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## **FOOD FOR CONSUMERS: MARKETING, PROCESSING AND DISTRIBUTION**

The paper reviews the role of food processing, from preservation by individual households to providing food when other sources are scarce to the level of large-scale agro-industrial processing. The sector is a major employer of both rural and urban dwellers, especially of women, and a major vehicle for growth in many countries. All processing operations, whether small-scale or large ventures employing thousands of people, must be based on the existence of a demand for the processed product, a demand which can be satisfied profitably. Unfortunately, agro-processing in many developing countries has tended to be promoted as a way of disposing of surplus production, without reference to the demands of the market, thus leading to the existence of numerous "white elephants."

Governments can provide an appropriate environment in which the post-harvest sector is able to function profitably. Policy should reflect the crucial role of the sector in ensuring an adequate, affordable and safe supply of food to consumers and in maximizing the efficiency of the production system. Governments can also make certain that policies, laws and regulations are consistent with the need to encourage the efficient functioning of the private sector in marketing and processing. Where it does not yet exist, the creation of an adequate body of commercial law, to provide security for those carrying out commercial transactions, is essential.

The paper highlights a number of "Priorities for Action" in the sector. These cover the areas of policy and legislative development; research into the post-harvest system; technology development, infrastructure improvement; promotion of improved post-harvest and marketing knowledge through the extension services; and finally, the provision of the necessary support services for the private sector.

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## INTRODUCTION

1.1 Progress towards the goal of universal food security is impeded by the absence of well-functioning marketing, processing and distribution systems. All too often the ability to store surplus food or move it from producing to processing or consuming areas is inadequate. Processing facilities frequently operate inefficiently. The costs of marketing can be considerable, and can constitute a major component of the final price. In a large number of countries the main constraints are inadequate transportation and processing systems. The costs to these societies are immense in terms of lost job opportunities, foregone economic growth and inadequate physical access to food.

1.2 Food marketing, processing and distribution systems evolve consequent to two fundamental and universal factors: the urbanization process and the development process. These processes lead to increased specialization in food production.

1.3 In earlier times the vast majority of the world's people were agriculturalists. Today most are not, and tomorrow an even higher proportion will live and work in urban settings. The demand for food therefore arises increasingly from urban places. On a worldwide basis the rate of growth in demand for food from urban areas is much higher than from rural areas; for the developing countries as a whole nearly five times higher.

1.4 As the urbanization process unfolds a larger share of national food consumption takes place at a location other than where it is produced. The marketing system must expand to provide the necessary services. It becomes more complex as the food markets are separated by space - producers sell in a market distant from the market where consumers purchase food.

1.5 The urbanization process also influences the composition of the diet. The diet of an urban resident tends to consist of a higher share of processed foods, in part because some foods do not travel well, either in fresh or processed form. Some of the ready-to-eat foods spoil soon after harvest, unless processed. Fresh produce must move to market soon after production, either directly to the consumer or to the producer, and most processed foods must be consumed within a relatively short span of time.

1.6 The composition of the national diet also changes as the development process proceeds. Consumers in urban and rural places seek a wider variety of foods, induced by rising incomes and encouraged by the advice of nutritionalists. A rising share of the diet tends to come from external sources.

1.7 The urbanization and development processes demand continual change in food production. In pure market economies producers rely entirely upon local market prices, which reflect changing processor and final consumer demands, to decide what and when to produce. Most economies now rely on market prices to induce shifts in production patterns for most food crops although many governments continue to pursue policies which influence the prices of staples.

1.8 Urbanization and development tend to encourage producers, communities and nations to specialize in products for which they have a comparative advantage. However, food production patterns are constrained by household needs, agro-climatic factors and the known and available means of production. Subject to these constraints, producers tend towards specializing in the production of products that promise the highest social and economic returns.

1.9 Specialization stimulates trade in food products, among the members of the local community or between them and other nearby or distant communities. Over time, the flow of food products moving between communities increases, and provides the basis for the further development of the marketing, processing and distribution system.

1.10 A well-functioning marketing system consists of multiple markets - to serve producers, processors and consumers. It rests upon the transportation system, and takes place at locations dictated by economics. It not only has the tasks of moving food products from producers to processors and consumers, but also to ensure the highest possible food quality and safety standards.

1.11 The differences in agro-climatic factors preclude efficient production of the full range of foods necessary to a healthy diet. Optimum efficiency is realized when a community specializes in the production of products in which it has a comparative advantage. But before this can happen it is necessary to have an efficient system to take the surpluses from the producing to the processing or consuming areas.

1.12 A large proportion of the resources devoted to meeting growing consumer demand for food has traditionally been allocated to ways of increasing agricultural production and productivity. In most countries far less attention has been paid to the chain through which the food reaches the consumer. Indicative of this approach was the 1974 World Food Conference, which, apart from a brief acknowledgement that "the efforts to increase food production should be complemented by every endeavour to prevent wastage of food in all forms,"<sup>1</sup> more or less ignored issues relating to food marketing, processing and distribution.

1.13 This relative neglect is difficult to explain in view of the essential contribution which these sectors make to national economies and to employment and their role in assuring an adequate, low cost and diversified supply of food to consumers throughout the year. An indication of the importance of the sector comes from the fact that in Western countries the share of the food producer in the final consumer price continues to decline. In Germany, for example, increased processing meant that crop producers received around 35 percent of the retail price in 1960, 26 percent in 1975 and only 14 percent at the end of the last decade<sup>2</sup>. If the marketing chain functions inadequately, investment in production becomes both more costly and more risky and may end up being wasted. Poor storage of staple grains in many developing countries leads not only to food loss but also to a wastage of the resources required to produce the food. These resources could have been used to diversify diets, or to produce crops for export. Equally, inadequate handling and transport arrangements for high-value export products such as fruits can jeopardize expensive investments in production facilities.

1.14 An efficient post-harvest chain can be environmentally friendly and promote sustainable development. The production of crops to meet market demand, the minimization of losses in the marketing chain and the efficient distribution of foods to areas where there is consumer demand all serve to avoid unnecessary production which can utilize scarce water resources, require heavy application of pesticides and fertilizers and lead to erosion and soil degradation. Where food resources are threatened, e.g. in the case of fish stocks, inefficiency and loss in the distribution chain only exacerbate an already dangerous situation. Improvements in the marketing chain, by rationalizing distribution methods, help reduce traffic, thus reducing energy costs. More efficient facilities, for example wholesale markets, reduce congestion and, by providing more sanitary conditions for food handling, lead to improvements in public health.

1.15 Some indication of the importance of marketing, processing and distribution can be gauged from the fact that between 1990 and 2010, production of cereals in developing countries is forecast to rise by 364 million tons and production of meat by 88 million tons. It is projected that between 1990 and 2010 the rural populations in developing countries will grow by 0.7 percent and urban populations by 3.4 percent.<sup>3</sup> Thus, it is likely that a major proportion of the expected production

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<sup>1</sup> From the Universal Declaration on the Eradication of Hunger and Malnutrition, *Report of the World Food Conference*, United Nations, New York (1975).

<sup>2</sup> Figures exclude fruits and vegetables. Source: ECA (1991), page 3.

<sup>3</sup> See FAO (1993).

increases will have to be marketed or processed, or both. As well as providing outlets for farmers' produce, the marketing and processing sectors generate considerable added value and provide opportunities for businesses to be established in rural areas. This, in turn, contributes to the growth of commercial activity and employment and lessens the flood of the population to urban centres. In fact, as noted above, the value added through marketing and, in particular, processing can be much greater than the value of the primary production. To sustain the sector, future investment requirements will be enormous. The companion World Food Summit paper entitled, "*Investment in Agriculture: Evolution and Prospects*"<sup>4</sup> estimates annual net investment requirements in the post-harvest sector as being around US\$16 billion simply to expand the capacity of the post-harvest sector in response to population growth and market demand.

