS Farmer Survey, 1965-66.

Regarding the use of and exposure to the mass media, the most innovative farmers tend to score in the *middle* ranges of both the Mass Media *Use* and Mass Media *Exposure* indices. The medium-range innovators are those who score highest on both indices, with the least innovative scoring consistently lowest. Table 7.9 illustrates these curvilinear relationships.

TABLE 7.9 FARMER INNOVATIVENESS RELATED TO EXPOSURE AND USE OF MASS MEDIA

	Degree of Farmer Innovativeness		
	Low	Medium	High
----- Percent -----			
<u>Scores on Mass Media Use Index</u>			
Highest tercile	14	51	40
Middle tercile	31	36	54
Lowest tercile	55	13	6
<u>Scores on Mass Media Exposure Index</u>			
Highest tercile	14	40	29
Middle tercile	28	26	46
Lowest tercile	58	34	25

SOURCE: LAFS Farmer Survey, 1965-66.

Consumers

Eighteen percent of the consumers said they had no main source of information on food prices. Of those who actually mentioned some principal source of food price information, 44 percent said the newspaper provided them with information on food prices, one-fifth said that advertisement "handouts" (22 percent) or radio programs (18 percent) were their principal source of food prices, and 9 percent said that actual visits to the food stores provided them with price information. The remaining respondents (7 percent) said they learned most food prices from other people.

The pattern of main sources or channels by which news reached the respondents was somewhat different than their price information sources. Nearly two-fifths (37 percent) said they received most of their news from the radio, and three out of ten (29 percent) said they received their news knowledge from either television or the newspaper. Interpersonal sources, such as family members, friends or business acquaintances was the main source for only one person in twenty (5 percent).

Respondents were more likely to have listened to the broadcast media than to see print media. They were asked to indicate whether they had used each of these media on the day prior to the interview. Three out of four (73 percent) had seen television, and two out of three (65 percent) had listened to radio. About two-fifths of the respondents (44 percent) said they had read a newspaper the day before the interview, and about one-third (32 percent) had read a magazine.

Customary exposure levels to radio and television, on the average, was about 14 hours per week. They read about one newspaper and one magazine on a basis which the respondent defined as "regularly". Although the exposure measures for the broadcast media are not directly comparable to the print exposure measures, it is likely that the broadcast media are attended to much more than are the print media.

Exposure to food advertisements in newspapers was reported by slightly over half (55 percent) of the respondents. Among the respondents who read food advertisements, about three-fifths (62 percent) said these advertisements influenced their purchasing, and about one respondent in eight (13 percent) said that the advertisements influenced their purchasing of at least certain products. The rest said they were not influenced.

High mass media users are somewhat more likely than are low users to live in the larger metropolitan area of San Juan. Moreover, high users strongly tend to live in wealthier-appearing neighborhoods (in either San Juan or Mayaguez), to have high incomes, and to be among the best educated. Conversely, low media users are most likely to live in poorer neighborhoods, have low incomes and be among the least educated.

Regarding basic food shopping behavior, high mass media using housewives shop at supermarkets to a much greater extent, and are the most likely to have milk delivered to their homes. The high group also shop at bakery shops somewhat more than do the others as well as at the public market place. On the other hand, the medium and low media-using housewives shop mostly at the *colmados*. Table 7.10 shows the percentages of housewives in each media use-group who reported having shopped at each type of retail food outlet.

TABLE 7.10 MASS MEDIA USE BY HOMEMAKERS RELATED TO PLACE OF SHOPPING

Percent who Shopped During "Past Two Weeks" at:	Score on Mass Media Use Index		
	High	Medium	Low
	- - - - - Percent - - - - -		
Supermarket	81	50	50
Milk delivery truck	64	52	39
<i>Colmado</i>	58	74	72
Bakery	53	44	44
Public marketplace	47	36	35

SOURCE: LAFS Consumer Survey, 1965-66.

Summary Comparisons Across the Three Groups

Across the three food marketing groups, the choice of newspapers as the main source of local news is consistently predicated by three variables: age, education, and income. Persons of higher education and higher income are more likely than their less educated and lower income counterparts to report this medium as their main source of news. They also tend to be younger. The radio audience is more likely to be lower income, less educated and somewhat older.

One interesting aspect is that these results are the same, regardless of whether the audience is urban -- consumer or retailer -- or rural producer. Of particular importance is the observation that newspapers, rather than radio, are the primary information channel used by the more innovative retailers, consumers and farmers. This is in part predictable from the fact that the higher income, more educated persons also tend to be the more innovative. Nevertheless, the radio is an important medium of economic information, and has the advantage of by-passing educational requirements to some extent.

Interpersonal communication continues to play a strong role as means of acquiring particular pieces of business-related information. Retailers and farmers rely on each other, and on the market places, as means of learning price and other economic information. Such word-of-mouth transmission is often error-prone and leads to distortion, information hoarding, and other imperfections.

At the beginning of the present section on communication, we noted that the development of the Puerto Rican mass communication system was considerably more advanced than that of Latin America, especially in terms of the broadcast media. It appears that the mass communication system is sufficiently extensive to be useful in providing market information to food marketing participants. In many other Latin American countries, the mass communication system is frequently not established well enough to be a ready option for the development of market information systems. In Puerto Rico the media system is present, but it is not yet being utilized systematically in the coordination of the marketing process.

Summary

The modernization of food marketing in Puerto Rico was part of a much broader socio-economic and political reform program. The whole process of change was catalyzed by a few leaders, the most prominent of whom was Luis Muñoz-Marin. The creative leadership of Muñoz and his administrative staff provided a stable, long-term organizational focus to the development process. Many of the reform programs grew out of studies and consultations involving researchers, public officials and experienced businessmen from mainland U.S. These studies and related discussions became major inputs into decisions rendered by the Puerto Rican government officials. The general strategy of development was to create a favorable environment for private investment. Incentives of various kinds were provided through tax policy, special credit arrangement, pre-feasibility studies and publicly supported training and technical assistance activities.

Within this environment there were several innovative entrepreneurs who became the pacesetters in the introduction of new food marketing institutions and practices. Among these, Harold Toppel looms as one of the most successful

in introducing modern supermarket operations. There were many other individuals who could be classed as the early adopters in the modernization of the food system. But, the vast majority of the food system participants were slow in adopting the new methods. Nevertheless, it appears that urban consumers, especially those in the middle and upper income groups, were quick to adopt new shopping patterns when the opportunity became available. The adoption of new methods by traditional food wholesalers and retailers moved slowly.

Along with the relatively greater adoption of certain innovations, more frequent and more extensive use of mass communication occurred. The print channels were best in reaching the innovators in each group, and radio best at reaching the others. Since the types of messages most suited to each group are quite different, this allows the mass communicator to tailor his messages to each group much more specifically than if he found that all channels were equally likely to reach any group of food marketing participants.

In addition to finding that heavier use of mass communication accompanies greater adoption of innovations, we also find that it accompanies holding more favorable modernization attitudes. Since many studies have indicated that exposure to mass communication has a general modernizing effect in less developed areas, we can conclude that the same general phenomenon is operating here as well.

Finally, we find a few instances of market information programs tailored to various food marketing participants. Although given limited resources with which to operate, the surveys indicate they are reasonably successful in helping various types of individuals improve their economic decisions. And because of the relative development of the island's mass communication system, it seems clear that there is considerable untapped potential for further expansion of market information activities.

CHAPTER 8

EVALUATING THE CONSEQUENCES OF MARKETING CHANGE

Marketing - A Systems Problem

Marketing changes have many important consequences for a society. In many cases, the reforms in marketing institutions and regulations require explicit governmental intervention. Thus the consequences of such intervention or even permissiveness requires careful review. It is useful to divide the consequences of marketing reforms into technical and social responses. In both cases the problems of assessing the consequences of marketing reforms are substantial.

Before detailing the technical and social problems marketing reforms may induce, we should indicate the type of the approach we've adopted to measure the consequences of marketing reforms. Since marketing processes are the links enabling goods and services to be exchanged in the private sector of an economy, investigation of the consequences of marketing reforms become an extremely complex matter--beyond the analytical capacity of traditional microeconomic analysis and not appropriately covered in macro-economic analysis. Thus, various approaches to assessing these consequences are explored in this chapter. Macro-economic models and input/output models are reviewed. General systems simulation models are also reviewed to assess the contributions that each class of model can make in assessing the problems. The latter part of this chapter presents a somewhat novel concept in simulation modeling, designed to assess market process changes.

We will explore the consequences of market process reforms with the approach indicated above. The problems have been categorized into two broad areas.

First, there are technical problems in estimating the relationships among elements of the marketing system and the other components or sectors of the economy. For example:

1. There are changes in distribution margins which affect performance of the economy.
2. There are changes in the technical coefficients of specific marketing functions or activities.
3. There are changes in the technical coefficients of production functions as a result of changes in market expectations or marketing channel operations.

The second class of consequences which needs to be evaluated in response to specific marketing reforms are political and social changes. The most critical of these are the income distribution and related employment effects

resulting from marketing reforms. For example, as a result of changes in the relative prices of products with different income elasticities, income is effectively redistributed. Income can be redistributed among sectors, e.g., from rural to urban residents as a result of changes in the relative prices of products being transferred from one area to another. Similarly, consumers can receive increases in real income by reductions in relative prices that will reduce distributors' prices to consumers.

The political consequences of marketing reforms reflect the power shifts inherent in vertical and horizontal shifts in income distribution. Vertical shifts are the changes in the share of income enjoyed by groups at differing levels of income. For example, when food prices fall relative to the prices of other goods and services, the lower income people with higher shares of their income spent on food are relatively better off--real income has been redistributed. The higher income people whose income is thereby "relatively" reduced often find the change discomfiting. Horizontal income shifts are relative changes in income, from one sector to another within the economy, for example, from rural to urban areas.

Agricultural efficiency improvements have often been associated with increases in the use of capital, primarily from urban produced inputs--usually substituted for farm labor. Thus, increases in agricultural efficiency may mean, ironically, a relative reduction in farmer contribution to the value of final output. Initial food production expansion often requires that the rural community direct a larger share of its present income to acquiring urban-produced inputs. Income is shifted to the urban area. As technology becomes more capital intensive fewer farm workers are needed for increased outputs and the migration from rural to urban areas is intensified. Power then shifts from the rural to the urban areas as a result of these forces.

Recognizing this, we need to consider the methodological problems of measuring these consequences. As discussed in Chapter 1, the traditional approaches of economics and micro-marketing have largely ignored the tertiary sector's contribution to development. Colin Clark's tripartite classification of economic activity, with agriculture as the primary sector, industry the secondary sector, and general services the tertiary sector, revealed that as incomes rise, the percent employed in secondary and tertiary sectors also tends to rise. Zimmerman finds the fit extraordinarily good.¹ He points out that because a country is poor, capital formation may be small and therefore, employment opportunities limited. When income is low, labor must stay in agriculture with the decline in land-man ratio resulting in further distress

¹L. J. Zimmerman, *Poor Lands, Rich Lands: The Widening Gap* (New York: Random House, 1965), p. 47.

and overpopulation in the rural area. Historical data drawn from England, Japan, and the United States and compared with shorter time series data from developing areas reveal no pattern which permitted Zimmerman to look at the role of exchange in the process of development. Zimmerman recapitulates his findings based upon Clark's and Kuznets' arguments as follows:

- A. "All over the world per capita production in agriculture is considerably lower than in the secondary and tertiary sectors; per capita income in the secondary and tertiary sectors tends generally to be equal."
- B. "In countries with a low per capita income, income is low in all three sectors and in some cases is lower in the same proportion."
- C. "In all low income countries, percentage employment in the primary sector is considerably higher than in the rich countries."²

In order to penetrate the problem of income distribution changes associated with improvements in the efficiency of marketing, it seems appropriate to consider the *processes* of exchange. We want to consider the consequences of change in the distribution as well as changes in the production system for such commodities as food. Is there perhaps a relationship between changes in the productivity of distribution activities and the efficiency with which producers can market their products? This may be as a result of reduction in uncertainties and risks, inducing greater investment in the agricultural sector. Harrison's analysis of the poultry and egg business in Puerto Rico (see Chapter 6) suggests that marketing reforms which induce greater dependability and coordination cause changes in the rate of investment and the level of investment in agricultural production activities. Thus, improvements in marketing may cause changes in the productivity of supply sectors. The extent to which these activities can be carried forward is, of course, limited by the offsetting costs of improvements in the distribution system. If widespread unemployment results in the distribution sector in the process of introducing more efficient agricultural production, the costs could offset the gains. The analysis presented earlier in Chapter 4 suggests that while the output per worker in the food distribution system increased sharply during the 1950's and early 1960's in Puerto Rico, the total employment did not shrink because of the growth in the urban marketing system.

In summary, the political and economic risks of marketing reforms may well be such that few policy makers are tempted to take action where sensitive income distribution and employment changes are so likely to result. Yet, such

²*Ibid.*, p. 54.

changes in income distribution, vertical as well as horizontal, may be crucial to internal development of an economy. Thus, the consequences of marketing reforms require examination of the whole market process of the internal economic system.

One of the principal methodological concerns of this phase of the research into marketing processes in Latin America concerned developing a means of measuring the consequences of marketing change.³ At first, the most economical approach to this study seemed to be merely to adapt traditional macro-economic modeling efforts to this special problem of measuring the results of changes in marketing processes. However, examination of this classical approach as well as a study of input-output and macro-economic models failed to provide an adequate basis for the required analysis. This chapter, therefore, reviews the traditional methods of analysis in order to reveal why it was necessary to construct another approach, borrowing from systems engineering techniques for the study of social process.

Traditional methods of macro-economics consider principally the income and employment changes resulting from changes in the supply and interest rates for money. The specific and individual consequences of selected investment reforms are not usually considered except at an aggregate level.⁴ On the other hand, classical micro-economic analysis focuses on the conditions necessary for equilibrium and the welfare consequences of defects in the competitive system which yields less than the results of the pure and perfect competitive state.⁵ The complexity of assessing the consequences of specific marketing reforms suggests that a systems approach might yield useful analysis. Prior to investing the effort needed to create a new and specific systems approach, other avenues were explored. A brief review of these will reveal some of the relationships between our analytical efforts and some other efforts to understand and describe economic processes.

Galbraith and Holton developed a descriptive model of the retail and wholesale marketing system of Puerto Rico during the 1950's. This model was presented in their study.⁶ The resulting analysis provided assessment of the

³See John E. Griggs, "Evaluating the Consequences of Marketing Change: An Application of Systems Theory" (unpublished Ph.D. dissertation, Michigan State University, 1968). Much of the analysis presented in this chapter is drawn from this thesis, which was a major part of the research effort of the project.

⁴Gardner Ackley, *Macroeconomic Theory* (New York: The Macmillan Company, 1961), Chapter 1.

⁵Joe S. Bain, *Industrial Organization* (Berkeley: University of California Press, 1956), Chapter 1.

⁶John K. Galbraith and Richard Holton, *Marketing Efficiency in Puerto Rico* (Cambridge: Harvard University Press), 1955.

cost patterns of four regional retailing areas, full line versus specialty store, and limited service outlets as opposed to full service (credit and delivery) outlets. Wholesale firms were also modeled to examine the differences in cost due to scale and breadth of line.

The demand attributes of allowing for enough outlets so that all consumers would be within walking distance of a store determined the model number of outlets. Savings were estimated based upon costs and mark ups required to serve consumers with traditional outlets. The model did not anticipate the nearly revolutionary impact of supermarkets before the end of the 1950's.

Modeling Efforts as an Approach to Describing the Marketing Process

Although reference to a "distribution" sector is contained in a few macro-economic models, it is useful to review two major classes of economic models: input-output and national income. The objective of this review is to determine the manner in which marketing related problems can be treated using features of existing models. Certain features of existing models are relevant to the approach developed here concerning the problem of measuring the economic impact of changes in marketing. A discussion of both the conceptual frameworks of existing models and a brief sketch of some of the methodological aspects of constructing these models follows.

Input-Output Models

Input-output analysis was developed in the early 1930's by Wassily Leontieff. Since then a number of input-output model forms have been developed, increasing both the complexity and usefulness of input-output analysis. Input-output ranks today as one of the most important types of economic models.⁷

In the input-output framework, an economy is viewed as a set of interacting industrial sectors. Each industrial sector produced a single output which is used by other industrial sectors as a production factor and then sold to final demand. To produce its output, each industrial sector uses the output of other industrial sectors in combination with labor and possibly imports from other economic systems.

Final demand for the output of an industrial sector equals the amount demanded by households, government, other economic systems (exports), and usually the net change in stock. Intermediate demand for the output of an industrial sector equals the amount demanded by all other industrial sectors within the system.

⁷Richard Stone, *A Programme for Growth-3, Input-Output Relationships* (Cambridge: The M.I.T. Press, 1962), pp. 2-5.

The total output of an industrial sector equals, by definition, the sum of the intermediate and final demand. In the basic input-output model, final demand is treated as an exogenous variable and therefore presents no computational problems. It is the computation of intermediate demand which presents the problem, and which required that Leontieff develop a set of simultaneous equations in order to obtain a solution. The use of simultaneous equations is required because Leontieff chose to view the economic system as a set of interacting industrial sectors; the total output of a given industry is functionally related to the input requirements of other industries which in turn are functionally related to the total output of the given industry. Leontieff chose to recognize the reality of industry interrelations and, with the aid of a simplifying assumption about joint-products and by-products and production functions, developed the basic input-output model. The assumption made is that the input requirements of any sector are in proportion to its output. In addition to this assumption of fixed proportions, input-output models assume that each industry produces its own specific output and no other. There is no assumption made, however, that these fixed proportions, called technical coefficients, are, in fact, fixed over time. It should also be noted that the assumption of proportionality of production does not allow for substitution effects and economies or diseconomies of scale except by subdividing industries into sufficiently small classes so that large-scale firms in an industry are not grouped with small-scale firms that have, in fact, different technical coefficients.

