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FOOD DISTRIBUTION RESEARCH FOR DEVELOPING COUNTRIES*

Martin Kriesberg

United States Department of Agriculture
Foreign Economic Development Service

Research is basic to development.

The importance of research to increase crop production in developing countries is now widely accepted. Less well recognized is the need for research to improve the marketing of these crops. Indeed, in much of the developing world there is very little research on food marketing. Yet food distribution problems are serious impediments to sustaining agricultural growth and overcoming worldwide hunger. Hence, there is need to increase individual and institutional competency for the conduct of marketing research in developing countries.

President Nixon's Foreign Assistance Message to the Congress on September 15, 1970, stressed the importance of helping create research capabilities in the developing countries. This paper is a preliminary effort to identify research needs on food distribution in the developing countries and to explore how the research effort might be organized.

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KINDS OF RESEARCH NEEDED

Many different individuals and institutions are involved in carrying out agricultural marketing activities, - the process by which food crops move from farms to consumers, and are given greater time, place and form utility. Hence, marketing research includes physical and economic analyses, studies on policies and the operation

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of public and private institutions.

The kind of marketing research needed and the manner in which the work may be organized will vary widely among developing countries. Research needs are likely to be related to such factors as: the stage of technology; the extent of urbanization; the level and distribution of incomes; the size of the country and the distribution of its population. Moreover, priorities for marketing research will depend on the goals or objectives set for a country's marketing system. Hence, this paper does not seek to set priorities.

Research needs are discussed under the following heads:

(1) research on market structure and marketing systems;

(2) research on marketing mechanics and operating efficiency;

(3) research on human nutrition and consumer economics;

(4) research on marketing management;

(5) research for market expansion.

Some overlapping of headings and subheadings has been unavoidable.

Perhaps the first order of research would be to "draw a research map" in which different marketing systems or models are associated with developing countries at different stages of development and at different rates of agricultural growth (particularly as this pertains to their ability to feed themselves). The USDA, in cooperation with AID, is now engaged in this kind of analysis.

1. Research on market structure and marketing systems

Most basic among market research needs in developing countries are studies to help understand how marketing systems are organized and operated. This is the starting point for efforts to improve performance.

Within recent years there have been a number of studies by universities under AID contract and by specialists under UN-FAO auspices which described agricultural marketing systems in a number of developing countries, e.g., Colombia, Nigeria, India and Brazil.[1/] These are detailed studies and provide basic information on how different commodities are marketed in low income countries (LICs).

Specific areas in which further research is needed on market structure and on the working of marketing systems in developing countries include the following:

a. Prices and price-setting mechanisms. Knowledge of commodity prices is basic to an understanding of market processes. Many developing countries have now begun the collection and publication of information on commodity prices and on retail food prices. There is need to improve the collection and dissemination of these kinds of data so the information will be more accurate and timely.

The way in which prices are set tells much about market structure. Because the price of food affects the living standard of most people in developing countries directly and decisively, governments have long intervened in the price-setting process for major food commodities. But until very recently, governments of developing countries had little understanding of supply and demand response to their pricing policies. Often price policies designed to hold down food prices for urban workers had the effect of detering increased production which, in turn, lead to scarcities and higher food prices in the cities.

Prices and the ways they are set (in the absence of government involvement) often indicate where the power is in the marketing system and where obstructions to supply or demand adjustments are likely to be encountered. Studies on who gets what in the market system and the interaction between principals to market transactions also suggest where opposition to market reform is likely to be encountered and the nature of the vested interests which will be involved. Hence, investigations along these lines are important in shaping LIC policies and in utilizing external assistance. Cornell University has done a number of studies on grain pricing policies in India under contract with AID.[2/] These studies provide information on prices and insights into the price-making process.

b. Institutions and institutional arrangements. Closely associated with studies of price-setting mechanisms are those concerned with marketing institutions and institutional arrangements. "Institutions" include formal organizations such as cocoa marketing boards and produce cooperatives, and also the informal arrangements which form the marketing matrix in developing countries. Among "informal institutions" or arrangements are the marketdays and the role of market women in central produce markets; another is the reinforcing role of money lenders and first stage middlemen within the different commodity systems. The issues of marketing muscle, of monopoly and monopsony, and the related factors of freedom of entry into market operations need objective study.