1.16 As noted in the FAO study entitled, "Agriculture: Towards 2010"<sup>5</sup>, it is now well recognized that failure to alleviate poverty is the main reason for undernutrition. Alleviating poverty is an enormous task but, by improving the handling of food between farm and consumer much can be done to enhance the access of the poor to inexpensive, but safe, food. Increasing the efficiency of the marketing chain can reduce costs and hence prices to the consumer. Reducing post-harvest losses can lead to significant reductions in consumer prices. Such efficiency improvements are vital if those with limited purchasing power are to be able to afford sufficient food of adequate quality. In many rural areas employment in post-production activities such as processing can make a major contribution to increasing incomes and thus alleviating problems of undernutrition. Women play an important role, frequently a dominant one, in such activities.

1.17 This paper focuses on the marketing, processing and distribution of staple grain crops, as well as of fruits and vegetables and, to a lesser extent, animal and fisheries products as well as non-wood forest products. Emphasis is primarily on developing countries, but attention is also paid to developments in western countries and to economies in transition. Initially, the paper reviews steps which can be taken to ensure that food production meets consumer demand. Overproduction is often a major cause of losses, as food has to be thrown away due to insufficient demand. However, the danger of overproduction can be minimized when producers plan their production in line with consumer requirements. The paper considers post-harvest handling on-farm and the role of storage both on-farm and within the marketing system. Many attempts to promote improved methods of handling, storing and primary processing have failed because they have been planned without reference to consumers' ability or willingness to pay for improvements and without reference to the way in which the marketing system functions and the need for those involved in the marketing system to make a profit. Whether at the level of small-scale village production or processing or at the level of large-scale processing, storing or marketing, those involved in promoting improved post-harvest activities need to pay greater attention to social and economic considerations.

1.18 While much can be done to match production with market needs, transport, storage and processing of produce will always be essential to ensure a correct matching of demand and supply. An essential part of this process is to plan with reference to the needs of the consumer. By meeting the demand of consumers, farmers, traders and processors should be able to operate profitably. However, the ability of the marketing system to function efficiently depends on the existence of an enabling environment. The role of governments in this respect is especially important, firstly, to recognize that everyone working in the post-production system must be able to trade profitably if they are to provide the necessary services. Ignorance of the true costs of marketing often leads to governments and their officials accusing traders and others of profiteering. Secondly, it is important to develop an appropriate macro-economic environment, in order to facilitate trade and create the potential for equitable economic growth. It is also essential to provide appropriate infrastructure and support services, such as the provision of markets and information services. Working with farmers to increase their knowledge of market opportunities and practices will become increasingly

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<sup>4</sup> FAO World Food Summit document No. WFS/96/TECH/3.

<sup>5</sup> FAO (1993).

important. The paper explores these issues and then considers ways in which food supply to rapidly growing urban areas can be secured. Issues related to food quality and safety are also stressed. The function of food processing is then discussed and conditions for the successful operation of food processing ventures identified. Finally, the paper makes a number of recommendations for future government and donor initiatives in the post-harvest sector.

1.19 While the paper concentrates on domestic marketing and processing of food crops, most of the points made are also valid for international trade in foodstuffs, with the additional limitation that trade between countries is hindered by national tariff and non-tariff barriers to trade. Food commodities are included in the Uruguay Round of Multilateral Trade Negotiations and this should increase food trade possibilities. To take advantage of these possibilities countries will need to strengthen their marketing capacity.

### **MEETING CONSUMER DEMAND**

#### **The advantages of catering to consumers**

2.1 While the central planning of production is now a thing of the past in nearly all countries, the need to orient production to the needs of consumers is still too little appreciated. Inadequacies in information on demand, concerning quantity, location and product requirements, continues to lead to a misallocation of resources and to a loss of markets. Under central planning or state purchasing arrangements the cost of such misallocation was absorbed by the government; underliberalized markets it is the farmer who suffers. The greater availability of information about markets' requirements should in future permit farmers to make more informed decisions about what and when to plant. Two island atoll countries provide examples of the way in which, given appropriate production systems, producers can respond to market opportunities. In the Maldives, farmers target water melon production almost exclusively at the Ramadan period when consumer demand is high and good prices can be obtained. In Tonga, farmers for many years produced the same crop for export to New Zealand to supply a two-month "niche" when the supply of other fruits on the New Zealand market was limited.

#### **Matching production with demand**

2.2 Significant food and financial losses can be caused by wastage resulting from overproduction. This has often occurred when subsidies have been given to producers, thereby leading to a disruption in normal market price signals and to significant supply-demand imbalances.<sup>6</sup> Unfortunately, governments have often not responded to such imbalances by reducing or removing the subsidies, even where there was no good food security reason for continuing with them. More often, steps have been taken either to store produce for which there are few market prospects or, alternatively, to process surplus raw materials into products which are not in demand.

2.3 The dependence of much food production on climatic fluctuations means that variability in food output can never be completely avoided. Furthermore, worldwide, farmers themselves tend to cause cyclical changes in levels of production by responding to previous years' price signals, so that high prices in one year can contribute to overproduction in the next. Nevertheless, for many horticultural products the effects of gluts can be reduced by the production of a range of varieties. Use of early and late varieties extends the season and should increase returns, but this will only be profitable if the varieties used produce reasonable yields and if they find acceptance with consumers. Some varieties also store longer than others and this can be used to lengthen the period the crop is available to the consumer. However, while researchers have done much to develop fruits and vegetables with definable post-harvest characteristics, this has not always been the case with

<sup>6</sup> An extreme example was a Near East country where high subsidies to farmers led to 90 percent of horticultural crops being destroyed because there was no market, while the use of subsidized irrigation to produce them was having damaging environmental effects. (Shepherd, 1991).



staple crops. Hybrid white maize, for example, has much higher yields than traditional varieties but poor on-farm storage characteristics. This is becoming particularly important now that the role of marketing boards is being reduced and farmers are having to store much of their surplus, for many months, on the farm.

2.4 One way of avoiding the creation of surpluses for some crops, particularly vegetables, is to stagger planting dates, where it is possible to do so. Successful out-of-season production can result in significantly higher returns and may well be more economical than long-term storage. Producers also have some limited scope for delaying the harvest. Growth-regulating chemicals, which permit staggered harvesting, can be used in some circumstances. However, while consumers in richer countries may be prepared to pay for year-round availability of particular crops, those in poorer countries may lack the purchasing power to justify the additional costs to the producer.

2.5 As with agricultural crops, the characteristics of livestock at the time of slaughter and the properties acquired during husbandry will determine the quality of the consumer product, whether sold fresh, frozen or processed. Livestock and dairy production can also be seasonal, as a result of variability in temperature, rainfall and pasture growth. Farmers tend to plan the birth of young animals in order to make optimal use of natural conditions, thus ensuring greater milk availability at certain times of the year. Nevertheless, the use of different varieties of pasture or improved fodder allows farmers to plan milk production in times of short supply. In the case of meat, animal weight will differ according to the availability of pastures and fodder, and this will affect the farmers' decision about when to send animals to the slaughter house. With adequate information about prices farmers can calculate whether higher prices will justify slaughtering at lower weight. In the livestock sector, examples of matching supply with demand are, the production of turkeys for the Thanksgiving holiday in the United States and for the Christmas period in many other western countries, and the production of sheep for the period of Ramadan in Muslim countries.

2.6 In more developed economies many farmers are now less concerned about meeting the needs of the consumers than they are about catering to the demands of the processors. To cite just one example, the Swiss frozen food industry presently offers around 500 individual consumer products. Under these circumstances it becomes impossible for the farmer to understand developments in consumer demand for those raw materials which he/she is producing. There is thus a growing trend for direct contracts to be made between farmers and processors or traders. These reduce the freedom of the farmer to exploit market demand in return for guaranteed prices and sales quantities.<sup>7</sup> To a certain extent the same situation also now applies to producers of produce, such as fruits and vegetables, which need to be consumed fresh; these producers now increasingly supply supermarkets under contract rather than the traditional wholesale marketing channels.

