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## **AGROINDUSTRIAL LINKAGES FOR THE IMPROVEMENT OF SMALL-SCALE FARMING IN JAMAICA**

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## CONTENTS

	<i>Page</i>
ABSTRACT .....	5
INTRODUCTION .....	7
1. Agro-industry in agrarian development .....	8
2. Definitions and orientations .....	9
3. Background to agriculture in Jamaica .....	10
4. Composition of gross domestic product (GDP) .....	11
5. Status of the Jamaican agro-food sector .....	11
6. Linkages in the agro-food system .....	15
7. Lessons from local agro-industry linkages .....	18
8. Overall analysis and conclusions from the case studies .....	28
9. Major recommendations .....	31
10. Policy implications .....	33
11. Strategies for implementation .....	34
Notes .....	35
BIBLIOGRAPHY .....	37
ANNEX .....	39



## ABSTRACT

There are some 100,000 small-scale farmers in Jamaica. Their average age is high (around 50 years) and education low (incomplete primary education). The average size of small farms is between 1.2 and 2.4 hectares (3 to 6 acres), and they are usually on hillsides or on poor soils. There are around 70, mostly small, agro-industries.

The broiler industry is the oldest and most successful agriculture/agro-industry linkage in Jamaica. There are two big agribusinesses that operate at international levels of efficiency. They have maintained relations with producers for the last 30 years. Contract farmers are responsible for housing, equipment, all utilities, on-farm management and labour, growing chickens to market size and delivering them. The processors provide one-day-old chicks, medication, feed and technical assistance (some twice a week). Farmers are paid on the basis of the conversion of feed to meat. This has given incentives to the farmers to try to improve their efficiency. The contract farmers are associated, which allows for more "equal-to-equal" negotiations with the agribusiness and they also own shares in it. Farmers exert pressure on agro-industry to homogenize the quality of eggs and one-day chicks and to use more domestic raw materials in order to depend less on feed imports.

The few other examples of contractual relations are characterized by lack of compliance both from the farmers' side and from the agribusiness side. One of the reasons are the price fluctuations that encourage switching to a higher bidder. The smaller farmers have hardly any trade channels other than "higglers" (intermediaries).

Some 50% of agro-industrial raw materials are imported because domestic production is insufficient, because there are no orchards using modern technology, because fresh market prices are better than those paid by agribusinesses and because the latter can import at cheaper prices. Imports are complicated by lack of currency, slow import procedures, transport problems and lack of information. On the local market, agribusinesses usually buy the leavings of the fresh markets, work at low technology levels, with obsolete equipment and idle installed capacity, compete domestically with the same products, are small by international standards but important in Jamaica for their share in industry and in employment. Neither agribusinesses nor technological institutes carry out much research or contribute much innovation.

There is, however, good potential in Jamaica for diversifying and modernizing agricultural production, fostering farmer/agro-industry coordination agreements and improving efficiency at the agro-industrial level; but a joint, strongly motivated effort by the Government and the various agents involved will be required in order to realize this potential.



## INTRODUCTION

Agro-processing forms the main manufacturing business in Jamaica. It is largely based on food processing of a range of tropical fruits, vegetables and spices, and it accounts for over 50% of traditional manufactured exports and over 25% of non-traditional manufactured exports (Shirley, 1994). The food processing component of the agro-industrial sector accounts for approximately 15% of total manufacturing output on the island.

Growth in the agro-industrial sector has been declining in recent years. Specifically, the food-processing subsector showed an overall decline in production for 1993 as against the previous year. The rest of the agro-industrial sector fared just as badly. Overall, the manufacturing sector during 1993 registered a decline of 2.9% compared with 1992, falling from 19.3% of gross domestic product (GDP) to 18.5%, at constant prices (Planning Institute of Jamaica, 1993). The island's food-import bill has climbed to over US\$ 250 million.

Small-scale industries remain the main conduits of food, fibre and agricultural-based industrial commodities in Jamaica. There are over 100,000 small farmers in Jamaica, with some 60 to 70 food processors.<sup>1</sup> They produce a range of products, including sauces made from local herbs and spices, canned ackee (the national fruit), canned calaloo, tinned juices and processed meats. They export a range of specialty and ethnic foods to markets and also in developed countries process excess quantities of crops that are currently produced in large volumes for export, such as papayas, bananas and mangoes.

The scope of the food industry in Jamaica is quite extensive, covering sugar; edible oils and fats; milk products; beverages; confectionery; meats; processed foods; post-harvest processing of coffee, cocoa, pimento and spices; and fresh fruits and vegetables for export and local consumption.

Conversion of agro-industrial commodities into non-food items forms a small part of the total activity in this sector. Products include essential oils, materials for dyeing, tanning and colouring, medicinal products, insecticides, cosmetics, skin care products and perfumes and colognes.

The relationship of small farmers with processors has largely been one of suspicion and recriminations, resulting in severe distortion in the system and the unnecessary import of an inordinate amount of material for agro-processing.<sup>2</sup> Added to this problem is the inefficiency in agricultural production in Jamaica, which is caused by such factors as inhospitable and infertile hillside farming, inadequate technology and conservatism among farmers.<sup>3</sup>

Production efficiencies are also low for many agro-processing enterprises. Many agro-processors are small, opportunist operators who function on an intermittent basis, depending on the availability of raw materials. Capital equipment is old, largely because the high cost of money is a major deterrent to new investment. Maintenance is irregular, and refurbishing, modification and upgrading are almost non-existent, not only because of shortage of funds, but also because of lack of skills and

vision. Packaging and labelling technologies are antiquated and costly in the industry (Ventura, 1990).

Social factors that have affected the agriculture-manufacturing conjuncture on the island include poverty, a history of slavery and social division, the small size of the country, dense population and competition for survival in one of the most dualist economies in the world (Davies and Witter, 1986).

An important Cabinet decision, which is reflected in the national industrial policy, is the establishment of agro-industry as the prime sector around which the nation's endogenous scientific and technological capacity will be developed.<sup>4</sup> The government is particularly interested in industries which constructively utilize the nation's human and natural resources, its cultural heritage and the environment. Agro-processing is high on the list of activities which have been identified as having the best prospects of attaining this national goal. However, if the agro-industrial chain is to contribute to development on the island, there have to be significant improvements not only in agriculture and agro-processing, but also in the dynamic reciprocal linkages between them.

### **1. Agro-industry in agrarian development**

It has been estimated that in developed economies about 80%-85% of agricultural produce is processed, compared to only 10%-20% in countries like Jamaica (Rao et.al., 1989). Nevertheless, agro-food initiatives represent 50% of the total manufacturing production and employ 22,500 workers, or over 20% of the manufacturing work force on the island. Agriculture forms just over 7% of the gross domestic product (GDP) in 1993 (Planning Institute of Jamaica, 1993), falling from 15% in the 1960s, but it employs over a quarter of the island's labour force. Agriculture's reduced contribution to this indicator is unrelated to industrialization and continues to decline because of falls in production and productivity. This reflects reductions in availability of land for cultivation, in both quantitative and qualitative terms, due to soil erosion and overuse and technological insufficiency. Consequently, the capacity to expand or improve agriculture is fast approaching its limits. Stagnation in agriculture inflicts growing unemployment, lower incomes and inadequate nutrition on the majority of Jamaicans.

Heavy reliance on agricultural production as a strategy to improve the socio-economic conditions of poor countries is destined to fail if it is not coupled with a well-supported agro-industrial programme. Agro-industrial enterprises provide varied outlets for agricultural raw materials, furnish a logical and convenient way to initiate and expand local industries, and often represent the only way to integrate rural with urban economies. Agro-industries stimulate forward and backward economic linkages by creating new marketable products and generating employment in raw-material production, processing and distribution.

Food processing should be central to agro-industrial programmes. Indeed, food processing is typically responsible for a quarter of all equipment in modern manufacturing in most developing countries, and agro-food industries are among the largest generators of employment per unit of investment, employing some 20%-30% of all workers in manufacturing in developing countries (Rao et al., 1989).



## **2. Definitions and orientations**

This section provides working definitions of two major concepts: agro-industry and "higglers".

### **a) *Agro-industry***

Agro-industrial activities can conveniently be grouped according to the types of products that are fashioned: i) processing materials of plant and animal origin into human foods; ii) processing materials into animal feeds; iii) processing raw materials into textiles, building materials and paper products; iv) processing by-products of plant and animal origin into various end products; and v) miscellaneous processing, such as waste products.

In many instances, agro-food industries constitute an extension of the traditional agricultural marketing system, making it possible to postpone for long periods consumption of commodities produced. The changes involved in agro-industrial processes need not be complex and indeed may be simple and traditional. In fact, they may not even be recognized as processing activities at all. For instance, the production of cow's milk is regarded as an agricultural activity, but changing fresh milk into the boxed products found in supermarkets is regarded as processing. It therefore falls within the manufacturing sector and is considered an agro-food industrial exercise.

### **b) *Higglers***

Higglers are generally inhabitants of farmers' communities, typically wives of farmers, who market local crops. Most of the domestic demand for fresh fruits and vegetables is supplied by these middlemen. Higglers buy produce, package it (often in fertilizer or crocus bags) and hire trucks to transport it to markets in urban centres. Typically, the higgler spends Thursday through Saturday selling in these markets and/or to street retailers. More affluent higglers may own trucks and wholesale directly to retailers, such as shops and supermarkets. These traders often organize to sell the non-exportable portions of the output of large farms.

Higglers have had a bad reputation for overcharging and taking advantage of farmers through unfair practices such as waiting long enough to buy produce, thereby forcing deep concerns about spoilage. They are also accused of price fixing in markets. Some researchers who have examined this question have taken issue with the notion that higglers extract exorbitant prices for fresh produce (Peraud, 1991). Evidence shows, however, that there is little competition either at the retail outlets or at the farms. Personal experience indicates that neither the farmers, the higglers nor the retailers are blameless in their dealings with each other.

Despite the reputation of the higglers, their system handles 70%-80% of domestic food crops and employs an estimated 20,000 persons weekly. The wholesale higglers not only purchase for resale to retail higglers, but also reap, assemble, transport and store crops, as well as grant credit to small farmers.

