

Report number 2381

Report to DFID on Attendance at FAO Sub-Group Meeting on  
Tropical Fruits (25-28 May, 1998, Thailand)  
Volume Two

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## **List of Official and Unofficial Papers Issued by the FAO Sub Group**

Most papers have the prefix **CCP: SG TF 98**, followed by /xxx.

### **Official Papers**

#### **Report of Informal Working Group**

- /1 — Provisional Agenda**
- /2 — Current Market Situation and Short-term Outlook**
- /3 — Supply and Demand Prospects**
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### **Other Unofficial Papers Issued by FAO**

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- CRS.2 — Supply and Demand Prospects for Tropical fruits in Thailand**
- CRS.3 — Supply and Demand Prospects for Tropical Fruits in Sub-Saharan Africa**
- CRS.4 — Supply and Demand Prospects for Tropical Fruits in Latin America**
- CRS.5 — Tropical Fruit Demand in the EU**
- CRS.6 — Tropical Fruits Network: The Malaysian Proposal**
- CRS.7 — Tropical Fruits Network: The Philippine Proposal**
- CRS.8 — Tropical Fruits Network: The Thai Proposal**
- CRS.9 — Statistics Questionnaire**
- CRS.10 — Tariff and Non-Tariff Barriers of the Tropical Fruit Trade: regulations of the EU, Japan and the US**
- CRS.11 — The Fruit Industry in Malaysia: Present Status and Future Outlook**
- CRS.12 to CRS.14 not issued**
- CRS.15 — Report of the Informal Working Group on the Establishment of a Tropical Fruit Network**
- CRS.16 — Presentation by the Common Fund for Commodities**
- CRS.17 — Perspective and Prospects of Fruit Crops in Pakistan**

**REPORT OF THE INFORMAL WORKING GROUP  
OF THE SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**25 - 28 May 1998, Dusit Resort, Pattaya City, Thailand**

An informal working group comprising representatives of 14 countries namely, Cote d'Ivoire, Cuba, Egypt, Fiji, France, Kenya, Malaysia, Netherlands, Philippines, Spain, Tanzania, Thailand, United Kingdom, and Vietnam, met on May 25, 1998. The Group was chaired by Mr. S. Bosma from the Netherlands. It undertook the task of defining the views of interested members concerning (i) organization and governance; (ii) drafting of the constitution and by-laws; and (iii) location of the headquarters of TFNET, a voluntary grouping of producing and consuming countries, and reporting its decisions to the Plenary.

The Working Group decided that: TFNET should be both inter-institutional (agency) and intergovernmental. The members of TFNET could be concerned national agencies, but they would act in concert through one national lead institution on intercountry decisions.

TFNET is a global network. Regional networks should be set up gradually as each region formed its own country groupings. The present focus should be on the global network. Where a regional network already existed or would soon be established, it might pilot operating linkages with the global TFNET.

There should be two categories of members. Ordinary members with voting rights and associate members. Ordinary members would be tropical fruits research and development agencies in the areas of production, consumption and trade in both producing and consuming countries. Associate members might be international aid agencies, private trading companies and other agencies deemed suitable by the governing body of TFNET.

Membership fees should be determined by the scale of production, consumption and trade, category of membership and other relevant factors. But this could be decided later when the first draft of the constitution and by-laws were ready.

It was agreed that Thailand would prepare the first draft of the constitution and by-laws and send it to member countries, by electronic mail wherever possible, for comment and approval.

Malaysia and Thailand were both acceptable as host countries of TFNET headquarters. They should be given the opportunity to decide among themselves as to which country should be the host. However if no agreement could be reached before the end of the session, a vote would be taken by the Working Group. The Plenary would be informed of the decisions of the Working Group.

January 1998



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Food  
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Agriculture  
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of  
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Organisation  
des  
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et  
l'agriculture

Organización  
de las  
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para la  
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y la  
Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### PROVISIONAL AGENDA

#### I. ORGANIZATIONAL MATTERS

- A. Election of Chairperson and Vice-Chairpersons
- B. Adoption of Provisional Agenda

#### II. ECONOMIC AND TRADE ISSUES

- A. Current market situation and short-term outlook
- B. Medium-term supply and demand prospects
- C. Policy developments

#### III. INTERGOVERNMENTAL ACTION

- A. Tropical Fruit Network (TFNET)
- B. Matters arising from the Sixty-first Session of the CCP
- C. Common Fund for Commodities

#### IV. ACTIVITIES IN OTHER ORGANIZATIONS

#### V. OTHER MATTERS

## AGENDA NOTES

At its Sixty-first Session, held in Rome on 25-28 February 1997, the Committee on Commodity Problems (CCP) called on the Intergovernmental Group (IGG) on Bananas to establish a Sub-Group on Tropical Fruits. The Sub-Group was duly established at the Fifteenth Session of the IGG on Bananas in Rome from 7 to 9 May 1997.

The First Session of the Sub-Group on Tropical Fruits is to be held in Pattaya, Thailand from 25 to 28 May 1998, commencing at 0900 hours at the Dusit Resort.

### I. ORGANIZATIONAL MATTERS

#### A. ELECTION OF CHAIRPERSON AND VICE-CHAIRPERSONS

The Sub-Group will elect a Chairperson and two Vice-Chairpersons for its First Session, in accordance with the Rules of Procedure of the IGG on Bananas.

#### B. ADOPTION OF PROVISIONAL AGENDA

The Provisional Agenda, **CCP: SGTF 98/1**, has been prepared in accordance with the guidance given by the International Consultation on Tropical Fruits which met in Kuala Lumpur, Malaysia in July 1996, and by the CCP at its Sixty-first Session in Rome in February 1997.

### II. ECONOMIC AND TRADE ISSUES

#### A. CURRENT MARKET SITUATION AND SHORT-TERM OUTLOOK

The Sub-Group is invited to review developments in the tropical fruits market in 1996/97 and assess the situation in 1997/98 with the assistance of document **CCP: SGTF 98/2**. Delegates are requested to review the document and to provide information on recent developments concerning tropical fruits in their countries.

Problems of obtaining statistics and market information, including an analysis of the response to the Sub-Group's questionnaire, as a basis for analysis will also be discussed in the background document. In order to develop a comprehensive database to facilitate the monitoring of market developments and the dissemination of such information, delegates are invited to comment on how the quality, disaggregation, coverage and timeliness of data could be improved.

#### B. MEDIUM-TERM SUPPLY AND DEMAND PROSPECTS

At the International Consultation on Tropical Fruits, it was generally accepted that there was a potential for growth in the consumption and trade of tropical fruits, as less than 10 percent of production is traded internationally. Regular assessments of supply and demand prospects were therefore considered necessary to assist both governments and the private sector in formulating production development policies and programmes and, if necessary, in adjusting targets.

Documentation for this agenda item is in two parts. The first, in document **CCP: SGTF 98/3**, presents an overview of the supply situation in Africa, Asia and Latin America, and demand for fresh and processed tropical fruits in major import markets.

The second part, covered under document **CCP: SGTF 98/4** provides a quantitative analysis of the medium-term outlook, on the basis of projections to 2005.

In addition, presentations will be made by the host government on production and market issues for tropical fruits in Asia and by the representative from the International Trade Centre UNCTAD/WTO on market developments of processed tropical fruits.

Delegates are invited to review these documents and suggest ways to foster a better knowledge of market opportunities for tropical fruits and enhance trade.

### **C. POLICY DEVELOPMENTS**

With the expansion in trade of tropical fruits, there is increased interest in monitoring policy developments affecting the sector. Three documents have been prepared to assist the Sub-Group in its consideration of this agenda item. The first, **CCP: SGTF 98/5** provides an overview of recent policy developments since the International Consultation on Tropical Fruits in July 1996; the second **CCP: SGTF 98/6** assesses the impact of phytosanitary measures on trade in tropical fruits, and the third, **CCP: SGTF 98/7** discusses sanitary measures and their impact on trade of tropical fruits.

Delegates are encouraged to share their experience in adopting measures agreed under the Uruguay Round, particularly the regulatory framework required to conform with the Agreement on SPS.

## **III. INTERGOVERNMENTAL ACTION**

### **A. TROPICAL FRUIT NETWORK (TFNET)**

To promote increased co-operation between producing and consuming countries, the International Consultation on Tropical Fruits proposed that a network be established under the auspices of FAO, possibly called the Tropical Fruit Network (TFNET) for the purpose of promoting, co-ordinating and implementing development activities. After consultation with member countries, including requests to provide proposals for the establishment of TFNET, document **CCP: SGTF 98/8** was prepared. Delegates are requested to provide guidance and recommendations on the structure and operation of the Network, including its funding and sustainability.

### **B. MATTERS ARISING FROM THE SIXTY-FIRST SESSION OF THE CCP**

The Sub-Group will be informed of the conclusions of the CCP and the IGG on Bananas regarding the future organization of work on tropical fruits.

### **C. COMMON FUND FOR COMMODITIES**

The Common Fund for Commodities has indicated that it would welcome an application from the Sub-Group for designation as an International Commodity Body (ICB). Furthermore, pending designation, the Fund would be prepared to examine any project proposals that the Sub-Group may wish to sponsor directly for financing by the Fund, taking into account that the Sub-Group works under the umbrella of the IGG on Bananas.

Therefore the Sub-Group may wish to apply for separate ICB status with the Fund and may also wish to review any project profiles submitted for its consideration well in advance of its session. Such proposals should reach the Secretariat by 31 March 1998.

## **IV. ACTIVITIES IN OTHER ORGANIZATIONS**

Other international organizations working in the field of tropical fruits, such as the World Bank, International Trade Centre UNCTAD/WTO, Asian Development Bank, and the Association of Marketing Agencies in Asia and the Pacific, may wish to inform the Sub-Group about their activities and programmes.

## **V. OTHER MATTERS**

March 1988



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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### CURRENT MARKET SITUATION AND SHORT-TERM OUTLOOK

#### INTRODUCTION

1. This document is divided in two parts. **Part I** examines the current situation and short-term market outlook for production and trade of tropical fruits, while **Part II** deals with statistical issues, particularly the continuing challenges associated with the gathering and dissemination of market intelligence on tropical fruits.
2. The statistical information analyzed in this document was derived from responses to a questionnaire sent to tropical fruit producing and consuming countries, supplemented by data from the FAO database, FAOSTAT. Statistics are available for individual fruit that have high trade volumes such as pineapples, mangoes, avocados and papayas, while for fruit with smaller trade volumes such as lychees, carambola, mangosteen, durian, longans etc., data are generally grouped under the category **other tropical fruits**. For each of the four major tropical fruits, pineapples, mangoes, avocados and papayas, supply and demand balance sheets are appended. A statistical compendium has also been compiled, and this is tabled as SG TF 98/CRS.11.
3. Delegates are requested to review the data and analysis of the current market situation and outlook, and contribute information on developments in 1997 and prospects for 1998. In addition, they are invited to evaluate the responses to the questionnaire and recommend improvements to enhance the exchange of information.

## I. CURRENT SITUATION AND SHORT-TERM MARKET OUTLOOK

### A. PRODUCTION

4. World production of tropical fruit in 1997 is estimated to have reached 55.8 million tonnes, most of which was absorbed domestically in the producing countries, either in fresh or

processed form. Although global trade in fresh tropical fruits is estimated to be less than 5 percent of production, fruit are available all-year round in importing countries because of the different growing and harvesting cycles in Africa, Asia and Latin America. In general, each market tends to import from its closest regional supplier in view of lower transportation costs and shorter duration from harvesting to retail distribution. Hence, North American markets are typically supplied by Latin America and the Caribbean, European markets by Africa and, to a lesser extent, by Latin America and the Caribbean (mostly to take advantage of space at competitive freight rates for banana shipments to Europe) and India, while trade in the Far East is mainly intra-regional. Of the 55.8 million tonnes of tropical fruit produced in 1997, 40 percent were mangoes, 23 percent pineapples, 9 percent papayas, 4 percent avocados, and other tropical fruits (mangosteen, lychee, rambutan, durian, etc.) made up the balance of 24 percent.

5. World production of **pineapples** increased by nearly 3 percent in 1997 to 12.7 million tonnes. Thailand was the largest producing country accounting for 16 percent of global output, followed by the Philippines (12 percent) and Brazil (10 percent). World production of **mangoes** in 1997 increased slightly to 22 million tonnes. India remained the world's largest producing country, accounting for almost 50 percent of global output, followed by China (9 percent) and Mexico (6 percent). World production of **avocados** increased by 9 percent to 2.1 million tonnes in 1997. Mexico was the largest producer (39 percent of the global output), followed by Indonesia (10 percent) and the United States (8 percent). In 1998, a further increase in output is forecast for Mexico. Good harvests are also expected in Israel and Spain, where output should reach 80 000 tonnes and 50 000 tonnes, respectively. World production of **papayas** in 1997 was estimated at a similar level to 1996, around 5.0 million tonnes. Brazil was the largest producer (49 percent of the global output), followed by Indonesia (12 percent) and Nigeria (10 percent). The global production of **other tropical fruits** increased by almost two percent in 1997 to 13.8 million tonnes. The Philippines was the largest producing country (27 percent of the global output), followed closely by India (24 percent) and Indonesia (14 percent).

## B. CONSUMPTION

6. The consumption of tropical fruits has generally increased over the last decade, as can be seen from the appended supply and demand balance sheets for individual fruits. However, the level in producing countries is difficult to ascertain as wastage and the share of production left unharvested varies from country to country and also according to the variety of fruit. For instance, a large portion of global output of mangoes is not harvested, mainly due to problems with marketing (including inadequate transport infrastructure from growing areas to market), and the highly perishable nature of the fruit.

7. Total consumption of **pineapples** has been increasing at an average annual rate of about 3 percent. However, data for the last two years reflect a slowing down in consumption of pineapple products mainly due to weather related reductions in availability from Thailand. For **mangoes**, consumer acceptance of mango-flavoured beverages has underpinned strong growth in the consumption of processed mangoes in import markets, particularly in Europe, while growth rates of fresh mango consumption remained high. The quantities of **avocados** and **papayas** utilized for processing are small, and therefore consumption is mainly as fresh fruit. For avocados, consumption has increased by about 5 percent annually over the past two years, while for papayas consumption declined by 2 percent between 1995 and 1996, due to a reduction in production.

## C. TRADE

8. World trade in fresh tropical fruit in 1996, the latest year for which complete trade data are available, reached 1.8 million tonnes, an increase of 14 percent over 1995, while the volume of exports of processed products increased by only one percent to 1.4 million tonnes (product

weight). The slowdown of trade in processed fruit reflected the large reduction in export availabilities of pineapple products from Thailand, the leading exporter, caused by two consecutive droughts. The export market for tropical fruit, particularly in developed countries, is a speciality market and is typically demand driven. In value terms, exports of tropical fruit (fresh and processed) in 1996 were nearly 18 percent higher than they were in 1995, rising from US\$1.87 billion to US\$2.20 billion, largely due to the rise in prices of pineapple products.

9. **Pineapple** is one of the most widely traded tropical fruits, mostly in processed form. In 1996, 1.3 million tonnes of processed products (product weight of canned and juice) were exported (75 percent of the international trade in pineapples by value). Global trade in fresh pineapples although accounting for only 25 percent of pineapple exports (fresh and processed), represented 31 percent of the total world trade in fresh tropical fruits by value. The total value of pineapple exports in 1996 (fresh and processed) reached US \$1.36 billion, 17 percent more than the 1995 total.

10. Although household consumption of fresh pineapple has not grown in producing countries, due to tight supplies and growing demand by the processing sector, import demand for fresh pineapples has been expanding due to a combination of improved distribution networks through supermarkets and increasing consumer awareness. Costa Rica was the largest exporting country of fresh pineapples, closely followed by Côte d'Ivoire and the Philippines. Increased price competitiveness in export markets by producers in Asia due to the currency devaluations, has been negated by a combination of increased input prices and adverse weather.

11. **Mangoes** were the second most important tropical fruit traded internationally, both in terms of quantity and value. Export returns from mangoes (fresh and processed) were almost US\$400 million in 1996. The volume of fresh mango exports exceeded 400 000 tonnes, or 24 percent of the tonnage of all fresh tropical fruits traded internationally. Over the past five years, exports of fresh mangoes grew at an average annual rate of 8 percent. However, between 1994 and 1996, growth was much higher with exports increasing by more than 30 percent, mainly due to growing consumer awareness in Europe and North America. Import demand for processed **mango pulp** (puree) and **juice** has also expanded as a mango flavour in fruit drinks, either in single flavoured or in multi-flavoured beverages, has become very popular. However, the bulk of the consumption of processed mango occurs in the producing countries themselves. In 1996, 807 000 tonnes of mango pulp and 136 980 tonnes of juice (product weight) were produced, while exports of pulp and juice amounted to only 45 971 tonnes and 6 752 tonnes, respectively.

12. In 1996, Mexico was the largest exporting country of fresh mangoes, accounting for nearly 40 percent of global exports. Most of its shipments were destined to North America. The Philippines and India were also significant exporting countries, together accounting for 17 percent of the world market. The main destination for the Philippines was China, Hongkong Special Administrative Region, an important re-export centre in the Far East, while exports from India were mainly for the United Kingdom and the Near East.

13. Exports of fresh **avocados** and **papayas** have both been increasing at the average rate of 10 percent annually over the past five years. In 1996, some 12 percent of **avocados** production was shipped, fetching US\$248.6 million in export receipts for the countries concerned. The largest import market was the EC, with France alone accounting for 40 percent of total imports into this market. The United States was a smaller import market as consumption is supplied mainly from domestic production. The global market for fresh **papayas** in 1996 absorbed 120 000 tonnes valued at US\$77.5 million, representing a rise of 16 percent over 1995 levels in terms of both quantity and value. A short shelf-life and current phytosanitary restrictions in several major markets constrain growth in exports. In 1996, Mexico increased its fresh fruit exports by more than 60 percent to 49 400 tonnes overtaking Malaysia as the largest exporting

country, with the United States being the largest import market. The recent lifting of phytosanitary restrictions on papayas from Brazil (the largest papaya producing country in the world) by the United States may lead to greater imports from that origin.

14. Trade in **other fresh tropical fruits** has been increasing by almost 7 percent annually in recent years, and amounted to about 150 000 tonnes in 1996. Many of these tropical fruits are not well known outside the Far East, where the bulk is consumed locally. In North America and Europe, demand was initially driven by ethnic preferences, but these fruits have been slowly gaining market recognition and demand is increasing. A market success story in this category is lychee. With production concentrated in the Far East, lychees can now be found in supermarkets all over the world in fresh, canned and juiced forms. In 1996, Malaysia was the largest exporting country of this group of other fresh tropical fruits, increasing exports by almost 70 percent to 69 000 tonnes, with the majority of trade being in the Far East region.

#### D. OUTLOOK

15. Following the currency devaluations in Asia, imports of temperate fruits into this region, which have been growing rapidly, are expected to decline in view of their relatively high elasticities of price and income. By contrast, trade of tropical fruits within Asia should continue to expand. The region is also expected to boost its exports of most tropical fruits, mainly to European and North American markets, which could negatively affect exports from other regions. The decline in freight rates for goods shipped from Asia, estimated at about 20 percent by the beginning of 1998 compared to a year earlier, should also contribute to the region's competitiveness. Globally, the consumption of tropical fruits is expected to increase, but as competition among exporters intensifies, prices could come under pressure. A notable exception to this tendency would be pineapples as adverse weather and higher input costs are expected to reduce the crop in Thailand, the world's largest producer of the fruit. Increases elsewhere (Côte d'Ivoire, Brazil and Costa Rica) should only partially offset this decline. For mangoes, buoyant demand in major markets should help maintain favourable prices.

16. Avocado prices are expected to weaken due to bumper crops in major exporting countries (Mexico, Israel and South Africa) and similarly for papayas, larger shipments, particularly from Brazil, could depress prices.

## II. STATISTICAL ISSUES

17. The International Consultation on Tropical Fruits which was held in Kuala Lumpur, Malaysia in July 1996, emphasized the difficulties which existed in obtaining production and trade statistics for these fruits and agreed that there was a need for the systematic collection and dissemination of information to facilitate the monitoring of market developments and to enhance market transparency. The major recommendations were that:

- basic information requirements include: areas (planted and harvested), yields, production and grower prices; f.o.b. prices, quantities and values of exports and imports by origin and destination; import, wholesale and retail prices; and tariffs;
- FAO should build upon its existing information system to develop a cost-effective means for compiling statistics on tropical fruits;
- an annual questionnaire should be issued to collect relevant information, the general format of which was agreed by the Consultation.

18. In August 1997 the questionnaire<sup>1</sup>, was sent to 86 producing, exporting, and consuming countries. Of these, 35 countries accounting for an estimated 47 percent of world production,

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<sup>1</sup> A sample copy of the questionnaire is included as SG TF 98/CRS.12 for easy reference.

77 percent of world exports, and 72 percent of global imports of all tropical fruits responded. An analysis of the response is appended as Table 5.

19. The response rate was very encouraging, particularly as it covered the majority of tropical fruit trading countries. However, in analysing the responses it became evident that the questionnaire required refinement. Countries that completed the section on production accounted for only 19 percent of world production. The other responding countries, accounting for 28 percent of production did not complete this section. Responses to the trade sections were more complete, but on pricing only 2 percent of the respondents gave any data and none responded in full.

20. With regard to specific components of the questionnaire, on **production**, some major producing countries did not respond, and therefore it is important that their response be included in future. In addition, because a large proportion of production is not commercially cultivated, perhaps an updating from recent agricultural censuses would be helpful to obtain an overview of total availabilities of fruit. As for **prices**, such information at the grower, wholesale and retail levels provides a valuable basis for assessing the market situation. Producer, export and import prices can only be obtained from Sub-Group members. Wholesale prices have been assembled from market reports, such as the New York wholesale market reports or the International Trade Centre's Market News Service's market reports. This information has been included in document CCP: SGTF 98/3 concerning market prospects in selected countries. However, considerable data validity was required before these price data were in a usable form, while sources for retail prices are almost non-existent.

21. Another major statistical problem for tropical fruit is the general absence of data for the group of other tropical fruits (excluding pineapples, mangoes, avocados and papayas) in a usable, disaggregated form. For example, for production and trade, mangosteen is listed with mangoes in some countries, carambola, durian, guava, longan, passion fruit and rambutan are listed as: *fruit, tropical (fresh) nes*; while lychees are listed under: *fruit, fresh nes*. It was hoped that the Harmonized Commodity Description and Coding System (HS) would have assisted in the compilation of disaggregated data and the avoidance of problems in recognizing the same product from one country to another, particularly if different names are used for a given fruit. Unfortunately, very few countries responded in greater detail than the standard 6 digit code.

22. In the light of the above observations, the Sub-Group is invited to suggest improvements in the format of the questionnaire and on how to increase member countries' responses, particularly in order to develop representative and timely price series.

**Table 1 - Pineapple**  
Supply and Demand for Selected Countries (fresh fruit equivalents)

	1995								1996								1997 Production
	Production	Imports 1_	Imports of processed 2_	Exports 1_	Exports of processed 2_	Utilization for processing	Fresh consumption 3_	Total consumption	Production	Imports 1_	Imports of processed 2_	Exports 1_	Exports of processed 2_	Utilization for processing	Fresh consumption 3_	Total consumption	
	... '000 tonnes ...								... '000 tonnes ...								
<b>World total</b>	<b>12122.0</b>	<b>693.1</b>	<b>1702.8</b>	<b>766.0</b>	<b>1875.2</b>	<b>3912.0</b>	<b>8210.0</b>	<b>12122.0</b>	<b>12435.0</b>	<b>761.0</b>	<b>1766.4</b>	<b>839.4</b>	<b>1904.1</b>	<b>3943.0</b>	<b>8492.0</b>	<b>12435.0</b>	<b>12738.0</b>
Cote d'Ivoire	217.0	0.0	0.0	138.0	0.2	1.0	80.0	80.8	238.0	0.0	0.0	170.0	0.2	1.0	65.0	65.8	235.0
Ghana	20.0	0.0	0.0	18.0	0.0	0.0	4.0	4.0	31.0	0.0	0.0	27.0	0.0	0.0	4.0	4.0	20.0
Kenya	270.0	0.0	0.0	0.5	176.5	162.5	107.0	93.0	270.0	0.0	0.0	0.4	182.6	162.0	107.0	87.0	270.0
Nigeria	800.0	0.0	0.0	0.0	0.0	0.0	800.0	800.0	800.0	0.0	0.0	0.0	0.0	0.0	800.0	800.0	800.0
South Africa	147.0	0.0	0.5	3.2	60.1	68.0	75.8	84.2	135.7	0.0	0.0	3.8	48.1	68.0	63.9	83.8	136.0
Brazil	951.0	0.0	5.1	10.0	0.6	6.7	934.3	945.5	1082.0	0.0	3.2	12.0	1.2	6.7	1063.3	1072.0	1255.0
Colombia	387.0	0.0	0.2	0.3	0.1	0.0	387.0	388.8	387.0	0.0	0.3	0.1	0.0	0.0	386.9	387.2	387.0
Costa Rica	250.0	0.0	0.0	178.0	0.0	0.0	72.0	72.0	260.0	0.0	0.0	178.0	0.0	0.0	82.0	260.0	260.0
Ecuador	54.5	0.0	0.0	4.9	0.4	0.5	49.2	49.3	57.9	0.0	0.0	9.4	0.4	0.5	48.0	48.1	57.9
Honduras	90.0	0.0	0.0	44.2	0.0	0.0	45.8	45.8	68.5	0.0	0.0	30.6	0.0	0.0	37.9	37.9	68.5
Mexico	281.0	5.0	12.9	2.0	3.0	15.0	269.0	293.9	301.0	1.0	1.6	3.0	6.4	15.0	284.0	294.2	301.0
USA	313.0	125.0	598.2	7.0	7.7	200.0	231.0	1019.5	315.0	131.0	612.5	8.0	6.7	210.0	228.0	1043.8	315.0
Venezuela	163.2	0.0	0.0	0.3	0.0	9.3	163.7	163.0	178.7	0.0	0.0	0.4	0.0	9.3	167.1	176.4	163.1
India	830.0	0.0	0.0	0.0	0.1	91.3	738.7	829.9	830.0	0.0	0.0	0.0	0.1	91.3	738.7	829.9	830.0
Indonesia	703.3	0.0	0.0	0.0	119.2	268.0	437.3	584.1	537.9	0.0	0.0	0.0	167.9	268.6	271.3	370.0	537.9
Japan	28.0	108.0	150.8	0.0	0.0	0.0	134.0	284.6	28.0	97.0	116.6	0.0	0.0	0.0	123.0	241.6	28.0
Malaysia	180.0	0.0	0.6	19.8	130.6	140.0	30.1	40.1	200.0	0.0	0.0	17.8	72.5	110.0	72.2	107.7	200.0
Philippines	1489.0	0.0	0.0	184.0	383.3	1158.0	147.0	921.7	1477.0	0.0	0.0	146.0	407.0	1185.0	146.0	924.0	1477.0
Singapore	0.0	20.8	70.2	1.6	72.4	15.9	3.0	16.7	0.0	19.4	39.1	1.2	40.6	15.9	2.3	16.7	0.0
Thailand	2088.0	0.0	0.0	1.0	768.0	1421.0	668.0	1319.0	2031.0	0.0	0.0	1.0	693.9	1421.0	809.0	1330.1	2031.0
EC(15) 4_	2.0	242.0	571.9	9.0	10.8	0.0	235.0	798.1	2.0	275.0	649.2	10.0	9.5	0.0	267.0	906.7	2.0
Australia	127.9	0.4	17.0	0.5	7.3	86.0	41.8	137.5	152.0	0.4	18.0	0.5	5.8	86.0	65.9	164.1	152.0

1\_ / Imbalance between imports and exports is accounted for by waste and unrecorded trade

2\_ / Excluding juice

3\_ / Including juice

4\_ / Excluding Intra-EC trade

**Table 2 - Mango**  
Supply and Demand for Selected Countries (fresh fruit equivalents)

	1995								1996								1997 Production
	Production	Imports 1_	Imports of processed 3_	Exports 1_	Exports of processed	Utilization for processing	Fresh consumption	Total consumption	Production	Imports 1_	Imports of processed 3_	Exports 1_	Exports of processed	Utilization for processing	Fresh consumption	Total consumption	
	... '000 tonnes ...								... '000 tonnes ...								
<b>World total</b>	<b>21584.0</b>	<b>350.6</b>	<b>80.0</b>	<b>352.0</b>	<b>86.2</b>	<b>1409.3</b>	<b>20174.7</b>	<b>21584.0</b>	<b>21888.4</b>	<b>373.6</b>	<b>86.0</b>	<b>407.4</b>	<b>87.9</b>	<b>1433.0</b>	<b>20456.4</b>	<b>21888.4</b>	<b>21964.4</b>
South Africa	30.1	0.5	0.0	8.2	0.0	0.0	21.4	21.4	25.3	0.3	0.0	7.8	0.7	0.0	17.7	17.0	32.0
Brazil	456.0	0.9	0.0	12.8	0.0	0.0	444.1	444.1	480.0	0.0	0.0	24.2	0.0	0.0	455.8	455.8	610.0
Mexico	1342.1	0.0	0.0	131.7	0.5	0.0	1210.4	1209.9	1188.9	0.0	0.0	143.9	0.5	0.0	1045.0	1044.5	1190.7
USA	3.6	141.7	25.0	0.0	0.0	0.0	145.3	170.3	3.6	171.4	23.3	0.0	0.0	0.0	175.0	198.3	3.6
China	1957.8	0.0	0.0	1.4	0.0	198.5	1759.6	1958.1	2007.8	0.0	0.0	2.3	0.0	198.5	1808.7	2005.2	2107.6
China, H. Kong	0.0	37.7	1.0	10.5	0.0	0.0	27.2	28.2	0.0	35.4	1.5	10.0	0.0	0.0	25.5	27.0	0.0
India	10800.0	0.0	0.0	23.3	64.0	1032.4	9744.3	10712.7	10800.0	0.0	0.0	23.3	65.0	1032.4	9744.3	10711.7	10800.0
Indonesia	889.0	0.0	0.0	1.7	0.0	0.0	887.3	887.3	1128.2	0.0	0.0	0.6	0.0	0.0	1127.6	1127.6	1000.0
Pakistan	883.7	0.0	0.0	18.8	0.0	5.2	861.8	867.0	907.8	0.0	0.0	18.4	0.0	5.3	884.1	889.4	884.0
Philippines	595.1	0.0	0.0	43.9	3.2	53.3	497.9	548.0	625.8	0.0	0.0	40.3	3.4	59.7	525.6	581.0	480.0
Saudi Arabia	0.0	12.0	13.8	0.0	2.8	0.0	12.0	22.8	0.0	11.9	13.8	0.0	2.8	0.0	11.0	22.9	0.0
Thailand	1200.0	0.0	0.0	3.7	9.9	95.8	1100.7	1188.5	1400.0	0.0	0.0	8.3	11.6	111.5	1280.3	1380.2	1400.0
UAE	8.8	30.7	10.0	0.0	0.0	0.0	39.5	49.5	9.1	30.0*	10.0	0.0	0.0	0.0	39.1	49.1	9.5
EC(15) 2_	0.0	63.7	28.7	1.1	0.0	0.0	62.6	89.2	0.0	66.0	28.3	1.2	0.0	0.0	64.8	93.1	0.0

1\_ / Imbalance between imports and exports is accounted for by waste and unrecorded trade

2\_ / Excluding Intra-EC trade

\_ / Estimate

Provision.

Table 3 - Avocado, fresh or dried  
Supply and Demand for Selected Countries

	1994				1995				1996				1997 Production
	Production	Import 1_/	Export 1_/	Total consumption	Production	Import 1_/	Export 1_/	Total consumption	Production	Import 1_/	Export 1_/	Total consumption	
	... '000 tonnes ...				... '000 tonnes ...				... '000 tonnes ...				
World total	2100.5	189.9	197.1	2093.3	1819.6	213.3	247.0	1785.9	1924.8	254.8	288.6	1891.0	2096.9
Congo Dem Rep	47.5	0.0	0.0	47.5	48.5	0.0	0.0	48.5	48.5	0.0	0.0	48.5	48.5
South Africa	48.4	0.0	28.2	22.2	45.4	0.3	28.4	17.3	53.4	0.2	27.4	26.2	40.0
Brazil	102.6	0.0	0.5	102.1	93.7	0.4	0.2	93.9	110.0	0.0	0.4	109.7	110.0
Canada	0.0	7.9	0.0	7.9	0.0	9.7	0.0	9.7	0.0	10.7	0.0	10.7	0.0
Chile	58.0	0.0	18.7	39.3	50.0	0.0	11.9	38.1	60.0	0.0	16.7	43.3	60.0
Colombia	74.0	4.2	0.0	78.2	74.0	8.3	0.0	80.3	74.0	8.0	0.0	82.0	74.0
Dominican Rep.	165.0	0.0	6.7	158.3	155.0	0.0	8.2	146.8	155.0	0.0	7.0	148.0	155.0
Guatemala	23.4	0.0	3.2	20.2	24.2	0.0	4.9	19.3	24.3	0.0	5.0	19.3	24.3
Mexico	799.9	0.0	26.0	773.9	790.0	0.0	43.9	746.1	837.8	0.0	68.0	769.8	825.0
Peru	53.1	0.0	0.0	53.1	53.1	0.0	0.0	53.1	64.4	0.0	0.0	64.4	72.9
Usa	130.2	23.9	9.6	144.5	158.9	18.6	13.1	164.4	172.6	25.4	9.3	188.7	171.1
Venezuela	40.2	0.0	1.7	38.5	41.4	0.0	2.2	39.2	36.3	0.0	2.6	33.7	36.3
Indonesia	102.0	0.0	0.0	102.0	162.7	0.0	0.0	162.7	229.7	0.0	0.0	229.7	230.0
Israel	49.4	0.0	28.6	20.8	57.8	0.0	38.8	19.0	76.9	0.0	51.7	25.2	85.0
EC(15) 2_/	49.9	84.6	1.9	132.6	54.7	105.7	1.7	158.7	48.7	110.2	2.4	156.5	44.7

1\_/ Imbalance between imports and exports is accounted for by waste and unrecorded trade  
2\_/ Excluding Intra-EC trade

Table 4 - Papaya, fresh  
Supply and Demand for Selected Countries

	1994				1995				1996				1997 Production
	Production	Import 1_/	Export 1_/	Total consumption	Production	Import 1_/	Export 1_/	Total consumption	Production	Import 1_/	Export 1_/	Total consumption	
	... '000 tonnes ...				... '000 tonnes ...				... '000 tonnes ...				
World total	4743.0	78.5	86.4	4735.1	5087.1	92.6	102.7	5077.0	4994.6	113.8	119.9	4988.4	4994.8
Nigeria	500.0	0.0	0.0	500.0	500.0	0.0	0.0	500.0	500.0	0.0	0.0	500.0	500.0
South Africa	20.3	0.0	0.0	20.3	21.1	0.0	0.2	20.9	26.6	0.0	0.3	26.4	20.0
Brazil	2362.3	0.0	5.9	2356.4	2448.8	0.0	5.3	2443.5	2448.8	0.0	5.7	2443.1	2450.0
Costa Rica	22.0	0.0	1.4	20.6	22.5	0.0	0.5	22.0	22.5	0.0	1.9	20.6	22.5
Jamaica	21.5	0.0	4.0	17.5	15.5	0.0	4.8	10.7	13.0	0.0	4.3	8.7	13.0
Mexico	489.0	0.0	16.4	472.6	483.0	0.0	29.6	453.4	496.8	0.0	49.4	447.5	391.0
USA	28.1	18.7	8.3	38.5	23.0	33.3	7.8	48.5	20.4	57.2	8.0	69.6	20.4
Hong Kong	0.0	13.7	0.0	13.7	0.0	14.1	0.1	14.0	0.0	11.8	0.3	11.5	0.0
India	470.0	0.0	0.3	469.7	490.0	0.0	0.3	489.7	490.0	0.0	0.3	489.7	490.0
Indonesia	371.4	0.0	0.0	371.4	586.1	0.0	0.0	586.1	603.4	0.0	0.0	603.4	597.1
Japan	0.0	5.2	0.0	5.2	0.0	6.4	0.0	6.4	0.0	8.0	0.0	8.0	0.0
Malaysia	52.0	0.0	35.2	16.8	52.0	0.0	36.3	15.7	52.0	0.3	32.8	19.7	54.0
Singapore	0.0	22.3	0.2	22.1	0.0	21.3	0.2	21.1	0.0	18.8	0.0	18.8	0.0
Thailand	120.0	0.0	0.3	119.7	120.0	0.0	0.0	120.0	120.0	0.0	0.0	120.0	120.0
EC(15) 2_/	0.0	8.8	0.2	8.6	0.0	8.3	0.1	8.2	0.0	10.5	0.1	10.4	0.0

1\_/ Imbalance between imports and exports is accounted for by waste and unrecorded trade  
2\_/ Excluding Intra-EC trade

Table 5

<u>Questionnaire on Tropical Fruit</u>							
Number of countries contacted							86
Number of replying countries							39
Share of replying countries							45%
<u>Share of World Production, Imports and Exports covered by replying countries, by product</u>							
	Mangoes	Avocado	Pineapple	Papaya	Other Trop Fruit, nes	Average	
							... percent ...
<b>Production</b>	26	82	61	67	55	<b>47</b>	
<b>Imports</b>	75	87	76	62	25	<b>77</b>	
<b>Exports</b>	75	97	70	92	76	<b>72</b>	

March 1998



منظمة الأغذية  
والزراعة  
للأمم المتحدة

联合国  
粮食及  
农业组织

Food  
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Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### SUPPLY AND DEMAND PROSPECTS

## I. INTRODUCTION

1. This document presents an overview of factors affecting supply of fresh tropical fruits in major producing regions, and factors affecting demand in the major import markets. A review of demand developments for processed tropical fruits is provided in document **CCP: SG TF 98/CRS.1** prepared by the International Trade Centre (UNCTAD/WTO).