#### Where to produce

2.7 While individual farmers have little, if any, choice about where to plant or to rear animals, governments have in the past influenced the overall location of production through pricing and other policies. Policies of encouraging subsidized production of one or two staple crops promoted the production of low weight-for-value commodities in remote areas and led to governments incurring excessive transport costs, both for inputs and the resulting outputs. Such policies eventually proved to be financially unsustainable. Recent moves towards market liberalization have meant that most countries no longer pursue pan-territorial pricing policies, with the result that farmers are having to diversify production in accordance with their comparative advantage.

2.8 Government, non-government organization (NGO) and donor-led development projects have frequently been guilty of promoting food production in areas with poor road infrastructure and

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<sup>7</sup> ECA (1991), page 4.

insufficient transport availability. There has been a tendency to see horticultural, livestock and dairy production as offering potential for increasing the incomes of the poorest farmers. This has often been done without addressing issues related to marketing costs and the availability of suitable marketing channels and infrastructure.

#### Utilizing price information

2.9 If farmers are aware of seasonal price and demand patterns from previous years they are able to plan their production more effectively, and using the appropriate technology, they can harvest both before prices are expected to drop and after prices start to rise again. Daily or weekly market price supply and demand information can help farmers decide when to harvest and, in larger countries, to which markets the produce should be sent.<sup>8</sup> While farmers in developed economies are generally able to obtain and interpret market information themselves, producers in developing countries are likely to require both a market price information service and assistance from the extension service in interpreting price information and in planning production. However, extension staff, while usually well trained to provide advice on production aspects, frequently lack access to information on marketing and post-harvest matters and are thus ill-equipped to advise farmers on production planning.

### ON-FARM OPERATIONS

#### Reducing on-farm costs

3.1 The quantity, quality and price of products available to consumers depends crucially on the way they are handled on-farm. Food safety is also a major issue. For example, poor drying and storage techniques can lead to mycotoxin development.<sup>9</sup> In order to improve post-harvest handling, FAO established the Special Action Programme for the Prevention of Food Losses (PFL) in 1978. The focus of PFL efforts has been on small farmers who, in developing countries, produce the bulk of food, both for themselves and for the market. More than half of these small farmers are women, and women also commonly play a major role in post-production activities (see Box 1).

3.2 During the 1970s post-harvest specialists worldwide tended to concentrate on the quantification of physical losses. Such studies were eventually largely discarded as being too costly and time consuming.<sup>10</sup> The approach to the post-harvest sector gradually changed to one which gives greater attention to studying the post-production system and to identifying its problems and bottlenecks.<sup>11</sup> However, because a non-commercial focus was adopted, suggested improvements were often based on what was technically possible rather than on what was economically justified.

3.3 In general, improved post-harvest technologies for grains have now been well identified.<sup>12</sup> In future, the focus of post-production activities for grains will be on adapting these technologies to specific environments and ensuring that they are economically and socially viable. With other crops, however, there is much potential for further technology development at the level of small- and medium-scale enterprises. For example, there is scope for new products with market prospects produced from traditional crops such as sweet potato.

<sup>8</sup> See Schubert (1988).

<sup>9</sup> See FAO (1979).

<sup>10</sup> For a detailed account of loss assessment and related issues, see Bourne (1977), Boxali (1986), Greeley (1982) and Harris and Lindblad (1978).

<sup>11</sup> See Booth (1987) for the evolution of FAO's approach to post-harvest development.

<sup>12</sup> See, for example, FAO (1985).

### Box 1 - Promoting the role of women in marketing

An FAO expert consultation on women in food production held in 1983 highlighted the following issues that required to be addressed in promoting the role of women in marketing. Many of the issues remain valid thirteen years later:

1. Marketing strategies and policies in many developing countries fail to take into account the multiple (farm, household and children) roles of women. Women account for an important if not a dominant share of rural trade (see, for example, para. 5.7 below) and their multiple roles are often not recognized. It is now increasingly acknowledged that women's needs should be catered for more specifically, if effective and meaningful marketing development is to take place.
2. A participatory approach is fundamental in formulating marketing development strategies. Women's participation can be encouraged by supporting the establishment and growth of women's trade associations and similar organizations. In organizations of both men and women, women's voting and other rights need to be guaranteed in the bye-laws.
3. Participatory planning requires grass-roots level marketing studies to identify, with the women concerned, their problems, constraints, opportunities and priorities. Without attempting to preempt the findings of such studies, it is likely that major components of marketing strategies, policies and projects would emphasize the following:
  - Markets are natural social centres as well as economic centres. They can act as focal points for a wide range of development activities, including extension, credit, input distribution and even public health and adult education.
  - Participation in marketing may be promoted by making markets more attractive and more accessible to rural women who dominate most markets as both buyers and sellers, through the provision of child day-care facilities, maternal and child health centres, and family planning clinics. General market infrastructure, such as shelter from sun and rain, sanitation, adequate space and equipment, also need to be promoted.
  - Training is important in making women more aware of their rights and opportunities in order to assist them in gaining access to market information, advisory services and credit.
  - Credit can be made more readily available to women traders by encouraging banks to recognize the business opportunities provided by female traders.

### Economics of post-harvest improvement

3.4 In theory, if all known technology and infrastructure were actually used losses in the post-harvest system could be reduced to almost nothing. However, the guiding principle of nearly every loss-reduction activity should be that the assumed benefits through reduced losses or higher prices must exceed the costs of the proposed improvements by an amount sufficient to justify the investment cost and the associated risk. Where possible, post-harvest improvements in developing countries should be relatively simple and low cost. For small grain stores, simple improvements to make existing structures secure against rats and vermin and to facilitate the application of insecticides may be more appropriate than the construction of new, more sophisticated, stores. Farmers tend to tolerate fairly high losses before making complex or expensive changes in their storage systems.

3.5 An understanding of the way in which the marketing system functions is a precondition for any post-harvest improvement activity. As an example, moves to improve on-farm drying of grains destined for the market will have little impact if farmers cannot get a higher price for well-dried grains.<sup>13</sup> There has been a tendency for farmers' interrelationships with private sector traders or millers to be ignored when planning post-harvest improvements. Suspicions about the private sector amongst aid agencies, government officials and NGOs have led to post-harvest activities by farmers' groups being promoted and subsidized, often in competition with the private sector. The track record of such group business ventures has, on the whole, not been good. The private sector, on the other hand, has demonstrated that, given the right policy and economic environment, it can rapidly respond to commercial opportunities and provide necessary services to farmers and consumers. The recent expansion in the number of small-scale maize hammermills in southern Africa, in response to the liberalization of maize markets, is a case in point.<sup>14</sup>

#### Social aspects

3.6 There are social as well as economic constraints to post-harvest improvement, and these are being increasingly recognized. A major determinant is the labour constraint. In rural areas, where an adequate level of powered equipment is still largely absent, manual labour is the most important production factor. Due to migration, a shortage of farm labour can often be experienced and during peak periods children may be required to return from school to assist on the farm. A socio-economic survey conducted by an FAO project in Swaziland found that women were heavily involved in all aspects of maize handling and that harvests were frequently delayed to allow the participation of children during their school holidays. One of the recommendations was that school holidays should be adjusted so that children would have holidays during harvesting time.<sup>15</sup> The introduction of technology can have unintended negative impacts on the poor and on women. For example, in some countries the introduction of the Asian rice harvesting sickle has led to women's wage labour being displaced by the use of male labourers. In Sierra Leone and elsewhere, the introduction of village-based threshing and winnowing machines meant the loss of traditional "gleaning" rights for the women who had previously carried out this work manually. Other sociological considerations that have to be taken into account are whether the proposed post-harvest intervention conflicts with religious beliefs, organizational capabilities, traditional village structures or domestic priorities. It is also essential to understand decision-making within the household, as well as who controls the household's resources.

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<sup>13</sup> This was, for example, the case in some Latin American countries in the early 1990s (Shepherd, 1993a). Cardino (1982), on the basis of research in the Philippines, argues that grain drying improvements, if not accompanied by improved on-farm storage, may result in more grain reaching the market soon after harvest, and thereby depressing prices.

