

## **MARKET RESEARCH AND FOOD TECHNOLOGY IN DEVELOPING COUNTRIES**

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In the developing countries, the use of market analysis to define problems and formulate appropriate solutions in the food technology sector is minimal. Many research projects aimed at improving the postharvest handling of foods or at combating malnutrition are initiated in the complete absence of reliable data on the intended market. Because of the special characteristics of, and the constraints associated with, the social markets in developing countries, the analysis of these markets may require a methodology that differs from that applied in industrialized countries. This paper compares conventional and social market research strategies and outlines the difficulties of undertaking such research in developing-country environments. Some recent experiences, which illustrate the needs and opportunities for a market orientation in food technology research projects in developing countries, are described. It is concluded that market research in the developing regions should be strengthened by creating a greater awareness of its importance at the national level, developing appropriate training courses, and elaborating appropriate research methodologies.

For organized industries in the developed world, market analysis represents the essential basis for product or process development. A project has no economic future unless an adequate demand exists for it. Market research, therefore, aims to identify consumer needs, market segments, and the purchasing process to minimize uncertainty in making marketing decisions. Conventional marketing emphasizes the attainment of profits through the identification of opportunities, and even the creation of needs, in a competitive, consumer-oriented industrial environment. Marketing has, therefore, emerged as a scientific discipline that responds to the needs of industrial companies for market information.

In the developing world, scant attention has been given to the application of market analysis to define and guide agricultural research and development projects, which includes the subsector of food technology. Perhaps this is because considerable demand for staple foods exists in the developing countries and the problem is one of overcoming food deficits and inadequate nutrition in noncompetitive markets rather than creating new markets. The target market is characterized by poor consumers, usually in rural areas, and limited resources. There has, therefore, been a tendency to assume that increases in the production of

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staples will be readily absorbed by a demanding market. Innovative research by agricultural scientists has indeed resulted in the development of high-yielding food plants with superior functional and nutritional properties and adaptable to a wide range of agroclimatic conditions. Nevertheless, it has invariably proved difficult to persuade the poorer farmers to grow the improved varieties and, in many cases, consumer acceptability problems have arisen where improvements have affected food characteristics. In recent years, there has been an increasing realization that the starting point for productive agricultural research should be the farmer's field. It is essential to have a thorough understanding of the technical, social, and economic constraints of traditional farming systems to define research that will lead to changes of benefit to the farmer. This is effectively a form of market analysis but proceeds a stage further in creating a relationship between researchers and farmers in designing and conducting agricultural projects.

Although agricultural scientists in developing countries are progressing in their use of systematic market evaluation for research project design, a comparable approach is less evident in the postharvest sector. Research in this sector normally aims to

- (a) Reduce postharvest food losses by improved storage, drying, or other processes;
- (b) Improve existing, or establish new, agroindustrial enterprises; or
- (c) Design and implement interventions for improving human nutrition.

Here, research is often confined to the laboratory or pilot plant, with products or processes being developed in the absence of *ex ante* market evaluation. In view of this omission, many projects in the food technology field in developing countries are never implemented, and the research investment is wasted. Perhaps the most eminent example of such wasteful exercises in nutrition is what McLaren (1974) terms the "great protein fiasco." As is now well known, the massive investments in protein technology research made during the two decades before the mid-70s were not justified by reliable data on the needs, habits, and economic status of the intended users. Consequently, the results of these abundant research efforts have remained mainly in textbooks. In her comprehensive review of this topic, Orr (1972) stresses its marketability and that the dietary patterns of the potential consumers must be fully appreciated. Marketing is now increasingly cited as an indispensable tool for the design of food technology and nutrition projects and for facilitating the commercialization of socially desirable food products in developing countries (Sheth and Sudman 1972; Austin 1980; Cavusgil et al. 1983; Hulse 1984; Gopaldas and Rutman 1985).

Given that the social market in developing countries is somewhat distinct from the conventional markets of the industrialized nations, it may not be appropriate to transfer the standard methodologies for market research. The various constraints existing in developing countries will demand the development of a modified framework for market research in problem definition for food technology projects. It is hoped that this workshop will highlight the opportunities for market research in this area, the existing constraints, and the techniques that may be used to obtain reliable market information. To set the scene, this paper will present a brief overview of market research methodology, discuss some limitations in conducting social market research in the developing-country environment, and

describe some recent experiences in the use of market analysis to define food technology projects.

