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

Salvador, Bahia, Brazil, 25 - 29 October 1971

REPORT ON THE EXPERT GROUP MEETING ON PROCESSING SELECTED TROPICAL FRUITS AND VEGETABLES FOR EXPORT TO PREMIUM MARKETS

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C O N T E N T S

P R E F A C E

1. The UNIDO Expert Group Meeting on Processing Selected Tropical Fruits and Vegetables for Export to Premium Markets, held in Salvador, Bahia, Brazil from 25 to 29 October 1971 in collaboration with ECLA, FAO, UNCTAD and the Institut Français de Recherches Fruitières Outre-Mer (IFAC), and which was hosted by the Federal Government of the State of Bahia, addressed itself to two principal questions: (a) the industrialisation of tropical fruit and vegetable processing in the developing countries; and (b) the promotion and integration of this industry in developing national economies and the expansion of export markets.

2. The meeting was opened with statements by Mr. A.C. Magalhães 1/, Governor of the State of Bahia, Mr. M. de Mello Kertész, Secretary General of the Secretariat of Planning and Technology, Bahia, and Mr. M. Mautner of UNIDO, on behalf of the Executive Director of UNIDO, Mr. I. Abdel-Rahman 2/.

3. The Group elected as Chairman Mr. V. Sgarbieri, and as Vice-Chairmen Mr. E.S. Chichester and Mr. J.C. Clarke. Mr. M. Mautner was Director of the meeting and Mr. F. Gomes de Souza Co-Director. Mr. Z. Berk was elected Rapporteur, and Mr. E. Carneiro-Dias served as Technical Secretary to the meeting. The Group also nominated the meeting Group leaders 3/.

4. UNIDO invited nine authors to present papers to the meeting. They were from Belgium (2), India, Israel, Italy, United Kingdom (2), United States of America and Yugoslavia. A further eighteen papers and reports were presented at the meeting by observers and participants from Argentina, Brazil, Ecuador, Arab Republic of Egypt, the Federal Republic of Germany, and Italy. Nine participants from the following countries were also invited: Colombia, Ecuador, Arab Republic of Egypt, El Salvador, Guatemala (2), Nicaragua, Thailand and Venezuela. One hundred and eighty-two observers from the following countries also attended: Angola, Argentina, Australia, Barbados, Brazil, Canada, Ecuador, El Salvador, France, Federal Republic of Germany, Guyana, Italy, Mozambique, the Philippines, Portugal, United States and Venezuela. The list of participants is reproduced as Annex 1 of this report.

1/ Attached to this report as Annex 1. 2/ Attached as Annex 2.

3/ A list of Meeting Groups and their leaders is attached to this report as Annex 6.

5. The agenda of the meeting was purposely restricted to certain fruits and vegetables, i.e. avocados, bananas, cashew nuts, citrus fruits, mangoes, pineapples, tomatoes, wine and grapes, which already carry some weight in the world markets. The industries processing these fruits and vegetables can quite realistically be expected to develop further if the three main factors of marketing, processing and raw material supply, which are essential to an economically viable industry, can be up-graded to satisfy modern industrial requirements, and taken into consideration as an integrated inseparable investment effort.

6. The meeting had many facets. Despite the emphasis that the agenda visibly lays on the technological aspects of the selected fruits and vegetables, the basic objective of the gathering should not be forgotten: the promotion of the processing and export of tropical fruits to premium markets.

7. Invitations were not restricted only to technologists. People from government departments and other authorities in the developing countries were also invited, to give them the opportunity to familiarize themselves with facts and trends in order to facilitate their decision-making at a later date.

8. Equipment producers were not forgotten either. It was the intention to give them a chance to meet prospective customers and offer their services under favourable conditions. Major fruit and vegetable processors from developed countries were present as well as some importers of processed fruits and vegetables who were interested in meeting potential producers with a view to making contacts for later contracts or joint ventures.

9. Processors from developing countries were also invited so that they could meet persons of interest from developed countries, exchange views and obtain first-hand information on certain problems. Consulting and engineering companies specialized in this field were invited, so that the participants through such contacts could learn of new developments and know-how, thereby minimizing the risk of developing countries being advised to accept obsolete or unsuitable equipment. This encounter also was to provide such companies with a unique opportunity to meet potential clients as well as to suggest improvements or new developments to them.

10. An invitation was also extended to UNIDO's Industrial Policies and Financing Section, who were most pleased to serve in their particular field. Mr. Q. Tran-Le of that section kindly undertook to organize the part of the meeting devoted to investment policy.

11. The meeting had a clearly promotional character. The goal was to promote any action, step or fact that could help the developing countries to advance further. UNIDO also wished to make an active contribution, knowing full well that the rate of development depends not only on the interest generated in the tropical developing countries, but also upon the interest, goodwill and assistance provided by the developed world.

12. It was intended that the meeting should produce something more than the conventional conclusions and recommendations based upon identification of problems and other obstacles hindering the rapid development of the processing and export of tropical fruits and vegetables. Furthermore, it was clearly meant to be a very special gathering of business people concentrating upon the economic aspects of particular importance to the developing countries. It was hoped to obtain positive results and progress towards the improved well-being of the people in lesser developed areas of the world. The participants were not only there to obtain information on new processing techniques or novel marketing methods for tropical fruit and vegetable products. They were also there to get down to business: business that respected the true interests of the developing world without ignoring those of the developed nations.

13. The meeting set up ten Working Groups which, following the general discussions of the respective group presentations 4/ summarised the current situation in their respective fields, described the problems involved and suggested possible solutions. The present publication includes a summary of the papers and discussions, and specific recommendations made by the various Working Groups.

4/ A list of documents issued for the meeting is attached to this report as Annex 5.

I. INTRODUCTION 2/

The situation on the markets, in the field of processing and raw material supply

14. It was expected that a meeting dealing with the problem of processing tropical fruits and vegetables to acceptable export market standards would arouse the particular interest of most sub-tropical and tropical countries. Despite the great interest and the valuable research and practical work that has been done in the cultivation, processing and marketing of tropical fruits and vegetables, various aspects of the problem have never been approached on the basis of integrating market needs with processing techniques and the assured supply and quality of raw material. It was thus considered that a general review of these three main factors should be made.

Export markets for tropical fruit and vegetable products

15. Close analysis of world market trends related to fruit and vegetable products showed the following interesting facts regarding unexpected marketing acceptabilities:

(a) Certain varieties of fruit preponderate significantly over others; more than 60 per cent of fruit products are citrus fruit products, followed by apples, pineapples, plums, peaches, strawberries, etc.;

(b) Some ten varieties of vegetables constitute more than 90 per cent of all the processed vegetables in the world market and also in developing countries. The remaining hundred or more varieties are of no major interest as processed products, either to the industry or to the consumer;

(c) In highly urbanized areas of the world fresh fruit and vegetables are becoming a certain kind of luxury. The greater part of the fruit and vegetables has already undergone a certain degree of processing before reaching the retail market. In 1970, for example, 67 per cent of the entire citrus crop in Florida was canned or otherwise processed into juices, concentrates, etc. This trend is continuing;

(d) In particular seasons of the year, fresh vegetables and fruit fetch a substantially higher price than processed foods.

2/ By Dr. [illegible], Head, Light Industries Section, ITD, UNIDO.

(e) It repeatedly happens that fruits which are popular and acceptable to the consumer when fresh are unacceptable or less acceptable when processed, for example: grapes, bananas, melons, etc.;

(f) Clear fruit juices with a more acidulated, aromatic character are more widely accepted on the world market than nectars and other pulpy juices, even though the latter are more similar to the fresh natural fruits or vegetables (most juices made from tropical fruits are pulpy or nectars with less acidity);

(g) People in developed countries are largely unfamiliar with the taste of many tropical fruits. Hence, despite well organized promotion and the fact that most people enjoy the taste on their first encounter with tropical fruits, it is generally difficult to create a continuous demand for processed goods from tropical fruits;

(h) In developing countries, vegetables and fruit are (with very few exceptions) in very short supply for commercial processing purposes. Quality does not meet the standards; size and maturity differ much more than in moderate climates. The cultivation and planting of fruit and vegetables is seldom intensified to ensure continuous supplies or to permit the collection of the raw material at reasonable picking and transportation costs. All these factors contribute to the difficulty or impossibility of processing such surplus raw material for premium markets;

(i) In subtropical and tropical conditions, the problems of insect infestation as well as those of fruit and vegetable storage and transportation become increasingly complicated. Losses are qualitatively and quantitatively high, caused by high temperatures and humidity during harvesting and transport, as well as by the very high enzyme content of the fruits themselves. In Ecuador, naranjilla juice, for example, loses its attractive greenish colour, wonderful aroma and taste within minutes of processing, if not processed according to the modern methods.

Processing tropical fruits and vegetables

16. The technology behind the processing of fruits and vegetables in moderate climates has developed very rapidly. All the raw material components are utilized wherever possible. The most modern high-temperature short-time techniques are used for heat treatments, such as sterilization, pasteurization, evaporation, and deaeration. Fluidised-bed drying, spray, pneumatic, foam and freeze drying systems

and processes have been introduced. Electronic and other modern devices are used to grade the fruit according to size, form, maturity, tenderness, appearance, etc. Modern extraction, peeling, filling, syruping, exhausting, canning and labelling equipment has also been developed. However, despite all the fruit processing developments in the advanced countries, it must be admitted that little or no attempt has been made to develop satisfactory processing techniques for certain important tropical fruits and vegetables.

