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FRUIT AND VEGETABLE PROCESSING INDUSTRIES FOR THE LATIN AMERICAN AND CARIBBEAN REGIONS*

Background Paper

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* The views expressed in this document are those of the author and do not necessarily reflect the views of the Secretariat of UNIDO. This document has not been edited.

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I. INTRODUCTION

1. Most of the Latin American and Caribbean countries are facing a long period of economic crisis. The per capita income of countries such as Argentina, Brazil, Mexico, Peru, etc. has been reduced which has a direct impact on the consumption of processed fruit and vegetables considered luxury goods and, are therefore, eliminated from the purchasing habits of large population groups.

2. However, in some regions the fruit and vegetables processing sector has experienced diversification, expansion and modernization; the main motor of these changes is the export market. Although the international market for processed fruit and vegetables did not expand extraordinarily, it went through an acceptance process which is encouraging and can be considered optimistic. Processed tropical fruit and vegetables from developing countries which until recently were considered also a luxury commodity in the industrialized countries, have more and more been accepted and presently range under the usual items of consumption of a large population group in these countries. New products, modern technology and quality and price of the products are the basic factors to be actioned to further expand the fruit and vegetables international market. To some extent this applies to the expansion of the local markets. One of the constraints that affects numerous fruit and vegetables processing plants is the small scale of production which is determined by the limited dimension of the local market. By combining both local and export markets, the production plants could benefit from the larger dimension and operate in a more rational way.

3. Since this is a position paper, it aims towards pointing out basic constraints which are hampering the processing of fruits and vegetables sector in Latin America and the Caribbean region and serves as basis for working out recommendations and actions to overcome such limitations. Consequently, the most important constraints only will be tackled and not the usual problems such as shortage of raw material, absence of qualified personnel, etc. which are traditional factors and the solution thereof has been discussed already in numerous papers and meetings. The present paper is addressed to the most sensitive and advanced issues concerning the competitiveness of the processed fruit and vegetables sector of Latin America and the Caribbean region in order to become a dynamic, modern and innovative activity.

4. The fruit and vegetables processing sector should be a modern integrated agro-industry. This type of industry comprises activities in the market to respond to the demand requirements; on the agricultural side to produce adequate raw material; and finally, in the processing set-up which should transform the raw material into the products required by the market in terms of quantity, quality and price.

5. The presentation of this paper will follow the steps of planning an integrated agroindustry. Initially a review of the market data will be made; then the agricultural aspect will be tackled; and finally, there will be a review of the most important features concerning processing and technology. In this way it will be possible to point out main constraints and opportunities on each side of the complex and in its totality.

II. FOREWORD

6. This is a position paper to serve as a basis for a preparatory meeting at which representatives of some Latin American and Caribbean countries together with experts from other regions will analyse the basic conclusions, recommendations and the paper's background and, taking into consideration their experience, a final document will be elaborated. The final paper will modify, enlarge and, whenever justified, correct viewpoints of this preliminary study. In this context, this position paper, to some extent, is a provocative document which in various cases is based on the author's experience and feeling, owing to the scarce statistical data available to fully support some of the statements presented.

7. The main conclusion is that the fruit and vegetables processing industry in Latin America and the Caribbean region is going through a process of changing completely. The economic crisis in these regions merely precipitated the chain of events which mark the transformation. The industry, with the exception of some sub-sectors, developed without main planning concept, starting on family basis as small and medium size enterprises. The entrepreneurs did not have full knowledge and the know-how comprising the integrated aspect of agroindustry. Most of these enterprises did not have control over the supply of raw material, their technological set-up was, in general, very primitive and their access to the market very limited. When competition did not exist and the economy as a whole experienced growth, it was possible to sell products of poor quality at high prices. Under this situation industries were profitable and progressive. The

