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PROBLEMS AFFECTING THE ESTABLISHMENT OF FOOD PROCESSING IN THE ENGLISH-SPEAKING CARIBBEAN AND A PROPOSED SOLUTION

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The potential for food processing, particularly fruit and vegetables, in the English-speaking Caribbean, has been established. Two recent papers by the author (Sammy 1980¹ and 1981²) provide the necessary proof if required.

This paper will deviate from the conventional and treat the subject more from the author's 14 years of experience in the study of the subject rather than from a study of the literature.

The potential for food processing may be considered in two broad areas: (1) for domestic consumption and (2) for export. The term domestic consumption will include inter-regional trade. The potential for domestic consumption is clearly established by our ever-increasing Food Import Bill, which at present stands at some EC\$1.9 billion. The potential of the export market is yet to be fully determined. However, indications are that there is a ready export market for good quality, processed, tropical fruits and vegetables, particularly for North America and Europe. In attempting to exploit this market there was marginal success in some cases while others were unsuccessful because of a failure to maintain regular supplies of a consistently good quality.

In the Commonwealth Caribbean, except for the export crops, there is little or no infrastructure for the production, processing and marketing of food crops. In order to develop a food industry it will be necessary to establish the infrastructure and provide the climate and conditions for its growth and development. During the initial stages of its development it will need to be protected and nurtured.

It has been given that the basis for the development of a food processing industry rests on the following foundation:

- (a) an adequate and reliable source of locally-produced raw material at reasonable cost;
- (b) a knowledge of proper processing technology;
- (c) proper packaging, adequate promotion and marketing;
- (d) trained personnel to man the enterprise.

This foundation was based on the experience of developed countries and pre-supposes that the support infrastructural services such as machine shops, welding shops, technicians, both mechanical and electrical are available. It also pre-supposes that information and technical advice services are available. However, this is not always the case. Our historical development did not provide us all with such a technological capability, and it is only in the MDCs, particularly Jamaica and Trinidad and Tobago, that there is any reasonable degree of back-up service. Even here, support

service and information service are not readily identifiable and available. In the Eastern Caribbean the situation is worse.

The development of the English-speaking Caribbean was based on export agriculture to the mother country. Thus, the infrastructure and experience gained were designed to meet that need. Attempts to change this system have more or less met with failure. A failure which reflects our limited experience in dealing with the world market.

Raw Material Supply

The development of a food processing industry based on imported raw material supplies are nothing more than assembly plants which prevent the development of the agricultural linkage. This has been the past experience of those governments in the region that initiated the development of a food processing industry through invitation and incentives, such as tax holidays, protection from competition and soft loans. After two decades these plants are still importing between 70 to 80 percent of their raw material requirements.

Since the infrastructure for the development of raw materials for a processing industry is absent, and since our land mass is small, terrain rugged, and labour costs high, it is unlikely that foreign capital would invest in the development of our agricultural raw material for processing because of the high risk and low profits. It would, therefore, seem that if we are to develop a food processing industry with raw material linkage, we would need to start small and expand both the processing facilities and the raw material supply as we grow. This is easier said than done, and would require much support and assistance depending on circumstances. In this respect, I would wish to give three examples:

- (1) the *Instant Yam Project* in Barbados which was closed down with the equipment and plant standing idle. One of its constraints was an inadequate supply of raw material (yam);
- (2) the production level of the food processing plant at True Blue in Grenada is reported to be affected by a shortage of supplies;³
- (3) the Sorrel Plant in Trinidad has been running at the loss because it is unable to get adequate supplies of sorrel. The one year it received 80 percent of its through-put, it showed a profit.

Locally produced raw material supply is one of the major constraints in the development of a food processing industry in the English-speaking Caribbean. The main reason for this constraint is the high cost of production and the variable quantity and quality of the produce.

Knowledge of Food Processing Technology

There exists a pool of knowledge in the English-speaking Caribbean on food processing - The Food Technology Unit of the Department of Chemical Engineering, University of the West Indies, St. Augustine, Trinidad; the Caribbean Industrial Research Institute, Trinidad; the Food Technology Institute of the Jamaica Industrial Development Corporation, Jamaica, and the Scientific Research Council, Jamaica. They are all involved in research and development work in food preservation and processing. Further the Food

Technology Unit at U.W.I. is involved in training and to date has turned out some 40 to 50 qualified food technologists. Thus the region has a fair supply of trained food technologists and facilities for future work.