17. No particular processing technique has been developed for bananas. Little is known for instance about an efficient banana peeling method, or a method for grading bananas according to the degree of ripeness as a preparatory stage in the industrial processing of this important raw material.

18. Pineapple processing techniques have only been developed to a limited degree. Trimming the outer part of the fruit to the desired radius for standard cans and removing the core is a very rough operation resulting in an undesirable ratio of better priced segments and low priced material for juice production.

19. Attention has centred recently on cashew-nut processing and advances have been made, but when compared with the highly efficient sophisticated technology applied in citrus processing, it is obvious that we are still on the verge of a development.

20. Mango processing techniques proper are non-existent. Tomato paste and apple pulp techniques have been adapted as a quick solution to the problem of processing mangoes on a commercial scale into pulps and jams. Nevertheless, it is quite evident that this is not up to the technological standards applied when processing other fruits in the moderate climatic zones of the world.

21. The reason for the above situation can be traced back to mutually exclusive developments. Were the world market to accept large quantities of papaya products, there would be a larger market for specialized papaya equipment. The larger market for papaya equipment would encourage research and the investment of money and talents, which would consequently lead to improved efficiency in papaya processing. More efficient processing would result in better quality papaya products on the world market at reduced prices, which in turn would lead to an explosive increase in demand. At the moment, however, this chain of events has developed into a vicious circle and the meeting is intended to prise this open and start an upward spiral movement with ever increasing diameters.

22. The means for achieving this depend on numerous factors. A certain economic and technological approach should be formulated, referring to the fruit and vegetable processing techniques used in countries with moderate climates and to food processing patterns in general.

Analytical fruit and vegetable technology

23. The food processing industry normally extracts the pure concentrated substance from the raw material as it is more widely acceptable and has a broader range of application than the original fruit and vegetable. The sugar industry extracts a pure chemical substance, saccharose; the vegetable-oil industry extracts an almost pure triglyceride, while the milling industry extracts an almost pure starch in the form of white flour (without any mineral substance and with a reduced protein and ash content).

24. The meat industry today, for example, obtains from one carcass a hundred different special products and cuts, the properties, structure, taste and character of which meet a certain market demand and offer the processor a good return on the money and skills invested because of the added value as a result of applied analytical technology. In the tropical and subtropical fruit industry, the methodical application of technological analysis is applied solely to citrus fruit processing giving a range of different products and by products, such as juices, segments, pulp, essential oils, pectin, animal feedstuff and certain vitamins (C and provitamin A complexes).

25. It would be interesting to see whether such a technique could not be incorporated in a new approach towards the many other varieties of tropical fruit and vegetables, particularly in those cases where analytical technology could be applied. For instance, banana powder without the typical aroma may well prove more applicable in the secondary food processing industries as an admixture to elementary components in new food products, such as chocolates, sweets, biscuits, ready-made foods, snacks, ice-cream, etc. A paper prepared for this meeting describes the trial application of such analytical technology to avocados as an industrial raw material.

Economy of scale and processing efficiency

26. The characteristic situation facing fruit and vegetable products on the world market arises from a number of complex factors. Public acceptance is not the sole

reason for the industrial processing of only ten vegetables out of hundreds. It is also the fact that the vegetables selected have a common attribute, a common denominator of processing efficiency. It is not just coincidence that green peas, spinach, beans, tomatoes, potatoes, sweet corn, carrots and a few other vegetables represent 90 per cent of the processed vegetables on the world market. Significant for them is the fact that all these vegetables can be planted, cultivated, protected against pests and disease, and processed by highly efficient mechanized, automated, commercial methods in accordance with the principles of industrial mass-production. Research has also made it possible to select strains of peas, tomatoes or beans which ripen at the same time, so that this factor and other properties enable the processor to apply highly efficient modern processing techniques throughout, from harvesting in the field through processing and further distribution to the premium market.

27. In addition to the issues of acceptability and processibility on a large scale, there are still more forces which could contribute to processing development and the establishment of a profitable export of fruits and vegetables, also in the field of tropical raw materials.

28. Attention should be paid to the proper utilization of the economies of scale, the relation of industry to the raw material produced, the location of the plant, possible exclusion of seasonal work and the year-round utilization of processing facilities. Furthermore, there are advantages to be gained by entering the market when others are absent, and relative demand is greatest. Benefits can be derived from producing a full assortment of merchandise with modern labelling and packaging systems at acceptable prices, and in such quantities to permit the launching of a publicity campaign, with a view to establishing premium prices and creating a brand-name for the company's products on a new market.

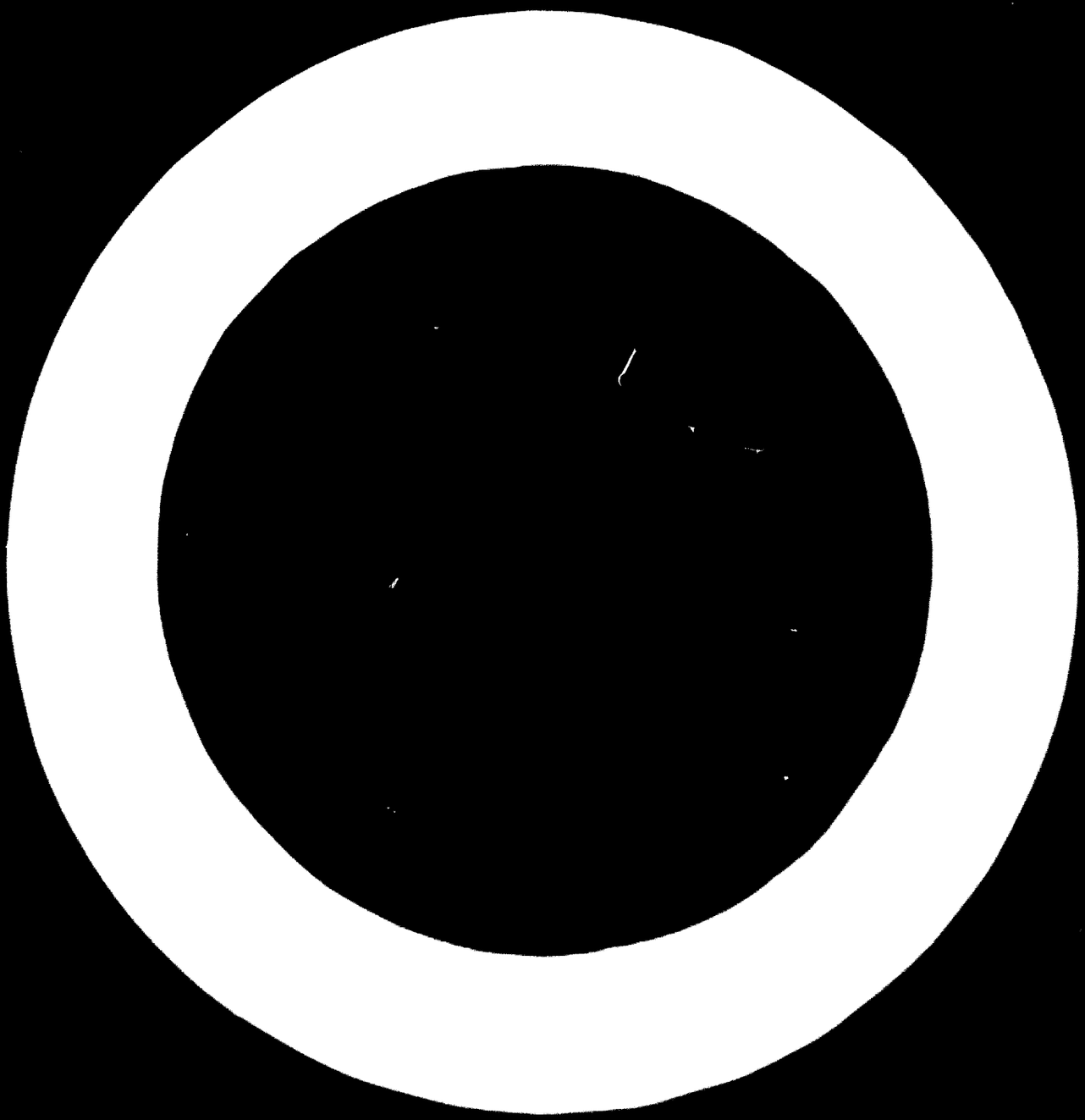
29. These are just a few examples of what should be done if the industrialisation and export of processed fruit and vegetables from developing tropical countries are to materialize successfully. The splendid success enjoyed by Taiwan with its pineapples and mushrooms in only ten years is an example to be followed. Other good examples are the rapid results achieved by certain tropical and subtropical countries (Brasil, Morocco, Paraguay and Trinidad) with the canning and processing of citrus products and concentrated citrus juices.