<sup>14</sup> For a detailed analysis of this development, see Zambia, 1994a.

<sup>15</sup> See Booth (1987).

### Box 2 - Potatoes in Bangladesh

Many of the points made in this paper are well illustrated by the recent experiences of Bangladesh with potato development. The country has excellent potential for off-season vegetable production and a Crop Diversification Programme (CDP) was set up by the Government in 1990, with assistance from Canada and the Netherlands, to exploit this potential.

Well-planned and executed farm demonstrations convinced farmers of the potential for growing potatoes, or of increasing existing yields. By 1993/94 families in the participating areas had increased average production to 860 kg and yields had risen from 10.0 to 18.1 mt per hectare. Unfortunately, the same emphasis that had been placed on improving production was not shown to the post-harvest system. Initially this did not present major problems because farm families were consuming much of their production and the existing marketing system could handle the surplus, for which there was adequate consumer demand.

However, the continued expansion in the area under potatoes, allied to a bumper harvest for the 1994/95 crop, caused farmers major problems and highlighted the weaknesses of the approach adopted. Demand for potatoes among Bangladeshi consumers proved to be relatively limited. While the CDP had promoted consumption of potatoes by farmers, there had been little effort to promote them among other consumers. This problem could probably have been overcome if there had been sufficient storage available so that the potatoes could be released slowly onto the market. But in Munjiganj district, for example, production reached 350 000 tons when available storage amounted to only 55 000 tons. Many farmers announced that they would not be growing potatoes in 1995/96 as they had made a loss on the 1994/95 crop.

The above situation, which is far from unique, highlights the importance of crop development projects taking into account from the outset the post-harvest system as well as actual production requirements. All such projects need to ask some very basic questions, i.e. "if we are successful in promoting increased output, can the marketing and post-harvest system handle the increase? If not, can we do anything to ensure that the marketing and post-harvest system can handle the increase and, if not, do we need to rethink our production activities?"

## STORAGE IN THE MARKETING SYSTEM

### Ensuring economic viability

4.1 Storage has many functions but all involve moving produce through time, whether this be to provide subsistence families with a food supply beyond the harvest period, to provide for national food reserves in the event of an emergency or to ensure year-round availability of exotic foods for affluent consumers. As with all other post-harvest activities, the guiding principle for decisions to carry out storage, other than for food security purposes, should be that it is economically viable to do so, i.e. that prices obtainable after storage should more than compensate for the cost of storage.<sup>16</sup>

4.2 Important for the future will be an increasing awareness of the implications of the ongoing liberalization process for storage. Governments, donors and technical assistance agencies have a role to play in conducting a thorough analysis of how the marketing system works in order to propose

<sup>16</sup> See Booth (1981) for an example of how an analysis of seasonal price patterns can be used to identify the advantage of medium to long-term storage of potatoes.

effective handling and storage improvements.<sup>17</sup> Moreover, in an era of rapid changes to marketing systems, both as a result of policy changes and as a consequence of urbanization, there is a strong need for such analyses to be dynamic rather than static in their approach; in fact, this rarely happens. A consequence of SAP measures (see Box 3) in many developing countries has been that storage and handling facilities, which were formerly owned and operated by parastatals, are now largely redundant or are used for purposes for which they were not originally designed. However, some donors have continued to provide to African countries storage which is neither compatible with existing requirements nor with the likely requirements of either the government or the commercial sectors after marketing liberalization has been completed. The construction of stores must be based on commercial need or demand, or else they only serve to increase the costs for the organizations running them.

### Changing storage requirements

4.3 While some former marketing agency stores will be needed as reserves for the purposes of ensuring food security which are, initially at least, likely to be operated by governments, others may go unused. Although there is some scope for traders to take over inter-seasonal storage functions from former grain marketing agencies, they are generally constrained by a lack of capital to finance stocks. One way to overcome this problem could be for traders to deposit stocks in secure warehouses and obtain loans with those stocks as security.<sup>18</sup> There would also appear to be scope for specialized storage companies; these could be private companies which take over

#### Box 3 - Consequences of Structural Adjustment Programmes

Changes to marketing arrangements for staple crops, for example as the result of Structural Adjustment Programmes (SAPs), may well imply changes in post-harvest handling requirements. In all regions of the world the reduction in the role of marketing boards means that farmers are often no longer able to sell their crops immediately after harvest. Although the private sector may, in time, develop a capacity to undertake long-term storage, in the short run the implication of such changes in many countries is that greater levels of on-farm storage will be needed. Farmers may require training in adequate drying and storage techniques and the supply of insecticides will have to be assured. Also required is an education programme for farmers, many of whom, having been fully supported by state marketing systems in the past, find themselves initially at a loss to adjust to having to produce in response to market demand and having to identify outlets for their produce.

In countries where marketing agencies largely controlled grain marketing, there was, until recently, little need for public marketing facilities for grains and other staples. Markets in these countries mainly concentrated on fruit and vegetables, animal and meat marketing. However, with marketing liberalisation there is now a need to make available wholesale market facilities where grain traders can easily dispose of their products and retailers can access low-cost supplies.

<sup>17</sup> An example of where such research is being carried out is in Zambia where the Ministry of Agriculture and an FAO project are carrying out in-depth reviews of developments as a result of marketing liberalization (Zambia, 1994).

<sup>18</sup> FAO has worked with the Natural Resources Institute (United Kingdom) to develop such an arrangement for African countries. The results of this work have been published by FAO, (Coulter and Shepherd, 1995)

marketing board warehouses, or the former marketing agencies seeking to develop new business activities. Governments can assist such developments by promoting warehousing legislation and advising on appropriate quality standards.

4.4 Many of the large stores used by fruit and vegetable distribution organizations in the formerly centrally planned states are inappropriate for use by the smaller wholesalers that are beginning to emerge. In many countries, the private sector has taken over these large facilities, but is tending to use them for storage of a wide range of consumer goods, not solely fresh produce. Cold stores were often badly designed and are generally so large and poorly maintained that the private sector is unable to operate them economically. The breakdown of the old distribution system has led in many cases to farmers having to take over responsibility for marketing their own produce. In time, it can be expected that wholesalers using modern fruit and vegetable handling techniques will emerge. However, they are likely to make investments in their own storage facilities rather than continuing to utilize the infrastructure of the former system.

#### **Opportunities for improvement**

4.5 Particularly in the case of horticultural produce, there is much scope for using the available improved post-harvest technology. For example, improved control of storage temperatures and humidity and the use of controlled atmosphere can extend storage periods.<sup>19</sup> In general, however, the tendency to look for purely technological solutions to problems in the post-harvest sector is better resisted.<sup>20</sup> Often, a consideration of economic, social and management aspects can identify less costly and more appropriate solutions. In the days of heavy government intervention in marketing, for example, many cold stores were constructed in wholesale markets to store local produce, but these ended up being used solely to store imported fruits as storage of domestically-produced perishable crops was inconsistent with the daily selling of fresh produce on consignment.

### **IMPROVING MARKETING SERVICES TO FARMERS - THE ROLE OF GOVERNMENTS**

#### **An enabling environment for the private sector**

5.1 Governments are now recognizing that direct intervention in produce marketing is not the best way to assist farmers. However, indirect support to those carrying out marketing is still very much required in most countries but particularly in those which have recently undergone policy changes affecting the post-production system and where adjustment to the new marketing system will require considerable effort.

5.2 There are many ways in which governments can improve post-harvest and marketing services to farmers. These include improving rural marketing infrastructure, maintaining roads, strengthening the marketing and post-harvest skills of the extension services and providing marketing information. Most important, is to ensure a clear and stable policy environment in which the private sector can operate profitably. Unless traders can buy and store produce secure in the knowledge that the state will not accuse them of being "hoarders" and seize their stocks, introduce price controls and release large quantities of government stocks or food aid onto the market so causing a price collapse, they will be unlikely to become fully active in the market. The private sector will also be able to function most efficiently where there is a favourable macro-economic environment. This implies low inflation and interest rates, manageable balance of payments and budget deficits and bank liquidity. One of the contradictions of SAP measures is that the private sector has often been expected to take over functions previously performed by the state, without first ensuring that an appropriate macroeconomic environment is in place.