There are several uses of a simple input-output model. First, the model allows the computation of total output requirements for a set of final demand estimations. Second, by using supplemental information and assumptions about total output and labor, imports or capital relationships, it is possible to estimate the labor, import or capital requirements for various sets of final demands. The model allows a simulation of the behavior of the economic system for research or economic development planning.^{8 9 10}

Prices of outputs have been introduced into some input-output models, and value added can be broken down into labor costs and profits. Hadley demonstrates

⁸UN ECAFE 1960, Chapter V, has a brief discussion of the problems associated with the use of input-output. (New York: United Nations, 1960).

⁹O. Morgenstern, ed., *Economic Activity Analysis* (New York: Wiley, 1954).

¹⁰The Planning Board of Puerto Rico developed input-output models which are used to predict economic growth trends. See "Modelos de Crecimiento Economico," Informe Técnico No. 3, Junta de Planificación, Estado Libre Asociado de Puerto Rico, 1966.

how the price and value added concepts are incorporated mathematically in the model.¹¹

The effect of wage rate changes upon the prices throughout the economic system can be studied with this feature of an input-output model.

The closing of an input-output model refers to the relationship which exists between labor, inputs, income and the level of final demand. One portion of final demand is export and government demand. Increasing the level of government demand for industrial output increases the total output of industrial sectors, thus increasing labor requirements. Expanded labor requirements increase consumer demand if there is more income. The Leontieff model requires the addition of a consumption function which relates demand for goods to the amount of income (labor requirements). Referring again to Hadley, one possible way of including the consumer sector is to treat it as another industry.¹²

Attempts have been made to introduce dynamic behavior into the input-output model.¹³ One of the most extensive input-output modeling efforts outside the U.S. Office of Business Economics was conducted at Cambridge University. The Cambridge model, designed for long-range economic prediction, has two characteristics.

In the Cambridge model a double classification system is used for industry and product. This classification reduces errors in the technological relationships established between industries by assigning product demand to the correct industry regardless of which industry in reality produces the product.¹⁴ In effect, technology is described on a commodity basis rather than on an industrial basis.

A second characteristic of the Cambridge model is the method of projecting future technical coefficient values. Due to data shortages, a combination of extrapolation and direct observation was used.¹⁵ The disaggregation of the model was detailed so that industrial experts could be invited to criticize and improve the technical coefficient estimates. In effect, the model was used as a policy model. Since its function is to serve long-range economic prediction needs, the model has been designed to consider changes in the technical coefficients.

¹¹G. Hadley, *Linear Programming* (Reading, Massachusetts: Addison-Wesley Publishing Company, 1962), pp. 490-492.

¹²*Ibid.*, pp. 499-501.

¹³M. M. Wagner, "A Linear Programming Solution to Dynamic Leontief Type Models," *Management Science*, 3, 3, 1957, pp. 234-254.

¹⁴Stone, *op. cit.*, pp. 11-14.

¹⁵Stone, *op. cit.*, pp. 24-30.

The Statistical Office of the United Nations has developed a list of industrial divisions referred to as the International Standard Industrial Classification (ISIC).¹⁶ In this list commerce, trade, finance, insurance and real estate are all grouped in one major classification. Other classifications are agriculture, mining, manufacturing, construction, public utilities, transport, storage, communication and services.

These industrial classifications are commonly used in most input-output models of economic systems. In a review of the development plans of thirteen countries, however, the trade sector was explicitly used in only four.¹⁷ While country development plans are not always directly related to the sectors which would be used in an input-output model, the exclusion of trade in nine country plans is indicative of its neglect.

In an input-output model the portion of industrial output going to final demand which is sold through wholesale or retail establishments is recorded as final demand for the industry and not the commercial sector actually selling the product. Thus, while the total output value for an industry such as mining approximates the value of shipments of mining ; the total output value for distribution sectors represents only a fraction of its total throughput.

Evaluation - An input-output model, without a basic alteration in the manner in which the distribution sector is treated, is not applicable to analyzing that sector's relationship to the rest of the economic system. The reason for this is the manner in which the distribution sector must be treated if it is to be defined as an industrial sector within the model.

In those cases where a trade or distribution sector is treated as an industrial sector in an input-output model, the inputs and outputs must be clearly understood. The inputs to the distribution sector include only such items as refrigeration units, cash registers, wrapping paper and string. These inputs are for use in the commercial sector as "factors of production." The output of the distribution sector includes sales to other industrial sectors and only a portion of its actual sales to final demand.

Although direct usage of an input-output model is not possible, aspects of the model are vitally important and useful in the context of measuring the impact of certain marketing reforms or changes. The interdependence of industrial sectors points to an important factor which must be considered in measuring the impact of marketing changes. If a marketing reform within the distribution sector alters the level of demand for the output of any industrial

¹⁶Statistical Office of the United Nations, *International Standard Industrial Classifications of all Economic Activities*, New York, 1958 (Statistical Papers, Series M, No. 4, Rev. 1).

¹⁷Joseph L. Tryon, unpublished working paper, 1966.

sector, the total output of all related industries will be affected. To simply record the demand changes for the affected good would understate the impact of the reform. Properly used, the theoretical relationship of the input-output model can be used to record secondary effects of marketing reforms within the production sector.

National Income Models

The original models of Harrod and Domar are the prototypes of the national income models. In these original models, the economic system was viewed in simple aggregate terms.

Evsey Domar's original model was designed to define the rate at which demand *must* increase in order to fully utilize increased productive capacity caused by capital accumulation. This model was not presented as a theory of growth but as a means of studying an aspect of the growth problem.¹⁸

The basic relationship in the model defines the equilibrium growth path. The equilibrium growth path is defined by the condition that no capital shortage exists, yet all capital provided by previous investment is fully utilized. The change in investment is equal to the marginal propensity to save multiplied by the ratio of added capacity to added capital stock multiplied by the investment in the time period.¹⁹

In his original model Harrod attempted to provide a theory explaining how steady growth occurs, using the acceleration principle to develop a theory of investment. A number of interpretations of Harrod's model have been made. Ackley states that the Harrod and a similar but more sophisticated model by Duesenberry operate on the same principle: "Growth occurs because the actual capital output ratio remains sufficiently far below the optimum ratio to induce sufficient investment to keep income growing as fast as (or faster than) capital accumulates."²⁰

Ackley qualifies the usefulness of these and other growth models.²¹ First, he states that these growth models were concerned with the study of growth in highly developed communities which have essentially the free market, free enterprise system of organization. Second, he noted that they concentrated only on the accumulation of capital and claims. Even population and technological trends are not considered.

¹⁸Ackley, *op. cit.*, p. 517.

¹⁹For more detail see Evsey D. Domar, "The Problem of Capital Accumulation," *American Economic Review*, 37 (December, 1948), pp. 777-794.

²⁰Ackley, *op. cit.*, p. 529.

²¹*Ibid.*, p. 506.

Recent models of the National Income type are more sophisticated and treat the economic system in a more disaggregated manner. A model developed by Ichimura is an example of a national income model with two defined sectors.²²

In the Ichimura model, a distinction is made between the private and public sectors of the economy. Private investment and consumption are treated separately from public consumption and investment.

The complexity and level of disaggregation of the national income model is virtually unlimited. Two examples of more complex models are those developed by the Simulmatics Corporation and the Social Science Research Council.

Simulmatics' model was developed as a dynamic model for simulating the Venezuelan economy.²³ Three sectors are defined in the model reflecting the importance of the petroleum industry in Venezuela. The petroleum, non-petroleum, and public sectors are modeled. Capital formation and output capability are related for each sector. Import and consumption functions are developed. Definitional equations are used to convert the model's assumptions into national income accounting terms.

Over 100 equations are involved in the presentation of the Venezuelan model. These include definitional, behavioral, and technical equations of varying complexity. The model is presented not as a hypothetical illustration but as a model based upon the Venezuelan situation; it was designed as a tool for policy makers.

The Social Science Research Council developed a national income model designed for short-run forecasting in the United States.²⁴ In the original model seven industrial sectors were defined; a thirty-sector model is now being planned. Numerous equations (over 150) of varying complexity are used to construct the model.

Evaluation - The commercial or distribution sector has been completely ignored in all but the most recent national income models. Of the models reviewed, only the SSRC model has reference to a distribution sector. In the SSRC model inventory levels, employment and price levels at the wholesale level were included as factors in the model.²⁵

Although referred to in the SSRC model, the distribution sector is certainly not an integrated part of the model. Employment, level of inventory

²²UN ECAFE 1960, pp. 81-86, for a fuller discussion of Ichimura's model.

²³Simulmatics Corporation, *Dynamic Models for Simulating the Venezuelan Economy* (Cambridge: The Simulmatics Corporation, 1966), pp. 41-49.

²⁴L. R. Klein, The Social Science Research Council Econometric Model of the United States, *Econometric Analysis for National Economic Planning* (London: Butterworth's, 1964), pp. 129-169.

²⁵*Ibid.*, pp. 139 and ff.

and prices as they relate to the distribution sector were included in the model because these factors had to be considered in the estimation of final demand; the distribution sector itself was not modeled.

Summary

In general, while the trend in input-output analysis has been toward more sophisticated handling of production-oriented problems, national income models have concentrated on improved estimations of final demand and capital-output relationships.

Within each basic type of economic model, input-output and national income, so many varied forms exist that the term "input-output" or "national income" is really insufficient to describe any particular model. As they become more complex, the differences seem slight.

The most important observation concerning existing economic models, with respect to the problem of measuring the economic impact of marketing change, is that the distribution sector of an economic system is treated in only a superficial manner. In input-output analysis the emphasis is placed upon the industrial sector and when included, the distribution sector is also treated as a productive sector. Thus, the payments to the distribution sector for breakdown, risk and uncertainty of capital tied up while demands are sorted out is effectively ignored as a cost to the society. In a national income framework the distribution sector is usually not defined. When reference to the trade sector is made, as in the SSRC model, the purpose is to improve estimations of the model with no particular concern for integrating the distribution sector into the model. Perhaps implicit in this studied ignorance of the distribution phenomena as an aspect of the economic process is the ancient traditional economic wisdom regarding trade as not productive but exploitive.

Aspects of input-output and national income models are relevant to the problem of measuring the impact of marketing changes, even though the distribution sector is not treated in either of these models in the required manner. The input-output model provides techniques for tracing the impact of distribution changes to output changes of different industrial sectors. The national income model provides techniques for tracing the impact of distribution changes to the final demand sectors.

The following section describes a different modeling technique, one with the potential for analysis of market processes and changes.

The Methodology of Systems Theory and the Development
of a Marketing Systems Model

The term systems theory, as used here, identifies a specific formalized mathematical methodology developed within the field of systems engineering for the study of physical systems; the modeling procedures are rigidly defined.^{26 27 28 29} General systems theory is a broader term used to define the inquiry into the assertions applicable to all systems, whether physical, biological or behavioral.

Systems theory has been used primarily to develop mathematical models of physical systems, particularly electro-mechanical and electronics systems. With the aid of a systems model, the mathematical descriptions of a system, and the behavior of a physical system can be studied on a computer. The inherent stability of a physical system and the sensitivity of that system to changes in the structure can be evaluated with a model, in some cases prior to construction of the system.

In contrast to social science application, systems models serve as basic tools for controlling and optimizing the behavior of physical systems and in designing new systems. Using the technique of systems theory, a physical system can be "built" in mathematical terms and its behavior analyzed on a computer prior to construction.

The components of a physical system are easily identified and may be physically separated from the system. The behavior of a single physical component can be studied in isolation and under a wide range of laboratory conditions. Well-defined measurement units and tools can assist in analyzing physical components. Physical systems have in most cases more explicit boundaries and thus to model a physical system is less an abstraction.

A limited amount of material exists describing the attempts to apply the methodology of systems theory to the study of non-physical systems. Such diverse "systems" as a university, a recreational system of a state, a church, and a corporation have been studied using systems theory as the

²⁶Kenneth Boulding, "General Systems Theory: The Skeleton of Science," *General Systems*, Vol. 1, 1956, p. 17.

²⁷James Miller, A. B. Blalock, "Toward a Clarification of System Analysis in the Social Science," *Philosophy of Sciences*, Vol. 26, 1959, p. 54.

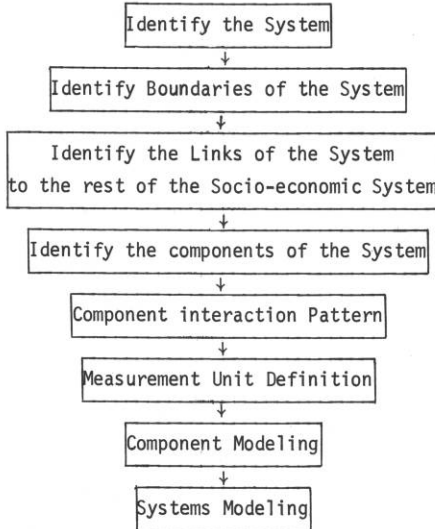
²⁸H. E. Koenig and W. A. Blackwell, *Electro-Mechanical System Theory* (New York: McGraw-Hill, 1961).

²⁹J. S. Fram and H. E. Koenig, "Application of Matrices to System Analysis," *I.E.E.E. Spectrum* (May, 1964), pp. 18-27.

basic research technique.^{30 31 32 33 34 35}

No one familiar with the methodology of systems theory claims that its application will lead to the immediate development of sophisticated models of socioeconomic systems. The basic value of systems theory in modeling socioeconomic systems lies, at this stage, in the structured approach it provides for the development of a mathematical model.

Figure 8.1
Steps in Developing a Systems Model



³⁰H. K. Kesavan and P. H. Roe, *Networks and Systems* (Waterloo, Ontario: University of Waterloo Press, 1963).

³¹H. E. Koenig, Y. Tokad and H. K. Kesavan, "Analysis of Discreet Physical Systems" (bound notes), Department of Electrical Engineering, Michigan State University, 1964.

³²M. G. Keeney, H. E. Koenig and R. Zamach, "State Space Models of Educational Institutions," Organization for Economic Cooperation and Development, Proceedings of the Second International Conference, Paris, January 25-27, 1967.

³³J. R. Ellis, "Outdoor Recreation Planning in Michigan by a Systems Analysis Approach; Technical Report No. 1," State Resources Planning Program, Michigan Department of Commerce, May, 1966.

³⁴H. E. Koenig, A. Hilmerson and L. Yuan, "Modern Systems Theory in Agricultural Industry -- An Example," American Society of Agricultural Engineering (submitted for publication October, 1967).

³⁵F. H. Mossman and R. J. Gonzalez, "Investigations into the Application of Systems Theory to the Capital Budgeting Problems," Working Report No. 1 (East Lansing, Michigan: Michigan State University, October, 1966).

Socioeconomic systems are abstractions or an aspect of the total process of life activity. Thus, identification of the system becomes critical. Next, the identification of the boundaries of the system is crucial in order that the limits of interactions studied are understood. Since the system defined necessarily links to the rest of the socioeconomic system, it is important to identify the terminals outside the system linking to the system. Identifying components is a necessary step in socioeconomic systems development just as in physical systems. The interaction pattern of the components and the measurement units are critical to modeling the components and finally linking the components into the system.

In general, there is no unique way to identify the components of a system. Yet, in systems modeling certain conventions establish the way in which the theory functions. A system is a group of components linked by terminals to other components or by terminals to other systems. Terminals are the interfaces or points of contact between the components or sub-components. A basic restriction imposed by the use of systems theory is that the two basic systems variables, flow and propensity, have specific and consistent measurement characteristics. A terminal can be thought of as an edge with two dimensions, flow and propensity. The edges or terminals between components have a "direction" in modeling theory. Conventions are to refer to the direction measured in both (x) propensity, (y) flow between two components as follows: Propensity x_1 is directed a to b if x_1 is greater than zero and b to a if x_1 is less than zero. Flow a to b if y_1 is greater than zero and b to a if y_1 is less than zero. Figure 8.2 presents some examples of propensity and flow. The propensity variables have a special property. For a closed path of edges, this property can be stated that $x_1 + x_2 + x_3 = 0$. This property is often referred to as the associative law of the real numbering system if $x_1 = 2$ and $x_2 = 3$ then x_3 must equal -5. Figure 8.3 illustrates this attribute of propensity variables.

Figure 8.2
Examples of Propensity and Flow

General Phenomena	Electrical	Mechanical	Hydraulic	Thermal
X propensity	Voltage	Velocity	Pressure	Temperature
Y Flow	Current	Force	Flow rate	Heat flux

Figure 8.3
Propensity Variable
Associative Law

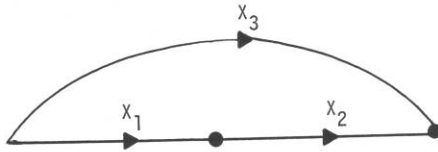
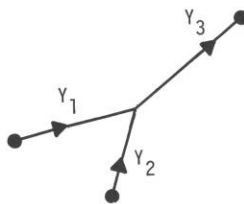


Figure 8.4
Flow Variable
Continuity Property

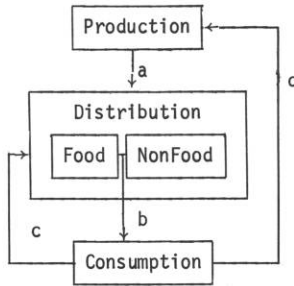


Flow variables also have a special measurement property: for a set of edges such as is shown in Figure 8.4, the sum of the flows at a vertex equals zero. This property can be stated: $y_1(n) + Y_2(n) = y_3(n)$. This property is sometimes referred to as the continuity property. If $y_1(n) = 4$ and $y_2(n) = 6$ then $y_3(n)$ must equal 10. Figure 8.4 illustrates the relationship.