30. The establishment of an economically viable food-processing industry is, however, based on certain rules which should be elaborated a little more because today's successfully run factories already have a generally fixed profile.

31. The successful processing of tropical fruits and vegetables for export requires factories with a minimum capacity of 200-500 tons a day. The factories should operate at least 120-180 days a year on a 2 or 3 shift basis. The fruit and vegetables should be supplied from local intensively cultivated growing areas to ensure that they are on the processing line no later than three to four hours after harvesting. The factory must also be fully equipped with all auxiliary materials and utilities such as water, steam, sanitation, repair and maintenance and packaging. Particularly important are the departments for the extracting and processing of all the valuable by-products, as shown by the example of the citrus industry.

Raw material supply

32. The factory should also have a fully equipped raw material section capable of providing all the services necessary for the integration of the agricultural production of the raw material by contracting with individual farmers for supplies or by organizing special co-operative production units or factory-owned plantations. The final aim should be to establish a homogeneous integrated agro-industrial process from the field through the factory to the consumer, avoiding a clash of material, economic, social and quality interests. A modern, up-to-date fruit processing factory cannot depend on so-called indigenous fruit surpluses.



[redacted]

[redacted]

[redacted] information on cashew apple [redacted] need for large-scale cultivation [redacted] by individual farmers was [redacted] information on [redacted] and North-Eastern Brazil. The [redacted] systems led to some useful and informative [redacted] emphasized the need for a clear-cut picture on [redacted] It was decided that all those interested would [redacted] under the direction of Mr. [redacted] as group leader, for further dis- [redacted]

[redacted], the Working Group came to the following conclusions:

(a) [redacted] in view of current production figures [1], good sales prospects and [redacted] of cashew apples, it is recommended that most [redacted] activities in this sector be pursued along integrated, agro-[redacted] lines;

(b) it is advisable to direct cashew nut production towards mass markets either [redacted] the establishment of agro-industrial combines, technical and [redacted] permitting, or through the combination of various small-[redacted] supplies of raw materials, such as co-operatives or contractual [redacted] with individual cashew nut growers in close co-operation [redacted] the processing plant;

(c) it is recommended that producer countries set up national control bodies [redacted] as possible in order to facilitate standardization of raw [redacted], processing methods and processed nuts at national and inter-[redacted] levels;

(d) it is recommended that endeavours be made to set up a body to facilitate [redacted] of information, the collection of documents, and their trans-[redacted], as well as their dissemination within an international framework;

[redacted]

(a) in view of the importance of possible qualitative improvements in the raw [redacted], it is recommended that concerted efforts be made in the field of [redacted] as particular regard to varietal selection, breeding and growing [redacted]

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[1] [redacted] nuts, and 4 million t fruit.

(f) It is also suggested that the exchange of high quality raw material be developed to identify possibilities of adaptation;

(g) It is suggested that a study be carried out to assess the compatibility of intercropping in large cashew plantations;

(h) In view of the great threat of parasitic attack, it is recommended that pesticide research be intensified in particular with regard to biological control agents;

Processing:

(i) Research should concentrate on:

1. Kernels - the objective being to obtain whole white, unstained and uncontaminated kernels·
2. Other parts of the plant, in particular the processing of cashew apples;
3. By-products of industrialization, i.e. shell, integumen, cashew nut shell liquid (CNSL) - in particular better utilization of the latter product;

(j) As the need to mechanize the cashew processing industry is closely linked with local conditions, it would seem more rational to adopt a gradual approach, which could be elaborated and completed in the course of industrial development.

CHAPTER [illegible]

46. The session began with a paper from Mr. A. [illegible], [illegible], [illegible] Brazil, entitled "Pineapple culture in three regions of [illegible]" [illegible] situation and problems were [illegible]

47. Mr. A.J. de Souza from the Instituto de Tecnologia de Alimentos (ITAL), [illegible] Brazil, completed the picture in his paper "Industrialization of pineapples" which discussed pineapple culture in Brazil in general.

48. Mr. L. Haendler, of IFAC, Paris, France, presented a paper entitled "Industrialization of pineapples". The market situation for pineapples and pineapple products was surveyed. The industrial processes used were described. The siting and working operation was discussed in more detail, with respect to equipment and systems.

49. A paper prepared by Mr. J. Abraham from the Industries Development Corporation, Haifa, Israel entitled "Markets for processed pineapple products" was read by Mr. M. Rosner from the same organization. The reasons for the success and failure of various countries in the export marketing of pineapple products were analysed.

50. Topics of discussion included the low yields in Brazil (8 tons hectare), processing equipment, by-product utilization (bromelin, peels and wine), and the future of concentrated pineapple juice.

51. Summarizing the session, Mr. M. Mautner of UNIDO stressed the need for industrialized agriculture and vertical integration for the particular case of pineapple.

52. It was decided that participants interested in the subject would meet with Mr. L. Haendler who had been nominated group leader for further discussions and elaboration of recommendations.

53. The Working Group concluded that in most Central and Latin American countries particularly in Brazil there is keen interest in growing pineapples either as fresh fruit for local markets or as raw material for processed products for export, but knowledge of industrial production methods and the different processes is limited. In view of the above, the Working Group made the following proposals:

1. In order to be able to assess their potential precisely, Latin American countries would welcome the provision of an expert group under the auspices

[redacted]

[redacted]

CHAPTER 4: BANANAS

54 The first speaker, Mr. de Martin from ITAL, Campinas, Brazil, presented a paper entitled "Banana culture in Brazil and the present situation", which emphasized varieties, yields and future plans. The impact of recent decreases in exports to Argentina on the economics of this crop was discussed.

55 Dr. [illegible] of ITAL read his paper "Technological and biochemical aspects of banana processing", underlining problems such as discolouration, pH as related to preservation and flavour retention. These difficulties are responsible, to a large extent, for the limited availability of processed banana products.

56. This view was developed further by Dr. [illegible], Professor at the University of Rhode Island, United States, in his critical study of the agricultural, technological and marketing aspects of banana processing, entitled "Factors in the processing of bananas". The number of processed banana products is limited, and [illegible] technology is faced with tremendous difficulties emerging from the particular characteristics of this fruit. A breakthrough in production development and market [illegible] is urgently needed. The speaker reported on progress in this direction and more [illegible] on a [illegible] frozen banana product.

[illegible]

[illegible]

39. It was agreed that the Working Group on Bananas and Banana Products should meet for further deliberations, under the leadership of Mr. C. [illegible] Forrester.

40. The Working Group discussed the somewhat unique position that bananas occupy in world trade. Bananas are available the year round on the export market, they are firmly established in the international dietary as a fresh fruit. However, there is little evidence of the utilization or consumption of processed banana products.

41. The flavour and taste of bananas is readily accepted, and consequently there is an opportunity to expand the utilization of processed banana products based upon this broad acceptance, if the basic properties are retained. The technology of banana utilization in industry has made some progress, however, there is a great need for additional work, and it will also be necessary to bring together the available knowledge in this area to serve as a basis for further advance.

42. Although this meeting provided substantial impetus in the right direction, it may be considered too limited when the economic importance of bananas is taken into account. UNIDO is, therefore, urgently requested to organize an international meeting, preferably in Central or Latin America, bringing together all persons concerned with developmental work in this field, to exchange information, to present new findings, and to elaborate an integrated plan for future developments. Prior to such a meeting, UNIDO should prepare a current bibliography of work on bananas to serve as a basis therefor.

43. Over the years, numerous efforts have been made to industrialize bananas and their by-products; however, a large number of problems remains to be solved. Some of the areas more deserving of additional effort are as follows:

(a) marketing of industrialized products;
(b) development of new varieties for processing;
(c) aseptic processing of pulp;
(d) freezing;
(e) high-vacuum freeze-drying;
(f) fluidized drying;
(g) supplemented powder.

44. The above areas of interest generally result in products resembling banana [illegible], however, can also be used as a raw material source for further products;

yet before any major efforts are mounted in this field the economics of both the processes and products must be examined critically. Some examples of potentially interesting products worthy of investigation are as follows:

(a) utilisation of various constituents to produce, for example, tannins, starch gums, pectins, phenolamines, etc.;

(b) fermentation of all parts of the banana plant to produce protein-rich mixtures, liqueurs, etc.;

(c) possible utilization of banana waste as feedstuff;

(d) utilisation of banana stem hearts to produce simulated "palmito" (heart of palm tree).

CHAPTER 5: WINE AND GRAPES

65. The present situation and potentialities of viticulture and the wine industry in Brazil were the subject of the first paper, read by Mr. T. Hashizume of ITAL, Campinas, Brazil, entitled "The current situation in viticulture in Brazil".

66. Mr. J.M. Sampaio of IPEAL, Cruz das Almas, Brazil, presented a paper entitled "The growing of wine grapes in Brazil".

67. "Establishment of grape-processing plants in developing countries" was the title of the paper presented by UN expert Mr. V. Zanko of Zagreb, Yugoslavia. The author reviewed trends in viticulture and the wine industry in the world, and analyzed factors of special importance to developing countries. The core of the paper was a description of the recent history of industrialization of wine production plants in Yugoslavia. The lesson to be learned from this history is that in the case of developing countries, the success of grape processing operations depends on the integration of large-scale agricultural production with industrial processing. Wherever possible, industrial processing should be specialized, i.e. a small number of products such as red and white wines, dry wines, etc. When exporting wines, it is necessary to divide the various tasks along the processing sequence in such a way that the last cellar is concerned with blending.