<sup>19</sup> See Harris (1986), FAO (1989), and Kader (1992).

<sup>20</sup> An example of what can go wrong comes from Peru in the 1960s. The Government constructed large forced-air stores in an attempt to regulate the supply and price of potatoes. A combination of high storage costs, potato collection difficulties and bureaucratic problems combined to defeat this aim. The stores have never served their intended purpose (Rhoades, 1988).

### Providing marketing information

5.3 Governments can facilitate marketing by providing reliable market information (see Box 4). The availability of information enables farmers to make informed decisions about planting, harvesting and, in the case of some forest products, gathering and selling of crops. Traders can make informed decisions about the most appropriate markets for particular produce in order to maximize the returns. Such a measure should help to stabilize fluctuating prices and reduce losses caused by gluts on particular markets, all of which benefit the consumers. Establishing an effective market information system in countries with limited resources can, however, run into several problems. Governments have often introduced systems which are far too complex for the available resources. They have also often become sidetracked from the main purpose of market information, which is to provide up-to-date information for commercial purposes, into providing only statistical data for government officials. Market information systems set up by technical assistance projects have frequently come close to collapse after the withdrawal of donor support, as governments have lacked the resources to sustain activities. Initially, it is preferable to develop a system which covers a limited number of markets and concentrates on obtaining only price and basic supply information for a limited range of crops. Consideration can be given both to commercializing information provision, initially by having price broadcasts sponsored and eventually by having the private sector take over the entire service,<sup>21</sup> and to the development of community-level information services. This has been done successfully in the forestry sector.

#### Box 4 - The Indonesian Market Information Service

Originally set up in the 1950s and subsequently expanded with assistance from the German Government, the Marketing Information Service (MIS) of Indonesia, operated by the Ministry of Agriculture, is one of the developing world's most effective.

Price information is collected daily from Monday to Friday on up to 21 vegetables in the 14 main vegetable-producing provinces as well as in the major wholesale markets. Average prices are then broadcast the same day on provincial radio stations in local languages, and in some cases on more localized stations, and selected price information is broadcast in the Bahasa Indonesia language on the national radio station.

The main users of the MIS are now farmers as traders are in regular contact with wholesale markets due to their frequent visits and wholesalers are able to exchange price information by telephone and fax. Almost all vegetable producers listen to the price broadcasts, either daily or when they intend to sell crops, and most report that the broadcasts, particularly the provincial or local broadcasts, are extremely useful in enabling them to bargain with traders. As a consequence, the broadcasts are very much appreciated by farmers.

Ministry officials charged with price collection also function as marketing extension specialists. They monitor prices and prepare graphs to help the farmers in understanding seasonal price trends and to help them plan production.

At an annual cost of around US\$500 000, the Indonesian MIS is not cheap. However, it has demonstrated benefits for farmers and can be considered an efficient example of the type of government support service.

<sup>21</sup> FAO has, for example, developed a software programme for use in processing and analysing market price information (FAO, 1994).



## Roads

5.4 The access of farmers to rural markets, like that of rural areas to urban markets is crucially dependent on the adequacy of the road network. Unfortunately, the experience in many countries has been that resources allocated to the construction of roads have not been followed up with appropriate resources for their maintenance. New approaches towards guaranteeing road maintenance need to be developed. Poor roads both slow-down transport, thus increasing losses due to perishability, and increase transport costs due to greater wear and tear on vehicles using them. Indeed, in some countries many farmers have been unable to sell produce because the transport rates demanded by truckers have exceeded the value of the produce.

## Constructing and operating markets

5.5 Governments, and more particularly local authorities, can facilitate marketing services for farmers by allocating land and by building infrastructure for rural markets. Such markets can provide an assembly site where farmers can sell their produce to traders for onward shipment to urban markets. They are also important as food sources for rural agricultural and non-agricultural labourers, artisans and the rural poor. Thus market improvements in rural areas can have a positive benefit on rural poverty alleviation and food security. Where such markets do not exist traders have to visit farmers individually, thereby pushing up marketing costs. Where markets do exist, they often lack basic facilities, have no shelter to protect produce from the sun and the rain and frequently have no hard standing, leading to flooding. All this reduces the efficiency of the market, leads to produce losses and presents possible health problems. Another important factor is the location of the rural markets. Where such markets have developed spontaneously, the location almost certainly reflects the preferences of both farmers and traders. Where possible, existing sites should be improved and the development of new sites avoided. Many new markets suffer from overly elaborate designs and unnecessarily costly structures, resulting in high costs and hence high charges to users.

## The role of extension services

5.6 In most countries marketing and post-harvest problems are regarded as beyond the scope of field-level agricultural extension workers. While some governments maintain agricultural marketing departments their activities rarely have any impact at the field level. Even when production extension workers identify marketing and post-harvest problems faced by farmers, their lack of expertise in the subject or lack of knowledge of appropriate sources of assistance makes them unable to help the farmers. Sometimes, the most visible participant in the marketing system, the trader, is then made the scapegoat for problems, particularly as extension workers tend to see the trader-farmer relationship as exploitative without having carried out a detailed examination of traders' marketing costs.<sup>22</sup> By utilizing price data provided by a market price information service, extension workers should be able to advise farmers on planning production for the market and on negotiating with traders. An extension officer trained specifically in marketing should also be able to provide advice and train farmers in improved harvesting methods, sorting and grading, improved packing and handling practices and appropriate storage.<sup>23</sup> Such needs may only arise in cases where there are no equivalent official government services or services provided by NGOs.

<sup>22</sup> For advice to extension workers on marketing cost analysis see Shepherd (1993).

<sup>23</sup> The Agricultural Support Systems Division of FAO has prepared two training videos on horticultural marketing for extension workers, as well as a manual for extension workers (FAO, 1989a; FAO, 1992; FAO, 1994a).

### Supporting the private sector

5.7 Dismantling state marketing structures should be done in a way which fosters competition and does not simply replace a public-sector with a private sector monopoly. It should also be accompanied by measures to strengthen the private sector. Support to traders which governments can provide includes training in business methods and advice on handling and storage. Traders should not, as a rule, be subsidized, but there may sometimes be a case for limited, targeted subsidies to promote improved techniques. For example, an FAO project in Nepal supplied plastic crates for traders to use for tomato marketing on an experimental basis. Such was the success of the crates in reducing losses and improving handling that traders were more than willing to pay the full commercial price to obtain additional crates. In West Africa women traders handle 60-90 percent of domestic produce from farm to consumer and women have a similar role in many Caribbean countries and in the Andean region of Latin America.

### SUPPLYING THE CITIES

#### The pace of urbanization

6.1 The population of urban areas worldwide is growing by 3.4 percent per annum and by around 5 percent in sub-Saharan Africa.<sup>24</sup> By the year 2000 there will be around 200 cities with populations of over 1 million and 21 "megacities" with populations of over 10 million people. However, by far the greatest part of the urbanized population lives in cities of less than 500 000 inhabitants. Urban growth rates that exceed the infrastructural and institutional mechanisms needed to support them have been an almost universal feature of the developing world during the past two decades. This momentum will continue to change the balance between urban and rural areas, to the extent that by 2010 all of the major regions will be over 35 percent urbanized. The urban population of least-developed countries is currently projected to increase by 4.6 percent per annum and, by 2025, 43 percent of the population of these countries is expected to be urbanized. Cities and towns are presently absorbing over 60 million people annually.<sup>25</sup>

6.2 Urban growth will continue to present enormous problems for the supply and distribution of food. Moreover, simple growth rate figures tend to mask the complexity of the problem. On the one hand, incomes of certain segments of the urban population are rising rapidly, leading to increasing demand for more expensive foods such as fish, horticultural, and forest products (e.g. spices) and livestock products as well as for products which provide a varied diet and are processed to offer greater convenience. On the other hand, the majority of urban dwellers in most developing countries remain highly disadvantaged, with very limited purchasing power. For these people, guaranteeing the efficient distribution of low-cost but nutritious food is becoming an ever more pressing concern.