Appropriate forms of marketing organizations such as marketing boards, cooperatives, national marketing authorities and private

marketing coporations should be studied in terms of country and commodity needs. What are the strengths and weaknesses of the different organizations in terms of different commodities and the stage of a country's development? What might be appropriate roles for government agencies, private enterprises, and quasi-public corporations in the organization of a country's marketing system? Precise answers to such questions may not be possible but analysis can help delineate alternatives and their relative merits in meeting particular situations. The FAO has published a report on marketing board operations which comes close to a prescription on their use in developing countries.[3/]

Research in these areas needs to be directed toward gaining the insights for shaping public policies to make marketing institutions better suited to the needs of national development. The full length studies mentioned earlier in such countries as Brazil, Kenya, Nigeria and Colombia provide some of these kinds of insights.

c. Commodity systems. Another way of looking at market structure and operation is in terms of commodity systems. Systems analyses of the commodities that make up the principal items in LIC diets are useful for identifying constraints in the flow of food crops from farm to consumer. Such analyses also suggest ways in which public and private policy makers interact and how they may cooperate to improve the working of the system.[4/] Commodities vary greatly in how and where they are produced, how they move to market and the process by which they come to the consumer's table. Hence, commodity analyses are the essential elements in understanding overall agricultural marketing systems.

d. Government policies, regulations, and operations. While a major purpose of research on market structure is to improve public policies and programs affecting marketing, the intervention of government itself is an important area of needed research. In developing countries where the private sector is small, government agencies are actively engaged in marketing operations, often providing farm production inputs and arranging for product marketings. An example of government involvement is the Federal Agricultural Marketing Authority of Malaysia. It reports an expansion of smallholder production of pineapple for canning by 72 percent over the years 1962-66 and attributes this to the Government's support of an additional canning plant and the pricing policy of the Malaya Pineapple Marketing Board which set an incentive price for pineapples delivered to the factory.

Government marketing operations are not free of the management problems which private enterprises have, nor are they free from the costs incurred in carrying out marketing functions. Hence, government marketing operations are not necessarily more efficient nor more equitable than similar operations in private heads. Government presence (or absence) in the marketing systems has an influence on the place and performance of the private sector in such systems. Moreover government policies which create uncertainties and possibilities of arbitrary changes affecting the fortunes of private traders effect the marketing system both directly e.g. inhibiting investment in marketing and indirectly e.g. increasing costs to cover added risks.

2. Research on Marketing Mechanics and Operating Efficiency.

Observers of marketing operations in developing countries are quickly aware of gross inefficiencies. Sometimes, of course, the local situations may warrant the continuation of practices which seem economically inefficient, e.g. the use of added labor where substantial underemployment exists. There are three broad areas where research on efficiency is germane for developing countries:

a. Efficiency in the use of resources. Most low income countries have severe shortages of the resources they need to develop a modern marketing system. And marketing suffers in the competition with other claimants for scarce public and private investments. Hence, it is particularly important that care be exercised in the use of what resources of capital and labor may be available. Moreover, investments in marketing facilities and enterprises should be able to bring a return high enough to encourage additional investment. Research on efficient resource use in marketing needs to be carried on in a systematic way so that a range of alternatives and their costs/benefits may be taken into account in making marketing decisions. The research needs to include resource use by both public and private organizations and the considerations involved in decision making.