2. Socio-economic factors influencing demand decisions have important implications in the formulation of production and marketing policies and strategies, and this paper attempts to discuss some of these. This document should be read in conjunction with documents **CCP: SGTF 98/2** which reviews the current market situation and short-term outlook, and **CCP: SGTF 98/4** which provides a quantitative assessment of medium-term demand prospects for tropical fruits. Other considerations are also important when discussing issues affecting international trade, such as the sanitary and phytosanitary framework under which trade takes place. Documents **CCP: SGTF 98/6** and **CCP: SGTF 98/7** deal with these issues.

## II. OVERVIEW OF FACTORS AFFECTING SUPPLY

3. There are three major regions that produce and export *fresh tropical fruits* (Charts 2 and 3); Africa, Asia, and Latin America and the Caribbean. Smaller quantities are produced in Oceania, North America, and Europe. Asia is by far the largest producing region with 4 million ha harvested in 1996 (Chart 1). It accounted for 69 percent of global tropical fruit output, but its share of the world's fresh tropical fruit exports was much lower at about 26 percent. The bulk of output in Asia is consumed domestically, and policies in the main exporting countries favour value-added industries. Asia accounts for over 85 percent of world exports of processed tropical fruit (85 percent of processed pineapples and 98 percent of processed mangoes). Although the Latin America and Caribbean region accounted for only 20 percent of global production, a

harvested area of 821 000 ha in 1996, its share of the world's fresh tropical fruit exports was 38 percent. Africa with 9 percent of the world's output from a harvested area of 636 000 ha in 1996, accounted for 15 percent of fresh fruit exports. Moreover, most of the balance of processed tropical fruits exported globally is accounted for by Africa. Exports of processed tropical fruits from Latin America and the Caribbean to world markets are not significant.

#### A. ASIA

4. In **Asia**, production and trade of tropical fruits are well established. They play an important role in national nutrition, particularly in Southeast Asia, and have contributed to achieving self-sufficiency objectives of governments (as well as providing substitutes for temperate fruit imports). Tropical fruits have been considered ideal diversification crops, particularly for smallholders. The region leads in varietal selection and breeding activities, particularly for the "lower volume" traded tropical fruits such as lychees, longans, rambutan, durian etc., and in recent years processing technology has advanced significantly, contributing to the region's dominance in the production and trade of processed tropical fruits. Finally, with the recent currency devaluation in certain Southeast Asian countries and reductions in freight rates to Europe, tropical fruit exports (both fresh and processed) from this region are expected to increase.

#### B. LATIN AMERICA AND THE CARIBBEAN

5. Tropical fruit production and trade in **Latin America and the Caribbean** is relatively well developed. Also in this region, tropical fruits are increasingly being used for diversification. The major difference with Asia is that the region specializes in the export of *fresh tropical fruits*. Processing is a very young industry which could develop with the expansion in production of fruit for export. The development of the tropical fruit industry in the region is likely to benefit from the existence of the highly developed banana industry, as many of the companies involved are the same. In their quest for premium quality products at competitive prices, production and marketing activities carried out by these companies are vertically integrated, with maximum control maintained from *farm to shelf*.

#### C. AFRICA

6. **Africa** has a less well developed production and marketing infrastructure for tropical fruits, mainly because of the economic difficulties of the 1980s and early 1990s. However, recently, stronger growth rates have stimulated investment in agriculture. Diversification into tropical fruit for exports, value-added processing (Africa is the second largest exporting region for processed pineapples and mangoes), and the building and upgrading of production and marketing infrastructure on all areas which have benefited from the improved economic environment.

7. However, smallholders have found the call for diversification very difficult to answer. Factors affecting their ability to produce premium quality tropical fruits in significant volumes include high input costs (particularly for fertilisers and agro-chemicals), and high freight rates due to the lack of suitable transport and transportation infrastructure to facilitate both domestic and export marketing, add to an already relatively high cost of production. Moreover, when small-holders receive cash advances from large production or exporting companies, the advance is often at the cost of lower farm-gate prices. To promote a dynamic future for tropical fruits in Africa, steps need to be taken to ensure the competitiveness and efficiency of the fruit production sector.

### III. FACTORS AFFECTING DEMAND IN MAJOR MARKETS

8. The three major import markets for *fresh tropical fruits* are the European Community, the United States, and Japan. Together, these markets account for more than 75 percent of world *fresh tropical fruits* imports, with the EC being the largest import market, both in terms of total and per caput import volumes, followed by the United States, and Japan (Chart 4). The recent trend is for an expansion in import volumes with the growth in consumer awareness, per caput GDP increases, and rising demand by recent immigrants.

9. Studies<sup>1</sup> estimate elasticity (*own-price, cross-price, and income*) for the three major fresh tropical fruits traded (mangoes, avocados, and papayas) indicate that consumers in all three markets react quite strongly to changes in prices of these fruits. On the contrary, for fruits with smaller volumes (mangosteens, longans, lychees etc.), consumption was price inelastic in most markets. Similarly, substitution and income effects of the fruits were significant. The factors affecting consumption in the individual markets are summarized below.

#### A. EUROPEAN COMMUNITY

##### *Economic factors*

10. The per caput import of tropical fruits in the EC is 1.83 kg, which compares with apparent per caput consumption levels of 9 kg for bananas and 19 kg for apples.

##### *a) Prices*

11. As mentioned above, consumer purchases are responsive to changes in prices of the individual tropical fruit, as well as the price of the tropical fruit compared to other fruits. Estimated *own price and cross-price elasticities* in the EC for avocados, mangoes and papayas are shown on Table 1. Of the three fruits, papaya was the most responsive to a change in its own price (own price elasticity of -2.73), and also its price compared to other fruits (cross-price elasticity of 1.92), i.e., as the price of papaya decreases, demand for the fruit increases substantially; and if the price of papaya increases relative to other fruit, demand for the other fruit decreases.

##### *b) Incomes*

12. It is usually expected that income elasticities for most fresh fruits are greater than units. In the EC, the demand response to an increase in income is strong for avocados and mangoes but not for papayas (Table 1).

##### *Other factors*

##### *a) Seasonality*

13. Consumption of tropical fruits is highest during the holidays, although the increasing availability of tropical fruits on a year-round basis has promoted consumption throughout the year.

##### *b) Distribution*

14. The largest importing countries in the EC are France, Germany, the Netherlands, and the United Kingdom. Belgium also imports sizeable quantities of pineapples and with the Netherlands, is important as an entry point and a re-exporting centre (intra-EC trade of tropical fruits in 1996 amounted to 55 percent of total imports).

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<sup>1</sup> Document CCP:CI 96/6, "Review of Policy Developments Affecting Banana Trade" and "Prospects for Non-Traditional Agricultural Commodities," S.Koroma, ESC, FAO 1997.

15. Large retail chains are prominent in the distribution of tropical fruits in Europe. In France, hypermarkets and supermarkets together accounted for around 70 percent of sales in 1995 (Table 2). The dominance of large-scale retailing is stronger for tropical fruits than for most other fresh fruits (only 58 percent of temperate fruit sales in France in 1995 were through supermarkets). The marketing of tropical fruits requires more advertising and stronger organization and logistics than the marketing of temperate climate fruits, as in many cases the former are relatively new to consumers.

*c) Demographics*

16. Consumer research indicates that in the EC, consumers that are the most likely to purchase tropical fruits were generally aged between 30 and 58 years, and usually housewives. The younger and older age-groups were less likely to purchase tropical fruits.

## B. THE UNITED STATES

### *Economic factors*

17. The per caput import of tropical fruits by the United States is 1.64 kg (Chart 5). However, it should be noted that 59 percent of consumption is sourced from domestic production (Chart 6). The per caput consumption of bananas and apples are about 11 kg and 15 kg, respectively.

*a) Prices*

18. Consumer response to prices in the United States was different from other markets. *Own-price* elasticities were much lower for papayas (-0.07) indicating that reaction to price increases would be more modest than to avocados (-1.48). *Cross-price* elasticities for mangoes were surprisingly high at 5.59, indicating perhaps a problem with missing variables during the estimation (Table 1).

*b) Incomes*

19. As expected, the income effect was low for papayas and highest for avocados, with mangoes in between (Table 1).

### *Other factors*

*a) Distribution*

20. The distribution system in the United States, like that in the EC, is highly integrated. Generally, the same marketing channels for bananas are used for the distribution of tropical fruits. The trend in the last 5 years has been towards direct sales from grower/exporter to large retail chains, cutting out the intermediaries. Therefore, successful marketing is becoming increasingly dependent on building strategic alliances with major distribution firms. This is particularly challenging to producers of minor tropical fruits where low volumes are typical.

*b) Demographics*

21. Health consciousness has been an important factor enhancing fruit consumption in the United States, and tropical fruits (especially the major 4) have begun to reap the benefits as consumer awareness expands. In addition, the novelty effect has played a role in the younger, higher income bracket segment of the population. The population of the United States, was estimated at almost 270 million in 1996, and consumer research has shown that the highest per caput consumption occurs with the 25 to 55 years age group.

## C. JAPAN

### *Economic factors*

22. The per caput import of tropical fruits in the Japan is 0.92 kg, which compares with apparent per caput consumption levels of 4 kg for bananas and 5 kg for apples.

#### *a) Prices*

23. *Own price elasticities* suggest that demand for avocados, mangoes and papayas are highly sensitive to price changes, particularly papayas (-2.95). Of the three major markets, the Japanese market shows the lowest *cross-price effects*, indicating that these fruits have few substitutes (Table 1).

#### *b) Incomes*

24. The *income effect* is highest for mangoes and lowest for papayas. Similar results were observed for papayas in all three markets. However, for avocados and mangoes, the demand response to increases in income differed for the three markets. The demand response for mangoes was highest in Japan while in the United States it was avocado, and in the EC, the effect was similar for mangoes and avocados.

### *Other factors*

#### *a) Seasonality*

25. Although tropical fruits are available on a year-round basis, consumption is highest during the holidays (gift-giving seasons in July/August and December/January).

#### *b) Distribution*

26. The bulk of fresh fruit imported into Japan is handled by major importers. Roughly half of imported fruits goes to wholesale markets, and the other half goes mainly to commission agents and supermarkets. Besides the quantities imported by importers, a certain amount of fresh fruit are imported by supermarkets directly from abroad.

#### *c) Demographics*

27. In Japan, the younger generation consumes less fresh fruit (tropical or otherwise) than the rest of the population. Comparing per caput consumption of fresh fruit by age-groups, data from the Ministry of Agriculture indicate that of the total fruits consumed, about 60 percent is consumed by the 35 to 39 and 55 to 59 years age groups. The 25 to 29 years and 45 to 49 years consume almost 40 percent of the quantities consumed by the above age groups, and the balance by the other age groups.

## IV. CONCLUDING REMARKS

28. The major constraints to increased trade in tropical fruits are related to growth in demand, as supply is deemed sufficient to meet current and future needs. However, to promote a dynamic future for tropical fruits, particularly in Africa, production has to be better organized, not only for the improvement of quality, but also to ensure competitiveness and efficiency of fruit production. On the demand side, other than economic factors, the improvement of packaging, transportation, and market promotion are specific requirements for the expansion of markets for tropical fruits. In addition, exporters need to create strategic alliances to ensure the acceptance, wide diffusion and efficient distribution of their products.

Chart 1 Harvested Area of Tropical Fruits in 1996, by Region ('000 Ha)

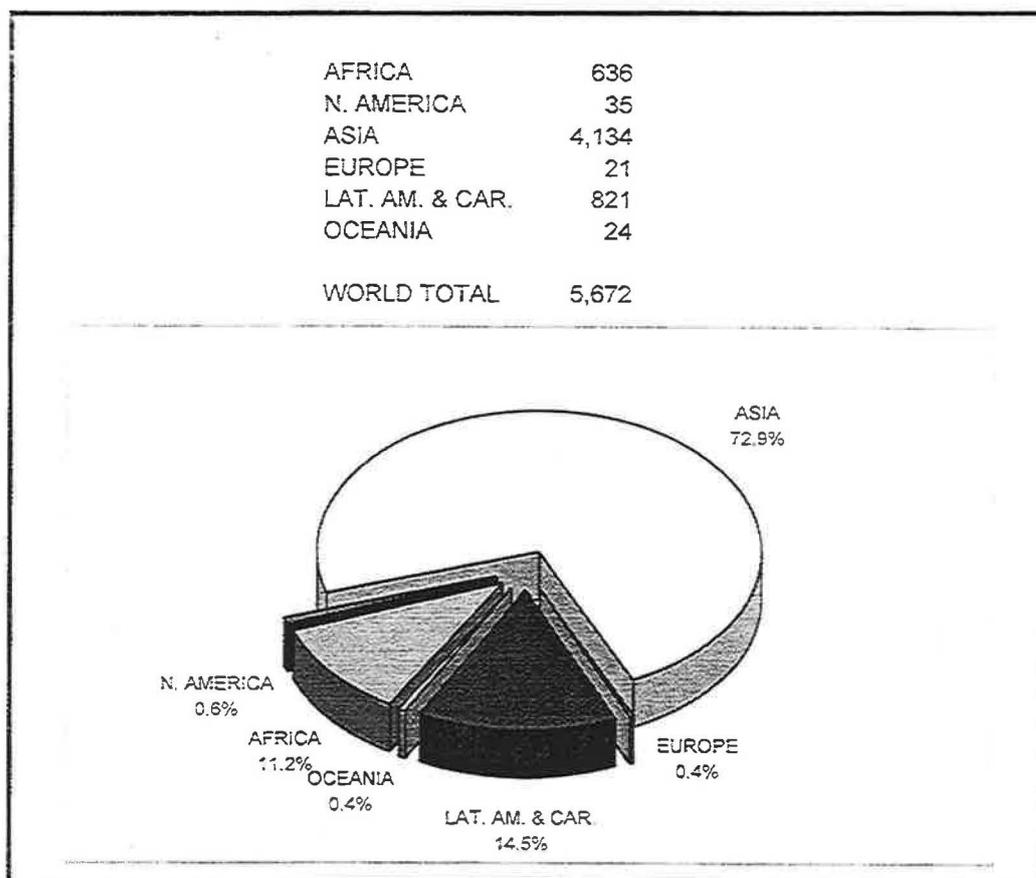


Chart 2 Production of Tropical Fruits in 1996, by Region ('000MT)

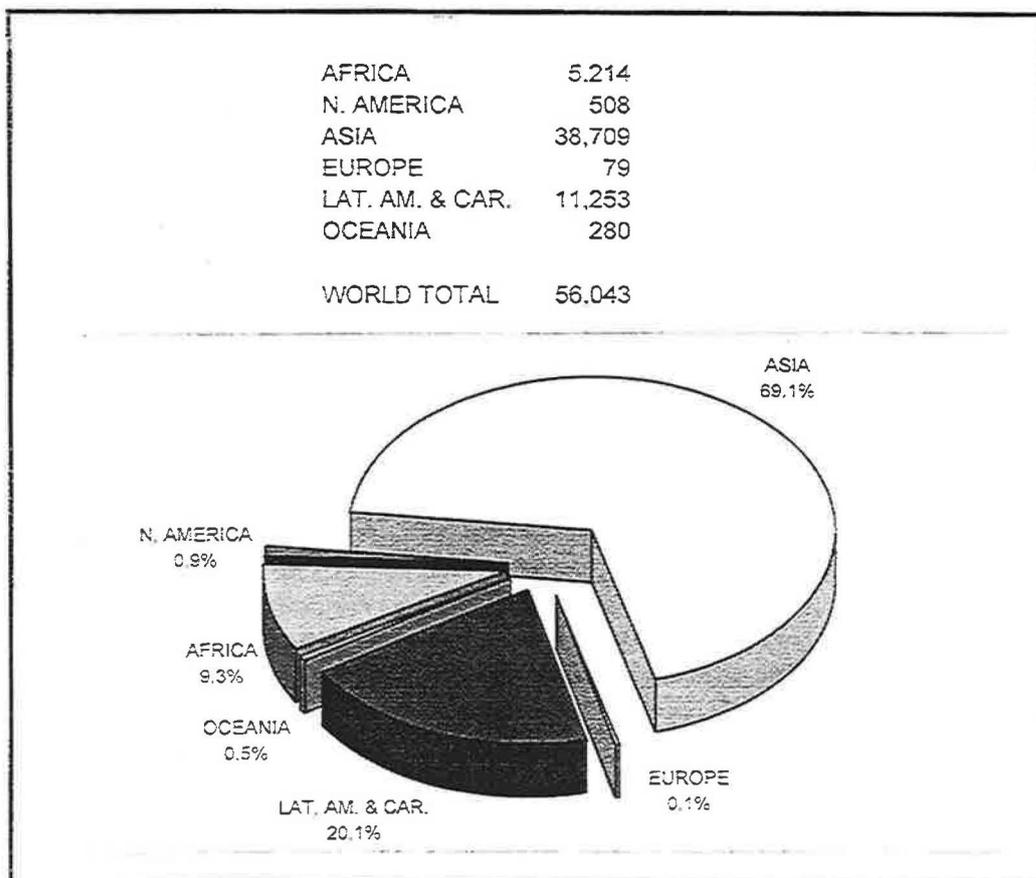


Chart 3 Exports of Fresh Tropical Fruits in 1996, by Region ('000 MT)

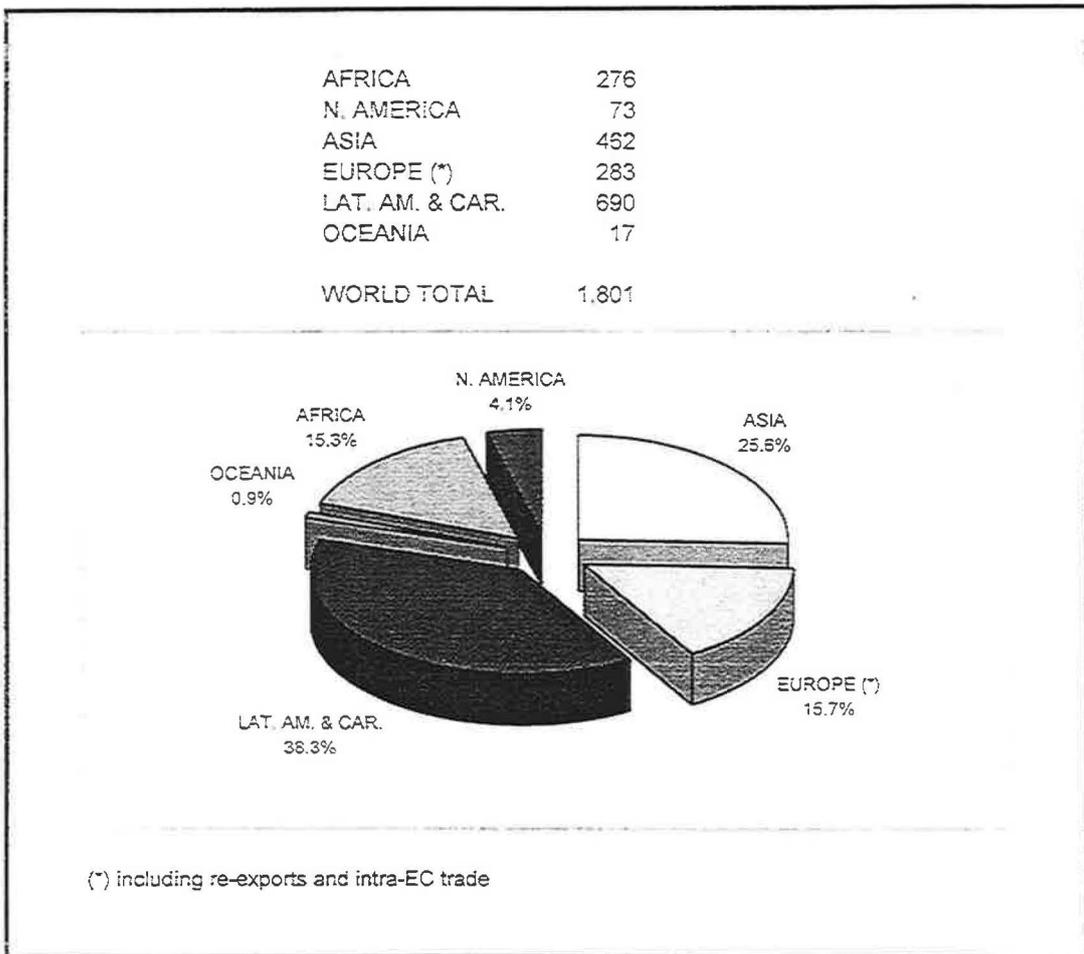


Chart 4 Imports of Fresh Tropical Fruits in 1996 ('000 MT)

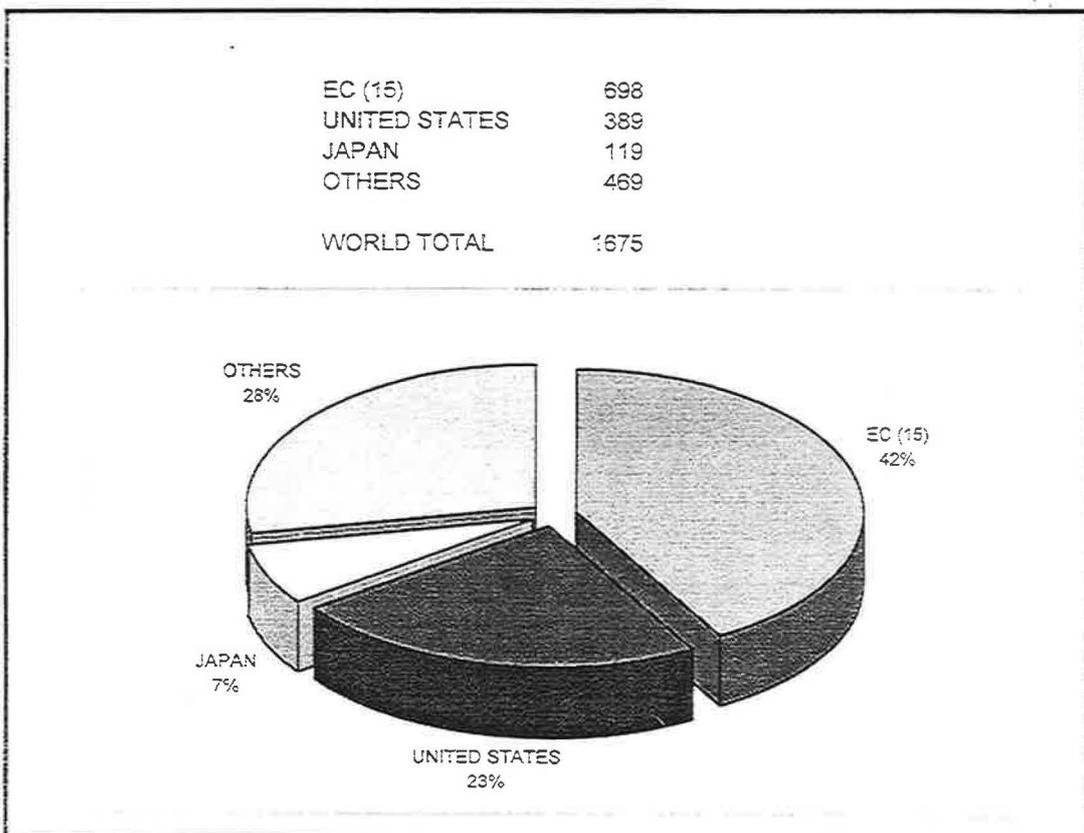


Chart 5 Per Caput Imports of Fresh Tropical Fruits in 1996 in Selected Markets (kg/head/year)

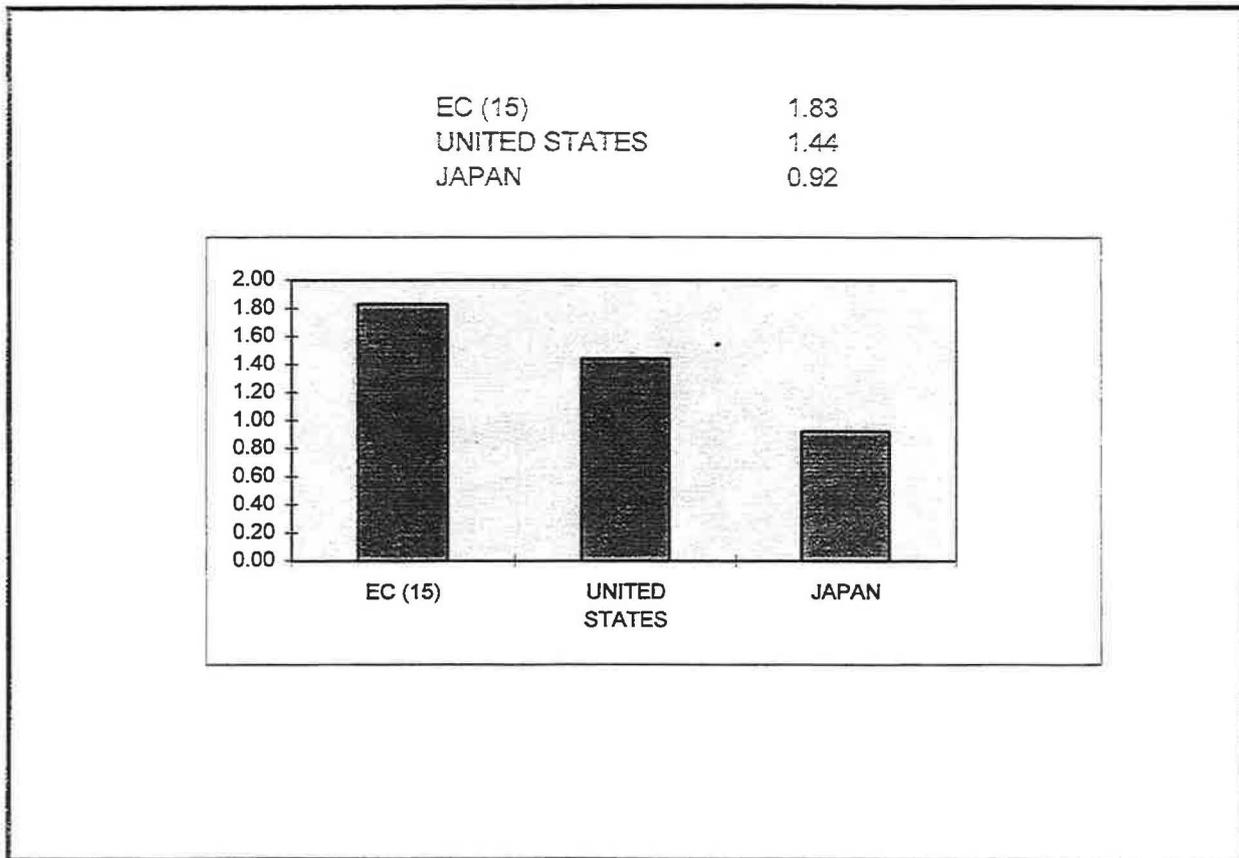


Chart 6 Consumption of Fresh Tropical Fruits in United States in 1996, by origin

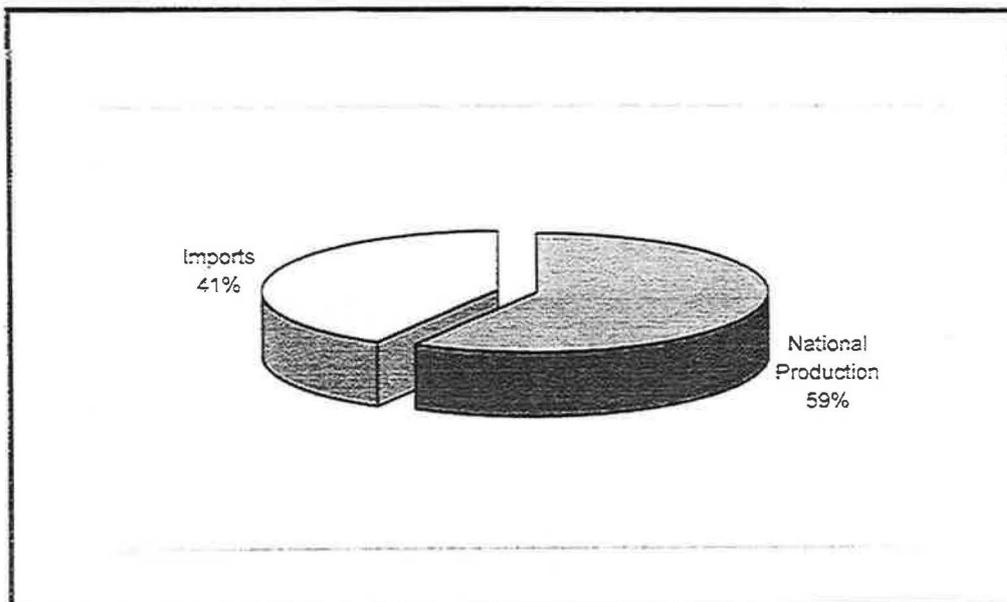


Table 1

<b>Estimated Own-Price, Cross-Price and Income Elasticities for the EC's Import Demand</b>			
	Own-price	Cross-Price	Income
Avocados	-2.58	1.07	1.74
Mangoes	-2.49	1.78	1.73
Papayas	-2.73	1.92	0.66

<b>Estimated Own-Price, Cross-Price and Income Elasticities for the United States Import Demand</b>			
	Own-price	Cross-Price	Income
Avocados	-1.48	0.34	3.23
Mangoes	-0.74	5.59	1.39
Papayas	-0.07	2.20	0.91

<b>Estimated Own-Price, Cross-Price and Income Elasticities for Japan's Import Demand</b>			
	Own-price	Cross-Price	Income
Avocados	-2.01	0.20	1.22
Mangoes	-1.41	0.34	3.23
Papayas	-2.95	0.95	0.4

Table 2 - Shares of Different Distribution Channels of Tropical Fruits Sales, France 1995

Hyper-market	Super market	Open Air Markets	Fruit and Vegetable Stores	Others
33%	37.3%	14%	5.9%	9.8%

Source: FLD/CTIFL

March 1998



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Food  
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Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### MEDIUM-TERM OUTLOOK

## I. INTRODUCTION

1. This document provides an analysis of market prospects for fresh tropical fruits to the year 2005. Using the FAO medium-term model, the projections to 2000 presented at the International Consultation on Tropical Fruits in Malaysia in 1996 were extended to 2005. The fresh fruits included in these projections are pineapples, mangoes, avocados and papayas, as data limitations prevented analysis for other tropical fruits. Projections were made on the basis of import demand analysis as supply availabilities were assumed to be sufficient to meet needs over the next decade. The demand projections were based on the assumption of constant real prices at 1993-95 levels, using United Nations population and income projections, supplemented by a trend factor to take account of changes in consumer tastes and preferences.

## II. PROJECTIONS RESULT

2. Demand prospects for tropical fruits are expected to be favourable over the next decade. The four fruits analysed represent on average approximately 75 percent of total fresh tropical fruit production and approximately 90 percent of exports in fresh form. Over the medium term, the projected global average annual growth in demand for the four fruits would range from 3 to 4.5 percent. Compounded over ten years from a base period of 1993-95, import demand would increase by an average of 40 percent by the year 2005.

3. The projections from the FAO medium-term model apply only to fresh fruit. Projections for processed tropical fruits are not accounted for in the model, due to constraints on trade information and conversion factors between fresh and processed forms. For future studies, the FAO hopes to have this information made available and for processed tropical fruits to be included in the projections

### A. PINEAPPLES

4. The market for fresh pineapple imports is expected to expand over the next decade, although growth will not be equal in all markets. Global imports of fresh pineapple are projected to increase by 35 percent, to 922 000 tonnes, by the year 2005. The bulk of the increase would be in developed countries as their global share is estimated to increase from 89 percent to 90 percent, while the share of imports by developing countries is estimated to decline from 11 percent to 10 percent. Europe is expected to remain the largest import market, with 484 000 tonnes by the year 2005. Imports into the EC would amount to 461 000 tonnes, or 50 percent of global pineapple imports. France would account for a large proportion of EC imports. By 2005, consignments to that country are projected to reach 133 000 tonnes, or 29 percent of total EC imports.

### B. MANGOES

5. World imports of fresh mangoes are projected to increase by 53 percent to 459 000 tonnes by the year 2005, with demand expected to rise as consumers become increasingly aware of the taste and culinary possibilities of mangoes. The share of developed and developing countries in global mango imports would be essentially unchanged. The largest importing region would continue to be North America, accounting for 42 percent of global mango imports, followed by Europe accounting for 24 percent, the Far East with 17 percent and the Near East accounting for 14 percent. Japan is not a significant importer of mangoes, and the market share of this country is estimated to remain at 3 percent.

6. Mangoes are one of the few tropical fruits that are imported in significant volumes by both developed and developing countries. The Near East and the Far East regions account for the largest volume of imports by developing countries. Consumers in the Far East are familiar with mango and mango products, and trade is mostly intra-regional.