### 3. Background to agriculture in Jamaica

#### a) *Topography and geography*

Jamaica is a mountainous island in the Caribbean situated at longitude 75 degrees west and latitude 18 degrees north. It has a land area of 11,500 square kilometres and a population of approximately 2.4 million. The density per square kilometres is about 450. Only 20% of the land is flat or gently rolling. A high central plateau extends east to west, while the coastal areas particularly in the northern and southern regions of the island are flat. Some 90 soil types have been identified, with soils of limestone origin dominating (Campbell and Hennemann, 1990). In general, they are not very fertile but are responsive to good management.

A wide range of climates are to be found, depending on the elevation. Rainfall ranges from over 250 centimetres in the northeast, thanks to the northern trade winds, to less than 100 centimetres in southern rain-shadow and coastal areas. The variation in climate makes it possible to produce a wide range of crops and livestock.

#### b) *The small-farm sector*

The small, or peasant's farms in Jamaica operate under varying conditions. However, in general the small farmers have very little land, in a range of approximately three to six acres. Most of the lands are of the worst quality, often fragmented into parcels and situated in inaccessible areas, primarily on hillsides. Consequently, infrastructure connections are usually very poor, and small farmers are cut off from the mainstream of the economy. The topography of small land holdings is such that mechanized equipment cannot be freely deployed.

Efforts to hedge against crop failures, to provide short-term cash and to maintain some form of old-age pension complicate the production patterns and economic behaviour of small farmers. Marketing is difficult, and identifying markets even more difficult. Transportation of crops to accessible points is often a serious challenge. Furthermore, land-tenure arrangements are insecure, and small farmers often find themselves in competition with the larger farmers because they produce the same crops.

The number of small farmers is approximately 150,000, averaging 10.7 per farm. Seventy per cent of the Jamaican farms are less than five acres and occupy some 11.6% of the land in farms.<sup>5</sup> At the other end of the spectrum, 0.2% of farms are over 500 acres and occupy 45% of the land in farms. Paradoxically, although most of the farms in Jamaica are small and situated on infertile hillsides, they produce the bulk of the food which is grown for local consumption.

Beckford and other economists from the University of the West Indies have argued that the plantation system is largely responsible for the retarded nature of agriculture on the island and the demonstrably skewed development of the economy. The argument is that the plantations were introduced to Jamaica to benefit the North Atlantic countries and that the income generated by the plantations, instead of being used to diversify the production base of the economy, served to promote industrialization and development in the already highly developed metropolitan economies (Beckford and Witter, 1980). Consequently, decision-making is often directed from the outside and strong linkages develop between the plantations and the metropolis, rather than between the plantations and the Jamaican economy.

The fact that the best lands in farms produce crops for export (sugar cane, bananas and citrus) is cited in support of this argument. Although this analysis doubtless has some validity in recent history, the current situation is more complex. Nevertheless, the notion still lingers in the minds of many, including small farmers.

#### **4. Composition of gross domestic product (GDP)**

Jamaica's real GDP grew marginally by 1.2% in 1993. This reflects slower growth in most of the food-producing and service sectors and contraction in manufacturing, construction and installation. Miscellaneous services, which include tourism-related activities, and transport, storage and communication were the only two sectors to register further growth in 1993. Agriculture, forestry and fishing was the only food-producing sector to perform credibly, growing by 8.8%, albeit slower than in 1992. This performance of the agricultural sector was attributed to a significant increase in domestic food-crop production (Planning Institute of Jamaica, 1994).

Production targets for many of the traditional crops, such as sugar cane, bananas, cocoa and coffee, were not achieved in 1993, mainly because of irregular weather patterns early in the year. Even so, earnings from traditional exports increased from US\$ 149.5 million in 1992 to US\$ 163.1 million in 1993. The total value of traditional and non-traditional exports increased by 10.7%, to US\$ 195.1 million, with non-traditional exports growing by 21.9% to US\$ 31.9 million. The growth in earnings from non-traditional exports was due to increases in production, coupled with heightened acceptance and favourable prices received for many of these crops. For traditional exports the growth was due to increased value of exports and not productivity.

For manufacturing GDP, a decline of 2.9% was recorded in 1993. The sector's contribution to GDP at constant prices was 18.5%, vis-à-vis 19.3% for 1992.

During 1993, the value of selected basic food imports increased 11.5%, to US\$ 179.9 million. Agricultural exports were US\$ 195 million, providing a trade surplus of US\$ 15.1 million. Cereals (US\$ 72.9 million) and meat and fish products (US\$ 54.1 million) continue to account for the bulk of imports.

#### **5. Status of the Jamaican agro-food sector**

The last comprehensive survey, conducted in 1983, revealed that the agro-food sector accounted for 50% of the total manufacturing production and employed approximately 22,500 workers, or over 20% of the manufacturing work force (Stone, 1986). Work in 1994 revealed that these percentages have not changed significantly, although an undetermined number of small agro-food operations have been added to the sector and many others lost, as individuals struggle to cope with underemployment and other economic hardships (Shirley, 1994). However, the real value of output has declined every year since 1976 except 1982. Over the period 1976-1984, the decline was estimated at 15%. A marginal increase occurred after the hurricane in 1988.

In real value of output, the sector's capacity utilization has remained low at approximately 50%, and the machinery and equipment are mainly obsolete. It was estimated in 1983 that a total of J\$ 47.1 million was needed to replace capital equipment, or approximately J\$ 65.9 million at 1990 prices.

Credit restrictions, devaluation of the Jamaican dollar, high import duties and bureaucratic delays have hindered growth in the sector. Other deficiencies include

marketing, warehouse space, raw materials and lack of experienced middle-management personnel and multi-skilled workers.

In summary, the sector suffers from high unit production costs, low capacity utilization, outdated and inappropriate equipment, inadequate warehouse space and production layout, poor factory buildings, high factory down time, poor product quality, inadequate packaging, insufficient research and development (R&D), poor marketing and inexperienced management (Ventura, 1990).

A series of studies over the last decade have confirmed several important limitations of the existing agro-food system.<sup>6</sup> Two major, interrelated factors are the insufficient supply and the high price of raw material. Disarticulation between subsectors and between subsystems results in a basic and severe problem of obtaining raw material at reasonable prices (Wilson, 1992; Reid and Sibblies, 1994).

Specific commodity boards manage some agro-food subsectors, including citrus, coffee, cocoa, bananas and pimento. These organizations form separate autonomous subsystems. Nevertheless, a similar lack of raw material is observed in these subsectors.

A range of non-traditional export crops, such as carrot, tomato, cucumber, mango, papaya, pineapple, ginger and pepper, flows through the free market. Even though construction of plantations has begun, several fruits, such as ackee, soursop and tamarind, are still generally picked from wild trees which seriously limits the availability of raw materials (see table 1 for a listing of a number of non-traditional commodities).

#### **a) *The food-processing subsector***

The food-processing subsector in Jamaica is made up of over 60 firms that produce a variety of products, including tinned fruits and vegetables, fruit juices and concentrates, sauces and processed meats (Shirley, 1994). A listing of the firms in the industry is provided in table 2, which also indicates the location of the processing facilities, the products produced by the firms and an assessment of the relative size of the facilities. As indicated in this table, there is a high degree of similarity in the range of products produced by the firms in the sector. Close to a third of the firms in the list produce sauces from local peppers, herbs and spices. The canning of ackee and calaloo are the next most common activities, followed closely by the production of canned juices, the canning of fruits and the production of jams and preserves. Table 3 contains a summary of the number of firms producing specific lines of products.

The subsector exports a mix of products which can be broadly separated into three categories.

- 1) Products targeted at specialty and ethnic markets. This category includes pepper sauces, crushed peppers and other pimento-based preparations.
- 2) Products targeted at traditional markets. These goods are produced from the excess of some of the crops that are exported fresh. The group includes citrus juices (\$ 103 million), fruit chunks, slices and purees (\$ 33 million) and processed coffee and cocoa products (\$ 50 million).
- 3) "Import substitution" products. These are produced from a variety of imported materials. The primary export market are countries in the Caribbean Community (CARICOM). Included in this category are sausages (\$ 31 million), ketchup (\$ 14.7 million), soups (\$ 23 million) and biscuits and confectionery (\$ 50 million).

Export earnings seem to be evenly distributed among the three categories of products (see table 4).

### ***Characteristics of the processing facilities***

Site visits to several of the processors indicate the following general characteristics (Shirley, 1994).

- 1) All of the firms considered large by local standards are small in global terms.
- 2) All of the firms use a mix of simple equipment, most of which is old. Only the largest firms, particularly those involved in the production of citrus concentrates, have regularly made technological investments.
- 3) All of the firms, with very few exceptions, buy their local raw materials from farmers and higglers, although a few processors have entered into long-term contracts with selected farmers.
- 4) Because of the seasonal pattern of supply, the utilization rate of the factories is low, characterized by periods of fairly intense activity interspersed with periods of inactivity. Some of the large processors import raw materials for canning and repackaging for local and regional consumption. These factories are used more intensively, but in almost every case, the factories operate on a single shift only.

### **b) *The impact of liberalization***

Three of the factors which have had the greatest impact on firms in the subsector over the past several years, are the rate of inflation, the liberalization of trade, and the rate of interest. Table 5 shows the change in exchange rates over the period, the movement of the Consumer Price Index, including the component for food and beverages, and the commercial loan rates over the period.

### **c) *Science and technology***

#### ***1) Research and development in Jamaican food processing***

The Jamaican food-processing industry arose around the work of the Food Technology Institute (FTI), which was established in 1954. This unit sought to demonstrate that existing foreign technologies could be adapted to Jamaican raw materials. Initially, import substitution was the goal. More recently, the FTI has undertaken the search for new products using local raw materials.

These activities involved little scientific research. Conventional mechanical and chemical engineering techniques were introduced and adapted to process local and imported raw materials into products suitable to local markets and conditions. This required little experimental development, engineering or applied science of any kind. Instead, simple trial-and-error efforts focused on repackaging and reformulating imported bulk material.

The FTI is presently involved in a series of development projects, among which are wheatless bread, solar drying of fruits, meat processing, milk evaluation, low-acid canned foods (ackee, calaloo, carrot, etc.), fruit and vegetable processing, fermentation applications and snack-food processing. The Institute, however, is desperately short of senior staff and resources to conduct R&D while also providing training and other services to the public.

Jamaica's food-processing subsector is highly dependent on the trends, hardware, software and financial support of the advanced economies, but because of low levels of

local R&D, the island still falls behind in the creation and application of competitive technologies. Consequently, investments in invention and innovation are scarce.