In industrial countries, the search for operating efficiencies often leads to increased scale of operations and to the substitution of some new machinery for labor inputs. In developing countries, with their persistent labor surpluses and capital scarcities, research

must be focused on other ways of holding down costs. Some areas of research that seem promising are: increasing the size of market transactions at each stage of the marketing system; more efficient scheduling of trucks and railroad cars for optium utilization of transport facilities; using shipping containers that can go from field packing to retail display; multiple use warehouses to serve the needs of different seasonal crops; employing extracting equipment that may be used for several crops as in cottonseed oil and peanut oil processing; setting simple standards for container capacities and commodity qualities to reduce congestion in marketing channels and reduce costs. In Korea, a recent study found that the failure to follow such standards slowed marketing processes measurably - adding time and expense to the movement of many commodities.

b. Reducing post-harvest product losses. In developing countries product losses on perishables are estimated at 25-30 percent and losses on grains are in excess of 10 percent of the harvest. Losses at these levels are many times greater than that which occurs in the United States and other more developed nations (in the U.S. less than 0.5 percent of stored grains held by the Commodity Credit Corporation is lost). The difference suggest possibilities for improvement in the basic marketing function of moving crops from producer to consumer Among the specific areas of needed research are: low cost, small retail refrigerator units, especially for handling meat, fish and poultry; warehouse engineering to provide storage protection in hot, humid climates; containers and packaging materials suited to these

same climatic conditions; application of chemicals to protect crops in storage against insect and fungus which attack crops in the LICs.

A simple fan cooling system was developed by USDA marketing engineers for use in temporary warehousing of strawberries and similar perishable fruits. The forced-air precooling system slows ripening, reduces decay, maintains quality over longer marketing periods. USDA/ARS entomologists studied ways of controlling insect damage to raisins and similar dried fruits. They found that treating the drying trays with the chemical, Malathion, was effective against insects while raisins were in the drying and storage stage.[5/] A program of research along these lines has been conducted in developing countries through the use of local currencies generated under the U.S. food aid program.[6/]

3. Research on Human Nutrition and Consumer Economics

While research needed to improve operations of public and private marketing enterprises has had a few belated beginnings, studies on the quality of diets and consumer economics is virtually nonexistent in developing countries. Governments in low income countries have been concerned with avoiding starvation among the poor, but they have usually stopped short of a concern to provide diets of adequate nutrition. "Consumerism," recently raising its anxious head in the United States and some other industrialized countries, has had no counterpart in the developing countries. Nevertheless, the need is no less great, although, the forms of consumer interest and the cost-benefit ratios appropriate for low income countries would be different,

A number of specific research areas seem called for: research on food consumption patterns, the quality of diets in developing countries and on ways to improve them.

Studies on caloric and protein levels conducted by FAO and USDA provide some clues to conditions in developing countries. But such data are based on aggregates and averages and are not stratified by income or other relevant population groups. Moreover, it is not at all clear that the data fully reflect dietary habits among subsistence rural groups and the extent to which diets include minor food crops and the consumption of wild animals. At the same time there is only spotty knowledge of how much of a food's nutrient value is lost as a result of poor culinary practices. While considerable progress has been made on improving the protein value of foods, research on the marketing and distribution of such products has been initiated by only a few private firms involved in such developing country enterprises.[7/]

A few studies have been made on eating habits within family groups of several developing countries. Among findings which have important implications for national food policies are the following:

(1) among poor families, fathers often come before children in the allocation of meager food supplies;

(2) when a youngster in a family gets a meal at school, a portion of his at-home meals is likely to go to a sibling entirely dependent on the family far;

(3) illnesses which are endemic in developing countries such as

malaria and intestinal worms have a particularly debilitating affect on large numbers of people by reducing the amount of protein available for normal body functions. Hence, significantly larger amounts must be consumed if minimum bodily requirements are to be met;

(4) the new high-yielding IR-8 rice sells at a discount in some countries where it was recently introduced because consumers preferred the kind of rice to which they were accustomed;

(5) as incomes rise in developing countries, there is a tendency for shifts in the consumption of food and many changes are to less nutritious but higher "status" foods.[8]

An example of how some of these problems are being met is in the AID-USDA project in Kenya. A USDA food scientist is assigned to the Department's project on developing new varieties of cereals in Kenya. His work involves studies of milling and cooking properties, nutrition, taste and other consumer acceptance factors which should be considered in the cereal breeding programs there.

Despite beginnings such as these (or perhaps because these comprise only a small amount of the knowledge needed) there has been virtually no systematic research directed at improving food delivery systems for those on the periphery of the commercial market. Control price stores and control price commodities are often employed in the developing countries, but little is known about the effectiveness of these practices or how they compare to alternatives which might be tried. Nor have there been studies on the implications of retail pricing practices on consumer purchasing behavior or retail profits. Public and private policies affecting food retailing and consumer

purchasing in developing countries have been promulgated without the kinds of information and understanding such decisions should be based upon.