However, there is a shortage of personnel, professional and lower, with factory experience, for while a university graduate may be equipped with theoretical knowledge and principles of food processing, he is lacking in experience of manufacturing operations and commercial procedures. Far too often the new graduate is expected to enter the world of manufacturing and commerce, and to shoulder responsibilities for which he was not equipped.

There is also need for training at a lower level for the factory floor, particularly for foremen and supervisors in the Element of Food Technology, Quality Control and Plant Maintenance. This may be achieved by short-courses of two to four weeks at U.W.I. in theory and principles, followed by in-house training.

Packaging Promotion and Marketing

Packaging is likely to be a major constraint, particularly in the Eastern Caribbean. While there are manufacturing concerns for glass bottles and jars, tin cans and some plastic films in Trinidad and Jamaica, and recently a glass factory in Guyana, one of the major concerns in the Eastern Caribbean is the unavailability of packaging supplies from the MDCs. Thus, LDCs have to obtain their supplies from the U.S.A. or Canada at the expense of their hard currency reserves. Further, the small volume required results in higher cost. This is especially so in the case of tin cans which are shipped as preformed open cans and thus occupy greater volume, as against flats. Small quantities of labels also cost much more than large quantities. Packaging is costly and when purchased in small quantities, it is costlier.

Promotion and marketing are expensive operations and can be ill afforded by small operators. Nevertheless, they are necessary if small operators are to break into the regional and foreign markets. One of the failures of the Instant Yam Project in Barbados was the inability to maintain a promotion programme.

Trained Personnel

To some extent we have dealt with the training of the food technologist and the factory floor personnel. Proper management of the food processing operation can be a major constraint, but a fully qualified and well-trained manager will be costly and possibly outside the financial limits of the small enterprise. A central monitoring centre with a well qualified and fully trained person can assist in helping the small processor with his problems.

A major constraint, particularly in the Eastern Caribbean, is the lack of back-up facilities of the mechanical and electrical/electronic type. Each small factory must have a good mechanic cum electrician to keep the equipment serviced and operational, as well as to effect minor repairs when needed. This necessitates a small workshop with the appropriate tools. Without such a person and facilities the small factory is likely to experience a lot of down time and a high repair and service bill.

The following examples will illustrate the point. At the Orange Hill Estate in St. Vincent there is a small processing unit, producing mainly juices and nectars. Most of the equipment was locally fabricated, while some of the manufactured pieces were modified to meet local requirements. Almost all the equipment was functional. This is because the estate has a good general mechanic, while not formally trained he is good with machines and things electrical. The estate also has a small workshop amply equipped.

On the other hand, at the Agro-Lab, also in St. Vincent, there is a relatively new (little used) *Simplex* filler, which has been standing idle for years because it needs repairs. They are unable to find someone who can repair it.

Equipment

Because of our historical past there is very little technological capability for identifying, locating and installing food processing machinery and equipment. We depend to a great extent on equipment salesmen. It is the author's experience that equipment salesmen in the English-speaking Caribbean are non-technical salespersons who are only interested in effecting a sale. They usually have no technical ability or knowledge of the equipment they are selling, nor can they provide service or repair back-up. Examples of unsuitable over and undersized equipment are common throughout the region.

Further, there is no common source from which information or advice may be obtained. There is need for a library of manufacturers' and dealers' catalogues of food processing equipment and machinery, both new and second hand.

There has been much argument against second hand equipment, but dependent upon the equipment and a knowledge of what one is looking for, second hand equipment with years of service may be obtained at a fraction of the cost of a new piece. There are a number of dealers who specialize in second hand food processing equipment, both in the U.S.A. and in Canada. In any case, basic pieces of equipment such as kettles and mixing tanks cannot pose problems except for the size. It will serve the territories well to train one or more persons in the art of locating, acquiring and installing such equipment and machinery.

A Proposed Solution

The author is of the view that a viable food processing industry in the region is unlikely under the present system, because it is a high-risk industry with a relatively small profit margin. Further, there is a lack of infrastructure and back-up service, the domestic market is likely to be small and marketing and transport costly for small enterprises. Yet a food processing industry is essential if the region is to survive. This calls for a different approach. The author therefore wishes to re-propose a system for consideration.

This system was first proposed in a paper entitled *A Model for Agro-based Industry in the LDCs of the Caribbean Commonwealth - Fruit and Vegetable Processing* (a paper prepared for the Standing Committee of Commonwealth Caribbean Ministers of Agriculture, CARICOM Secretariat, Georgetown, Guyana, May 1974)⁴.