### C. AVOCADOS

7. World imports of fresh avocados are projected to increase by 55 percent to 287 000 tonnes by the year 2005. The growth in imports is expected to be mainly in developed countries, with their share of the global market for avocados increasing from 91 percent in the base period to 95 percent by the year 2005. The largest importing region would continue to be Europe, where France would remain the biggest importing country. By the year 2005 imports into France are expected to reach 108 000 tonnes and account for 57 percent of avocado consignments to the EC and 46 percent of total avocado imports into Europe. Fresh avocado imports to North America are projected to be only 38 000 tonnes by the year 2005, as the United States produces avocados domestically for internal consumption. Avocado imports into Japan are projected to increase to 5 000 tonnes in 2005. Among developing regions, Latin America and the Caribbean is the largest producing and consuming region. Avocado imports into Latin America are expected to increase marginally from 12 000 tonnes to 13 000 tonnes by the year 2005.

### D. PAPAYAS

8. Global fresh papaya imports are expected to increase by 46 percent to 118 000 tonnes by the year 2005. Developed countries would account for 56 percent of world papaya imports and developing countries would account for 44 percent. Almost all the growth in import demand in developing countries would be concentrated in the Far East, where papaya imports are projected to increase by 36 percent from 36 000 tonnes in the base period to 49 000 tonnes by the year 2005. In developed countries, the consumer market is still evolving. The United States would continue to be the largest importing country with imports projected to increase to 40 000 tonnes by the year 2005, representing almost 60 percent of papaya shipments into developed countries.

### III. GENERAL CONCLUSIONS

9. Developed countries currently account for about 80 percent of world imports of fresh tropical fruits, and this should remain unchanged over the next decade. The share of fresh tropical fruit imports by developing countries is currently around 20 percent, with the countries of the Far East accounting for the bulk of this amount.
10. Europe is expected to remain the world's largest import market, with shipments by the year 2005 accounting for an estimated 47 percent of trade in fresh tropical fruits. Within Europe, the EC would remain the largest market, and France would continue to be the largest importing country. The share of Europe in global imports of all fresh tropical fruits, except mangoes, is projected to increase by the year 2005.
11. North America is expected to remain the world's second largest market for fresh tropical fruits. The North American share of global imports is expected to increase for pineapples, mangoes and papayas, but decrease for avocados. The United States, the largest importing country within this region, also produces a small amount of tropical fruits in the southern states and Hawaii, which partially satisfies their own domestic consumption needs. Overall, the North American market exhibits signs of slower growth, around 4 percent over the next decade, as it could be considered a more mature market for these fruits. In addition, there is a vast selection of fruit available to the consumer, both tropical and temperate.
12. The import market in Japan is expected to decrease its share of global imports of fresh tropical fruits to less than 10 percent by the year 2005. Pineapples would remain the dominant tropical fruit imported. Like the United States, Japan is a more mature market and there is a very wide selection of fruit available to consumers.
13. In developing countries, import preferences are traditionally for temperate fruits, as tropical fruits grow in abundance in these countries. Imports of tropical fruits occur mainly in countries that lack available land resources such as Singapore and China, Hong Kong Special Administrative Region.

Table 1 Summary Table of Imports of Major Tropical Fruits by Main Countries/Regions

Country / Regions	Total Imports			Share of Total		
	Base Period	Projection 2000	Projection 2005	Base Period	Projection 2000	Projection 2005
	thousand tonnes			percent		
<b>WORLD</b>	1254	1495	1785	100	100	100
<b>DEVELOPING</b>	223	260	305	18	17	17
Africa	3	3	3	0	0	0
Latin America	41	44	47	3	3	3
Near East	48	58	71	4	4	4
Far East	132	157	188	11	11	11
Other Developing	0	0	0	0	0	0
<b>DEVELOPED</b>	1031	1237	1481	82	83	83
North America	321	390	475	26	26	27
Canada	30	36	41	2	2	2
United States	292	357	437	23	24	24
Europe 1/	572	693	842	46	46	47
E.C. (15) 2/	547	650	773	44	43	43
France	205	234	270	16	16	15
Germany	65	79	95	5	5	5
Netherlands	60	67	77	5	4	4
United Kingdom	50	62	77	4	4	4
Spain	31	31	32	2	2	2
Japan	133	150	170	11	10	10
Other Developed	5	7	8	0	0	0

Base period is 1993 to 1995.

1\_ / Incl. Switzerland, Russia, Eastern Europe and Other Western European Countries.

2\_ / Including intra-EC trade

Table 2 Pineapples: Projections of Imports to 2000 and 2005

Country/ Region	Base Period 1993-1995	Projection 2000	Projection 2005	Growth Rate
	thousands tonnes			percent
<b>WORLD</b>	686	795.3	921.9	3.0
<b>DEVELOPING</b>	74	81	89.3	1.9
Africa	2	2	2.0	0.2
Latin America	27	29	31.3	1.5
Near East	2	2	2.1	0.3
Far East	44	50	56.9	2.6
Other Developing	0	0	0.0	0.7
<b>DEVELOPED</b>	612	713	830.5	3.1
North America	145	172	204.5	3.5
Canada	18	21	24.0	2.9
United States	128	153	182.3	3.6
Europe 1/	350	412	484.3	3.3
E.C. (15) 2/	333	392	460.7	3.3
France	111	121	132.7	1.8
Germany	43	52	61.8	3.7
Netherlands	22	26	30.7	3.4
United Kingdom	21	25	30.5	3.8
Spain	25	25	25.3	0.1
Japan	114	128	144.5	2.4
Other Developed	3	3	3.6	1.9

Base Period from 1993 to 1995.

1\_/ Incl. Switzerland, Russia, Eastern Europe and Other Western European Countries.

2\_/ Including intra-EC trade

Table 3 Avocados: Projections of imports to 2000 and 2005

Country/ Region	Base period 1993-1995	Projection 2000	Projection 2005	Growth Rate
	thousands tonnes			percent
<b>WORLD</b>	185	231	287	4.5
<b>DEVELOPING</b>	16	16	17	0.3
Africa	1	1	1	0.1
Latin America	12	12	13	0.5
Near East	4	4	4	0.0
Far East	1	1	1	0.0
Other Developing	0	0	0	0.6
<b>DEVELOPED</b>	169	217	278	5.1
North America	25	31	38	4.2
Canada	8	9	10	1.7
United States	17	22	29	5.3
Europe 1/	138	180	234	5.4
E.C. (15) 2/	134	159	189	3.5
France	79	93	108	3.2
Germany	10	13	16	4.7
Netherlands	11	11	11	0.1
United Kingdom	14	19	25	6.0
Spain	4	4	4	0.0
Japan	4	5	5	3.1
Other Developed	2	2	3	2.5

Base Period from 1993 to 1995.

1\_/ Incl. Switzerland, Russia, Eastern Europe and Other Western European Countries.

2\_/ Incl. intra-EC trade

Table 4 Mangoes: Projections of imports to 2000 and 2005

Country/ Region	Base period 1993-1995	Projection 2000	Projection 2005	Growth Rate
	thousands tonnes			percent
<b>WORLD</b>	301	372	459	4.3
<b>DEVELOPING</b>	94	118	147	4.6
Africa	0	0	0	3.8
Latin America	1	1	2	4.2
Near East	42	52	65	4.5
Far East	51	64	81	4.7
Other Developing	0	0	0	3.0
<b>DEVELOPED</b>	207	254	312	4.2
North America	125	155	192	4.4
Canada		1	2	3.8
United States	125	155	192	4.4
Europe 1/	73	88	106	3.8
E.C. 2/	71	90	114	4.8
France	14	19	27	6.7
Germany	10	12	14	3.3
Netherlands	23	27	31	2.9
United Kingdom	13	15	18	3.2
Spain	2	2	3	2.6
Japan	9	11	14	4.2
Other Developed	0	0	0	4.5

Base Period from 1993 to 1995 .

1\_/ Incl. Switzerland, Russia, Eastern Europe and Other Western European Countries.

2\_/ Incl. intra-EC trade

Table 5 Papayas: Projections of imports to 2000 and 2005

Country/ Region	Base period 1993-1995	Projection 2000	Projection 2005	Growth Rate
	thousands tonnes			percent
<b>WORLD</b>	81	98	118	3.8
<b>DEVELOPING</b>	38	44	52	3.1
Africa	0	0	0	0.4
Latin America	1	1	1	0.6
Near East	0	0	0	0.0
Far East	36	42	49	3.2
Other Developing	0	0	0	2.9
<b>DEVELOPED</b>	43	53	66	4.4
North America	26	32	40	4.4
Canada	4	5	6	4.2
United States	22	27	34	4.5
Europe 1/	11	14	18	4.9
E.C. 2/	9	9	10	0.9
France	1	2	2	8.8
Germany	2	3	3	5.5
Netherlands	3	4	4	3.8
United Kingdom	2	3	3	4.9
Spain	0	0	0	0.8
Japan	5	6	7	2.6
Other Developed	1	1	2	6.2

Base Period from 1993 to 1995 .

1\_/ Incl. Switzerland, Russia, Eastern Europe and Other Western European Countries.

2\_/ Incl. intra-EC trade

March 1998



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联合国  
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Food  
and  
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of  
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Organisation  
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pour  
l'alimentation  
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Organización  
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Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### RECENT POLICY DEVELOPMENTS IN INTERNATIONAL TRADE OF TROPICAL FRUITS

#### I. INTRODUCTION

1. This document reviews policy developments affecting international trade in tropical fruits, primarily commitments under the Uruguay Round (UR) since their implementation in 1995. Prior to the Round, the main policy instruments affecting trade in tropical fruit were quotas, tariffs, and sanitary and phytosanitary measures. These instruments were retained under the UR, with the exception of quotas which were converted to tariff equivalents. Other elements emerging from the UR negotiations such as minimum access provisions and the reduction of production and export subsidies, play a lesser role in trade of tropical fruit.
2. This document is composed of two parts. The first deals with market access issues (mostly tariffication and an update of tariff reductions) in certain markets. These markets were selected because of their importance in terms of shares of the global value of imports of tropical fruit. Of the US\$2.2 billion value of tropical fruit imported globally in 1996, the European Community (EC) accounted for 50 percent; North America, 26 percent; and Japan, 10 percent. Several smaller importing countries made up the balance.
3. The second part of the document deals with the broader issues surrounding sanitary and phytosanitary measures (SPS), which are expected to be of growing importance to international trade in tropical fruits. As these issues are considered to be of greater significance than those concerning market access for tropical fruits, two additional technical papers have been prepared to supplement this review: phytosanitary aspects of the SPS Agreement CCP: SG TF 98/6, and the sanitary aspects of the SPS Agreement CCP: SG TF 98/7.

## II. MARKET ACCESS

4. One feature of the Agreement on Agriculture which is of relevance to tropical fruit is the conversion of import quotas, variable levies and voluntary export restraints to tariff equivalents (tariffication) and commitments for the reduction of tariffs over the implementation period of the Round. Developing countries had the option of setting bound tariff levels. The average reduction for the developing countries for all agricultural commodities taken together was set at 24 percent with a minimum reduction of 10 percent (compared to 36 percent with a minimum of 15 percent for developed countries), and a longer transition period (10 years instead of the 6 years for developed countries).

5. The following section briefly reviews progress in the reduction of tariffs as committed by the major importing countries under the UR.

### A. EUROPEAN COMMUNITY (EC)

6. In the EC, market access provisions for tropical fruits consist mainly of customs duties, which are all *ad valorem* rates. Furthermore, unlike other fruit and vegetables, mostly temperate or sub-tropical (e.g. citrus), tropical fruits are not subjected to the entry price mechanism or import licensing. Table 1 lists the EC commitment on tariff reduction under the UR including the levels reached in 1997. It should be noted, however, that under its various preferential schemes, duties under tariff quotas on some fruit have already been reduced to zero or will reach zero at the end of the UR implementation period (Table 2).

7. The reduction of tariffs on guavas, mangoes, mangosteen, papayas, lychees, passion fruit and carambola to zero by 2000 would eliminate the competitive advantage of countries which previously enjoyed preferential treatment, namely the African, Caribbean and Pacific (ACP) countries signatories to the Lomé Convention with the EC, countries in the Mediterranean Basin which enjoy preferential access to the EC and countries falling under the EC's GSP scheme. The new tariff regime would bring the former preferential supplying countries into line with other exporting countries, and could result in shifts in the origin of supplies and a boost to demand. Similarly, the reduction in tariffs for pineapples, avocados, limes, durian and rambutan should expand demand for these fruits.

8. In terms of domestic support, the only significant assistance is provided to manufacturers of "tinned pineapples" in producing countries, namely Guadeloupe and Martinique. Production aid is granted to processors who undertake to pay producers at least the minimum price fixed each year.

### B. NORTH AMERICA

9. Imports of tropical fruits into the United States which are not covered by preferential trade agreements are levied either a fixed or *ad valorem* tariff. Countries which enjoy duty free access to the United States include those belonging to the Caribbean Basin Economic Recovery Act (CBERA), namely Antigua and Barbuda, Aruba, Bahamas, Belize, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Monserrat, Netherlands Antilles, Nicaragua, Panama, St Kitts and Nevis, St Lucia, St Vincent and the Grenadines, Trinidad and Tobago, and the British Virgin Islands; the Andean Trade Preference Act (ATPA) members namely, Bolivia, Colombia, Ecuador, Peru and Venezuela; and Israel.

10. In addition to these agreements, the United States has a special relationship with Mexico under the North American Free Trade Agreement (NAFTA). Under NAFTA, all tropical fruits shipped from Mexico, except guavas (if imported between 1 June and 31 August), avocados, and papayas, have been allowed duty free entry into the United States from 1 January 1998. Guavas,

mangoes and mangosteens (entering between 1 September and 31 May), and pineapples were the first fruit to enter duty free under NAFTA in 1994. These were followed by full-year free access for mangoes and mangosteen in January 1998. The rest, namely avocados, papayas, and guavas (imported between 1 June and August 31) will only be allowed duty free entry from 1 January 2003.

11. As mentioned above, developing countries which do not belong to the above agreements, namely those from Africa, Asia and the Pacific, are subjected to either fixed tariff rates (in the case of pineapples, avocados, guavas, mangoes and mangosteens) or *ad valorem* tariffs (for papayas and other fruits) (Table 3). *Ad valorem* tariffs were reduced by 1 percent for papayas and 5 percent for tropical fruit under the HS code 08.10.40 category in 1996, according to the latest tariff schedules published by WTO. Fixed rates for other fruits were also reduced by 6 percent for pineapples and 5 percent for avocados.

12. The other North American market, **Canada** does not levy import duties on tropical fruit shipments, irrespective of country of origin or variety of fruit. The Central American market of **Mexico** on the other hand imposes a 50 percent *ad valorem* base rate tariff on all tropical fruits imported in 1995, except for those originating from the United States. A reciprocal arrangement exists with that country, as described above. By 1996, Mexico had lowered its import duties to 20 percent well below its bound rate commitment of 36 percent by 2004 (Table 4).

### C. JAPAN

13. Market access rules for imports of tropical fruits into Japan are relatively straight forward. All duties are *ad valorem*, and apart from those applicable to pineapples, rates are low and would not be considered inhibitory to trade. Japan sources a significant portion of its pineapples domestically, principally from Okinawa and this is reflected in the relatively high base and bound duties for this fruit (Table 5). Immediately before the commencement of the UR implementation in July 1995, Japan reduced its import duties on tropical fruits, except pineapples, by an average of 43 percent (50 percent reduction for avocados). Initially, it was thought that this would result in a greater assortment of tropical fruits becoming available in the Japanese market. However, slower economic growth over the last three years has curtailed the expansion in demand for non-traditional imports.

### D. OTHER MARKETS

14. Imports into **New Zealand** were duty free even before the Uruguay Round, while in **Australia** duties were reduced from 2 percent to zero under the base rate commitment. Some expansion in demand has occurred in both countries primarily due to population and income growth. The continuation of duty-free imports of tropical fruits from all origins into **China**, **Hong Kong Special Administrative Region**, and the duty-free access to the **Singapore** market from ASEAN suppliers (10 percent bound rate on imports from non-ASEAN countries) would suggest that the Southeast Asian market will continue to expand. The **Republic of Korea**, set relatively high base rate duties ranging from 50 percent to 59.2 percent, as previous quotas were converted to tariff equivalents, and its average 15 percent tariff reduction commitment would consolidate rates at 45 percent by the year 2004. This country's import licensing mechanism was finally dismantled in July 1997 in conformity with tariffication requirements. In 1996, actual import duties were generally somewhat lower than the UR Commitments (Table 6). For pineapples at 40 percent they were even below final bound rates.

## III. SANITARY AND PHYTOSANITARY MEASURES

15. The major impact of the Uruguay Round on tropical fruit trade is expected to come from the Agreement on the Application of Sanitary and Phytosanitary Measures. The Agreement is

expected to lead to a change in regulatory measures which are considered to impede trade unfairly. As sanitary and phytosanitary measures are each treated in greater detail in documents CCP: SG TF 98/6 and CCP: SG TF 98/7, the following section briefly reviews developments in the overall SPS framework.

### A. OVERALL FRAMEWORK

16. The most relevant aspects to trade in tropical fruits are as follows:

- The WTO Committee on SPS established under the Agreement on the Application of Sanitary and Phytosanitary Measures is responsible for drawing up a list of international standards (Prepared by the International Plant Protection Convention as regards plant health and Codex Alimentarius as regards food safety) required to gain access to international markets and to minimize health risks.
- WTO members are committed to ensuring that SPS measures are only applied to the extent necessary to protect human, animal or plant life or health, and that these are based on scientific principles and are not maintained without sufficient scientific evidence (Art.2) in order that countries do not arbitrarily decide on the risks against which they wish to be protected.
- WTO members are committed to accepting as equivalent, even if these differ from their own, those measures that objectively demonstrate the appropriate level of sanitary protection (Art.5) including (and thus reducing the expense of certification) recognition of the concept of pest or disease-free areas (Art.6) to minimize the extensive differences that exist between countries as regards the measures adopted against the risks of disease from fresh fruit and vegetable imports.
- There is recognition of the difficulty that the Agreement entails for many countries, especially developing countries, in meeting the sanitary and phytosanitary requirements of importers, with special provisions being made for technical assistance and special treatment allowing, in particular, least-developed countries (LDC) to delay implementation of the SPS agreement for up to 5 years (Art.14), compared to the 2 year maximum for other developing countries.

### B. SANITARY REQUIREMENTS

17. In relation to food safety, the SPS and Technical Barriers to Trade (TBT) Agreements use Codex Standards as the international benchmark for most foods, including tropical fruits. The Codex Alimentarius Commission is the international body responsible for the execution of the Joint FAO/WHO Food Standards Programme. Codex Alimentarius is a collection of international food standards adopted by the Commission and presented in a uniform manner. Standards established by the Codex Committee on Fresh Fruits and Vegetables and subsequently adopted by the Codex Alimentarius Commission include those for pineapples, papayas, mangoes and carambola (adopted in 1993), lychees and avocado (adopted in 1995), and mangosteens (adopted in 1997). The most recent Seventh Session of the Codex Committee on Fresh Fruits and Vegetables (September 1997) also finalized draft standards for pomelos, guavas, and chayotes for submission to the Commission for adoption at its Twenty Third Session in June 1999.

### C. PESTICIDE RESIDUE

18. Regarding pesticide residue levels, most developed country markets are in the process of completing or have completed the drawing up of tolerance levels for imports of tropical fruits. At the time of writing this document, information was available only for the EC. It is hoped that information on other markets would be made available during the discussion at the Session of document CCP: TF SG 98/7 regarding sanitary issues. In the EC, tolerances have been fixed for the most commonly used chemicals, and also Maximum Residue Levels (MRL) for several fruits.

Information on these have been appended as Table 7. The MRLs should be read in conjunction with the legend at end of Table 7.

#### D. PHYTOSANITARY

19. On the question of phytosanitary requirements for tropical fruits, the following general factors need to be taken into account:

- tropical fruits tend to be highly perishable and easily damaged;
- tropical areas tend to have plenty of pests and considerable pest problems;
- phytosanitary treatments for tropical fruits tend to be difficult to develop;
- tropical fruits have many internal feeding pests, which are impractical to manage through inspection;
- fruit flies are the single biggest pest problem;
- tropical fruit producing countries tend to be smaller and poorer – less technically capable of meeting phytosanitary requirements of trading partners in developed countries;
- field management and treatment in tropical countries tends to be small-scale and more difficult to coordinate and audit for phytosanitary certification purposes; and
- timely, efficient, and modern transport is frequently lacking for the secure movement of fruit from tropical locations;

20. A major development having implications for the cost-effectiveness of phytosanitary treatments of tropical fruit exports from developing countries was the decision reached at the 9th meeting of the Montreal Protocol in September 1997. At that meeting, the 163 countries that are signatories to the Protocol agreed to phase-out the use of methyl bromide as a fumigant. In developed countries, the complete ban would come into effect by 2005. For the United States, which accounts for about 40 percent of global use, under the Clean Air Act the phase-out would occur by 2001. It is likely that any further changes to the agreement would result in nearer deadlines rather than extensions.

21. Fumigation with methyl bromide has long provided the cheapest, easiest and most practical way to meet phytosanitary requirements for many tropical exports, including fruit, vegetables, flowers, plants, grain, and wood. Therefore, there is a need to find alternative treatments to avoid severe negative effects on exports of tropical fruit.

#### IV. CONCLUDING REMARKS

22. Under the Uruguay Round, the reduction in tariffs on imports of fresh tropical fruits is not expected to have a major impact globally as duties were already low in most major markets. However, for countries which will lose their competitive advantage due to the erosion of preferential access, it may be expected that adjustments will be required to maintain market shares.

23. The harmonization of sanitary and phytosanitary measures are expected to benefit trade in fresh tropical fruits in the longer run. However, adjustments will also be required by exporting countries, in particular as they phase out the use of long-established treatment methods with methyl bromide, and work towards alternatives such as hot-water immersion or irradiation. Although a longer phase-out period is stipulated for developing countries (2015) than for developed countries (2005), it is widely believed that if bans come into place in developed country markets then imports of tropical fruits treated with methyl bromide may not be allowed. This situation could present major problems for many developing countries, particularly if the costs incurred in meeting SPS standards (including investment in new treatment plants etc.) outweigh the benefits for small export volumes.

24. In the longer run, success in expanding exports would depend on the efforts of supplying countries wishing to penetrate or retain markets to adapt to the changing international trading environment. Investment in new treatment infrastructure must be in tandem with market expansion efforts to optimize returns on investment. Therefore, it may be prudent for exporting countries to capitalize on gains achieved under the UR and sustain demand expansion with continued market development activities.

Table/Tableau/Cuadro 1

EUROPEAN COMMUNITY/ COMMONAUTE EUROPEENE/ COMUNIDAD EUROPEA						
Code Numbers HS Numeros Codes SH Códigos Numéricos SA	Description/Description/Descripción	Autonomous 1_/	Conventional 2_/	Base rate of duty 3_/	Rate of duty in 1997	Bound rate of duty 4_/
(.....%.....)						
08.04.30	Pineapples	9.0	9.0	9.0	7.9	5.8
08.04.40	Avocados					
08.04.40.10	From 1 December to 31 May	4.0	8.0	8.0	4.0	4.0
08.04.40.90	From 1 June to 30 November	12.0	8.0	8.0	7.0	5.1
08.04.50	Guavas, Mangoes and Mangosteens	4.0	6.0	6.0	4.0	Free
08.07.20	Papayas	2.0	6.0	6.0	4.0	Free
08.10.90.30	Lychees	7.5	-	11.0	7.3	Free
08.10.90.40	Passion fruit, carambola	11.0	-	11.0	7.3	Free
08.10.90.85	Durian and rambutan	11.0	-	11.0	10.3	8.8

**NOTES/NOTES/ NOTAS:**

1\_/ Applicable if less than or when no conventional duties exist.

Applicable dans le cas où les tarifs douaniers sont plus bas que les conventionnels ou quand n'existaient pas.

Aplicables cuando los aranceles son más bajos que los convencionales o cuando no existen.

2\_/ Applicable to imports from GATT members or countries the EC has concluded MFN agreements.

Applicable aux importations provenant des pays membres du GATT ou ceux concluant accords du type NMF avec les pays de la C.E.

Aplicable a las importaciones procedentes de los países miembros del GATT y de aquellos que hayan concluido acuerdos de tipo NMF con los de la C.E.

3\_/ Based on the Geneva Protocol to the GATT (1987).

Basée sur le Protocole GATT de Genève (1987).

Basado en el Protocolo GATT de Ginebra (1987).

4\_/ To be implemented in equal annual instalments beginning on 1 July 1995 to 1 July 2000.

Doit être mis en place dans quote-part équivalentes annuelles à partir du 1 juillet 1995 jusqu'au 1 juillet 2000.

A ser implementadas en cuotas anuales iguales a partir del 1ro de julio de 1995 hasta el 1ro de julio del 2000.

Table 2 - EC generalized system of preference (GSP) tariffs for selected tropical fruits

Tableau 2 - Tarifs du système généralisé de préférence de la CE (SGP) pour certains fruits tropicaux

Cuadro 2 - Aranceles del sistema generalizado de preferencias de la CE (SGP) para algunas frutas tropicales

AVOCADOS	Jan 1 May 31	June 1 Nov 30	Dec 1 Dec 31	GUAVAS	Jan 1 Dec 31	MANGOSTEENS	Jan 1 Dec 31	PINEAPPLES	Jan 1 Dec 31	MANGOES	Jan 1 Dec 31								
EC EXTERNAL TARIFF in %	4	7	4	EC EXTERNAL TARIFF in %	4	EC EXTERNAL TARIFF in %	4	EC EXTERNAL TARIFF in %	7.9	EC EXTERNAL TARIFF in %	4								
PREF. ENT. PRICE ECU/100 Kg				PREF. ENT. PRICE ECU/100 Kg															
ENTRY PRICE ECU / 100 Kg				ENTRY PRICE ECU / 100 Kg															
TARIFF EQUIVALENT				TARIFF EQUIVALENT		TARIFF EQUIVALENT		TARIFF EQUIVALENT		TARIFF EQUIVALENT									
MODULATION				MODULATION		MODULATION		MODULATION		MODULATION									
LICENCE	N	N	N	LICENCE	N	LICENCE	N	LICENCE	N	LICENCE	N								
PREFERENTIAL DUTY in %				PREFERENTIAL DUTY in %				PREFERENTIAL DUTY in %				PREFERENTIAL DUTY in %				PREFERENTIAL DUTY in %			
ACP (LOME)	0	0	0	ACP (LOME)	0														
Algeria (DZ)	0.8	1.4	0.8	Chile (CL)	2	Chile (CL)	2	Chile (CL)	7.3	Chile (CL)	2								
Chile (CL)	2.7	5.9	2.7	Egypt (EG)	0	Egypt (EG)	0	Mexico (MX)	7.3	Cyprus (CY)	0								
Cyprus (CY)	0	0	0	Israel (IL)	0	Israel (IL)	0	Overseas Countries & Terr. (LOMB)	0	Egypt (EG)	0								
Israel (IL)	0	0	0	Jordan (JO)	2.4	Jordan (JO)	2.4	SPGA	0	Israel (IL)	0								
Mexico (MX)	2.7	5.9	2.7	Lebanon (LB)	2.4	Lebanon (LB)	2.4	SPGE	0	Jordan (JO)	2.4								
Morocco (MA)	0	0	0	Mexico (MX)	2	Mexico (MX)	2	SPGL (Excl. CL, MX, TH)	6.7	Lebanon (LB)	2.4								
Overseas Countries & Terr. (LOMB)	0	0	0	Overseas Countries & Terr. (LOMB)	0	Overseas Countries & Terr. (LOMB)	0	Thailand (TH)	7.3	Mexico (MX)	2								
SPGA	0	0	0	SPGA	0	SPGA	0	Turkey (TR)	0	Overseas Countries & Terr. (LOMB)	0								
SPGE	0	0	0	SPGE	0	SPGE	0			SPGA	0								
SPGL (Excl. CL, MX, TH)	1.4	4.9	1.4	SPGL (Excl. CL, MX, TH)	0	SPGL (Excl. CL, MX, TH)	0			SPGE	0								
Thailand (TH)	2.7	5.9	2.7	Thailand (TH)	2	Thailand (TH)	2			SPGL (Excl. CL, MX, TH)	0								
Turkey (TR)	0	0	0	Turkey (TR)	0	Turkey (TR)	0			Thailand (TH)	2								
										Turkey (TR)	0								

Source: CIMO

Codes:

SPGA: least developed countries enjoying the generalized tariff preference of the EC (Chapters 1 to 24)

SPGE: Bolivia, Colombia, Costa Rica, Ecuador, Guatemala, Honduras, Nicaragua, Panama, Peru, El Salvador, Venezuela (Chapters 1 to 24)

SPGL: countries enjoying the system of generalized tariff preference except SPGA and SPGE

LOMB: Overseas territories

Table/Tableau/Cuadro 3

UNITED STATES OF AMERICA/ ETATS-UNIS D'AMERIQUE/ ESTADOS UNIDOS DE AMERICA		BEFORE THE UR		UR COMMITMENTS		
Code Numbers HS Numeros Codes SH Códigos Numéricos SA	Description/Description/Descripción			Base rate of duty	Rate of duty in 1996	Bound rate of duty
08.04.30	Pineapples - in bulk	0.64 c/kg	Free (E,IL,J)	0.64 c/kg (U)	0.60 c/kg	0.51 c/kg
08.04.40	Avocados	13.20 c/kg	Free (E,J)	13.20 c/kg (U)	12.50 c/kg	11.20 c/kg
08.04.50	Guavas, Mangoes and Mangosteens	8.27 c/kg	Free (A,E,IL,J)	8.27 c/kg (U)	7.70 c/kg	6.60 c/kg
08.07.20	Papayas	8.5%	Free (A*,E,IL,J)	8.5%	7.5%	5.4%
08.10.40	Other fruits, fresh	3.4%	Free (A*,E,IL,J)	8.5%	3.4%	5.4%

**NOTES/NOTES/ NOTAS:**

**General Rate:** applicable to all products of MFN.

**Tarife General:** applicable à tous les produits sous NPF.

**Tasa General:** aplicable a todos los productos bajo la NMF.

**Special rate:** duties under one or more special tariff treatment programs, such as:

**Quota-part special:** tarif sous un ou plus programmes de traitement des tarifs speciaux, tels que:

**Tasa especial:** aranceles bajo uno o mas programas de tratamientos preferenciales, tales como:

E = Caribbean Basin Economic Recovery Act (CBERA). member countries are: Antigua & Barbuda, Aruba, Bahamas, Belize, Costa Rica, Dominicana, Dom. Rep., El Salvador, Grenada, Guatemala, Guayana, Haiti, Honduras, Jamaica, Montserrat, NL Antillas, Nicaragua, Panama, St. K. & Nevis, St. Lucia, St. Vincent & Grenadines, Trinidad & Tobago and Br. Virgin Islands.

IL = Israel Free Trade Area/ Surface d'exchange libre avec Israel/ Area de Libre Comercio con Israel.

J = Andean Trade Preference Act (ATPA), member countries are: Bolivia, Colombia, Ecuador, Peru and Venezuela.

Act Andin du Commerce Preferentiel (AACPF), dont les pays membres sont les suivants: Bolivie, Colombie, Equateur, Perou et Venezuela.

Acta Andina de Comercio Preferencial (AACPF), cuyos miembros son: Bolivia, Colombia, Ecuador, Perú y Vénézuéla.

c = US cents/ centimes/ centimos, % = pourcent ad valorem/ porcentaje ad valorem/ procentaje ad valorem, (U) = Unbound/sans plafond / sin tope.

Table/Tableau/Cuadro 4

MEXICO/ MEXIQUE/ MEXICO				
Code Numbers HS Numeros Codes SH Códigos Numéricos SA	Description/Description/Descripción	Base rate of duty	Rate of duty in 1996	Bound rate of duty
		(.....%.....)		
08.04.30	Pineapples	50.0	20.0	36.0
08.04.40	Avocados	50.0	20.0	36.0
08.04.50	Guavas, mangoes, mangosteen	50.0	20.0	36.0
08.07.20	Papayas	50.0	20.0	36.0
08.10.90	Other fruits	50.0	20.0	45.0

Table/Tableau/Cuadro 5

JAPAN/ JAPON/ JAPON		RATES OF DUTY (% ad valorem)					
Code Numbers HS Numeros Codes SH Códigos Numéricos SA	Description/Description/Descripción	General 1_/	referential 2_/	Temporary 3_/	Base rate of duty 4_/	Rate of duty in 1996	Bound rate of duty 5_/
08.04.30	Pineapples	20.0	-	-	20.0	19.0	17.0
08.04.40	Avocados	20.0	4.0 / Free (c)	6.0	6.0	5.0	3.0
08.04.50	Guavas, Mangoes and Mangosteens	20.0	4.0 / Free (c)	6.0	6.0	5.0	3.0
08.07.20	Papayas	20.0	3.0 / Free (c)	4.0	4.0	3.3	2.0
08.10.90	Other fruits, fresh: durians, rambutan, passion fruit and carambola	-	-	10.0	10.0	8.3	5.0

## NOTES/NOTES/NOTAS:

1 / General : is a long term tariff, and it will only be altered when there are structural changes in the industry concerned.

General: est un tarif à long terme, qui sera altéré seulement dans le cas où il y a des changements structurels dans les industries concernées.

General: es un arancel a largo plazo, que sera alterado solo en caso de cambios estructurales de las industrias concernientes.

2 / Preferential : (MFN) applied under GSP for imports from developing countries on the basis of agreements reached at the United Nations Conference on Trade and Development (UNTAD).

Préférentiel: (NPF) appliqué sous le SGP aux importations provenant des pays en développement selon les Accords pris à la Conférence des Nations Unies sur le Développement de Commerce (CNUDCI).

Preferencial: (NMF) aplicado bajo el SGP a las importaciones procedentes de los países en desarrollo en base a acuerdos alcanzados en la Conferencia de las Naciones Unidas sobre el Desarrollo del Comercio (CNUDCI).

3 / Statutory: or Temporary rate, imposed for short periods of up to one year to meet the requirements of short term supply fluctuations which affect a particular commodity.

Statutaire: ou bien tarif temporaire, imposé à brève terme jusqu'au pour aboutir les requisites de fluctuations de l'offre de bref term qui affectent certains produits de base.

Estatutario: o arancel temporal, impuestos durante breves períodos de hasta un año para llenar los requisitos de breves fluctuación de la oferta que afectan a determinados productos de base.

4 / Base rate: on the whole, lower than the General and it applies only for imports from countries which have GATT arrangements with Japan. It's based on the Geneva Protocol to the GATT (1987).

Tarif de base: toujours plus bas que le General et appliqué seulement aux importations provenant des pays qui ont des accords GATT avec le Japon. Il est basé sur le Protocole GATT de Genève (1987).

Tasa de base: en su conjunto inferior a la General y aplicada solo a las importaciones procedentes de los países que tienen acuerdos GATT con Japon. Se basa en el Protocolo GATT de Ginebra (1987).

5 / Bound rate: or Most Favoured-Nation Tariff, Uruguay Round (GATT) of Multilateral Trade Negotiations, 15 April 1994.

It shall be implemented in equal annual instalments over the implementation period beginning on April 1995 and ending on 31 March 2001, unless otherwise specified therein.

Tariffe Mafonier: ou bien de la Nation Plus Favorisée, Table Ronde Uruguay (GATT) des Négotiations Multilatérales du Commerce, 15 avril du 1994.

It sera appliqué en quote-part annuelles équivalentes à partir de la période de application qui comence en avril 1995 jusqu'au 31 mars 2001, sauf ultérieures specifications.

Tasa sin tope: o de la Nación Mas Favorecida, Ronda Uruguay (GATT) de las Negociaciones Multilaterales del Comercio, 15 de abril de 1994.