That part of modeling theory dealing with the establishment of a modeling structure can be illustrated using as an example a three component model of a socioeconomic system. Figure 8.5 describes three identified sectors of the economic system and their points of contact.

Figure 8.5

Three Component Socio-Economic System



The production and distribution and the consumption sector of the socioeconomic system are identified. In a socioeconomic system where the distribution sector is an identified component, a food distribution subsector and a nonfood distribution subsector could be identified as subcomponents of the distribution component. This process could be continued by identifying "types" of food distributors within food distribution subsector: modern or traditional "types," for example. The terminals a, b, c and d in Figure 8.5 signify the movement of certain items between the three sectors. Terminal a could represent the flow of product from the production sector into the distribution sector. Terminal b could represent the flow of these same items from the distribution sector to the consumption sector. Terminals d and e could represent the labor used by the distribution and production sectors.

If we assume that the propensity variable can be thought of as the flow of monies, the essential problem is to define the measurement units for the flow variable. A common unit of consumption must flow from the distribution sector to the consumption sector and in turn, for the logic to operate, these common units of consumption must be measured as they flow from the production

sector to the distribution sector. Simply defining the annual flow of physical units does not make it an operationally defined variable. It could, for example, be defined as pounds per year, or tons per year. Since the socioeconomic presumes literally thousands of types of goods, the systems approach would be defeated by complexity if we were not to establish a convention for flow that is an operational definition. Determining the value of the flow and propensity variables of the distribution sector is, of course, a difficult problem. The flow variable could represent a unit flow of a variety of food items whose normal physical units of measurements are pounds, dozens, quarts and cases. Establishing some consistent measure of "units" and "unit value" is essential to operationalizing the systems model.

The following approach was used in evaluating the parameters associated with the distribution sector in the model presented here. The dollar values of the flows of food and non-food consumption goods, though subject to difficult definition, are generally available. The unit value of these flows is, however, a curious abstraction. The values represent the estimates of expenditures of individuals and families within the socioeconomic system measured by the summation of all purchases, each purchase being valued as the product of some price per unit times the number of units purchased. How many units of each and every item purchased at different prices by each family is unknown.

In any socioeconomic system, however, an estimate can be made of the approximate number of families in the system. The total dollars expended by these families for goods and services purchased through the distribution sector can also be established. By defining the "unit" as the package of goods an average family purchases in a year permits us to derive a common unit of goods for the flow of product from the production to the distribution sector.

The price per unit of labor can be obtained from dividing the annual Census-reported payroll by the number of employees reported for the sector being modeled. Thus, we have a common unit of income in terms of wage income. A similar common unit of non-wage income can be established at some point in time.

Using these conventions, individual components can be modeled, measuring the propensities and flows along edges connecting terminals within the components. In turn the system can then be modeled by linking the components and closing the system.

The methodology of systems theory states that users may view systems in the manner most useful and meaningful to the purpose at hand. The system may be broken into components or parts the user deems necessary. By observing the restrictions placed on the definitions of the two variables, flow and propensity, the user is guaranteed that enough independent equations can be

generated to make the entire system of equations a model itself solvable as a system of simultaneous equations. The model presented in the next section represents an attempt to merge systems modeling techniques and certain concepts and features of existing economic models into an approach for measuring the broad economic consequences of change *within* the distribution sector of an economic system.

The market processes system can be viewed as a collection of interrelated economic sectors. As was developed in Chapter 1, the literature on the role of marketing in development has described the need to consider the whole economic system. The methodology of systems theory is based on the concept of viewing the system as a set of interrelated sectors. Existing economic models, such as input-output and national income, have dealt with the problems of modeling certain economic sectors such as production and consumption and establishing relationships between those sectors, but they have not adequately developed the distribution sector.

The distribution sector presented here will be explicitly included in the model of the economic system. In order to alter facets of distribution and mathematically simulate the reactions of the system, the distribution sector must be included explicitly in the model. The technique of systems theory provides an approach for modeling the distribution sector as an integrated part of the system. Existing models can assist in the task of modeling other sectors and allow for more attention to be focused on the problem of introducing the distribution sector.

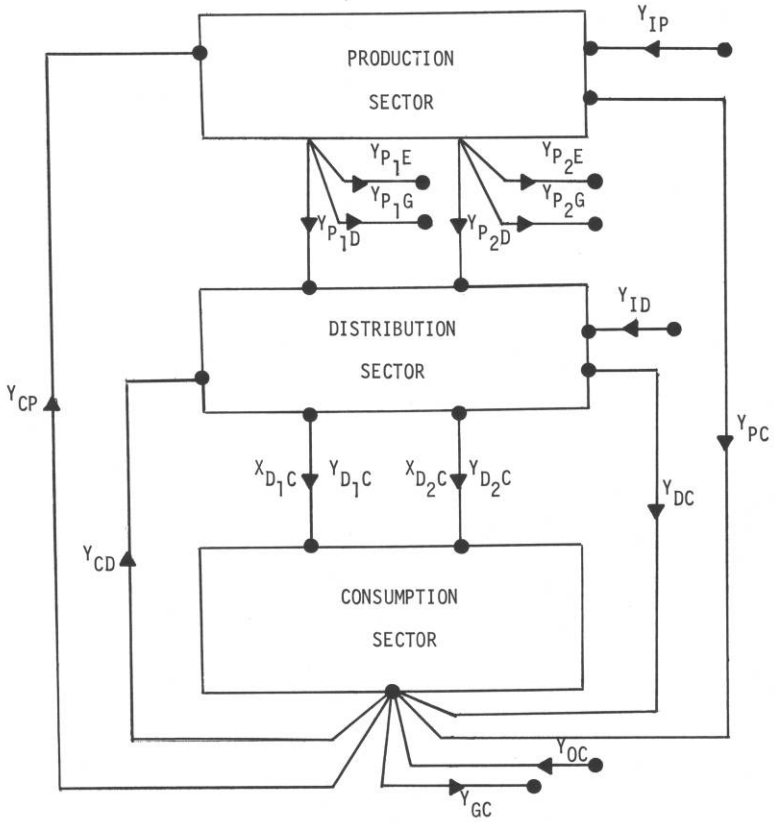
A Simplified Model of the Market Processes of the Puerto Rican Economy

Utilizing general systems theory, a systems model has been developed to examine the consequences of change in the marketing processes of the simulated Puerto Rican economy. Figure 8.6 shows the model structure of a three-component model with terminals linking the model to other system by imports, Y_{IP} and Y_{ID} , and exports, Y_{P1E} and Y_{P2E} ; government as an employer, Y_{CG} ; and as a buyer of goods, Y_{P1G} and Y_{P2G} . The internal linkages of the model show the flows of foods from production, Y_{P1D} , and nonfoods from production, Y_{P2D} , to distribution. Distribution flows are treated in terms of propensity or price, X'_{D1C} and X'_{D2C} , as well as in terms of flows of a common unit of consumption per household equal to the number of consumer households in the consumption sector, Y'_{D1C} and Y'_{D2C} .

Consumer income comes from wages from production, Y_{CP} and distribution

Y_{CD} . Non-wage income derives from Y_{DC} and Y_{OC} , income from other sources, as well as the previously mentioned government income source, Y_{CG} .

Figure 8.6
Model Structure of the Puerto Rican Market Simulation



Component Modeling

The components of each of the sectors are described in graphic form here. The mathematical details of the model are presented in John Griggs' dissertation, Chapters 5 and 6. Figure 8.7 presents the production sector as a component graph. The edges bear only one subscript for a unit price is assumed for all inputs except labor and a unit price is assumed for all output. The flows identified in Figure 8.7 show inputs of labor, Y_{CP} , imports of goods to the production sector, Y_{IP} , and now wage income, Y_{PC} . Their services and goods are all combined to yield outputs of food Y_{P_1} and Y_{P_2} nonfood consumption goods. In turn, outputs are distributed to the distribution sector Y_{P_1D} and Y_{P_2D} as well as to the terminals of exports Y_{P_1E} and Y_{P_2E} and government Y_{P_1G} and Y_{P_2G} .

Figure 8.7
The Production Component

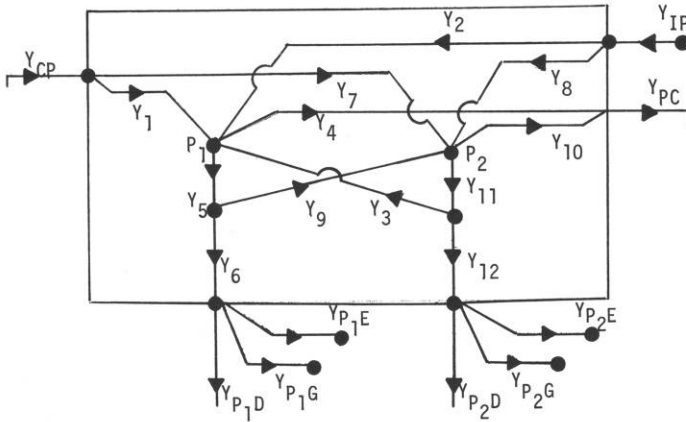
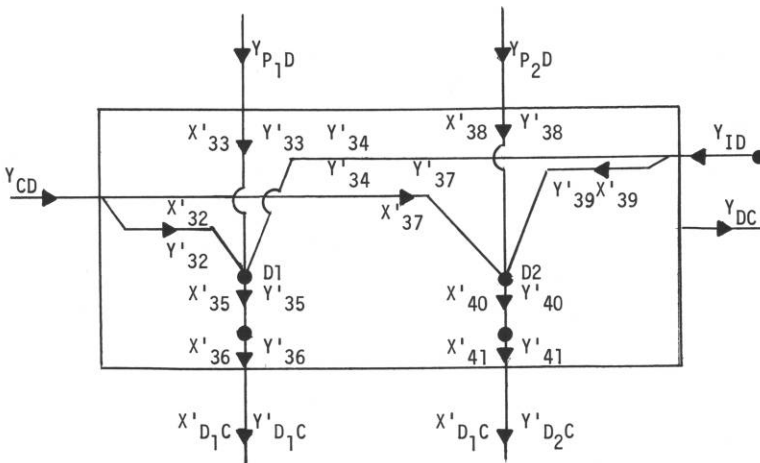


Figure 8.8 is a component graph of the distribution sector. It is similar to the production sector except for the price of outputs of the internal terminals (X'_{36} , Y'_{36}) and (X'_{41} , and Y'_{41}). The price of output is measured in terms of the value of food for X'_{D_1C} purchased by the average family in Puerto Rico in 1963. X'_{D_2C} represents the average family purchases on nonfood consumption goods, excluding housing, etc.³⁶ The internal terminals (X'_{36} and Y'_{36} , X'_{41} and Y'_{41}) reflect the "margin" added to value of product as it is distributed. This is not related to the flows into the sectors, except that it reflects the uncertainties and risks that are compensated for by the addition of a mark-up by wholesalers and retailers facing uncertainty as to consumer demand and risks of price changes of future inputs as they ship, hold, and break down products for consumers.

Figure 8.8
Distribution Sector



³⁶In a later section concerned with operationalization these terms will be more fully defined.

The distribution sector has both price and quantity flows for all internal variables. The unit of measure of quantity remains the same as X_{D_1C} and X_{D_2C} . The exception to this is Y_{DC} , non-wage income which is not linked to the internal terminals, and it is expressed in dollars without a "unit" measure. Each Y' variable is measuring, in physical units, the flow of an item associated with the edge. For example, Y'_{33} and Y'_{38} represent the physical units of food and nonfood items moving from the production sector through the distribution sector. Y'_{32} and Y'_{37} measure the units of labor employed in the distribution of foods and nonfood items. Y'_{34} and Y'_{39} measure the units of food items and nonfood items entering the distribution sector from other socioeconomic systems. Variables Y'_{35} and Y'_{36} are equal and measure the total unit output of the food distribution subsector. Similarly, variables Y'_{40} and Y'_{41} are equal and measure the total unit output of the nonfood distribution sector.

However, X'_{35} and X'_{36} are *not* equal, nor are X'_{40} and X'_{41} equal. The differences reflect the "margin" added to the value of the goods for the marketing services of absorbing risk and uncertainty, as well as the financial costs of inventory where no product loss is involved.

The variable X'_{35} is related to X'_{32} , X'_{33} and X'_{34} . The variable X'_{35} is best described as the "imputed cost" of producing one unit of output of the food distribution subsector. The value of the variable is defined as:

$$X'_{35} = k_{32} X'_{32} + k_{33} X'_{33} + k_{34} X'_{34}.$$

The imputed cost, X'_{35} , is equal to the sum of the cost of each input required to produce one unit of output. Applying the same assumption to the nonfood distribution subsectors yields:

$$X'_{40} = k_{32} X'_{37} + k_{38} X'_{38} + k_{39} X'_{39}.$$

The propensity variables X'_{36} and X'_{41} represent the dollars per unit added to imputed cost per unit to arrive at an exit price per unit from the distribution sector. The assumption used is that X'_{36} or X'_{41} equals a fixed percentage, m_{36} or m_{41} , of imputed cost, X'_{35} or X'_{40} . Stated mathematically:

$$X'_{36} = m_{36} X'_{35}$$

and

$$X'_{41} = m_{41} X'_{40}$$

There are no internal edges shown connecting with the terminals marked Y_{DC} . The variable Y_{DC} represents the 1963 dollar value of nonwage income generated for the consumption sector from the distribution sector. The propensity variables, X'_{32} and X'_{33} and X'_{34} and X'_{37} , X'_{38} , and X'_{39} are in terms of 1963 dollars per unit. If, for example, Y_{32} were reported in manhour units, X'_{32} would be in 1963 dollars per manhour. Variables X'_{35} and X'_{40} represent

the imputed costs per unit of food or nonfood items. Variables X'_{36} and X'_{41} represent the value per unit added to the imputed cost to arrive at the price per unit of food or nonfood item at exit from the distribution sector. These are the mark-ups charged by the distribution sector in excess of the imputed costs of inputs.

From these propensity and flow variables some parameters are derived that are ratios of price to quantity. These are technical coefficients because the equations of the system state that inputs are related in fixed proportions to the output. Parameters k_{32} and k_{33} and k_{34} are these ratios. For example, k_{32} units of Y_{32} are required for each unit of Y_{35} . k_{37} and k_{38} and k_{39} are technical coefficients for the respective inputs to the nonfood distribution subsector. In developing the model, it is assumed that wages, imports and production flowing through the distribution system are known.

The Consumption Sector

Figure 8.9, the component graph of the consumption sector, reveals the flow of product from the distribution sector, foods and nonfoods, and the income generated by the consumption sector in the form of wages from production and distribution sectors, nonwage income from the production and distribution sector, other income and income from government sources. Three consumption terminals are defined, C_1 , C_2 and C_3 , representing three levels of income within the community. The incomes are expressed as Y_{44} , Y_{47} and Y_{50} . Consumption of food and nonfood goes to each of the terminals with a price and quantity expressed in terms of the proportion of family units in the consumption terminal. For the lowest income Y_{42} and X_{42} represents the flow of food consumption to that income group. Total income of the consumption sector is defined as:

$$I = Y_{CP} + Y_{CD} + Y_{CG} + Y_{PC} + Y_{OC} \quad (8.5)$$

The distinguishing characteristic used to define consumption subsectors is income level; income level is used as a surrogate to distinguish between consumers with different average propensities to purchase food and nonfood.

A Systems Model

The systems graph is shown in Figure 8.10. The edges represented by solid lines have associated with them the defined system variables; those edges represented by broken lines indicate an association with a terminal variable.

There are sixteen edges shown in Figure 8.10; sixteen flow variables and two propensity variables are defined. Eight of the sixteen flow variables are system variables: Y_{P_1D} , Y_{P_2D} , Y'_{D_1C} , Y'_{D_2C} , Y_{PC} , Y_{DC} , Y_{CP} , Y_{CD} . The remaining eight flow variables are terminal variables; the values for all but Y_{IP} and

Figure 8.9

Consumption Component

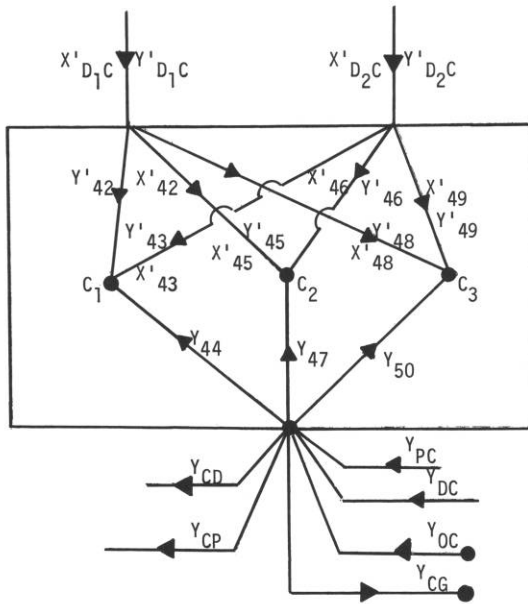
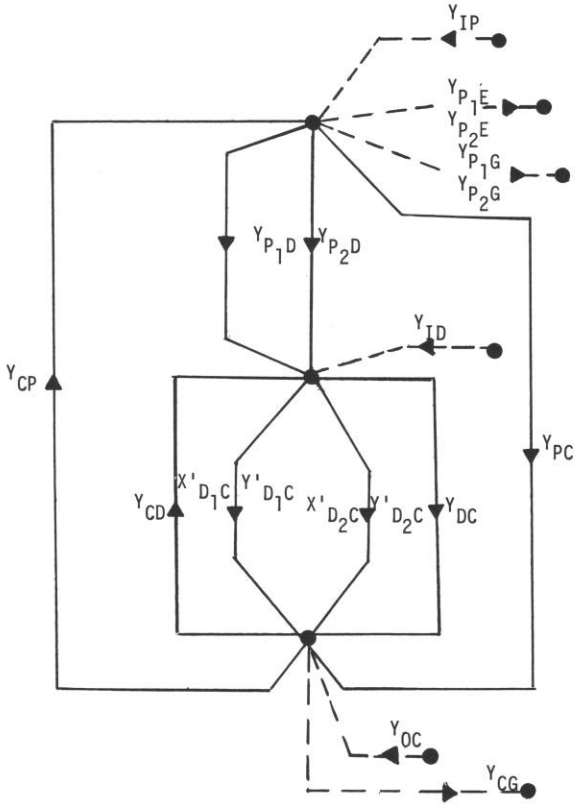


Figure 8.10

Systems Graph



Y_{ID} are assumed to be known. The two propensity variables listed above may be expressed as functions of known terminal variables or known variables such as those in the set $[X'_{32}, X'_{33}, X'_{34}, X'_{37}, X'_{38}, X'_{39}]$. The functional relationship would be expressed, in all cases, with some set of parameters used to develop the three component models; there were twenty-three parameters used.