4. Research on Marketing Management

One of the areas in which marketing research for developing countries has been especially lacking is on the management of marketing enterprises. The reasons for this lack are clear: government marketing enterprises have often been seen as not being subject to operating costs and the need to turn a profit on investment; the idea that marketing, no less than industrial enterprises had managerial problems which could be met by improved management methods has not been widely accepted. Yet many observors of marketing enterprises in developing countries report that poor management is one of the most critical shortcomings to improved performance. Among the areas of research on marketing management that should have high priority in developing countries are the following:

a. Marketing channels, sales, and promotional strategy. While developing countries offer fewer alternatives in marketing channels and promotional programs, some choice is possible. In the absence of appropriate vehicles, the marketing entreprenuer may establish channels or promotional strategies especially suited to his product needs or country situations. For example, the marketing of a protein-rich product may be done through pharmacies, food stores, institutional feeding establishments or any combination of these and other channels. The promotion of such a product may be as a snack or component of a meal; as a nutritious food or as a tasty one with little reference to its dietary value. Milk may be marketed as it is in Ecuador as one

grade and type or, as in Costa Rica, in several different grades and forms including dry milk solids.

b. Financing marketing enterprises. In recent years there has been widespread acceptance of the need for external financing and of special credit arrangements to improve farm production in developing countries. But there has been no comparable concern for financing the marketing of farm products. Research is needed on sources of financing for marketing enterprises in developing countries, the terms of credit, and the affect on marketing costs of different interest rates. Marketing managers in developing countries need a better understanding of how to mobilize near term and long term capital. Studies are needed on accounting and projective procedures which are appropriate for loan applications or equity financing.

5. Research for Market Expansion

Within the past few years a number of developing nations have reached the point in their agricultural development where supplies begin to outrun demand; they need to expand their markets in order to sustain agricultural growth. While this situation has occurred before with traditional export crops such as coffee, cocoa, rubber and a few other commodities, the possibilities of excess productive capacity for food crops seemed far fetched a few years ago. Now there are possibilities that the market will limit the application of high-yield production technology. Most of the developing countries (and the developed nations too) look to exports as a means of balancing supply and demand. This paper, however, is primarily concerned with ways in which research can contribute to the development of domestic markets.

For many food crops, demand elasticities are assumed to be low; studies suggest that downward shifts in price are not accompanied by large increases in quantities purchased. Most studies on demand elasticity in developing countries, however, have been limited to food grains. Demand elasticity for meats, dairy products, poultry and eggs, and for produce is normally considerably greater than for cereals; more research on these other crops is needed.[9/] Moreover, demand elasticity studies are traditionally based on data obtained from commercial transactions; such studies may not accurately reflect responses to significant price changes among the very poor who are on the periphery of the commercial market.

In developing countries, low income of a large proportion of the people is a principal impediment to increasing demand. Hence, research is needed to determine how the large numbers who cannot fully participate in the market economy may be helped to have effective demand for the foods they need. Among practices widely utilized in developing countries are: (1) food for work programs in which food is used as partial payment for work done (usually on public projects); (2) price control stores or depots for distribution of basic foods in low income neighborhoods; (3) subsidized foods by government payments to people at some point in the food distribution system so that the ultimate cost to the consumer is lower than its commercial value would be. Research is needed on the efficiency of these alternatives in terms of resources used and of effective demand created. (Recent studies on U.S. food distribution program may offer suggestions for adaptation in developing countries.)

Research in developing countries is also needed on the extent to which commodity and product promotion may increase demand or shift consumption pattern to more nutritious foods. A world-wide demand has been created for Coca Cola by virtue of strong promotion and distribution efforts. Could similar results be obtained with other products? In the United States there has been heavy emphasis on advertising and promotional programs for commodities and for individual products. Developing countries should not and need not incur similar costs, but research associated with expanding the market for commodities and introducing new products can help provide useful insights for a more innovative and consumer oriented food industry.