#### The need for wholesale distribution systems

6.3 Although much scope remains for encouraging home garden and peri-urban production, most food supplied to cities will come from more distant areas and this will require the improvement of rural-urban linkages through continuing investment in roads, transport and marketing infrastructure, such as assembly markets in producing areas and wholesale and retail markets in urban areas. If transport, storage and marketing systems are inefficient, marketing costs will be high adversely affecting food prices and the access of lower income groups to food. This implies that considerable attention should be paid to the planning, establishment and efficient functioning of marketing infrastructure. Unfortunately, the combined needs of farmers, traders and consumers are often not considered by national and urban planners. There are numerous examples of new urban markets

<sup>24</sup> Source: FAO Agrostat.

<sup>25</sup> See UN Economic and Social Council report (1995).

which have had difficulty in becoming established because of a reluctance on the part of traders or their employees to operate in them, due to errors in location or design or to the absence of supporting infrastructure.

6.4 In the case of the former centrally planned economies and in many developing countries, there is no suitable market-driven wholesale distribution system enabling produce to be efficiently and profitably moved from producer to urban consumer. Firstly, there is, as previously noted, little available market price information. Secondly, linkages between traders and farmers are inadequately developed, leading to high marketing costs, as traders buy from numerous small-scale producers or as farmers take their own produce to retail markets. Thirdly, there is a general lack of experienced market functionaries able to act as wholesalers and commission agents. Finally, there is inadequate physical infrastructure for effective and efficient marketing to take place.

6.5 An important area for investment in the future is the provision of appropriate infrastructure. Planning markets requires more than simply identifying a site and designing the structures; the ownership and management of the market as well as the regulations which will govern its operation are also priority concerns. This implies early and continued consultation with the expected users of the market. Market planning also requires a detailed knowledge of the marketing system and realistic forecasts of throughput.<sup>26</sup> Land for markets should be set aside in Urban Development Master Plans.

6.6 Support to the promotion of efficient wholesale marketing systems will continue to be a priority in both developing countries and those economies currently in transition for many years to come. Nevertheless, over time food distribution practices in these countries are likely to take on many of the characteristics of distribution systems in the developed countries, which are becoming increasingly concentrated. In Belgium, France and the United Kingdom, as extreme examples, 10 percent of retail units account for over 80 percent of food distribution, the result of increasing numbers of hypermarkets and supermarkets. Such stores purchase directly from the producer or processor, by-passing traditional distribution systems. Such is the level of consolidation within the retail industry that the major companies are in a strong bargaining position with their suppliers.<sup>27</sup> The economies in transition of Eastern Europe also had a high level of consolidation but with the advent of privatization this is breaking down and the number of small retail units is rising. With time it is likely that the consolidation trends seen in Western Europe will be followed in Eastern Europe as well.

#### **Marketing of animal and fisheries products**

6.7 In order to examine the supply of animal products to urban areas it is necessary to divide these products into two categories. Beef, lamb and dairy production is, in many developing countries, generally small scale, with a predominance of independent milk producers owning five animals or less. They are located in areas which are often at some distance from the urban markets, and hence are heavily constrained by poor roads, and weak collection and marketing services. This is also an emerging problem in some states of the former USSR. Pig and poultry meat, and egg production, in contrast, are increasingly large-scale and frequently sited on the outskirts of cities. Such production is thus less constrained by infrastructural weaknesses. In the longer term, economies of scale will become of increasing importance if urban areas are to be adequately supplied. This applies particularly to dairy production and milk collection and processing where, initially, consolidation of small producers for the purposes of collaborative marketing efforts and, later, managing the transition from small to medium- and large-scale production will be important issues.

<sup>26</sup> For information on market planning, see FAO (1991) and FAO (1995).

<sup>27</sup> ECA (1991), page 6.

6.8 Post-harvest losses of fish in many developing countries amount to 25 percent and more of fish entering the market. Among the factors contributing to this situation are the lack of, or inadequate use of ice, poor handling of the product, inadequate road infrastructure and wasteful forms of processing. Inadequate wholesale and retail fish markets in many developing countries contribute to the wastage and may reduce the level of consumer demand. In many countries, both public and private sector investment in the distribution chain would result in considerable increases in the quantity and quality of fish available for consumption. In some countries, however, such investment has not emerged rapidly enough to compensate for the breakdown of state fish marketing organizations. In Poland, for example, the private sector was relatively slow to fill the gap created by the collapse of the state marketing body due to the high risk associated with the perishability of fish and the fact that, under the former system, there were no fish markets at the point of landing.

#### Programmes for low-cost food supply

6.9 There is a wide range of programmes in developing countries designed to assure urban consumers specified quantities of one or more food staples at prices fixed by the government. These often provide basic rations irrespective of income. In general, there is evidence that food stamp plans, rationing schemes and fair price shop systems can successfully increase food intake amongst the needy in urban areas, although they have placed a heavy burden on government budgets. In India, for example, food is distributed by the states under the Public Distribution System. Grain is issued by the Food Corporation of India at a uniform price to states which distribute the grain to consumers through Fair Price and ration shops. An important element of the operation is the fact that the rice supplied, although fully edible, is regarded as being of low quality because of the high proportion of broken grains. Consumers with a reasonable level of purchasing power are, for this reason, unlikely to purchase state distributed rice, ensuring that it can be targeted at those most in need. There is, however, a high element of subsidy involved in distributing grain in India, estimated at over US\$1 billion a year. This has stimulated a search for alternative approaches to meet the needs of the urban poor. Similarly, untargeted food subsidies in Egypt were estimated to be costing around US\$2 billion annually in the early 1980s.<sup>28</sup>

6.10 Untargeted food subsidy programmes are not generally the most cost-effective way of improving food consumption for the very poor. Moreover, food subsidies, once introduced, are difficult to remove. An alternative approach, used in some Asian countries, is to supply subsidized rice only to shops in the cities' poorer areas. Sri Lanka significantly reduced the fiscal costs of its food subsidy programme in the early 1980s by shifting from ration shops to food stamps and excluding much of the population from the programme.<sup>29</sup> In theory, rationing offers the possibility of targeting the most needy urban dwellers. In practice, few rationing programmes have been considered completely successful, a major problem being to identify and access those most in need.

#### Maximizing food availability

6.11 A number of approaches to reduce the cost of food distribution have been tried in Latin America, through the organization of consumer and small shopkeepers' networks to obtain better purchasing terms. Such networks include consumer purchasing associations and cooperatives, retailer purchasing associations and voluntary chains. Although they contribute towards enhancing food availability, experience to date has been that such initiatives fail to reach the very poor unless subsidized. An interesting approach has been in operation in Brazil for some years. Wholesale markets supply shops (known as *Sacolão* or shopping bags) with a selected range of fresh produce which are sold in the shops at a fixed, standard price per kilogram. The customer can select several different fruits, vegetables, roots and tubers and which are all weighed together at the check-out

<sup>28</sup> See Pinstrup-Andersen (1988).

<sup>29</sup> Ibid.

point. Produce on offer varies according to supply conditions, so that when the price of a particular product is seasonally high it is not included in the range available in the *Sacolão*.

### Street food vending

6.12 In many countries the sale of raw and prepared foodstuffs by itinerant vendors is widespread. The buying and selling of street foods is a daily activity undertaken by many urban residents. It is a source of employment and income and also contributes a significant share to the daily food consumption of a large number of people. With the expansion of cities and towns, increasing numbers of people find in street foods a convenient and economical source of food. Street food vending employs a large number of women who utilize their earnings to enhance the general standard of living of their families. In certain cities in Africa, as much as 90 percent of the street food trade is carried out by women.