There are ten variables which can be expressed as functions of known variables; the six system flow variables, the two system propensity variables, and two terminal variables, Y_{IP} and Y_{ID} .

Two system flow variables, Y'_{D_1C} and Y'_{D_2C} , and two system propensity variables, X'_{D_1C} and X'_{D_2C} are of greatest interest. All of the other system variables can be expressed as functions of these variables.

Making the Model Operational

Identifying each parameter and putting estimates based on the chosen initial year, 1963, is a task that did not begin when the model was completed, but rather, the mutual process of model building, identification and estimation proceeded together. The parameters and the source of their estimation is discussed below.

Figure 8.11 shows the systems variable values estimated from 1963 Puerto Rican experience. The details of the flow estimates within each sector and the estimation of terminal variable are discussed below. The overall estimates employed in the model are shown in the next three figures. Figure 8.12 shows the values estimated for flows in the production sector; Figure 8.13 details the distribution sector and Figure 8.14 shows the consumption sector.

The estimation of price and units of food and nonfood consumption goods passing through the distribution sector is deferred until the other parameters are estimated.

Some of the values for the defined flow variables shown in Figures 8.11, 8.12, 8.13, and 8.14 were estimated in a fairly direct manner. The value of imports into Puerto Rico in 1963 are reported as \$1,195.7 million:³⁷ \$671.1 million are classed as raw materials, intermediate goods, and capital goods, and \$488.6 million as consumer goods.³⁸ Assuming that raw materials, intermediate goods, and capital goods are used by the production sector, the values

³⁷1963 *External Trade Statistics* (San Juan: Bureau of Economic and Social Analysis, Planning Board, Commonwealth of Puerto Rico, 1965), pp. 1-72 and 76-166. The individual codes are too numerous to list. Both Table 1, reporting imports from the United States to Puerto Rico, and Table 2, reporting imports to Puerto Rico from foreign countries must be considered.

³⁸*Ingreso y Producto, Puerto Rico 1964* (San Juan: Planning Board of the Commonwealth of Puerto Rico, 1965), p. 50.

Figure 8.11

Estimated System Variable Values in 1963

(Dollars in Millions)

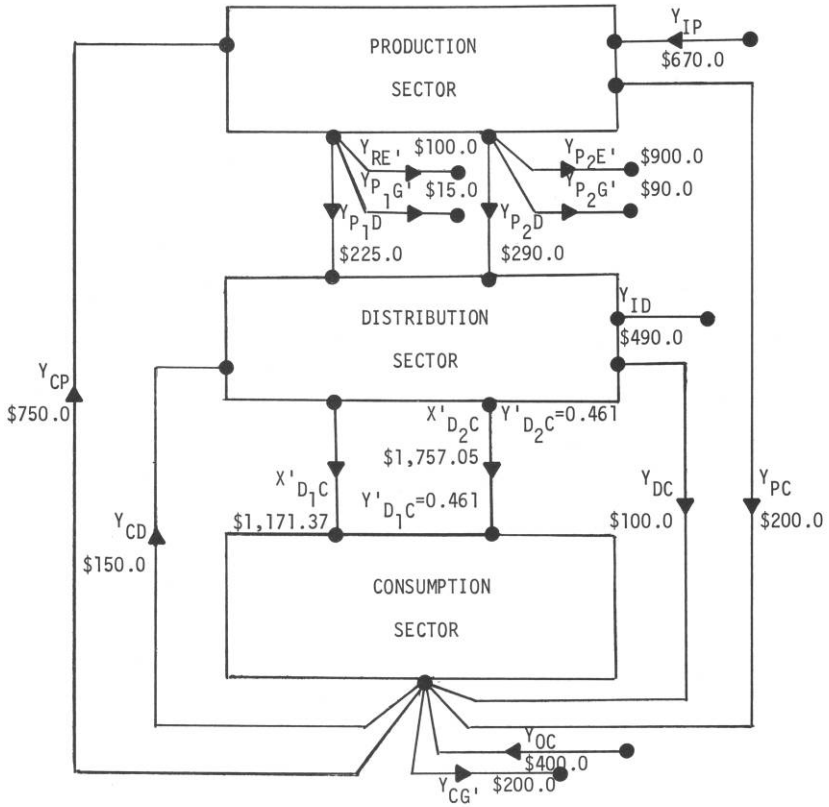


Figure 8.12

Estimated Variable Values: Production Sector
(Dollars in Millions)

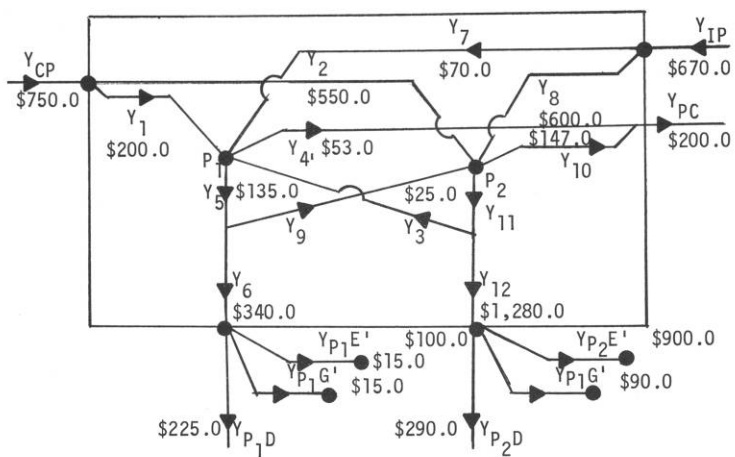


Figure 8.13
 Estimated Variable Values 1963: Distribution Sector

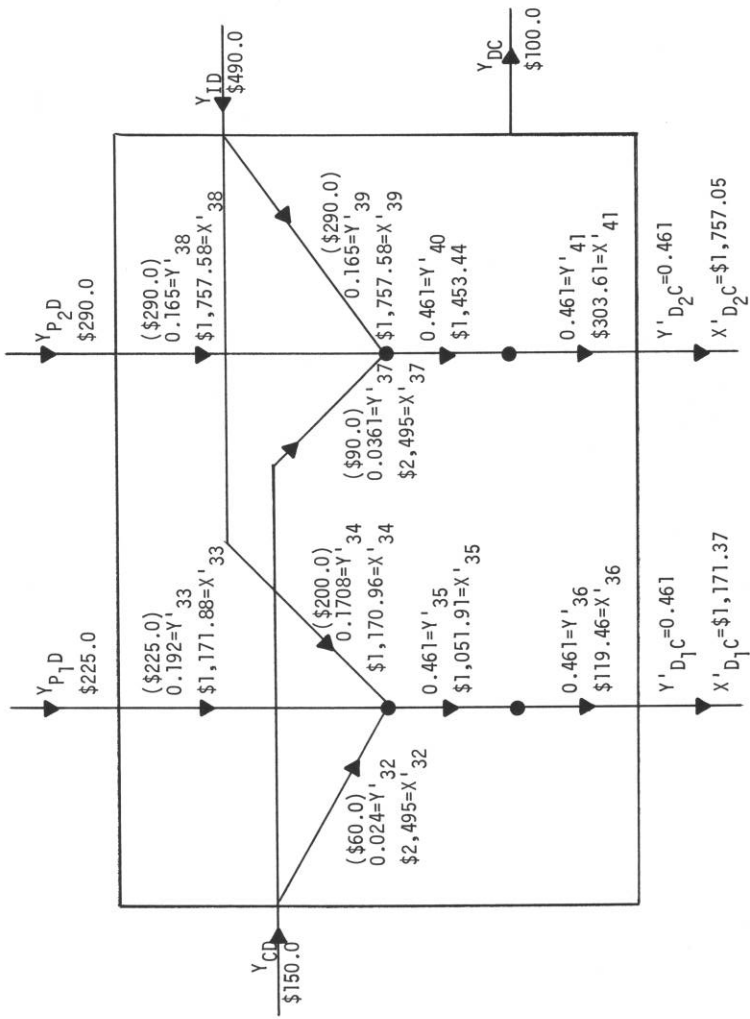
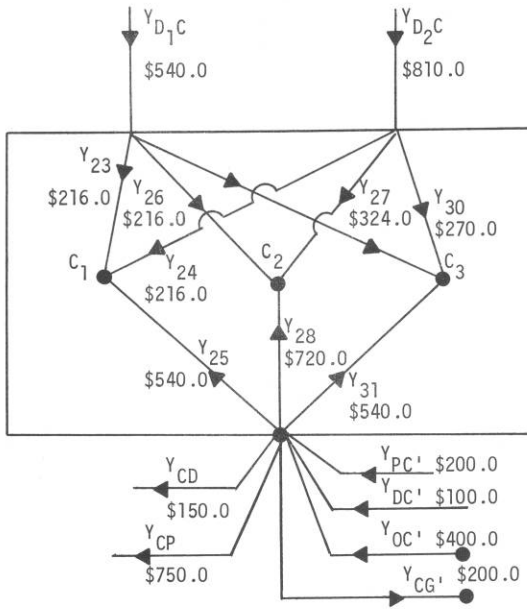


Figure 8.14

Estimated Variable Values, 1963: Consumption Sector



of Y_{IP} and Y_{ID} are approximated as \$670.0 and \$490.0 million respectively.

Of the \$488.6 million in consumer goods imports, \$201.1 million are classed as food, and the balance, \$287.5 million, as nonfood.³⁹ Nonfood items included autos (\$43.3), electrical appliances (\$35.4), other consumer durables (\$35.6), alcohol and tobacco (\$19.0), and other consumer nondurables (\$154.2). The values of Y_{15} , food imports to distribution, and Y_{20} , nonfood imports to distribution are approximated as \$200.0 million and \$290.0 million respectively.⁴⁰

Splitting \$670.0 million worth of imports between the two production subsectors presents a more difficult task since the destination of imports is not reported.

The definition used for the food production subsector is such that it would include what is normally thought of as the agricultural sector and a portion of the "food and kindred products" classification of the manufacturing sector (S.I.C. code 20). The manufacturing concerns included within the food production subsector are meat processing plants (S.I.C. 201), dairies (S.I.C. 202), canning plants (S.I.C. 203), grain mills (S.I.C. 204), bakery plants (S.I.C. 205), candy plants (S.I.C. 207), and miscellaneous foods and kindred products (S.I.C. 209). Excluded from the food production subsector, yet contained within the food and kindred products classification of the manufacturing sector, are sugar refining and alcoholic beverage plants; this exclusion is made to match the commodity classifications used in both the distribution and consumption sectors of the model.

By scanning the import data, an approximate value of \$70.0 million is assigned to the food production subsector. Included in this estimate are the import values of such items as unmilled rice (\$26.9), fodders and feeds (\$6.8), agricultural machinery (\$1.7), and fertilizers (\$2.4). The values of Y_2 and Y_8 are approximated as \$70.0 million and \$600.0 million respectively.

Determining the values for the parameters associated with the consumption sector involves the use of many sources of data. The first estimates of parameter values for the consumption sector are derived from data on consumption and income patterns obtained in a 2,648 household survey conducted by the Department of Labor of Puerto Rico; the data was collected in 1964 and covered income and expenditure information for all of 1963.⁴¹

Reported data is regrouped into income classifications of high (\$7,500 and over per year), medium (\$3,000 to \$7,499), and low (less than \$3,000)

³⁹*Ibid.*, p. 50.

⁴⁰*Ibid.*, p. 50.

⁴¹*Ingreso y Gastos de Las Familias - 1963* (San Juan: Bureau of Labor Statistics, Department of Labor, Commonwealth of Puerto Rico, 1967), p. 111.

income per family.⁴² Income distribution percentages are obtained by summing the reported incomes (average family income times the number of families) within the three income ranges and dividing by the total income (average family income for all families times the total number of families). Income distributions (d_1 , d_2 , d_3) for the high, medium, and low income categories are computed as 28.7 percent, 39.9 percent, and 31.4 percent respectively.

For determining the percentages of total income by income group spent on food and on nonfood, the reported expenditure data by income group is used.⁴³ The value of total food expenditures for each income group is determined and that value divided by the total income computed for the income group. The percentages of income spent on food (f_1 , f_2 , f_3) for the three income groups are computed as 21.0 percent, 31.1 percent, and 43 percent for the high, medium, and low income groups respectively.

The percentage of income spent on nonfood by income groups is obtained by first summing expenditures on selected nonfood items for each income group and then dividing by the total income for the income group. Nonfood expenditures included expenditures on items defined in the study as clothing, house furnishings, transportation, alcoholic beverages and tobacco, personal care, and recreation. The percentages of income spent on nonfood items (n_1 , n_2 , and n_3) for the high, medium, and low income groups are computed as 43.2 percent, 42.3 percent, and 36.1 percent, respectively.

To arrive at the values for the consumption sector parameters actually used requires introducing values determined for Y_{D_1C} , the value of food consumed, Y_{D_2C} , the value of nonfood items consumed, and I , total income.

For a given value of I , the values of the nine parameters for the consumption sector dictate what the values of Y_{D_1C} and Y_{D_2C} will be. It is important to note that a change in the value of any of the three income distribution parameters or the six percentage expenditure parameters alters the relationship between Y_{D_1C} and Y_{D_2C} and total income, I . Shifting a higher percentage of income to the lower income group will, for example, increase food consumption as a percentage of total income, since the lower income group expends a

⁴²*Ibid.*, p. 5. The income groups of less than \$1,000, \$1,000 to \$1,999, and \$2,000 to \$2,999 were defined as "low"; income groups of \$3,000 to \$3,999, \$4,000 to \$4,999, and \$5,000 to \$7,499 were defined as "medium"; the income group of \$7,500 and over was defined as "high".

⁴³*Ibid.*, p. 5. The dollar value of expenditures was obtained as the product of the percentage of average total expenditure and the reported average total expenditures.

relatively higher percentage of its income on food. Determining the values for Y_{D_1C} , Y_{D_2C} and total income, and the nine consumption sector parameters must thus be done simultaneously to arrive at the desired balance.

Three data sources are used to obtain estimates of income and food and nonfood consumption levels. The income and expenditure survey data of the Department of Labor provides one source, the Census of Business and the Census of Manufactures combines to provide a second, and Ingreso Y Producto a third source.

In Ingreso Y Producto, food consumption expenditures are reported as \$498.7 million for 1963. Nonfood expenditures, including expenditures on alcoholic beverages and tobacco, clothing and accessories, personal care, household operations, transportation, and recreation, equaled \$1,018.4 million. Ingreso Y Producto reported income as \$1,927.0 million.

Using the income distribution and consumption expenditures parameters obtained from the survey data and the value of \$1,927.0, values of \$619.0 and \$782.6 million respectively for food and nonfood consumption, Y_{D_1C} and Y_{D_2C} , are obtained.

The census information from businesses and manufacturers can also be used to obtain approximate values of Y_{D_1C} and Y_{D_2C} . Retail sales of food stores and eating and drinking places to the general public are reported as \$391.1 million.⁴⁴ Withdrawals by the owners of these establishments are reported as \$15.7 million.⁴⁵ Wholesalers in the groceries and related products trade reported selling \$11.9 million to the general public and withdrawing \$0.2 million for personal use.^{46 47} The manufacturers in the food and kindred products classification, defined previously as part of the food production subsector, reported to have sold \$32.2 million directly to consumers.⁴⁸ By summing, a value of sales equal to \$451.1 million is obtained. Although some nonfood sales are included, the estimate of \$451.1 million is used to approximate food sales; it does not include the value of sales of agricultural products not sold through those firms reporting in either census.

By subtracting the above estimate of \$451.1 million for Y_{D_1C} from the total reported sales and withdrawals for manufacturers, wholesalers, and

⁴⁴*Census of Business, 1963* (Washington: U.S. Department of Commerce, 1965), p. 28.

⁴⁵*Ibid.*, p. 29.

⁴⁶*Ibid.*, p. 18.

⁴⁷*Ibid.*, p. 18.

⁴⁸1963 *Census of Manufactures*, p. 38. The sum of the appropriate industry data under the column header "Domestic Consumers."

retailers of \$1,241.5 million, an estimate of \$790.4 million for Y_{D_2C} of non-food items reported as sales to consumers is obtained.⁴⁹

Estimates arrived at from the Department of Labor survey are \$1,508.8 million for income, \$494.9 for food expenditures, and \$611.1 for expenditures on the selected nonfood items.⁵⁰

Each of the above sources provides different values for Y_{D_1C} , Y_{D_2C} , and I . It is necessary to obtain a workable balance between these figures and the values for the nine parameters as obtained from the survey material. The values of Y_{D_1C} and Y_{D_2C} actually used are \$540.0 million and \$810.0 million respectively with a value of \$1,800.0 million for income. The percentages of income spent on food and upon the specified nonfood items are thus 30% and 45% respectively.

