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Expert: group neeting on processing selected tropical fruits and vegetables for export to premium markets

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PRODUCT DEVELOPMENT AND TEST MARKETING OF CANNED TROPICAL FRUIT FOR EXPORT 1

by

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I. INTRODUCTION

The twin concepts of product and market development for export are too often to be characterized as "gray areas" in the corporate minds of many food processing companies in developing countries. An analogy can be drawn with those areas marked "terra incognita" on medieval maps - places that normal people did their best to avoid. When opened up by resolute explorers, however, such places were usually found not to be infested by unnameable horrors but were generally blest with exotic delicacies as bananas, pineapples, mangoes and other delights of the tropics. Similarly, if approached in a determined and logical manner, using established product development and marketing techniques, processing of tropical items for export should not be a hazardous undertaking but rather a stimulating and profitable overseas expansion of the enterprise. The most difficult obstacle to overcome may well be the financial outlays involved to attain a successful foreign trade. But this is not an insurmountable problem; after all, did not the most famous of explorers, Columbus, persevere through seven long years to obtain Queen Isabel's backing for his voyages of discovery?

II. SCOPE AND NEED FOR PRODUCT PROGRAMMING

Product development is the frequently employed term to describe a programme undertaken to apply new technology and materials to commercial end-uses. It is an aspect of the Research and Development (R and D) techniques which have themselves become recognized by many manufacturing companies of all types as important to growth and successful competition. Product development properly includes development of the necessary processes for commercial production and may also connote pilot operations to examine the technical feasibility of small-scale laboratory research. This provides the data required for the design of full-scale plant and tests the engineering and economic premises of the project.

There is an extensive literature in the area of R and D techniques and at least one useful reference which takes into account the requirements in developing countries(1). Whether the product under development is destined for domestic or

export markets does not involve qualitative differences in technique. Nevertheless, the investment required is frequently higher in the case of production for foreign markets. Certainly the risk of error is greater because of the larger number of unknown variables. It is both more difficult and more expensive to set magnitudes on these variables with reasonable accuracy, therefore the techniques applied should be chosen with care to ensure maximum results for minimum outlay. (5,6)

Frequently processing enterprises have relative strength in either the technological or in the economics and merketing end of business, but rarely in both. If this situation is not remedied in some way it can lead to distortions in product development work which, to be fruitful, relies heavily on a close and understanding relationship between technical and marketing personnel. Without a good balance between the two there is probability of disappointing commercial results or even product failure in foreign markets. For example, canned fruit exports to the United Kingdom from Latin America have been seen to fail in the past because quality control measures did not maintain the specified minimum standards of the buyer — a technically skness; on the other hand, a technically acceptable canned pineapple item was found, too late, not to have had a chance on the export market because the brand name and labelling were inappropriate — a marketing error.

It does not require many experiences of this nature before two unfortunate results are likely to occur:

- 1) Processors in the exporting countries concerned become discouraged in their efforts to penetrate export markets. This may come about either by direct experience or through hearing of the misfortunes of other businesses in the industry.
- 2) Overseas buyers and consumers become extremely cautious of products from a particular country or even a whole region.

Not long ago, UNCTAD carried out a study (12) of propessed agricultural exports from developing countries into selected developed countries, that is to say the premium markets of the Common Market, U.S.A. the United Kingdom and Japan. Part of the study examined exports of the 31 most important products in the category, ten of which were fruit and vegetable items. A listing of the major suppliers of these ten items from among developing countries showed that Latin America had a relatively low representation, as follows:

<u>Developing countries</u>: Frequency of mention as major suppliers to selected developed countries for 10 processed fruit and vegetable product groups. (a)

Six mentions - Morocco, Yugoslavia

Five mentions - Taiwar.