## *2) Food technology in Jamaica*

The sector is predominantly labour-intensive and employs a high proportion of part-time labour. Capital equipment is old, as high investment-capital costs deter new investment. The layout of machinery in many process lines and buildings is congested, making it difficult to deploy labour effectively or to install efficient flows of raw materials, products and packaging. Factory buildings and space are often crude adaptations of existing structures, which complicates cleaning and general sanitation, including pest and rodent control.

The problem of old and inappropriate equipment, coupled with low levels of mechanization and maintenance, creates inordinately high levels of waste and downtime. In some instances equipment does not meet product safety and sanitary standards. Capacities and type of equipment at different steps in many processing systems do not synchronize. Furthermore, cooking and pasteurization of products are done in batches, which is inordinately energy-consuming and inefficient. The cost of energy and rising environmental concerns will make the handling of energy crucial in cost-benefit decisions in this sector.

An insufficient scientific and technological information base and a lack of technical and engineering expertise have caused costly selections of inappropriate technologies for the industry. In a sense, the present technological infrastructure has not been able to bridge the gaps between the international knowledge base, the laboratory, the factory and the marketplace.

Approximately 50% of raw material is imported. Local farmers produce directly for the fresh produce market, where the prices are attractive. Invariably, the processing industry receives produce of very poor quality that is left after the fresh-produce market is satisfied. Locally grown raw material is also seasonal, causing severe fluctuations in the utilization capacity of companies. Finally, the unreliability of local supplies is exacerbated by the small plots on which non-traditional crops are grown.

Importation of raw material is also afflicted with problems, such as scarce foreign exchange, customs delays, lack of information and transportation. Timeliness of supply is not guaranteed for two main reasons: first, delays cause transportation bottlenecks and second, the scarcity of foreign exchange affects the regularity and quantity of purchases. Obtaining an adequate amount of raw material requires arduous administrative and organizational efforts on the part of processors. However, little or no effort has been made to improve the sources, quality and types of raw material specifically for processing.

In summary, the shortcomings of agro-food processing industries are as follows:

- small industrial size;
- outdated equipment;
- poor adjustment to domestic needs and demand (range of products, packaging);
- poor adjustment to export requirements;
- low quality and insufficient controls of quality; and
- lack of backward linkages.

This situation results in a general loss of industrial development and export opportunities. The outdated equipment in the sector is still underused, even though only a limited range of products are manufactured and the demand is not fully satisfied.

Another major problem clearly is the supply of raw material, which is insufficient, irregular, partly inadequate, and costly. A range of explanations are generally given for the low, and hardly improving, levels of agricultural production:<sup>7</sup>

- small-scale farming results in low yields and highly seasonal production;
- too much government and private land is kept idle;
- subsistence crops prevail on family farms, and sugar cane on large estates, thus preventing a massive reorientation of production towards new crops which are better adjusted to expanding demand;
- the isolation of production areas and the bad condition of roads prevent a smooth marketing and transportation of fruits and vegetables; and
- predial larceny significantly reduces output.

The generally high prices of raw material are further explained by two factors:

- the small scale of farming induces high production costs;
- the higglers who market most of the fruits and vegetables dominate the market and hold a bargaining power, which results in overpricing.

Examining linkages in the agro-industrial system in Jamaica therefore demands a close look at the supply and management of raw material for processing. Limitations of the processing industry are only partly related to the raw material problem. Nevertheless, the latter has become the main focus of business management in the agro-food subsector.

A reluctance to fully understand the various factors involved in the relationships between farmers and processors has resulted in inefficiencies which can no longer be tolerated in a fiercely competitive world situation. The Jamaican small farmer has little bargaining power, except at election time, and is largely regarded as a backward individual with little to offer in the development of the island. This mistaken notion has to be corrected if agro-processing is to make its full contribution to the nation's economy. Clearly, innovations in farm systems, marketing and processing have to be instituted to overcome the inefficiencies in the system, and the small farmers are at the centre of this endeavour.

## **6. Linkages in the agro-food system**

The market relationships in the agro-food system in Jamaica are complex, fragmentary and mainly ill-informed. Few of them go directly from the farmer to the end user. Only large farms have direct links, either with foreign markets, with large domestic users of fresh products (supermarkets, hotels), or with processors (Abbott, 1987).

The bulk of family farms are linked to end users through middlemen: agents of exporters, agents of processors, and higglers, who supply the domestic fresh market. Only a few family farms belong to producers' marketing organizations (PMOs) or have contracts with processors, thus forming direct links with the final user.

The links among the parts of the system are often short-term —week-to-week or even day-to-day. Mid- or long-term relations may involve either formal or verbal agreements. The links are based, more or less, on reciprocal information on the conditions of the final market. Most of the fruit and vegetable markets —particularly those which involve family farms— are of a short-term, not-fully-informed type (Peraud, 1991).

**a) *Lack of information***

Basic information is not freely exchanged. Even if the exporters of fresh products and the processors are fully informed of the conditions of their final markets, such as prices of fresh tropical fruits in a given foreign country or prices of local processed foods, they are not completely aware of the volume of supply or of the range of prices in areas other than the ones where they have agents.

**b) *Undifferentiated produce***

Products are not differentiated according to the specific qualities and varieties appropriate for separate markets, except on large farms. These farms have direct access to export markets and are able to match different qualities with specific markets. Exporters can therefore make selections of required fruits and vegetables from the farms their agents have chosen. Farmers who have contracts with processors can also supply them with qualities required for processing, and sell the rest of their production to higgler. Likewise PMOs can market specific qualities to exporters or supermarkets.

What happens more frequently, however, is that different markets will be supplied with the same bulk products. Domestic fresh markets receive products which could have been suitable for exports, or which should be processed. In the same fashion, processors receive fruits and vegetables which could have been sold on the fresh markets, or rejected material hardly suitable for processing. Since there are generally few outlets for a given product in a given community at a given moment, and since most of the products are perishable, sales in bulk are the rule, and sales according to use the exception. Consequently, even if processors require a lower quality, they often have to compete with the demand —and hence the prices— of the domestic fresh market.

**c) *Anomalies in the system***

Most of the subsector is not influenced or regulated by world prices. Only large-scale farms which grow and directly export have to adjust their production and costs to world prices. Local markets are dominated by the domestic price of fresh products as determined by higgler. Exporters, who work with agents, tend to pay a little more than the local higgler's price, since they take only top-quality products. Processors try to benefit from temporary decreases in higgler's prices in order to obtain cheaper supplies. "Suggested" farm-gate prices, which are published in local newspapers by the Marketing Division of the Rural Agricultural Development Agency (RADA), are related to export prices of fresh products, but they have little effect on marketing since hardly anybody knows what they represent (Peraud, 1991).

Price levels vary dramatically according to the regions and to the periods of the year. For example, ranges from 1 to 33 for tomatoes, and from 1 to 12 for cabbage, have been observed as minimum and maximum values by the Ministry of Agriculture's data bank. These fluctuations are seasonal differences, but some of the seasonal price variations cannot be explained by changes in volume of production. For most of these products, steady supply and price safety cannot be achieved unless these wide seasonal variations are tempered. More surprisingly, regional price differences, observed during a given month, are often as large as, and sometimes larger than, the seasonal ones. They



often range from 1 to 2 or 3, and can reach up to 1 to 10 and 1 to 13, as in the case of tomatoes.

Certain other anomalies are also witnessed. For example, low prices are observed in regions where the acreage of a given product is larger than normal, or in regions where the yield per acre is higher than the average. This is true for tomatoes in St. Elizabeth and for tomatoes, carrot and cabbage in St. Thomas. On the other hand, St. Andrew, which feeds the largest market in Kingston, shows constantly high prices with relatively low yields.

The reasons for these phenomena include geographic isolation, which increases the difficulty and cost of transportation; lack of links between the family farms and different possible outlets; and lack of information on market conditions in different parts of the system. These occurrences result in an extremely fragmented market, with juxtaposed surpluses and shortages situations, and possible losses of profitable outlets for the farmers and of profitable supplies for the processors.

#### **d) *The higgler's system***

Higglers operate in a variety of situations, all of which fulfil the wholesale function. Higglers are numerous and assertive, and they play different roles at different stages of the market. Consequently, formation of cartels is unlikely on a wide scale, even though this can occur on occasion.

Since the domestic fresh market plays a dominant role in general pricing, the higglers play a vital role. They are usually informed of the local situation on the fresh market and of the conditions of supply. Since markets are fragmented, there is very little competition among higglers, who buy in a given area. Higglers derive strong bargaining power from the local volume of supply and the urgent need for local farmers to get rid of perishable outputs. Local gluts give them good opportunities to reap profits.

Data on the differences between farm-gate and market prices show that the total margin is roughly 50% of the retail price, which covers higglers' margins, transportation costs and retailers' margins. Although actual margins may occasionally far exceed this amount, Peraud asserts that on the average, prices are not excessive (Peraud, 1991).

Higglers' practices may seem parasitic and harmful —it is probably true, for instance, that they foster predial larceny. From an economic point of view, however, they fulfil the wholesale function, and there is apparently no efficient way to replace them. Any other kind of wholesale sector would probably have the same bargaining power, because of the conditions of production and the isolation of supplies. On the average, higglers take reasonable margins. Their omnipresence and their ability to play on margins would probably enable them to efficiently resist any attempts at price controls. Any assessment of linkages between small farmers and processors must recognize higglers as an important factor.

#### **e) *Organized marketing***

The biggest food-processing company, Grace Kennedy, is developing a system of contracts with farmers. Key features include involvement of the processor in supplying farm inputs, steady request for specific volumes and reasonable, stable prices. Establishing long-term relationships guarantees a more secure marketing for farm products and a better supply for processing plants.

Except for carrots, such contracts are still rare. Where agreements do exist, they are often verbal, and sometimes are limited to a very few large growers, as in the case of papaya. Some producers' marketing organizations (PMOs) and large farms steadily satisfy specific demand, such as from exporters, hotels and supermarkets, generally under verbal agreements.

Attempts to establish firm contracts have frequently failed, both from the side of farmers and from the processors. These failures are one of the most commonly expressed reasons for the mistrust between farmers and processors.

Enforcement and special market conditions are two reasons for these failures. Even when contracts are written, bilateral commitment between a processor and a farmer is difficult to enforce. Wide fluctuations in the market do not encourage long-term pricing in advance marketing. Temporary market conditions, such as high prices for produce or large surpluses of products at the processor's plant, often cause these agreements to break down.