The values for the terminal variables Y_{CG} and Y_{OC} are obtained from information in Ingreso y Producto. The government is reported to have compensated employees \$244.5 million;⁵¹ the value for Y_{CG} is estimated as \$200.0 million. The value of other income sources is computed as \$445.1 million;⁵² this would include wage income from households and nonprofit institutions (\$45.3 million), wage income from the "rest of world" (\$114.0 million), transfer payments (\$260.8 million), rent income (\$101.4 million), minus contributions to social insurance (\$48.3 million). The value for Y_{OC} is estimated as \$400.0 million.

The Census of Business reports an annual payroll of \$150.5 million for wholesale and retail firms.⁵³ This value is taken as an approximation of Y_{CD} . The total wage bill is split in direct proportion to the estimated throughput (\$540.0 and \$810.0 million) of the two distribution subsectors and the values for Y_{13} and Y_{18} computed.

The Census of Manufactures reports sales to wholesalers and retailers of \$287.2 million;⁵⁴ this value excludes sales to wholesalers and retailers of the previously defined food and kindred product group classified within the food production subsector. The value of Y_{P_2D} is estimated as \$290.0 million.

⁴⁹The value of \$1,241.5 million is equal to the total values of sales as reported on the same pages in the sources footnoted in 46, 47, and 48 above.

⁵⁰*Ingresos y Gastos de Las Familias, op. cit.*, p. 31. Income is "average income" times "total number of families" and the food and nonfood expenditure values were obtained by summing reported expenditures by income group.

⁵¹*Ingreso y Producto, op. cit.*, p. 25.

⁵²*Ibid.*, p. 27.

⁵³*Census of Business 1963, op. cit.*, p. 12. The sum of annual payroll to wholesale trade and retail trade.

⁵⁴1963 *Census of Manufactures, op. cit.*, p. 48.

The food and kindred product subgroup from the Census of Manufactures defined within the food production subsector reported sales to wholesalers and retailers of approximately \$126.1 million.⁵⁵ An approximate value of \$100.0 million represents agricultural value to distribution. The \$100.0 million estimate is derived by subtracting an estimated \$135.0 million and \$48.0 million from a \$293.0 million estimate of agricultural output valuation;⁵⁶ the \$125.0 million is for sugar cane, tobacco, and coffee which is assumed to move to the nonfood production sector and the \$48.0 million is for the reported value of agricultural exports excluding sugar, molasses, alcohol, and malt beverages.⁵⁷ ⁵⁸ The sum of \$126.1 and \$100.0 is used to obtain an estimated value of \$225.0 million for Y_{P_1D} .

The values for Y_{16} and Y_{21} are most difficult to estimate. Ingreso Y Producto reports \$326.4 million in income generated by unincorporated business profit, partnerships, and dividends;⁵⁹ no indication of source is given. On an arbitrary basis, \$200.0 is estimated as generated from within the production sector and \$100.0 from within the distribution sector.

The \$100.0 million valuation for Y_{DC} is split between the food and nonfood distribution subsectors on a proportional basis to total sales; Y_{D_1C} and Y_{D_2C} . The values are estimated as \$40.0 and \$60.0 million respectively.

Four of the six terminal variables are associated with the production sector; Y_{P_1E} , Y_{P_1G} , Y_{P_2E} , Y_{P_2G} . The estimated values for Y_{P_1G} and Y_{P_2G} , \$15.0 million and \$90.0 million, are obtained from the reported sales to the government and "other" in both the Census of Business and the Census of Manufactures. Reported sales of \$8.3 million and \$7.4 million to the government are obtained from these sources for food; \$64.5 million and \$32.3 million are reported for nonfood sales.⁶⁰ ⁶¹

The estimated value of food exports, Y_{P_1E} , is \$100.0 million; this value is estimated from a reported export value of \$48.3 million for certain agricultural products and \$54.5 million in reported value of exports from the food

⁵⁵*Ibid.*, p. 48.

⁵⁶Commonwealth of Puerto Rico, Department of Agriculture and Commerce, *Facts and Figures on Puerto Rico's Agriculture*, 1963.

⁵⁷*Ibid.*

⁵⁸1963 *External Trade Statistics*.

⁵⁹*Ingreso y Producto*, *op.cit.*, p. 27.

⁶⁰*Census of Business 1963*, *op.cit.*, p. 18.

⁶¹1963 *Census of Manufacturers*, *op.cit.*, p. 48.

industries in the Census of Manufactures.^{62 63} The estimated value of nonfood exports, Y_{P_2E} , is \$900.0 million; this value is estimated from \$168.8 million reported value of exported sugar and alcoholic beverages and \$742.2 million which is reported as export from manufacturers in the Census of Manufactures.^{64 65}

By definition, the value for Y_6 is the sum of Y_{P_1D} , Y_{P_1G} , and Y_{P_2E} . The values for Y_6 and Y_{12} are thus \$340.0 and \$1280.0 million respectively.

The value for Y_5 , \$475.0 million, is the sum of Y_6 and Y_9 . Considering only the value of the principal crops of sugar cane, tobacco, and coffee, Y_9 is estimated as \$135.0 million, is the sum of Y_{12} and Y_3 . The value Y_3 , \$25.0 million, is approximated from the product of the ratio of purchases of the agricultural sector from all sectors to the total sales of the agricultural sector as reported in the 1963 Input-Output Table and the value of Y_5 .⁶⁷

Total wages reported by the productive sectors of the economy, excluding that generated by the trade or distribution sector, is reported in Ingreso Y Producto as \$799.0 million.⁶⁸ Summing the value of wages as reported in the Census of Manufactures, wages reported by service industries within the Census of Business, and the reported wages of the agricultural, construction and mining, transportation, and financial sectors as reported in Ingreso Y Producto yields \$619.1 million.^{69 70 71} The value of \$750.0 million is used for Y_{CP} . Split in direct proportion to the total output of the food production subsector and the nonfood production subsector yields approximate values of \$200.0 and \$550.0 million for Y_1 and Y_2 respectively.

Determining numeric values of the flow and propensity variables of the distribution sector is a difficult problem. As discussed previously, both of these variables are scalars; the flow variable Y'_{D_1C} , for example, represents

⁶²1963 External Trade Statistics, *op. cit.*

⁶³1963 Census of Manufactures, *op. cit.*, p. 440.

⁶⁴1963 External Trade Statistics, *op. cit.*

⁶⁵1963 Census of Manufactures, *op. cit.*, p. 440.

⁶⁶Commonwealth of Puerto Rico, Department of Agriculture and Commerce, *Facts and Figures on Puerto Rico's Agriculture*, 1967.

⁶⁷1959-60 Input-Output Table, Puerto Rico Planning Board, Commonwealth of Puerto Rico.

⁶⁸*Ingreso y Producto*, *op. cit.*, p. 25.

⁶⁹1963 Census of Manufactures, *op. cit.*, p. 22.

⁷⁰Census of Business 1963, *op. cit.*, p. 13.

⁷¹*Ingreso y Producto*, *op. cit.*, p. 25.

a unit of flow of a variety of food items whose normal physical units of measure are pounds, dozens, quarts and cases.

Establishing some measure of "units" and "unit value" is, of course, essential. The following approach is used in evaluating the parameters associated with the distribution sector.

The dollar value figures approximated for Y_{D_1C} and Y_{D_2C} , the dollar value of food and selected nonfood items consumed, are used as a basis to derive both per unit, Y' , and price per unit, X' , estimates.

The values of Y_{D_1C} and Y_{D_2C} are estimated as \$540.0 and \$810.0 million respectively. These values represent estimates of the expenditures of individuals and families within the socio-economic system for the year 1963 as measured by the summation of all purchases; each purchase being valued as the product of some price per unit times the number of units purchased. How many units of each item were purchased at different prices by each family is unknown.

There were approximately 461,000 families in Puerto Rico in 1963.⁷² As estimated, these families, in total, spent approximately \$540.0 million on food and \$810.0 million on selected nonfood items. By defining a "unit" as the package of goods an average family purchases in a year, values can be derived for the defined variables and, thus, the parameters of the distribution sector.

Assuming that 461,000 units of food were purchased, the value of Y'_{D_1C} equals 0.461 million units. Since the product of Y'_{D_1C} and X'_{D_1C} equals \$540.0 million, the value of X'_{D_1C} can thus be computed as \$1,171.96 per unit. The price per unit of the nonfood items can be computed as \$1,757.58 per unit in a similar manner.

The values of Y'_{D_1C} and Y'_{D_2C} could have been arbitrarily set at any values and the values of X'_{D_1C} and X'_{D_2C} computed accordingly. Faced with the necessity to establish some valuation procedure, the choice of units is made to reflect some usable base or reference figure. The values of both Y'_{35} and Y'_{36} equal Y'_{D_1C} ; 0.461 million. The values of both Y'_{40} and Y'_{41} equal Y'_{D_2C} ; 0.461 million.

The price per unit of labor, \$2,495, is obtained from the Census of Business by dividing the annual payroll value by the number of employees reported.⁷³ The values of X'_{32} and X'_{37} are assumed to be equal and thus \$2,495 is the value assigned to both of these variables. The number of units associated with these two variables are obtained by division; Y'_{32} equals \$60.0 million divided

⁷²*Ingresos y Gastos de Las Familias*, Puerto Rico, 1963, p. 5.

⁷³*Census of Business 1963, op. cit.*, p. 12.

by \$2,495 or 0.024 million units, and Y'_{37} equals \$90.0 million divided by \$2,495 or 0.0361 million units.

For the flow variables Y'_{33} , Y'_{34} , Y'_{39} , the number of units are estimated from the values determined for Y'_{D_1C} and Y'_{D_2C} . For example, the ratio of the value of food imports, \$200.0 million, to the value of Y'_{D_1C} , \$540.0, is 0.3704. Since 0.3704 times 0.461 million units equals 0.1708 million units, the value of Y'_{34} is set equal to 0.1708 million units. The values of Y'_{33} , Y'_{38} , and Y'_{39} are established in the same manner.

If Y'_{34} equals 0.1708 units, X'_{34} equals \$1,170.96 per unit; \$200.0 million divided by 0.1708. The values of X'_{33} , X'_{38} , and X'_{39} are established in a similar manner.

It is most important to stress the fact that no single source nor any rigid sequence of steps is used to arrive at an estimated value for a flow variable. Values are sought from source documents, rounded, altered, and balanced against each other to arrive at a relatively consistent and balanced set of values.

Once the value of each propensity variable is determined, the parameters k_{32} , k_{33} , k_{37} , k_{38} , and k_{39} can be obtained by simple division. The parameter k_{33} , for example, equals 0.192 million units divided by 0.461 million units or 0.4165. The values for all of the technical coefficient parameters are determined in like manner; the resultant values are given below in Table 8.1.

TABLE 8.1 PARAMETER VALUES OF TECHNICAL COEFFICIENTS

Production Sector			
$a_1 = 0.421$	$a_3 = 0.053$	$b_4 = 0.112$	
$a_7 = 0.421$	$a_9 = 0.103$	$b_{10} = 0.113$	
Distribution Sector			
$k_{32} = 0.052$	$k_{33} = 0.416$	$k_{34} = 0.370$	$m_{36} = 0.114$
$X'_{32} = 2495.00$	$X'_{33} = 1406.26$	$X'_{34} = 1170.96$	$b_1 = 0.074$
$k_{37} = 0.078$	$k_{38} = 0.358$	$k_{39} = 0.358$	$m_{41} = 0.209$
$k_{37} = 0.078$	$k_{38} = 0.358$	$k_{39} = 0.358$	$m_{41} = 0.209$
$X'_{37} = 2459.00$	$X'_{38} = 1757.58$	$X'_{39} = 1757.58$	$b_2 = 0.074$
Consumption Sector			
$d_1 = 0.300$	$f_1 = 0.400$	$n_1 = 0.400$	
$d_2 = 0.400$	$f_2 = 0.300$	$n_2 = 0.450$	
$d_3 = 0.300$	$f_3 = 0.200$	$n_3 = 0.500$	

The values for X'_{35} and X'_{40} must be determined prior to establishing the values for the "mark up" parameters, m_{36} and m_{41} . The parameter m_{36} is the percentage of the imputed cost of one unit of food which is added to the imputed cost to arrive at the value of X'_{D_1C} , the price per unit for food to the consumption sector. The variables X'_{35} and X'_{40} are defined as "imputed cost"; they equal the summations of the products of the price per unit of an input and its technical coefficient k . Using the values for the per unit prices of inputs (X'_{32} , X'_{33} , X'_{34} , X'_{37} , X'_{38} , and X'_{39}) and the technical coefficients (k_{32} , k_{33} , k_{34} , k_{37} , k_{38} , k_{39}) as derived above, X'_{35} and X'_{36} are computed to be \$1,051.91, and 20.92 percent, \$303.61 divided by \$1,453.44, respectively.

A computer program was written to obtain a simultaneous solution to the final sets of equations relating the values of the system variables to the parameters and terminal variables. With the computer program and the reference set of values for the model's parameters and terminal variable, the model is operational.

Sensitivity Tests and Simulation

Two types of techniques are used in testing and application of the model, sensitivity analysis and simulation. In sensitivity analysis, the value of a single parameter is altered and the response of the system variables recorded. The term simulation is used to describe the condition where more than one parameter will be altered at a time and the response of the systems variables recorded.

Sensitivity Analysis - The response of the systems variables are studied in relation to changes in the values of five parameters associated with the food distribution subsector of the distribution sector; m_{36} , k_{32} , X'_{32} , k_{33} , X'_{33} .

Table 8.2 records the values for the specified system variables, total income, and the products $X'_{D_1C}Y'_{D_1C}$ and $X'_{D_2C}Y'_{D_2C}$, for five different values of the parameter m_{36} .

The reference value of m_{36} is 0.144 or 11.4 percent. The reference value is increased and decreased by 20 percent in increments of 10 percent. Runs 1, 2, 3, 4, and 5, identified in Table 8.2, record results for percentage changes from the reference value of m_{36} of +20.0 percent, +10.0 percent, 0.0 percent, -10.0 percent, and -20.0 percent respectively. Run 3 is, of course, the reference run. The values of all other parameters and terminal variables are held constant and equal to their reference values.

A decrease in the value of m_{36} results in increases in the values of all system variables except the price per unit of food, which decreases, and the price per unit of non-food, which remains constant.

TABLE 8.2 THE SIMULATED IMPACT OF DISTRIBUTION MARGIN (M36)
CHANGE (SENSITIVITY ANALYSIS)

	Incr. Food Margin 20%	Incr. Food Margin 10%	1963 Base Vals.	Redc. Food Margin 10%	Redc. Food Margin 20%
$X'_{D_1C}Y'_{D_1C}$	537.93 ¹	538.45	540.02	540.28	541.57
$X'_{D_2C}Y'_{D_1C}$	789.11 ¹	806.89	808.64	810.39	812.15
Y'_{D_1C}	0.450 ²	0.455	0.461	0.466	0.472
Y'_{D_2C}	0.460 ²	0.461	0.461	0.462	0.463
Y_{P_1D}	219.7 ¹	222.2	224.8	227.5	230.3
Y_{P_2D}	289.4 ¹	289.8	290.3	290.7	291.2
Y_{CP}	747.4 ¹	748.7	750.1	751.5	752.9
Y_{PC}	199.3 ¹	199.6	200.0	200.4	200.8
Y_{CD}	147.1 ¹	147.9	148.7	149.6	150.4
Y_{DC}	99.6 ¹	99.8	99.9	100.1	100.2
I	1793.4 ¹	1796.0	1798.7	1801.5	1804.3
X'_{D_1C}	1195.4 ³	1183.4	1171.4	1159.4	1147.4
X'_{D_2C}	1754.1 ³	1754.1	1754.1	1754.1	1754.1
m_{36}	0.136 ⁴	0.125	0.114	0.102	0.091

¹Millions of dollars (1963).

²Millions of units.

³Dollars (1963).

⁴Unitless.

For ease of analysis, Graph 8.1 records the percentage changes for selected variables; Y'_{D_1C} , X'_{D_1C} , Y'_{D_1C} , X'_{D_1C} , and I .

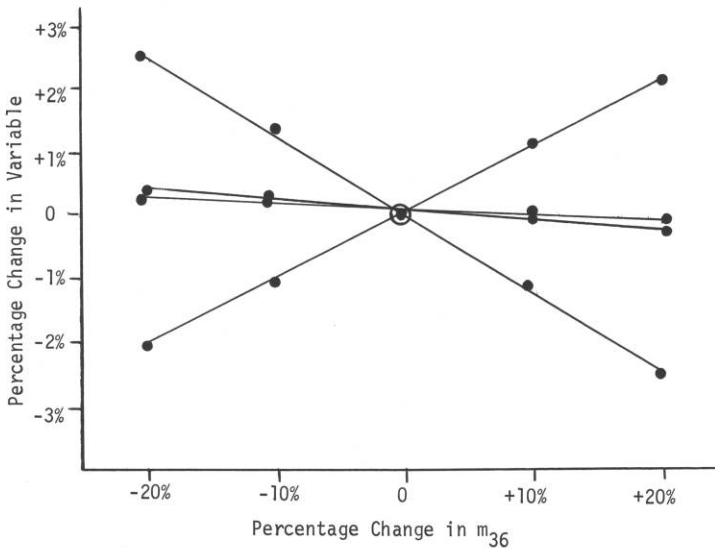
Lowering the margin, the value of m_{36} , lowers the price per unit of food, X'_{D_1C} . Under the assumptions of the consumption sector component model, the three consumer subsectors purchase an increased volume of physical units, Y'_{D_1C} , given the lower price and the same total income, I .