Puede ser implementado en ratas anuales equivalentes luego del período de implementación que comencera en abril de 1995 y termina el 31 de marzo del 2001, salvo ulteriores especificaciones.

(c) denotes that the imports from the Lesser Developed Developing Countries are duty free.

(c) signifie que les importations provenant des pays moins développés sont d'entrée libre de tarifs.

(c) denota que las importaciones procedentes de los países en desarrollo menos desarrollados entran libres de aranceles.

Table/Tableau/Cuadro 6

REPUBLIC OF KOREA/ REPUBLIQUE DE COREE/ REPUBLICA DE COREA					
Code Numbers HS Numeros Codes SH Códigos Numéricos SA	Description/Description/Descripción	1987-88	Base rate of duty	Rate of duty in 1996	Bound rate of duty
		(.....%.....)			
08.04.30	Pineapples	50.0	50.0	40.0	45.0
08.04.40	Avocados	50.0	59.2	56.4	45.0
08.04.50.10	Guavas	50.0	59.2	56.4	45.0
08.04.50.20	Mangoes	50.0	59.2	56.4	45.0
08.04.50.30	Mangosteens	50.0	59.2	56.4	45.0
08.07.20	Papayas	50.0	59.2	56.4	45.0
08.10.90					

Table 7 - Maximum residue levels for selected fruits in the EC (in ppm)

Tableau 7 - Niveau maximum de résidues pour certains fruits dans la CE (en ppm)

Cuadro 7 - Nivel máximo de residuos para algunas frutas en la CE (en ppm)

Pineapples

2,4,5, T	0.05 (*)	Deltamethrin	0.05 (*)	Maneb	0.05 (*)
Acephate	0.02 (*)	Diazinon	0.02 (*)	Mecarbam	0.05 (*)
Aldicarb residue	0.05 (*)	Dibromoethan 1-2	0.01 (*)	Methalaxyl	0.05 (*)
Aminotriazole	0.05 (*)	Dichlorprop.	0.05 (*)	Methamidophos	0.01 (*)
Amitraz residue	0.02 (*)	Dicofol	0.02 (*)	Methidathion	0.02 (*)
Atrazin	0.1 (*)	Dinoseb	0.05 (*)	Methomyl Thiodicarb	0.05 (*)
Benamaxyl	0.05 (*)	Dioxathion	0.05 (*)	Methyl Bromide	0.05 (*)
Benfurocarb	0.05 (*)	Disulfoton	(n)	Metiram	0.05 (*)
Benomyl	0.1 (*)	Endosulfan	0.05 (*)	Paraquat	0.05 (*)
Binapacryl	0.05 (*)	Endrin	0.01 (*)	Permethrin	0.05 (*)
Bromophos-ethyl	0.05 (*)	Ethephon	(f)	Phorate	0.05 (*)
Camphechlor	0.1 (*)	Fenarimol	0.02 (*)	Pirimiphos-methyl	0.05 (*)
Captafol	0.02 (*)	Fenchlorphos	0.01 (*)	Procymidon	0.02 (*)
Carbendazin	0.1 (*)	Fentin	0.05 (*)	Propiconazole	0.05 (*)
Carbofuran	0.1 (*)	Fentutadin	0.05 (*)	Propinèbe	0.05 (*)
Carbosulfan	0.05 (*)	Fenvalerate	0.05 (*)	Propoxur	0.05 (*)
Chlormequat	0.05 (*)	Furathiocarb	0.05 (*)	Propyzamide	0.02 (*)
Chloropyriphos	0.05 (*)	Glyphosate	0.05 (*)	TEPP	0.01 (*)
Chloropyriphos-methyl	0.05 (*)	Heptachlor	0.01 (*)	Thiabendazole	0.05 (*)
Chlorothalonil	0.01 (*)	Imazalil	0.02 (*)	Thiophanate Methyl	0.1 (*)
Cyfluhtrin	0.02 (*)	Iprodione	0.02 (*)	Triazophos	0.02 (*)
Cypermethrin	0.05 (*)	Lambdacyhalothrin	0.02 (*)	Triforin	0.05 (*)
Daminozide	0.02 (*)	Maleic Hydrazid	1 (*)	Vinclozoline	0.05 (*)
DDT	0.05 (*)	Mancozeb	0.05 (*)	Zineb	0.05 (*)

Mangoes

2,4,5, T	0.05 (*)	Deltamethrin	0.05 (*)	Maneb	0.05 (*)
Acephate	0.02 (*)	Diazinon	0.02 (*)	Mecarbam	0.05 (*)
Aldicarb residue	0.05 (*)	Dibromoethan 1-2	0,01 (*)	Methalaxyl	0.05 (*)
Aminotriazole	0.05 (*)	Dichlorprop.	0.05 (*)	Methamidophos	0.01 (*)
Amitraz residue	0.02 (*)	Dicofol	0.02 (*)	Methidathion	0.02 (*)
Atrazin	0.1 (*)	Dinoseb	0.05 (*)	Methomyl Thiodicarb	0.05 (*)
Benamaxyl	0.05 (*)	Dioxathion	0.05 (*)	Methyl Bromide	0.05 (*)
Benfurocarb	0.05 (*)	Disulfoton	0.02 (*)	Metiram	0.05 (*)
Benomyl	0.1 (*)	Endosulfan	0.05 (*)	Paraquat	0.05 (*)
Binapacryl	0.05 (*)	Endrin	0.01 (*)	Permethrin	0.05 (*)
Bromophos-ethyl	0.05 (*)	Ethephon	0.05 (*)	Phorate	0.05 (*)
Camphechlor	0.1 (*)	Fenarimol	0.02 (*)	Pirimiphos-methyl	0.05 (*)
Captafol	0.02 (*)	Fenchlorphos	0.01 (*)	Procymidon	0.02 (*)
Carbendazin	0.1 (*)	Fentin	0.05 (*)	Propiconazole	0.05 (*)
Carbofuran	0.1 (*)	Fentutadin	0.05 (*)	Propinèbe	0.05 (*)
Carbosulfan	0.05 (*)	Fenvalerate	0.05 (*)	Propoxur	0.05 (*)
Chlormequat	0.05 (*)	Furathiocarb	0.05 (*)	Propyzamide	0.02 (*)
Chloropyriphos	0.05 (*)	Glyphosate	0.05 (*)	TEPP	0.01 (*)
Chloropyriphos-methyl	0.05 (*)	Heptachlor	0.01 (*)	Thiabendazole	0.05 (*)
Chlorothalonil	0.01 (*)	Imazalil	0.02 (*)	Thiophanate Methyl	0.1 (*)
Cyfluhtrin	0.02 (*)	Iprodione	0.02 (*)	Triazophos	0.02 (*)
Cypermethrin	0.05 (*)	Lambdacyhalothrin	0.02 (*)	Triforin	0.05 (*)
Daminozide	0.02 (*)	Maleic Hydrazid	1 (*)	Vinclozoline	0.05 (*)
DDT	0.05 (*)	Mancozeb	0.05 (*)	Zineb	0.05 (*)

Table/ Tableau/ Cuadro 7 (cont'd)

## Passion Fruit

2,4,5, T	0.05 (*)	Deltamethrin	0.05 (*)	Maneb	0.05 (*)
Acephate	0.02 (*)	Diazinon	0.02 (*)	Mecarbam	0.05 (*)
Aldicarb residue	0.05 (*)	Dibromoethan 1-2	0.01 (*)	Methalaxyl	0.05 (*)
Aminotriazole	0.05 (*)	Dichlorprop.	0.05 (*)	Methamidophos	0.01 (*)
Amitraz residue	0.02 (*)	Dicofol	0.02 (*)	Methidathion	0.02 (*)
Atrazin	0.1 (*)	Dinoseb	0.05 (*)	Methomyl Thiodicarb	0.05 (*)
Benamaxyl	0.05 (*)	Dioxathion	0.05 (*)	Methyl Bromide	0.05 (*)
Benfurocarb	0.05 (*)	Disulfoton	0.02 (*)	Metiram	0.05 (*)
Benomyl	0.1 (*)	Endosulfan	0.05 (*)	Paraquat	0.05 (*)
Binapacryl	0.05 (*)	Endrin	0.01 (*)	Permethrin	(c)
Bromophos-ethyl	0.05 (*)	Ethephon	0.05 (*)	Phorate	0.05 (*)
Camphechlor	0.1 (*)	Fenarimol	0.02 (*)	Pirimiphos-methyl	0.05 (*)
Captafol	0.02 (*)	Fenchlorphos	0.01 (*)	Procymidon	0.02 (*)
Carbendazin	0.1 (*)	Fentin	0.05 (*)	Propiconazole	0.05 (*)
Carbofuran	0.1 (*)	Fentutadin	0.05 (*)	Propinèbe	0.05 (*)
Carbosulfan	0.05 (*)	Fenvalerate	0.05 (*)	Propoxur	0.05 (*)
Chlormequat	0.05 (*)	Furathiocarb	0.05 (*)	Propyzamide	0.02 (*)
Chloropyrifos	0.05 (*)	Glyphosate	0.05 (*)	TEPP	0.01 (*)
Chloropyrifos-methyl	0.05 (*)	Heptachlor	0.01 (*)	Thiabendazole	0.05 (*)
Chlorothalonil	0.01 (*)	Imazalil	0.02 (*)	Thiophanate Methyl	0.1 (*)
Cyfluhtrin	0.02 (*)	Iprodione	0.02 (*)	Triazophos	0.02 (*)
Cypermethrin	0.05 (*)	Lambdacyhalothrin	0.02 (*)	Triforin	0.05 (*)
Daminozide	0.02 (*)	Maleic Hydrazid	1 (*)	Vinclozoline	0.05 (*)
DDT	0.05 (*)	Mancozeb	0.05 (*)	Zineb	0.05 (*)

## Avocados

2,4,5, T	0.05 (*)	Deltamethrin	0.05 (*)	Maneb	0.05 (*)
Acephate	0.02 (*)	Diazinon	0.02 (*)	Mecarbam	0.05 (*)
Aldicarb residue	0.05 (*)	Dibromoethan 1-2	0.01 (*)	Methalaxyl	(f)
Aminotriazole	0.05 (*)	Dichlorprop.	0.05 (*)	Methamidophos	0.01 (*)
Amitraz residue	0.02 (*)	Dicofol	0.02 (*)	Methidathion	0.02 (*)
Atrazin	0.1 (*)	Dinoseb	0.05 (*)	Methomyl Thiodicarb	0.05 (*)
Benamaxyl	0.05 (*)	Dioxathion	0.05 (*)	Methyl Bromide	0.05 (*)
Benfurocarb	0.05 (*)	Disulfoton	0.02 (*)	Metiram	0.05 (*)
Benomyl	0.1 (*)	Endosulfan	0.05 (*)	Paraquat	0.05 (*)
Binapacryl	0.05 (*)	Endrin	0.01 (*)	Permethrin	0.05 (*)
Bromophos-ethyl	0.05 (*)	Ethephon	0.05 (*)	Phorate	0.05 (*)
Camphechlor	0.1 (*)	Fenarimol	0.02 (*)	Pirimiphos-methyl	0.05 (*)
Captafol	0.02 (*)	Fenchlorphos	0.01 (*)	Procymidon	0.02 (*)
Carbendazin	0.1 (*)	Fentin	0.05 (*)	Propiconazole	0.05 (*)
Carbofuran	0.1 (*)	Fentutadin	0.05 (*)	Propinèbe	0.05 (*)
Carbosulfan	0.05 (*)	Fenvalerate	0.05 (*)	Propoxur	0.05 (*)
Chlormequat	0.05 (*)	Furathiocarb	0.05 (*)	Propyzamide	0.02 (*)
Chloropyrifos	0.05 (*)	Glyphosate	0.05 (*)	TEPP	0.01 (*)
Chloropyrifos-methyl	0.05 (*)	Heptachlor	0.01 (*)	Thiabendazole	0.05 (*)
Chlorothalonil	0.01 (*)	Imazalil	0.02 (*)	Thiophanate Methyl	0.1 (*)
Cyfluhtrin	0.02 (*)	Iprodione	0.02 (*)	Triazophos	0.02 (*)
Cypermethrin	0.05 (*)	Lambdacyhalothrin	0.02 (*)	Triforin	0.05 (*)
Daminozide	0.02 (*)	Maleic Hydrazid	1 (*)	Vinclozoline	0.05 (*)
DDT	0.05 (*)	Mancozeb	0.05 (*)	Zineb	0.05 (*)

Table/ Tableau/ Cuadro 7 (cont'd)

## Lychees

2,4,5, T	0.05 (*)	Deltamethrin	0.05 (*)	Maneb	0.05 (*)
Acephate	0.02 (*)	Diazinon	0.02 (*)	Mecarbam	0.05 (*)
Aldicarb residue	0.05 (*)	Dibromoethan 1-2	0.01 (*)	Methalaxyl	0.05 (*)
Aminotriazole	0.05 (*)	Dichlorprop.	0.05 (*)	Methamidophos	0.01 (*)
Amitraz residue	0.02 (*)	Dicofol	0.02 (*)	Methidathion	0.02 (*)
Atrazin	0.1 (*)	Dinoseb	0.05 (*)	Methomyl Thiodicarb	0.05 (*)
Benamaxyl	0.05 (*)	Dioxathion	0.05 (*)	Methyl Bromide	0.05 (*)
Benfurocarb	0.05 (*)	Disulfoton	0.02 (*)	Metiram	0.05 (*)
Benomyl	0.1 (*)	Endosulfan	0.05 (*)	Paraquat	0.05 (*)
Binapacryl	0.05 (*)	Endrin	0.01 (*)	Permethrin	0.05 (*)
Bromophos-ethyl	0.05 (*)	Ethephon	0.05 (*)	Phorate	0.05 (*)
Camphechlor	0.1 (*)	Fenarimol	0.02 (*)	Pirimiphos-methyl	0.05 (*)
Captafol	0.02 (*)	Fenchlorphos	0.01 (*)	Procymidon	0.02 (*)
Carbendazin	0.1 (*)	Fentin	0.05 (*)	Propiconazole	0.05 (*)
Carbofuran	0.1 (*)	Fentutadin	0.05 (*)	Propinèbe	0.05 (*)
Carbosulfan	0.05 (*)	Fenvalerate	0.05 (*)	Propoxur	0.05 (*)
Chlormequat	0.05 (*)	Furathiocarb	0.05 (*)	Propyzamide	0.02 (*)
Chloropyriphos	0.05 (*)	Glyphosate	0.05 (*)	TEPP	0.01 (*)
Chloropyriphos-methyl	0.05 (*)	Heptachlor	0.01 (*)	Thiabendazole	0.05 (*)
Chlorothalonil	0.01 (*)	Imazalil	0.02 (*)	Thiophanate Methyl	0.1 (*)
Cyfluhtrin	0.02 (*)	Iprodione	0.02 (*)	Triazophos	0.02 (*)
Cypermethrin	0.05 (*)	Lambdacyhalothrin	0.02 (*)	Triforin	0.05 (*)
Daminozide	0.02 (*)	Maleic Hydrazid	1 (*)	Vinclozoline	0.05 (*)
DDT	0.05 (*)	Mancozeb	0.05 (*)	Zineb	0.05 (*)

(\*) indicates the limits of analytical determination.

(a) ppm0.02\* as from 1 January 1998

(b) ppm0.01\* as from 1 January 1998

(c) ppm0.05\* as from 1 January 1998

(d) ppm0.01\* as from 1 January 1998

(e) ppm0.02\* as from 30 June 1999

(f) ppm0.05\* as from 30 June 1999

(g) ppm0.01\* as from 30 June 1999

(j) ppm0.02\* as from 1 July 2000

(k) ppm0.05\* as from 1 July 2000

(m) ppm0.05\* as from 30 April 2000

(n) ppm0.02\* as from 30 April 2000

March 1998



منظمة الأغذية  
والزراعة  
للأمم المتحدة

联合国  
粮食及  
农业组织

Food  
and  
Agriculture  
Organization  
of  
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Nations

Organisation  
des  
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pour  
l'alimentation  
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Organización  
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Unidas  
para la  
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y la  
Alimentación

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### TRADE IN TROPICAL FRUIT: PHYTOSANITARY ISSUES CONCERNING IMPORTS AND EXPORTS

## I. INTRODUCTION

1. As for all fresh fruits and vegetables, trade in tropical fruit can occur only if a number of requirements are met. These are firstly, the requirements of the purchaser, as regards quality and price, and secondly, the requirements of the government of the importing country which has the responsibility to safeguard plant and human health, if necessary through the regulation of imports of products that may pose risks. This document deals with phytosanitary issues, while document CCP: SG TF 98/7 deals with sanitary aspects affecting human health.

2. Risks to plant health concern plant pests<sup>1</sup> including fungi, bacteria, viruses, nematodes, insects and mites and other plants such as weeds. Pests of regulatory concern may be those that do not occur in the territory of the importing country or those that are present in the country but are subject to control measures to prevent further spread or to mitigate the economic impact of their damage. It is this category of regulated pests which defines the scope of phytosanitary protection measures and which may have implications for trade.

3. The concerns of governments of importing countries for plant health can lead to the specification of a considerable number of requirements for exporters to meet. Each trading nation has different pests and rationales for their regulatory positions. Also, there is some diversity in the measures used for pest risk management and great variability in the capability of national systems to implement measures for protection or meet the requirements of other countries.

<sup>1</sup> Any species, strain, plant, animal or pathogenic agent injurious to plant or plant products. Source: Glossary of Phytosanitary Terms — FAO 1996.

Consequently, the resolution of phytosanitary issues of concern to a national plant protection organization (NPPO) can be complex.

4. The Agreement on the Application of Sanitary and Phytosanitary Measures of the Uruguay Round (SPS Agreement) provides guidance to members of the WTO on the fair and reasonable use of sanitary and phytosanitary measures in trade. The International Plant Protection Convention (IPPC) is named in the SPS Agreement as the international standard-setting body for phytosanitary measures. Although the scope of the IPPC is broader than its application to trade, the guidance provided by the IPPC concerning measures in trade is consistent with and complementary to the SPS Agreement. The relatively recent development of a relationship between these institutions reflects the shift towards globally harmonized approaches to achieve rules-based trade under the WTO in the area of plant protection.

5. However, there remain, in many countries, a great many regulations and procedures affecting the import of plant products which may seem to trading partners to be of dubious validity. It is hoped that greater conformity to the principles and provisions of the SPS and the IPPC, either through a conscious effort to observe the obligations therein or as a result of dispute resolution, will bring all countries to embrace scientifically-based phytosanitary regulations which are both fair and safe.

## II. PHYTOSANITARY ISSUES CONCERNING IMPORTS

6. Phytosanitary requirements are designed to provide the level of protection deemed appropriate by the importing country as it relates to imported plants, plant products or other articles regulated for phytosanitary purposes. In developing and applying phytosanitary requirements, governments take into account not only the need to protect the plant health status of their country but also their obligations under bilateral, regional, or international agreements. The IPPC and the SPS Agreement are of particular relevance in this respect.

7. The IPPC describes the responsibilities, rights and obligations of governments in undertaking their regulatory functions in phytosanitary matters. It also elaborates the duties of NPPOs the requirements in relation to imports, and the use of phytosanitary certification as a means to assure importing countries of compliance with their requirements. This is balanced by the requirement for measures to be technically justified and correspond in their strength to the risk involved. International Standards for Phytosanitary Measures (ISPMs) established under the IPPC provide greater detail for harmonization in the application of phytosanitary measures.

8. The SPS Agreement attempts to facilitate trade by setting rules for the application of standards in sanitary and phytosanitary matters. Key principles of the SPS have also been elaborated in the New Revised Text of the IPPC and in standards established under the IPPC. These complementary principles describe the concepts upon which trading countries should base their regulations, procedures, and actions in relation to international trade and plant quarantine. Therefore, as agencies prepare import regulations they must bear in mind not only national interests, but also the obligations to which they have agreed to adhere under the IPPC and the SPS Agreement.

9. Specifically, phytosanitary measures must:

- be applied only to the extent necessary to protect plant life or health,
- be based on scientific principles and risk analysis or an international standard,
- not arbitrarily discriminate between Members of the WTO,
- not be more trade restrictive than is necessary to achieve the appropriate level of protection,
- be made and maintained in a transparent way.

10. Although there are grounds for optimism for the management of phytosanitary systems in the future, it must be recognised that the need for accurate phytosanitary information, the need to develop and observe standards, and the need to understand the range of dispute systems available for phytosanitary controversies becomes more acute as time passes.

### **III. SYSTEMS TO MEET PHYTOSANITARY IMPORT REQUIREMENTS**

11. Where plants or plant products for export have certain pests associated with them which could lead to having to meet phytosanitary requirements in a specific importing country, the exporting country must put into place systems to ensure that the standards set by the NPPO of the importing country are met. These may range from rigorous and complex control and testing systems to simple inspections. Typically, where an unacceptable pest risk has been identified, the import requirements will involve a treatment or a combination of pest mitigation measures which must be competently executed to assure a high level of confidence for the certifying official in the exporting country as well as the phytosanitary authorities in the importing country.

#### **A. TREATMENTS**

12. In developing such systems, an NPPO must take note that importing countries may prefer that their requirements are met without the use of a chemical or physical treatment so that there are no pesticide residues, no additional costs, and product quality is not affected. Normally, imports from pest-free production areas are preferred because of the above-mentioned factors. Growing concern over the adverse effects of chemical treatments is expected to enhance the attractiveness of pest-free areas or places of production, as well as of non-chemical pest-management options for assuring that commodities meet import requirements.

13. Physical treatments, with no residue problems, are the next most favoured means of meeting phytosanitary requirements. These may include: hot water immersion treatment, vapour heat treatment and forced air treatment. In some cases a combination of treatments such as refrigeration and fumigation and long-term cold treatment are successful in lowering pest risks adequately. Some of these physical treatments do not have much flexibility and can be satisfactory only when the fruit is in optimum condition and the equipment is functioning perfectly.

14. Extending the treatment combination concept, a "systems approach" can be employed where a series of different safeguards and mitigations are linked in a defined system to reduce the pest risk to acceptable levels. This procedure has been used by the mainland United States for avocado imports from Mexico and Hawaii. These systems are usually based on commodities being poor hosts or non-hosts of the pests in question. Also, such approaches usually afford greater general acceptance of the "treatments" for a range of pests rather than for just one species.

15. It should be noted that irradiation as a treatment could offer opportunities for trade in many tropical fruits, especially in the event that methyl bromide is banned. Irradiation has been used in a two year commercial project (April 1995- July 1997) for fruit from Hawaii to mainland United States. Despite a perception that there is public resistance to radiation treated products, there are many reports of public acceptance and, in some cases, public preference for irradiated food in this market.

#### **B. IN-COUNTRY INFRASTRUCTURE**

16. For the export of tropical produce to countries with stringent requirements, an infrastructure with the following components is generally required:

- an official plant protection organization with appropriate authority and resources to:
  - liaise with the government of the importing country,
  - undertake the procedures necessary for certification and provide the requisite documentation.
- an advisory group, under the auspices of government or industry, particularly when systems are being developed
  - to work with producers, graders, packers etc.
  - to notify all parties of the requirements and ensure they are met before the certification process is begun.
- a research facility, to work with industry and NPPOs to develop effective treatments with acceptable residue levels.
- a communication system
  - to keep producers and exporters up to date with developments in the importing country NPPO/exporting country NPPO relationship
  - to allow the exporting NPPO to be informed of developments or problems in the production system.

### **C. COMPLIANCE ARRANGEMENTS**

17. An importing country must be satisfied of compliance with its requirements. This involves the NPPO of the importing country making checks of different types (depending on the procedure(s) used to achieve the pest risk reduction) on the system(s) being used. The importing country NPPO may check:

- to see that the NPPO of the exporting country is a competent authority and capable of undertaking the procedures involved in meeting the importing country's requirements. This may involve an examination of the national phytosanitary standards of the exporting NPPO and visits to management and operational staff and to supporting laboratories.
- to validate the NPPO's description of the pest status of the exporting country, e.g. that certain pests are of low incidence because of the application of control measures.
- that the application of pest treatment(s), or the monitoring of a pest-free area, meets requirements by:
  - the presence of an inspector during the application of a treatment,
  - an official audit of the systems used for risk mitigation,
  - any documentation associated with procedures regarding the treatment or relating to the pest free area.

18. Therefore, the exporting NPPO must have checking systems of its own to ensure that the national production and certification procedures operate in a manner that allows the importing country's requirements to be satisfied.

19. In summary, the meeting of the requirements of an importing country requires full information about that country's standards and cooperation between the government authority of the exporting country and its exporters and producers. These groups need to develop reliable and efficient systems so that the NPPO of an importing country has confidence in the production and certification systems. The certification procedure must conform to checks so that only produce that meets requirements is exported. Without an appropriate infrastructure with official and industry inputs, there is little likelihood that stringent phytosanitary requirements could be met.

## **IV. PHYTOSANITARY ISSUES CONCERNING EXPORTS**

20. The ease or difficulty of export of plant products is dependent to a large extent on the requirements of the intended market. For some countries, there are few if any import requirements, and consequently the export of plant products to those markets may be a relatively

simple matter. For others, the introduction of pests which can affect national plant production potential, for the domestic or export markets, may be a significant threat, and these countries may have stringent import regulations. In these instances, it can take several years to establish appropriate systems to meet the requirements and give the importing country assurance that the risks of pest establishment are low enough to be acceptable.

21. As there are differing degrees of stringency of import requirements, so there are different ways of structuring regulations. In some countries the regulations may be generic and apply to all trade partners for a particular crop; in others the regulations may be more specific and apply to a particular crop/country combination; in most cases, there is some combination of both generic and specific types. In any event, requirements should conform to international standards or in the absence of standards be based on pest-risk analysis.

## V. CONCLUDING REMARKS

22. Many factors need to be considered in the successful export of tropical fruit. After obtaining the up-to-date sanitary and phytosanitary requirements of the prospective importing country or countries, the exporter and NPPO of the exporting country have to determine if the same, or other procedures achieving an equivalent level of protection can be put in place so that the product can meet the requirements. For any import requirement but the most simple, considerable effort, expertise and expense may need to be outlaid to meet phytosanitary requirements. An export system may include some or all of the following components:

- development of phytosanitary certification systems,
- research, development and implementation of pest treatment systems,
- use of checks to ensure compliance with requirements,
- development of pest diagnostic and pesticide analysis laboratories,

23. Systems for the exportation of tropical fruits are often not developed quickly and may be expensive. Industry and government must be convinced of the benefits to be derived from exports before embarking on a course to gain export markets for tropical fruit which involve meeting difficult import requirements. This requires a long-term view and careful consideration of the costs and benefits in order to prioritize efforts. For example, the export of fresh fruit from Chile to the United States began a decade ago based on only a few commodities with relatively simple requirements. As a result of very careful strategic planning and investment in targeted research, Chile has successfully increased the number of commodities authorized for export to the United States and has expanded the volume tremendously – to the point where Chile is now the major supplier of winter fruit and vegetables to the United States. In addition, Chile has successfully argued for lowering the stringency of many requirements through a history of “clean” shipments and sound scientific arguments.

24. To overcome the problems inherent in the export of tropical fruit, NPPOs must consider a wide-ranging strategy that includes:

- acquiring a thorough knowledge of the importing country's requirements along with establishing liaison that allows negotiations to take place easily.
- developing a thorough understanding of existing international standards for phytosanitary measures.
- using the services of organizations or agencies that can provide expertise, advice, or aid in developing export operations or support procedures.
- undertaking the careful analysis of the cost/benefit of research, extension, operational procedures and support facilities relating to fruit exports.

25. It is intended that the complementary relationship of the IPPC and the SPS Agreement will facilitate trade. However, it will take time for major facilitating factors to fully develop, for example, the elaboration of a satisfactory range of phytosanitary standards.

26. The reduced availability and acceptance of pesticides, especially the pending loss of methyl bromide as a fumigant for quarantine treatments, will clearly have strong implications for trade in tropical fruits – many of which require fumigation either as a condition for export or as a result of the detection of pests. To date, initiatives toward research for alternatives has been extremely limited, although funding mechanisms exist and expertise is available. This is an area where there is both a urgent need and substantial benefit to be gained from relatively small investments.

March 1998



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Food  
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Agriculture  
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of  
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Organisation  
des  
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pour  
l'alimentation  
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Organización  
de las  
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Unidas  
para la  
Agricultura  
y la  
Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### TROPICAL FRUITS: FOOD SAFETY ISSUES UNDER THE SPS MEASURES OF THE WORLD TRADE ORGANIZATION<sup>1</sup>

#### I. MAJOR ISSUES AND REGULATIONS REGARDING FOOD SAFETY STANDARDS IN TROPICAL FRUITS

1. The importance of tropical fruits for improving nutrition in the context of food security, poverty alleviation and export potential for foreign exchange is increasingly being recognized. Tropical fruits have a role in a healthy diet and are currently engaging consumers' attention in a big way.
2. The Codex Alimentarius is a collection of international standards for safety and quality of food as well as codes of good manufacturing practice and other guidelines to protect the health of the consumer and remove unfair practices in international trade, including those for tropical fruit (see below). Currently, 162 countries (nations that belong to FAO and/or WHO) are members of the Codex Alimentarius Commission. The Model Food Law developed jointly by FAO and WHO and the Codex Alimentarius standards, guidelines and recommendations and the reports of the FAO/WHO Joint Expert Committees on Food Additives (JECFA) and the Joint Meeting on Pesticide Residues (JMPR) and also *ad hoc* Expert Consultations constitute unique references in the development and harmonization of food legislation world-wide. The two most relevant Codex bodies concerned with fresh tropical fruit are the Codex Committee on Fresh Fruits and Vegetables and the Codex Committee on Food Hygiene, which also ensures the quality and safety of all foodstuffs, including tropical fruits.

<sup>1</sup> Prepared and presented by Dr. Biplab K. Nandi, Senior Food and Nutrition Officer, FAO Regional Office for Asia and the Pacific, 39 Phra Atit Road, Bangkok 10200, Thailand at the First Session of the Committee on Commodity Problems, Sub-Group on Tropical Fruits, Pattaya, Thailand, 25-28 May 1998.

3. Codex fresh fruit standards adopted by the Codex Alimentarius Commission to date include avocado, banana, carambola, lychee, mango, mangosteen, papaya and pineapple. The Codex has also evolved recommended standards for various processed tropical fruits through its Codex Committee on Processed Fruits and Vegetables. As a further assistance to ensure quality processing of tropical fruits, the Codex has adopted international codes of hygienic and/or technological practice. Those applicable to the tropical fruits include: General Principles of Food Hygiene, Code of Hygienic Practice for Canned Fruit and Vegetable Products, Code of Hygienic Practice for Dried Fruits, Code of Hygienic Practice for Dehydrated Fruits and Vegetables, Code of Practice for the Processing and Handling of Quick Frozen Foods. It is considered that the codes apply to any fruits, including tropical fruits if these are being processed by canning, drying, dehydrating or quick freezing. The General Principles of Food Hygiene are, however, considered applicable to all foods, including tropical fruits and vegetables. In addition, a Code of Practice for the Packaging and Transport of Fresh Fruits and Vegetables was also adopted by the Codex Alimentarius Commission in 1995. Human health matters also concern pesticide residues or environmental contaminants which may be associated with the plant material.

4. The Uruguay Round Agreements on the Application of Sanitary and Phytosanitary Measures (the SPS Agreement) and the Agreement on Technical Barriers to Trade (TBT) have given a new direction to the international food trade. With the reduction of tariff barriers, there is a possible danger that alternative forms of protection will be utilized, including arbitrary sanitary and phytosanitary measures. The SPS Agreement confirms the right of WTO Member countries to apply measures necessary to protect human, animal and plant life and health. It covers all food hygiene and safety measures, including the control of residues of pesticides or other chemicals. Considering only those provisions related to sanitary protection measures, the SPS Agreement has specific provisions related to risks arising from additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs. Essentially, SPS measures are food safety measures, and animal and plant quarantine measures. The SPS measures refer to all relevant regulations and requirements, especially those prepared by the CAC.

5. Food safety standards are defined in the SPS Agreement as those relating to food additives, veterinary drug and pesticide residues, contaminants, methods of analysis and sampling and codes and guidelines of hygienic practice. Codex food safety standards are used as the reference point for the WTO in this regard.

6. The Agreement on Technical Barriers to Trade (the TBT Agreement) is designed to prevent the use of national or regional technical requirements, or standards in general, as unjustified technical barriers to trade. It covers all types of standards including quality requirements for foods except requirements related to sanitary and phytosanitary measures and includes a very large number of measures designed to protect consumers against deception and economic fraud.

7. The SPS agreement recognizes the Codex recommended standards as the *de facto* international reference standards in the arbitration of trade disputes as well as in reviewing their national requirements. This has thus given the Codex standards an even greater importance to those countries that are involved in importing and exporting of foods including tropical fruits.

8. The FAO/WHO Codex Alimentarius Commission is recognized by the World Trade Organization as the international body responsible for the formation of standards relating to the safety of foodstuffs. Codex has established several thousand maximum residue limits (MRLs) for pesticides and levels for contaminants in a wide range of foods. This work is continuing through relevant Codex committees using the information provided by the Joint FAO/WHO Meeting on Pesticide Residues (JMPR) and the Joint FAO/WHO Expert Committee on Food Additives (JECFA). To assure FAO's continued support to provide up-to-date and appropriate science-based advice on matters related to food quality and safety, other *ad hoc* expert consultations are

also convened on topics of current interest. Recent examples include Joint FAO/WHO Expert Consultations on: Biotechnology and Food Safety; Application of Risk Analysis to Food Standards; Risk Management and Food Safety; Food Consumption and Exposure Assessment; Food Fortification: Technology and Quality Control (October, 1995); and the FAO Expert Consultation on Animal Feeding Practices and Food Safety.

9. In setting national MRLs some countries use the Codex MRLs directly, a few recognize them for important foods in the absence of comparable domestic MRLs, while others take the Codex MRLs into consideration as they develop their national MRLs. Problems regarding residue level differences between exporting and importing countries could arise due to the factors such as the different ways pesticides are used in the different countries and the absence of use of some pesticides in countries where the concerned crops are not grown or the pests do not occur.

#### **A. STATUS OF REGULATIONS**

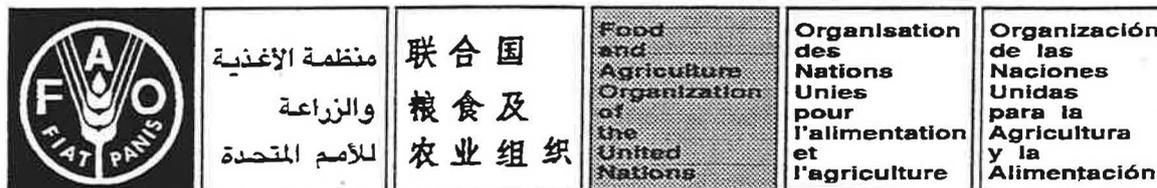
10. It has been observed that food control operation systems are more active in some developed countries than that of in some developing countries. It may be mentioned that neither a too stringent nor an absolutely relaxed regulation is desirable for a healthy international trade. What is important is that there has to be a total "mutual recognition" and "equivalence" (the situation of measures which are not identical but have the same effect) of requirements leading to harmonization between importing and exporting countries so that a balance is maintained on the status of regulations.

#### **B. BENEFITS OF THE REGULATIONS**

11. Positive nutrition campaigns in the recent years, particularly after the ICN, have stressed the nutritional value of fruits, including tropical fruits, and vegetables (especially yellow and dark green vegetables). A strong association between consumption of fruits and vegetables and prevention and control of micronutrient malnutrition, and possible protection from risks of certain non-communicable diseases has been recognized. National dietary guidelines and recommendations to increase both fruits and vegetables intake have generated awareness to the consumers for their nutritional and health benefit. Tropical fruits are today considered as an important dietary item for maintaining a healthy diet and lifestyle.