## CONVENTIONAL AND SOCIAL MARKET RESEARCH STRATEGIES

A market is a system of exchange that develops as people cease to produce entirely for their own consumption (Toffler 1981). Historically, the introduction of new technology has resulted in increased specialization of production; in turn, making people more dependent on an expanding and more complex market to exchange what they produce for articles they have to and wish to consume.

In Asia, particularly Southeast Asia, the national food systems are becoming more market oriented (MacCormac 1985). This is reflected in a change from an agrarian society food system per se (Fig. 1) to a mix of agrarian and industrial society food systems (Fig. 2). Asian food systems still contain elements of both, but are increasingly mirrored by Fig. 2. Thus, the number and types of market

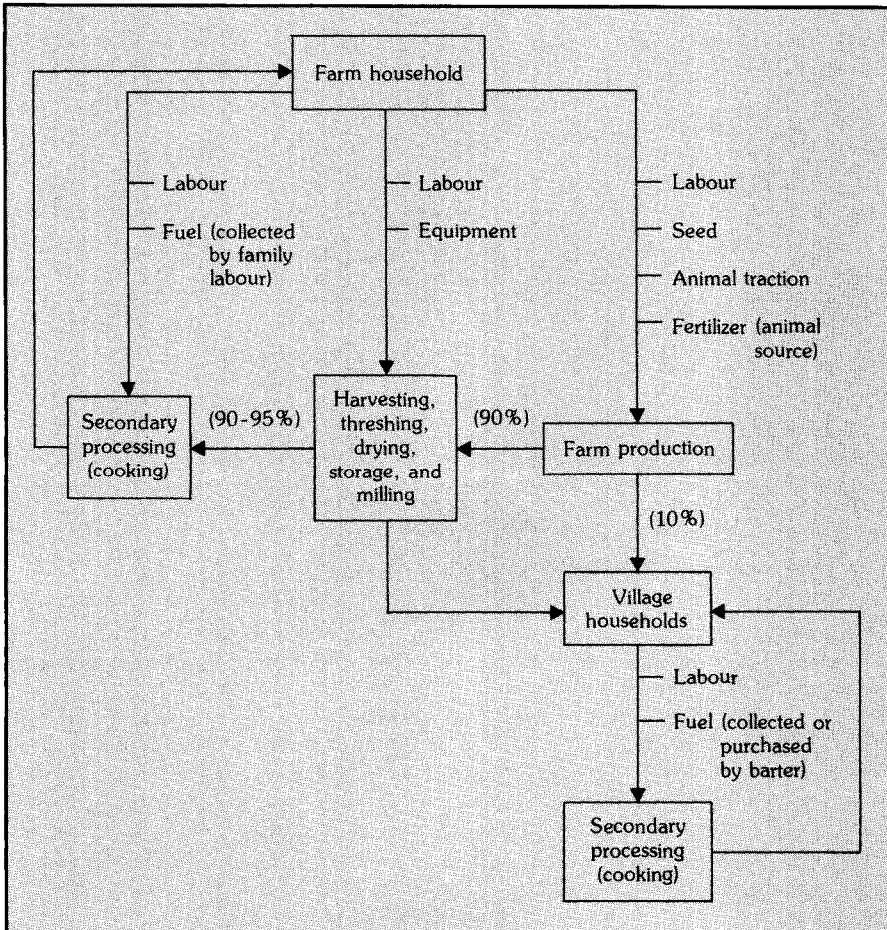


FIG. 1. Agrarian society food system (source: MacCormac 1985).



consumption and investment has associated income distribution and growth effects and is not independent of the marketing strategy.

Our opinion is that food product and process marketing can have positive net benefits in terms of economic growth and public welfare. To achieve these benefits, however, the market research strategy should develop pricing, promotional, and distribution techniques that reflect real costs, are informative and educational, and minimize monetary income distribution bias in favour of the high-income groups. It should not attempt to create needs.

Food technology research projects may have conventional or social objectives or combinations of both. In conventional marketing, emphasis is given to the attainment of break-even points or profits and may specifically exclude poorer consumers. On the other hand, social marketing accommodates poorer consumers and aims at national goals despite relatively limited sources (Cavusgil et al. 1983).

The marketing and market research strategies associated with conventional and social food technology research objectives are different. Conventional market research starts with identification of consumer needs or aspirations, competition, and market segments (for maximum economic returns). The information obtained is then used to develop a technology, determine market entry prices, and select methods of technology promotion and distribution. This "marketing mix" is evaluated using economic criteria such as, number of sales to break even, profits, and growth in market share.