68. A film on the development of the wine industry in Yugoslavia was shown. The contrast between inefficient home industry type operations and modern wine processing was stressed.

69. During the discussion period, several participants spoke in favour of increasing the consumption of wine in Brazil, as this seems to be essential to the development of the industry. In this connexion the danger of alcoholism associated with an increase in wine consumption was mentioned. It was suggested that for this and other reasons, it would be more appropriate to develop the industry in Brazil in the direction of higher quality products.

70. Mr. V. Zanko as group leader and Mr. T. Hashisume met with participants interested in the subject for further discussion of the grape processing technology, in particular the production of grape-juice and wine. In the course of the discussions, it was re-established that the Brazilian wine industry has considerable

potential, which cannot be utilised until the country's viticulture has been modernised to international standards and grape processing is carried out on an industrial scale.

71. The Working Group agreed that UNIDO should be asked to commission a group of experts to carry out a detailed field-study of the wine-growing areas of Brazil, investigating the following aspects:

- Viticulture:
  - soil and climate requirements
  - planting
  - methods of growing and mechanisation
  - economics
- Grape processing:
  - end-products and their structure
  - technology
  - equipment and mechanisation
  - marketing
  - economics.

72. After the completion of this study, which would contain recommendations relating to the development of viticulture and industrial processing, it would be desirable to distribute it to technologists, industrialists and government representatives to encourage discussions prior to the editing of a final version. It was felt that the best means of arranging such a discussion would be to organize a seminar to be held in Bento Gonçalves (Rio Grande do Sul), Brazil in 1972.

73. The work carried out in ITAL, Campinas, on the processing of mangoes was described by Mr. A. Gorgatti Netto, Director of the Institute. Of particular interest was the development of a machine for peeling and slicing mangoes for canning or freezing. Mr. Gorgatti supplied additional details of the machine when he showed slides on ITAL laboratories in another session.

74. The processing and trade aspects of mango and its products were discussed in detail by Mr. H.C. Bhatnagar of the Central Food Technological Research Institute, Mysore, India in his paper "Some aspects of preservation, processing and export of mango and its products". Mango is the king among tropical fruits (annual production 9 million tons, of which 7 million tons are produced in India). Yet international trade in fresh fruit or processed products represents no more than a small fraction of this figure. The technological processes, from the trees to the finished products, were described both for green and ripe mango products. Problems were underlined and the needs for technological-economical breakthrough development were formulated.

75. The discussions dealt with problems of agricultural aspects, equipment, by-product utilisation, and suitability of varieties. Some controversy arose as to whether the varieties most suitable for fresh consumption were also suitable for processing.

76. Discussion within the Working Group headed by Mr. H.C. Bhatnagar centred on the irregular bearing habit of the mango and the consequent difficulties experienced by the processors who are interested in receiving adequate quantities at reasonable rates. Hence, it was suggested that an intensive study programme be initiated in mango-growing areas to study the problem. Such institutes as the Institute of Horticultural Research in Bengalore, India, or the Instituto Agronomico de Campinas, São Paulo, Brazil, could take up such a proposal.

77. In view of their very short post-harvesting storage life, fresh mangoes cannot be shipped over long distances. Hence, the proposal was made that in possible collaboration with such institutes as the Instituto Centro-Americano de Investigacion y Tecnologia Industrial (ICAITI) in Guatemala, or the Central Food Technological Research Institute (CFTRI) in Mysore, India, priority be given to the close study of

the most important [illegible] life to at least four weeks. [illegible] atmosphere storage should also be [illegible].

78. It was recommended that the existing [illegible] suitability for processing at various [illegible] throughout the mango growing region and definite recommendations be [illegible]. It was suggested that any future expansion of mango cultivation be confined to [illegible] known to be suitable.

79. In view of the urgent need for mechanization of the mango processing industry, it was recommended that the performance of the [illegible] and [illegible] be [illegible], and if necessary, a larger modified unit be designed. [illegible] should also be given to the design for a machine for slicing raw mangoes, in [illegible] with ITAL and CFTRI.

80. Steps should also be taken to promote the [illegible] of [illegible] products such as powders, mango cereal flakes, etc.

81. In view of the fact that various programmes envisaged by the Working Group involved the collaboration of scientists and technologists from different countries and necessitates the augmentation of existing laboratory facilities, it was recommended that international agencies such as [illegible] and [illegible] or other donor [illegible] means take steps to ensure that:

(a) a well-conceived exchange programme for scientists and technologists is implemented without delay to facilitate progress;

(b) minimum additional amounts of essential equipment are supplied to the laboratories and/or institutes carrying out the coordinated programme of work.

82. Following the acceptance of the above principles and [illegible] where necessary, a detailed programme of work can be drawn up stating financial commitments with respect to the exchange of personnel and procurement of equipment.

[illegible]

[illegible] de Recuperação Economico- [illegible], [illegible], Brasil, described his work on flow [illegible] new product development.

[illegible] in Mendoza (Argentina)" by [illegible] Tecnologia de Frutas y Hortalizas [illegible], was circulated in the author's absence.

[illegible] the need for large scale industrialisation [illegible] culture and harvesting) and in [illegible] processing industry. He pointed out that [illegible] industry provides a model for such success.

[illegible] of Rhode Island subscribed to [illegible] additional details on operations in [illegible] most of the operations in the [illegible] mechanically harvested, and sorted, [illegible] in the field by means of mobile units, so that a [illegible] in finishing operations with material [illegible] field plants.

[illegible] and processing in Brasil (average [illegible], utilisation of by-products, processes and [illegible] during the discussion period.

CHAPTER 8: AVOCADOS

88. Although this fruit was not directly a subject of discussion at the meeting, various aspects were treated in a paper entitled "The avocado, a fruit for agricultural industry" by Messrs. G. Mangeot and L. Haendler, of IFAC, Paris.

89. It was generally agreed that the importance of this fruit could not be ignored. Current production figures are far from negligible (400,000 to 500,000 tons per annum); although there are few processed avocado products available on the market, it seems that interesting results could be obtained in this field despite the lack of data on the subject.

90. The Working Group under the leadership of Mr. L. Haendler made the following recommendations:

(i) that an economic study be carried out to establish potential avocado-based products such as oil, stabilised pulp, kernel-oil, etc.;

(ii) that an agro-industrial study be made to assess the adaptability of different strains to different processes in relation to the ecosystem.

CHAPTER 9: PASSION FRUIT

91. The meeting noted an increasing use of passion fruit pulp and juices and consequently decided to set up a Working Group headed by Mr. A.J. de Souza jr. of ITAL, Campinas, Brazil, which came to the following conclusions:

(1) In view of the interest in and demand for passion fruit products, UNIDO is requested to organize and sponsor in the near future a special meeting for experts, processors and potential buyers of passion fruit;

(2) The passion fruit processing industry in Brazil should seek ways and means of organizing the industry to derive full benefit therefrom, of promoting the consumption of passion fruit products on local and foreign markets and of increasing production;

(3) Governments are urged to support agriculture, technological and marketing research with respect to passion fruit products;

(4) The various bodies engaged in passion fruit research should co-ordinate their efforts and co-operate as much as possible;

(5) The industry is advised to guarantee by means of contracts minimum prices for the raw material, and to establish a grading system as a basis therefor;

(6) Efforts should be made to overcome the lack of comparative information on raw material costs in various passion-fruit producing countries;

(7) The products and packaging best suited to industrialisation should be closely studied: in Brazil, the Institute of Food Technology (ITAL) should co-operate closely with the industry in this field;

(8) A close study should be made of the suitability of can lacquers for various passion fruit products;

(9) The industrialisation of passion fruit by-products should be studied: in Brasil the work already done by the Centro de Pesquisas e Desenvolvimento (CEPED) in this field should be followed up.

92. The activities of FAO in assistance regarding marketing and other aspects of tropical fruits and vegetables were summarised in two papers by Mr. [illegible] Clarke of FAO, entitled "Product development and test marketing of canned tropical fruit for export" and "Export market outlets for Brazilian canned fruit and vegetables". After analysing the present situation, the speaker emphasized the special importance of product development, experimental production and experimental marketing for tropical fruit and vegetable products, and explained FAO's experience and activities in these fields.

93. The importance of organisation in industry with respect to marketing (especially exports) was brought up in a paper entitled "Overseas marketing of Australian canned fruit" by Mr. R.L. Tucker of the Australian Canned Fruits Board, Melbourne, Australia, which was read in his absence. The paper provided clear proof of the need for country-wide organisation of "marketing boards" with legal status.

94. The same point was demonstrated for another country in a paper entitled "The South African canning industry with particular reference to the South African Canned Fruit Export Board" by Mr. N.J. Lawson of Cape Town, South Africa, which was circulated at the meeting.