12. Given the nutritional benefit discussed earlier the outlook for tropical fruits is very promising. However, in order to be able to derive maximum nutritional advantage from these fruits it is essential that they are safe and wholesome. It is, therefore, evident that the developing countries (over 97 percent of world production and exports of tropical fruits originate in developing countries) have to bring their infrastructure to a level to meet Codex recommended standards, codes and guidelines.

March 1998



## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### THE TROPICAL FRUITS NETWORK

## I. INTRODUCTION

1. The International Consultation on Tropical Fruits held in Kuala Lumpur on 15-19 July 1996, recommended among other actions, the establishment of an FAO-sponsored global Network on Tropical Fruits (TFNET) to promote international cooperation in the production, consumption and trade of this commodity group. It further agreed that Malaysia should be the prime-mover in setting up TFNET.
2. Since then three countries, namely Malaysia, the Philippines and Thailand, have conveyed to FAO their ideas on the form and functions of the proposed TFNET. To supplement their ideas, FAO has reviewed other technical networks under its sponsorship and support. These included among others, the Association of Food Marketing Agencies in Asia and the Pacific (AFMA); the Asia Pacific Rural and Agricultural Credit Association (APRACA); the Animal Production and Health Commission for Asia (APHCA); and the Asia and Pacific Association of Agriculture Research Institutions (APAARI).
3. The aim of this note is two-fold:
  - i. to present different organizational models for consideration and possible adoption by the proposed TFNET; and
  - ii. to specify the tasks ahead leading to the establishment of TFNET.

## II. ORGANIZATIONAL MODELS

4. There is consensus on rationale, objectives and functions of TFNET. This was reached at the Consultation in Kuala Lumpur and reiterated by some of the participating countries in various related fora since then. Essentially, it is felt that a global network of producers and consumers could focus usefully on issues relating to production and trade of tropical fruits. TFNET would aim to help increase productivity and output, raise consumption and improve nutrition, increase

domestic marketing efficiency, and expand foreign trade of this hitherto neglected commodity group. It would promote cooperation in research and development; facilitate human resource development; and serve as a clearing house of information in this sub-sector.

5. Given this consensus on the aims and aspirations of TFNET, the remaining major decisions to be made concern the organization and governance of the proposed network. A number of proposals are presented below.

#### A. THE MALAYSIAN PROPOSAL<sup>1</sup>

6. In this proposal, a Board of Trustees made up of representatives of producing and consuming countries and chaired in turn by member countries governs TFNET. There would be three *ex officio* members on the Board: the Director of TFNET, a representative of the host country and a representative of FAO. It would meet at least once a year.

7. Membership in TFNET would be open to all member and associate member countries of FAO and concerned international organizations.

8. Malaysia proposes establishing the TFNET Secretariat in Kuala Lumpur. Preliminary discussions indicate that it intends to offer office and other facilities at the Malaysian Agricultural Research and Development Institute (MARDI), Serdang, free of charge to TFNET as well as staff and operating expenses over a period of three years. From the fourth year of operations, the bulk of the costs would be borne by member countries, donors and international organizations.

9. There would be strong linkages with FAO as TFNET would operate under the auspices of FAO and report to the Sub-Group on Tropical Fruits.

#### B. THE PHILIPPINE PROPOSAL<sup>2</sup>

10. The model proposed by the Philippines envisages a three-tier organization comprising a global network supported by regional and national networks.

11. The Global Network would be governed by an Executive Board including representatives from four regional networks, FAO and elected members. Headed by an Executive Officer or Director, the Global TFNET office would function mainly as an international coordinating body.

12. Each of the four regional networks for Asia, Africa, America including Latin America and the Caribbean, and Europe would have a regional office comprising the Regional Director, four fruit experts from the region and the required administrative support staff. These posts would be funded by the host country. The task of the regional network would be to coordinate research and development activities in the region. In this work, it would be guided by a Regional Technical Committee consisting of one representative from the global network and one representative from each of the member countries.

13. Each of the national networks would be managed by a National Coordinator who would be assisted by five or more professional staff and the appropriate number of administrative support staff. These personnel and office facilities would be funded by the member countries. The work of the national network would be to coordinate research and development activities within the country.

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<sup>1</sup> CCP: SG TF 98/CRS.7 - The Malaysian proposal

<sup>2</sup> CCP: SG TF 98/CRS.8 - The Philippine proposal

14. Appointments to posts at the global, regional and national levels would be for a period of two years with one possible reappointment.
15. The three tiers of networks would meet one or more times a year in different locations to allow wider participation by members.
16. The Philippines has offered to host the Regional Network for Asia at the Bureau of Plant Industry in Los Baños, Laguna. It further proposed to have its National Network at the Crops Research Division of the Philippines Council for Agriculture Resources Research and Development, which is also located in Los Baños.

### C. THE THAI PROPOSAL<sup>3</sup>

17. The Royal Government of Thailand suggested an option similar to that of the Philippines outlined above. The slight difference is in the make-up of the governing bodies.
18. There would also be three levels of governance: global, regional and national. At the global level, a Board of Trustees would be composed of:
  - a) six *ex officio* members namely, an FAO representative, coordinators of the four regional networks and the Executive Director of TFNET, and
  - b) six selected scientists and administrators from member countries.

Members of the first group would serve by virtue of their appointed posts while those of the second group would serve for three-year terms. The Board would set policy and advise on programming and funding.

19. Regional networks of the Asia-Pacific, Africa, Latin America-Caribbean and Europe-Near East regions would be established to implement regional activities. They would be governed by a Regional Coordination Committee made up of national coordinators of the region. Each one of them would be headed by a Regional Coordinator who according to the proposal, might be the FAO Regional Plant Production and Protection Officer.
20. In the member countries, national networks of concerned institutions would be set up. They would be advised by National Coordination Committees comprising representatives of concerned government and non-governmental agencies; and run by a National Coordinator appointed by the government.
21. There would be ordinary members and associate members of TFNET. Membership dues of ordinary members would be calculated from a formula based on area planted and export value. Associate members would be charged a fixed rate. The fees collected would go partly to fund regional activities and partly to support global initiatives.
22. Thailand has also offered to host the global secretariat of TFNET. It would provide office space and other facilities at the Horticultural Research Institute and fund staff costs and general operating expenses of the Secretariat including the salary of the Executive Director for the initial two-year period.

### D. OTHER CONSIDERATIONS

23. In reviewing the proposals from Malaysia, the Philippines and Thailand, it may be useful to also consider the strengths of various FAO technical networks (AFMA, APRACA, APAARI, APHCA) and contributory factors for good governance. These include among others: realistic, well-defined objectives; uncomplicated structural and functional organization; membership

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<sup>3</sup> CCP: SG TF 98/CRS.9 - The Thai proposal

*Inter-agency faster than Inter-gov.*

commitment particularly in funding; limited dependence on donors; a practical programme of work and budget; and continuity in leadership at the national and global levels.

24. Funding sources have included donor countries and member institutions and/or countries. Generally staff salaries are paid from annual membership dues while the network's activities are financed mainly from members' contributions in kind (travel and DSA of national consultants, research and training facilities, board and lodging of visiting trainees, etc.); international agency technical support funds; and donor country contributions in cash. Members also make extra-budgetary contributions on an *ad hoc* basis.

25. It is also important to note that some of the FAO technical networks work better when members are parastatals or autonomous institutions with authority to make funding and programme decisions. With such authority they can decide on foreign travel, offer to host training activities and make other research and development commitments without going back to the ministry concerned. AFMA with 29 member institutions from 12 countries is a prime example of such a professional association.

26. An idea that may be borrowed from the FAO Animal Production and Health Commission for Asia (APHCA) is the national currency fund. This fund is built up from regular or *ad hoc* contributions and managed by each member government. It is used to pay for TCDC activities undertaken within the country including training, publications, local consultants, studies, and research and development projects.

27. The national currency fund has been a useful feature of APHCA because:

- many developing countries find it easier to make contributions to the networks activities in domestic but not foreign currency;
- small annual or *ad hoc* contributions could be accumulated for major undertakings later on;
- contributions are voluntary and based on affordability whereas the benefits are shared equally; and
- fund administration by the network headquarters is minimized.

For these reasons, TFNET could probably benefit from such a national currency fund arrangement.

### III. TASKS AHEAD

28. Selecting the model for the network's structural and functional organization is one of several immediate decisions that must be made in the process of establishing TFNET. In addition, there are other tasks ahead, which could also be facilitated by actions taken at this stage. These include:

- providing additional guidelines for the constitution and by-laws particularly eligibility for membership, fees, operational procedures etc.;
- deciding on the location of the TFNET office;
- delegating responsibility for the drafting of the constitution and by-laws; and
- scheduling activities which would culminate in the establishment of TFNET.

Subsequent necessary actions include among others:

- convening a workshop to finalize the draft constitution and by-laws;
- convening a meeting for the founding of TFNET;
- registering TFNET in the host country; and
- approving the first Programme of Work and Budget developed by the head of TFNET in consultation with member countries/institutions.

These proposed actions might be scheduled as in the draft work plan in Annex Table 1.

#### IV. CONCLUSIONS

29. Several countries have expressed an interest in TFNET through statements in various FAO fora and in written communications. There appears to be a consensus on the broad objectives and functions.
30. In the follow-up discussions between FAO and several concerned countries, three issues have emerged. One concerns the location of the TFNET headquarters. At least two countries have expressed interest to host the global headquarters of TFNET. There may be others too.
31. The second issue is whether TFNET should have regional sub-groups to cover adequately the diverse interests of countries in five continents. In taking a decision on this matter, the number of members, diversity of tropical fruits of commercial interest as well as the potential funding would have to be taken into account. FAO's experience in setting up networks points to the importance of being realistic in aspirations and practical in approach. Based on participation in the Kuala Lumpur Meeting in 1996, no more than 20 member countries can be expected to join the network and perhaps a dozen to be active. It may be rational at this stage to concentrate on the global TFNET and to consider the need for regional networks at a later stage.
32. The third issue concerns membership – specifically would members be governments or national institutions? The type of membership selected has far-reaching consequences for network operations. A membership made up of institutions would mean that TFNET is a professional association dedicated to research and development of tropical fruits. The implications are: a potentially significantly high membership from multiple members per country; possibly larger budgets owing to more fee-paying members and *ad hoc* donations; a broader spectrum of disciplines represented by member institutions in each country i.e. marketing, cooperatives, trade, investment as well as production; and faster decision-making. It may be significant to note here that annual fees of member institutions in AFMA and APRACA are sufficient to pay staff salaries, equipment, office supplies, communications and other miscellaneous expenses of the network headquarters. On the other hand, if members are governments, the advantages would be: political commitment at a high level for TFNET actions; direct and stronger linkage with donors; and in some cases better access to state funds. Immediate consideration of this issue is necessary as it would determine the definition of the constitution and by-laws.
33. Other issues will likely emerge as details on financial and operational matters are considered. Experience indicates that they can be dealt with as they arise, as long as a schedule is established and adhered to as much as possible.



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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### EXTRACT FROM THE REPORT OF THE FIFTEENTH SESSION OF THE INTERGOVERNMENTAL GROUP ON BANANAS (Rome, 7-9 May 1997)

#### C. MATTERS ARISING FROM THE COMMITTEE ON COMMODITY PROBLEMS

30. The Group took note of the recommendations of the Sixty-first Session of the Committee on Commodity Problems (CCP) calling upon the Group to establish an interim Sub-Group on Tropical Fruits. Several delegations stressed the importance of tropical fruits for the improvement of nutrition, export earnings and food security in developing countries. The Group established the interim Sub-Group on Tropical Fruits with Terms of Reference as provided in document CCP: BA 97/10.

31. With regard to the decision of the CCP that the Sub-Group on Tropical Fruits should subsequently be merged with the Intergovernmental Group on Bananas into one Group with separate sub-groups dealing with bananas and tropical fruits, preferably having back-to-back sessions, several delegations stressed that such arrangements should not in any way detract from the high priority attached to work on bananas, which occupied a very special place in their economies and a prominent place in the world fruit trade.

32. The Group was informed that the Government of Thailand had offered to host the First Session of the Sub-Group on Tropical Fruits. The delegation of Thailand expressed the hope that all members of the Group would be able to attend that Session in Bangkok, probably in April 1998.

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### TERMS OF REFERENCE AND RULES OF PROCEDURE OF THE SUB-GROUP ON TROPICAL FRUITS<sup>1</sup>

#### I. TERMS OF REFERENCE OF THE SUB-GROUP ON TROPICAL FRUITS

1. The Sub-Group shall provide a forum for consultations on and studies of the economic aspects of production, marketing, trade and consumption of tropical fruits.
2. The field of competence of the Sub-Group shall include:
  - a) strengthening data collection, standardize presentation and improve dissemination of information on production, utilization, exports and imports of tropical fruits, both in the short- and long-term;
  - b) studies on the economic aspects of consumption, with special reference to the relations between consumption and prices, income, trade barriers and distribution systems, and studies on the possibilities of increasing world consumption, analyzing and improving the understanding of the markets to enable effective planning and programming;
  - c) studies of the efficiency and social aspects of the tropical fruit industry with particular reference to the improvement of nutrition and living standards of those engaged in the tropical fruit industry;
  - d) studies of economic problems of production, transportation, marketing and distribution of tropical fruits, including those of improvement of quality, with a view to developing recommendations for promoting the marketing of high quality tropical fruits at prices that are fair to both producers and consumers.

<sup>1</sup> The SGTF shall operate under the same Rules of Procedure as the Intergovernmental Group on Bananas.

3. The Sub-Group shall consider how best to deal with any special difficulties which may exist or may be expected to arise and shall submit reports and/or recommendations on the subject to the Intergovernmental Group on Bananas.

## **II. RULES OF PROCEDURE OF THE INTERGOVERNMENTAL GROUP ON BANANAS<sup>1</sup>**

### **A. OFFICERS**

1. The Group shall elect at each of its sessions a Chairperson, a first Vice-Chairperson and a second Vice-Chairperson from among the representatives of its eligible Members who shall remain in office until the election of a new Chairperson and Vice-Chairpersons.
2. The Chairperson, or in his absence one of the Vice-Chairpersons, shall preside at meetings of the Group and exercise such other functions as may be required to facilitate its work. In the event of the Chairperson and the Vice-Chairpersons not being able to preside at a meeting, the Group shall appoint the representative of one of its eligible Members to take the chair.
3. The Director-General of the Organization shall appoint a Secretary who shall perform such duties as the work of the Group may require and prepare the records of the proceedings of the Group.

### **B. SESSIONS**

1. The Group shall normally hold its sessions every two years and shall only hold such sessions in each biennium as are listed in the Programme of Work of the Organization for the relevant period. However, the Director-General may, if requested by the Group or by its Chairperson, or on his own initiative, exercise his authority to hold sessions not provided for in the current Programme of Work when in his view such action is necessary for the fulfilment of the Programme of Work as approved by the Conference. The Director-General shall report any such unscheduled sessions to the next Session of the Council.
2. Any number of separate meetings may be held during each session of the Group.
3. The sessions of the Group shall be held at places to be decided, in consultation with the Director-General, by the Group or by the Chairperson.
4. Notice of the date and place of each session shall be communicated to all Members of the Group and to participating observer nations, Associate Members and organizations at least two months in advance.
5. Each Member of the Group shall have one representative. Such Member may appoint an alternate and advisers to its representative on the Group.
6. Presence of the representatives of a majority of the Members of the Group entitled to vote shall constitute a quorum for any formal action by the Group.

### C. ATTENDANCE

1. Participation of international organizations in the work of the Group shall be governed by the relevant provisions of the Constitution and the General Rules of the Organization as well as by the rules on relations with international organizations.
2. Attendance in an observer capacity by Non-Member States of the Organization at sessions of the Group shall be governed by the principles relating to the granting of observer status to nations adopted by the Conference.
3. Meetings shall be held in private, unless the Group decides otherwise.
4. Any Member Nation or Associate Member of the Organization which is not a Member of the Group, or any non-member state invited to attend a session of the Group in an observer capacity, may submit memoranda on any item on the agenda of the Group and participate without vote in any discussion at a public or private meeting of the Group, unless in exceptional circumstances the Group decides that it is necessary, in the interest of the Organization, to restrict attendance to the representative of each Member Nation and Associate Member of the Organization.
5. Members of the Group that have been unrepresented at three consecutive sessions of the Group shall be requested by the Director-General to state whether they intend to maintain membership in the Group or whether they would wish to be considered as observers.

### D. AGENDA AND DOCUMENTS

1. The Director-General, in consultation with the Chairperson of the Group shall prepare a provisional agenda and circulate it at least two months in advance of the session to all Members of the Group and to participating observer nations, Associate Members and organizations.
2. Any Member of the Group or any Member Nation of the Organization or Associate Member acting within the limits of its status may propose to the Director-General the insertion of an item on the provisional agenda. The Director-General shall thereupon circulate the proposed item to Members of the Group and to participating observer nations, Associate Members and organizations together with any necessary papers.
3. The Group in session may by general consent amend the agenda by the deletion, addition or modification of any item provided that no matter referred to it by the Committee on Commodity Problems or on the request of the Council or Conference may be omitted from the agenda.
4. Documents not already circulated shall be dispatched with the provisional agenda or as soon as possible thereafter.

### E. VOTING

1. Subject to the provisions of paragraph 2 of this Rule, each Member of the Group shall have one vote.
2. Associate members participating in the work of the Group as Members of the Group shall not hold office nor have the right to vote.
3. The decisions of the Group shall be ascertained by the Chairperson. If it does not prove possible to reach a decision by general consent, the Chairperson shall resort, upon the request of one or more representatives of Members of the Group, to a vote, in which case the pertinent provisions of Rule XII of the General Rules of the Organization shall apply *mutatis mutandis*.

## **F. RECORDS AND REPORTS**

1. Each session of the Group shall report to the Committee on Commodity Problems. The report of the Group shall embody its views, recommendations and decisions, including, when requested, a statement of minority views.
2. Reports of sessions shall be circulated to all Members of the Group and shall be made available for information to all Member Nations and Associate Members of the Organization and to Non-Member States invited to attend the session as well as to interested international organizations entitled to be represented at the session.
3. Subject to Rules C.4 above and F.4 below, records of sessions shall be circulated to all Members of the Group and observer nations, Associate Members and organizations having attended the session.
4. Whenever a meeting of the Group is restricted to representatives of each Member Nation and Associate Member of the Organization in accordance with the provisions of Rule C.4 above, the Group shall at the beginning of that meeting decide whether a record of the meeting shall be kept, and, if so, what circulation, not exceeding that provided for in Rule F.3 above, shall be given to it.
5. The Group shall determine the procedures in regard to press communiqués concerning its activities.

## **G. SUBSIDIARY BODIES**

The Group may when necessary establish subsidiary bodies subject to the necessary funds being available in the relevant chapter of the approved budget of the Organization, and may include in the membership of such subsidiary bodies Member Nations and Associate Members of the Organization that are not members of the Group.

Before taking any decision involving expenditure in connection with the establishment of subsidiary bodies, the Group shall have before it a report from the Director-General on the administrative and financial implications thereof.

The Group shall determine the Terms of Reference of its subsidiary bodies which shall report to the Group.

## **H. SUSPENSION OF RULES**

Any of the foregoing Rules of Procedure of the Group may be suspended by the Group provided that twenty-four hours' notice of the proposal for the suspension has been given and that such action is consistent with the Constitution and the General Rules of the Organization. Such notice may be waived if no Member objects.

## **I. AMENDMENT OF RULES**

The Group may decide, by a two-thirds majority of the votes cast, to amend its Rules of Procedure, provided that such amendments be approved by the Committee on Commodity Problems and are consistent with the Rules of Procedure of the Committee.

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### POSSIBLE PRIORITIES OF THE SUB-GROUP ON TROPICAL FRUITS

#### I. INTRODUCTION

1. This document presents a possible strategy for the overall improvement and development of tropical fruits. Such a strategy, outlining problems affecting the commodity group, and measures required to deal with these, is intended to provide the wider context within which specific development projects can be considered. To assist the Sub-Group in formulating a strategy statement, this document contains suggestions for major aspects which might be included. The Sub-Group is requested to review, comment and provide any additional suggestions which it considers relevant for the elaboration of a strategy statement.

2. The Sub-Group should note that specific project proposals emanating from it will be considered by the Common Fund for Commodities (CFC) not only in the context of the overall strategy, but also in relation to the priorities for project financing and the criteria which have evolved in the CFC to maximize the impact of its operations. Thus, for example the CFC has tended to favour projects expected *inter alia* to have an early measurable impact, which command sizeable co-financing resources and which have a potential to benefit the least developed countries.

#### II. POSSIBLE ISSUES FOR CONSIDERATION

3. Tropical fruits are an important source of income, at both the farm and export level, for most of the producing developing countries. However, in terms of exports, tropical fruits are relatively new to import markets, and therefore suggested actions may include quality improvement, the identification and development of new markets, market promotion and the investment in appropriate technology and infrastructure to meet the sanitary and phytosanitary requirements of import markets. In the following sections these actions have been grouped into

categories, and the Sub-Group may wish to discuss these as well as identify other specific measures which it considers necessary to improve **the economic viability and sustainability of the world tropical fruits economy**.

#### **A. FOSTERING MARKET EXPANSION**

4. A major strategy to increase the viability and sustainability of the global tropical fruit economy would be through the expansion in demand, particularly in new and potential growth markets. A larger demand base would translate into higher returns to producers and exporters. Within this priority, programmes may aim at:

- fostering consumption in underdeveloped markets, including markets in developing countries;
- enhancing and sustaining market promotion efforts; and
- encouraging liberalization of imports.

5. In fostering market expansion, the Sub-Group is reminded of the need for parallel improvement/development in the following areas:

- physical market development;
- enhancement of market infrastructure and support services to facilitate private sector initiatives;
- institution-strengthening including training at all levels;
- improvement of commodity market risk management and commodity trade financing capacities;
- policy advice on commodity market development.

#### **B. IMPROVED MARKET TRANSPARENCY**

6. Transparency is necessary to reduce market distortions. Apart from the dissemination of timely market information and intelligence on supply, demand and prices, there is a need to conduct market research in order to better understand the structure and functioning of existing, new, and potential growth markets. There is also a need to better understand distribution channels and to find ways to minimize physical marketing and trading risks. Measures to support these objectives may include the development of quality standards and grading, and the improvement of collection and warehousing systems.

#### **C. DEVELOPMENT AND IMPLEMENTATION OF IMPROVED TECHNOLOGY AND ALTERNATIVE QUARANTINE TREATMENT**

7. In an increasingly competitive environment, the development and implementation of new technologies and farm management practices are of paramount importance to improve productivity and quality and thus to better meet market requirements. In addition, to meet phytosanitary requirements of import markets, particularly as the traditional fumigation with methyl bromide is being phased out, alternative cost-effective treatments must be identified and appropriate infrastructure constructed.

#### **D. PRIORITY SETTING**

8. In setting priorities for project identification and development, the Sub-Group may wish to indicate those areas which it considers as having a significant measurable impact on the problems faced by the world tropical fruits economy.

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### POSSIBLE PRIORITIES OF THE SUB-GROUP ON TROPICAL FRUITS

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#### IDENTIFICATION OF SUITABLE MEASURES (ACTION PROGRAMME WITH PRIORITIES) TO DEVELOP POTENTIAL OF THE COMMODITY AND/OR ADDRESS ANY PROBLEMS

The measures shall contribute to improving the structural conditions in markets and enhancing the long-term competitiveness and prospects of a particular commodity. Examples of possible measures are:

- (a) Research on and development of new end-uses, <sup>fishery</sup> development of new plant varieties for higher yield and resistance to disease and climatic adversities, increase in mineral recovery, etc;
- (b) Improvement of the international competitiveness of the commodity through higher productivity or reduction of post-harvest losses; improved processing methods; improvements in the quality and technical composition of products; development, adaptation and transfer of technology etc;
- (c) Promoting consumption of commodities, their products, by-products and derivatives through stimulation of demand as well as the development and commercialization of new products and opening of new markets;
- (d) Horizontal and vertical diversification; <sup>marketing</sup>
- (e) Improvement of marketing, quality assurance, trading and transport;
- (f) Sustainability of production and use, environmental concerns.

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

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**PROJECT CONCEPT: AFRICAN FRUIT FLY INITIATIVE<sup>1</sup>**

<sup>1</sup> Submitted by the International Fund for Agricultural Development for discussion by the Sub-Group on Tropical Fruits.



**Rationale:**

1. Europe and the Middle East are the major destination markets for the fruit exported from East Africa. Recently, the countries in both regions are becoming increasingly concerned about fruit fly quarantine and fruit quality. Lack of expertise in fruit fly management is one of major factors limiting quality fruit production in the region.
2. Trade promotion has recently become one of the key objectives for several donor agencies. However, expanding fruit production and export will greatly increase the risk of translocating fruit flies within Africa and to other tropical regions of the world.
3. To date, very little research on African fruit flies has been conducted in Africa, and for many native African fruit flies of economic importance, such as mango fruit fly, *Ceratitits cosyra*, the range of control and monitoring methods available is very limited. Also, the existing regional programs for fruit fly control operate mainly in the United States, Latin America, Asia, Mediterranean and Pacific Regions, and none in East Africa.

**Proposed Programme:**

4. The 5-year Initiative represents a unique multi-disciplinary and multi-institutional effort to develop, test and adapt sustainable fruit protection technologies for African fruit growers. It is based on a demand-driven agenda drafted after consultations with local fruit growers and over 30 collaborators from the United States, Latin America, Europe, the Middle East, Indian Ocean Islands and Africa. It comprises seven activities assembled into three major segments focused on; (A) applied research and technology validation targeting African countries, (B) exploration for new agents for biological control of fruit flies and, (C) study biodiversity of African fruit flies to assist fruit fly management and quarantine operations world-wide.
5. The strategic, applied segment of the Initiative targeting African countries, is focused on adaptive research, technology development, validation and transfer. This segment is targeting smallholder fruit producers particularly in East Africa and the pilot operations was developed in response to the requests from farmers from Kenya, Tanzania, Sudan and Uganda, after conducting preliminary surveys and socio-economic assessments. It comprises three main operations, which are inter-linked and mutually dependant. They cover three major aspects of technology development and transfer, and a post-harvest management and marketing:
  1. Package development: Improvement and adaptation of detection, monitoring and control methods of African fruit flies.
  2. Pilot operations: Package validation and evaluation under smallholders conditions in the pilot areas: Nguruman (Kenya) and Pemba-Zanzibar (Tanzania).
  3. Assessment of package applicability: Management of African fruit flies (assessment of the applicability of the package in other areas in East Africa, and later on, in West Africa as well).
  4. Technical support to smallholders in Kenya and Tanzania for post-harvest management of fruits and fruit-flies and effective marketing of their fruits. This operation is designed to establish the financial viability of the developed technology.

**Expected Outputs:**

6. The expected outcomes of the first (applied) segment of the Initiative are that: relative efficiency of the existing fruit fly attractants against native African fruit flies of economic importance will be tested and their implications for development of control methods and quarantine will be evaluated; potential attractants from various cultivated and wild/indigenous fruits will be identified and evaluated; a package of effective fruit protection and pest management methods will be selected, validated and introduced in the target locations of the pilot projects; fruit fly species composition in East Africa, their pest status and major

environmental reservoirs, seasonality and shifts between different fruits will be described; 15-25 specialists in fruit fly control methods will be trained; training materials/workbooks about the fruit fly pest status and recommended control methods in the region will be published.

7. The expected outcomes of the second (biological control) segment of the Initiative are that: candidate agents for biological control of fruit flies (parasitoids and pathogens) will be identified, evaluated and made available for control programs in Africa and other tropical regions.

8. The expected outcomes of the third (biodiversity) segment of the Initiative are that: genetic variability and relationships among different populations of selected native African fruit flies will be assessed; the information collected to date in Africa on fruit flies, their natural enemies and host plants will be compiled; their distribution will be mapped; a CD database will be published and made available on Internet; 15-20 para-taxonomists on African fruit flies and their parasitoids will be trained.

**Summary Cost/Financing:**

9. The total cost of the three segments of the Initiative is estimated as US\$5 200 000. The estimated cost of the three segments are given below. In the first (applied) segment, the cost of applied research represents about 30 percent of the total cost, while the remaining part covers costs of training and capacity building, and also technology validation and transfer in pilot operations

<b>Component A:</b> the first (applied) segment	- US\$3 300 000
<b>Component B:</b> the second (biological control) segment	- 900 000
<b>Component C:</b> the third (biodiversity) segment	- 1 000 000
<b>TOTAL</b>	<b>- US\$5 200 000</b>

? ICiPE already collaborate USDA, not NRI ?

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### DEMAND PROSPECTS FOR PROCESSED TROPICAL FRUITS <sup>1</sup>

<sup>1</sup> This document was prepared by Mr Rudy Kortbech-Olesen, Senior Market Development Adviser, International Trade Centre UNCTAD/WTO for the First Session of the Sub-Group on Tropical Fruits.

## A. INTRODUCTION

Tropical fruit products are sold in a variety of processed or semi-processed forms, the following three product groups being the main ones: *Canned fruit* ("prepared or preserved"); *Fruit juices, juice concentrates and fruit pulp/purée*; and *Dried/dehydrated fruit*.

## B. WORLD SUPPLY

With the exception of a few major items there are no statistics on world production of tropical fruit. However, according to the FAO Production Yearbook, the total world crop of bananas amounted to 55.8 million tons in 1996, followed by mango with 19.2 million tons, pineapples (11.8 million tons) and papayas or pawpaws (5.9 million tons). Plantains (29.7 million tons) and avocados (2.1 million tons) are not included in this paper. For the purpose of comparison, it should be noted that the total world crop of oranges amounted to 59.6 million tons in 1996, and that of apples amounted to 53.7 million tons.

The FAO statistics provide a breakdown by regions and countries for the above fruit, but do not specify other tropical fruit. The figures include total production of fresh fruit, whether used for fresh fruit consumption or animal feed, or processed into various products, including those covered by this paper. No figures are given on the utilization of the fresh fruit production, and there are no figures on global production of processed tropical fruit products.

## C. WORLD TRADE AND MARKET SITUATION BY PRODUCT GROUP

### CANNED TROPICAL FRUIT

#### World trade

Pineapple continues to be the most important canned tropical fruit, followed by tropical fruit cocktails (tropical fruit salads), lychee, mango and papaya.

With total world imports of canned pineapple amounting to \$739 million in 1996, it is not only the biggest canned tropical fruit in world trade but also the largest item of any processed tropical fruit traded. The United States is by far the biggest importer with \$228 million in 1996, corresponding to about 31% of total world trade, by value. Together, the five biggest markets, including also Germany, Japan, the United Kingdom and the Netherlands, accounted for 64% of the total. See table 1.

The major supplying countries are Thailand (by far the biggest with about 42% of total world exports in 1996), followed by the Philippines, Indonesia, Kenya, Malaysia and South Africa. Singapore, the Netherlands, Germany and Belgium are re-exporters only, though they account for a substantial share of world trade. See table 2

No figures exist for other canned tropical fruit, though importers in some markets indicated that sales might reach up to 5% of canned pineapple sales. However, this estimate seems to be too high in most markets. Thailand appears to be by far the largest supplier of most of these products.

### Market segments

The retail sector is estimated to absorb around two-thirds of canned pineapple sales in most markets, while catering and the food industry (including the bakery industry) account for the balance. For canned pineapple the bakery industry is a very important outlet. Other tropical fruit are sold almost entirely for retail though some quantities go to catering (e.g. lychee for Chinese restaurants).

### Product characteristics

**Pineapple** is sold in the following main forms: slices (mainly for retail), tidbits, chunks, pieces and crushed (mainly for catering/industry). **Tropical fruit cocktails** usually contain pineapple, papaya (red and/or yellow), guava and banana in light syrup and/or passion fruit juice. Some packs may include other fruit, e.g. rambutan, longans or mango. Traders in some markets indicated a growing interest amongst consumers for tropical fruit cocktails.

After pineapple, **mango** (mainly slices) is probably the most important canned single fruit product, followed by **lychee**, **papaya**, red or yellow (chunks or dice) and **guava** (quarters, halves or dice). **Other tropical fruit** include rambutan, jack fruit, pitahaya (slices) and kumquat though sales of these products are relatively small. In some markets, e.g. France, there is a growing market for canned **coconut milk**.

Other canned fruit include two-fruit products. A Thai producer, for example, exports papaya/pineapple, pineapple/ mango and papaya/mango, all packed 50/50. Rambutan stuffed with pineapple is exported by Thailand and Viet Nam.

## TROPICAL FRUIT JUICES, CONCENTRATES AND PULP/PUREE

### World trade

In 1996, world imports of fruit juices and concentrates reached \$6.438 million, having fluctuated heavily in recent years, though it should be noted that world trade has increased very considerably over the last two decades. By far the largest share of world trade in fruit juices consists of citrus juices (mainly orange) and temperate-zone fruit juices, e.g. apple juice, whereas tropical fruit juices and concentrates accounted for the balance (about 5%). These figures do not include trade in pulp/purée.

Pineapple juice (mainly concentrate) is by far the most important tropical fruit juice. In 1996, world imports amounted to \$372 million, while they fluctuated enormously since 1990 and peaked at \$383 million in 1991. The fluctuations were caused by great variations in supply rather than demand factors, though there has been a considerable increase in world trade in pineapple juice over the last decade. See table 3.

Imports of pineapple juice into the five largest markets, i.e. the United States, the Netherlands, Spain, France and Germany, amounted to \$256 million in 1996 or 69% of world

imports. The three largest suppliers of pineapple juice/concentrate, Thailand, the Philippines and Indonesia, together account for over half of total world exports. Other important suppliers are Kenya, Costa Rica, South Africa, the United States and the Dominican Republic. Again it should be noted that world trade includes a very large amount of re-exports (mainly from the Netherlands and Germany). See table 4.

With the exception of pineapple, there are no reliable statistics on world trade in tropical fruit juices, concentrates and pulp/purée. However, based on information from trade sources and fragments of trade statistics, annual world trade in these products (excluding pineapple) can be estimated in the range of 185,000 to 210,000 tons in single strength equivalent, valued at between \$175 and \$225 million. The three most important tropical fruits, apart from pineapple, are banana, passion fruit and mango. The major markets are the European Union and the United States.

#### Market segments

Though there is a certain trade in consumer-packed items, fruit juices, concentrates and pulp/purée continue to be traded internationally, mainly in bulk form, and used as a raw material by various industries. Though they vary with the fruit and market in question, a few end-uses are common to most markets:

- The beverage industry is by far the biggest end-user of these products. It produces juices, nectars, fruit juice drinks, multi-fruit and multi-vitamin beverages, alcoholic liqueurs, syrups, etc.
- The dairy industry produces such items as yoghurt, yoghurt drinks, ice-cream, pudding desserts and sauces. In addition to fruit juices/concentrates and pulp/purée, this industry also uses tropical fruit pieces, chunks, titbits, etc. in either frozen or canned form.
- Other food industries produce a range of products, containing some tropical fruit, such as bakery products, baby food, jams and confectionery. The baby food industry is the largest end-user of banana purée.

#### Product characteristics

**Pineapple** juice/concentrate - the largest item - is mostly traded as a 60-65°Brix concentrate, frozen or aseptically packed. The main suppliers are mentioned above.