Social market research identifies human needs in noncompetitive societies and defines the means of delivering technologies to satisfy these needs. Further analysis quantifies specific needs, develops technology, and selects market entry prices, techniques of promotion, and systems of distribution. This "marketing mix" is evaluated using criteria that differ from those employed for assessing marketing strategies. Criteria such as percentage of the target population reached with the technology, quantities of the technology produced and distributed, and frequency of use of the technology may be used. Benefits are measured in terms of development goals, such as improved nutritional status or increased rural income. The use of economic criteria is generally limited to the latter and to selecting the least-cost strategy to achieve a quantitative goal. The use of a social market research strategy, however, should not automatically eliminate the use of conventional criteria because these improve the efficiency of some aspects of the social strategy without reducing the attainment of social goals (Cavusgil et al. 1983). As already stated, a food technology research project may have both conventional and social objectives. Before development resources are committed to the research or implementation of the results, however, we should carefully determine whether objectives are independent, complementary, or competing.

## **PROBLEMS OF SOCIAL MARKET RESEARCH**

For market research to be useful, it must be reliable. Under the conditions existing in the developing countries, reliability may be questionable unless certain factors are taken into account. Normally, field-survey results are supplemented by secondary data collected from government or trade statistics. Secondary data are particularly important for demand forecasting and the prediction of the project profitability. The experiences of Stanton et al. (1981) in Latin America appear to

reflect the general norm in the developing countries. Deficiencies in availability, currency, validity, and homogeneity of secondary data cause difficulties in interpretation. Austin (1981) recommends that analysts verify the accuracy of such data to ensure reliable projections by evaluating the data-collection techniques. It is also appropriate to retain a sceptical attitude toward published statistics because erroneous data tend to be self-perpetuating.

The collection of primary data through field surveys is subject to considerable drawbacks, particularly when rural environments are being studied. As Kaynak (1978) notes, the validity of primary market research depends upon (a) an organized and competent team of interviewers who are well acquainted with the respondent population, (b) a correctly selected representative sample, (c) carefully designed and pretested questionnaires, and (d) adequate financial facilities. These critical issues are discussed in the following.

### **PERSONNEL**

Formalized market research is a relatively recent development, even in industrialized countries. It may, therefore, not be surprising that the activity is poorly supported in the developing nations. Kaynak (1978) states that marketing research and consultancy firms and even independent, experienced interviewers and market research analysts are generally unavailable in these regions. Moreover, in the case of small agroindustries, the financial and managerial resources at hand may be too limited to conduct thorough market research. For this reason, Austin (1981) suggests that this function be carried out through government assistance to the entire industry or sector. Unfortunately, the social project attitude that may permeate government interventions in developing countries tends to become an excuse for the inefficient performance of marketing functions (Cavusgil et al. 1983). In essence, there appears to be a dire need to fuse the social commitment characteristic of governments and voluntary organizations with the motivational and efficiency characteristics of private sector business managers.

Market researchers and analysts from the industrialized nations, who have undertaken studies for companies interested in entering developing-country markets, consistently note the benefits of seeking local inputs in problem or concept definition and in the actual surveys (Goodyear 1981; Kushner 1981; Stanton et al. 1981). Western researchers who have not sought such assistance have experienced radical difficulties because of differences in the use of language, in lifestyles, and in the beliefs and values associated with a culture. Thus, the ideal market researcher in a developing environment will have an intimate knowledge of that environment and a thorough grounding in appropriate survey techniques. In view of the experience in field research that is gradually being built up by many food scientists, nutritionists, and home economists in the developing countries of Asia, it could be argued that an invaluable core of potential market researchers is emerging. Such a body of experience requires further support through appropriate training in survey and analytical techniques. This workshop represents a beginning in the process of information exchange and training. Serious consideration, however, should be given to establishing formal courses in market analysis and business management for food scientists and nutritionists in the developing world.