6.13 However, street foods have tended to be overlooked by many development planners, policy-makers and researchers. They have tended to be viewed negatively because of the problems they create in terms of environmental hygiene, food safety and traffic congestion. The assumption has been made that, with modernization, this informal sector would disappear. This has not been the case as street food vending has become a global urban phenomenon. A more constructive approach would be recognition of the activity and of its important social and economic roles; the education of street food vendors in hygienic practices; the provision by public authorities of adequate facilities, including tap water and garbage disposal facilities; and the involvement of street food vendors in all decisions related to their activities, including the identification of sites for food stands or carts.

## FOOD PROCESSING

### The role of food processing *in the family*

7.1 A particularly important aspect of food processing is that it permits greater diet diversity giving consumers access to a wider range of products and, hence, vitamins and minerals, than they would otherwise consume. The most basic level of processing is food preservation which, in a variety of forms, has been practised by families in traditional societies for generations, in order to provide food when other sources are scarce. Examples include meat preservation through drying, salting, curing and smoking. Non-wood forest products offer possibilities of balancing seasonal availability of cultivated crops and providing income and employment opportunities. Palm varieties are particularly good sources of food for processing, providing vegetable oil, palm wine and flour for baking. In Melanesia, palm sago, produced through a laborious process, provides a staple carbohydrate for some 300 000 individuals. However, as most people now have access to more convenient, commercially processed foods or are within reach of government food distribution programmes, many of the traditional ways of guaranteeing food security are dying out. This is not necessarily a desirable trend, particularly in those areas of the world subject to food shortages. Governments can assist by taking steps to document existing practices and, where appropriate, by promoting improved methods.

### *in the village*

7.2 Village-based processing includes basic transformation activities such as milling as well as processing of products for which there is potentially a market.<sup>30</sup> Such processing can be done on an individual or group basis and provides employment for millions of rural people, often being the main source of income for rural women. The processing of *gari* in West Africa or the smoking of fish in Ghana are examples, enabling highly perishable products to be transformed into a product

<sup>30</sup> For details on processing at rural level, see FAO (1988).

which can be transported long distances and stored. Often with the support of donors and NGOs, village groups are now processing fruits and vegetables themselves. Where such ventures have been designed to preserve crops that would otherwise be discarded, so that they can be consumed after the fresh season is over, few problems occur. Where, however, village-based processing is designed to provide cash incomes, such schemes have often run into marketing problems due to a lack of management and marketing expertise and the failure to adequately research the potential markets.

*on a larger scale*

7.3 Agro-industries convert commodities into processed foods which are usually more stable and more marketable than the raw, untreated commodity. They can thus make available certain types of food, e.g. animal protein, often at low prices, to consumers who would not otherwise have access to them, ensure year-round availability of seasonal, perishable products and provide food in a more convenient form than the raw material. Where urban populations require processed foods in large quantities, mechanized processes with high output capacities are generally efficient and economic. Widely dispersed populations may, on the other hand, be better served by smaller-scale technologies. Food processing industries may be concentrated in urban centres or spread among rural communities where they offer the twin advantages of processing perishable crops and animal products close to their source and of providing employment for rural people. Small-scale milk processing in rural areas, for example, is labour intensive (up to 100 kgs per work day) while small rural slaughter houses can, in many cases, provide a nucleus for the establishment of satellite meat processing industries.

7.4 Agro-industries offer considerable scope for employment generation. In the future, the rate of growth of the labour force in non-production agriculturally-related activities will be far higher than for farm work. During the past two decades, employment in food-processing industries in Asia rose by about 8 percent a year. In Malaysia, food processing has enjoyed an annual growth rate of over 11 percent since 1970 and food factories now employ over 15 percent of all industrial workers.

7.5 Many nations lack the material, financial and human resources essential for stable, sustainable development of food processing and other related agro-industries. Even among the more advanced developing countries, the need is greatest to raise the standards of operating efficiency in the industries that exist, rather than to promote product innovation. Unfortunately, many national and academic research institutions seem more dedicated to inventing new products than assisting basic industries to operate with greater efficiency. As a result, there is a need for agro-industrial advisory services that can assist food industries to use their limited resources more efficiently and economically. This calls for a greater emphasis on operations research on the factory floor than for research in laboratories and pilot plants.

#### **Demand for processed products**

7.6 All processing operations, whether small-scale, village-level activities or large ventures employing thousands of people must be based on the existence of a demand for the processed product, a demand which can be satisfied profitably. This simple fact has not always been appreciated as governments and donors have tended to promote agro-processing as a way of disposing of surplus production. In the 1970s, FAO identified 70 canning, slaughtering and related plants in Africa, almost all constructed using donated funds, which had not succeeded because of a failure to fully research the market before the investment was committed.<sup>31</sup> A recent study of African state-owned processing ventures makes the same point.<sup>32</sup>

<sup>31</sup> Abbott (1986), pp. 116-121.

<sup>32</sup> Problems experienced with agro-processing ventures in Africa are well discussed in Jaffee and Morton, (1995).

7.7 Technological innovation to improve shelf life, storage properties, and consumer appeal depend on an adequate assessment of the associated improvements required. Ultra High Temperature (UHT) milk, for example, appears to address supply problems stemming from the seasonality of production and retail problems which are due to the short shelf-life of fresh milk. The introduction of UHT milk, however, has not been uniformly successful in developing countries, in part because it needs high quality milk, expensive packaging, stringent hygiene, and good infrastructure, and is significantly more expensive than fresh milk. Moreover, consumer acceptance of the taste has been poor in some countries. Many of these aspects were ignored or poorly assessed during the planning stage.

#### Constraints to agro-industrial development

7.8 Even where markets exist, there may frequently be significant barriers to the development of agro-industries in the food sector. In some countries certain processing activities are still reserved for the state sector, or private entrepreneurs are required to accept state equity. Other countries remain reluctant to encourage foreign investors in the food sector without attaching numerous restrictions to their activities, while domestic investors are often constrained by a lack of liquidity, underdeveloped or non-existent stock markets and a lack of venture capital.<sup>33</sup>

7.9 As a result of restructuring in Eastern Europe and the former USSR, and of SAPs in Africa, Asia and Latin America, macro-economic constraints which effect the development of efficient food processing are gradually being addressed. However, in several countries overvalued exchange rates continue to encourage imports at the expense of domestic production. In many countries official and unofficial restrictions on private investment persist. Policy changes have not always been transparent, causing uncertainty which has deterred private investors. The application of price and margin controls squeezes profitability and restrains investment. In some countries, the damage to domestic industry is compounded because such controls are only applied to locally produced goods, thus providing a strong incentive for wholesalers and retailers to concentrate on selling imports. Export development of processed products is also constrained by overvalued exchange rates, by protectionism in the most affluent markets and by the lack of marketing and presentational skills. An important problem is the inability of many exporters to meet the quality requirements of importing countries.

7.10 In Eastern Europe and countries of the former USSR, food processing industries have been caught in a credit squeeze resulting from having to fund operating and some investment capital requirements from high-cost commercial credit. The loss of traditional markets has exacerbated their problems. Countries have had varying degrees of success in responding to the new environment, but those companies forced to rely on commercial credit have nearly all experienced difficulties. This has affected their ability to develop the new products necessary to compete with suppliers from the West. Similarly, in Africa, financial reform as a result of SAPs has tended to reduce credit availability and increase interest rates. In effect, one aspect of SAP reform, control of liquidity, can be seen to be militating against the success of another aspect, privatization of the food sector. Another major area of concern for countries that have recently undergone SAPs is that the legal framework is often inappropriate for the new transactional methods. Commercial laws and procedures may provide inadequate protection for private property (physical and intellectual) and fail to cover such matters as the enforcement of contracts.

#### Official food control

7.11 An important element in the food marketing chain is the control procedures necessary to assure that the food is safe, of high quality (meeting established official standards and buyers' requirements).