Income does not remain constant, however, because of the model's response to increases in the value of Y'_{D_1C} . Increasing the value of Y'_{D_1C} causes more units of labor, Y_{CD} , and more units of input from the food production subsector, Y_{P_1D} , to be required by the food distribution subsector. Increasing Y_{P_1D} also requires that more labor, Y_{CP} , be supplied to the food production subsector. Nonwage income is also increased for both subsectors due to the increase in dollar volume throughput.

With a higher level of income, both wage and nonwage, the three consumer subsectors spend an increased amount on food and nonfood items according to the income distribution and average consumption expenditure coefficients for food and nonfood items. Increases in the level of demand cause further increases in the values of the flow variables throughout the system.

Graph 8.1

Sensitivity Analysis: m_{36}



Of interest to note is the order of magnitude of certain changes. Graph 8.2 shows that a 20 percent reduction in m_{36} results in an approximate 2 percent decrease in the price per unit of food and a 2.4 percent increase in the number of units of food consumed. A 0.3 percent increase in income and total dollars spent on food is recorded. The increase in the unit consumption of food is due both to a decrease in food price per unit and an increase in total income.

The marketing significance of this sensitivity test should be underscored. In Chapter 4 a comparison of prices in modern large-scale supermarkets were shown to be lower than in competing smaller stores. This price difference was for many products in excess of the 2 percent studied in the sensitivity analysis. The total income-increasing effect of 0.3 percent in response to a 2 percent food price reduction suggests the order of magnitude of development gains from marketing efficiency changes.

Table 8.3 records the values of the specified variables corresponding to five different values for the parameters X'_{32} and k_{32} ; the price per unit of labor to the food distribution subsector (and the ratio of labor to output of the food distribution subsector).

The marketing significance of changes in these parameters merits mention. A change in distribution labor cost would be reflected directly in food price changes and wage income changes; other responses are not so evident. Changes in the structure of retailing, have been shown in Chapter 4 to reflect the kinds of changes in use of labor that k_{32} parameter changes would produce. Thus, while it is unrealistic to expect only one of these factors to change at one time, it is useful to see the pattern of probable effects, all at one time.

The reference value of X'_{32} is \$2,495 and the reference value of k_{32} is 0.063. These values were altered by 20 percent above and below their reference values in increments of 10 percent. The reference values are given in Run 3. The model's responses to these changes are identical in magnitude and direction since the effect on imputed cost, X'_{35} , and thus the price of output, X'_{D_1C} , will be the same for an identical percentage change in either the price per unit value or the technical coefficient of any input.

Decreases in the value of either k_{32} or X'_{32} cause some very interesting reactions. The price per unit of food decreases, of course. The level of income, I , decreases, yet of the four sources of income whose values change, Y_{CP} , Y_{PC} , Y_{CD} , Y_{DC} , two increase in value, Y_{CP} and Y_{PC} , and two decrease in value, Y_{CD} and Y_{DC} .

The unit consumption of food increases while the unit consumption of non-food decreases. Total dollars spent on both food and nonfood decrease.

TABLE 8.3 THE IMPACT OF DISTRIBUTIVE WAGE CHANGE AND DISTRIBUTION
LABOR COSTS (PARAMETERS k_{32} and X'_{32})

	Increase Wage Cost And Labor Use By 20%	Increase Wage Cost And Labor Use By 10%	1963 BASE VALUES	Decrease Wage Cost And Labor Use By 10%	Decrease Wage Cost And Labor Use By 20%
$X'_{D_1C}Y'_{D_1C}$	542.54 ¹	540.77	540.02	538.00	535.83
$X'_{D_2C}Y'_{D_2C}$	813.9 ¹	812.15	808.64	806.89	805.13
Y'_{D_1C}	0.452 ²	0.456	0.461	0.465	0.469
Y'_{D_2C}	0.464 ²	0.463	0.461	0.460	0.459
Y_{P_1D}	220.7 ¹	222.7	224.8	227.0	229.1
Y_{P_2D}	291.9 ¹	291.1	290.3	289.4	288.5
Y_{CP}	749.0 ¹	749.5	750.1	750.6	751.2
Y_{PC}	199.7 ¹	199.9	200.0	200.2	200.3
Y_{CD}	159.9 ¹	154.3	148.7	143.0	137.2
Y_{DC}	100.5 ¹	100.2	99.9	99.6	99.3
I	1809.1 ¹	1804.0	1798.1	1793.4	1788.0
X'_{D_1C}	1200.3 ³	1185.9	1171.4	1157.0	1142.5
X'_{D_2C}	1754.1 ³	1754.1	1754.1	1754.1	1754.1
k_{32}	0.063 ⁴	0.057	0.052	0.047	0.042
X'_{32}	2994.90 ³	2744.50	2495.00	2245.50	1999.60

¹Millions of dollars.

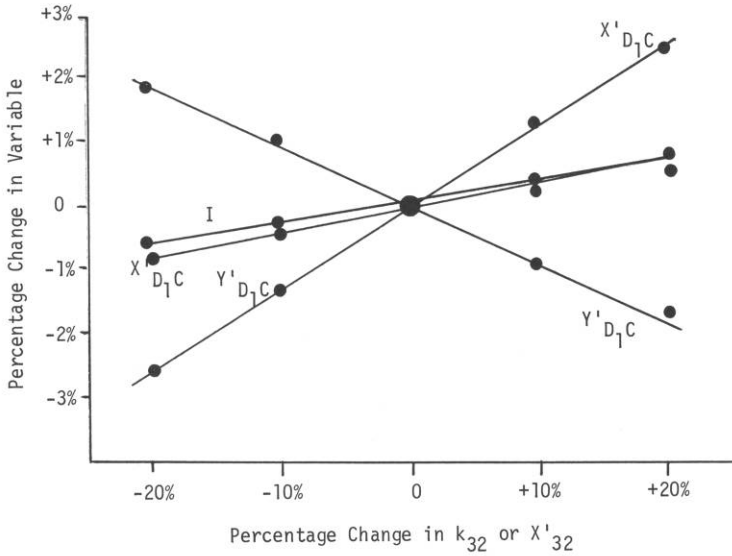
²Millions of units.

³Dollars.

⁴Unit/unit.

Graph 8.2

Sensitivity Analysis: Distribution Wage Rate
 k_{32} and Wage Costs of Distribution X'_{32}



Graph 8.2 shows the percentage changes in selected variables; Y'_{D_1C} , X'_{D_1C} , Y'_{D_1C} , X'_{D_1C} , and I . These variables were chosen to allow for comparison with the previous graph.

As the figures in Table 8.2 indicate, some interesting response patterns exist for changes in the input price, X'_{32} , or technical coefficient parameter, k_{32} . In fact, two opposing responses are set in motion when either of these parameters are altered.

Consider a reduction in the per unit cost of labor, X'_{32} , or in the technical coefficient for labor, k_{32} . Lowering either value lowers the imputed cost and thus the price of food to consumers, X'_{D_1C} . Lowering the value of X'_{D_1C} , if no other changes are involved, would cause a change similar to that described above for reductions in m_{36} ; all of the systems flow variables would increase in value. Lowering either value, X'_{32} or k_{32} , has another effect, however; it lowers the wage income generated by the food distribution subsector for a given unit level of food consumption. This reduction causes a reduction in income and a subsequent reduction in consumption if no other changes are involved.

The net effect of these two opposing responses are given by the results shown in Table 8.3. The reduction of food price, X'_{D_1C} , caused an increase in per unit consumption of food, Y'_{D_1C} , which more than offsets the decrease in per unit consumption of food caused by a decrease in income. Note that the per unit consumption of nonfood decreases as would be expected with a constant per unit price, X'_{D_2C} and lower income, I .

It is extremely interesting to note the wage and nonwage income response pattern. Total wage and nonwage income generated by the production sector increases; with constant wage rates, the increase in wage generation from the food production subsector caused by the increase in demand for food, Y_{P_1D} , more than offsets the reduction in wage generation by the nonfood production subsector caused by a reduction in nonfood demand, Y_{P_2D} . In the distribution subsector, wage generation decreases; a portion of the reduction is caused by the decrease in demand for nonfood and the remainder is caused by the reduction of wage rates to the food distribution subsector even with a higher per unit labor requirement.

The need for a model is clearly demonstrated in this sensitivity test. While the reaction of the model to changes in m_{36} is perhaps directionally predictable, such is not the case in the reaction of the model to a change in either k_{32} or X'_{32} .

Table 8.4 records the values for the specified variables corresponding to five different values for either X'_{33} or k_{33} ; the price per unit of food from production to distribution or the ratio of food units from production to distribution to food units from distribution to consumption. The reference value of X'_{33} is \$1,171.88 and the reference value of k_{33} is 0.416; these are shown in the third column of Table 8.4. Each reference value is increased and decreased by 20 percent in increments of 10 percent.

When either k_{33} or X'_{33} is lowered, total income and dollar expenditures on food and nonfood decrease. Food consumption on a per unit basis increases while nonfood consumption decreases. This result is analogous to that of the previous test. Three of the four sources of income shown, Y_{CD} , Y_{PC} , Y_{CD} , and Y_{DC} , differ in their directional response to a change in either X'_{33} or k_{33} , however, when compared with their response to a change in either X'_{32} or k_{32} .

Graph 8.3 shows the percentage changes in variables for comparison with the previous graphs. The percentage increase in Y'_{D_1C} , for example, is higher for a 20 percent decrease in X'_{33} or k_{33} than for X'_{32} or k_{32} , or m_{36} .

As in the previous sensitivity run, the two opposing responses to a change in an input price or a technical coefficient are netted out by the model. The

TABLE 8.4 THE SIMULATED IMPACT OF CHANGES IN THE PRICES OF FARM AND OTHER FOOD PRODUCTION PRICES k_{33} AND CHANGES IN THE EFFICIENCY OF FOOD DISTRIBUTION (X'_{33})

	20% Increase in Costs	10% Increase in Costs	1963 Base Data	10% Decrease in Costs	20% Decrease in Costs
$X'_{D_1C} Y'_{D_1C}$	542.76 ¹	541.80	540.01	537.33	535.60
$X'_{D_2C} Y'_{D_2C}$	813.90 ¹	812.15	808.64	806.89	803.38
Y'_{D_1C}	0.424 ²	0.442	0.461	0.481	0.504
Y'_{D_2C}	0.464 ²	0.463	0.461	0.460	0.458
Y_{P_1D}	248.4 ¹	237.1	224.8	211.5	196.9
Y_{P_2D}	292.0 ¹	291.2	290.3	289.3	288.2
Y_{CP}	761.3 ¹	755.9	750.1	743.7	736.6
Y_{PC}	203.0 ¹	201.6	200.0	198.3	196.5
Y_{CD}	144.5 ¹	146.5	148.7	151.1	153.8
Y_{DC}	100.5 ¹	100.2	99.9	99.6	99.2
I	1809.3 ¹	1804.3	1798.7	1792.7	1786.1
X'_{D_1C}	1280.1 ³	1225.8	1171.4	1117.1	1062.7
X'_{D_2C}	1754.1 ³	1754.1	1754.1	1754.1	1754.1
k_{33}	0.500 ⁴	0.450	0.416	0.375	0.333
X'_{33}	1406.26 ³	1289.07	1171.88	1054.69	937.50

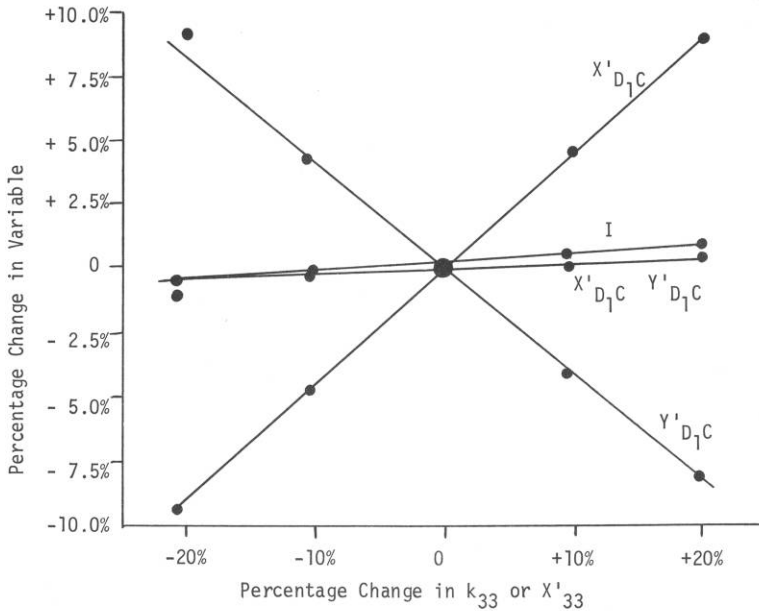
¹Millions of dollars.

²Millions of units.

³Dollars.

⁴Unit/unit.

Graph 8.3
Sensitivity Analysis: k_{33} and X'_{33}



interesting difference between the sensitivity runs for X'_{33} and k_{33} , and X'_{32} and k_{32} , is the difference in the magnitudes of the responses and the direction of change in the components of total income.

In response to decreases in both X'_{33} and k_{33} , income generated by the production sector decreases as does nonwage income generated by the distribution sector; wage income generated by the distribution sector increases, but not enough to prevent a decline in total income. In response to decreases in X'_{32} and k_{32} , all income changes, except nonwage income generated by distribution, are in opposite directions. In both tests, a decline in total income occurs.

The reduction in the price of food, X'_{D_1C} , is more dramatic for a change in X'_{33} or k_{33} , than for the same percentage change in X'_{32} or k_{32} since the portion of total imputed cost incurred for internally produced food is higher than that incurred for labor; imputed cost and price is thus more noticeably influenced and the model reacts more noticeably to the change.

Simulating Marketing Reform Consequences

Three simulation tests are reported below. While these three tests in no way exhaust all of the possible tests, they are sufficient to demonstrate the approach and, in a limited way, deal with the policy issue of offsetting gains and losses in marketing reform.

A word of caution is in order as actual simulations are presented. The reader should be cautioned from placing undue reliance on the model simulations. Many other elements not explicitly modeled may in fact distort the results of reforms. The functional relationships specified in our model are not explicitly tested. The assumption that average propensity will persist when prices are changed means, of course, that we assume marginal consumption propensity is consistent with the disaggregated average propensities of the three income groups.

Table 8.5 records the values of certain system variables corresponding to five different sets of values for k_{33} and k_{34} . The parameter k_{33} is the ratio of unit inputs into the food distribution subsector from the food production subsector to the unit output of the food distribution subsector, and the parameter k_{34} is the ratio of unit inputs into the food distribution subsector from other socio-economic systems to the unit output of the food distribution subsector. The parameter k_{33} was altered in a sensitivity test in the previous section.

The sum of k_{33} and k_{34} is held constant for the five sets of parameter values recorded in Table 8.5. The recorded values for Run 1 are approximately equal to the reference values as used in the sensitivity runs, that is 1963 Base year values; they have been rounded for ease of reporting.

As the ratio of k_{33} (Production) is decreased relative to k_{34} , (imports) Run 1 to Run 5, or as more units of input to the food distribution subsector are required from external sources relative to internal, the values of the system flow variables decrease. Food and nonfood consumption decreases as does total income and dollars spent on food and nonfood.

In the above simulation run, the price remains fairly constant because the total number of input units required is held constant, the sum of k_{33} and k_{34} , and because the prices per unit of these inputs are approximately equal. Under these two conditions, the imputed cost and thus the selling price is fairly constant.

The marketing significance of these simulated substitution changes in imports for local production are an explicit test of the "National Market" concept described in earlier chapters. Substitution of domestic production for imports does increase income. There is a subtlety to the matter that must be observed; namely, import substitution can be a benefit if local production is

TABLE 8.5 THE SIMULATED IMPACT OF INCREASING IMPORTS WHILE
REDUCING INTERNAL PRODUCTION OF FOODS

	Run 1	Run 2	Run 3 1963 Base year values	Run 4	Run 5
$X_{D_1C} Y_{D_1C}$	543.0 ¹	540.6	539.5	538.3	537.11
$X_{D_2C} Y_{D_2C}$	813.9 ¹	812.2	810.4	806.9	805.1
Y'_{D_1C}	0.462 ²	0.460	0.459	0.458	0.457
Y'_{D_2C}	0.464 ²	0.463	0.462	0.460	0.459
Y_{P_1D}	238.0 ¹	232.0	226.1	220.1	214.3
Y_{P_2D}	291.8 ¹	291.1	290.4	289.7	289.0
Y_{CP}	756.6 ¹	753.6	750.6	747.7	744.7
Y_{PC}	201.8 ¹	201.0	200.2	199.4	198.6
Y_{CD}	149.3 ¹	148.9	148.6	148.2	147.9
Y_{DC}	100.4 ¹	100.2	100.0	99.7	99.5
I	1808.1 ¹	1803.7	1799.4	1795.0	1790.7
X'_{D_1C}	1175.4	1175.3	1175.3	1175.3	1175.3
X'_{D_2C}	1754.1 ³	1754.1	1754.1	1754.1	1754.1
k_{33}	0.44 ⁴	0.43	0.42	0.41	0.40
k_{34}	0.34 ⁴	0.36	0.37	0.38	0.39

¹Millions of dollars.

²Millions of units.

³Dollars.

⁴Unit/unit.

not *too much less* efficient than imported production. The simulation provides a useful framework for examining these tradeoffs, and the relative prices of domestic to imported products a basis for evaluating the options. In this illustration, prices were kept constant and equal.

We must ask now what consequences would likely ensue if large-scale marketing reforms were instituted. The general systems simulation of Puerto Rico provides a means of assessing the consequences of reforms in market processes which have complex effects, for example, income generating effects of price reductions and income reducing effects of wage reductions due to the employment consequences of technological changes.