### **SAMPLING**

Proper sampling is fundamental for reliable market research. Conventional methodology, however, is difficult to apply in the developing countries because of

limited statistical information (Kaynak 1978; Stanton et al. 1981). Although sampling frames may exist for some metropolitan areas, their period of usefulness may be minimal in the face of rapidly expanding and shifting populations. Given the expense of maintaining these frames, governments tend to forego the activity and official census maps become outdated. Thus, precise sampling is not feasible and market researchers resort to the use of stratified, quota, area, and convenience sampling techniques based on incomplete maps and population data. Calculation of the sample error and determination of valid population inferences then become extremely difficult. From their experience in Latin American countries, Stanton et al. (1981) report that quota sampling procedures can be so divergent and uncontrollable in different countries that the comparability of the data is severely affected. The problem is exacerbated by other complications, such as the existence of multifamily households. In the rural areas of developing countries, interviewers often apply random walk procedures in the selection of samples (Funk 1963). Although these constraints dictate that truly random sampling may not be feasible in the developing countries, it should at least be possible to ensure that the sampling units reflect the social environment selected for the purpose of the study.

## **SURVEY METHODS**

Conventionally, market data are recovered by means of telephone, mail, or direct interview surveys. Because of the characteristics of the social market in developing countries, however, direct surveys and interviews are the most feasible. Personal interview is often the only method of obtaining reliable information. Even then, obstacles may be created by nonresponse in view of social and cultural inaccessibilities. As Kaynak (1978) notes, in Asia women may be culturally and socially inaccessible to interviewers whereas in other areas men are relatively inaccessible. Indeed, sexual differences between interviewer and respondent may become an important source of research bias (Kraemar 1971). Other factors causing bias include the inevitable presence of other individuals (clinical witnesses) during the interview and the tendency for respondents to provide answers that they think the interviewer wishes to hear.

Survey questionnaires need to be designed to eliminate, as far as possible, the effects of these biases. Stanton et al. (1981) define three possible approaches in questionnaire design:

- (a) The EMIC approach, which holds that attitudinal or behavioural phenomena are expressed in a unique way in each culture;
- (b) The ETIC approach, which involves the creation of a questionnaire that is multinational and culture free in its application; and
- (c) The HYBRID approach, which combines country-specific concepts with "pan-cultural" ones not having a specific cultural bias.

In general, the EMIC and HYBRID approaches would appear the most appropriate. Questionnaire design and presentation may vary widely even within the same region or country depending upon the respondent group targeted. Suitable formats are likely to be simpler than those used for conventional market analysis. As previously stressed, the involvement of market researchers having an intimate knowledge and sympathy with the environment and populations under study is crucial. To direct research for the benefit of poorer people, statistical purity

may be less important than broad coverage, the appropriate objective being to understand rather than to measure precisely (Pickard 1982). Thus, exposure of researchers to the realities of specific end-user environments may be the key issue. Goodyear (1981) believes that qualitative market research should be employed in developing countries. Qualitative research establishes certain basic dimensions of unfamiliar, uncharted markets. In qualitative interviews, the questions are not predetermined. Instead, feedback from the respondent determines the development of the interview. Such feedback from the intended beneficiaries of potential research is invaluable in assisting the researcher to understand the user environment, rather than merely measuring certain characteristics of it.

### **FINANCING MARKET RESEARCH**

Thorough market research can be an expensive and time-consuming venture. As noted earlier, the financial and managerial resources of developing-country institutions are often too limited to undertake this function. National market services for an entire industry or sector could be established at minimum cost. It will also be important to focus market research carefully so that only relevant and usable data are collected. Market research information should be balanced against cost so that researchers obtain adequate amounts of quality data at least cost (Austin 1981). To achieve this, sound judgment is required.

## **RECENT DEVELOPING-COUNTRY EXPERIENCES**

Recent experiences in Asia have highlighted the needs and opportunities for market research in defining food technology projects. Appropriate case studies will be presented in this workshop. The following sections briefly discuss the relevance of market research to several postharvest themes of interest to the International Development Research Centre (IDRC).

### **RICE POSTHARVEST TECHNOLOGY**

In Southeast Asia, the development of early maturing, high-yielding varieties (HYVs) of rice resulted in at least one crop being harvested in the wet season. The problem identified was "wet paddy" and the solution proposed was artificial drying (GTZ 1982). Thousands of man hours and millions of dollars went into research and development activities to produce new drying technology. To date, none of the technology developed has been widely accepted, with most of the wet-season paddy being dried by sun and wind. Although the developed equipment is technically capable of drying paddy, the technology proved too expensive and of inappropriate capacity for the intended users. Its introduction was not accompanied by appropriate training in its fabrication, use, and repair (Manilay and Cardino 1984). Moreover, government price regulations provided little or no incentive for improving quality through drying.