Since there is no organized large scale production of food crops, except those for export, it would be necessary to establish a raw material supply as well as the processing technology and marketing. The author therefore proposes, initially, the establishment of a number of small scale community processing units, strategically located with respect to raw material potentials. These small scale units will not be able to maintain the necessary infrastructures for success. The author is therefore also proposing the establishment of three regional service units that will provide the necessary services for successful operation. The three service units would be:

- (1) *An Agronomy Unit* to assist in determining existing and potential areas for processing development and the development of new crops for processing. This unit should have a regional base, but should work in close cooperation with territorial agricultural personnel, both government and private. The regional base could be part of the restructured Regional Research Centre (RRC) now CARDI, at the U.W.I., St. Augustine, Trinidad.
- (2) *A Technical Unit* to provide technical services as follows:
 - (a) to maintain a catalogue of food processing machinery and machinery manufacturers;
 - (b) to advise, select, purchase and install appropriate processing equipment;
 - (c) to set-up, bring into operation and train local personnel in the operations of processing units;
 - (d) to provide mechanical servicing and trouble shooting services;
 - (e) to provide food technology advice, quality control guidance and inspection and product development.

It is necessary that this unit work in close cooperation with the Faculty of Engineering (Food Technology Unit) at U.W.I., CARIRI, The Food Technology Institute, Jamaica Industrial Development Corporation and the four Produce Laboratories in Grenada, St. Vincent, St. Lucia and Dominica.

- (3) *A Marketing and Purchasing Unit* responsible for all export marketing and market information. The unit should also be responsible for all overseas purchasing of equipment, materials and supplies.

Location of Processing Units

There are two prevailing views with respect to size of plant and location of processing units in the Commonwealth Caribbean. The first is the establishment of small scale processing units in each territory located within the areas of raw material production. The other is a relatively large processing unit located on one of the islands with the other territories producing the raw materials, then shipping them to the processing unit.

The author strongly supports the first view for the following reasons:

- (1) small plants located in each territory will have a strong community development contribution.

- (2) agricultural raw materials do not often lend themselves to too much handling and transportation. Normally, for long hauls, pre-processing or special storage and handling is required. Harvesting for long hauls calls for reaping earlier, lower maturity and, therefore, loss of quality. Long hauls result in higher wastage due to transport and handling damages;
- (3) large processing units are not necessarily more economical than smaller units. The cost of production does not necessarily become less with *volume of production*. In agricultural products, processing gains made by volume of production are often annulled by cost of transport, handling and preprocessing as well as spoilage and loss in quality.

The author would strongly like to discourage any attempt at large central processing in any one territory.

Establishment of the Processing Units

The units should be established either as cooperatives or as farming complexes in which the farmers are shareholders of the processing units, on a strictly business basis free from political patronage. Since small farmers have little or no knowledge of how to go about identifying a potential, of making a feasibility study or of setting up and running a plant, this will have to be done by a competent team of technologists - The Technical Unit.

The mode of operation in the establishment of these processing units should be patterned after the UNIDO Model in which the regional governments through (CARICOM/CARIFTA and the Caribbean Investment Corporation) should act as the assisting agency, identifying the potential, inviting the farmers to participate, setting up the plant, training the local personnel and eventually handing over to the group. Financing should be either interest-free or soft loans payable over a period of 15 to 20 years with a three to five year moratorium.

An example of such an operation would be as follows: Let us assume that in district 'A', within a radius of five miles there are about 500 seedling mango trees of a particular variety: this could be the nucleus of a mango processing industry, the term *industry* used in a restricted sense. First a survey of the processing potential and product development of the fruits is made. Let us also assume that the survey indicates that the variations in quality of the products are acceptable. The product development survey also indicates that the following products may be readily prepared: mango nectar, mango jam and green mango slices for chutney.

Next a preliminary market survey is made to determine the market potentials for these products. Let us assume that the survey shows that there is a potential market for mango nectar in the CARIFTA region and abroad, that there is a market in the United Kingdom for green mango slices in brine, but that mango jam is a relatively new product on the market and therefore its potential would be uncertain. A preliminary economic analysis indicates that there is a reasonable chance that mango nectar would be commercially successful.

At this stage, the farmers should be brought into the picture, told about the possibilities and their reaction to such a project should be determined. If they show little or no interest in the scheme the project

should be shelved. If, on the other hand, the farmers show enthusiasm and willingness to participate, then the next phase of the project should be undertaken.