**Passion fruit** is sold as juice (14-16°Brix) and mainly as a concentrate (50°Brix), preferably in frozen form because of quality reasons (aroma/flavour). Main suppliers include Ecuador, Brazil, Peru and Kenya (45°Brix). **Mango** is sold as pulp (13-18°Brix) or concentrate (28-32°Brix), mainly frozen and aseptically packed. Main suppliers include India, Peru and Ecuador. **Guava** is sold mainly as purée (8-11°Brix) and as a concentrate (20-25°Brix), frozen but also in aseptic packs. Main suppliers include South Africa, Malaysia, India, etc. **Papaya** is sold as pulp (9-10°Brix) and concentrate (21-25°Brix), in frozen form and aseptic packs. Main suppliers include India, Peru, Brazil, etc.

**Other tropical fruits**, most of which are sold in fairly small quantities include: acerola (purée and concentrate), mainly from Brazil; cherimoya (pulp) from Venezuela, Brazil and Ecuador; guanabana/soursop (pulp) from Peru, Colombia and Venezuela; and lychee (concentrate), starfruit (concentrate) from Malaysia.

In general, aseptically packed tropical fruit concentrate and pulp/purée tend to be better accepted in the United States than in Europe, though, of course, it will depend on the type of fruit and end-use in question.

## **DRIED/DEHYDRATED TROPICAL FRUIT**

### World trade

As separate trade statistics on dried/dehydrated tropical fruit are not available, it is impossible to give a precise overview of world trade in this product group. However, rough estimates put total world trade at around 30,000-35,000 tons, valued at an estimated \$65 million (including banana chips and dried bananas). This constitutes only a small part (about 5%) of total world trade in all dried fruit, including temperate-zone, subtropical and tropical.

On the basis of information from trade sources and fragmented data, world trade in dried/dehydrated tropical fruit can be estimated as follows: dried bananas (6,000-8,000 tons), banana chips (12,000-15,000 tons), dried/dehydrated pineapple (5,000-6,000 tons), dried/dehydrated papaya (4,000-5,000 tons), other dried/dehydrated tropical fruit, e.g. mango, guavas, kumquats, etc. (3,000-4,000 tons). The figures do not include coconut chips and dice. The major markets are the European Union (mainly Germany, France, the United Kingdom and the Netherlands), the United States and Japan.

### Market segments

Consumers in the main markets have a long tradition of eating dried fruit (i.e. sun-dried) and nuts, whether temperate-zone or subtropical, e.g. dates and figs, sultanas, raisins and apricots.

Dehydrated (mainly hot-air dried) fruit, and tropical fruit in particular, fall into another category and offer, at least to some extent, additional end-uses. Though they vary somewhat with the type of fruit in question, the main end-users described below form market segments common to most markets.

- The dried fruit and nut industry is the largest end-user of dried/dehydrated tropical fruit. It produces a wide range of products, the most popular being fruit and nut mixes, though some tropical fruit are also sold in single-fruit packs, such as banana chips, pineapple pieces or slices, and papaya pieces or spears.
- The breakfast cereal industry is believed to be the second largest end-user of dried/dehydrated tropical fruit, e.g. in *müsli*. Tropical fruit is used more for appearance (because of their strong colours) than for flavour.

- The confectionery industry uses dried/dehydrated tropical fruit in various products like health bars, snack bars, *müsli* bars, fruit bars and chocolate bars, which are often taken as a snack between meals.
- Several other food products may include some dried, dehydrated or even freeze-dried tropical fruit, e.g. bakery products, dairy products, baby food, rice packs, prepared dishes, instant desserts and fruit teas.

#### Product characteristics

Dehydrated **pineapple** (second largest item after banana) is sold in a number of different cuts (e.g. diced, in granules, tidbits, rings/slices). The colour should be light yellow or gold. Thailand is by far the biggest exporter, but supplies are also coming from the Philippines, South Africa, Taiwan Province (China) and other areas.

**Papayas** are likewise sold in all markets; though the fruit is less well known among consumers, it is appreciated by food manufacturers and packers. Dehydrated papaya is imported diced, in granules, chunks and spears. The colour should preferably be a natural red, which is supplied by Thailand. The lesser accepted white and other lighter colours are supplied by Thailand, the Philippines and Taiwan Province (China).

**Mangoes** in dehydrated form are little known by consumers and are sold in much smaller quantities than the above fruit. However, end-users in several markets have indicated an interest in buying more of this fruit if prices were lower. Mango prices are usually up to twice as high as those for pineapple and papaya. The leading suppliers are Thailand, India and the Philippines, followed by Taiwan Province (China) and Malaysia. Dehydrated mango is imported in dice, granules, chunks, slices, spears, and as powder. The colour should preferably be yellowish orange.

**Other tropical fruits** are sold in very small quantities, though packers and end-users are interested in experimenting with new fruit, if available. Dehydrated fruit in this category include:

Guavas, kumquats, durian, starfruit, jack fruit, guyabanos, longans, crystallized ginger and stargooseberry.

Most importers and end-users usually have their own, usually strict, specifications, which suppliers have to meet. The buyer will specify cut/style, moisture content, sugar content, whether the product should be with or without SO<sub>2</sub>, etc. Pineapple, for example, is usually offered in three forms: regular sugar (75-85%), low sugar (50-65%) and no sugar (40% natural sugar content).

It should be noted that tropical fruit is also offered by some producers in freeze-dried form. These products are of very high quality and are used for special purposes, e.g. instant desserts and *müsli*. Prices are high and the market is reported to be very small, though sales may be increasing due to new end-uses by the industry.

## D. MARKET PROSPECTS BY PRODUCT GROUP

### **Canned tropical fruit**

In general, the world market for canned tropical fruit suffers from the overall stagnation in canned fruit sales, as consumers, and young consumers in particular, prefer to buy fresh fruit or for certain end-uses even frozen fruit. However, canned pineapple is expected to remain the most important processed tropical fruit item for the foreseeable future. Both the United States and the European Union markets for canned pineapple are expected to stabilize around their present size. Other traditional markets also seem to be fairly mature, while new markets, for example, in Central and Eastern Europe, are more likely to offer growth possibilities, at least in the longer run. However, the pineapple business is not just a result of demand forces and the development will, to a very large extent, depend on the supply situation in the major producing countries, including the effects of El Niño as seen in recent months.

There is a growing demand in several European markets for tropical fruit salads thanks to a certain general interest in tropical products amongst consumers. Processors in developing countries also seem to be pushing this product more aggressively than in the past, as a means of diversifying their exports. It helps them to better utilize their production capacity and keep their unit costs down. Two-fruit products, e.g. papaya/mango, are increasingly being introduced in major markets, which is likely to increase overall sales of these fruit, though from a low level. As shown above, the market for individually canned fruit (excluding pineapple) is small, though a few products, e.g. canned mango, canned lychee and canned papaya, sell relatively well. Again the growing interest in tropical products as such may have a positive effect on future sales.

### **Fruit juices, concentrates and pulp/purée**

Though world trade in fruit juices (tropical and non-tropical) has fluctuated considerably, in value terms, during recent years, most major markets have increased in volume terms during the same period. In general, the world market for fruit juices is expected to show further growth in the future, *inter alia*, because of a low per capita consumption in many markets and a growing health consciousness in most markets.

Considering more specifically tropical fruit juices, concentrates and pulp/purée, traders generally expect sales of these products to grow at least at the same rate as the juice market as a whole, and in some cases even more. Again the fruit juice business and related food industries are expected to benefit from the general interest in tropical fruit, including fresh produce, in most markets.

The major markets in the European Union and the United States are expected to remain the most important outlets for tropical fruit juices, concentrates and pulp/purée, whereas, for example, Japan and the Republic of Korea are less interesting markets for this product group. On the other hand, there are some growing markets in Asia (though recent economic and financial developments are likely to have a negative effect, at least in the short to medium term) and Latin America, including some of the traditional exporting countries, e.g. Brazil (passion fruit juice).

Again, the future export development for several tropical items will also depend on the supply situation in major producing countries. As mentioned above, the El Niño effect has caused supply disturbances for pineapple, for example in the case of Thailand and Indonesia. Similar problems have occurred in Latin America, e.g. for mango (in particular Peru) and for passion fruit (Ecuador). At the time of report writing it is very difficult to predict what the possible long-term effects of El Niño will be.

### **Dried/dehydrated tropical fruit**

As shown above, the dried/dehydrated tropical fruit trade is fairly small compared with the trade in the other processed tropical fruit products discussed here. However, it is an important business for those exporters involved in it. Though dried banana and banana chips have been known in major markets for a long time, the market for dried/dehydrated fruit such as pineapple, papaya and mango has developed only comparatively recently, say within the last decade. Thanks to heavy promotion by dried fruit and nut packers and food processors, e.g. *müsli* manufacturers, imports of this product group reached their current level fairly easily, but have not increased much during the last few years.

Traders in Europe and the United States are generally of the opinion that the market is more or less stagnant, and that little growth can be expected in the near to medium term. One of the impeding factors is that the taste of dehydrated tropical fruit is an acquired one for most consumers. Another factor is the high sugar content of dehydrated tropical fruit, which, to some extent, is detrimental to its success as a health food.

However, in the longer run, world trade in dehydrated tropical fruit may expand further. This will depend on the world economic situation, on the emergence of new markets and, in particular, on innovative product development by producers of dehydrated fruit and the food industries. It is interesting to note that some producers are actually experimenting with new product forms, e.g. rehydratable fruit, products with longer shelf life, items with lower sugar content, and new variations in product cuts. At the same time food producers are introducing more products with dehydrated fruit as an ingredient. It is also encouraging that exports are taking place to non-traditional markets, e.g. China is importing dehydrated papaya and pineapple.

### **Other forms of processed tropical fruit products**

In addition to the three major product groups, discussed above, there are several other processed or semi-processed tropical fruit products.

There is, for example, a growing market for frozen tropical fruit, e.g. pineapple, mango, papaya and banana, in slices, pieces, chunks, titbits, dice, cubes, etc., dependent on the fruit in question (mainly IQF as opposed to block-frozen). These products are used as ingredients in bakery products, dairy products, baby food, fruit salads, etc.

Smaller export markets exist for tropical jams, jellies, syrups, and other retail-packed tropical fruit products, though such products are usually produced by domestic manufacturers, e.g. in Europe, from imported raw material such as those mentioned above.

### **Organically produced tropical fruit**

ITC has just started a market research project on organic food and beverages, which will cover most foodstuff of interest to developing countries, including tropical fruit to the extent that information is available. Several countries in Europe, as well as the United States and Japan constitute the major markets for organic products. Though its share of the total foodstuff market is still small (typically in the 0.5-2.5% range), the organic market is reportedly growing rapidly, and developing countries should be aware of these developments, which offer certain opportunities for tropical fruit.

Currently, organically grown tropical fruit is mainly exported in fresh form, e.g. avocados (Israel, South Africa), mangoes (South Africa, India), pineapples (Ghana), bananas (Dominican Republic, Costa Rica, Honduras, Uganda), papayas (Israel, Brazil), litchees (South Africa). However, some processed tropical fruit products are also in demand, e.g. banana purée (e.g. for the baby food industry, pineapple juice, dried fruit (like pineapple, mango and banana) for dried fruit packs, *müsli* and as ingredients in various forms of processed food.

### **Summary on prospects for processed tropical fruit**

In summary it can be concluded that total world trade in processed tropical fruit has reached an estimated \$1,500 million in 1996, an impressive figure by most standards, its importance being accentuated by the fact that it is supplied almost entirely by developing countries. Canned products are the most important category, in terms of total export value, with canned pineapple accounting for over half of total sales in processed tropical fruit, followed by juices, concentrates and pulp/purée, which are mainly traded internationally in bulk form and used as raw material by various industries. As shown, dried/dehydrated tropical fruit is traded in relatively small quantities. Among these major product categories, fruit juices, concentrates and pulp/purée appear to offer, by far, the best prospects for a long-term increase in exports. As indicated, the demand for organic tropical fruit is growing, though the market is still very small.

Table 1

## Imports of canned pineapple by top 25 importers, 1992 - 1996

Value US\$ '000

Importing countries (SITC.3: 05893)	1992		1993 Value	1994 Value	1995 Value	1996	
	Value	% of tot.				Value	% of tot.
United States	256,474	31.7	240,842	207,449	185,299	228,468	30.9
Germany	95,622	11.8	74,979	80,178	65,785	96,206	13.0
Japan	62,536	7.7	61,685	66,492	59,041	52,096	7.0
United Kingdom	56,289	6.9	43,397	31,604	40,407	51,679	7.0
The Netherlands	26,399	3.3	44,766	29,033	29,762	47,442	6.4
France	35,942	4.4	25,779	27,320	28,889	30,114	4.1
Spain	28,420	3.5	20,679	19,399	19,141	24,950	3.4
Italy	23,533	2.9	16,629	15,347	16,299	21,898	3.0
Canada	23,384	2.9	20,417	15,740	16,017	20,840	2.8
Belgium-Lux.	18,691	2.3	16,498	15,581	14,381	17,187	2.3
Singapore	35,757	4.4	28,042	26,535	23,276	15,571	2.1
Argentina	6,622	0.0	8,677	7,859	10,386	13,626	1.8
Finland	16,011	2.0	11,550	13,967	6,395	13,080	1.8
Korea Rep.	17,840	2.2	9,900	12,869	13,159	12,744	1.7
Switzerland	12,077	1.5	8,907	9,262	9,025	9,985	1.4
Sweden	12,036	1.5	7,762	11,246	5,787	8,622	1.2
Portugal	9,581	1.2	6,510	4,669	5,520	8,397	1.1
New Zealand	8,714	1.1	7,771	6,831	7,445	8,025	1.1
China,H.Kong	7,682	0.0	5,549	6,057	8,035	7,629	1.0
Austria	6,724	0.8	6,508	8,767	3,649	7,213	1.0
Norway	6,499	0.8	4,736	5,175	4,316	6,509	0.9
Denmark	4,046	0.5	4,178	3,997	4,391	6,162	0.8
Australia	10,247	1.3	5,838	4,722	3,929	6,103	0.8
Chile	4,411	0.5	3,212	3,542	5,364	6,077	0.8
Czech Republic			1,740	2,395	2,993	4,939	0.7
Mexico	2,473	0.3	2,771	13,392	4,983	n.a.	
Others	22,280	2.7	14,371	21,274	24,095	13,708	1.9
<b>Total</b>	<b>810,290</b>	<b>100.0</b>	<b>703,693</b>	<b>670,702</b>	<b>617,769</b>	<b>739,270</b>	<b>100.0</b>

Source: ITC/UNSO Comtrade Data Base.

Table 2

## Exports of canned pineapple by major exporter, 1992 - 1996

Quantity : Tons  
Value : US\$ '000

Exporting countries (SITC.3: 05893)	1992			1993		1994		1995		1996		
	Quantity	Value	% of Val.	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	% of Val.
Thailand	495,239	328,914	51.2	507,563	287,084	712,272	265,285	388,193	234,089	n.a.	277,943 <i>a/</i>	42.1
Philippines	243,453	96,233	15.0	237,853	94,163	215,227	90,182	191,648	80,780	250,037	93,185	14.1
Indonesia	71,529	47,048	7.3	99,773	49,983	99,121	46,854	90,959	47,671	125,940	91,814	13.9
Kenya	67,533	34,846	5.4	67,336	34,119	n.a.	41,946 <i>a/</i>	n.a.	52,457 <i>a/</i>	n.a.	64,914 <i>a/</i>	9.8
Malaysia	50,189	31,161	4.9	52,190	26,066	50,965	23,677	44,548	22,945	n.a.	22,205	3.4
Singapore	41,820	31,286	4.9	40,634	25,307	38,663	24,039	36,177	23,053	28,796	21,849	3.3
South Africa Rep.	n.a.	19,181	0.0	n.a.	14,642	32,670	18,032	30,072	17,790	24,070	17,293 <i>b/</i>	2.6
Germany	5,354	6,261	1.0	4,662	4,983	8,082	8,768	10,235	12,524	13,309	16,218	2.5
Netherlands	3,290	3,880	0.6	27,786	22,606	21,740	15,867	29,380	20,997	16,875	16,168	2.4
Belgium-Lux.	5,450	7,325	1.1	4,761	5,416	6,310	7,079	6,121	7,424	10,209	12,616	1.9
China	15,022	8,251	0.0	10,338	4,818	11,903	5,402	8,698	4,465	10,430	6,695	1.0
France	869	1,265	0.2	538	1,256	943	1,722	1,785	2,725	1,999	3,608	0.5
United Kingdom	426	596	0.1	1,688	1,819	1,433	1,524	1,656	2,077	2,087	3,274	0.5
USA	6,357	5,385	0.8	4,417	3,977	3,779	3,292	3,618	3,288	3,424	3,252	0.5
Australia	5,448	3,814	0.6	4,390	3,385	3,675	3,460	3,210	3,618	2,901	3,070	0.5
Others	n.a.	16,403	2.6	n.a.	11,336	n.a.	10,290	n.a.	9,848	n.a.	6,770	1.0
<b>Total</b>	<b>n.a.</b>	<b>641,849</b>	<b>100.0</b>	<b>n.a.</b>	<b>590,960</b>	<b>n.a.</b>	<b>567,419</b>	<b>n.a.</b>	<b>545,751</b>	<b>n.a.</b>	<b>660,874</b>	<b>100.0</b>

Source: ITC/UNSO Comtrade Data Base.

*a/* Based on world imports by origin.*b/* Based on national export statistics.

Table 3

**Imports of pineapple juice into the 25 major markets, 1992 - 1996**  
(in millions of US dollars)

Importing country/area	1992		1993	1994	1995	1996	
	Value	% of total				Value	Value
United States	92.15	32.1	86.23	67.41	81.29	100.29	27.0
Netherlands	22.53	7.8	25.13	30.91	44.47	67.47	18.1
Spain	34.17	11.9	17.06	20.66	21.51	33.00	8.9
France	21.88	7.6	14.80	16.30	21.60	27.44	7.4
Germany	21.03	7.3	13.07	15.50	20.08	27.39	7.4
Italy	19.75	6.9	16.49	20.50	22.15	26.33	7.1
United Kingdom	13.61	4.7	10.52	8.24	11.45	13.25	3.6
Japan	10.37	3.6	6.73	6.45	7.91	12.20	3.3
Canada	9.14	3.2	6.45	6.08	5.95	7.81	2.1
Belgium-Luxembourg	4.96	1.7	3.62	3.80	5.21	7.64	2.1
Russian Federation a/	0.28	0.1	2.01	9.14	9.19	6.07	1.6
Israel	4.37	1.5	2.37	1.29	2.29	5.44	1.5
Portugal	5.73	2.0	1.55	1.84	4.02	4.78	1.3
Finland	2.27	0.8	1.54	3.65	2.25	4.64	1.2
Chile	0.67	0.2	0.66	0.82	1.67	2.89	0.8
Greece	1.38	0.5	1.22	1.62	3.09	2.66 c	0.7
Singapore	1.64	0.6	2.39	2.27	2.02	2.43	0.7
Austria	1.32	0.5	1.75	2.40	1.02	2.13	0.6
Australia	0.99	0.3	0.74	0.83	2.31	1.78	0.5
Ireland	1.42	0.5	1.03	1.05	1.62	1.77	0.5
Switzerland	1.53	0.5	1.12	1.24	1.38	1.64	0.4
Korea Republic	4.47	1.6	2.26	2.13	1.50	1.62	0.4
Denmark	1.18	0.4	0.47	1.05	2.37	1.60	0.4
Czech Republic			0.43	0.85	1.19	1.35	0.4
Argentina	0.95	0.3	0.87	0.82	2.09	1.22	0.3
Others	9.44	3.3	9.58	11.84	13.71	7.12	1.9
<b>TOTAL</b>	<b>287.23</b>	<b>100.0</b>	<b>230.09</b>	<b>238.69</b>	<b>293.34</b>	<b>371.96</b>	<b>100.0</b>

Source: ITC/UNSO Comtrade Data Base System.

a/ Based on world exports by destination.

b/ Provisional figures

c/ Comext, Eurostat.

Note: Percentages may not add up due to rounding.

**Table 4**  
**Exports of pineapple juice by major exporting country, 1992-1996**  
**(in US\$ million)**

Exporting country	1992		1993	1994	1995	1996	
	Value	% of total				Value	Value
Thailand	79.02	35.6	57.23	66.75	94.76	131.76 <sup>a</sup>	34.3
Netherlands	25.05	11.3	25.41	30.79	43.96	58.39	15.2
Philippines	30.57	13.8	30.03	30.76	34.47	38.21	10.0
Indonesia <sup>a/</sup>	4.98	2.2	6.65	9.69	15.42	30.67	8.0
Kenya	7.61	3.4	6.15	14.36 <sup>a</sup>	15.62 <sup>a</sup>	20.82 <sup>a</sup>	5.4
Germany	7.82	3.5	3.74	9.77	9.23	14.35	3.7
Costa Rica	4.05 <sup>a</sup>	1.8	4.58 <sup>a/</sup>	6.27	7.85	10.25	2.7
South Africa Republic	13.47	6.1	5.67	6.12	7.01	6.72 <sup>b</sup>	1.8
Belgium-Luxembourg	7.90	3.6	6.73	6.08	6.38	6.55	1.7
United States	8.15	3.7	5.61	6.31	7.83	4.98	1.3
Dominican Republic <sup>a/</sup>	3.22	1.4	3.60	2.24	0.45	4.68	1.2
France	3.73	1.7	2.52	2.13	3.56	3.60	0.9
Spain	3.94	1.8	1.10	2.65	2.64	3.33	0.9
Finland	0.04	0.0	0.30	2.06	2.65	2.99	0.8
Brazil	8.22	3.7	4.38	3.63	1.52	2.24	0.6
Côte d'Ivoire <sup>a/</sup>	2.07	0.9	1.28	0.75	0.80	1.95	0.5
Austria	0.29	0.1	1.93	2.51	1.23	1.58	0.4
United Kingdom	0.42	0.2	0.43	1.28	1.71	1.35	0.4
Mexico	1.88	0.8	0.35	0.75	1.35	1.31 <sup>a</sup>	0.3
Italy	0.07	0.0	0.26	2.90	4.29	1.29	0.3
Martinique	1.09	0.5	1.64	1.28	0.99	n.a.	0.0
Cyprus	0.11	0.0	0.35	0.94	1.01	0.86	0.2
Malaysia	0.77	0.3	1.06	0.94	0.91	0.83	0.2
Australia	0.84	0.4	0.72	0.81	0.56	0.67	0.2
Denmark	0.50	0.2	0.37	1.17	0.79	0.51	0.1
Israel	1.05	0.5	0.44	0.94	2.72	0.35	0.1
Others	5.31	2.4	5.36	8.02	15.52	33.62	8.8
<b>TOTAL</b>	<b>222.17</b>	<b>100.0</b>	<b>177.89</b>	<b>221.90</b>	<b>285.23</b>	<b>383.86</b>	<b>100.0</b>

Source: ITC/UNSO COMTRADE Data Base System.

<sup>a/</sup> Based on world imports by origin.

March 1998



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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### SUPPLY AND DEMAND PROSPECTS FOR TROPICAL FRUITS IN THAILAND<sup>1</sup>

<sup>1</sup> This document was prepared by the Thai Ministry of Agriculture and Cooperatives for the First Session of the Sub-Group on Tropical Fruits.

# **SUPPLY AND DEMAND PROSPECTS FOR TROPICAL FRUITS**

## **IN THAILAND**

### **I. INTRODUCTION**

A large public recognises the value of consumption of fruits, particularly of tropical fruits, in providing important and necessary dietary intake, including vitamins, nutrients, micronutrients, fibre and other elements and thus contributing to improved health and welfare. As consumer awareness and knowledge of various tropical fruits in many importing countries is still limited, it has to be recommended that these health benefits of tropical fruit be emphasised on a global basis to promote their consumption.

Many varieties of tropical fruit are produced and traded globally. The major ones in terms of volume include pineapple, mango, avocado and papaya. The bulk of tropical fruit (over 97 %) is produced in developing countries, while much of the remaining 3 % is grown in the United States, South Africa, Australia, Israel, Spain and Japan. Of the 43 mill.t of tropical fruit produced globally in 1996, mangoes comprised around 44%, or 19 mill.t.

A global export of world trade in tropical fruit has grown rapidly in the past two decades. Major fresh tropical fruit amounted to 1.5 mill.t in 1995 (valued at about \$1 bill.), which was nearly triple the volume traded in 1980. Although pineapples were the major fresh fruit traded globally, accounting for 56 % of world exports, followed by mangoes (22 %), avocados (16 %) and papayas (6 %), exports of other major fruits have grown at much faster rates in the last decade.

Developed countries imported most of the tropical fruit, with the EC accounting for nearly 50 % of pineapples and 69 % of avocados in 1995. The US accounted for 45 % of the world trade in mangoes while Japan took 17 % of the world trade in pineapples. Singapore, Malaysia and Hong Kong were also important markets for major tropical fruits.

Demand for non-traditional tropical fruits, although small in volume terms compared to other categories of fruits, has grown rapidly since the early 80's. World trade in non-traditional tropical fruits remained mainly concentrated in the Far East in 1995. Available estimates indicated that 75 % of the world exports of these fruits (including durian, longan, mangosteen, rambutan, carambola and guavas) originated from Thailand, Malaysia, Indonesia, China, Pakistan and India, and were absorbed mainly by Hong Kong and Singapore. The other 25 % consisted mainly of passion fruit and lychee, which originated from Israel, Africa and Central America, and shipped to the EC, while limes were exported to the US, EC, Japan and the Middle East.

There are no obvious, indicative "world prices" for many tropical fruits as they are traded in relatively small quantities and in diverse markets. Price developments for these fruits are largely driven by demand factors, given that the ratios of exports to production are relatively small. A smaller ratio also implies that supply can support a rapid expansion in export trade. Trade in tropical fruit is expected to continue to expand but actual growth will depend largely on the development of new markets and on economic growth in importing countries.

The impact of the reduction in tariffs under the Uruguay Round is assessed to be relatively small

for tropical fruits, given that the pre-Uruguay Round tariffs were already low, although for some commodities important gains may be realized. Particularly the importance for tropical fruits is the harmonization of sanitary and phytosanitary measures (SPS) which should stimulate trade. In this connection, there is recognition in the SPS agreement of the difficulties that developing countries may face in meeting the sanitary requirements of importers, and there are special provisions for technical assistance in this area. The least-developed countries may delay implementation of the SPS agreement for up to five years, compared with two years for other developing countries.

In July 1996, FAO convened an International Consultation on Tropical Fruits in Kuala Lumpur. Various issues related to the development of tropical fruits were addressed (ICTF, 1996) and it was concluded that several problems need to be resolved by way of orderly development of the tropical fruit market. In this regard, the following strategy was adopted to guide actions:

- strengthen data collection, standardize presentation and improve dissemination among the member countries;
- analyze and improve understanding of the markets to enable effective planning and programming;
- monitor the impact of production and trade policies such as those related to the Uruguay Round Agreement (changes in tariffs), including the Agreement on the Application of SPS measures (especially those related to compliance with SPS requirements of importing countries) and inform governments of the developments ;
- seek ways and means to organize appropriate generic market promotion through exporter and importer collaboration with support from international organizations (e.g. the Codex Alimentarius in establishing food standards) with a view to strengthen consumer knowledge of the nutritional value of tropical fruit ;
- promote research and development of critical technologies in post-harvest handling, including downstream processing for industrial use ;
- extend application of appropriate modern technologies in production and marketing to raise sector productivity ;
- strengthen the management of tropical fruit genetic resources ;
- enhance human resource development in the tropical fruit sector ;
- reinforce direct relationships between producing and consuming countries, and
- encourage financing agencies, including the World Bank and the regional banks, to give high priority to lending for tropical fruit commodity investments.

It is therefore the intention of this paper to give an account of the present fruit production and development situation in Thailand, with regard to the future importance of tropical fruit in its

domestic and export markets. In addition, it aims to outline the intentions of the Royal Thai Government to further the development of global tropical fruit production and trade, via its national policies and international commitments.

## II. TROPICAL FRUIT PRODUCTION IN THAILAND

### A. Background

Ages before large scale commercialisation of fruits took off, Thai farmers had been growing fruit trees in their backyards, and over the past centuries they have been selecting and collecting well performing fruit trees. At present, there is still a large and very valuable genetic pool of many fruit species available in rural Thailand, since much of it originated from seeds. With the improvement of propagation techniques and the implementation of proper breeding programmes over time, new varieties and cultivars have been developed. This has led to the existence of a wide range of fruit tree species and various excellent varieties in present-day Thailand.

Thai tropical fruits can be divided into two groups; the first group includes some ten fruits that are of major economic importance and with a great potential to support the demand of both local and overseas markets. They are: durian, longan, mangosteen, pummelo, pineapple, mango, rambutan, papaya, lychee and tangerine, of which the first three fruit species are considered as the Thai 'champion products'. The second group comprises a number of less economically- important fruits, which are cultivated with a view of meeting the local demand rather than for export purposes. They include santol, rose apple, sugar apple, jujube, marian plum, guava, 'longkong', langsat, young coconut, tamarind, 'sala', jack fruit, lime, grape and banana. Table 1 gives some statistics on total planted area and production of the most important fruit crops in Thailand.

### B Seasonality of Thai Fruits

With a large diversity of fruit species being cultivated in Thailand, fruits are very common commodities in local markets throughout the year. Tropical and subtropical fruits in Thailand can be classified into two arbitrary groups based on their availability over time. There are : (a) seasonal type and (b) non-seasonal or ever-bearing type (Table 2).

(a) Seasonal-type fruits can be found during certain months of the year. They comprise: santol, jack fruit, rambutan, durian, sugar apple, jujube, marian plum, mango, mangosteen, 'longkong', sapodilla, longan, pummelo, tangerine, etc.

(b) Non-seasonal or ever-bearing types: At anytime of the year these fruits are available in the local markets. They consist of banana [such as: 'Namwa' (ABB), 'Hom Thong' (AAA) and 'Khai' banana (AA)], guava, young coconut, papaya and pineapple.

**Table 1: Total area and yield of the most important fruit crops (1994)**

Fruit Crops	Area (ha)		Total Area (ha)	Total Production (mt)
	Bearing	Non-bearing		
Pineapple			99,195	2,350,963
Mango	171,342	86,969	258,311	1,231,768
'Namwa' banana (ABB)	88,694	20,029	108,723	1,025,409
Durian	70,893	41,167	112,060	746,642
Rambutan	56,084	12,445	68,529	616,473
Tangerine	30,064	8,191	38,255	609,758
Papaya	18,615	5,837	24,452	363,589
Jack fruit	24,518	12,335	36,853	344,500
Sugar apple	35,748	7,230	42,978	209,292
'Khai' banana (AA)	12,225	3,130	15,355	148,050
Tamarind	37,367	37,203	74,570	140,313
Longan	25,995	13,940	39,935	128,688
Mangosteen	15,392	16,374	31,766	104,096
Lime	16,341	5,316	21,657	87,561
Pummelo	10,037	5,482	15,519	81,372
Cashew nut	39,771	22,050	61,821	55,238
Langsat	12,455	25,225	14,680	46,925
Lychee	9,210	4,609	13,819	45,009

Source: Dept. of Agricultural Extension, 1994.

### Influence of Climate on Fruit Production in Thailand

Geographically, Thailand is located in the northern hemisphere, stretching from 6°N to 20°N. Taken into account that the country also features several mountain ranges (with the highest peak at 2500 m above sea level) it could be understood that Thailand enjoys a wide range of (regional) climate types. Two major annual monsoons play an important role in the country's agriculture. The south-west monsoon brings rain from mid-May until mid-October, providing fruit trees with sufficient vegetative growth. On the other hand, the cool and dry north-east monsoon from the second half of October throughout February allows fruit trees to slow down their vegetative growth and consequently, reproductive growth is stimulated. This applies to the Central region as well as in the North and the Northeast and East. The situation is totally different in the Southern peninsular. During this period, when the northeast monsoon passes over the Gulf of Thailand it brings in abundant rainfall, stimulating vegetative growth. Flowering of fruit trees in the South starts at the time when rains have receded, i.e. during March and April. As a consequence, the fruiting season occurs two months later in the Southern region as compared to the Eastern region, for the same range of crops. (e.g. durian, mangosteen, rambutan, langsat, and longkong).

As there are numerous fruit species, with their harvest periods undoubtedly overlapping, they bring about a constant supply of fruits to meet the demand of markets throughout the year. In addition, attempts have been made to identify and select off-season types, for the reason that they

Table 2: Seasonality of native fruits in Thailand (listed alphabetically)

Common name	Month											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Banana												
Durian												
Guava												
Jack fruit												
Jujube												
Langsat												
Lime												
Longan												
Longkong												
Lychee												
Mango												
Mangosteen												
Marian plum												
Papaya												
Pincapple												
Pummelo												
Rambutan												
Rose apple												
Sala												
Santol												
Sapodilla												
Sugar apple												
Sweet tamarind												
Tangerine												
Young coconut												

can enjoy off-season prime prices. Furthermore, flowering-regulating technologies in many fruit crops such as mango, durian and lime have been successfully applied in Thailand, thus aiming to avoid seasonal over-supplies during the normal harvesting period.

### C. Regional Distribution of Cultivated Area and Production of Fruit Crops

At present, a large number of fruit crop species, including tropical and sub-tropical ones, can be observed in the Thai local markets. Out of these, only 33 fruit species have been statistically recorded as economic fruit crops by the Department of Agricultural Extension, while the rest are considered to be of minor importance. Table 3 shows that the total fruit area in Thailand covered about 1.2 million ha, with an overall production volume of just over 9 mill.t. More details of the distribution of both the cultivated area and the production volume of each of the concerned regions are presented. Both the northeastern and the southern region occupied 22 % each of the country's production area while the northern and eastern regions respectively represent 21 and 19%. The central and the western regions contributed only 6 and 9 %, respectively.

With regard to the volume of fruit production per region, it could be noted that the highest volume (about 2.3 mill. t, equal to 25% of the total production value) came from the East region, followed by 2.2 mill.t from the South region (24%). Even though both the Northern and the Northeast region have a slightly larger production area than the other two, fruit production values were substantially lower: 1.3 mill. t and 1.46 mill. t, respectively.

**Table 3:** The regional distribution of cultivated area and production of fruit crops in Thailand.

Location	No of fruit Species	Cultivated area (ha)	Percentage	Production (t)	Percentage
Northern	33	250,572	21	1,311,870	15
Northeastern	31	258,015	22	1,457,848	16
Central	24	67,913	6	688,504	8
Eastern	29	227,456	19	2,293,706	25
Western	29	108,280	9	1,072,876	12
Southern	28	254,404	22	2,207,482	24
Total		1,166,640	100	9,032,286	100

Source: Department of Agricultural Extension, 1994.

### D. Percentage of Cultivated Area and Production per Crop

When dividing the total fruit production area into five arbitrary classes based on percentage contribution per crop, the following picture appears (Table 4): mango is the most important fruit crop in terms of area, followed by banana, and further down the line, rambutan, durian, tamarind and pineapple.

**Table 4:** The percentage classes of commercially cultivated area of each individual fruit crop in Thailand, 1994.

Classes of cultivated area	No. of fruit crops	Kinds of fruit crops
> 20	1	mango
11 - 20	1	banana
6 - 10	4	rambutan, durian, sweet tamarind, pineapple
1 - 5	12	Jack fruit, sugar apple, lime, santol, champedak, young coconut, papaya, mangosteen, 'longkong', langsat, lychee, longan, orange, pummelo
< 1	13	rose apple, peach, Japanese apricot, guava, jujube, passionfruit, marian plum, 'sala', sapodilla,
Total	31	

When comparing individual fruit species' contribution to the percentage of the national fruit production volume, as presented in Table 5, it can be learned that pineapple contributes more than 20 % of the country's total production volume, while banana and mango production classify in the second group at a level of 11-20 % jack fruit, sugar apple, guava, sweet tamarind, lime, mangosteen, longan and papaya are the species classify within the group of 1-5 %.