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<sup>33</sup> Ibid.

expectations) and is nutritionally sound. This element applies whether the food is a raw commodity, semi-processed, processed, manufactured or prepared. Implementing food control practices to assure food safety, quality and nutritional value is of paramount importance. Food moving in international trade must meet established international food standards, e.g. those set by the Codex Alimentarius Commission. International trade agreements such as, the North American Free Trade Agreement (NAFTA), Southern Common Market (MERCOSUR) and others, have set trading practices, standards and measures for food safety and protection of human and animal health. These measures have increased the level of safety and quality of food in international trade, promoted international food trade and helped to provide assistance to the development of the food industry, particularly in developing countries. These agreements have, however, placed costly burdens on developing countries in terms of improving and strengthening their food export control procedures to assure market access, and to protect both their trading reputations and international consumers.

#### International trade

7.12 The Uruguay Round of trade negotiations involved countries in undertaking commitments to reduce domestic support to agriculture, cut export subsidies, eliminate non-tariff barriers to trade and to rely in the future on tariffs to regulate imports. Many countries have agreed to reduce their agricultural tariffs, often substantially, over the next few years. In addition, a number of countries have introduced tariff quotas under which a certain volume of imports will be eligible to enter at a lower rate of tariff. Special safeguards to protect importers from import surges have been allowed under certain conditions. Finally, sanitary and phytosanitary regulations have been put under a new special discipline. Together these changes in market access are expected to boost the value of world agricultural trade significantly, offering higher prices and some increase in import possibilities for a number of agricultural commodities. To take advantage of these possibilities countries will need to strengthen their marketing capacity. Expenditure on *bona fide* export marketing by developing countries is allowed under the Uruguay Round.

#### PRIORITIES FOR ACTION

8.1 The above sections call for greater priority to be attached to the marketing, processing and distribution of food. On the basis of the foregoing discussion, a number of priority areas for action by governments and donors can be identified. These are sub-divided below under the headings of: Policy; Research; Technology; Infrastructure; Extension, and Support Services to the private sector.

#### Policy

8.2 Governments can assist by taking steps to develop an awareness of the importance of the post-harvest sector. This involves creating an appropriate macro-economic environment in which food producers, traders and processors can function profitably. Policy should similarly reflect the crucial role of the post-production system in ensuring an adequate, affordable and safe supply of food to consumers and in maximizing the efficiency of the production system itself. The benefits to consumers of the lower prices which can result from reduced losses and improved efficiency in marketing and processing need to be recognized. Governments can help by committing themselves to create a greater awareness of post-production issues amongst those responsible for pre-harvest activities, and to develop the skills of those working in the post-harvest sector. An important area of concern in this respect is coordinating the activities of all relevant agencies in this area.

8.3 Governments are encouraged to continue implementing measures to ensure that decisions on investments in crop production and processing are based on market demand. Thus, policies, laws and regulations should be both consistent with the need to encourage the efficient functioning of the private sector in marketing and processing and to guard against possible abuses such as cartels, collusion and other monopolistic practices. Existing legislation can be examined for its relevance and to remove unnecessary constraints on the private sector and policy directed at promoting



effective competition, enabling viable small and medium-scale concerns to compete on equal terms with larger companies. Issues which governments can address include the misallocation of resources through price controls, direct subsidies, interest rate subsidies and credit rationing. In many countries, a major priority is to develop new commercial legislation to provide security for those carrying out commercial transactions.

8.4 Donors can assist governments to carry out the necessary reviews of legislation and its impact on efficient marketing and processing. Donors are also well placed to advise countries without an adequate body of commercial law on the development of necessary legislation.

#### Research

8.5 Interventions designed to improve post-harvest handling, processing and marketing should be examined within the context of the functioning of the entire post-harvest system, and from the standpoint that all actors within that system need to operate profitably. Without an understanding of the social and economic aspects of, and interlinkages within the system, there is a danger that inappropriate measures will continue to be taken. Governments can be most effective where they have a detailed knowledge of the functioning of post-harvest and food preservation systems and carry out the research necessary to develop this knowledge. A priority for governments and international organizations is also the need to devote more attention to the availability of statistics regarding post-harvest matters. The level of small-scale processing in developing countries is, for example, often underestimated which, in turn, leads to the low allocation of resources to the sector.

8.6 In recognizing the complexity of supplying foodstuffs to rapidly growing urban areas; special programmes designed to assure the supply of low-cost staples to urban consumers need to be constantly reviewed to ensure that they result in cost-effective operations. The experiences of countries which have successfully reduced costs without sacrificing policy objectives can be examined. The many different approaches to reducing costs of retailing in urban areas, for example through the establishment of voluntary chains, certainly merit further investigation. The positive role of street food should be recognized. At all levels and in all environments, the use of appropriate technologies in solving food safety and environmental hygiene problems would benefit from investigation and promotion.

8.7 The research areas elaborated above will be expensive to carry out. Donors should continue to increase support to poorer countries to enable them to carry out such research, both in terms of funding part of the research and in developing national research capacities. Collaborative efforts between international agencies, research institutions and national organizations to support such research can be further developed.

#### Technology

8.8 An important consideration for both governments and donors in introducing both large and small-scale technology is that such technology be given appropriate economic and social evaluation within the context of the operation of the marketing system. Where appropriate, technology should include effective quality assurance systems. Governments and donors alike should aim to encourage economically viable investment in processing facilities, cold stores, etc. by the private sector. Donors are well advised to resist the provision of lavish facilities to soon-to-be-redundant government bodies in favour of concentrating investment on developing the capacity of the private sector to make viable investments.

#### Infrastructure

8.9 Notwithstanding the above comments, there are areas in which considerable government investment is required in order to promote the flow of food from producer to consumer. A vital

consideration in this respect is for governments to focus on food distribution requirements when planning road construction and maintenance. Particular areas of emphasis include the development of appropriate marketing infrastructure, both assembly markets in rural areas and wholesale and retail markets in urban areas as well as installations for fish marketing. Nearly all countries require improved infrastructure but this is a particular need for countries in transformation. National governments can stress to local authorities the need for markets and ensure that these needs are incorporated into urban and rural development plans.

8.10 The planning of markets should take full account of local conditions and requirements and markets constructed only after such detailed research has been carried out. Well-planned markets will attract construction capital for well-prepared projects from internal and external sources.

#### Extension

8.11 Extension services have an important role to play in promoting the improved supply of quality food to consumers. Governments can widen the horizon of extension services by training field officers and new recruits in marketing, post-harvest handling and basic agri-business so that they are able, for example, to advise farmers on improved storage techniques or on how to bulk their produce as a group to reduce marketing costs. To develop marketing and post-harvest activities by extension workers depends on improved communication between existing production extension services, market operators and the marketing services of agriculture ministries with, where necessary, the development of an appropriate structure to ensure the necessary linkages between them. The establishment of a Marketing and Post-Harvest Extension Support Unit is suggested as the best means of bringing about these linkages. Donors can assist by funding training facilities and by developing training materials.

#### Support services to the private sector

8.12 A competitive private sector requires information, whether it be information on prices in local markets or information on export opportunities for fresh and processed products. Governments can facilitate efficient marketing by providing marketing information services. Donors can assist governments to establish such services, but care should be taken to ensure that they will be sustainable once assistance is withdrawn. Private sector provision of market information should be encouraged where feasible. Market information services are a particularly important tool for easing the transition from state-controlled to private-sector marketing.

8.13 Governments can provide positive support to private-sector traders and processors by offering training in marketing management, research, export marketing development and business methods, as well as advice on handling, packaging and processing. Quality control is also an important issue, particularly for processed produce and for the export of fresh produce. In taking into account the special needs of the many women involved in food marketing and processing, governments can assist by providing information and training on the use of appropriate processing technology and by providing extension support for marketing of fresh and processed products. Donors should consider developing business and technical training programmes for the private sector and supporting the development of associations representing farmers, traders and small- and large-scale processors, both as channels for training and as organizations which are capable of promoting improved understanding between state and private sectors.

8.14 A major constraint to private enterprise development is the lack of finance. Many countries, particularly those in the process of restructuring, lack a suitable banking structure to meet the needs of entrepreneurs. Governments, sometimes with assistance from donors, can help by reviewing the policy environment within which banks operate, in order to assess its continued suitability in the light of the requirements of the developing private sector, and, more generally, to identify ways of increasing the efficiency of the financial sector.

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