95. Mr. W.J. Gall, Special Adviser to the Canadian International Development Agency (CIDA), Ottawa, Canada, presented a paper entitled "Canadian technical assistance in food technology". CIDA is the governmental body concerned with official assistance to the developing countries. In the area of food processing, the agency is mainly concerned with problems of food loss and wastage, but also with marketing and production issues. Another group association more specifically connected with food technology training is C + 1 (Canada Plus-One). An interesting concept is that of the "mobile training unit" (MTU) which has been active in Chile, Korea, Malaysia, Peru, Thailand, etc.

96. Mr. Clarke headed the Working Group on marketing whose recommendations were as follows:

(1) Whereas the export of processed fruit and vegetables to premium markets is a highly competitive field with great advantages for the larger, integrated marketing organizations having the technical and financial resources

[illegible]

and whereas the [illegible] fruit and vegetable [illegible] in developing [illegible] and consistent [illegible] of export trade policy, practices and incentives, as well as to negotiate with governments and international agencies with regard to technical and financial assistance to the industry,

it is recommended that the fruit and vegetable processing industries in developing countries organise themselves into effective and strong groups by forming export marketing boards or similar organisations, based on existing successful examples of these in several countries, but adapted to meet the special requirements of each country concerned;

(2) Following on the above, it is recommended that the appropriate international technical assistance agencies be requested to analyse the operational methods of the best examples of national export marketing organizations for processed fruit and vegetables so that reliable guidelines can be provided on the requirements and alternative forms of such organisations, to assist in the establishment of similar organisations in developing countries;

(3) It is further recommended that fruit and vegetable industries in developing countries collaborate through their own central organisation to produce adequate production, sales and marketing statistics on their industry, such as current and forecast annual packs of various items, without which it is not possible to carry through effective export market sales programmes;

(4) Whereas developing fruit and vegetable processing industries seeking to enter premium export markets are normally heavily dependent on adequate and proper government support, including fiscal incentives and export development and promotional activities;
it is recommended that governments, with the assistance of international agencies if required, and in close co-operation with the fruit and vegetable processing industry, should evaluate their existing export promotion regulations and policies to determine whether these are effective and fully meet the particular requirements of the industry, and where necessary, improve the operational effectiveness of these export promotion measures;

(5) It is recommended that [illegible] agencies and banks and other related [illegible] their efforts more closely to produce a coherent and integrated programme of assistance for the growth of national fruit and vegetable processing industries.

(6) It is recommended that the governments and the industries in developing countries work together with the appropriate international agencies to train export marketing specialists in the fruit and vegetable processing sector and that some of these specialists be physically located in the major premium export markets in order to provide reliable and up-to-date marketing information to their countries as well as to assist in increasing the export sales of processed fruit and vegetables;

(7) Whereas reliable market information for processed fruit and vegetables in the major export markets is dispersed, fragmentary and generally difficult to obtain;

it is recommended that the international agencies concerned and other related market research organisations seek to co-ordinate their market information services in this area and study ways and means to improve the information available to processing industries in developing countries, especially with regard to imports into the major markets by specific items, together with regular prices reporting on these items.

[illegible]

97. The fact that the conference [illegible] one session on investment on the first day and another on the last is indicative of the importance of the topic to the development of fruit and vegetable processing industries.

98. On the first day of the meeting, Mr. Q. Tran-Le from UNIDO introduced the UNIDO Investment Promotion Programme. The speaker stressed the importance of investment promotion for the implementation of projects. The Programme covered sixty-six well-defined projects. A list of projects was circulated.

99. In his second lecture, Mr. Q. Tran-Le described the future steps for implementation of the Investment Promotion Project. A meeting on this subject was to take place in Singapore. The meeting would provide an opportunity for personal contact and practical dealing between parties interested in co-operation through partnership in investment, know-how, joint marketing, etc.

100. Investment promotion and incentives in Brazil and more particularly in the State of Bahia were analysed by representatives of the Bahian Government and the Superintendencia do Desenvolvimento do Nordeste (SUDENE). The participants had the opportunity to see these incentives at work during their tour of the impressive development project at the Aratu Industrial Centre with plant visits to the Carlsberg brewery and the tropical fruit processing plant run by Bahia Frutas S.A.

101. Following detailed discussion the Working Group, under the leadership of Mr. Q. Tran-Le, made the following recommendation: it is recommended that UNIDO investment promotion activities be expanded to ensure improved coverage from both the geographical standpoint, especially for the benefit of Latin American countries, and from the sectoral standpoint, especially as far as the processing of tropical fruits and vegetables is concerned.

CHAPTER [illegible]

PARTICIPANTS' AND OBSERVERS' RECOMMENDATIONS

102. In addition to the technical recommendations made by the various Working Groups, the following proposals and recommendations were brought forward by various individuals during and after the general discussion periods and were unanimously accepted by the meeting.

103. Recommendations made by Mr. J.B. Díaz Moreno of Quito, Ecuador relating to training courses for technicians working in the agro-industrial sector

In view of the fact that tropical fruits and vegetables have a promising future owing to the existence of a wide variety of raw material in most tropical countries, and in view of the fact that agronomic research institutes exist in which improved materials and adequate technology are available for production and industrialization, it is recommended that:

(1) UNIDO be requested to organize short training courses at various levels for technical and administrative personnel in the agro-industrial sector to provide them with adequate knowledge of the production of raw materials and their industrial processing;

(2) UNIDO be requested that at the time of organizing these technical courses, attention be devoted to marketing aspects so as to satisfy the countries' local demand and to promote exports.

104. A joint recommendation was drawn up by Mr. F. [illegible] of El Salvador, Mr. F. Escobar and Mr. J.F. [illegible] of Guatemala and Mr. O. [illegible] of Nicaragua which read as follows:

In view of the interest in regional development and the development of uniform systems and methods permitting the industrialization of a series of agricultural products, in particular fruit and vegetables which constitute an important factor in the economy of the member countries of the Central American Common Market, it is recommended that UNIDO organize, in possible collaboration with the Central American Research and Technological Institute (ICAITI), a seminar for the Caribbean area and Central America in the near future to treat matters relating to regional agro-industrialization as well as its links with the marketing of fresh and processed products.

[redacted]

CHAPTER 13:

PARTICIPANTS' AND OBSERVERS' STATEMENTS

108. Mr. A. Gorgatti Netto, Director of ITAL, Campinas, Brazil, described the activities of this institute. Slides were projected. The importance of a few topics in fruit biochemistry, such as flavonoids, browning reactions, etc. was mentioned.

109. Mr. [illegible] from the Corporacion Venezolana de Fomento, Venezuela, announced the establishment of a new Experimental Industrial Centre for Exportation (CIEPE) in San Felipe, Venezuela. The consultants to CVF in this project provided technical data and more details.

110. Mr. [illegible] from the Institute of Agronomy of the State of São Paulo presented additional information on pineapple growing in Brazil. Slides were shown.

111. Mr. [illegible] from the [illegible], Ecuador, described the activities of his organization in the fields of agricultural development and industrialization of crops.

112. Mr. [illegible], from the Industrial Development Centre for Arab States (IDCAS) [illegible], described the fruit and vegetable processing industry in the Arab Republic of [illegible].

113. Mr. [illegible], Federal Republic of Germany, [illegible] of fruit and [illegible] atmosphere of [illegible].

114. Mr. [illegible] in the State of [illegible] (see para. [illegible]).

115. Mr. [illegible], São Paulo, Brazil, [illegible].

116. Mr. [illegible] fruit and vegetable [illegible].

117. Mr. [illegible] fruit and vegetable [illegible].

118. Numerous participants and observers expressed their gratitude orally and in writing to the organizations and authorities concerned with the organization of the meeting, and spoke of the profit they had derived from the papers and discussion.

119. At the final session certificates of attendance were issued to Brazilian participants. Speeches of thanks were delivered on behalf of the participants and observers by Mr. R. Huet of IFAC, France and Mr. H.C. Bhatnagar of CFTRO, India. Mr. D.A. Sette on behalf of FAO thanked the organizers of the meeting and the Bahian authorities for their hospitality. Mr. M. de Mello Kertész spoke on behalf of the Secretariat of Planning and Technology of the State of Bahia 1/, and thanked the participants and observers for having contributed so effectively to the success of the meeting. Mr. W. Mautner of UNIDO formally closed the meeting with a speech of thanks directed towards the participants, observers and the Bahian authorities responsible for the organisation of the meeting, in which he expressed his appreciation of their combined efforts, which had undoubtedly prepared the way for fruitful follow-up action.

1/ Attached to this report as Annex 3.

[redacted]

[redacted]

It is a great honour for us to [redacted] to our state. We are happy to note the presence of so many [redacted] you every success in your [redacted] We hope that the [redacted] a landmark in the development of the fruit and vegetable processing industry and more particularly the production of exports to [redacted] countries.

My particular thanks go to Mr. [redacted] given us and for having selected our state as the venue for the [redacted] processing selected tropical fruits and vegetables. I also wish to thank the representatives of the Secretariat of Planning and Technology of Bahia, who have assisted UNIDO with the preparation of this undertaking. Furthermore, we are extremely pleased to act as hosts.