favourable conditions encouraged others to enter into the business and to some degree a competitiveness arised. However, the market could not absorb larger quantities of high prices and poor quality products. With the economic crisis the family budget became more and more tight and processed fruit and vegetables were systematically eliminated as luxury products that are not essential. Large parts of the industries started to operate at lower levels and the profitability also went down. Most of the original owners sold their industries, numerous enterprises closed down and new enterpreneurs entered in the business. It seems that a new phase is now beginning. Some entrepreneurs with a more professional and technical background are initiating a more rational approach with the aim of improving quality, reducing costs and directing their production to a market sector for which processed foods are a need and not a luxury. In this context the production of agricultural raw material is going through basic changes. The industry contracts the agriculturalist supplying them with seeds and giving guidance from the planting to the harvesting period, on post-harvesting practices and transportation to cold storage, followed by the processing phase. Besides introducing innovations in the processing of fruit and vegetables, large scale promotion campaigns are launched to make the products more attractive. As mentioned, this phase is still in the beginning and the local markets as a whole have not yet shown an increase. What happens is that some more dynamic and agressive modern enterprises are enlarging their shares of the market, whereas enterprises which are not modernizing are being eliminated.

8. As regards the fruit and vegetables processing sector. there are exceptions in the Latin American and Caribbean countries. The most important is certainly the citrus processing sub-sector which developed in Brazil to a leading role in the world scenery. The Brazilian citrus fruit industry is fully integrated from the fruit to processing into frozen concentrated juice and industrialized by-products, to its transportation to the final consumption markets. Today this is one of the largest, most modern and profitable enterprises. At country level, also exceptional is the Chilean case, which went through a ten-year programme of modernization with high investments to become a modern, integrated and profitable agroindustry with the main orientation towards the export market of fresh and processed products.

9. Although this paper deals only with processed products, it is interesting to show figures of the international market for fresh fruit:

EXPORTS OF FRESH FRUIT

(in millian US$)

South Africa	1,100
Spain	980
Israel	500
Chile	460
Hawai	200
Mexico	200
Brazil	50

From the above figures can be seen that countries at a similar development level show completely different export values.

For example Chile, a small country, exports almost ten times more than Brazil. It seems that the development of production and exports of fresh fruits goes parallel with the production and exports of processed products, at least, this is the case in Brazil where modern agricultural production of fruit is only at the beginning with very small exports of fresh fruit; in the case of Chile both fresh and processed fruit grew systematically in the last ten years.

10. In the next sections of this paper, analyses of the main factors affecting the fruit and vegetables processing industry in Latin America and the Caribbean will be presented which will be the ground to work out basic points to be discussed and further elaborated with the aim to obtain a solid basis for specific recommendations.

III. MARKET

11. As previously mentioned, the international market plays an important role in respect to the development of tropical fruit and vegetables production. The influence of imports should not be limited to quantities but also take into consideration quality, prices and potentiality for further growth. The introduction of these products in sophisticated markets like the European countries and, to some extent, the United States and Japan was a long way and required a great deal of effort directed to the production of products in accordance with the market requirements in respect to acceptance of new flavours, in finding the proper way to promote the new products and make them pricely attractive. The results of such efforts are particularly visible in the Federal Republic of Germany, the Netherlands and Switzerland, as can be seen in the following data of per capita consumption in the middle of the eighties:

CONSUMPTION PER CAPITA OF TROPICAL FRUIT JUICES

(in liters)

France	Fed.Rep.Germany	Netherlands	UK	Switzerld	USA	Japan
4,1	20,62	17,6	9,7	21,0	5,9*	2,6

Although France and the United Kingdom show small consumption per capita in comparison with the other EEC-countries, these consumptions are increasing significantly in both countries.

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* per capita consumption of fruit juice in USA is estimated in 27 litres from which only 22% are not citrus juice.

12. The above figures clearly indicate that tropical fruits entered into the market of the industrialized countries, and there is evidence that the upwards trend will continue, particularly now when there are signs of a newly started phase of economic growth in Europe after a period of severe recession. The main factors explaining the acceptance of exotic fruits both fresh and processed in the international market are:-

- increased travelling and exposure to exotic flavours;
- increasing wealth and spending power;
- promotion;
- lower prices.