**Table 5:** The percentage classes of production volume of each individual fruit crop cultivated in Thailand, 1994.

Ranges of production (%)	No. of fruit crops	Kind of fruit crops
> 20	1	pineapple
1 - 20	2	banana, mango
6 - 10	3	rambutan, durian, orange
11 - 5	8	jack fruit, sugar apple, guava, sweet tamarind, lime, mangosteen, longan, papaya
< 1	17	santol, champedak, rose apple, peach, Japanese apricot, jujube, passionfruit, marian plum, young coconut, sala, 'longkong', sapodilia, langsat, lychee, pummelo, pear, grape
Total	31	

#### E. The Ten Economically Most Important Fruits

Trends in cultivation area and production of the country's important fruit crops are presented in Table 6. All of the fruit species out of the ten major fruit crops had positive expansion rates with regard to cultivation area, ranging from 0.9 % to 78.7 %. Among these, pummelo had the largest expansion, at 78.7 %, followed by mangosteen (46.1%), longan (43.6%), durian (31.7%), mango

(28.1%), lychee (19.2%) etc. With fruit production volume, the values of the change rates varied from -22.5 to + 41.1%. Mangosteen had the highest production volume increase (41.1 %), followed by durian (30.3%), pummelo (15.7%) and longan (10.7%).

**Table 6:** Cultivated area and production trends of the ten economically most important fruits of Thailand-A comparison between 1992 and 1995.

Fruit	Year	Cultivated area (ha)	Change rate (%)	Production (t)	Change rate (%)
1. Mango	1992	235,666		1,110,995	
	1995	301,946	+ 28.1	1,207,568	+ 8.7
2. Pineapple	1992	89,721		2,180,407	
	1995	90,493	+ 0.9	2,037,707	- 6.5
3. Longan	1992	37,388		114,555	
	1995	53,785	+ 43.6	126,789	+ 10.7
4. Durian	1992	97,238		711,371	
	1995	128,024	+ 31.7	927,194	+ 30.3
5. Rambutan	1992	67,852		607,559	
	1995	74,186	+ 9.3	634,143	+ 4.4
6. Mangosteen	1992	25,914		90,940	
	1995	37,867	+46.1	128,280	+ 41.1
7. Pummelo	1992	14,588		75,688	
	1995	26,065	+78.7	87,606	+ 15.7
8. Papaya	1992	23,928		340,042	
	1995	24,525	+ 2.5	342,772	+ 0.8
9. Lychee	1992	12,760		46,168	
	1995	15,208	+ 19.2	35,762	-22.5
10. Tangerine	1992	40,269		680,971	
	1995	42,246	+ 4.9	585,453	- 14.0

Sources: Department of Agricultural Extension, 1992 and 1995.

#### F. Status of the Major Thai Fruits

While having a high climatically suitability for the growth and development of many fruit crops, Thailand is considered as one of the most genetically abundant sources of tropical fruits in the world. Besides high diversification in tropical fruit species, some sub-tropical fruit are also able to adapt and perform well in certain areas of high elevation, mainly in the northern region. Although a wide range of fruit species exists in this country, only a number of these are of high economic importance. The presentation, which follows, is specifically addressing Thailand's major fruit crops.

Mango (*Mangifera indica* Linn. ):

Mango is native to the Indo-Myanmar region where it has been cultivated for over 4000 years (Mendoza and Wills, 1984). The spread of Buddhism is believed to have facilitated the distribution of mango into Thailand. The area under mango cultivation in 1995 was about 301,946 ha which was the largest fruit area or about 26 % of the total fruit area. It was estimated that approximately two-thirds of trees planted were at the fruit-bearing age. The principal production areas were the Northeastern and Northern regions, with about 34 and 27 % of the total area for mango, respectively.

Thailand is considered as the origin of many mango cultivars that are commercially produced and marketed as ripe, mature-green and immature-green fruits. Even though more than 100 mango cultivars have been observed in the country, only some are grown commercially such as 'Raet', 'Khieo Sawoei', 'Nong Saeng', 'Nam Dok Mai', 'Nang Klangwan', 'Chao Khun Tip', 'Thong Dam', 'Phimsen Man', 'Phimsen Prieo', 'Fa Lan', 'Ok Rong', 'Kaeo', 'Ok Rong Thong', 'Chok Anant' and 'Phetch Ban Rat'. The total mango production of the country was about 1.2 mill. t (1995) and the three largest producing provinces were Nakhon Sawan, Nakhon Ratchasima and Chachoengsao with the production of about 10, 9, and 9 % of the total volume respectively. The cultivar 'Kaeo' gave the highest production, accounting for about 31 percent of the total volume, followed by 'Khieo Sawoei' (14.7 %).

#### **Durian** (*Durio zibethinus* Murray):

Durian is believed to have originated in Borneo. It is presently grown in many ASEAN countries and other tropical parts of the world. Durian is a very high-value crop and the most famous fruit in Southeast Asia. Its popularity arises not only from its excellent taste but also from its specifically strong odour. Thailand is the world's largest producer and exporter of high quality durian, followed by Malaysia and Indonesia (Nanthachai, 1994). The area for durian was reported to be around 128,024 ha or about 11% the total fruit cultivation area in 1995. The eastern and the southern regions hold the majority of total durian area, i.e. about 52 and 41 %, respectively. Approximately 200 durian cultivars have been named in Thailand. Out of these only 60-80 cultivars have been commercially grown, but at present only four cultivars, namely 'Chani', 'Kra Dum', 'Mon Thong' and 'Kan Yao' are very common in the market. Among these, 'Mon Thong' has the largest area of about 53 % of the total durian area, followed by 'Chani' (30%) and 'Kan Yao' (5%). The total durian production of the country is around 927,000 t and the three largest producing provinces are Chanthaburi, Chumphon and Rayong with a production of about 32, 15 and 14% of the total volume, respectively.

#### **Pineapple** (*Ananas comosus* (L.) Merr.)

The native land of pineapple is believed to be in the American continent. It is widely spread over many tropical areas especially in the ASEAN countries. Pineapple has a high nutritional value, i.e. rich in vitamins, mineral salts and fiber. Apart from fresh consumption, it can be processed in many ways, such as canning, juice, jam, ice cream, etc. In 1995, Thailand was the world's largest producer, with the area of 90,500 ha. The total pineapple production was around 2 mill. t, i.e. the highest volume (23%) of the total national fruit production and was about 19 % of the world's total volume. The Southern region has the largest area (59%), followed by the eastern region (17%) and the western region (14%). The largest pineapple-producing province was Prachuab Kiri Khan

with the production of over 50 % of the total volume, followed by Rayong, Phetchaburi, Chonburi and Chumphon. As commercial cultivars, 'Phuket' (Malacca Queen) and 'Intharachit', a 'native' cultivar, are suitable for fresh consumption only whereas 'Pattavia' (Smooth Cayenne) is popularly used for both fresh consumption and processing.

#### **Rambutan** (*Nephelium lappaceum* (Linn.)

Rambutan is native to Malaysia and Indonesia; the word 'rambutan' is derived from Malay, meaning 'hairy fruit'. Although rambutan is cultivated in many ASEAN countries, Thailand has become the major rambutan producer (Lam and Kosiyachinda, 1987). In 1995, the area of rambutan stood at about 74,186 ha, i.e. about 6 % of the total fruit area. It was estimated that, in 1995, about 82 % of planted trees were at the fruit-bearing age. The two major growing regions were the southern and eastern regions, covering 46 and 54 % of the total rambutan area, respectively. The three largest growing provinces were Chanthaburi (40%), Chumphon (14%) and Surat Thani (12%). The total volume of rambutan was around 634,143 t of which Chanthaburi province contributed to more than 50% of the total volume. The best commercial cultivar was 'Rong Rian' producing about 77 %, followed by 'Si Chomphu' (23%).

#### **Papaya** (*Carica papaya* Linn.)

Papaya is one of the most important fruit crops in tropical countries and its centre of genetic diversity is regarded to be in tropical America. Besides being delicious, papaya also contains great amounts of vitamins A, C and digestive enzymes with low-calory components, making it good for the health. In 1995, the total area of papaya was 24,525 ha or about 2 % of the total fruit area in the country. The largest producer was the northeastern region covering 53% of the total papaya area, followed by the southern region (18%) and the eastern region (9%). The total volume of papaya production was 342,772 t and the three largest producing provinces were Chumphon (18%), Si Sa Ket (10%) and Nong Bua Lamphu (10 %). Many papaya cultivars have been recorded in the country but 'Khaek Dam' is the most widely accepted commercial variety. Approximately 46 % of the papaya cultivation area was devoted to 'Khaek Dam', followed by 'Koko' (10%) and 'Khaek Nuan' (8%).

#### **Pummelo** (*Citrus maxima* Linn.):

Pummelo is one of the best fruits in Southeast Asia and the centre of genetic diversity is believed to be in either the southern region of China or Indo-China (Anon, 1986). The fruit is large, rounded with a rather thick skin making it suitable for both long storage periods and export. The edible pulp is juicy, tasteful and rich in vitamins A, B1 and C. The planted area of pummelo in 1995 was 26,065 ha or about 2 % of the total national fruit area, with a production volume of 87,606. The northern and the southern region were the two largest producing regions, covering 28 and 32 % of the total pummelo area. So far, over 20 cultivars have been recorded, of which eight are popular, namely, 'Thong Di', 'Khao Paen', 'Khao Phuang', 'Khao Namphung', 'Khao Hom', 'Khao Yai', 'Khao Taengkwa' and 'Ta Khoi'. Among these, 'Thong Di' had the greatest planted area, accounting for about 35 % of the total pummelo area. The three largest pummelo-producing provinces were Nakhon Pathom (18%), Prachin Buri (8%) and Phichit (7%).

#### **Longan** (*Dimocarpus longana* Lamk)

Longan, originated in Southern China and subsequently spread to many countries in Asia such as Thailand, India, Myanmar, Sri Lanka, etc. The dissemination of longan to Thailand was reported to be in the reign of King Chulalongkorn by the Chinese people and the introduced plants adapted well to the northern soil and climatic environment. The area of longan, in 1995, was around 53,785 ha or approximately 4.6 % of the total fruit land, with a production of about 126,789 t. About 91 % of the longan area was located in the northern region. The three largest longan producing provinces were Lamphun (33%), Chiang Mai (30%) and Chiang Rai (7%). Among the four popular commercial cultivars, 'E Dor' occupied the highest area or 75 %, followed by 'Haeo', 'Bieo Khieo' and 'Si Chomphu' covering each 7 % of the total longan area.

#### Mangosteen (*Garcinia mangostana* Linn.)

Mangosteen, one of the most delicious tropical fruit crops, is believed to have originated around the Sunda islands close to the Malay archipelago. It is widely spread all over the ASEAN countries as well as other tropical countries in America. At present, Thailand has become one of the leading mangosteen producers. The cultivated area (1995) was about 37,867 ha or about 3 % of the total fruit area, with a production volume of about 128,280 t. Approximately, 69 % of the mangosteen cultivation area was located in the southern region and about 30 % was planted in the eastern region. The three most important mangosteen-producing provinces were Chanthaburi (35%), Chumphon (25%), and Nakhon Si Thammarat (12%).

#### Lychee (*Litchi chinensis* Sonn.)

Lychee is native to the southern region of China. Traditionally, it has been grown specifically in the northern region of Thailand where the weather is cool during the winter. At present, lychee orchards have also been successfully established in the central plains, especially in Samut Songkhram province, using a cultivar tolerant to warmer conditions. The area for lychee was around 15,208 ha, about 1.3 % of the total fruit production area, with a production volume of 35,762 t (1995). The northern region was the largest producer, covering 82 % of the total lychee area. The rest of the production is scattered over the country. A production share of 59 and 17% were recorded for the Chiang Mai and Chiang Rai, respectively. To date, six lychee cultivars (viz. 'Hong Huai', 'O Hia', 'Kim Cheng', 'Chakraphat', 'Khom and 'Kra lok') have been commercially grown, of which 'Hong Huai' (68%) and 'O Hia' (12%) are the two most popular ones.

#### Tangerine (*Citrus reticulata* Blanco)

Tangerine belongs to the mandarin group of citrus and is believed to have originated in China. Subsequently, it has found its way to the Indo-China peninsular, Europe and the Americas. In Thailand, the most commercially popular variety is 'Bang Mot', with a thin yellow to orange skin and which peels easily. It is rich in vitamins, especially A, B1 and C. Apart from being an important fruit in the fresh consumption market, it is also important to the processing industry, viz. fruit juices, jams and syrups. In 1995, the cultivation area stood at about 42,246 ha, accounting for about 4% of the total fruit production area in the country. The major production areas are the central (69%) and the northern region (17%), accounting for a total of about 86% of the country's tangerine area. The production volume stood at about 585,453 t. Although planted area increased slightly over the period 1992-95, the production volume dropped significantly. The major causes

of this production drop are the devastating impacts of greening, tristeza and phytophthora, and as a result, the present output volume is no longer sufficient to satisfy the Thai domestic demand.

### III. DEMAND FOR TROPICAL FRUITS

#### A. Domestic Demand

Very limited information exists in this field on a national level, and perhaps, Thailand is not an exception. But, in view of the development of global trade in tropical fruits, it should be emphasised that the potential of market and production expansion forecasts also rely on this sort of data. The demand for any country is a function of income and education/preference levels. Again, few statistics are available to support the assessment of the trend of the local consumers with regard to fruit consumption.

#### Characteristics of household fruit consumption

For the past 30 years, Thailand has shown a remarkable economic performance (before the current economic crisis started off in July 1997). The accelerated development in the various economic sectors, particularly the industrial and services sectors, may be attributed to the improvement and expansion in the transportation system, public consumption and marketing structure. Over the period 1992-96, the average annual economic growth rate equalled 7.92%, as illustrated in Table 7.

The GNP per capita rose from 38,869 baht in 1992 to 50,380 baht in 1996. As population and the economy expanded, the demand for living space and work opportunity also rose, propelling a rapid expansion of urban areas and a drastic shift of the labour force away from rural employment towards urban industries. Urbanization together with the development of marketing and trading systems ultimately led to an increase in spending on consumption goods and services.

**Table 7:** Gross domestic product (at 1988 prices), population, consumption value and growth rates of food, vegetables & fruits, 1992-96

	Value			Average annual growth rate 1992-96 (%)
	1992	1994	1996	
Gross domestic product <sup>1</sup> (bill. baht)				
- Agriculture	296	307	327	3.94 %
- Industries	1,700	2,072	2,407	9.11 %
- Services	247	271	308	5.67 %
Total	2,282	2,695	3,095	7.92 %
GNP per capita <sup>1/</sup> (baht)	38,869	45,043	50,380	6.64 %
Population <sup>2/</sup> (million)	57.29	58.71	60.00	1.16 %
Private consumption expenditure <sup>1/</sup> (bill. baht)				
Total	1,550	1,971	2,503	12.73 %
Food	350	404	525	10.75 %
Vegetables & Fruits	28	31	46	29.55 %

Sources: <sup>1/</sup> National Income of Thailand, NESDB, 1996.

<sup>2/</sup> National Statistics Bureau, 1996 .

With reference to total food and fruit expenditure, both have increased concurrently with economic growth. As shown in Table 7, the average growth rate of annual spending on vegetable and fruit items have annually increased with an average 29.6%, during the period 1992 to 1996.

The nutritional value of fruit is well documented and they constitute an integral component in people's daily diet. However, the consumption patterns of these product depend largely on the economic power and social behaviour of individual families, which differ between and within the various communities of Thailand. Table 8 indicates that in 1988 fruits purchase per capita per month was the highest in municipal area (Bangkok and vicinity) with the lowest experienced in rural area (the Northeast).

**Table 8:** Income and expenditure on food per capita in 1988.

Household location	Income per capita (baht/month)	Consumption Food (baht/month)	Expenditure Fruits (baht/month)
Municipal area	2,414	705	50
Suburbs	1,349	467	32
Rural	879	399	21
Average	1,526	448	34

Source: Sectorial Economics Programme, TDRI, 1992

In general, preferential consumption patterns between types of fruits vary with the changes in the

consumer's individual income. As income levels rise, the consumption pattern shifts from lower grade of fruits to those of higher quality.

With particular reference to the estimates of fruit consumption per year, Table 9 shows that the total fruit consumption increased from 2.9 mill. T in 1986 to 3.3 mill. t per year in 1990.

Table 9: Estimates of vegetable and fruit consumption, 1986-90 <sup>1/</sup>

Year	Vegetable consumption (mill.t)			Fruit consumption (mill.t)
	Leafy vegetable	Other	Total	
1986	1.2874	3.8358	5.1232	2.9387
1987	1.3192	3.9035	5.2542	3.0319
1988	1.3518	4.0276	5.3794	3.1280
1989	1.3852	4.1271	5.5123	3.2272
1990	1.4194	4.2290	5.6484	3.3295

Source: Sectorial Economics Programme, TDRI.

<sup>1/</sup> Calculated from this equation

$$D_t = D_0 (1 + e(y-p) + p),$$

by  $D_t =$  consumption in  $t$  year;  $D_0 =$  consumption in base year

$e =$  income elasticity;  $y =$  income growth;  $p =$  population growth

In 1990, the private consumption expenditure for fruit and vegetables stood at 52.02 bill. baht (at 1988 prices), accounting for 20.4% of the total food expenditure in that year. The expenditure for fruit and vegetables increased further, in absolute figures, to 64.8 bill. baht in 1995 (at 1988 prices), but in relative figures, it slightly decreased to 20.1% of the total food expenditure.

## B. Demand on a global scale

In order to avoid redundancy, reference is made to "Chapter VIII: Prospects", since demand and prospects are covered in that chapter.

## IV. MARKETING ISSUES: IMPORT AND EXPORT

### A. Domestic markets

#### An Outline of the Fruit Marketing System in Thailand

In a free-trade system, supply and demand (marketing and prices) are the important mechanisms that mobilize commodities from production origin to the consumers. Inefficient marketing results in a higher cost of transaction, affecting both producer and consumer prices. Development of an efficient marketing system is therefore very important, and the more so for tropical fruits, which

are very perishable and mostly seasonal in nature.

Marketing systems for fruits are generally less complex than that of cereals and other agricultural commodities. Although different characteristics do exist among specific markets, depending on the type of fruit, all are, from local traders to wholesale and retail markets, operating freely according to the existing supply and demand conditions. Among various activities involved in the marketing system, transportation (coupled with road condition) is the most important component of marketing cost. Therefore, any location having poor transport and communication facilities will be in a disadvantage in terms of market competitiveness. Although the fruit processing industry is at present highly developed and modernized, the lack of quality raw material and an irregular of supply has become a primary constraint that prevents the industry from operating at full capacity and this has also affected the export.

The determination of prices for fruits is generally done by local traders who offer farmers a buying price, based on market information of the previous days. In certain areas of the central region where horticultural production has been established for a long time and where farmers have a long standing relation with traders from various wholesale markets in Bangkok, farmers contact the wholesalers on their own behalf. They then arrange the shipment according to the trader's advice and are informed of the price later on.

Since road conditions have improved drastically, over the last decade, a steadily growing number of truck merchants (brokers) and individual farmers alike have stepped in the trading business. This has changed the traditional nature of marketing channels, in that farmers themselves load their produce to sell directly to the wholesale and retail markets in Bangkok and other main cities.

The determination of prices in wholesale markets is done by the traders mainly based on their observation on the quantity supplied and the demand in that market, at that time. Therefore, the change in prices of fruit in the market occurs frequently and rapidly, depending on the supply and demand situations on any particular day. The auction system for trading fruits in the existing markets has not yet been adopted. Each merchant in the market thus acts rather like an agent doing transactions with the middlemen (brokers) who deliver the commodities from the production area to the market. The long standing wholesale markets in Bangkok are located in Pak Klong Talad which includes the market of the Marketing Organization for Farmers, the Thai Agricultural Promotion Market (Talad Songserm Kaset Thai) and Yod Piman Market. These are wholesale markets of both vegetables and fruits. Particularly, the traditional wholesale markets for fruit are in Wang Mahanak which include Mahanak Market and Padung Krung Kasem Market. At present, wholesale market centers both for vegetables and fruits have extended to many locations especially in Bangkok's outskirts and neighboring provinces such as Si Mum Muang market (Rangsit), Talad Thai (Patumthani), Bangkae market, Chedi Front market in Nakhon Pathom Province, Nonthaburi market in Nonthaburi Municipality.

It can be said that the present fruit marketing system is different from the traditional one which had most activities concentrated in Pak Klong Talad and Wang Mahanak areas. Now, the central markets have extended to other places and provinces which have been developed as centers of transport and communication, e.g. Talad Thai. Hence, market competitiveness has become more intense than ever.

At present, and in order to facilitate more efficient marketing and export services, the Thai

government has developed a so called "one-stop" services policy. The latter aims to short-cut the lengthy chain of handling, grading, packaging, quality control and certification, customs formalities, etc., which presently have to be executed at different places (multi-stop system), by providing all these services at one central market. There is a need for a new physical marketing infrastructure, which adopts the auction system and integrates the services of the various government and private organizations concerned with fruit trade, to the benefit of producers and traders in the domestic and export markets.

Diagram 1 illustrates the domestic marketing channels of fresh and processed fruits. It presents the main channels of fruit trade from farm through brokers - wholesalers - retailers - consumers. The majority (80%) of Thai tropical fruit supply goes to the domestic market whereas a remaining 20% of fresh and processed produce are exported to the foreign markets.

For processed crops, the brokers take on a role of crop collectors, i.e. they purchase the raw material (fresh produce) from farmers and delivers it to the processing company. In many instances, processing companies have their own land on which they produce the needed crops (e.g. pineapple) or work through the system of contract-farming, in order to ensure their own supply.

In case of fresh produce, local merchants play an important role as brokers, they buy fresh produce from farmers and sell it to either the wholesale market or to the supermarket chains in town.

Examples of major fruit wholesale markets in Bangkok are Pak Khlong Talat market, Maha Nak market, Si Mum Muang market and Talat Thai market. Supermarket depots can be defined as company-owned wholesalers or individual private wholesalers who provide post-harvest handling facilities in order to minimize the post-harvest losses from farm to packing house and from packing house to retail outlets.

Examples of supermarkets and smaller retail outlets in Thailand are numerous: in major towns, there are well established retail markets such as the Big C superstore, Lotus superstore, Makro superstore, Top supermarket, etc. The Big C, Lotus and Mackro superstores are companies which have their own depots located in the Talat Thai wholesale market in the outskirts of Bangkok.

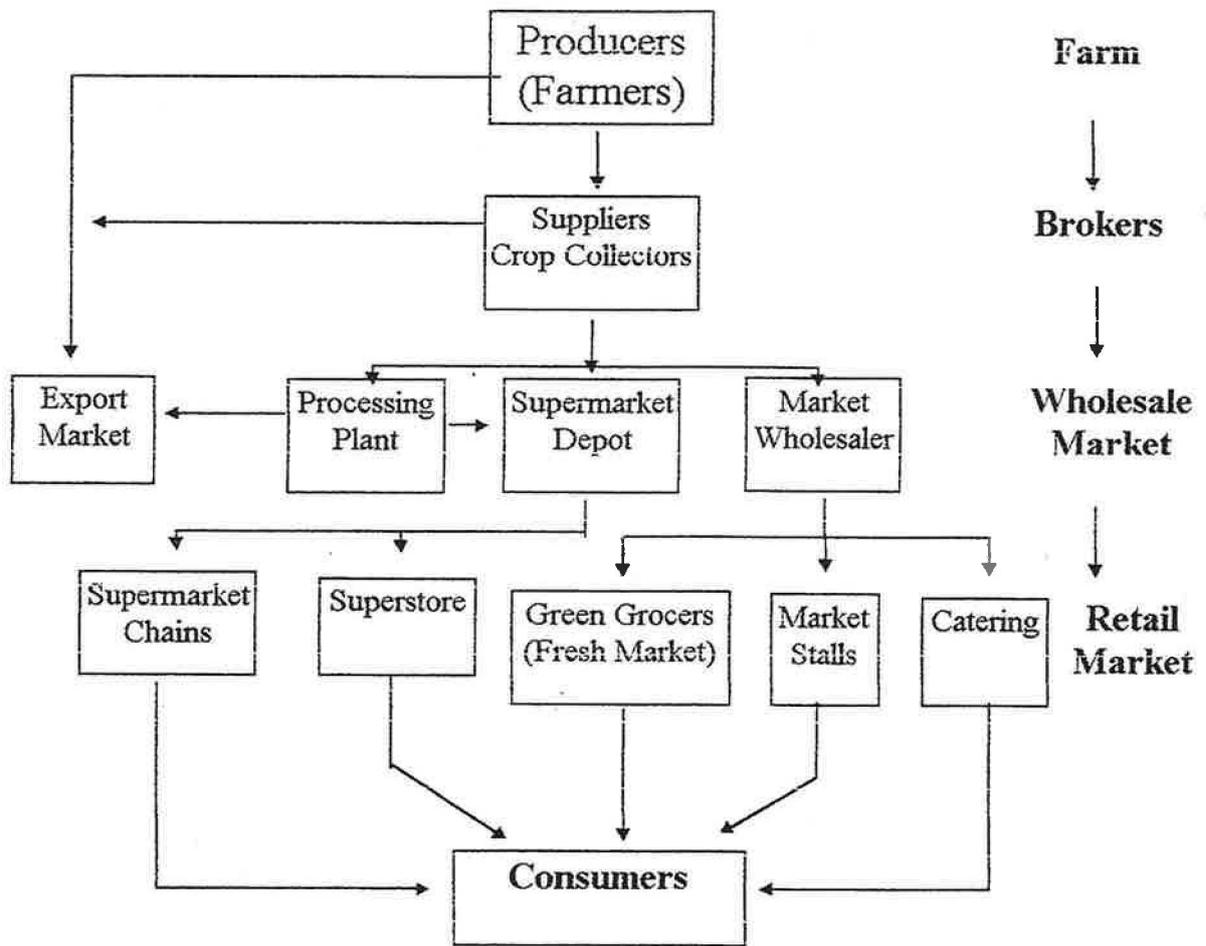
There are also numerous local fresh markets, at provincial, district and sub-district levels.

## **Fruit Price Mechanism**

### **(1) Marketing seasons of fruits**

Between perennial fruit trees and annual fruit crops, most annual and annual-perennial fruit crops produce output year round, while perennial fruit trees yield seasonally. Moreover, the northeastern monsoon and southwestern monsoon affect the climatic conditions in different regions, in a different degree, resulting in a varying time for harvesting certain kinds of perennial fruits. The harvesting season in southern region is normally about two months later than in the eastern region. For example, rambutan grown in eastern region is harvested in June and July while in southern region it is harvested during August-October. Therefore, the marketing season of certain fruits which can be grown in different regions is longer than the harvesting season in one particular region.

Diagram 1: Marketing Channels of fresh and processed fruits in Thailand



Both seasonal and non-seasonal fruits are subject to price variation, depending on the time of the year. During the period of May till September, there is the largest diversity of fruit available in the markets. Although the substitutability between different fruits varies, the great varieties and quantity of fruits harvested in the same month will have implications in terms of total supply to the markets, with an effect on wholesale-price levels.

## (2) Bangkok fruit wholesale prices

Prices of fruits are determined by market demand and market supply at a particular time. Because fruits are highly perishable, price becomes an important instrument in bringing about changes in the market demand to meet the supply situation at that time. Therefore, changes in price can take place many times and rapidly each day to ensure that no commodity will remain in the market that day.

As can be seen from Table 10, prices of fruits increased, especially of 'Hom Thong' banana and pineapple which experienced more than 20% increase in price. Most perennial fruits enjoyed positive price changes. Those with more than 30% increase are mango, durian, sugar apple, jack fruit and tangerine and those with decrease in price are pummelo and 'Namwa' banana.

**Table 10:** Yearly average Bangkok wholesale price of selected fruits during 1986-91 and 1992-96 and percentage price changes of the two periods

Type of fruits	Yearly average Bangkok wholesale price (baht)		
	1986-91	1992-96	% change
<b>Perennial fruits</b>			
Lime (fruit)	1.08	1.13	4.63
Mango (fruit) <sup>1/</sup>	3.96	6.11	54.29
Longan (kg)	26.69	31.20	16.90
Sapodilla (kg)	9.09	11.50	26.51
Durian (kg)	18.69	25.45	36.17
Rambutan (kg)	7.34	8.94	21.80
Sugar apple (kg)	11.60	19.58	68.79
Jack fruit (kg)	9.30	13.72	47.53
Tangerine (kg)	7.55	14.76	95.50
Pummelo (fruit)	24.83	17.85	-28.11
<b>Annual fruits</b>			
'Hom Thong' banana (fruit)	0.97	1.51	55.67
'Namwa' banana (bunch)	5.88	5.00	-14.97
Pineapple (kg)	4.38	5.39	23.06

Source: Derived from price data obtained from Department of Business Economics and the Office of Agricultural Economics.

<sup>1/</sup> Using the price of Nam Dok Mai

## **B. Export markets**

The overall quantity of fruit exported from Thailand in 1995 was about 941,000 mt, worth around 19.5 bill. baht or approximately \$US 778 mill. (Table 11). The top earners of the fresh fruits were durian, longan and lychee (Table 12) while in the frozen fruit group, durian, pineapple and mangosteen were the most important ones (Table 13). Pineapple, which contributed more than 50% of both quantity and value of canned products, plays a paramount role in the country's canning industry (Table 14) and takes a lion's share in the fruit juice export (Table 15). Besides pineapple, also canned longan, lychee, rambutan and mango show a growing importance in the fruit processing industry. In the dried fruit category, longan contributed as top export earner, followed by tamarind (Table 16).

### **Major export markets for Thai fruits, by species**

Thailand's exports of selected agri-business products nearly doubled between 1985 and 1992, rising from \$1.0 to \$1.9 bill. Exports in 1992 increased 14 % from 1991 levels of \$1.7 bill.

Processed fruit and vegetables, the second largest export category, accounted for 41 % of total horticultural exports in 1992, compared with 32 % in 1989. The export value of processed fruit and vegetables increased 66 % over the same period to \$795.5 mill.

Pineapple exports stood at \$963 mill. in 1996, up significantly from \$425 mill. in 1992. Of the eight product forms reported by the Thai Customs Authority, canned and juice products contributed the most. Exports of canned pineapple and pineapple juice, which account for the vast majority of exports, decreased from \$325 mill. in 1992 to \$ 260 mill. in 1996 and increased from \$79 mill. to \$88 mill., respectively. Fresh exports, still relatively unimportant, only accounted for 812 mt at \$205,000 (1992). The US and Europe (primarily Germany and the Netherlands) imported the majority of canned pineapple. The Netherlands and the US were also the largest buyers of pineapple juice.

Fresh longan export value and volume enormously increased from 12,811 mt (\$11.7 mill.) in 1992, to 61,053 mt (\$ 51 mill.) in 1996, with the majority shipped to Hong Kong, Singapore and Indonesia. A similar same pattern of growth applies to exports of dried longan which they stood at 724 mt (\$4.6 mill.) in 1992, whilst this increased to 26,850 mt (\$ 42 mill.), and the major markets are China, Hong Kong and Singapore. Canned longan was exported mainly to Malaysia, Singapore and the US. They stood at 16,132 mt (\$ 28 mill.) in 1996.

Fresh durian exports more than quadrupled from 1992 to 1996; they stood at 15,116 mt (\$10.8 mill.) and 65,694 mt (\$ 48 mill.), respectively, with Taiwan, Hong Kong and Malaysia being the largest intakers. Frozen durian exports more than doubled over the same period, from 2,390 mt (\$6.9 mill.) in 1992 to 5,635 mt (\$ 11.3 mill.), in 1996, with the most important markets being US, Australia and Canada.

Lychee exports totalled \$ 32.3 mill. in 1996, up from \$ 16.1 mill. in 1992. Canned exports accounted for \$ 18.8 mill. of the 1996 total, with Malaysia, Singapore, and the US taking the majority of these exports. Almost the entire fresh export (\$ 13.5 mill.) is shipped to Hong Kong, Singapore, Malaysia, and Indonesia.

Table 11. Fruit export from Thailand 1995-97 and growth rate average over that period, for 3 years

Items	1995		1996		1997		Growth rate	
	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt	Val
Fresh	136,626	2,792.97	189,072	3,556.39	219,873	4,738.47	26.86	30.25
Dried	15,224	350.39	47,616	1,376.24	56,904	2,476.56	93.21	165.86
Frozen	9,716	407.39	12,024	526.22	13,979	649.75	15.58	26.29
Canned	437,529	7,429.55	406,278	8,865.96	342,742	8,403.67	-11.49	6.35
Juice	137,808	3,179.38	121,993	3,849.59	104,315	3,253.63	-12.99	1.62
Preserved by sugar	27,493	1,273.84	28,317	1,382.81	27,155	1,579.08	-0.62	11.34
Other forms	176,686	4,024.96	70,386	1,898.80	82,977	1,484.13	-31.47	-39.28
Total	941,102	19,458.48	875,686	21,456.01	846,945	22,585.29	-5.13	7.74

Table 12. Major export of fresh fruit (1995-97)

Items	1995		1996		1997		Three Major Export Markets	Growth rate	
	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)		Qt	Val
Durian	48,716	1,004.10	65,694	1,202.10	72,987	1,399.60	Taiwan, Hong Kong, Malaysia	22	18
Longan	31,719	882.10	61,053	1,286.40	81,632	2,119.90	Hong Kong, Singapore, Indonesia	60	55
Lychee	3,257	118.60	11,603	336.40	11,158	327.10	Hong Kong, Singapore, Malaysia	85	66
Mangosteen	3,117	65.70	2,167	39.50	2,812	62.40	Taiwan, Hong Kong, Japan	5	3
Pummelo	4,776	56.10	6,182	66.90	3,247	44.40	Hong Kong, Singapore, Canada	18	11
Mango	3,658	42.20	8,250	120.10	8,522	148.90	Malaysia, Taiwan, Canada	56	88
Miscellaneous	41,383	624.17	34,123	505.00	39,515	636.20	Hong Kong, Taiwan, Canada	2	1

Table 13: Major export of frozen fruit from 1995-97

Items	1995		1996		1997		Three Major Export Markets	Growth rate	
	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)		Qt	Val
Durian	3,547	200.70	5,535	281.60	5,493	334.00	USA, Australia, Canada	24	9
Pineapple	2,672	57.50	3,104	77.80	2,837	90.70	Netherland, Japan, Germany	3	26
Mangosteen	704	46.10	707	57.00	436	37.00	Japan, Taiwan, Hong Kong	21	10

Table 14 Major export of canned fruit from 1995-97

Items	1995		1996		1997		Three Major Export Markets	Growth rate	
	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)		Qt	Val
Pineapple	383,990	5,763.00	346,325	6,510.00	279,513	5,901.90	USA, Germany, Netherland	-15	1
Longan	10,554	415.20	16,132	690.20	15,975	753.10	Malaysia, Singapore, USA	23	35
Lychee	3,796	296.90	14,081	471.30	15,525	626.50	Malaysia, Singapore, USA	33	45
Rambutan	7,204	250.80	1,287	475.90	10,033	388.00	Hong Kong, China, USA	18	24
Mango	5,914	136.40	6,337	175.40	5,993	182.30	Hong Kong, Australia, Netherland	1	16
Rambutan with Pineapple	3,323	121.10	4,260	165.90	3,930	174.90	Taiwan, Singapore, Malaysia	9	20
Mixed Fruit	17,743	446.20	16,553	373.20	11,773	377.00	Singapore, Malaysia, Hong Kong	-19	-8

Table 15: Major export of fruit juice from 1995-97

Item	1995		1996		1997		Three Major Export Markets	Growth rate	
	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)		Qt	Val
Pineapple	102,367	2,348.60	83,943	2,987.90	62,182	2,215.30	Netherland, USA, Spain	-22	-3

Table 16: Major export of dried fruit from 1995-97

Items	1995		1996		1997		Three Major Export Markets	Growth rate	
	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)	Qt (MT)	Val (M Baht)		Qt	Val
Longan	3,655	195.50	26,850	1,046.10	36,075	2142.90	China, Hong Kong, Singapore	214	231
Tamarind	10,118	114.90	16,987	181.60	15,407	187.40	Malaysia, Singapore, UNTD Arab EM	23	28

Sources: data in tables 11-16 are derived from the Department of Customs

Note: abbreviations; Qt = Quantity; Val = Value; MT = Metric Tons, M Baht = million Baht

## V. CONSTRAINTS IN THE THAI AND GLOBAL FRUIT SECTOR

Before the present economical crisis struck several countries in Asia, Thailand's economy was placing at an average growth rate of 8% annually over the last decade and this resulted in the pushing up of the average per capita income beyond \$US 2,500 in 1995. The number of people working in the farm dropped from 80% in 1980's down to the figure just above 50% last year. Demand for industrial workers with a guaranteed minimum wage has drawn more of the work force toward factories. Competition for workers between the industry and agriculture sectors was becoming more serious and, as history shows, often the agricultural sector was worst hit. At the same time, low fruit prices in the last 2-3 consecutive years made things worse for fruit growers.