On the other hand, we wish to point out that we consider the venue to be a most fortunate and appropriate one in view of Bahia's outstanding primary development in such modern industrial sectors. Bahia has denoted the existence of this potential, but our failure to exploit it properly has been due to the lack of co-ordination between modern technology and its effective application to developing resources. However, we are confident that the [redacted] will provide the impetus for the dynamic utilization of these resources. As so rightly pointed out by Mr. Ramirez, this seminar will open up new avenues for the development of the sector under analysis, and I would like to point out that our Government attaches high priority to agricultural development and the processing of agricultural raw materials.

As a simple demonstration I would point out that in 1977 the agricultural budget for our state will be three times larger than the budget of 1975. However, it must be emphasized that nothing durable or positive can be achieved unless it is soundly based on modern science and technology. It is this topic that we expect to gain from the seminar: the recommendations and guidelines concerning the application of modern science and technology to the processing of fruits and vegetables.

[redacted] period of progress and [redacted] interest in technological [redacted] Research and [redacted] expects to invest some [redacted]

[redacted] of great importance to Brazil, which [redacted] progress. This progress is evidenced [redacted] the cause of development; the [redacted] centre will be significant and [redacted]

[redacted] harmonious relationship [redacted] and we can confidently expect a [redacted] at a higher rate than ever before. In the [redacted], a special sector will be set up to deal with [redacted] fruits and vegetables. Bearing in mind the [redacted] we feel that [redacted] bearing upon the new research work [redacted]

[redacted] the current situation in Brazil is the [redacted] the maintenance of equilibrium between the [redacted] the Federal Government is taking measures to diversify [redacted] kinds of incentives to encourage the establishment of modern processing plants in these areas than the traditional industrialized regions in the South. Bahia will thus become one of the two most important [redacted] areas of Brazil, as a very dynamic sector of the industry is [redacted] We can see that the state of Bahia by combining [redacted] and support of the Government, and by [redacted] and natural resources will rise to rank [redacted]

[redacted] and economic development as a whole, I would like [redacted] you to visit the Aratu Centre on that you see [redacted] and support to industrialization. The Aratu Centre [redacted] one of the most modern industrial estates. Twenty-five modern industries

are already operating there, and by the end of this year this number will increase to fifty industries working at full capacity. Furthermore, a harbour is being built to serve the estate with the financial assistance of the Inter-American Bank. This harbour will be one of the most modern in the country, helping to promote industrialization and facilitate the export of processed raw materials.

However, I should repeat that industrial development is not our sole objective. We believe in development and progress only if there is a balance between the various sectors of production, and here again agriculture is one of our main priorities. We think that agriculture is a basic factor for industrial development and progress as a whole. Modern agriculture entails using modern inputs and processing the products as much as possible in the primary production areas. The Bahian Government is most active and is doing its utmost to attract and establish industry in our state.

At this juncture, I should refer to the support we are enjoying from Bahian business circles, who are pursuing a very determined policy and seizing every new investment opportunity, either amongst themselves or in joint ventures with enterprises from other parts of Brazil and abroad. Particular attention is devoted to foreign investors: they are invited to co-operate with us and progress with us. Private investors will find all the pre-requisites for harmonious progress with profitability. Investors come to us to make a profit, and this is what we offer. The conditions we offer are conducive to profitable operation and market.

I am convinced that my government will fulfil its achievements just as I am confident that the seminar will constitute a major contribution to our endeavours, clarifying and giving us guidelines for the establishment and development of this most important sector. I wish to repeat that we will support you throughout your work; you can rely on the support of the Secretariat of Planning and Technology under the dynamic leadership of Mr. Kertész, who will be on hand all the time to help you in every possible way and ensure that the seminar is a practical and useful undertaking.

In conclusion I wish once again to welcome all of you and offer you the hospitality of my state. Might I encourage you to take advantage of our hospitality so that you may work in the best possible way. Our great objective is progress; not only progress in Bahia, nor progress in Brazil alone, but progress for mankind as a whole, which is the true basis for world peace.

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ANNEX 2

OPENING ADDRESS READ BY MR. M. MAINER

ON BEHALF OF THE EXECUTIVE DIRECTOR OF UNIDO

I wish to welcome you on behalf of the Executive Director of UNIDO, Mr. I.H. Abdel-Rahman, to this Expert Group Meeting on Processing Selected Tropical Fruits and Vegetables for Export to Premium Markets, which has jointly been organized by UNIDO, ECLA, FAO, UNCTAD, the Institut Français de Recherches Fruitières Outre-Mer (IFAC), and the Government of the State of Bahia, to whom we are deeply indebted for standing host to this meeting, and for the excellent facilities and support tendered. The success of this meeting will be in no small measure due to the co-operation the Government has shown us throughout the preliminaries to this meeting.

This meeting represents a serious endeavour on the part of UNIDO to promote and accelerate the industrialization of the tropical fruit and vegetable processing industry in the developing countries, and to contribute to its effectiveness in world markets. It has been convened in full awareness of the key role that the proper promotion and integration of this industry can play in developing national economies. Rational integration of the fruit and vegetable processing industry does not merely imply improved yields and more effective utilization of raw materials, it also reduces the need for imports, while exports are generated and associated industries expand. The outcome is a greater supply of food, better employment opportunities, and a basis for further industrial growth.

For those countries fortunate to be endowed with extensive fruit and vegetable resources, the industry can cease to be a simple supplier of calories and nutrition. It can develop beyond the stage of mere import substitution, since efficiently processed and competitively priced fruit and vegetable products can substantially increase export revenue by the value added during processing. Furthermore, the relocation of industrial development from the consuming to the producing countries can be seen as an attempt to redress the inherent imbalance of the international division of labour.

The specific aim of this meeting is to bring together representatives of the various sectors associated with the processing of tropical fruits and vegetables so that they can outline the approach to be adopted when establishing or re-organising the industry. The meeting will direct its attention to a limited number of tropical fruits and vegetables, indicating the most efficient processing systems and equipment, the objectives of further research, international standards, quality control and other marketing requirements, to ensure efficient operation at the various levels.

It is hoped that this meeting will lead to requests for technical assistance in specific fields identified at the meeting, since it should not be forgotten that by promoting the export of processed goods to premium markets, the commercial prospects of the developing countries are considerably strengthened and their economies become less susceptible to fluctuations in demand and prices for the raw materials on which their exports previously depended. Export promotion is a dynamic factor that strengthens the industrial structure of the developing countries, and modernisation of the tropical fruit and vegetable processing industry is imperative if one wishes to avoid further economic deterioration in the developing countries.

It would be premature to anticipate the type of recommendations and follow-up action that will emerge from this meeting. However, it should be emphasized that we in UNIDO attach just as much importance to the follow-up action resulting from the meeting as to the meeting itself. We do not consider meetings such as these as isolated events, but as starting points for the application of science and technology to the development of the economies of the developing countries within the scope of our technical assistance programmes. I am sure that this meeting and the deliberations initiated here will lead new impetus to the efforts in this field, and I hope that we can continue to count on your support in the follow-up activities.

In conclusion, I wish to thank all speakers, participants and observers for coming here today. I am very much aware of the fact that you have both professional responsibility to attend this meeting and I wish you every success in your discussions.

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ANNEX [illegible]

CLOSING STATEMENT BY MR. [illegible]
SECRETARY GENERAL OF THE [illegible]

I believe that now is the opportune moment for me to say a few words about this meeting and to express my particular thanks to all those who contributed to the success of the undertaking. The close link between technological and economic development is so imbued in the modern world that it is hardly necessary to comment on it. Consequently, the people and the Government of India who are deeply involved in this struggle for socio-economic development are intent upon learning about new technological developments in order to re-organise, expand and modernise the current methods of exploiting natural resources. The problem of new technology is very complex; sometimes it is absolutely necessary to carry out research work and set up the proper technology, other times the technology has to be imported. The import of technology does not entail the mere importation and application of technology that was developed for other areas, as the problems prevailing in one particular area are different from those of other areas. Hence, adaptation is necessary and the equipment has to be [illegible]

[illegible]

processed fruits and vegetables. In fact, Bahia has all the climatic and other conditions necessary for the production of a variety and quantity of foods ranging from the typically tropical fruits to those common to countries with temperate climates.

The realisation of this potential requires rapid co-ordination and modern technological development in order to make the best use of natural resources, creating an export product of real value and thereby increasing the gross national product. In principle, it is obvious that the processing of fruit, vegetables and other agricultural material should be carried out in rural areas for purely rational reasons. Processing raw materials other than in the production area would entail increased transportation and storage costs and incur possibilities of wastage, which would have an inhibitory effect upon production to international standards.

Another important factor to be considered is the admixture of by-products of the fruit and vegetable processing industry to other protein-rich by-products of the cotton seed and coconut processing industries. This would constitute a basis for the production of animal feedstuffs and the subsequent development of intensive feeding systems to raise cattle for domestic or foreign markets.

In addition to the benefits of industrialisation, advantages would also be [illegible]

[illegible]

in productivity and [illegible] dynamic change in this sector, the [illegible] the Research and Development Centre [illegible] technological level [illegible] import of the [illegible]

All these efforts [illegible] and in less than ten years it is hoped that our industry will be operating at a very high standard. The fruit and vegetable industry has [illegible] contribute to the national economy in several ways; it will [illegible] the available resources, create employment opportunities for [illegible] areas, and effectively boost income particularly in rural areas.