Four mentions - Jamaica, Tunisia

Three mentions - Algeria, Israel, Iran

Two mentions - Ivory Coast, Mexico

One mention - Argentina, Brazil, Chile, Ecuador, Ghana, Kenya,

India, Peru and U.A.R., among others.

i. Dried tropical fruit 2. Raisins; 3. Other dried fruit; 4. Fruit jams; jellies and purées; 5. Unfermented fruit and vegetable juices; 6. Frozen fruit; 7. Fruit in temporary preservative; 8. Other preserved fruit and nuts; 9. Dehydrated vegetables; 10. Other preserved vegetables.

Considering the potential of the sub-continent the study gives an indication of the opportunities that await those countries able and willing to promote their exports of processed fruits and vegetables. It might be added that the same study, examining major suppliers among the developed countries, showed that the United States was a leading supplier to premium markets in nine out of the ten items, while South Africa appeared in six.

III. STACES IN PRODUCT DEVELOPMENT

The procedures in product development may be broken down into several broadly defined steps, from product conceptualization to point of commercialization. The basic aim of the technique is to find answers to three questions:

- 1. Technical feasibility Can the product be made commercially?
- 2. Marketing feasibility Can the product be sold commercially?
- 3. Economic feasibility Can the product be profitable?

The ten product groups accounted for 24 per cent of the value of all processed agricultural products exported in 1966 by developing countries to selected developed countries (E.E.C., U.S.A., U.K. and Japan). The groupings were as follows:

Development of a product for the market assumes that all the relevant characteristics of the product class have been determined by prior basic and applied research. In practice the stages of the development technique should be set out and followed in careful detail, according to a basic pattern dapted from an appropriate source (1). The detail of each stage may vary according to individual requirements but redical departure from the sequence, such as elimination of the pilot stage, may result in expensive failures, although the risk may be justified in certain circumstances. For example, where well-tested production techniques are transferred in complete facsimile from other countries, a short-cut may save valuable time.

The schematic outline for an export product development programme is shown in Table I, with eight major steps, in which the vital linkage between the technical and marketing areas is clearly demonstrated. It is important to note that Table I is necessarily a condensation for expository purposes; in actual practice both the stages and the steps within each stage would require expansion in detail.

Each of the numbered stages in Table I signifies a point at which a situation analysis is made, conclusions are reached and a decision taken on the specific direction to be taken in the immediately following stage. Additionally, the stages are grouped into four phases, A, B, C, and D, which are no-return points - commencement of each phase implies that all the stages within that phase will be completed. The decision to enter each phase of the programme will normally be taken at the director level within a company, based on the information provided by the director in charge of research and development.

Table I: EXPORT PRODUCT DEVELOPMENT - Schematic Outline with responsibilities of Technical and Marketing Departments by Stages.

C+ 0.00	Market 1 D		
Stage	Technical Responsibility	Marketing Responsibility	
Phase A 1. Preliminary Product Evaluation (Desk Research)	-Set performance requirements -Raw material requirements -Set quality control procedures -Timing of production process Jointly: Prepare cost of product:	-Initial economic study - Marketize, distribution, channels, competitors, turiffs, etc.	
2.Prepare initial Product Samples	-Selection of materials -Stability and storage tests -Alternative process flow charts Jointly: Evaluate packaging alter	-Potential customer specifications -Transport and shipping proced-	
3.Internal Product Evaluation	-Evaluate sample performanceMarket review -Engineering Cost review Jointly: -Compare with competitive productsEstablish tentative product specificationsProposal for process development		
Phase B 4.Process Development	-Process selection -Assemble small-scale pilot equipment -Perfect process in prototype -Prepare field test samples Jointly: Review tests and samples		
5.Initial export field test evaluation	-Inform on techniques for customer usage Jointly: -Special tests for customer	-Select test market buyers -Transport and distribute -Conduct market survey -Analyse market response mur specifications	
	and Government regulati -Comprehensive review of results	ons.	
Fhas: C 6.Full-scale Pilot Plant Operation	-Define process in detail -Scale up to pilot design -By-product and waste disposal -Installation and operation Jointly: Examine possibility of incommercial process	ntegration with existing	
7.Export Market Tests	-Produce export market test samples -Finalize engineering and Production cost studies Jointly: Present complete manufact with budgets to management	-Selection of test areas -Operation of market tests -Assemble and analyse test data -Prepare marketing programme turing and marketing plan	
Phase D 8.Prepare for commercial operations	-Final site selection -Detailed design of facilities -Propare operating manual	-Prepare advertising and promotional campaign -Sales training programme -Preparation and negotiation of sales agreements and contracts with overseas buyers	
•			