The highly individualistic nature of many Jamaicans also affects marketing. Cooperatives are often seen from a political rather than from an economic point of view. There is a surprising scarcity of farmers' marketing organizations, even though the shortcomings of individual marketing are clearly obvious. PMOs are starting to appear, and the Commodity Board system has been successful with traditional crops such as coffee, citrus, bananas, pimento and cocoa. These active farmers' associations demonstrate that collective forms of marketing can work to overall benefit, if the proper leadership and organization are found.

## **7. Lessons from local agro-industry linkages**

Linkages in the local agro-industrial chain are influenced by a number of factors, some specific to the nature of the crop being sold, and others more general and related to sociocultural nuances. Consequently, a complex of different types of linkages can be identified depending on the size of the farming and processing operations and the level of organization of the parties.

This report examines the linkages involving small farmers and collectives of small farmers, on the one hand, and small and large processors on the other.

Four cases are described in detail to exemplify the wide range of activities in which relationships among small farmers and small processors are common: the processing of bammy (cassava bread), the small-scale processing of cheese, the processing of ackee and the processing of fruit into jams, jellies and juices. Two additional cases —coconut and potato, and broiler chickens— illustrate the success small-farmer organizations have had in dealing with large processors.

### **a) *Cassava bread***

#### **i) *Description of the business***

Processing cassava bread —or bammy making, as it is locally called— is mainly a family or community operation. Young and old, and women and men, all work together in this business. Often this is the central economic activity for a family. The women commonly take charge of the operations, while the men do much of the heavy work, such as grating and squeezing. Women usually cook and sell the product.

There are only about four large-scale bammy producers in the country, making on the average 6,000-8,000 bammies per day, using about half a ton of roots. On the other hand, there are 2,000-3,000 small-scale bammy producers, with a processing capacity of some 90 kilograms of roots at a time. They usually bake only once per week, because of the shortage of roots. These processors complain that although they have the customers, they cannot obtain enough cassava to increase production to meet the demand.

Despite the fact that rural areas offer few opportunities to profit from the processing of local crops, small farmers still remain reluctant to grow cassava. Because of poor communication between processors and farmers, combined with bad roads and transportation, the farmers see growing cassava as too much of a risk. This attitude was reinforced by a recent failure at a bammy factory with a capacity of over 50 tons, due mainly to a lack of coordination between the requirements of the factory and those of the farmers.

Furthermore, growing cassava for bammy making is somewhat complicated. The processors require cassava which is neither too young nor too old. Young cassava is very spongy and high in moisture, precipitating low bammy yields, while old cassava is very woody, likewise curtailing accepted yields from one unit weight of cassava. (Ideally yields should be a 1:1 ratio of bammy to cassava roots.) The yields are also affected by variety. Root sizes which are too small will lead to low yields, while large roots are cumbersome and difficult to handle, especially in the labour-intensive small processing. The ideal root size is 2 to 3 kilograms, with a water-droplet shape. On the farmer's side, wide variations in root sizes should encourage grading, with low prices being paid for small and large roots, and premium price for ideal sizes and shapes. Finally, cassava becomes unsuitable for processing within 24 hours of reaping. A just-in-time production system is indicated, if high quality and good economy are to be achieved.

In summary, farmers are reluctant to produce more cassava because of poor communication between cassava growers and bammy makers; lack of information about cassava varieties and yields and prices to be expected; lack of technology to increase cassava yields; unreliability of transportation and bad road conditions; and rapid susceptibility of cassava to spoilage.

#### *ii) Lessons from this case*

The linkage between farmers and bammy makers must be firmly established to ensure high quality and consistent supply of products at reasonable prices. The processor and the supplier must see each other as worthwhile customers, and the farmer must appreciate the concept of bammy as a value-added product of cassava. They must further realize that a high-quality bammy will increase income and employment throughout the area.

The small bammy processor does not have the financial or technological capabilities to assist the small cassava farmers to improve security and productivity. Consequently, government has a clear role to play in helping to increase the production of cassava by improving the productivity and suitability of the local cassava crops for bammy making. The Rural Agricultural Development Agency (RADA) must ensure that small farmers can achieve yields of 36 tons/acre, which are being obtained at Bodles Agriculture Station. The plan to subsidize cassava production, to demonstrate that the present production rates of about 4-6 tons/acre can be significantly increased, is fully supported.

The question of the hydrogen cyanide (HCN) content of bammy, must also be addressed by the public sector. Managing this problem is contingent on clearly defining

sweet and bitter cassava types in Jamaica and identifying what happens to the HCN during processing. Solution to this problem is clearly outside the competence of small farmers and processors. The government's R&D establishment must take on the responsibility.

Bammy processing is highly labour-intensive, particularly the hand grating and squeezing. Baking in dutch pots is also very slow, limiting production to about 24 bammies per hour. Capital-goods development work must generate hand-operated graters, small, hand-operated screw presses and solid-fuel hot plates and rings, all at reasonable costs. Concomitantly, the varieties of cassava being developed must be adaptable to mechanical peeling; specifically, they must be of consistent size and shape to make full use of any new equipment.

It is clear that neither the small farmers nor the processors possess the resources or skills to improve their technological capabilities on their own. The first steps in this direction, therefore, must be the responsibility of government, if this business is to flourish. Active, astute and sensitive extension workers are necessary to recognize and subsequently define technical problems and to identify points of intervention to improve the bammy trade. An interactive system would include farmers, processors, extension workers and R&D officials. Each group must be fully aware of the workings of the others, for meaningful relationships to be built and maintained.

Because cassava is a seasonal crop, linkages between farmers and processors must be very open to prevent gluts in the industry. When the crop is in season, farmers must take an active interest in the business of bammy making, and between crops, processors should show some concern for planting by the farmers. Incentive schemes and investments by the processors in farming could help in this regard. Bammy makers could also encourage farmers by providing a fair price for high-quality roots, through contract and guaranteed prices. When the farmer and the bammy maker are the same person, or when they belong to the same company, the situation approaches the ideal.

The level of education of both cassava farmers and processors is just around primary level; some are not able to read. This relatively low level of education affects the speed with which information is transmitted and the willingness to embrace new options, especially in management and accounting practices. This chronic problem will have to be broached from outside the cassava business to effect improvements.

## **b) *Cheese***

### **i) *Description of the business***

This example of small farmers' relationships with a small producer has special features, which must inform any attempt to improve linkages. The dairy farmers are typical of small farmers on the island, in that their average age exceeds 50 years, they are semi-literate, and they are very protective of their ability to survive. The small processor, however, is part of a non-governmental organization (NGO), in this case a non-profit community-development organization set up to improve the quality of life among disadvantaged peoples on the island. The processors are educated individuals, with all the social connections of the middle class.

The average operator produces 22.5 kilos of cheese per day, using 250 kilos of milk. The milk comes from 30 to 70 small farmers, from a pool of 217. The cheese is aged for 12 weeks before it is ready for the market.

The aging time places a financial strain on the processor. The market for the cheese produced is being extended to colleges, supermarkets and hotels, to alleviate the cash flow problems experienced during the aging of the cheese. Unevenness of supply of raw material is also a problem, as with other industries in the agro-food subsector.

The different sociocultural backgrounds of the farmers and processors has led to serious misunderstandings among the parties. The processors insist that the dairy farmers have a short-term, get-rich-quick, mentality. This attitude supposedly manifests itself as the low-volume, high-value syndrome, in which farmers consider profits from large volume and good service too tedious and instead expect windfall profits from small volumes, even when this is unrealistic. Processors further bemoan what they refer to as a freeness mentality among small farmers. They feel that if a cheese plant were given to farmers, they would gladly accept it, but if there were any obligation to pay, either for the plant itself or for maintaining it the offer would be rejected. The reasoning was that small farmers are terribly averse to taking chances; they would prefer to put their money in banks and accumulate interest than to take on the obligation of running a manufacturing enterprise, irrespective of the returns.

From the farmers' perspective, white collar workers —namely owners and processors— do not really put in a good day's work, yet they become wealthy. Farmers believe that these entrepreneurs simply come in at 8:30 a.m. and leave at 5:00 p.m., during which time they simply sit at a desk making telephone calls. Through "right political connections" the processors have attained a comfortable living without the pressures of commensurate work.

In addition to these misunderstandings and mutual lack of respect, the cheese industry experiences several, more concrete problems:

- a) inadequacy of milk supply, which causes significant idle capacity in the cheese plant;
- b) an average age of farmers of 63 years;
- c) the absence of extension and veterinary services;
- d) an emerging pattern of declining rainfall, with longer drought periods than normal; and
- e) the probability that the competitiveness of the cheese produced will be eroded by increased cost of milk production, caused by the large input of imported feeds.

ii) *Lessons from this case*

Small-farmer/processor relationships are complicated by the extreme views the partners have of each other. In some quarters these cause serious structural problems. These difficulties are set within a wider crisis of leadership in rural Jamaica. Economic hardship has left very few role models, and hence few leaders, in the deep rural areas. The farm work programme exacerbates the problem: the brightest and the best small farmers apply for these programmes and are accepted; most never return to work in their villages. Furthermore, leadership from other professions, such as teaching or the clergy, has been undermined by a growing lack of respect for traditional professions.

Technological adaptation and development are a must for improving the linkages between small farmers and processors.

Several solutions are necessary to address the problem of inadequate supply. A system must be developed to allow farmers to milk twice daily, instead of the current practice of once daily. Effective and efficient extension and veterinary services must

assist small farmers to improve their animal-husbandry skills, thereby allowing the animals to achieve their milk-producing potential. Demonstration farms should be established in different areas to show how milk yields can be significantly increased.

The high average age of farmers affects the industry not only because it calls into question the future of dairy farming and cheese processing, but also because the older farmers tend to be highly risk averse and resistant to change.

Increasingly, raising the prices of commodities is the main method these farmers use to gain added incomes. They will not entertain reducing production cost or increasing their efficiency as part of this objective. Successful demonstrations of new techniques or systems are essential to convince most small dairy farmers that improving efficiency will raise their incomes.

Such demonstrations should target young farmers, who must be encouraged to participate in the industry through the provision of training and adequate land space to allow them to produce a minimum of 100 pounds of milk daily. Clearly, they will also require modern equipment, such as tractors and other implements for land preparation and milking, because generally they are not inclined toward labour-intensive methods and are more oriented toward the mechanical technological age.