For sake of illustration, two further programs of reform are simulated in their impact upon the modeled market processes of Puerto Rico. These reforms, while hypothetical, are designed to approximate the order of magnitude of changes found in the development experience of Puerto Rico. Both reforms require investment of about \$4 million spread over three years. In both cases the reforms develop a 4.3 percent margin reduction for food distribution. An 8 percent reduction in distribution wage costs is planned for the first simulation. It is assumed that the reduction is due to expanding the number of supermarkets and reducing the labor cost associated with wholesale and retail distribution.⁷⁴ The second program envisions the same distribution margin change. However, wage costs would be reduced by only 4 percent as a shift to indigenous production implies increased local handling of food products throughout the channel. Technical coefficients change very slightly to expand local food production (even though unit price is higher) and reduce imports by a like amount. This latter trade-off of production for imports affects local demand through increased local incomes. It is assumed that vertical coordination would be encouraged and import restrictions would be adjusted to take advantage of expanded domestic production at constant prices.

The performance indicators of the two simulations presented in Table 8.6 show the differing results. The first shows effects of merely modernizing retailing. The second shows a more balanced internal market integration process.

The construction investment would expand the economy during the period of building. The \$4 million investment in the first case of modernizing the distribution sector would gain \$2.2 million in income before the wage-reducing effects set in and ultimately cut dollar income by \$3.2 million at the end of five years.

⁷⁴ John R. Wish, *Economic Development in Latin America*, an annotated bibliography (New York: Frederick A. Praeger, 1965), pp. 124 ff.

TABLE 8.6 PERFORMANCE INDICATOR RESPONSES TO MARKET-INTEGRATING REFORMS

FIFTH YEAR LEVEL OF CHANGES DUE TO REFORMS

PERFORMANCE INDICATORS	1963 Puerto Rico Base Year Values	FIFTH YEAR LEVEL OF CHANGES DUE TO REFORMS	
		4.3% Margin Reduction 8% Dist. Wage Cut	4.3% Margin Reduction 4% Dist. Wage Cut 1% Increase in Production 1% Decrease in Imports
Real food consumption*	461,000	467,000 +1.0%	465,000 +0.8%
Real non-food consumption*	461,000	461,000 --	461,000 --
Producers' shipment of food	\$224,800,000	\$227,600,000 +1.0%	\$227,900,000 +1.1%
Producers' shipment of non-food	\$290,300,000	\$289,700,000 -0.3%	\$290,200,000 0.05%
Wages of production workers	\$750,000,000	\$751,000,000 +0.05%	\$751,400,000 +0.1%
Non-wage income from production	\$200,000,000	\$200,300,000 +0.15%	\$200,400,000 +0.2%
Wages of distribution workers	\$148,700,000	\$144,400,000 -3.0%	\$146,800,000 -1.0%
Non-wage income from distribution	\$ 99,900,000	\$ 99,700,000 -0.2%	\$ 99,900,000 --
Income of community	\$1,798,600,000	\$1,795,400,000 -0.1%	\$1,798,500,000 --
Price of one year's food supply	\$1,170.30	\$1,153.90 -1.5%	\$1,159.70 -1.0%
Price of one year's non-food supply	\$1,754.10	\$1,754.10	\$1,754.10 --

* Units are the number of families who can be provided a year's food or non-food consumption needs at the average level of the 1963 base period.

The market integrating actions, plus the same distribution reforms, would recoup \$2.3 million in dollar income prior to the reduction in dollar income of only \$100,000.

In gross dollar terms these may or may not be attractive reforms, but we must look at the price changes and demand changes as well as the effects on wage and non-wage income of production and distribution sectors.

Table 8.6 shows the performance indicator changes related to the two reform programs. In both cases food consumption would be increased. Production of food would increase; wages and profits (non-wage income) would rise too. Distribution wages would fall substantially in the first reform.

In both reforms food prices would decline relatively, allowing additional amounts of income to be devoted to non-food consumption or savings, which must be calculated outside the model.

We have in this limited illustration of the application of the general systems model of Puerto Rico ignored some refinements which can and should be incorporated in application such as population trends, income level, distribution trends, and other changes external to the forces under examination.

The earlier model of marketing efficiency improvements in the Galbraith and Holton study suggest important savings due to rationalizing the wholesale and retail food marketing system. The three models studied of limited service, credit retailers and credit plus delivery retailers are assessed in conjunction with wholesaling at 15 percent margin as well as an 8 percent margin. Savings ranged from 15 million dollars or 9.3 percent of C.T.C. up to 33 million dollars or 18.9 percent of C.T.C. This analysis assumed only current best practice and no significant supermarket or modern wholesaling programs.⁷⁵

These reforms recommended add up to a real income increase with mild deflation. Given the inflationary forces pressing most developing economies, these kinds of reforms appear to have substantial importance. However, distribution modernization is not as rewarding as a more balanced internal market process modernization and market integration.

Suggested Research to Improve Simulation Application to Marketing Development

Four areas are suggested for further research efforts in the field of general system modeling of market processes. First, it is suggested that improvements be made in the model itself. The assumptions made about the behavior of the defined sectors of the model need to be improved; in the same vein, the sectors of the model need to be treated in a more disaggregated form.

⁷⁵Galbraith and Holton, *op. cit.*, p. 122 ff.

Second, it is suggested that the data collection and measurement problems be addressed in greater detail. A systems model needs information on the actual flow pattern of goods. Current information sources report little on actual flow paths nor is data presented in both unit and price per unit terms. Further research into the types of measurement definitions usable for the flow and propensity variables needs to be conducted.

Third, the problem of the valuation of the costs incurred in a specific parameter change or set of parameter changes needs to be considered. The cost of altering certain parameters must certainly be viewed as part of the problem in evaluating the results of a marketing change.

Fourth, it is suggested that future models developed be more directly usable by those in a decision-making capacity. This would involve, perhaps, greater ease in altering parameter values and interpreting results.

CHAPTER 9

SUMMARY, CONCLUSIONS AND SUGGESTED APPLICATION OF FINDINGS

Introduction

The first part of this chapter summarizes some of the highlights of the Puerto Rican experience in attempting to modernize their food marketing system as part of a more general program of economic and social development. Some of the successes and shortfalls of their efforts are noted and suggestions are offered for further efforts to improve market performance. The second part of the chapter considers the relevance of the Puerto Rican experience to other developing communities, especially in Latin America. Some of the principal issues and hypotheses concerning the role of food marketing in economic development are identified and discussed in relation to the Puerto Rican experience. The chapter concludes with some suggestions for organizing marketing improvement programs in other developing communities.

Summary and Conclusions Concerning Changes in the Puerto Rican Food Marketing System

During the fifteen year period 1950 to 1965, Puerto Rico enjoyed unusual political stability and a rapid rate of economic development. Governor Muñoz Marin had become the first popularly elected governor of the island in 1948 and was instrumental in obtaining "Commonwealth" status in 1952. Between 1950 and 1965 per capita real income in Puerto Rico doubled and by 1965 it was approaching an average level of \$900 per person.

During this fifteen year period of rapid economic and social change consumers improved their diets by shifting away from starchy foods toward more high protein foods (meat, milk, eggs) and certain fruits and vegetables. At the same time the percentage of income spent for food by the average Puerto Rican family declined from 42.5 percent in 1953 to 32.8 percent in 1963.

In 1950 most of the food was retailed through small *colmado* type stores carrying relatively few products and operating on relatively wide margins. Plaza markets and specialized food stores handled most of the perishable foods. Wholesaling was also small scale and high cost. Credit was an important dimension to the wholesale-retail system and added to the final cost to consumers.

By 1965, approximately 40 percent of the retail food sales in the San Juan area were made through modern supermarkets and much of the remaining food sales were made through smaller but relatively modern neighborhood food stores. These rather remarkable changes in the food distribution system were encouraged and assisted by public efforts.

The political commitment to improve the Puerto Rican food distribution system was an important part of the more general social reform movement that emerged with the Popular Democratic Party. This reform gathered support in the late 1930's under the leadership of Luis Muñoz Marín who became the charismatic leader of a sustained program of social and economic progress. Through Operation Bootstrap, industrial development and tourism became important growth points in the Puerto Rican economy during the period 1945-1965.

Modernization of food marketing was seen by political leaders as a means to reduce food costs to the low-income people that made up the bulk of the population and as one of the amenities that would help attract mainland businessmen and technicians that were needed to help organize industrial plants and tourist facilities.

Following a relatively unsuccessful attempt at public ownership and operation of several large retail food stores (1946-51) the Governor of Puerto Rico brought in several consultants from the mainland to direct studies of the food production-distribution system and to make recommendations for action programs to improve the performance of this segment of the island's economy. In 1954 a high level Food Advisory Commission was appointed by the Governor to review these various studies and to come up with an action program to reduce food costs and to improve marketing services.

During the period 1950-65 a series of public actions were undertaken to modernize the food system (see Chapter 2). These were formulated and carried out within the context of a more general program of planned economic development that gave heavy emphasis to the government's role as a fomenter of private enterprise. Governor Muñoz was the central political figure who gave direction to this program. He was ably supported by individuals such as Teodoro Moscoso and several competent young men who carried out responsible roles in planning and program implementation. Outside consultants were frequently used in laying the groundwork for development activities.

The public efforts to improve the performance of the food system included programs of research, education and technical assistance. Complementary programs were instituted to improve the coordination of food production, distribution and consumption activities. Since Puerto Rico was importing more than one-half of its food supply there was an important concern over the institutional arrangements and the physical handling facilities for food products moving from mainland U.S. sources through wholesaling firms in the San Juan port area and on to retail stores.

Direct public investments were made in a wholesale food marketing facility in the San Juan port area, several plaza type markets in urban centers and a livestock slaughtering and meat processing plant. The government also took an active role in conducting a feasibility study and helping arrange the land

purchase and financing of modern grain handling facilities in the San Juan port area.

The efforts to improve the food distribution system also included training, direct technical assistance and credit incentives to food marketing firms; new rules and regulations to improve market coordination and to protect the interests of consumers; and public programs to provide marketing information and services that would not likely be provided by private enterprise.

A relatively large food distribution program was organized by the Economic Development Administration. The purpose of this program was to introduce modern methods of food retailing and wholesaling to Puerto Rico. The general strategy was to foster a competitive set of food wholesaling and retailing units with large supermarkets serving as a lead element in bringing about change. Countervailing institutions were to be fomented including retailer-owned wholesaling firms, voluntary chains and a federation of consumer cooperative food stores. A group of food marketing specialists was employed by the Economic Development Administration to implement this strategy through educational and technical assistance activities. Special credit incentives were also arranged to stimulate changes in retailing and wholesaling.

The urban consumers of San Juan readily accepted the more modern supermarket type of retail food outlet. Retail advertising and a public information program for consumers facilitated the shift in shopping patterns. However, the higher income, younger and better educated homemakers were the quickest to shift to the supermarket type food outlets.

In spite of the public efforts to assist local retailers they were slow in adopting more modern practices. The entry of supermarkets operated by outsiders (mostly mainland U.S.) provided a lead element in the process of change and served to demonstrate new methods of food distribution. The EDA food marketing specialists found it particularly difficult to foment the organization of a viable retailer-owned wholesaling operation or a voluntary chain. Major barriers to the organization of affiliated retailer groups seemed to be the unwillingness of existing retailers to work together; their credit ties with existing wholesalers and a lack of financial records to support loan applications to other credit sources. Another major barrier to changes in the wholesale system was the exclusive dealership arrangements under which most of the canned goods and other processed foods from mainland U.S. food manufacturers were entering Puerto Rico. The legality of this trade practice had been questioned many times but no official action had been taken by federal or commonwealth agencies to change this situation. On the contrary, the commonwealth legislature enacted a law in 1964 to reinforce the position of exclusive dealerships of existing food importers.

The larger food chains such as Grand Union and Pueblo were able to circumvent the entrenched food wholesalers by shipping directly from mainland food warehouses to San Juan using trailer ship service. This has tended to erode the position of traditional food dealers. Nevertheless, small retailers who handle more than two-thirds of the island's food supply still must deal mostly with the limited line and relatively high cost traditional wholesale system.

The delay in construction of the Central Wholesale Market until 1964 hampered the rationalization of the Puerto Rican food distribution system during the critical period when efforts were being made to create larger scale wholesale units with affiliated retailers. Had this facility been available earlier it might also have played a more important coordinating function in aligning retailer demand with sources of supply for locally produced fruits and vegetables. In retrospect it would appear greater effort probably should have been exerted to foment effectively coordinated production-distribution systems for local produce. The large supermarkets found it easy to obtain uniform high quality fruits and vegetables from mainland sources. Thus, the backward vertical coordination of the supply system for local products was relatively neglected, a condition which could not have been tolerated if there had not been easy access to outside supply sources. An exception has been the organization of a coordinated production-distribution system for eggs which linked producer groups with supermarket buyers. A few sporadic attempts have been made by Pueblo Supermarkets and Grand Union to develop local supply systems for other products, but with limited success.

Quite apart from the EDA program to modernize food retailing and wholesaling a program was being carried forward to improve the coordination of the fluid milk production, processing and distribution system. The milk regulation program set prices and stabilized producer-processor relationships. Milk handling practices were also made more stringent to protect the consumer. As a result the market was stabilized; producers adopted output expanding, cost reducing technologies, and consumers received relatively steady supplies of clean milk at reasonable prices. This was a distinct change from a rather chaotic market situation that preceded the milk program. The milk regulation has been strongly supported by the major participants in the milk system -- producers, processors, and consumers.

The lack of effective market coordination in the production and distribution of most fruits and vegetables is in sharp contrast to the milk and egg programs mentioned above. Various attempts have been made to institute cooperative marketing organizations, but at the time this study was conducted only a few of these could claim much success.

Suggestions for Further Changes in Puerto Rican Food Marketing System

Several suggestions for public action to improve food marketing were discussed with Puerto Rican officials at the completion of the field work for this study. Only the more general suggestions that seem particularly important on the basis of a re-evaluation of the Puerto Rican situation are presented in this report.

In retrospect it now seems clear that the potential benefits of food marketing modernization have not yet been fully realized in Puerto Rico. Although much of the food now moves through more modern outlets, more than one-half of the food still moves through relatively small, more or less traditional neighborhood stores. Supermarkets and modern superettes are continuing to take over an increasing share of the retail food business and are spreading from San Juan to other cities on the island.

Nevertheless, food prices could probably be further reduced if local retailers could compete more effectively with the leading food chain, Pueblo Supermarkets. The Pueblo organization has achieved a relatively high level of operational efficiency through their integrated wholesale-retail activities and large scale operations. Their net profits have been relatively high and no competitor has yet compelled them to take a lower margin (see Chapter 4). It should be noted, however, that these profits were being largely reinvested in additional food distribution facilities in Puerto Rico. Furthermore, both Pueblo and Grand Union have benefited consumers through lower food prices, a larger assortment of high quality foods and indirectly through the competitive effects on other food retailers.

The original strategy for modernizing urban food distribution in Puerto Rico anticipated the need for a workably competitive market structure. The EDA program objectives called for the development of affiliated groups of local retailers and a federation of consumer cooperatives as effective competitors for corporate supermarkets.

Further efforts seem to be needed to implement the original EDA strategy to create an effectively competitive food distribution system. Three related reforms are suggested:

- 1) Strict enforcement of equal pricing laws -- either the federal Robinson Patman Act or the Puerto Rican Act No. 77 (June 25, 1964) to give Puerto Rican food wholesalers and retailers more equal access to mainland processed foods (see Chapter 5).
- 2) The repeal or amendment of the "brokers" law (Act No. 75, June 24, 1964) which tends to perpetuate the exclusive dealerships enjoyed by some of the existing importers-wholesalers (see Chapter 5).

- 3) Foster the further development of a voluntary chain such as the Almacen Central group and/or the Cooperative Federation.

The first two suggested reforms should enable a voluntary chain or the Cooperative Federation to achieve lower costs of food products delivered from the mainland U.S. These cost reduction possibilities coupled with an efficient, large scale wholesale warehouse and a closely coordinated group of retail stores might then be more effective competition for Pueblo and Grand Union. A technical assistance and supervised credit program would be needed to develop the retail outlets necessary to support an efficient wholesaling operation. It should be noted that the total Puerto Rican food market is too small to support many efficient sized wholesale-retail food operations. (Puerto Rico, with its central city of San Juan, is a market comparable in size to one in Milwaukee, Wisconsin or Denver, Colorado.)

This study has shown that the modern supermarket food outlets are more readily available to medium and upper income families than to lower income families. Thus, it is suggested that public efforts to improve food retailing give special attention to low income areas. Supervised credit, technical assistance and tax advantages could be used to develop more modern outlets affiliated with a voluntary chain group. Also, the University of Puerto Rico consumer information program that has been relatively effective in reaching middle and upper income homemakers should give increased attention to low income groups. This may require greater use of inter-personal communication channels rather than the mass media.

If the suggestions made above were carried out there would be a substantial change in the structure and operating characteristics of food wholesaling. This would alter the physical location of wholesaling activities as small, limited line wholesaling firms in the old San Juan pier area were replaced by larger, full-line wholesalers located either in the Central Wholesale Market area or other locations. (Both Pueblo and Almacen Central have located large warehouses in the Carolina area which is a considerable distance from the Central Market.)

It was observed earlier that easy access to mainland U.S. food sources supported the rapid growth of supermarkets without the constraint of having to develop local production-distribution systems. The continuing unemployment problem in Puerto Rico and the need to shift land from sugar cane to other labor intensive crops points up a need for further efforts to develop vertically coordinated production-distribution systems for fruits and vegetables. The shortcomings of the existing fruit and vegetable production-distribution system were examined in Chapter 6, and compared to similar but much better coordinated systems for milk and eggs.