A feasibility study should now be made to determine the profitability of the project (both financially and socially), the size of the plant, the type and suitability of equipment and the cost, bearing in mind the community development aspect of the project. Only if the feasibility study indicates that the project is viable, should we continue with it. We should now consider establishment of a plant. Simultaneously a factory manager must be appointed, orchard development started, and technical personnel sent for training. The factory manager should be involved in the laying down of the plant so that he becomes familiar with the plant equipment.

After the plant is completed, the Technical Unit team should run it for the first year during which time the local counterparts should be trained. In the second year, only one technical adviser should be retained, the running of the plant being the responsibility of the locals. In the third year, the locals must take full control of the plant, seeking advice from the Technical Unit only when necessary.

The pre-investment expenses should be borne by the Assisting Agency and charged to development. The cost of the plant, the expense of laying it down and the cost of the first two years of operation should be in the form of a soft loan payable in 15 to 20 years. The farmers should contribute about ten percent of this cost either in cash, labour or kind.

Marketing of the products should be undertaken by the Marketing Unit at a nominal cost to the farmers. If the feasibility study indicates a small pilot project, then this will provide much needed experience. It will help to build up a team of trained personnel and provide products for export market evaluation.

Initially, each unit should be limited to a few products using basically the same type of processes, e.g. a fruit canning unit should not go into dehydration initially. This will provide experience and hopefully enable the development of good quality products. The main objective at first would be to develop: (a) a raw material supply; (b) technology; and (c) markets.

The initial scale of operation will depend on the quantity of raw materials as well as local and potentially available markets.

Scale of Operation

Cottage type operations should be discouraged except when the product is for home or highly localized use. Cottage type units for commercial operations have certain built-in disadvantages which would prevent or retard development and expansion of a food processing industry. Some of these would be:

- (a) cottage type processing is somewhat different from commercial type;
- (b) containers used in cottage type processing are usually different from those used in the commercial type. Thus, glass containers are normally reusable but are also more expensive, heavier and bulkier than commercial type containers.

- (c) uniformity of quality is impossible with cottage type operations because of a lack of quality control;
- (d) the nature of cottage type operations does not lend itself to costing or scale-up and thus expansion;
- (e) with cottage type operations, raw material development and market investigations become almost impossible.

The smallest operation should be the community type unit.

Equipment

In order to obtain the best value for money spent, some degree of expertise must be developed with respect to food processing equipment. A catalogue of equipment and manufacturers should be built-up: a start has already been made by Caribbean Food and Nutrition Institute (CFNI)⁵. Attempts should be made to standardise equipment in the region as far as possible in order to reduce the amount of spare parts held in stock and to permit interchange in times of emergency.

When buying equipment, advice should be obtained from the professional experts (Technical Unit) instead of the sales personnel from manufacturers' agencies. Package deals must be avoided - many pieces of small scale food processing machinery could be fabricated locally instead of imported. It is necessary that a regional pool of food manufacturing equipment expertise be developed.

Products

Each territory should be helped to develop the product or range of products to which it is best suited. At the same time, no attempt should be made to restrain any territory from developing any product of its choice. Experience will determine whether or not it will succeed. In some cases, a common product may successfully develop in each territory. This is all to the good, for the success of such a products is assured.

Product development should be both regional and territorial. Regional, through U.W.I. with financing from the RRC and international agencies, and territorial, through CARIRI, the Food Technology Institute, Jamaica and the Produce Laboratories in the Eastern Caribbean.

Markets

The Marketing Unit may be operated jointly through the various territorial marketing agencies as well as through a regional agency. The regional agency should be particularly responsible for marketing intelligence and market exploration.

The model given is merely conceptual. It will be necessary to work out details.

A small beginning involves minimum risks due to failure and provides experience and training. When a raw material source, technology and markets will have been developed, these small units will coalesce giving rise to larger factories.

The concept given here is biased towards rural development. It must be recognized sooner or later that National Development may go hand in hand with increased poverty for the lower half of the rural population unless priority is given to the distributional aspects of technological advancement. Most developing countries see technological development as the answer to all their problems, and in pursuance of this goal, they are tempted to import technology and technologists rather than develop their own. We must remember that such importations exclude participation by the locals in the development process, thus making it superficial.

*"A country can, with one leap, cross the technological chasm from 'donkey to jet' but in crossing with one leap it will most certainly leave its people behind. Meaningful entry into the technological age must be in such stages and at such a rate as to include most of its people."*⁶

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