The industry also needs better water-harvesting systems to capture water which currently goes to waste during the rainy seasons and to make it available for watering animals and irrigating pastures during the dry seasons.

The institution of a new feed regime would reduce the cost of milk production significantly. This programme should include measures to improve pastures, to increase cultivation of cutting grass, such as King grass, Napier and sugar cane, to increase cultivation of legumes and other nutritious fodder materials, and to manufacture local feeds from readily available indigenous raw materials, such as cassava for energy and Lueucaenia or Gliricidia (Quickstick) for protein.

Improved management of local grasses in both the wet and dry seasons, could provide replacements for costly imported feed for cows. Work on indigenous feeds is sadly lacking in Jamaica, yet it has the potential to increase local production in many quarters. This type of work on indigenous feeds for small farmers can only logically be undertaken, at this time, by the government's R&D establishment or by large dairy farmers. Unfortunately, the private sector in Jamaica historically has shown a strong aversion to conducting or supporting R&D work. The milk processors are no exception to this rule.

The development of a dairy technology that is better suited to Jamaica's conditions is a matter of extreme urgency. This technology must be labour-intensive and must aim to carry successfully eight or more animals per acre, to economize on the use of arable lands. The animals must be kept as stress free as possible, i.e., kept in cool places all day, relieved of all internal and external parasites, and provided with an abundance of feed and water.

Extension service has proved to be a critical variable in improving the output of small farmers. However, in the milk industry, extension workers in the public sector have become lackadaisical and unreliable because of improper supervision. Consequently, the dairy industry has proposed that public extension officers be attached to private processors, who will provide the level of supervision deemed to be required. Processors have expressed willingness to top up the salaries of extension workers to ensure their total commitment to their jobs, because it is in the processor's interest that their milk suppliers become more reliable, efficient and cost-effective.

If milk producers and cheese processors entered into an organic relationship in which each participated in the success or failure of the other's business, three essential things would be accomplished:

- 1) Demonstration activities would be easier to undertake.
- 2) The most urgent areas for R&D and extension work would be easily identified and discharged, and there would be more assurances that the new methods would be adopted.
- 3) A secure market for the farmers and a secure supply of milk for the processors would be provided.

c) **Ackee**

i) *Description of the business*

Ackee processing dominates the agro-food industry in Jamaica. The fruit grows in abundance in the wild, and ready ethnic markets abroad can bear relatively high prices for these products. Ackee is still listed in North America as a toxic commodity, and it therefore attracts serious restrictions on its importation. The black market is in full swing, however, resulting in high prices for producers.

Ackee grows wild in Jamaica and generally is not cultivated in orchards. The fruit is collected from scattered individual trees on different properties, including so-called open lands whose ownership is still in doubt. A few middlemen collectors try to corner the collection of the fruit and to gain control of its processing by fixing prices and limiting distribution of the fruit. These collecting agents oppose and undermine any form of cooperative. Processors have responded by installing their own operatives to ensure supplies of raw material. A second strategy to counter these middlemen would be to encourage other, more responsible agents, who are more amenable to the processors, to enter the system and wrestle monopoly control from the few scheming collectors. Higglers have less influence in this system because processors require truckloads of ackees, instead of boxes. Farmers prefer collectors who need large quantities, because they provide security in regular collections and transportation.

Although plants growing wild present a problem of collection and transportation, wild trees are considered free of contamination from farm chemicals. Their fruits can fetch premium prices in gourmet markets.

ii) *Lessons from this case*

The major problem in the ackee business is insufficient supply of raw material coming from scattered trees, which makes collection cumbersome and costly. The government, either independently or through support to processors, should create nurseries of seedlings, with the ultimate objective of giving these seedlings free to farmers who are willing to establish orchards. Farmers should also receive technical assistance and guarantees to buy the fruit when it becomes available in two to four years. Ackees are durable plants and require little attention to reach maturity. During the maturation of the trees, farmers would be free to grow and sell crops that mature more quickly, such as calaloo, pineapple, carrot and passion fruit, which have solid domestic and foreign markets.

Demonstration is the most powerful means of influencing farmers to invest in a processing business. Ackee orchards should be established on government lands or on

private experimental farms, to illustrate the economics of investing in a set of, say, 12 ackee trees. Each tree at maturity can provide about 15 boxes of ackees twice a year; with a sale price of \$ 100 per box, the net gain is \$ 36,000, which is enough to keep one child in school for the year. Information of this type, obtained from actual farms in a particular vicinity, can convince local farmers to establish and operate commercial orchards.

Any programme to encourage farmers to grow ackee should be supported by R&D and extension services and should include steps to improve efficiency. First, farmers need information on choosing and cultivating the best varieties, on local and foreign markets, on the types of support available from government agencies and on processing activities and processors. Second, training and equipment for farmers is crucial. If preprocessing and cottage industries are incorporated into the system, road crews will be needed to deliver containers and finished goods. Third, field officers must be trained to give technical assistance to farmers. Finally, lifting legal restrictions on the sale of ackee products must become a priority.

Improving the ackee farmer/processor relationships will afford farmers greater incomes and involvement in the industry and alleviate supply problems for processors. Clearly, the best relationship between farmers and processors, as indicated in the other cases reviewed, is to set up contracts with farmers to grow specified quantities and qualities, under special conditions (such as strict control of pesticides). The ideal arrangement, of course, is for the farmer and the processor to be the same person or to belong to the same operation. There are three important steps which appear beneficial: encouraging and training farmers to become involved in preprocessing activities such as removing the pegs from the fruits and removing the seeds from the pegs; setting up cottage industries, such as using the waste material from the preprocessing business; and demonstrating the potential of growing ackee as an orchard crop, as discussed above.

It is interesting to note that although ackee is not eaten in Mexico, ackee orchards are being planted there in anticipation of the extended markets to appear under the North American Free Trade Agreement (NAFTA).

#### **d) *Jams, jellies and juices***

##### **i) *Description of the business***

Processing fruits into jams, jellies and juices suffers from similar problems as those confronted in the ackee business. There is little organized planting, which causes raw-material shortages and wide fluctuations in both variety and quality. Additionally, higglers are serious competitors, and farmers are prone to sell raw produce to the export market, where they fetch higher prices.

Organized growing has already been established for some fruits, such as mango, banana and papaya. These fruits are now being fashioned into novel jams, jellies and juices, because of the security of supply. Other fruits, such as sweetsop, tamarind, naseberry and guava, have exotic appeal and are in great demand, but they are not being processed on any appreciable scale because no orchards are to be found on the island. As a matter of fact, some crops such as Tommy Atkins Mangoes, simply will not be grown for processing, because there is no ready export market for them.

The processors have found themselves financially exposed because of the lack of disease-prevention technologies and a general weakness in plant pathology and care in Jamaica. Papaya is a case in point. Virus diseases have literally wiped out the crop, and



the processors consequently sustain significant losses. What is most surprising is that these outbreaks were not predicted and that no preventive strategies were introduced after the first outbreaks. Government is being called on to provide services in plant pathology and to engage in long-term preventive work through adequate laboratory diagnostic and surveillance services.

ii) *Lessons from this case*

Jamaica has a lot of material which could be processed, but it is not of the right quantity and quality. This once more highlights the need for orchards, especially for exotic fruits such as tamarind, guava and Jamaican cherry. Grading raw material and establishing a system to pay responsible, mutually acceptable prices according to reliable evaluation would promote increased value and quality of crops.

Home processing of fruits is traditional in Jamaica. Cottage industries, at the village level, could be established relatively easily by expanding on the traditional activities. Industrial-sized equipment is simple to handle, methods for processing are conventional, and standards can easily be set and monitored.

Under these arrangements the main processors would simply contract out processing at various stages of their operations. They would then buy back the finished or semi-finished products from the farmers to supplement their main-line production. In this way, farmers could easily be encouraged to plant orchards or to provide better care of the trees they already have. Each cottage processor could work with the main processors to maintain standards, to develop new products and to ensure proper handling and transportation of these semi-finished or finished goods. The ideal would be to tie all this to targeted R&D and to establish competitive standards.

Such cottage industries could be set up through individual farmers, community enterprise organizations, 4H clubs, schools' home economic departments and similar institutions. Contract processing now takes place between large processors and smaller ones in the urban areas. It is simply a matter of extending this principle to rural groups and, where appropriate, to the farms themselves.

Processors have also started to market under single labels, which has allowed for more consistent quantity of supply and better quality and packaging, as well as response to markets. Developing a market strategy around a single label for the sale of products to local consumers, such as specialty stores and hotels, as well as to foreign ethnic and gourmet markets, is a significant change in the Jamaican agro-processing system. This strategy could derive even greater benefits if the label could be extended to the national level, incorporating the concept of "another Jamaican quality product". The Jamaica brand name is being used to market many products from other tropical countries, with much success in both the United States and Europe. However, it has not been systematically exploited by Jamaican exports, except in a few well-known instances such as coffee and cocoa.

An extension of this marketing strategy to include farmers, who have become aware of the need to export high-quality Jamaican goods with predictable regularity, will foster a modern and flexible agro-industrial marketing system, in which all actors have a definitive and profitable stake. Incidences of excess raw material will occur less frequently and will be easily remedied by transferring the excess from one processor in the group to another. Such marketing approaches would foster cooperatives, or consortia of operations, which eventually will become the norm.

Through such collaborative, nationalistic approaches, testing products, working out supply schedules and purchasing raw material and equipment will also become easier and

less costly. Inputs from foreign suppliers will be substantially improved, as they would be negotiated in bulk and with demands for special qualities. This would have a direct impact on farmers' incomes and efficiency.

e) *Coconut and potato*

i) *Description of the businesses*

The sale and processing of coconuts is quite different from the other commodities investigated. Coconut farmers are much more loyal to processing, which is organized by a Commodity Board to which most of the farmers belong and for which they have a good deal of respect. Farmers are encouraged to group themselves into committees. These committees sell their fruits to one main collector, who then passes them on to the Commodity Board. Coconuts are sold exclusively to the Board, which then sells preprocessed coconut as copra to the primary processor, Seprod Company Limited. Potato farmers are organized into a similar Potato Cooperative, which has seen the same positive results.

The bond between coconut farmers and processors was strengthened after the outbreak of lethal yellowing disease on the island some years ago, which threatened the entire industry. The Commodity Board instituted a successful replanting campaign and assisted farmers with insurance, extension services and transportation. These actions reinforced the farmers' loyalty to the Board.