Phase A provides a large amount of factual information about the proposed product and its performance, it assesses the potential market in preliminary terms, and indicates the probable nature of the manufacturing process. Finally, quite precise estimates of production costs and sales and marketing overheads are determined. Phase B tests the product concepts in more detail and on an expanded scale in small pilot plant operations; it also gives the first external reaction to the product by field tests at a low-level of penetration, say to selected importers or large wholesalers in the mager foreign markets. A description of such a test follows later in this paper. It is an important phase because, if properly earried out, it should have solved all basic problems and answered the main queries regarding the ultimate viability of the product as an export item. Phase C scales up the previous phase in every respect and provides an in-depth market study in as many ereas as may be required. In this phase the necessary financial outlays become significant. It should be noted that the procedural outline for export market research and marketing activities given in Table I is not of operational value. The many and varied aspects of this topic are covered adequately elsewhere, among the most useful of the publications in this field are the manuals designed for use specifically in developing country situations and published by the GATT International Trade Centre in Geneva. (13, 14)

Finally, Phase D commits the enterprise to an expert campaign with as much certitude of success as can be attained through a planned programme of technical and market tests. However, it should be fully understood that even the most exacting research cannot guarantee a profitable product that will be bought by a sufficient number of consumers. Even in the United States where R and D techniques have been developed to their highest pitch, the large food processors find that only one out of every two new products can pay their way and, at best, only one in four can be said to be significantly profitable.

IV. HICH INVESTMENT COSTS IN EXPORT DEVELOPMENT

It is evident that such a highly controlled and costly procedure as has here been outlined for export product development is beyond the means of the average small— or medium—scale, or even large—scale, fruit processor in a developing country. This is one major reason why there has been such a high failure rate in the past for processed tropical fruit items which have attempted to establish themselves in premium markets. Even where the necessity for some kind of product development procedure

has been recognized, there has not been the capacity of carrying out an adequate programme. Thus, success in the export field has usually been a matter either of happy business intuition or by production of a standardized item which can meet export market specifications at satisfactory cost levels. One of the problems with production of a standardized item, however, is that there are many imitators. This is precisely the reason that cannot pine pple is one of the most competitive tropical fruit products to market. In a recent etudy (7) of five premium export markets in Europe and North America it was found that no less than 11 different countries, most of them developing nations, were competing in exporting pineapple items. Another study (9) reports that even for such a limited export item as cannot mangoes five exporting countries were selling to the United Kingdom, where total annual requirements were hardly more than 25,000 cases in 1964. The equally limited premium market for industrialized banana items is split between at least 10 countries (8).

The cost of entering a market such as the United States, the closest premium outlet for Latin American countries, involves large amounts of money if there is to be a measurable chance of success. An interesting study of the U.S. food industry (2) has shown that since 1960 all new products have originated with the larger companies, whereas prior to that time individual inventors or small companies were the major source of innovations. This change has coincided with the substantial increase in R and D expenditures of the large firms. Examining 127 food products in detail the study estimated everage costs for research work as shown in Table 2.

TABLE 2: AVERAGE DEVELOPMENT COSTS FOR 127 NEW FOOD PRODUCTS MARKETED IN THE U.S.

Field of Study	Cost (US*)
Technical development	\$ 68,000
Market Rescarch	\$ 26,000
Test Narketing	\$ 248,000

Source: Buzzell, R. D. and Nourse, R. E. M.,
Product Innovation in Food Processing 1956-64,
(Harvard Business School, 1967)

In the above Table the marketing responsibilities have been split to show that the initial Market Research Studies (up to and including Phase B in relation to Table I) are relatively less costly than the test marketing operations which alone accounted for more than 70 per cent of total average product development costs of \$350,000. Test marketing is expensive because it involves not only detailed consumer response studies but also must experiment with advertising and other publicity effectiveness research. In most premium markets this would necessarily involve costly TV programming.