The modern supermarkets and superettes need stable supplies of uniform, high quality fruits and vegetables. These retail demands should be effectively linked with local production. Some of the larger supermarket organizations have produce buyers that have been attempting to stimulate local production through contracts or less formal agreements. Efforts of this type should be reinforced by public efforts to organize producer associations patterned after the egg producer association. Through the combined efforts of the Agricultural Experiment Station, the Extension Service, and the Department of Agriculture, additional fruit and vegetable production and marketing associations could be organized or existing associations strengthened. Additional feasibility studies are needed to identify opportunities where fruit and vegetable processing operations could be successfully introduced as the principal coordinator of production. In some instances the processing operation might be a market stabilizer for products that can also be sold in fresh form to local wholesalers and retailers. Concurrently with the activities described above there should be further public effort to improve grades and standards for fruits and vegetables and to provide a reasonable set of trading regulations to reduce risks for producers, processors, wholesalers and retailers. Workable forward contracting arrangements should also be promoted.

Relevance of the Puerto Rican Experience to Other Areas

There are ample grounds to challenge the transferability of the Puerto Rican effort to modernize their food marketing system to other developing communities. The Commonwealth of Puerto Rico is an integral part of the United States political and economic system and as such enjoys the advantages, and perhaps some of the disadvantages of free trade relationships with mainland U.S. The island Commonwealth participates in a variety of federal programs which bring significant net transfers of goods and services to the Puerto Rican economy. During a period of rapid economic advancement the population pressures within the island were eased by migration to the mainland, mostly to New York City. Another important and rather unique feature of the island was the stable, reform-oriented government widely supported by the island citizenry and lead by a trustable, charismatic leader with assistance from competent public officials. Since many of these conditions may not exist in other developing communities, one can voice doubts about the transferability of Puerto Rican development experiences and in this case the approach to modernizing food marketing.

On the other hand, one can argue that many of the social, cultural and economic conditions which existed in Puerto Rico prior to the reform program of the Popular Democratic Party were similar to the conditions that now exist in many Latin American communities. For one thing there is a common

Spanish cultural background. Furthermore, the level and distribution of income in Puerto Rico in the early 1940's was similar to the income conditions which now exist in many areas of Latin America. Also, the food distribution system that existed in Puerto Rico in this earlier period closely resembled some of the structural and institutional patterns now found in several Latin American urban centers.

Acknowledging the similarities and differences between the Puerto Rican situation and other Latin American communities it seems reasonable to argue that the basic procedures for fomenting food marketing changes could be followed elsewhere. The political and bureaucratic procedures were as follows:

- 1) In the Puerto Rican case there was a strong and sustained commitment of political leaders to the need for an improved food system as part of a more general social and economic development program.
- 2) The political leaders commissioned qualified experts to help local technicians study and diagnose the shortcomings of the existing food system and offer concrete recommendations for action programs to improve market performance.
- 3) A high level advisory committee was appointed by the top political leader to review, modify and adapt the recommendations of the consulting experts. This committee included private sector as well as public sector leaders. Some of the consulting experts also participated in the committee's discussions.
- 4) Follow-up action was taken by political leaders and by public officials to implement the advisory committee's recommendations.

In Puerto Rico the concern of the top political leaders preceded the diagnostic studies and program recommendations. In some communities preliminary studies and consultant evaluations may be necessary to generate the high level political concern that must precede substantive policy changes and initiation of marketing reform programs.

The political-economic viewpoints which served as the frame of reference for the formulation and administration of Puerto Rican economic development programs may also be a useful guide in other developing communities. The central views regarding the role of the public sector in market organization that seemed to prevail were as follows:

- 1) A central function of the public sector should be to serve as a catalyst in fomenting private sector activities that are desired by the community. Feasibility studies, credit, tax policies, and technical assistance were seen as major tools for fomenting private sector development.

- 2) Public regulations should be used when rules are needed to insure equitable and reasonably stable relationships among market participants.
- 3) The public sector should provide services which are essential to effective coordination of marketing systems when these services are not likely to be effectively provided by the private sector, e.g. market information, research and extension.
- 4) The public sector should finance investments in market infrastructure such as roads, and selected food distribution facilities, but should not become a direct participant in food wholesaling and retailing functions.

This set of viewpoints leaves a broad range for public decision-making. It does, however, differ significantly from the strong anti-middleman viewpoints which seem to undergird policies of direct intervention in food marketing activities in many Latin American countries.

The Puerto Rican strategy for fomenting a workably competitive urban food distribution system may also be transferable to other communities. This strategy called for the introduction of larger scale, more effectively coordinated wholesaling and retailing units offering a larger variety and higher quality products at lower prices than could likely be achieved through traditional small-scale, poorly coordinated wholesale-retail food systems. Modern supermarkets were seen as a lead element in the modernization of the food system with effective competition emerging from an overall structure which included corporate food chains, a federation of cooperative supermarkets and smaller cooperative food stores, a retailer owned cooperative wholesaling organization and/or a voluntary chain organization. The competitive interaction of this mixture of urban food distribution organizations was seen as a means of insuring that cost savings would be passed on to the consumer and back to the farm producer thus reducing the likelihood that excessive profits would be retained by the more efficient food distribution entities.

The Puerto Rican strategy for improving the performance of vertical production-distribution systems for major food commodities also offers some useful ideas for modernizing similar food channels in other communities. The egg program described and evaluated in Chapter 6 illustrated how a combination of public and private efforts brought about substantial changes in production and distribution efficiency including significant improvements in product quality. Critical elements in this program were the efforts of an agricultural extension specialist who served as the catalyst in organizing an egg producer association and who was able to introduce new production technologies along with significant increases in the size of production units and an intergrated program of production and marketing. With the assurance of a contract market

outlet through a large retail food chain the producer association developed an efficient egg assembly and packing facility and a merchandising program for their products. The effectiveness of the merchandising program was enhanced by egg grading and packaging regulations initiated and supervised by the Puerto Rican Department of Agriculture. The egg program benefited producers through higher and more stable incomes, while consumers benefited through lower prices and more dependable supplies of higher quality products. The food retailers benefited from lower costs of procurement and from the dependability of an adequate supply of high quality eggs.

The Puerto Rican milk program demonstrated how chaotic fluctuations in milk prices and supplies and poor product quality could be significantly ameliorated through a rather comprehensive program to regulate prices and milk handling practices administered by a special public agency. Given the oligopoly structure of the milk processing industry the milk program has provided a workable solution to some of the major problems of market organization. Again as in the egg industry, the benefits have accrued to all segments of the industry. Consumers benefited through expanded supplies of a higher quality products delivered regularly at reasonable prices. Processors have been able to operate more efficiently with more stable supplies and a market-wide system of handling temporary milk surpluses without upsetting the market for fresh fluid milk. Producers have benefited by having a dependable market outlet and stable prices.

Issues and Hypotheses Concerning the Role of Food Marketing in Economic Development

A number of theories and viewpoints concerning the role of marketing in economic development were presented in Chapter 1 of this report. We now return to this general arena, after having studied the Puerto Rican situation, to reconsider some of the issues and hypotheses that pertain.

As a general frame of reference we have assumed that the economic development process involves the transformation of a rural, agrarian-based economy to a more urban, industrialized one. As industrialization and urbanization occur, there is increasing specialization of labor and greater dependence on market processes as a coordinator of production and consumption activities.

The food system accounts for a large proportion of total output of goods and services in nearly all economies. In less developed countries more than one-half of the population may be directly employed in food production and distribution. As development proceeds the rural population migrates toward urban centers thus creating a need for a more extensive and complex set of food marketing services.

In many Latin American cities the average family spends 40 to 50 percent of its income for food and the poorer one-half of these families often spend

60 to 80 percent of their income to obtain food supplies. The cost of marketing services varies widely by product and local production-distribution circumstances. But it is not uncommon for urban consumers to spend nearly half of their total food outlay for marketing services -- assembly, processing, wholesaling and retailing. And as agriculture becomes more commercialized, farm families become increasingly dependent upon purchased food, farm production inputs and other industrially produced items that flow from large cities to rural trading centers.

As the income level of the community rises the percentage of total income spent for food declines. However, the demand for improved quality and variety of foods and related marketing services tends to increase with rising income levels. These patterns of adjustment are clearly evident in the Puerto Rican case (Chapter 3). Thus, over time, an increasing proportion of the consumer food outlay tends to go for marketing services and a declining proportion goes to the farm production activity. Nevertheless, the commercial farmer can share the general improvement in income levels if he is able to expand output and increase productivity through the adoption of improved technologies.

One of the most fundamental issues concerning the role of marketing in economic development concerns the dynamics of technological and institutional change. The views of Drucker, Moyer, Collins and Holton were summarized in Chapter 1 (pp. 26-69). More recently the Food and Agriculture Organization of the United Nations has published a report which reinforced the view that marketing is a dynamic force in stimulating economic development. The preface to this report states:

Primitive and high-cost methods of agricultural marketing are incompatible with sustained economic growth and particularly with development of the agricultural economy. An effective marketing sector does not merely link sellers and buyers and react to the current supply and demand situation. It has a dynamic role in stimulating both production and consumption. On the one hand, it activates new demands by improving and transforming farm products and by seeking out and stimulating new customers. On the other hand, it guides farmers to new production opportunities and encourages greater production in response to demand.

In practice, however, the difficulties and complexities of marketing processes and their significance to economic progress have often been underrated, at heavy cost to economic development. Attention in national planning and investment effort has too often focused excessively on production, under the assumption that, once crops are produced and roads and railways built, a marketing structure will spring up almost automatically.¹

¹ Food and Agriculture Organization of the United Nations, "Marketing, A Dynamic Force in Agricultural Development", *The World Food Problem*, Report No. 10, Rome, 1970.

The three case studies of vertical coordination in the Puerto Rican production-distribution system for eggs, milk, fruits and vegetables, summarized in Chapter 6, strongly support this view of the dynamic role of market organization. Here the evidence clearly indicates that institutional arrangements which improved market coordination and reduced market risk stimulated the adoption of new cost reducing technologies, improved product quality and stimulated expansion of output. In both the milk and egg examples the improved arrangements for market coordination involved a combination of public and private efforts to devise new institutions.

The Puerto Rican experience also supports the view that a progressive and efficient marketing system is unlikely to automatically arise through the competitive interactions of firms in the marketplace. Collins and Holton have enumerated several reasons why small marketing firms may be confronted with severe environmental constraints that discourage or prevent them from expanding their businesses and adopting significant innovations (Chapter 1, pp. 27-28). Thus, it appears that the small scale, relatively inefficient food distribution system that existed in Puerto Rico prior to 1950 had limited innovative capacity and that significant public efforts were required to break the low-level equilibrium situation that prevailed. In these efforts to foment improvements in the Puerto Rican food system the evidence supports the hypothesis that individuals from outside the community are likely to be more innovative than the well established local firms.

Another issue centers around the possible dynamic effects of increased productivity in food distribution on effective demand. One hypothesis is that reductions in food prices which accrue from improved food market organization will have a significant stimulating effect on the demand for non-food items and for food as well. The empirical evidence from cross-sectional analyses of consumer expenditure data and comparisons of expenditure patterns over time support this hypothesis (see Chapter 3). The marginal propensities to consume additional consumer goods is very high among the low income families who make up a high proportion of the population in less developed communities. Also, the income redistribution effects of reductions in food prices favor low income families who spend a much higher percentage of their income for food than do higher income families. (These relationships were incorporated into the system simulation model presented in Chapter 8.) The lower income segments in both rural and urban areas stand to gain relative to upper income groups as food prices decline as a result of improved market organization. If this hypothesized set of relationships is correct this suggests that food marketing reform programs should receive serious consideration in communities where many other development policies have a tendency to widen the income gap between the rich and the poor.

But there are those who argue that food marketing reforms, and especially those directed at wholesaling and retailing functions, will have undesirable employment effects. This issue arises on a wide variety of development options involving technological or institutional changes that have the potential of increasing the productivity of human as well as other resources. Much of the technological change in agricultural production has had sizeable effects on employment opportunities in this segment of the economy. Some view this as a desirable phenomena whereby agriculture can release surplus labor that can then be more productively employed in the non-agricultural sector of the economy. If the adjustments occur in this fashion, total national output is increased and human welfare is enhanced. The same rationale can be applied to development programs that increase labor productivity in marketing activities. Unfortunately adjustments in the labor market are not likely to occur without rather serious problems of unemployment and underemployment. Hence, policy makers must continually be concerned with the employment effects of development programs.

The Puerto Rican evidence suggests that urban food marketing reforms can be introduced, yet critical labor displacement effects avoided. It appears that the shift to more modern food marketing methods can proceed in such a way that new distribution institutions can take over the expansion in demand for food marketing services. In the larger Latin American cities the combination of population expansion plus growing incomes gives rise to annual increases in demand for food marketing services of 7 to 10 percent. In Puerto Rico total employment in food distribution remained relatively stable, while output of marketing services per worker was increasing. Even so, there were instances in which new, large self-service markets forced some small food retailers out of business. These small retailers either retired or sought employment elsewhere. In this case those affected did not become politically active in trying to protect themselves from supermarket type outlets. Some of those who remained in the food business became employees in larger, more efficient retail or wholesale firms and probably had higher earnings than they could have achieved by operating small, privately owned food stores.

Although the issue of marketing reform employment effects remains open, it seems reasonable to believe that major improvements in food marketing systems can be successfully initiated without sharp reductions in employment but it would be highly desirable to have alternative employment opportunities for a growing labor force. Some of the alternative opportunities might be created by the increased demand for both food and non-food consumer goods that would result from reductions in food prices. The results of a simulation model of the Puerto Rican economy tended to substantiate that the negative employment effects of modernizing food marketing may be substantially offset by other adjustments within the total system (see Chapter 8).

A Suggested Approach to Food Marketing Reforms in Other Communities

The relevance of the Puerto Rican experience to the organization of marketing improvement programs in other Latin American communities was considered earlier in this chapter. It was argued that the general strategy used in Puerto Rico could be adapted to the needs of other communities. In this concluding statement more specific suggestions will be elaborated which reflect some of the insights gained from an *ex-post* analysis of the Puerto Rican case.

Before outlining specific suggestions it would be useful to project a general diagnosis of the existing food marketing situation in many Latin American communities. Although each community has its own distinctive characteristics there appear to be a number of common difficulties with the organization and performance of their food systems. Generally, the larger cities in Latin America are growing very rapidly, often doubling in size over a period of 12 to 15 years. Existing urban food distribution systems are typically composed of a mixture of many very small neighborhood food stores, some specialized food outlets and a few traditional plaza markets where small scale, highly specialized stall operators are grouped together. To the extent that they exist, larger and more modern food stores are concentrated in high income neighborhoods. The wholesaling functions are relatively small scale and specialized by product. Each day retailers spend large amounts of time assembling small lots of merchandise to be resold through their small stores. As urban centers grow into large cities and eventually into complex metropolitan areas, the traditional small scale and poorly coordinated wholesale-retail food systems become increasingly unsatisfactory. The logistical arrangements become more costly, consumers often receive low quality products and they must spend unreasonable amounts of time shopping for the family food supply. In many instances the undesirable social and ethnic conditions that evolve in traditional wholesale-retail trading areas create pressures for public action to eradicate these markets or at least transfer them to other locations.

At the same time the urban retail-wholesale system may function very poorly as a mechanism for assessing the differential demands for product quality. Hence, the price signals and related market information transmitted back through the vertical commodity assembly systems to farmers may lead to poor alignment of farm production with consumer demands. Meanwhile, at the farm end of the system producers are frequently faced with uncertain product prices, small scale but nevertheless oligopolistic assembly markets, a lack of reliable information on current market conditions, and poor transportation linkages with larger trading centers.

Public policies in marketing in Latin America usually reflect a strong anti-intermediary position on the part of the government expressed through

price regulations, direct intervention in various aspects of product handling and distribution and public support of "cooperative" enterprise. In most cases relatively little emphasis has been directed to fomenting a progressive and efficient private sector in food marketing.

The general diagnosis sketched above cannot apply equally well to all Latin American communities and certainly it does not provide a sufficient basis for the design of a market improvement program for any particular community. But it does provide a general viewpoint as to the nature of the problem.

It seems highly probable that public efforts to improve food marketing systems are likely to be formulated within a rather traditional policy framework and may approach the problem on a piecemeal basis. The results can be costly to the community in terms of uneconomic investments in marketing facilities (central markets, storage and processing facilities). There are a number of examples where such mistakes have occurred. But even more serious and less physically self-evident are the unnecessary costs associated with poorly coordinated markets where public efforts either hamper market operations or fail to provide conditions to facilitate effective market coordination. This serves to emphasize again that the food system is a complex set of interrelated activities.

What specific suggestions follow from this general diagnosis? A basic proposal is that the governments of Latin American countries that desire to undertake major food marketing improvement programs should begin with an assessment of their problem situation. This should be carried out by highly qualified marketing experts in collaboration with a small group of local technicians. The objective of this activity should be to make a preliminary diagnosis of food marketing problems and to prepare a plan of action that would lend to improved market performance. This preliminary assessment should be carried out during a short period of time (2 to 3 months). Support from high level government officials could facilitate this activity. Previous studies, secondary data, direct observation and a few carefully planned in-depth interviews with market participants and public officials would provide the information base for a report which would include a general diagnosis, a strategy for change and specific projects. A preliminary work plan would be provided for each major project. In some instances additional studies may be recommended to further specify the problems and the actions to be taken. Where major investments are to be made in physical facilities, feasibility studies will be necessary as a basis for financial planning. The procedures followed in Puerto Rico for review and adaptation of the proposed marketing improvement program could be followed as a means of getting implementation underway (see p. 276).

There are two fundamental considerations that should underlie a program to improve food marketing. One is that the diagnoses and prescriptions be made within a broad food system framework and secondly that programs and policies be geared to a long-run (5 to 15 year) effort with adequate provisions for monitoring, re-evaluating and program revision as new conditions arise.

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