Today, a payment is made to farmers, based on crops sold to the Commodity Board system. This has further strengthened the loyalty between farmers and their Commodity Board. Potato farmers have demonstrated a similar loyalty to their Potato Cooperative. The loyalty transcends temptation to sell to higglers or other exploitative middlemen.

ii) *Lessons from these cases*

Loyalty to the coconut Commodity Board and the Potato Cooperative has developed for various reasons. Farmers can buy equipment cheaper through the cooperatives than through regular hardware stores. Raw material is bought at a mutually accepted, fixed price. The cooperatives provide the necessary extension services. Marketing produce is free of hassles. Finally, farmers have a strong say in the operations of the cooperatives. These farmers do not sell to their cooperative because they cannot do better. Rather, this is done rationally and with calculated confidence.

An ideal situation for small farmers emerges. They are linked voluntarily to a cooperative which provides seeds and inputs, such as fertilizers, at reasonable prices and which offers transportation to processing plants. A well-run cooperative clearly can overcome the tendency of many farmers to be suspicious and individualistic. Many Jamaican small farmers regard themselves as vulnerable and unable to take risks. However, when security and decent incomes are assured, they display a great deal of loyalty, patience and understanding.

**f) *Broiler chickens***

**i) *Description of the business***

The oldest and most successful agro-industrial linkages are to be found in the broiler-chicken industry. These go back about 30 years and have been responsible for the local industry reaching world-class standards.

This is an example of large processors dealing with small to medium-sized farmers all of whom are shareholders in the processing company. Because the farmers are grouped into two growers' associations, commendable levels of equity and common understanding are achieved. This collective leverage by farmers not only is good for the farmers, but it also provides a stable and responsible unit for the processors to deal with on a continual basis.

There are two major broiler processing companies in Jamaica: Jamaica Broilers Limited, which processes 25-27 million kilograms of broiler meat, and Caribbean Broilers, which processes 9-12 million kilograms. An additional 6-11 million kilograms is produced by non-contract farmers in deep rural areas and is sold locally as live birds, since refrigeration is not readily available.

Processors and growers are currently renegotiating their contract. The old contract states that farmers are responsible for housing, equipment, all utilities (including bagasse), on-farm management and labour, provision of all-weather roads to transport chickens, and security. The processors provide one-day-old chicks, medication, feed and technical assistance (sometimes once or twice a week).

Farmers are expected to grow chickens to market size, which is 1.6-1.8 kilograms live weight for the fast food market, which takes about 6 weeks, and 1.8-2.0 kilograms for the regular consumer market, which takes about seven weeks. When the chickens are ready for processing, farmers have to take the chickens off feed and prepare for shipment. The processors crate the birds and truck them to their plants. Birds are weighed immediately on arrival at the plant to guarantee full value to the farmers, because stress causes dehydration and weight loss. (This is not a problem for processors, because on freezing, the birds recapture some of the lost weight as ice.)

Finally, the old contract contains an incentive scheme which promotes efficiency among the growers. They are paid on a sliding scale, based on the conversion of feed to meat (live weight). The accepted ratio is 0.8-1.0 kilograms of feed to 0.4 kilograms of meat. A number of factors affect the efficiency of conversion, some of which are outside of the farmers' control. For example, birds grow better in cooler temperatures, so weight varies according to the season of the year. Water quality also affects feed conversion rates, as do quality of feed, disease in the eggs and, of course, management of operations. The feed is known to vary, when importation of ingredients lags behind demand. The graduated pay scale awards higher rates to the more-efficient growers, based on arrival averages. Top farms get \$ 8.50 per bird, and the lowest-paid farms \$ 6.50 per bird.

The new contracts under negotiation are more in keeping with what obtains in the United States. Under these contracts, farmers are responsible for medication and feed and for the birds condemned on their farms. With these changes come higher prices for birds delivered. Also, farmers will be paid on two-week rolling averages, in which payments will be based on whether they are on, below or above the average conversion observed during the period. This of course depends on their level of efficiency.

The farmers, however, argue that the United States has better control systems to maintain good-quality eggs and feed and hence birds. About 20 out of every 20,000

chickens have to be culled because of defects relayed in the eggs. In Jamaica, eggs are not separated into different grades according to their quality, and the composition of ingredients in the feed sold to farmers is not always optimal. Additionally, local public health inspectors are actually stationed at the processing plants. The farmers believe that this close working relationship between health inspectors and processors creates biases and conflicts of interest. In essence the farmers are calling for better eggs and veterinary technology, to ensure uniformity of day-old chicks, and more work on the use of local raw material for animal feeds, to reduce dependency on imports.

The farmers also feel that the base price being offered for chickens is too low to offset their high capital investments and insurance costs. The processors offer no financial help, except some discounts for purchasing equipment at the company's supply store.

#### ii) *Lessons from this case*

This case demonstrates clearly the range of intricate problems that can be faced in the grower/processor linkage. The changing situation demands constant negotiation, but the linkages are strong enough to withstand it. The growers are properly informed, and they feel that their interests are being protected by an association they control. Mutual feelings of respect and equity must be renewed continually for industrial tranquility to reign.

The farmer-processor relationship which has evolved has proved so successful that some companies are now growing vegetables on mined-out bauxite lands using a similar contractual approach.

The pig industry also has incorporated features similar to those of the broiler industry. Grace Kennedy Limited is the main player in this business. They grow only 10% of their demand, obtaining 68% on contract and 30% from the open market. They provide veterinary services, pharmaceuticals, finances to purchase feed, and guaranteed minimum prices tied to a band on the open market. If prices are outside the band, adjustments are made to ensure a reasonable income for all growers. The processor has learned that it is better to take some losses than to break contracts with farmers. By assuring security for farmers, the processor obtains a consistent supply for processing.

### **8. Overall analysis and conclusions from the case studies**

Each commodity has its own special requirements in the grower/processor linkages and one has to be careful with generalizations. Even so, several factors recur throughout the system and must be taken into account in any effort to strengthen agro-industrial linkages.

#### a) *Small farmers' insecurity*

In general, small farmers rely mainly on rain-fed agriculture to produce the crops which can profitably be processed. Their unreliable behaviour toward contracts and processing reflects the insecurity associated with this reality. They understandably seize the first opportunity to sell perishable produce as a hedge against perceived impending losses and to capture higher prices on the fresh-food market.

Higglers and other wholesalers exploit these insecurities, making it difficult for processors to compete, especially in times of scarcity. In fact, what is often sold for processing is rejected produce which is unsuitable for the local fresh market or for export. In some instances, such as bananas, this suits the processing businesses because the defects are often only cosmetic; the fruit is still suitable for processing, yet it carries a lower price. On the whole, however, the rejected fruit is not suitable for processing. Poor-quality raw material means low-quality processed products. Ideally R&D should devise methods to transform this so-called rejected material into quality chemicals or food and feed ingredients.

Although hard-and-fast generalities must be voiced with caution, some features of the agro-industrial linkages clearly are influential. They must be taken into consideration if overall improvements are to be expected in the system. These are as follows:

- i) whether the raw material is seasonal;
- ii) whether higglers and other middlemen operating in the area are purchasing the same material for the fresh-food or export markets;
- iii) whether the crop is perishable;
- iv) whether the commodity is transportable and whether transportation is adequate;
- v) impact of weather on the yields;
- vi) availability of information on pricing and other important factors such as agronomy, expected yields and susceptibility to disease;
- vii) current market conditions; and
- viii) cohesiveness of the small farmers in the area.

The cohesiveness of small farmers appears to have the greatest accumulative and beneficial effect. This factor not only allows better critical masses in purchasing inputs like packaging and organizing transportation, but strong farmers' groups create stronger negotiating positions and give the farmers a greater sense of power, control and hence security. Also it provides a broad base for disseminating information and generating and sharing knowledge. Better discipline can be imposed within farmers' groups, and the effects of incentives can more easily be applied and monitored.

There are various ways in which farmers' groups can be organized, ranging from loose collectives to more structured and accountable cooperatives. The most effective organizations draw their success from providing more equity, income and security for farmers. They accomplish this objective through democratic operations and the provision of up-to-date information to farmers, which is vital in decision-making and in risk taking.

Most processors agree that small farms cannot be of much benefit to the processing industry unless they form part of a larger grouping or a collective system. Processors must also bind together to become reliable and reasonable partners in the agro-industrial enterprise.

#### **b) *Raw material***

Belonging to a cooperative or processing company is not enough. Farmers must produce raw material efficiently, to allow processors to generate the surpluses necessary to continue to buy raw material at prices that allow farmers a decent living. Most farmers do not grow the best varieties for processing, so they receive low prices for low-quality products, which stand in contrast to the prices offered on the fresh-food market. Improving quality and uniformity must be the objective of the system, and this will depend on more relevant R&D and extension work. Farmers also must take better care

of the scattered exotic plants which they may have on their farms. Agronomic and processing information must be made available if they are to do so effectively.

Competitive businesses cannot be established on the harvesting of scattered fruit trees. Apart from the cost of collection and transportation, there is no control over the varieties which can be found, which causes difficulty in processing and unreliable product quality. Growing orchards specifically for processing is a vital necessity. This requires collaborative action between farmers, processors, R&D workers and financial institutions.

The mechanism for obtaining raw-material supplies is the greatest structural challenge facing the development of the agro-processing industry in Jamaica (Reid and Sibbles, 1994). Improving quantity, quality and overall efficiency has a lot to contribute to the agro-industrial relationship. Such changes clearly are outside the scope of individuals, or individual enterprises or institutions. This has to be made a serious national effort, supported by both the public and private sectors. The notion that Jamaicans are proud, individualistic people and therefore cannot collaborate has to be discarded, and strategies have to be instituted to ensure the collaboration of the major players in the system. The science and technology community has a vital role to play, but unfortunately the agricultural R&D system is at its lowest ebb since its establishment in the 1950s. This crucial raw-material problem requires budgetary and financial recognition, with specific policy and planning measures to address the most urgent concerns.

#### **c) *Unpredictability of processors***

Small processors tend to move from one product to another, or simply to no product at all, depending on their cash flow situations and their perceptions of the availability of raw material. This irregular demand for farmers' commodities creates a great deal of insecurity among farmers, and they tend to sell at the first opportunity, irrespective of contracts.