As indicated earlier, less than half of name food products are even able to recoup such heavy financial outlays by subsequent sales receipts. Although it is not in the scope of this paper, it should also be added that marketing costs continue to run high even after the commercial launch of a product. During the first year of regular distribution of the products in the quoted study marketing expenditures ran at 43 per cent of total sales returns, but thereafter promotional costs tend to decline rapidly. However, 44 per cent of these products had failed to break even financially two years after their launch date. Typically, the period necessary to complete product development to point of commercialization was from two th three years.

Promotional costs are likely to be comparable in other premium markets of the world, but it is difficult to obtain cost figures in most cases. For the market promotion of Israeli "Jaffa" brand citrus to the United Kingdom no less than £250,000 (US\$ 600,000) was spent in one year alone. Another authority has estimated that at least US\$ 250,000 would have to be spent on the promotion of passionfruit juice to create a worthwhile market in the United Kingdom (10).

V. ROLE OF COVERNMENT AND INTERNATIONAL AGENCIES

It would be impractical to expect even the largest food processors in developing countries to undertake product development programmes on the scale and financial level indicated in the previous section of this paper. Yet unless they can participate at this level no processor will be able to match the technical and marketing skills of more advanced competitors in the field. Excluding the luck factor the biggest share of the markets will go to the better equipped.

Fortunately, in many countries of Latin America, as well as in other developing regions of the world, there now exist the means of essisting domestic food industries to improve and expand their facilities to meet the stringent requirements of export markets. Assistance as being provided through various sources such as Government and industry research institutions; university food technology, business administration and agricultural marketing programmes; philanthropic foundations; and national and international agencies.

For example, in Brazil the Government working through the São Paulo State Secretariat of Agriculture less set up the Institute of Food Technology (ITAL) with assistance from the United Nations Special Fund Programme implement deby the Food and Agriculture Organization of the U.N.

Some 50 qualified food technologists and ingineers are terking on research for Brazil and Latin America to advise and help industry and improve the nutrition of the nation. The facilities at ITAL are among the best to be found in any similar institution anywhere in the world, and include research and development laboratories and several full-scale pilet plants in which the equipment and machinery alone is valued at more than US\$ one million.

Processed fruit industries in Brazil and elsewhere have received considerable assistance in export product development work from ITAL. Most notably the Brazilian citrus industry which began frozen orange concentrate production in 1962 became the world export leader of this item by 1966 and now exports more than 30,000 tons of concentrate annually with a value of more than \$11 million. Two of the seven presently operating concentrate plants were designed at ITAL and assistance is continuing in product development for the industry. The Institute has also prepared quantities of samples for full-scale export market trials of cannot mangoes and acidified banamapurée. At present the Institute is in the final stages of installing a full-size pilot plant for production of aseptically packed banama products — costing in the region of \$300,000. In most cases the industrial sector concerned or a government development agency has contributed substantially to the cost of specialized research work at ITAL.

Another recent product development programme, however, was sponsored entirely by the Institute itself as part of its undertaking to promote the export of Brazilian canned tropical fruit items (3). From the inception of the Institute in 1964, a considerable amount of applied research had been carried out in this area

to define the commercial potential in terms of raw materials, processes and product utility with respect to expert market conditions. A series of technical memoranda were published describing processes for a number of tropical fruit items. In effect all the technical requirements for the initial stages of an expert product development programme had been fulfilled but the marketing data that would confirm these findings was lacking.