In conclusion, I wish to thank you all for having come here for this [illegible] and co-operate and advise in this field. My particular thanks go to UNIDO for its endeavours; UNIDO was in fact the operative agency behind this meeting, as for our part merely helped. We are sure that this is the first of many meetings we intend to co-operate further, not only with UNIDO, but also with FAO and WHO, to make the best possible use of the technical assistance provided by the agencies.

I also wish to thank the Bank of Ghana, since this financial agreement provided the facilities and other services for this meeting.

Finally, I would like to thank Mr Gautney, his colleagues, the resident of the meeting and all the others, who contributed so much, and demonstrated their sympathy through their presence and participation. I would also like to thank the representatives of the Indian Government, especially Mr [illegible] who did an excellent job in such a short time and provided UNIDO with the requisite assistance. I am sure that the success of the seminar is mainly due to the kind co-operation of you all and we are most grateful to you, and we hope that you remember Ghana as a place where we will always be ready to welcome you with friendship and hospitality.

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ANNEX 4

List of participants and observers

Experts

NAME	FUNCTION	MAILING ADDRESS
Mr. Zeki BERK	Professor Department of Food and Biotechnology	Technion Israel Institute of Technology Haifa, Israel
Mr. Harish C. BHATNAGAR	Chairman Discipline of Fruit and Vegetable Technology	Central Food Technological Research Institute Cheluvamba Mansion Mysore - 2, India
Mr. Michael J.D. BOWN	Chief Executive	Sturtevant Engineering Co. Ltd. Hamlyn House Highgate Hill London, N.19, England
Mr. Gian P. CASADIO	Professor Faculty of Political Science	University of Bologna Piazza di Porta Mascarella 7 40126 Bologna, Italy
Mr. Clinton O. CHICHESTER	Professor Department of Food and Resource Chemistry	University of Rhode Island Kingston Rhode Island 02881, USA
Mr. Leslie D.G. COWARD	Principal Scientific Officer	Tropical Products Institute Culham, Abingdon Berkshire, England
Mr. Lucien [illegible]	Chef du Service de Développement Industriel	Institut Français de Recherches Fruitières Outre-Mer (IFAC) 6, rue du Général Clergerie Paris XVIe, France
Mr. Raymond [illegible]	Chef de la Section Qualités [illegible] et Arômes	Institut Français de Recherches Fruitières Outre-Mer (IFAC) 6, rue du Général Clergerie Paris XVIe, France
Mr. Vanja [illegible]	United Nations Expert	[illegible] 11 Zagreb, Yugoslavia

[illegible]

[illegible]	[illegible]	[illegible]
[illegible]		
Mr. Guillermo [illegible]	Expert in [illegible]	[illegible] [illegible] [illegible]
Ecuador		
Mr. Jaime E. DIAZ MORENO	Jefe Programa de Agro-Industria	[illegible] [illegible] Apartado Postal [illegible] Quito, Ecuador
Arab Republic of Egypt		
Mr. Mahmoud EL RAFEI	Technical Consultant Food Industries	Industrial Development Centre for Arab States (IDCAS) P.O. Box [illegible] Cairo, Arab Republic of Egypt
El Salvador		
Mr. Federico ESCALANTE	Ingeniero Químico	Instituto Salvadoreño de Fomento Industrial San Salvador, El Salvador
Guatemala		
Mr. Felipe ESCOBAR	Director Técnico	ICAITI 11 Calle 3-21 Zona 1, Guatemala
Mr. Juan F. HERRERA	Ing. Químico División de Investigación Aplicada	ICAITI Av. La Reforma 4-47 Zona 10, Guatemala
Nicaragua		
Mr. Mario SOLORZANO MARIN	Jefe, Sección Experimentación y Desarrollo Depto. Invest. Tecnologicas	Banco Central de Nicaragua Apartado Postal 2252 Managua, D.N., Nicaragua
Thailand		
Mr. Prasert SUKOLPIS	Chief Production Group	The Preserved Food Organization Bangpong Rajaburi, Thailand

[illegible]	[illegible]	[illegible]
[illegible]		
[illegible]	[illegible]	[illegible]

[illegible]

Argelia

Dr. [illegible]	Ing. Agrónomo	[illegible] [illegible] [illegible], Algeria

Argentina

Dr. [illegible]	Ingeniero [illegible]	[illegible] San Rafael Mendoza, Argentina

Australia

Dr. [illegible]	First Commercial Secretary	Australian Embassy Lima, Peru

Austria

Dr. Wolfgang [illegible]	Austrian Trade Delegate	Av. Rio Branco 99 - 16° and. Rio de Janeiro, Brasil

Brasil

Dr. José [illegible]	Geólogo	[illegible] Salvador Bahia, Brasil
Dr. Domingos ALENCAR	Eng. Agrônomo	SUDENE Recife Pernambuco, Brasil
Dr. [illegible] ALMEIDA	Economista	Ed. [illegible] - 9° and. Rua Miguel Calmon Salvador Bahia, Brasil
[illegible] Maria de [illegible] ALVES	Economista Secretaria Indústria e Comércio	Rua Alvares Cabral, 16 Salvador Bahia, Brasil

[redacted]

[redacted]	[redacted]	[redacted]
[redacted]		
Dr. [redacted]	[redacted]	[redacted]
Dra. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]
Dr. [redacted]	[redacted]	[redacted]

[illegible]	[illegible]	[illegible]
Brasil (continuação)		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

[redacted]

NAME	FUNCTION	MAILING ADDRESS
Brasil (continued)		
Mr. Nivaldo A. COSTA	Advogado	PROMOEXPORT Rua Torquato Bahia 4-8/208/211 Salvador Bahia, Brasil
Mr. Hermenegildo M. CRUZ	Engo. Agrônomo Federação de Agricultura	Rua Miguel Calmon 19 -8/403/4 Salvador Bahia, Brasil
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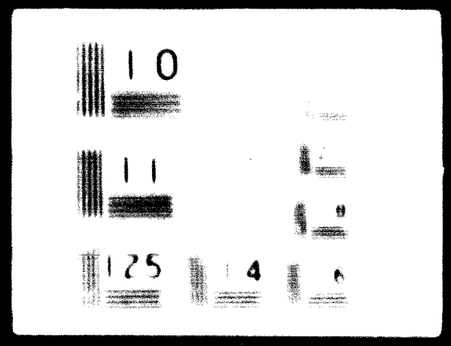

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ANNEX 2

List of Documents [1]

SYMBOL	TITLE
ID/WG.88/1	Provisional agenda and programme of work
ID/WG.88/2	Rapport sur les produits transformés à base d'agrumes (document prepared by Mr. [illegible] Dupaigne, Institut Français de Recherches Fruitières Outre-Mer (IFAC), Paris, France)
ID/WG.88/3	Perspectives d'industrialisation des pays en voie de développement offertes par la production d'extraits aromatiques associée aux cultures fruitières (document prepared by Mr. R. Muet, Institut Français de Recherches Fruitières Outre-Mer (IFAC), Paris, France)
ID/WG.88/4 (RESTRICTED)	Cashew nut growing, processing and marketing, with particular reference to Brazil (document prepared by Mr. G. Cassadio, Professor of International Economic Organisation, University of Bologna, Bologna, Italy)
ID/WG.88/5	Factors in the processing of bananas (document prepared by Mr. C.O. Chichester, Professor, Department of Food and Resource Chemistry, University of Rhode Island, Kingston, R.I., USA)
ID/WG.88/6	L'établissement d'une usine de transformation de raisin dans les pays en développement (document prepared by Mr. V. Zanko, United Nations expert, Zagreb, Yugoslavia)
ID/WG.88/7	Importance des noix de cajou dans les programmes de développement (document prepared by Mr. P. Ratanova and Mr. G. Duvernoul, Institut Français de Recherches Fruitières Outre-Mer (IFAC), Paris, France)
ID/WG.88/8	Industrialisation de la banane (document prepared by Mr. P. Ratanova and Mr. G. Duvernoul, Institut Français de Recherches Fruitières Outre-Mer (IFAC), Paris, France)

[1] A limited number of copies of these documents are available in the language in which they were presented (English or French) and may be requested from the UNIDO Industrial Documentation Centre, P.O.B. 707, 1010 Vienna, Austria. Summaries of the papers in English, French and Spanish may also be requested from the same source.