13. The above factors influence both the fresh and the processed items.

14. In respect to the processed products, the main factors influencing the increase in demand are:

- the use of new packaging, aseptic cartoons (tetrapack);
- introduction of multi-fruit drinks.

15. As regards the UK market, in addition to the above the following should be indicated:-

- the availability of fruit juices by doorstep delivery;
- the development of own label products;
- the promotion of blended juice or drink both in stores and magazines and on television;
- changes in breakfast eating habits.

16. Therefore, processed tropical fruit and vegetables are becoming current components of the diet of a large number of industrialized countries. In addition to importing, various of these countries also produce or re-export products which are re-processed into their final consumption forms.

17. The market of pulps and paste which are processed into final products and re-exported makes it difficult to obtain statistical data of consumption in different countries which do not have a statistical breakdown of all the processed fruit and vegetable products. It is certain that in Italy, Austria, Sweden and other countries tropical fruit and vegetables processed products are imported and locally consumed. Therefore, it can be stated that in one way or the other the tropical products under study have internationally been incorporated into the eating habits.

18. The available data refers to the mid-eightees and the following are the estimates of imports of the EEC-countries, United States and Japan.

PROCESSED TROPICAL FRUIT AND VEGETABLE PRODUCTS*

Country/region	ton	%	US$ 000	%
EEC	55,000	73,7	85,047	89,4
USA	18,000	23,9	7,509	7,9
Japan	2,174	2,8	2,575	2,7
TOTAL	75,147	100,0	95,131	100,0

* canned products not included.

19. Most of the 75,147 tons refer to pulps which are reprocessed and transformed into juices and drinks; the pulp is also used in the production of baby foods, frozen desserts, ice cream, bakery products, sirups and toppings. The most usual fruits are mango, guava, papaya, passion fruit, pomegranate, naranjilla and soursop. With a total value of about US$ 100,000.000 per year the market is not enormous but is sufficient to justify the statement that the pioneering phase is over and to encourage the activities towards improvement through expansion of the existing markets and opening of new ones.

20. Regarding the Latin American and Caribbean countries' exports the estimates are the following:

TROPICAL FRUIT PRODUCTS EXPORTS

a) OF SOME L.A. AND CARIBBEAN COUNTRIES

	Brazil		Jamaica		Ecuador	
	Quantity ton	Value US$	Quantity ton	Value US$	Quantity ton	Value US$
Passion fruit juice	7,784	16,485	-	-	1,500	-
Cashew juice	588	612	-	-	-	-
Guava juice	1,168	871	-	-	-	-
Guava paste	2,028	1,322	-	-	-	-
Guava jelly	-	-	84	-	-	-
Mango juice	-	-	-	-	50	-
Papaya juice	-	-	-	-	100	-
Others	494	407	413	-	-	-
TOTAL	12,017	19,697	497	-	2,100	-

b) OF OTHER COUNTRIES

	Quantity ton	Value US$
Colombia	440	947
Peru	752	1,476
Chile	62	150
Dominican Rep.	44	64
Mexico	20	52
Argentina	381	517
TOTAL	1,719	3,206

c) TOTAL EXPORT OF L.A. AND CARIBBEAN COUNTRIES IS ESTIMATED IN:

	Quantity ton	Value US$
Brazil	12,017	19,697
Jamaica	497	-
Equador	2,100	-
Other countries	1,719	3,206
TOTAL	16,333	22,903

This total represents only about 21,7 per cent of the total imports into the EEC-countries, USA and Japan. It is a small participation, however, the available data indicates that at least nine countries have installed industries able to produce for the international market. Brazil is by far the largest exporter of the region being responsible for 73,6 per cent of the whole export.

21. In respect to canned products, there is evidence that Argentina, Brazil, Colombia, Costa Rica, Haiti, Honduras, Jamaica and Panama are exporters. However, the quantities are negligible. The most important canned products are papaya, guava, mango, lychee and kiwi, the latter being exported mainly by South Africa and New Zealand.