In order to obtain a measure of consumer receptivity in export markets it was decided to set up a relatively modest export field test for ten cannot tropical fruit products. These were:

- 1. Tropical Fruit Salad (pineapple, papaya, banana and passionfruit)
- 2. Passionfruit juice
- 3. Papaya in syrup
- 4. Papaya in passionfruit syrup
- 5. Papaya nectar with passionfruit juice
- 6. Pineapple slices in syrup
- 7. Pincapple juice
- 8. Pineapple juice ith passionfruit juice
- 9. Banana purée
- 10. Bananas sliced in passionfruit juice

Potentially good sales prospects were thought likely to exist in several foreign countries: The United Kingdom, Sweden. West Germany, Switzerland, France, Denmark and Canada. Accordingly, contacts were made with 22 importers and wholesalers in these countries who agreed to collaborate with the Institute in testing the products and then completing a relatively short questionnaire. The list of importers was compiled from a number of reputable sources such as the London Chamber of Commerce and the International Trade Centre in Geneva.

Additionally, the Tropical Products Institute in Lendon agreed to act both as a technical consultant and as a for rading agent for the sample products. This latter is a very necessary and time-consuming service when a large number of samples have to be conducted through Customs and then delivered throughout the country to the participating companies.

The Tropical Products Institute also submitted each variety of product to a physical and chemical examination in their laboratories and sent another set of samples to the Public Health Laboratory at Colindale for a microbiological examination. This type of procedure is to be recommended in order to obtain a non-biased technical report on the appearance and composition of the product and its container on arrival at destination.

The balanced opinions and costs of independent and non-prefit agencies can thus be taken as a datum line against which may be measured the views of the commercial enterprises, most of which could not readily supply any form of scientific evaluation of the product in any case.

In total over 1200 cans of A $2\frac{1}{2}$ size (approximate not weight 30 fluid ounces) of all products were canned, specially labelled, boxed and crated for overseas shipment.

Field tests in export markets by means of surveying firms established in the import and wholksals trade of an item is an accepted form of market research, especially when there are limited funds available. Nevertheless, it is consumers who finally buy and use products. The results obtained from a trade survey should therefore only be used as a guide to probable consumer receptivity of the products tested, porticularly where the items are either totally or relatively new to the market. With new products of unknown demand, even the most experienced in the trade must tend to rely on subjective opinion. Several of the wholesalers in the TTAL survey themselves pointed out that they were unfamiliar with the particular product and could only intuitively assess its likely market potential. In fact, as far as the United Kingdom part of the test was concerned half of the tested products were completely new to the participating firms. In this respect it is of interest that one firm submitted the ten products to a small taste test panel of pot ntial consumers and the responses of this panel frequently differed from the opinions of the trade.

While the field test previded some extremely valuable information on export markets it would be financially reckless to proceed with production on a commercial scale without carrying out a carefully designed test marketing programme for these processed fruit items.

Such a programme, as has been shown, would necessarily decalate research expenditures to extremely large amounts, possibly in the range of hundreds of thousands of dollars for a single product. Unfortunately, these amounts of money for test marketing purposes are not normally forthcoming from any of the sources of assistance indicated earlier in this paper. The problem of anadequate financing of many product development projects partly depends on the general incomprehension of the scale of funds required. However, even if such miscenceptions were evercome there would undoubtedly be few institutions able to make the necessary sums of money available. Where funds of such magnitude are being used today for development of agricultural enterprises they are most often located in some type of gev rumental export premotion department (15) or in the major commodity export marketing beards which function in a number of developing countries. (4)

Mhat is now needed to overcome the lack of adequate test marketing studies in many export development programmes is a concerted approach to define the problem and propose solutions. That marketing models for different types of products require to be developed and analysed so that minimum cost programm a may be devised to match the needs of developing countries and their specific gricultural industries. The relevant United Nations agencies concerned, together with the Regional Economic Commissions, and in a position to contribute significantly by combining resources to suggest solutions and implement action. The problem of export development and promotion is currently receiving close attention in FAO. It has been suggested that there are at least two directions helding out promise. These are:

- 1. Joint export development ventures by groups of developing countries with similar commercial interests; and
- Collaboration in test marketing and product promotion with leading processing and distributing private companies in the developed, premium markets.

With recognition of both the need and the opportunity that can be met by product development and test marketing techniques, there can be rising confidence that the necessary backing will soon be forthcoming. And the experience of Christopher Columbus supports this optimistic view.

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