SYMBOL	TITLE
ID/WG.88/9	Overseas marketing of Australian canned fruits (document prepared by Mr. R.L. Tucker, Assistant Manager, Australian Canned Fruits Board, Melbourne, Australia)
ID/WG.88/10	Industrial and marketing organisation, standards and quality control of citrus fruit (document prepared by Mr. Z. Berk, Professor, Department of Food and Biotechnology, Technion - Israel Institute of Technology, Haifa, Israel)
ID/WG.88/11	L'industrialisation de l'ananas (document prepared by Mr. G. Mangeot and Mr. C. Py, Institut Français de Recherches Fruitières Outre-Mer (IFAC), Paris, France)
ID/WG.88/12	L'avocat - un fruit pour l'industrie agricole (document prepared by Mr. G. Mangeot and Mr. L. Haendler, Institut Français de Recherches Fruitières Outre-Mer, Paris, France)
ID/WG.88/13	Product Development and Test Marketing of Canned Tropical Fruit for Export (document prepared by Mr. John G. Clarke, FAO Marketing Economist, FAO, Rome, Italy)
ID/WG.88/14 (RESTRICTED)	The South African Canning Industry with Particular Reference to that Section Controlled by the South African Canned Fruit Export Board (document prepared by Mr. N.J. Lawson, Manager, South African Canned Fruit Export Board, Cape Town, South Africa)
ID/WG.88/15	Some Aspects of Preservation, Processing and Export of Mango and its Products (document prepared by Mr. H.C. Bhatnagar, Chairman, Discipline of Fruit and Vegetable Technology, Central Food Technological Research Institute, Mysore, India)
ID/WG.88/16	Experimental Work and Overseas Trials of a Cashew Nut Processing Plant Designed and Built by the Tropical Products Institute (document prepared by Mr. L.G. Coward, Principal Scientific Officer, Tropical Products Institute (TPI), Culham, Abingdon, Berkshire, England)
ID/WG.88/17	Markets for Processed Pineapple Products (document prepared by Mr. J. Abraham, Industries Development Corporation, Haifa, Israel)
ID/WG.88/18	Cashew Nut Processing from Village Industry to Industrial Complex (document prepared by Mr. M.J.D. Bown, Chief Executive, Sturtevant Engineering Co. Ltd., London, England)
ID/WG.88/19	Export Market Outlets for Brazilian Canned Fruit and Vegetables (document prepared by Mr. J.G. Clarke, Marketing Expert, FAO, Rome, Italy)
ID/WG.88/20	Report of the Expert Group Meeting on Processing Selected Tropical Fruits and Vegetables for Export to Premium Markets

ANNEX 6

LIST OF WORKING GROUPS AND THEIR LEADERS

Working Group 1	Citrus Fruit Processing
Group Leader	Mr. R. Huet (France)
Working Group 2	Cashew Nut Processing
Group Leader	Mr. L. Haendler (France)
Working Group 3	Pineapple Processing
Group Leader	Mr. L. Haendler (France)
Working Group 4	Banana Processing
Group Leader	Mr. C.O. Chichester (USA)
Working Group 5	Wine and Grape Processing
Group Leader	Mr. V. Zanko (Yugoslavia)
Working Group 6	Mango Processing
Group Leader	Mr. H.C. Bhatnagar (India)
Working Group 7	Passion Fruit Processing
Group Leader	Mr. A.J. de Souza jr. (Brazil)
Working Group 8	Avocado Processing
Group Leader	Mr. L. Haendler (France)
Working Group 9	Marketing
Group Leader	Mr. J.G. Clarke (FAO)
Working Group 10	Investment Promotion
Group Leader	Mr. Q. Tran-Le (UNIDO)

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ANNEX I

Agenda

Monday, 23 October 1972

09.30 to 09.50 Registration of participants

Item 1: 09.50 Opening address by Mr. M. de Mello Kertész, Secretary General of the Secretariat of Planning, Science and Technology, Bahia

Introductory statement by Mr. M. Mautner, Chief, Light Industries Section, Industrial Technology Division, UNIDO, on behalf of Mr. I.H. Abdel-Rahman, Executive Director of UNIDO

Item 2: 10.00 Election of Chairman, Vice-Chairman, Director and Co-Director of the meeting, Rapporteur, Working Group leaders, and Adoption of the Agenda

Coffee Break

Item 3: 10.20 Introductory paper by Mr. M. Mautner, UNIDO, relating to tropical fruit and vegetable products and their export to premium markets

Discussion

Item 4: 11.40 Introductory statement by Mr. Q. Tran-le, UNIDO, on UNIDO's Investment Programme

12.00 to 14.00 Lunch Interval

Item 5: 14.00 "Citrus fruit maturity in the State of Bahia" by Mr. O.S. Passos

ID WG.88/10: "Industrialisation and marketing organisation, standards and quality control of citrus fruit" by Mr. Z. Berk

ID/WG.88/2: "Processed products from citrus fruits" by Mr. F. Dupaigne (presented on the author's behalf by Mr. R. Huet)

ID/WG.88/3: "Prospects for the industrialisation of developing countries offered by the production of aromatic extracts in association with fruit production" by Mr. R. Huet

Discussion

Coffee Break

Item 6: 16.45 ID/WG.88/7: "The importance of cashew nuts in development programmes" by Mr. L. Haendler and Mr. G. Duverneuil

ID/WG.88/4: "Cashew nut growing, processing and marketing with particular reference to Brazil" by Mr. G.P. Casadio

ID/WG.88/16: "Experimental work and overseas trials of a cashew nut processing plant developed and built by the Tropical Products Institute" by Mr. L.G. Coward

ID/WG.88/18: "Cashew nut processing from village industry to industrial complex" by Mr. M.J.D. Bown

Discussion

Evening: Welcoming address by Mr. A.C. Magalhães, Governor of the State of Bahia

Address by Mr. M. Mautner, UNIDO

Official reception hosted by the Bahian authorities

Tuesday, 26 October 1971

Item 7: 08.00 "Pineapple culture in three regions of Bahia" by Mr. A.P. da Cunha

"Industrialization of pineapples" by Mr. A.J. de Souza, Jr.

ID/WG.88/11: "Industrialization of pineapples" by Mr. L. Haendler

ID/WG.88/17: "Markets for processed pineapple products" by Mr. J. Abraham (presented on the author's behalf by Mr. M. Rosner)

Discussion

Coffee Break

Item 8: 10.15 "Banana culture in Brazil and the present situation" by Mr. Z.J. de Martin

"technological bio-cehmical aspects of banana processing" by Mr. V. Sgarbieri

ID/WG.88/5: "Factors in the processing of bananas" by Mr. C.O. Chichester

ID/WG.88/8: "Industrialization of the banana" by Mr. P. Estanove and Mr. G. Duverneuil (read on the authors' behalf by Mr. L. Haendler)

Discussion

12.00 to 14.00 Lunch Interval

Item 9: 14.00 "The current situation in viticulture in Brazil" by Mr. T. Hashizume

"The growing of wine grapes in Brazil" by Mr. M.J. Sampaio

ID/WG.88/6: "Establishment of grape-processing plants in developing countries" by Mr. V. Zanko

Discussion

Coffee Break

Item 10: 16.00 ID/WG.88/13: "Product development and test marketing of canned tropical fruit for export" by Mr. J.G. Clarke

ID/WG.88/19: "Export market outlets for Brazilian canned fruit and vegetables" by Mr. J.G. Clarke

ID/WG.88/9: "Overseas marketing of Australian canned fruit" by Mr. R.L. Tucker

"Canadian technical assistance in food technology" by Mr. W.J. Gall

ID/WG.88/14 (RESTRICTED): "The South African canning industry with particular reference to that section controlled by the South African Canned Fruit Export Board" by Mr. N.J. Lawson (circulated in the author's absence)

Discussion

Wednesday, 27 October 1971

Item 11: 09.00 Statements by representatives of ICAITI and ITAL

ID/WG.88/15: "Some aspects of preservation, processing and export of mango and its products" by Mr. H.C. Bhatnagar

Discussion

Coffee Break

Item 12: 11.00 Statements by representatives of Bahia's Secretariat for Industry and Commerce, the Secretariat for Finance, and SUDENE, relating to investment promotion and incentives

12.00 to 14.00 Lunch Interval

Item 13: 14.00 "Industrialization of tomatoes in Mendoza (Argentina); current situation, problems and research" by Mr. A.F. Bonino (circulated only)

Statements relating to tomato cultivation and processing by representatives of CEPLAC and ITAL

ID/WG.88/12: "The avocado, a fruit for agricultural industry" by Mr. G. Mangeot and Mr. L. Haendler

Discussion

Coffee Break

Item 14: 16.00 Statements by participants and observers

Discussion

Thursday, 28 October 1971

Item 15: 08.00 Visit to the Aratu Industrial Centre, Salvador, Bahia, Brazil

11.30 Visit to CIBEB, Carlsberg Brewery and Bahian fruit factories

13.00 to 15.00 Lunch Interval

Friday, 29 October 1971

Item 16: 09.00 "Investment promotion" by Mr. Q. Tran-le

Discussion

Coffee Break

Item 17: 10.30 Meeting of the Working Groups to consolidate their final recommendations

12.00 to 14.00 Lunch Interval

Item 18: 14.00 General meeting to finalize and adopt conclusions and recommendations resulting from the meeting

Item 19: 16.00 Closing ceremony

Concluding address on behalf of the participants by Mr. R. Huet and Mr. H.C. Bhatnagar

Concluding address on behalf of the observers by Mr. J.R. Diaz Moreno

Farewell address on behalf of the UNDP Resident Representative by Mr. D.A. Sette

Farewell address by Mr. M. de Mello Kertész, Secretariat of Planning, Science and Technology, Salvador, Bahia

Address and vote of thanks by Mr. M. Mautner, Director of the meeting, UNIDO

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