22. An interesting case to be presented is the Chilean integrated agroindustry development to produce and process fruit specially for export. Two lines of processing were selected, namely dried and canned fruit. From almost nil the export of dried raisins to the USA reached 8,400 tons in 1986. The dried apple exports increased from 255 tons in 1985 to 455 tons in 1986. Last not least, the exports of tenderized prunes to Brazil and Europe have grown about 123% between 1985 and 1986. The total export of tenderized prunes reached 1,639,000 lb. in 1986.

23. In respect to the market among the Latin American and Caribbean countries, the main portion refers to fresh products; Brazil sells bananas and pineapples to Argentina and buys large quantities of apples. There are also some exports and imports of processed fruits and vegetables but the quantities are small. Argentina and Chile export dried and canned temperate climate products and imports tropical juices, marmelades and other conserves. In Central America there are also some imports and exports at sub-regional level, however, since this region is going through a large period of social and economic crisis, the imports and exports have been systematically reduced.

24. As regards the national markets with the exception of some items like processed tomatoes, no significant improvement was registered in the last ten years. The statistical data annexed, although scarce, is sufficient to document the above considerations about the markets for processed fruit and vegetables in Latin American and Caribbean countries.

IV. RAW MATERIALS PRODUCTION

25. In order to give an idea of the complex situation regarding the supply of agricultural produce to the fruit and vegetable processing in Latin America and the Caribbean, the following statements are presented:

26. "There has not been a history in St. Lucia, West Indies, of organization in the growing and marketing of crops other than bananas and coconuts. It is relatively easy to flood the local market with fruit and vegetables, so farmers have learned to produce to suit market conditions. As a result, there is not much left over for processing, as most of the produce is consumed as fresh.

27. The food industry, in Colombia, is poorly coordinated with the producers. This has been due in part to the shortage of basic infrastructure in rural areas. The lack of direct link between the users and the raw material producer, along with deficient storage in some regions and lack of adequate packaging, mainly for fruit and vegetables, resulted in an estimated food loss of $ 300 million in 1986.

28. In general, the industry is faced with limited supplies and few suppliers; inferior and inconsistent raw materials, ingredient, and packaging; import restrictions; constant inflation, unpredictable replacement costs; and erosion of quality in what is needed to buy for the industry".

29. The above applies to the large majority of small to medium size fruit and vegetable processing plants, all over the region, and refers specifically to the traditional part of the industry

which is facing most of the economic crisis. By contrast, it can be mentioned that in Chile a $ 2 billion programme was implemented in the last ten years do develop the agricultural production of fruit and vegetables. "Perhaps one of the most outstanding features of the Chilean agricultural sector today is the emergence of well funded and better managed agroindustrial companies, in contrast to the individual farm structure exhibited prior to 1973". In the same way, exists in Brazil for example the San Francisco Valley that has a surface of the size of France, the double of available water for irrigation that exists in California and sun for more than 300 days per year, to give an idea of the potentiality of this country to produce fruit and vegetables. In the San Francisco Valley national and international groups are implementing large projects to develop production in an integrated manner aimed at producing fresh fruit both for the international and local market and also to process the produce which is not at the quality level for the fresh market. Only one of such projects involves about US$ 0,5 billion to be invested from now on to 1992.

30. The above examples show the contrast existing in the region under study in which the economic crisis is putting out of work the small to medium size traditional enterprise and where the favourable prospective of the international market is encouraging the modern, capital intensive integrated agroindustry.

31. Apart from the large projects, the practice of contracting an agriculturalist to produce fruit and vegetables specifically for processing is presently usual. In this case the industry supplies basic inputs and technical assistance to the farmers and prices, quality, quantity are fixed previous to the harvesting.

The Latin American and Caribbean regions are able to produce almost all types of fruit and vegetables known in the world. There is not a shortage of potentialities, what exists however are unbalanced situations and the predominance, in most countries, of a traditional industry which was established to use the surplus of raw material. This situation of an erratic basis combined with a limited and highly fluctuating market, is now facing the final crisis from which only the well organized enterprise will survive.