A better strategy would be for small processors to cooperate in processing, to enable the purchasing of a range of raw materials from a particular area on a regular basis. This would slowly build confidence among the farmers, especially if they were allowed to do some preprocessing themselves and thereby add to their incomes. Teaching them to process left-over raw material would also help their domestic situation and create a new attitude towards processing.

Two factors emerge as major shortcomings which require special attention. First, farmers and processors need information on marketing, both at the local and international levels, and information about the availability of relevant R&D, extension services and financing. Second, agricultural R&D must find ways to improve productivity and quality on small farms and processing plants.

#### **d) *Information***

Proper marketing and pricing require up-to-date information about the availability of produce across the island and their price movements. However, Jamaica does not have a comprehensive picture of its bioresources (Ventura, 1990), and indeed even an objective estimate of raw-material supplies from year to year in different places is not possible. Such lack of information has aggravated an already distrustful situation between farmers and processors. Competition for raw material is fierce and sometimes disruptive. Speculative procurement affects the amount of working capital that is tied up in raw

material, packaging and other ingredients that processors need to ensure high levels of capacity utilization.

Relevant information will help both farmers and processors in their negotiations and in the scope of their expectations. The Ministry of Agriculture or the Jamaica Agriculture Society could provide this information on a daily basis on news stations, using information collected by extension officers or summaries of the activities of the major wholesalers and supermarkets to determine indicative prices and demand.

Information about export possibilities for specialty markets is important to local processors and to the exporters who buy from them. The processors will become proficient only if they are aware of the needs of the international markets and of the new technologies and standards which will provide ways to meet these needs.

The main features of an information system are as follows (Wilson, 1992; Reid and Sibbles, 1994):

- i) equal accessibility by processors and farmers;
- ii) wide coverage;
- iii) collection and dissemination of accurate and reliable quantitative information on supply and demand conditions for targeted crops;
- iv) timeliness; and
- v) cost recovery.

**e) *Research and development***

Research and experimental development (R&D) is a costly but essential activity in the agro-industrial linkage. Small countries like Jamaica are always short of sufficient researchers to do comprehensive research and transfer of technology, even in only a few selected areas. Graduate students and technical workers should be encouraged to tackle problems being experienced in the country, as part of the requirements for their research theses and general training.

A crucial area of concern is the prevention and treatment of diseases which cause serious falls in production. Likewise, the creation or adaptation of new varieties must become a top priority. No systematic transfer and adaptation of agricultural technology is currently taking place on the island due to a shrinking R&D competence in national agriculture. This has to be addressed with urgency.

**f) *Extension service***

Such information and R&D systems must be coupled with a dynamic extension service if they are to have timely beneficial impact. Small farmers will need this type of service to translate and use the information that becomes available. Also, extension workers are better able to define and handle the problems experienced by the farm sector.

## **9. Major recommendations**

Both small farmers and small processors are literally cut off from credit, largely because they lack adequate collateral. Many initiatives have tried to remedy this problem, but they generally handled the farmers and processors separately, without recognizing them as part of an agro-industrial system. Credit made available to farmers and processors who

formed close agro-industrial linkages would do much to foster such relationships. Perhaps this could take the form of an input credit fund for raw-material supplies based on contractual supply agreements (Wilson, 1992; Reid and Sibblies, 1994).

Improving the overall productivity and versatility of the agro-industrial system requires certain changes at the level of the small farmers, the processors, and the public- and private-sector support systems.

**a) *Recommendations for farmers***

1. The subsistence incomes and insecurity of farmers have to be remedied through assistance to substantially improve their production and productivity, specifically regarding raw material slated for processing; increased familiarity with the agro-industrial business to gain better perception of, and confidence in, these operations; and involvement under contract in on-site preprocessing or processing, for established processors, to supplement their incomes.

2. Farmers must be prepared to produce specifically for processing, with regard to both cost and quality.

3. Farmers must plant orchards of specialty crops to ensure adequate and regular supplies of raw material.

4. Farmers must be made aware of what is happening at different sites, to obtain information about production, post-harvest care, packaging and transportation which will improve their decision-making.

5. Farmers, extension workers and R&D specialists must work together to produce high-quality material for processing and to grow raw material specifically to be used in mechanical processes.

6. Small farmers must become part of cooperatives, consortia, or some other form of district association to ensure economies of scale when purchasing inputs, to form a larger bargaining unit to deal with contracts and other production and marketing matters and to obtain timely advice on planting and agronomic expectations.

7. Such associations could establish farmers' cooperative banks, insurance schemes and agricultural machinery enterprises and could undertake some form of processing.

8. Training programmes and demonstration projects should be instituted to attract young farmers into farming raw material for processing.

9. Extension work must be routinely monitored and evaluated to ensure that appropriate knowledge is reaching farmers on a timely basis.

10. Farmers must take steps to improve their reading, writing and communication skills.

**b) *Recommendations for processors***

1. Processors must organize to ensure more consistent use of raw materials. Steps to achieve this goal include forming a combination of processors, buying a range of raw material from a single farm area, and becoming more knowledgeable about what is happening in the various areas in which they operate.

2. Processors must routinely develop contracts with farmers to buy prescribed quantities at guaranteed prices.

3. Processors must assist farmers, as far as possible, to grow specially for processing, including both quality and type of material.



4. Processors must work with farmers to ensure access to proper extension service and transportation of produce.
5. Where possible, processors should assist farmers with inputs such as fertilizers feed, seedlings or seeds and proper irrigation.
6. Processors should try to bring farmers into processing by contracting out either preprocessing of material or cottage processing to the final product, to help farmers improve both their incomes and their understanding of the various factors influencing processing.
7. Regular meetings between farmers and processors —not merely the middlemen or agents of the processors— would improve the informational flows between both parties and head off problems before they became contentious.
8. Processors must encourage or support the nation's R&D apparatus to work on problems of productivity, quality and processing of raw materials.
9. Processors could support or provide qualified extension services for small farmers.
10. Processor associations could institute quality-control systems to reduce delays.

**c) *Recommendations to improve ancillary services***

1. Government must take a proactive stance in dealing with the agro-industrial system by providing market, technological and price information to farmers and processors; setting up a techno-economic intelligence system to gather and disseminate the best technological and market-forecasting information on the trends and demands in different global market systems; encouraging R&D work on local raw materials to develop new products for niche markets; and influencing graduate students to work on problems relevant to improving the nation's agro-industrial system.
2. Government and non-governmental organizations should study different farming communities to find ways to encourage cooperatives and other types of collective actions.
3. Special financial and insurance mechanisms should be created to help small farmers overcome their production difficulties and to encourage farmer-processor linkages.
4. Better roads should be provided to ensure adequate transportation systems for linkages between farms and processing plants.

## **10. Policy implications**

Government has to take a more systematic and focused approach to agro-industrial development to obtain the maximum benefit from these endeavours. Establishment of the Agribusiness Council is a step in the right direction, but it requires a clear national policy to guide its actions. More resources will have to be marshalled to ensure the development and implementation of a national policy which fosters agro-industrial initiatives and ensures the best use of scarce resources.

Jamaica has suffered in the past from approving well-written policies without sufficient resources to effect them. Budget lines must be identified to give national credibility to policies supporting agro-industry. Outside technical assistance could then be successfully sought and applied. The government has already embarked on restructuring its budget to accommodate specific objectives.

The mere increase in agro-industrial production is not enough to improve agroprocessing. Processing, in general, now operates with old or obsolete equipment and antiquated management, organization and technology, which seriously limits the ability to compete in world markets.

The private sector, especially the large processors, must undertake or support targeted research to improve their operations and to assist farmers in improving quality. A small tax on imported raw materials could be used to expand R&D to address these problems.

Special training programmes must be designed for rural youths if commercial agriculture is to prosper and grow. These programmes could coincide with the establishment of demonstration plots for crops and orchards of exotic fruits grown specifically for agro-industrial processing. Most rural youths, however, require land to become part of the agro-industrial enterprise. Special attempts should be made to identify idle lands and to make these parcels available to those who are interested in production and processing.

Finally, development policies and plans should not be confined to land-based activities. The seas and coastal waters are vast, untapped resources which have not been fully considered in agro-industrial development. Given the production limits of agriculture, the seas must be systematically approached to provide for growing populations and expanding trade.

## **11. Strategies for implementation**

A strategy for improving the agro-industrial system must start with the production and delivery of raw materials in reliable quantities and specific qualities. Out-dated production methods and inadequate organization cannot provide the necessary increases in efficiencies and quality. Gathering raw material from wild plants is not a reliable basis on which to establish and maintain supplies for special markets. Agriculture must establish orchards and incorporate up-to-date care and husbandry to produce crops specially tailored for processing. Providing the qualities and even quantities required cannot be left solely to the farming community, but rather must become a joint effort between farmers, processors and the R&D community.

Processors must take a more strategic view of the welfare of farmers. They must organize themselves to offer the best prices and continuity of purchase, which will enable farmers to bank on stable and reasonable incomes.

The recently formed Agribusiness Council is ideally placed to help facilitate the transformation of the industry. This body must set itself the task of gathering the most up-to-date information on what is happening in the subsector. It must act as a catalyst for expeditious action in government agencies such as Jamaica Promotions Limited (JAMPRO) and the Rural Agricultural Development Agency (RADA) and as a reliable fulcrum for private sector interaction.

An annual assessment and report of progress in the agro-industry interphase must be prepared and shared with all the decision- and policy-making bodies in the sector. On knowledge, the subsector can thrive.

### Notes

<sup>1</sup> These are approximate figures because the numbers are constantly changing. Nevertheless, the proportion remains about the same.

<sup>2</sup> A.C. Wilson and other consultants have found this to be a serious problem. See Wilson, 1992; Reid and Sibblies, 1994.

<sup>3</sup> These are basically subsistence farmers whose methods have changed very little for the last five decades.

<sup>4</sup> This decision, made in 1994, has been repeated by the Prime Minister, the Governor General and other Ministers of Government on several occasions.

<sup>5</sup> Some 20% of the land in farms is described as ruinate; it is potentially suitable for agricultural purposes, but has reverted to bush.

<sup>6</sup> A number of studies have been conducted and a series of reports written on this subsector. See, for example, reports by Agro 21 in the 1980s and a series of papers by JAMPRO consultants.

<sup>7</sup> The raw-material problem surfaces in every study designed to improve the industry. See Wilson, 1992; Reid and Sibblies, 1994.