Cooperatives have been an effective instrument for market expansion in a number of countries. For example, in Paraguay, one vegetable marketing cooperative led the way for five more in the Asuncion area. When tomato production of the six cooperatives exceed local demand they formed a federation of vegetable marketing cooperatives and negotiated a sale of 5,000 tons of tomatoes to Argentina - thereby initiating a new export program of value to the individual producers and the country's foreign exchange earnings. Research is needed on where and under what circumstances cooperatives and similar institutions may be useful in market expansion.

In the interest of overall economic development, low income countries need to begin research on new product development and on new uses for their major commodities. Traditionally, developing countries have marketed commodities with very little processing. Where the commodities have been exported, the industrialized countries have

have usually done the processing (sometimes shipping the finished product back to the countries from which the commodity was initially purchased). Research leading to more processing in the LICs could help provide needed employment in these countries and improve their terms of trade with the more developed countries.* And research leading to fuller utilization fo commodities (as in the use of by-products in meat packing operations) can help hold down the costs of the primary consumer product.

ORGANIZING FOR THE CONDUCT OF MARKETING RESEARCH

In much of the world, agricultural marketing research has lagged behind production research. Over the past decade, agricultural research institutions - national and international - have grown in size and technical competency. The work at the International Rice Research Institute in the Philippines, at the International Maize and Wheat Improvement Center in Mexico, and at the Inter-American Institute for Agricultural Sciences in Costa Rica are particularly noteworthy. These international research installations and the score of country agricultural research organizations have been primarily concerned with the development of new seed strains, testing application of fertilizer and pesticide, identifying and treating plant diseases. Relatively less attention has gone to studies on the economics of new seed varieties or the market potential for new commodity types. Production research has contributed knowledge that has dramatically increased farm productivity; little research has been directed at ensuing problems of

* Of course, improvement in the terms of trade between industrial and non-industrial countries may not be accomplished without changes in trade practices and tariff structures.

marketing or means of increasing the productivity of labor and capital expended in marketing activities.

Where the purpose of marketing research is to enhance the position of individual growers or processors, or a small association of them, it may be expected that they will bear the principal cost of doing the research. For traditional export commodities such as coffee, bananas and rubber, adequate resources have been available in producing countries to undertake market studies, albeit for and by the marketing agencies directly involved. The work has been primarily concerned with price and commodity movement data and with analyses of market potentials. For food crops, largely a "peasant" and subsistence type of farming, there has been almost no research in marketing. Now that food crops have acquired a new commercial importance in developing countries and marketing emerges as a limiting factor for sustained growth, the need for research to meet market problems becomes evident.

The deep involvement of governments of developing countries in agricultural modernization and the paucity of national or international research institutions currently able to undertake market studies to meet these needs poses the problem of how such research might best be organized and initiated. Much of the research to improve marketing processes should probably be done by government agencies, educational institutions and quasi-public research foundations. There is need for all of these institutions to do such research, since in much of the world individual farmers and marketing firms or their associations are likely to lack the expertise and the resources. Research on market

structure, for example, would need to be done by organizations that are not part of the marketing system. Government agencies may conduct some studies, but the research units would need to be apart from agencies carrying on marketing operations or regulatory functions.

The kind of research which might be done by a nation's central marketing department might include the following:

(1) Research to help private firms and local government agencies in planning new marketing facilities, including economic and engineering feasibility studies;

(2) Studies on organizing and managing cooperatives and other associations of farmers and middlemen to improve their marketing operations, and studies to determine ways of improving specific operations such as cost control; inventory management and turnover; physical transport and handling of commodities;

(3) Analyses of marketing processes to enhance the possibility of having their commodities and products destined for foreign markets, priced competitively.

(4) Studies of commodity prices at different stages of the marketing system, the costs of different marketing functions, factors affecting price changes by season and by years, impact of changing prices on production and consumption of different commodities;

(5) Evaluation of government marketing operations, food distribution programs, and of units concerned with promulgating and enforcing grades and standards, weights and measures, container specifications and other regulatory activities.