32. There is still a long way to go, research and development is required to develop the best species and to ascertain the most adequate production methods, post harvesting practices, transportation and storage. The difficulties involved are enormous and only to mention an example,in the last two years a large company in the Brazilian San Francisco Valley lost completely the production due to her inexperience.

33. However, there are also other market elements which can disturb the agroindustry development. For example, one Brazilian company established a factory to process tomatoes with a capacity of 3.000 tons, which can be considered a very large plant. The company was fully established to produce the adequate raw material, using the proper seeds and having wide experience in this type of agriculture. The final product was aimed at export to the EEC market. However, subsidies of 60 % were given to the produce of one of the EEC countries and the above mentioned factory could not compete with another producer in such a favourable position. As a result, the 3.000 ton capacity factory is idle and the agricultural set-up to produce the tomatoes for processing was lost.

34. All what was mentioned above indicates the complexity of producing agricultural raw material for a food processing sector and the need of a proper plan to cope with a competitive market which is subject to a great number of changes.

V. FRUIT AND VEGETABLE PROCESSING

35. In the same way as described in the previous chapter on raw materials production, the existing fruit and vegetable processing industries in the region under consideration, also show significant differences in their set-up of processing capabilities. A recent study indicates that "there exist two facilities modestly equipped in St. Lucia, West Indies, to produce jams, jellies, marmalades, hot sauce, ketchup, etc. One of these two plants has virtually ceased operations, while the other is struggling to survive". The reasons for the failure of such operations are the usual constraints, namely: scale of production resulting in high cost per unit output; lack of manufacturing management, etc; all summing up in high costs and poor quality products. In respect to Colombia, "the fruit and vegetables industry is one of the least developed in the country. The canning companies and factories manufacturing marmalade and frozen fruit juice utilize poor technology. Most of them have an equipment that is more than 25 years old, and the sanitation at the factory level is imperfect."

36. Not only Latin American and Caribbean regions are characterized by contrasts, even in the same country there are enormous differences within the same industrial branch. In Brazil thousands of small plants are manufacturing in the most primitive way. At the same time there are highly sophisticated plants using the latest technology which is imported; there is no difference with a similar industrial plant operating in an industrialized country. Such plants are presently implementing programmes of automation involving millions of dollars.

37. The same applies to the Chilean fruit and vegetable processing development. In this country approximately 36% of the fruit and vegetables produce is actually being processed. Investments in new processing facilities in the last ten years have reached an average of about US$ 5 millions per year. Through this programme Chile has incorporated modern production and process technologies as well as administrative and management know-how in agroindustry.

VI. RESEARCH, DEVELOPMENT AND TECHNICAL ASSISTANCE

38. There exist in the Latin American and the Caribbean regions numerous food processing research and development centers operating at country or regional level. All these institutes have a special branch dealing with fruit and vegetables. In one way or the other most of the institutes have received technical assistance of UN or other international or regional organizations. An installed capacity for research and development covering all aspects from the agriculture to the packaging of final products is available. Concerning training, there are also various universities with courses for food processing engineers comprising specialization in fruit and vegetable processing.

39. Both governments and private institutions are able to assist the industry in the elaboration of technical feasibility studies to the installation and start-up operation phase.

40. Therefore, it can be pointed out that in the same way as there exist enormous potentialities for the production of agricultural raw material, there also exist basic capabilities for modern technical assistance in the region under study. Such technical assistance would be able to advise also on the production of a great number of parts of the equipment required to operate an industry at an up-to-date and sophisticated level, since in this region exist industries capable to manufacture most of the equipment required.