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## **ANNEX**





Table 1

**EXPORTS OF NON-TRADITIONAL CROPS, 1987-1992**

(Thousands of kilograms)

	1987	1988	1989	1990	1991	1992
Yams	10,493	9,535	6,972	8,565	9,570	11,051
Breadfruit	248	196	68	143	400	363
Calaloo	115	113	116	131	157	239
Carrot	0.3	0.5	-	0.14	0.23	0.75
Cucumber	323	404	72	138	126	122
Pumpkin	1,184	775	829	938	1,198	1,710
Hot pepper	2.8	93	151	167.5	244	420
Sweet pepper	72.8	64.9	12	40.9	-	17
Thyme	38	53	66	67	81	111
Scallion	21	21	23	23	23	30
Avocado	105	27	15	44	70	108
Mango	495	570	293	435	1,081	1,152
Papaya	200	421	215	495	1,401	1,738
Pineapple	1.2	5.1	0.3	1.9	1.4	6.1
Plantain	106	31	107	127	202	426
Naseberry	12	17	11	10	15	8
Starapple	1.4	1.3	-	1.64	0.63	1.1
Sorrel	14.6	2.7	10.0	7.7	14.61	30
<b>Subtotal</b>	<b>13,433.1</b>	<b>12,330.5</b>	<b>8,960.3</b>	<b>11,473.78</b>	<b>14,584.87</b>	<b>17,532.95</b>
Other	4,671.9	1,664.5	447.7	380.22	600.13	960.05
<b>Total</b>	<b>18,105</b>	<b>13,995</b>	<b>9,408</b>	<b>11,854</b>	<b>15,185</b>	<b>18,493</b>

Source: Data Collection and Statistics Branch, Ministry of Agriculture, Jamaica.

Table 2

## FOOD-PROCESSING FIRMS IN JAMAICA AND THEIR RANGE OF PRODUCTS

Firm name	Location	Size	Calaloo	Ackee	Jams	Fruits and vegetables	Juices and concentrates	Coffee and cocoa	Spices and sauces	Soups	Dried snacks	Processed meats	Other
Agro Mart	Kingston	S							X				
B-Marts Corporation	Kingston	S		X									mackerel
Bi-Best Foods Ltd.	Kingston	S	X	X									coconut creme
Busha Browne Co.	Kingston	S			X				X				
Canco Ltd.	Kingston	S		X	X								
Caribbean Exotics	M/ville	S	X	X		X				X			
Central Food Packers Ltd.	San. Tan.	S	X	X		X							
Citrus Development Co.	Kingston	M					X						
Coffee Ind. Ltd.	Kingston	L						X					
Cottage Industries Ltd.	St. Ann	L	X	X					X				
Desnoes & Geddes	Kingston	L											soft drinks
Dr. Ian Sangsters & Co.	Kingston	L											liqueurs
Exotic Products	Kingston	S				X							
Fachoy Food Ltd.	Falmouth	S							X				
Fruits of Jamaica	Kingston	M				X	X						
Gift Affair	Kingston	S			X				X				
Grace Food Processors	Savannah	L										X	
Grace Canning Ltd.	Kingston	L	X	X		X	X		X	X			
Grays Pepper Products	Savannah	S							X				
Hak Has Manufacturing	Kingston	S							X				
Higate Food Products	Bog Walk	L							X				confectionery

Firm name	Location	Size	Calaloo	Ackee	Jams	Fruits and vegetables	Juices and concentrates	Coffee and cocoa	Spices and sauces	Soups	Dried snaks	Processed meats	Other
ICD	Kingston	L			X	X	X						
Island Bees Ltd.	Kingston	S			X								
Jamaica Citrus Growers	Bog Walk	L					X						
Jamaica Extracts	M/ville	S											
Jamaica Producers Group	Kingston	L	X	X			X		X				essential oils
Jamaican Roots	St. Cath.	S					X						
Jamaica Standard Products	M/ville	S						X					
KRB Lea & Co.	Kingston	S											
King Pepper	Trawlany	S							X				liqueurs
Lakeside Enterprises	Kingston	S									X		
MFV Ltd.	Kingston	S							X				
Mecra Manufacturing	Kingston	S	X	X					X				
Mussons Jamaica Ltd.	Kingston	L	X	X			X		X				breadfruit
National Continental Corp.	Kingston	L									X		biscuits
Native Food Packers	Kingston	S			X						X		
Natural Products	Clarendon	S					X						
Neal & Massey Ltd.	Kingston	L							X				
Nestle	Bog Walk	L											Milo, cond. milk
Perishables		S						X					
Picka-Peppa Co.	M/ville	L							X				
Pioneer Chocolate	M/ville	M						X					confectionery
Plantation Pride	May Pen		X	X		X							
Resort Consumables	Kingston						X						

Firm name	Location	Size	Calaloo	Ackee	Jams	Fruits and vegetables	Juices and concentrates	Coffee and cocoa	Spices and sauces	Soups	Dried snaks	Processed meats	Other
Robert's Products Ltd.	Kingston		X	X	X		X		X				
Scott's Preserves	Kingston	L	X	X	X				X				
Shamrocks Foods	Kingston												liqueurs
Shims Wholesale	Kingston												syrups
Southern Processors	St. Eliz.	L											
T. Geddes Grant Ltd.	Kingston	L				X	X		X				
Tia Donna Ltd.	Kingston								X				
Tijule Co. Ltd.	Clarendon				X	X			X				
Trinjam Food Processors	St. Cath.								X				
Trout Hall (1969) Ltd.	St. Cath.	L				X	X						
VAP Ltd.	St. Cath.			X									syrups
Westico Ltd.	M/ville	S		X									breakfast cereal
Wisynco	Kingston	L	X	X	X		X		X				

Source: Jamaica Promotions Limited (JAMPRO).

Table 3

**NUMBER OF FIRMS PRODUCING SPECIFIC LINES OF PRODUCTS**

Calaloo	Ackee	Jams	Fruits and vegeta- bles	Juices and concen- trates	Coffee and cocoa	Spices and sauces	Soups	Dried snacks	Proc. meats
13	14	10	11	12	4	22	2	3	1

**Source:** G.V. Shirley, The Jamaican food processing sector: where we are today, Kingston, Jamaica Promotions Limited (JAMPRO), 1994.

Table 4

**SELECTED PROCESSED FOOD EXPORTS (1992)**

	Quantity	CIF value (J\$)	Primary destination(s)
Guava jams and jellies	106,657 kg	4,672,487	Canada, United Kingdom, United States
Other fruit preserves (with and without sugar)	45,995 kg	4,008,559	Caricom, United States
Mango puree	99,372 kg	2,100,680	Canada, United Kingdom, United States
Grapefruit chunks	991,216 kg	29,773,242	United Kingdom
Pineapple (chunks and slices)	34,603 kg	1,457,628	Caricom
Orange juice, unconcentrated	29,682 l	672,302	Barbados
Orange juice concentrate	1,927,796 l	56,570,362	Netherlands, United Kingdom, United States
Grapefruit juice, unconcentrated	22,320 l	460,193	Barbados
Grapefruit juice concentrate	667,270 l	21,246,982	Netherlands, Trinidad and Tobago, United Kingdom
Pineapple juice	168,805 l	3,293,175	Barbados, Trinidad and Tobago
Passion fruit juice	5,013 l	126,429	United States
Juice of any other single fruit	389,614 l	10,611,074	Netherlands, United Kingdom, United States
Pineapple-based juices	153,687 l	3,449,879	Barbados, Trinidad and Tobago, United States
Other mixed juices	314,920 l	6,930,430	Canada, United Kingdom, United States
Vegetables and vegetable mixtures	283,984 kg	6,642,212	Canada, United Kingdom, United States
Ackee	871,333 kg	62,953,260	Canada
Coffee, roasted	7,718 kg	3,936,530	Cayman Islands, United States
Coffee extract	16,796 kg	6,923,987	Canada, Japan, Trinidad and Tobago
Cocoa powder (unsweetened)	211,107 kg	22,768,072	Caricom, Trinidad and Tobago
Cocoa powder (sugar added)	103,870 kg	6,769,014	Caricom

	Quantity	CIF value (J\$)	Primary destination(s)
Cocoa butter	163,101 kg	9,361,177	United States
Pepper sauce	524,524 kg	35,402,541	Canada, Cayman Islands, United States
Other sauces	388,349 kg	29,844,242	Canada, Trinidad and Tobago, United States
Peppers, crushed and ground	51,142 kg	2,097,442	Canada, United Kingdom, United States
Other ground preparations of pimento	1,772,926 kg	84,746,289	Canada, United Kingdom, United States
Ketchup	934,873 kg	14,656,951	Barbados, Caricom, Trinidad and Tobago
Soups	403,056 kg	23,086,175	Trinidad and Tobago, United Kingdom, United States
Preserved fruits, peel and nuts	16,618 kg	1,011,286	Caricom
Confectionery	106,721 kg	4,781,203	Caricom
Chewing gum	71,109 kg	1,301,072	Caricom
Chocolates	303,514 kg	37,919,564	Caricom
Biscuits unsweetened	810,059 kg	24,491,406	Caricom
Biscuits sweetened	575,609 kg	28,427,864	Caricom
Chicken and other sausages	965,515 kg	29,285,645	Belize, Caricom, Trinidad and Tobago
Other preparations of pork meat	39,276 kg	1,761,559	Caricom, Trinidad and Tobago
<b>Total for all listed categories</b>		<b>583,540,913</b>	

Source: G. Shirley, 1994. External Trade 1992, part II, Statistical Institute of Jamaica.

Table 5  
**CHANGES IN CONSUMER PRICE INDEX, FOREIGN EXCHANGE RATES AND  
 COMMERCIAL LOAN RATES**

	1986	1987	1988	1989	1990	1991	1992
US\$ rate <sup>a</sup>	5.50	5.52	5.50	6.50	8.17	20.91	22.2
<b>Annual change in consumer price index <sup>b</sup></b>							
All groups (weight: 100)	14.8	6.7	8.3	14.3	22.0	51.0	77.3
Food and drink (weight: 55.6)	17.8	7.3	9.5	20.0	22.3	54.8	77.5
<b>Commercial loan rates <sup>b</sup></b>	26.8	26.1	25.8	29.8	34.6	38.7	48.4

<sup>a</sup> US\$ exchange rate on last trading day of the Period. *Statistical Digest*, Research and Programming Division, Bank of Jamaica, March-April 1993.

<sup>b</sup> *Economic and social survey, Jamaica*, PIOF 1991, 1992.