But national marketing research programs are not enough. Few developing countries have the resources to undertake the breadth and depth of marketing research needed. A pooling of scarce resources is therefore likely to provide optimum results per dollar and per man-hour of research time. Support for some international centers of competence could help in developing new marketing technology for LICs, train their marketing personnel, and provide extension services to their marketing organizations.

Consideration should be given by groups of countries in a region and by international organizations to establishing marketing research centers in several key locations in the Southern Hemisphere and providing more support for existing institutions.

While marketing problems are often country and commodity specific, there is an expertise in solving such problems which is widely applicable. Commodity handling engineers, price economists, commodity utilization chemists have analytic approaches which facilitate finding solutions to specific aspects of commodity marketing. But because marketing needs to be viewed in terms of the system's interrelated parts, effective research in marketing calls for interdisciplinary efforts and an adequate "mass" of expertise.

Discussions are now underway among international organizations such as the U.S. A.I.D., the World Bank, the Ford and Rockefeller foundations and others, on supporting an international network of agricultural research. The discussions owe much to the successful application of research efforts in Mexico and the Philippines that the foundations supported and which led to the widely heralded "miracle seeds" and increased crop production. However, despite greater awareness of the interrelatedness of production and distribution, the discussions on an international research network are yet little concerned with what happens to the product after it is grown.

The funding of regional or international centers concerned with marketing research could and should be financed from several sources. Private agribusiness firms of developing countries stand to gain by such research, and several have indicated a willingness to help under-

write institutions of this type. Governments in the region and particularly the governments which provide land and laboratory facilities would be providing important capital inputs. The international lending agencies and the large philanthropic foundations should contribute seed capital for needed physical facilities and for initial staffing of professional people with international reputations.

THE CHALLENGE

In developing countries the problems of distribution are beginning to emerge as no less important than the problems of production. When we emphasize the marketing of food, we call attention to a critical issue confronting nations as they move forward in their development; namely, more equitable distribution of the goods of a more productive economy. Food is so basic that a political (as well as moral) case can be made for the proposition that, as production is increased, distribution should be improved also. Indeed, unless the increased product is more widely shared among the masses for whom demand elasticity for food is greatest, the drive for increased production will not be sustained. Moreover, if a case is made for food, there may be carry-overs to other aspects of the economy. Thus, more people may share in the more productive society, and this is at the heart of economic development.

Emphasis on the marketing aspects of agricultural development can also help shape the overall economies in countries where high-yield technology takes hold. An implicit objective of U.S. foreign aid policy is to help bring about more open, equitable and efficient economic systems

in developing countries - economic systems in which private enterprise plays a larger role and private initiative is rewarded. These objectives are more likely to be attained through a market-oriented economy than through an atomistic-subsistence economy or a centrally planned economy. A more broadly based commercial agriculture and a concern with the marketing system to support it can contribute to the growth of market economies in heretofore traditional agricultural societies.

More research is needed to provide the insights and impetus, as well as the new technology, for improving food marketing systems. The time has never been more ripe; the need has never been greater.

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6. Examples of such research reported by USDA's Agricultural Research Services are: A study by the University of Baroda, India on Metabolic changes in the storage and Ripening of Mangos; a study by the Hebrew University of Jerusalem on the Use of Antimetabolites for the control of stored product insects; research on the application of gamma rays for the control of some stored-grains pests, by the Ministry of Agriculture, West Pakistan.

7. See Dan Rosenfield's "Fortified Foods: The Next Revolution," Chemical and Engineering News, August 10, 1970. Also, see Harold Frost, "The Role of Private Enterprise in Marketing Foods in Low Income Countries," in The Marketing Challenge, proceedings of a marketing seminar, USDA, 1970.

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9. See the surveys on food consumption by the FAO e.g. 1958 and 1964, also The Agricultural Development of Peru. Report of an FAO/IBRD Commission, 1959; A. E. Schaefer, "Nutritional Deficiencies in Developing Countries," Journal of American Dietetic Association, April, 1963; R. D. Stevens, Elasticity of Food Consumption Associated with Changes in Income in Developing Countries, ERS, USDA, 1965.