VII. CONCLUSIONS AND RECOMMENDATIONS

41. In this paper, on various occasions, the economic and social crisis was mentioned affecting Latin America and the Caribbean region. Although well known worldwide, it is worth mentioning here a few pertinent aspects of this crisis in order to better understand what influence and impact they have on industry. A new 'jargon' was created to describe this crisis, namely "stagflation", i.e. stagnation with inflation. This crisis started at least ten years ago and continues to mark the region under study, and all indications are pointing towards an aggravation of the situation in direction of a hyperinflation. In countries like Brazil and Peru, etc. with a four-digit inflation, generally prevailing interest rates of about 30% per month and where the inflation rate stands as index for price corrections, the consequence of these factors, among others, is a stagnating economy. There are no new investments in the production sector; and while the economic activities concentrate more and more on financial speculations, the industry is not renovated and therefore becoming obsolete.

42. Another aspect which is important to mention is that in most of the countries under study prevails a kind of mixed economy: at the same time that the countries claim to have a market economy, the governments participate, to a great extent, in the economic activity not only through numerous controls but also as a direct participant, that is as owner of government enterprises which operate in the industrial production and commercialization sectors.

43. Due to the fact that the economic crisis is affecting large population groups, the government intervenes and establishes direct controls over the prices. The freezing of prices leads to shortages and numerous articles disappear from the market. This is a continuous circle of high prices, controls, shortages and new levels of prices higher than before, and new levels of inflation.

44. In view of the complexity of the problem, it is difficult, if not impossible, to invest in the production sector which requires time to mature and to produce returns on investment.

45. The industry, especially the small and medium size enterprises, is becoming more and more obsolete producing with increased costs and poorer quality products. With the crisis aggravating, this type of industry will not be able to respond to the market demands and, consequently, cease operations. Only new enterprises or the more efficient ones will remain in this sector. Presently this kind of selecting process is taking place. However it is a long and socially painful way to go.

46. It is also important to mention that in countries such as Brazil and Mexico, there are important and well equipped research and development centers. During the elaboration of the present study, interviews were carried out with various entrepreneurs, and they were not aware of the existence of such institutes; furthermore, the mentioned entrepreneurs showed no interest in receiving technical assistance from official institutions - such is the disbelieve in the Government. In this context, it is easy to diagnose the problem affecting large parts of the fruit and vegetables processing industry

in Latin America and the Caribbean region. It is a branch which needs to be rehabilitated, to be changed into modern integrated agroindustries, using better technology and producing high quality products at lower costs. However, it is not enough only to diagnose the disease, but one must find ways and means to overcome the situation - and this is the most difficult part of the problem. It seems that it is necessary to implement a comprehensive programme aiming at promoting investment to rehabilitate, modernize and expand the fruit and vegetables processing indstry of the region under consideration. This programme should comprise various steps such as:-

1) Diagnosis

   There is a general knowledge of the critical situation in the above mentioned industry, nevertheless, an in-depth study is necessary to ascertain the details of the problem and to quantify the resources needed to implement the modernization programme.

2) Quality Control

   The Governments should establish quality standards and enforce rigorous controls to banish from the market all products which do not correspond to the minimum established quality levels. This would eliminate from the market large part of the products and producers which are not able to comply with the basic health and industrial standards requirements.

3) Investment Promotion

The Governments should assist in the implementation of investment programmes aiming at the development of the industrial branch under study. In this context, rigorous conditions should be established and only industries able to achieve a high standard would benefit. Through this programme, small and medium size enterprises should be encouraged to merge, and the integrated agroindustry should also be a basic requirement.

4) Technical Assistance

A large programme for diffusing the availability of research and development facilities should be carried out and the industries should make use of the facilities to elaborate feasibility studies as a basis to participate in the investment programme.

5) International Co-operation

Bearing in mind the experience of enterprises of industrialized countries and the influence of the international market in the development of the processed fruit and vegetable industry, efforts should be made by the international organizations to encourage such enterprises to participate in the above mentioned programme. One of the important tools to be put at work is the implementing of sectorial investment promotion meetings with full participation of such enterprises.

47. The international organizations like UNIDO, FAO, World Bank, etc. should intensively participate in the formulation and implementation of the various phases of the programme.