### **GRAIN STORAGE**

In both South and Southeast Asia, farm households maintain a large (often the largest) proportion of their crop for their own consumption, either as food or seed. Estimates of loss in on-farm storage indicated potential benefits from loss reduction (National Academy of Sciences 1978). Much research has been undertaken to design improved or new on-farm storage structures. These have met with limited success because of high cost (certain types of loss being valued too high by



the scientist) and very often because farmers wish to preferentially protect their seed, rather than the entire stored crop. In this case, the farmer's perception of farm household risk and uncertainty places priority on the ability to plant the subsequent crop. Avoidance of losses of the recently harvested crop becomes a secondary consideration.

### **FISH DRYING**

In most developing countries with coastal fishing communities, sun-drying is a traditional method of preserving fish. Scientists had correctly concluded that this often results in nonuniform drying, physical damage, and fouling from insects and animals. Moreover, revenue is lost when drying is not possible because of rain. Research was implemented to improve product quality by developing artificial drying procedures. To our knowledge, results to date show that low-income rural and urban markets in developing countries do not differentiate significantly, through price incentives, between sun-dried and artificially dried fish. This means that the utilization of drying technology is limited to rainy periods only, and the returns are not sufficient to recover the relatively high fixed costs of the dryer.

### **FRUIT AND VEGETABLE HANDLING AND PROCESSING**

Horticultural crops provide farm cash income and employment opportunities for rural populations in developing countries. In many cases, the produce may find high-value markets distant from the production points. Nevertheless, because of the perishable nature of these commodities and the lack of adequate handling facilities, losses are extensive. Preliminary market analysis can effectively define important areas for improved handling and processing. Unforeseen opportunities for supplying a market demand and generating rural income may often be identified by well-planned *ex ante* studies. For example, an IDRC-supported study recently completed in Sri Lanka highlighted potential for partial processing of fruits and vegetables as a viable rural venture (Curtis and Gunetileke 1984). The results of this study will form the basis of a more comprehensive research project to develop and improve the handling and processing of horticultural produce in the country.

### **PROCESSING OF DRYLAND CROPS**

Sorghum and millets represent the staple diet of poor people inhabiting the semi-arid tropics of South Asia and Africa. Little attention, however, has been devoted to improving the processing and utilization of these crops. Between 1977 and 1980, a study was conducted in India with the objective of obtaining an understanding of traditional practices for the storage and processing of sorghum and millets in rural areas (Pushpamma and Chittemma Rao 1981). This study produced invaluable information that has led to the design and implementation of improved dehulling and milling technologies for poor rural people.

### **NUTRITION INTERVENTIONS**

Definition of the market and the consumer is essential for nutrition interventions, such as government programs to serve malnourished children (Austin 1980). Nevertheless, a market orientation is often lacking in projects aimed at designing and delivering items such as supplementary foods to target beneficiaries. There are many examples of nutrition programs that have been founded on insufficient market data on food or weaning habits, socioeconomic status, and

lifestyles of the intended beneficiaries. Inadequate appreciation of marketing and delivery systems for supplementary foods invariably leads to "leakage," poor targeting, and high intervention costs. Several authors have demonstrated the valuable contribution to be made by market research to the effectiveness of nutrition programs (Valverde et al. 1981; Gopaldas 1983; Mongkolsmai and Kietdaj 1984).

## **FUTURE NEEDS**

Clearly, market research is a prerequisite for reducing uncertainties for the adoption of the results of food technology projects. Such studies should be incorporated as a component of a total systems research effort. The Post-Production Systems and Agricultural Economics programs of the IDRC collaborate whenever possible to support short-term interdisciplinary studies to identify specific postproduction needs of national food systems. The results of these studies may then be used by national scientists to develop technology development and improvement programs, geared to end-user requirements. This approach to support for postharvest food research will continue to develop and expand. To strengthen such activities, the following actions are needed:

- To create an awareness at the national level in developing countries of the benefits of market research in food programs,
- To explore ways of establishing appropriate training courses for market researchers in developing countries,
- To develop suitable and reliable methodologies for undertaking market research for social objectives in developing countries, and
- To consider the possibility of creating market research and training centres oriented to the problems of the developing world.

This workshop should serve as a first step in promoting these actions, which would result in more effective postharvest research for the benefit of poor people in the developing world.

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