In order to overcome or minimise the problems, Thai growers must be well prepared for the future.

There are 2 categories of problems that should consider: -

### (1) Production Problems:

#### **Cultural practice strategies**

The development of new cultural practice technology including planting systems, training systems and pruning strategies, for certain economic crops, should be given top research priority. An ultimate solution is seen to be the development and adoption of canopy management, as well as height control, in order to help facilitate more mechanization, which in turn lessens dependence on a large labour force. Fertigation techniques along with the IPM programmes should be applied more rigidly and efficiently. In doing so, not only higher yields per area unit and a reduction in the cost of production could be obtained, but also an environment safer to the community and the globe, could be created. Cost reductions and less use of pesticides would make the fruit commodities cheaper and more acceptable to the importers and the consumers.

#### **Excessive use of chemicals and the need for compliance with international quality standards**

With a very high concern about the excessive use of pesticides in agriculture, the Ministry of Agriculture and Cooperatives has established policies addressing a sharp reduction in the use of agro-chemicals and has encouraged the use of integrated pest management, in both the Seventh (1992-1996) and the Eighth (1997-2001) National Economic and Social Development Plans. In this respect, the Thai Government, in co-operation with the Federal Republic of Germany has successfully developed integrated pest management programmes aiming at a minimal use of pesticides in many major fruit crops such as durian, mango, pummelo and tangerine. Currently, the management scheme has been extended to cover all major fruit crops, monitored by the Entomology and Zoology Division and the Horticultural Research Institute of the Department of Agriculture and the Department of Agricultural Extension.

#### **Low farm-gate prices**

Most fruit farmers are small-scale operators, with little or no bargaining power. Since there are only a limited number of central market traders and there is no clear fruit quality standard applied at the farm gate buying point, traders play a paramount role in the regulation of the farm gate

prices. Moreover, the marketing operations are still inefficient, resulting in high transportation costs and substantial post-harvest losses, which are all factors affecting the farmer's income and his performance - and in the end- the consumer.

Note: in "Chapter 8: National Policies", it is explained that the Thai government actively encourages fruit farmers to group themselves and to register their association.

## **(2) Marketing Problems:**

Tropical fruits are considered as highly perishable in nature and, therefore, more research efforts in postharvest handling are needed, in order to prolong the shelf life of fresh fruit. For example, a breakthrough in lengthening the storage life of durian, up to 15 days, provided an alternative trading route, i.e. from air cargo to sea transport. This reduced the transportation cost and resulted in more durian export.

At the same time, very few people around the world, especially Westerners, are familiar with tropical fruits. It is a matter of fact that these fruits are very nutritious and delicious too. More consumer awareness is needed, in order to expand the markets of this sector. Enhanced co-operation among tropical fruit producing countries is seen as one of the best strategies for a joint promotion campaign.

In addition, most exporting countries face importer-specific trade barriers, as the quality standards set by the individual importing countries can differ from country to country. It is therefore deemed necessary, to jointly develop a common understanding and a global set of regulations, such as is being proposed in the Sanitary and Phytosanitary Measures System.

### **Specific Thai domestic market constraints:**

Domestic processing outlets and high value fresh produce retail markets receive their products by road transportation. In view of this, there are several limiting factors impeding the expansion of wholesale markets, particularly for the fresh produce, and some factors can be summarised as follows:

(a) **Quality of produce:** Produce quality does not always meet market requirements, probably due to the lack of market orientation in the production, indicating that proper post-harvest handling systems, designed to maintain the quality of the produce, may be insufficient.

(b) **Irregularity of supply:** Mostly, the produce is seasonal and the harvesting season is short, resulting in an irregular market supply. This, in itself, leads to wide fluctuations in price. Meanwhile, the processing markets and supermarkets always demand continuity of supply.

(c) **Packing techniques:** Lack of know-how and standard requirements for packing, container sizes and materials in use locally, result in crop damage during post-harvest handling and transportation from farm to packing centres.

(d) **Geographical distance :** Production areas and the location of the processing companies are

often too far apart, which results in high transportation costs and substantial post-harvest losses.

(e) Market information: In Thailand, there is insufficient marketing information, especially from processing companies and wholesale markets, regarding grades, quality, quantity requirements, trends in demand, prices and consumer preference. There is also a lack of systematic and reliable statistics on market demand and supply so that promoting agencies are not in a position to foresee what crops are in demand, the quantities needed and the prices likely to be paid to farmers. This makes it difficult for the promoting agencies to develop satisfactory working relationships with the processors and wholesalers and to enable them to enter into agreements with farmers to promote particular crops.

In summary, fruit experts here in Thailand do agree with the Consultation's (Kuala Lumpur, 1996) view that there is potential for growth in production, consumption and trade of tropical fruit worldwide. The sector provides opportunities for export diversification, employment and income generation. It could make an important contribution towards food security and balanced nutrition especially in developing countries. However, it is acknowledged that there are a number of constraints that continue to thwart the development of the tropical fruit sector and they include, among others, the following:

- lack of comprehensive, timely and accurate market information covering production, utilisation, demand, market prospects, quarantine regulations and non-tariff barriers;
- weakness in consumer awareness;
- need to further develop and disseminate technologies in production, post-harvest handling, processing, product development and distribution; and
- policy-related issues (e.g. required quality standards) affecting production and international trade.

## VI. RESEARCH AND DEVELOPMENT

### A. Background

The Horticultural Research Institute (under the umbrella of the Department of Agriculture, Ministry of Agriculture and Co-operatives) is responsible for research and development (R&D) in horticultural crops. There are 7 regional research centres, together with 16 satellite stations working collaboratively. Technologies obtained from the research programmes of the Institute are transferred to the Department of Agricultural Extension before being released to growers.

In addition, also instrumental in the R & D of fruits in Thailand are the Universities and the private enterprises. As they are located, spread over the different regions, their interests and work reflect the crops suitable for their particular agro-climatological zone(s). Research and development results are communicated, on a regular basis, through seminars and workshops, often organised in co-operation with the Horticultural Research Institute.

## B. Research strategies

In order to undertake research to the benefit of both the farmer-growers and private sectors, a research and development master plan for individual fruit crop has been established. The master plan serves the national plan and the requirements of growers and private sectors. Research activities are: breeding programmes, crop production technologies, plant protection, soil and water management, post-harvest technologies, certification of new varieties, integrated pest management and land suitability studies for the agricultural zoning of fruit.

## C. Research highlights (period 1989-1996)

### (1). The release of newly recommended varieties

Fruit crops	Varieties	Remarks
1. Durian	Kan Yao -Ari Chani Chan Chai Mun Thong Saen	less fibre, fine texture of flesh less fibre, small seed fine texture of flesh
2. Pummelo	Tha Khoi	160-180 fruits/tree
3. Mango	Kaeo Si Sa Ket	processing mango
4. Coconut	Sawi 1 Chumphon 60 Chumphon 2	oil content 64-67%, flesh 322 g/fruit 9856 fruits/ha, flesh 446 g/fruit early variety, yield and oil content close to that of Sawi 1
5. Cacao	Chumphon 1	Yield 795 kg/ha
6. Sour tamarind	Si Sa Ket 019	Yield 13.3 kg/tree tartaric acid 17%
7. Macadamia	660 Chiang Mai 508 Chiang Mai 344 Chiang Mai	high percentage of recovery attractive kernel suitable for a wide range of altitudes
8. Papaya	Khaek Dum Si Sa Ket Phichit 1	cylindrical shape papain
9. Cashew	Si Sa Ket 60-1 Si Sa Ket 60-2	grade 3 of standard kernel, early variety grade 3 of standard kernel

### (2) Research subjects per crop

## Pineapple

Although 'Smooth Cayenne' has been a commercial cultivar particularly for industry, germplasm collection has been made to seek a variety desirable for table use. There are a number of lines which are of economic potential, for example, 'Phetchaburi 1', 'Phetchaburi 2', 'Tainan 4' and 'White Jewel'. In addition, a breeding programme through reciprocal crossing has been conducted with an aim to seek better characteristics. Induced mutation via radiation has also been undertaken to obtain a range of variation. To meet consumer requirements, collection and evaluation of existing commercial varieties, 'Smooth Cayenne', 'Nang Lae' and 'Phuket' has been undertaken to establish a pineapple standard in line with Codex. Multiplication by means of tissue culture techniques has been successfully achieved.

Crop management has also been investigated including types and size of planting material in relation to growth and development, partial removal of leaves before chemical treatment for floral induction and response of flowering to various chemicals. Removal of leaves in-between rows resulted in increased flowering and makes maintenance more convenient. Differences in cost of chemical use for floral induction between ethrel + urea and calcium carbide are significant and it should be considered by growers. Attempts in controlling marbling have been made, although no progressive results are achieved. A nitrate residue in cans, as recently reported, has increasingly become a barrier for exports. It is evident that the presence of excessive nitrate is associated closely with lack of molybdenum. Further investigation is needed. Post-harvest studies have also been executed to correct fruit rot during transportation by means of an appropriate harvesting index, fruit waxing, fungicide treatment and appropriate storage temperatures.

## Durian

In 1994, Thailand produced a total of 787, 512 t of durian with a market value of 10 thousand million baht. However, only 13% were exported. Most attention has been paid to technology for producing quality durian, the control of the seed borer (*Mudaria luteileprosa* Holloway), an integrated control of foot and root rot (*Phytophthora palmivora* Butler), processing technology, and clonal identification, using isozyme pattern and DNA fingerprinting techniques. With respect to technology for producing quality durian, source-sink relationship has to be considered. Detailed technology includes pruning, foliar sprays of nutrients and pesticides to ensure healthy trees after harvesting. Then, encouragement of fruit set is made through flower thinning, foliar sprays of micronutrients, hand pollination at night and management of soil and water. Finally, yield and quality are improved by fruit thinning, control of vegetative flushing during fruit development, fertiliser application, watering, uses of chemical, supporting of mature fruits to avoid fruit drop and appropriate harvesting techniques.

The control of seed borers, including the use of black-light blue traps and chemical sprays, is practised throughout the growing areas in eastern Thailand. However, its efficiency may be limited if some growers in certain areas do not practice this, since the insects are able to continue their life cycles. Growers have successfully accepted integrated control of root and foot rot. The practical procedures consist of enhancement of tree health by foliar sprays of nutrients and carbohydrate-containing compounds, the use of chemicals to get rid of an existing disease and pathogen population control by using a biological control agent, i.e. *Trichoderma*. Fertigation to increase

efficiency of fertiliser application is also being examined and evaluated. Processing is another alternative to absorb excess of fruits during the peak season. Packaging and storing aspects for export have also continuously been developed to meet a worldwide requirement. Preliminary study on use of sonic response technique for determination of fruit maturity has been examined.

### **Mangosteen**

The demand in 1995-96 for mangosteen for export was around 3,000 t. Technology for producing quality mangosteen has been developed, based on sink-source relationship knowledge. Firstly, tree health after harvesting has to be emphasised. This can be achieved by pruning, fertiliser application, induction of synchronised vegetative flushing and regular sprays of pesticides. Secondly, flowering is induced through management of watering. Finally, yield and quality are improved by enhancing fruit development, soil and water management through fertigation and appropriate harvesting techniques.

Control of thrips causing corky fruit can successfully be obtained by chemical sprays together with sticky glue traps. Since propagation of mangosteen has been widely practised using seedlings and the fact that their seedlings are nucellus ones, induced mutation via radiation is carried out to obtain a range of variation for future breeding programmes. In addition, identification of varieties using isozyme techniques has been progressively undertaken. A study on controlled-atmosphere storage of mangosteen was also investigated.

### **Rambutan**

A phenological study in rambutan has been undertaken so that improved management during certain development stages could be undertaken. For instance, a carbohydrate-containing compound, seaweed, glucose and/or micronutrients are applied at different stages to encourage growth and development. Consequently, yield and quality are improved. A hybridisation programme recently brought in 'Si Chomphu' hybrid no. 7-7-2 which is early bearing. Investigations on uses of organic matter and inorganic nutrients have already been done.

### **Longan**

Clonal selection in three longan varieties, viz. 'Do', 'Bieo Khieo' and 'Haeo' were carried out and the selected clones have been regionally tested. Seasonal changes in total non-structural carbohydrate and total nitrogen content were measured and relationships between those to flowering were examined. Foliar sprays of chemicals and micronutrients have been found to promote flowering. Chemical treatments and SO<sub>2</sub> fumigation have been investigated in order to extend storage life of longan.

### **Lychee**

'Hong Huai' lychee has been clonally selected for consistently high yielding characteristics with excellent fruit quality. Regional yield trials of the selected clones have been undertaken. In addition, a promising, early-bearing hybrid variety, between 'Jakkrapat' and 'Hong Huai', has been achieved. Paclobutrazol application to induce synchronised flowering has been evaluated. Soil and water management at different stages of growth and development has to be taken into account to

optimise vegetative growth and maximise yielding ability. The use of plant growth regulators with regard to fruit quality after harvesting, for example, fruit colour and fruit abscission were examined. Weeds in lychee orchards can effectively be controlled by intercropping with legumes, consequently, lowering the use of herbicides. Control of insects, particularly *Bactocera dorsalis*, has also been studied.

### **Pummelo**

One of the limiting factors in pummelo orchard is a pest. Therefore, attention has been given to research activities with an emphasis on control of insects by means of chemical sprays and fruit netting. Insects of economic significance include thrips, red mites and scale bugs. Individual netting with 1-mm grid blue nylon net of 40x50 cm can protect fruit from damages caused by insects. Fruit dipped in GA3, wrapped with PVC and kept at 10° C can last up to 6 months without the presence of yellowing on fruit skin.

### **Mango**

A breeding programme for "industrial mango" through clonal selection brings in a number of promising clones desirable for both, processing and green mango. To increase utilisation of the selected clones, particularly for juice making, crossing with introduced varieties has been carried out. A breeding programme for green mangoes has also been undertaken. Identification of varieties by means of isozyme patterns and, in some cases, DNA fingerprinting has been progressively achieved. A phenological study in mango, together with the analysis of certain compounds at different stages of growth, has been undertaken so that proper orchard management, with the aim to increase flowering and yield, could be implemented.

One of the most important limiting factors in mango production is damage caused by insects and diseases. Integrated pest management to control anthracnose, has revealed that pruning after harvesting, appropriate timing of chemical spraying, and the encouragement of fruit growth through foliar sprays of micronutrients, resulted in a reasonable reduction in the damage caused by *Colletotrichum gloeosporioides*. With respect to stem borer (*Rhytidodera simulans*), injection of nematodes (*Steinernema carpocapsae*) into stems or branches at which stem borers attack, can reduce damage by 50-60%. Pre-harvest practices appeared to be a more important factor in controlling fruit rots after harvesting, although chemical treatments can effectively decrease loss caused by diseases.

### **Papaya**

Almost all research activities in papaya are undertaken on the elongata-type, 'Khaek Dam' variety, since it is used both as green papaya (a major diet ingredient for nearly everywhere in the country) and as ripe papaya. Papaya ringspot virus has been the most serious constraint in papaya production in Thailand for several years. Therefore, emphasis has been put on controlling papaya ringspot virus, including conventional breeding programmes, induced mutation via radiation, genetic engineering, cross protection using mild strains and the use of chemicals. Soil and water management, particularly in growing areas with very low soil fertility and waterholding capacity has been investigated, among it the use of polymers to preserve more water.

## Banana

A breeding programme with the 'Khai' banana (AA group) resulted in the selection of 14 lines of which yielding characteristics are superior to that of the existing ones. Regional yield trials are being tested. Phenological studies of different types of banana were summarised. Control of diseases has also been examined. Investigations on use of chemicals to suppress growth of suckers in 'Khai' banana shows that paraquat (27.6%) at 125 ml a.i. /l of water is capable of suppressing suckers (i.e. to promote growth and development of mother plants). As a result, labour cost for removal of suckers can be reduced by 50%.

'Longkong' (a presumed natural hybrid between langsat and duku)

Crop management to optimise vegetative growth and maximise yield in 'longkong' has been investigated, including the improvement of tree health after harvesting, forced water stress to induce flower initiation, studies on the appropriate fertiliser and water supply, thinning of panicles, application of growth regulators (e.g. GA<sub>4+7</sub>) for consistent development of panicles and fruit set, and the application of foliar sprays of micronutrients with regard to fruit abscission and fruit break.

## Guava

Apart from work with commercial varieties which are mainly improved by growers from progenies, a germplasm collection of juice guava from Hawaii, Australia and other countries has been conducted. Yield trials with the juice-guava varieties revealed that one or two varieties have potential to meet the factory's requirements for juice processing.

## Tangerine

The domestic demand for tangerine has significantly increased since 1995, at a time and period that the production suffered a major decline. First of all, many tangerine areas, which are traditionally located around the major urban areas (mainly in the Central Plains), have been lost to urban expansion, in the wake of the land price boom in the nineties. Secondly, as most of the plantations have been derived from marcotted material, increasing losses have been endured, since this planting material is highly susceptible to phytophthora, tristeza and greening.

For this latter reason, research is now concentrating on improved planting material, derived from the development of disease free budwood and the introduction of an extended number of disease resistant or tolerant rootstocks, via the import of their seeds. In this respect, emphasis is put on the co-operation with - and the strengthening of - the private nurseries, in order to produce improved planting material under an umbrella of "certified-disease-free" nurseries.

## VII. National Policies

Even though Thailand is one of the world's leaders of fruit producing countries for export of both

fresh and processed products, the trade situation of Thai fruits in the world's food markets seems to be in difficult situation, due to severe international competition. To strengthen the national agricultural policy, the government has established a plan for future fruit development, of which the major guidelines are as follows:

1. Development of new and superior fruit varieties suitable for local consumption, processing industry and export markets.
2. Strengthening of the support in R&D programmes which emphasise on:
  - collection and conservation of germplasm to minimise genetic erosion in fruit crops.
  - orchard management to reduce production costs, focusing on the improvement of cultural practices and soil and water managements.
  - minimal use of pesticides to avoid detrimental effects to consumers, growers and environment leading to the development of integrated pest control programmes.
  - the use of rootstocks grafted with disease-free planting material to increase productivity and longevity of fruit trees.
  - development of effective harvest and grading devices for increasing quality and decreasing production costs of fruit crops with high export potential.
  - improvement of post-harvest technology on prolonging storage life, handling and packaging for overseas markets.
  - investigation in sophisticated techniques for processing and development of attractive value-added products to meet the demand of both local and international markets.
3. Implementation of quality and standard regulations for fruit crops with high potential for export (related to SPS measures and the HACCP system)
4. Support existing ones and promote the establishment of new farmer co-operative groups at district and provincial levels aimed at: (i) exchanging experience, and (ii) becoming group-centres as a bargaining power and to seek financial support from other sources at low interest rates.
5. Encouragement of an agro-industry enterprise which should try to solve over-supplies, seek ways to increase the value of fruit products and help to boost the export potential.

One of the major targets in the fruit production policies of Thailand is to encourage the establishment of standardized fruit production processes, thus contributing to the development of the hazard analysis critical control point (HACCP) system in the future.

In order to facilitate more efficient marketing and export services, the Thai government has developed a so called "one-stop" service policy as mentioned earlier in Chapter IV, Marketing

Issues.

## VIII. FUTURE PROSPECTS

### A. The Four Major World Fruits

The Consultation in Kuala Lumpur, July 1996 reviewed the potential for import growth of tropical fruit in the world market to the year 2000 and noted that relatively strong growth was expected for pineapple, mango, avocado and papaya. However, it was recommended that countries should exercise considerable caution in expanding their production capabilities in order to avoid the danger of over-supply. In this connection, it emphasised the value of consultations and increased information flow regarding prospective production and consumption developments. Thailand is in full agreement with this.

### B Prospects for Non-traditional Agricultural Commodities

Trade in several non-traditional agricultural commodities (NTCs), particularly, but not exclusively in the horticultural area, has been growing relatively rapidly in recent years. Such commodities are becoming increasingly important for developing countries.

The major import markets for NTCs are the EC, the US and Japan, which together account for over 60 % of the value of world trade in these commodities. Although the NTCs amounted to only 6 % of the total value of agricultural imports of these three countries in 1994, imports were growing at a rate of 9.9 % per annum during 1985-94, compared with 6.8 % for other agricultural imports (Table 5). The major exporters of NTCs among the developing countries were China (\$1.42 bill. in 1994), Mexico (\$1.26 bill.) and Thailand (\$738 mill.).

Two main reasons behind the rapid import growth of NTCs in the developed countries are consumer preferences associated with rising incomes and increased capability on the part of certain developing countries to increase shipments at competitive prices. The development of lower cost transportation and communications and the greater availability of production and marketing technology in developing countries have been important contributing factors.

### Demand Prospects for Fresh Fruits

It is widely accepted that there is potential for import growth in many markets, although a number of difficulties need to be resolved for the realization of this potential. In particular, there is a need to strengthen consumer awareness, especially of the lesser traded and known fruits. In many markets, the health attributes of tropical fruit might lead to heightened consumer interest. However, in some other markets health considerations were considered to be of secondary importance. Appropriate promotion programmes, taking into account critical economic and demographic factors including price, quality, seasonality, income, age, ethnicity and consumer knowledge are needed.

Assurances of stable supplies at prices, which are remunerative to growers and reasonable to

consumers, are important factors for maintaining market growth. The latter requires continued attention by exporting countries to improvements in production patterns, procurement, storage, grading, quality control, sanitary and phytosanitary measures, packaging, transportation and shipping (including cost savings).

### Demand prospects for processed tropical fruit

World trade of fruit products generated more than US \$1 bill. in 1994, and this is in particular important to the economies of developing countries which accounted for almost the entire quantity traded globally. Among the processed tropical fruits (canned, juices, concentrates and pulp/puree, and dehydrated) canned products were the most important, with pineapple accounting for over half of total world trade, followed by juices, concentrates and pulp/puree. Among the three major product categories, fruit juice/concentrate seems to offer the best growth prospect, with regard to a long-term increase in export.

## IX. CONCLUSIONS:

In agreement with the recommendations of the FAO Consultancy on Tropical Fruits, held at Kuala Lumpur in July, 1996, Thailand expresses its determination to co-operate with the global community in creating a more orderly global trade in tropical fruits. It acknowledges that there are still a number of fundamental questions to be answered, problems to be solved and serious actions to be taken on the national and international level. This challenge will only be tackled properly, when all of us, tropical-fruit producers and importers, do our homework first and communicate progress and difficulties encountered. We ought:

- to strengthen data collection and dissemination of relevant *information*;
- to analyse and improve understanding of the local and export markets to enable effective *planning*;
- to strengthen the monitoring of the impact of our *national and international trade policies* in relation to Uruguay Round Agreement, including the agreement on the application of sanitary and phytosanitary measures (i.e. compliance with SPS requirements of importing countries), to further the development towards the HACCP system and the implementation of the CODEX standard, whilst informing fellow governments about the development;
- to seek ways to organise appropriate *market promotion* through exporter and importer collaboration with support from international organisations, with a view to strengthen *consumer awareness* of the value of tropical fruits;
- to promote research and development of *technologies in post-harvest handling* including downstream processing for industrial use;
- to extend the application of appropriate *modern technologies in production and*

*marketing* to raise sector productivity;

- to strengthen the *management of tropical-fruit genetic resources*; enhance human resource development in the tropical fruit sector and reinforce direct relationships between producing and consuming countries; and
- to encourage *financing agencies* including the World Bank and the regional banks to give high priority to *lending* for tropical fruit commodity investments, at low interest rates.

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March 1998



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pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
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Unidas  
para la  
Agricultura  
y la  
Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

First Session

Pattaya, Thailand, 25-28 May 1998

### SUPPLY AND DEMAND PROSPECTS FOR TROPICAL FRUITS IN SUB-SAHARAN AFRICA

## SUMMARY

Recommendations  
Introduction  
The context of the study  
Justification  
Scope  
Objectives of the study  
Methodology

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1-2 The system of production  
1-3 Origin of producers  
1-4 Land matter  
1-5 The financing of the production  
1-6 The sector of fruit in the Sub-Saharan Africa countries economy  
1-7 The organization of the marketing  
1-8 Autoconsumption  
1-9 At The level of the stock  
1-10 Situation of the main fruits in January 1998  
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1-12 Major constraints major of the sector of fruits  
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### SECOND PART : APPROPRIATENESS OF FINANCING

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3-3 At the marketing level  
3-4 At the financing level

CONCLUSION  
ATTACHMENTS

## RECOMMENDATIONS

The analysis of the current situation of the sector of fruits leads to the following recommendations relating to production, processing, marketing and financing.

### AT THE PRODUCTION LEVEL

**Recommendations focus on the main next points :**

- 1 - Encouragement of the Research/Development for the development of effective and competitive fruit varieties, resistant to sicknesses and to the other enemies.
- 2 - Vigorous campaign aiming at the improvement of the quality of the products presented to the market. This campaign has to be initiated by professionals and public authorities.
- 3 - Initiate a policy of volunteer service of groups of producers in cooperative or companies. These grouping have for goal to put forces and capacities in common , for a better profitability in the use of tools and a facilitated access to the inputs at interesting prices.
- 4 - Promotion of a region based policy : For West and Saharan Africa, Central Africa, southern Africa.
- 5 - Initiate and / or encourage a policy of lower taxes on all the inputs and all equipment concerning agricultural production. Indeed, the study has determined the cost of factors as one the major constraints that constricts the agricultural development in general and the development of the sector of fruits in particular.
- 6 - Initiation by African States of a strict policy and volunteer service relating to land matters. A policy of incentive to the agricultural production, and a favorable healthy environment to the growth of the sector of fruits.
- 7 - Research in priority measure of encouragement for small producers.
- 8 - Initiation, encouragement of a policy of vulgarization, training, information, and supervising for the producers.  
This policy will be led by the State and by professionals.

## **AT THE PROCESSING LEVEL**

1 - Encourage the traditional processing. It should be noted that this sector regroups several small artisans. The concern is to adapt their working tools and improve it.

2 – Repair the old units of processing. Give the necessary financing resources to these units. The production will be able to supply them.

## **AT THE MARKETING LEVEL**

1. New market prospecting such as eastern Europe, the south of the Mediterranean basin for the sale of fresh fruits and processed products.

2. Use of modern methods of effective marketing.

3. Improvement of the commercial approach at the national and regional level. This improvement concerns the collection, the exploitation and the distribution of information beside economic operators concerned. This function of information can be insured by public authorities or by a private structure.

4. Immediate and cash payment to producers that deliver to the embarkation. This disposition will avoid to the producer the long and painful treasury difficulties prejudicial to its activity.

5. Initiate or promote a policy of fruit improvement for export and for the local consumption. Professionals have to seek the quality «EXTRA» The policy can be led by professionals and the state.

6. Establish a judicious panel of importers.

The number of importers in the panel has to be drastically reduced.

## **AT THE FINANCING LEVEL**

1. Imagine a mechanism of financing for the sector of fruits, that will include large spectrum of activities , from research to marketing. As of date, January 1998, there is no such system of financing of the agricultural sector.

2. Put in place a Fund of GUARANTEED LOANS. This fund would be constituted by withdrawal on sales
3. Give a higher preference to the assistance in the form of inputs or training than to those in the form of cash or food.
4. Negotiate long term financing the World Bank, the ADB, EDF, and sources of private financing.

## **INTRODUCTION**

The sector of fruits participates in bringing export revenues in several countries of sub-Saharan Africa. The main operators are large producers and a very great number of small agricultural producers.

The study's goal is to present the current situation of this sector . It focuses on present perspectives for medium term. It also addresses the measures envisaged by producing countries. These perspectives depends also on the effort of the International Community, especially that of the European Union .

Therefore the study articulates itself around two parts : the presentation of the current situation and perspectives.

## **THE CONTEXT OF STUDY**

The study was performed four years after the devaluation of the franc CFA. It took place in an economic and political environment characterized by structural adjustment policies initiated by the World Bank and the IMF .

Concerning fruits specifically, the context is characterized by ;  
the decline on the part of African country market  
the decline of product prices  
the liberalization of the fruit sector  
the increase of the consumption on the international market  
the research of a policy at the regional level.

## **JUSTIFICATION**

The present study finds its justification in :

The need to better know operating systems on one hand, and the situation of production and marketing on the other .

The perspectives of marketing, production, financing opportunities in the sector and improvement of producers conditions, especially the small producers.

## **SCOPE**

The study concerns Sub-saharan Africa. Nevertheless it will focus particularly on West Africa. Countries, judiciously chosen because of their Agro-ecological situation, will serve as illustration.

## **OBJECTIVES OF STUDY**

### **GENERAL OBJECTIVE**

It consists in exposing the current situation, analyzing perspectives of the production and the trade of fruits on the basis of outlets, and political measures envisaged.

### **SPECIFIC OBJECTIVES**

The study focus specifically on the following objectives :

- 1 - A brief description of the current market situation which shows the main types of fruit produced and commercialized
- 2 - The main measures concerning the trade of fruit (how these measures affect the development of trade and production)
- 3 - The importance of the fruit sector in the economy of the region by reference to export revenues and income of small farmers.
- 4 - The impact of the fruit sector and policies concerning the food security and the food stock.

## **METHODOLOGY**

In order to reach the objectives enumerated above, the next methodology has been chosen. It comprises two sections :

### ■ Section «Bibliographical Researches»

It consisted in identifying, consulting and analyzing the documentation relating to the fruit sector.

### ■ Section « Inquires on the field

It was done with the Embassies, international Organizations and the Ivorian administration. The inquiry on the field was realized with the help of the appropriate questionnaire.

■ The analysis of information

It has consisted in analyzing the questionnaire , cross-checking and interpreting the data.

## **FIRST PART : PANORAMA OF THE SECTOR OF FRUITS**

### **1-1 FRUITS TAKEN INTO ACCOUNT BY THE STUDY**

Sub-Saharan Africa has a multitude of fruits. They come from farms of various scales. Science has improved the varieties of fruits sold for great consumption at the local level or those destined to commercial transactions with the European continent for example.

Other fruits remains at a natural state. They participate however in the feeding of numerous populations.

The study focuses on the totality of fruit of sub-Saharan Africa. However, it has been necessary to retain only a dozen, given the number relatively high of these fruits that can be grouped in three categories according to the importance. This categorization takes into account the total production, the commercialized production and the auto - consumption.

**Table N°1 : The main fruit concerned by the study**

FRESH FRUITS	MAIN FORM OF PROCESSING										
	Juice	Jam	Slice	dried	Scent	Alcohol	Beer	Peel	Oil	Concentrate	Syrup
Δ Citrus fruits	A λ	λ		A	λ			λ			λ
□ Cashew nut				A							
Δ Pineapple	A λ	λ	λ	A		λ					
□ Avocado									Λ		
Δ Banana	λ	λ		A							
Δ Plantain				A			Λ				
□ Date											
□ Grenadine	A λ	λ									
□ Papaya	λ	A λ		A							
Δ Mangue	λ	λ									λ
O Goyava	λ										
O Tamarin											

A : Artisanal processing

λ : Industrial processing

Δ : First importance

Λ : Susceptible secondary importance of interest

O: Secondary importance

## **1 - 2 THE SYSTEM OF PRODUCTION**

There are two types of systems of production corresponding to the local population involved . The first one, is related to technical norms of production . As far as the second one, it implies a form of spontaneous production composed of disseminated trees in fields, alongside paths, and villages.

Industrial units are characterized by small , medium size and large units whose areas reach several hundred hectares.

## **1-3 ORIGIN OF PRODUCERS**

The population of the fruit producers is composed of:

Full time producers living exclusively from the income of their farms. They can be Europeans, Africans (generally dignitaries of States) or multinational companies (SCB , OCB)

Sharecroppers.

## **1-4 LAND MATTERS**

The installation of an orchard has particular social and economic implications. It necessitates a preliminary investment. It leads to an individual and definitive appropriation of the land. This form of access to the land sometimes becomes source of friction in Africa, where the land is still managed with a strong emphasis on community.

## **1-5 FINANCING OF THE PRODUCTION**

In most sub-Saharan African countries, there is no financing institutions adapted to the agriculture in general and to the sector of fruits in particular. The small producers benefit from practically no financing. They receive some cash advances from cooperators. Some big producers, notably Europeans and Africans benefit from pre - financing from importers.

## **1-6 THE SECTOR OF FRUITS IN SUB-SAHARAN AFRICA COUNTRIES ECONOMY**

Except Kenya, Cameroon, Côte d'Ivoire, Nigeria, Burkina Faso, the sector of fruits participate very weakly in the GDP of the other countries.

Concerning the offer and demand, let us note the following points:

The offer is superior to the demand for the main products intended for export : Banana, Pineapple.

The demand superior to the offer for the other fruits.

Trading is taking place with European countries, especially the European Union.

It mainly deals with fresh pineapple, banana, and secondarily with fruits, mangoes, cashew nut.

## **1. 7 ORGANIZATION OF THE MARKETING**

It has many forms and varies from a country to another. Most of the countries export to cooperators or brokers.

In other cases some great companies of export buy from producers or produce themselves their fruits.

In addition, there are in most of producing countries, private groups that tend to develop the export : OCAB in Côte d'Ivoire, OCB in Cameroon.

The fruits concerned are subjected to inter-state and inter-area trade.

But this trade has a bad organization and a lack of information. It needs to be better organized.

## **1-8 AUTOCOSUMPTION**

It is about 10 to 15 % for banana and pineapple. It reaches approximately 80 % for other fruits.

## **1-9 AT THE STOCK LEVEL**

The date and the cashew nut can be stocked. However, demand is superior to offer. There is no stock. The other fruits are very perishable.

## **1-10 SITUATION OF MAIN FRUITS IN JANUARY 1998**

### **a) Cashew nut**

Africa is the first region for cashew nut production with approximately 325 000 tons. It exports 140 000 tons of non processed nuts for a value of 80 millions Dollars. Industry of the cashew offers to African producer of raw nuts an opportunity that generates income

The main producers are Burkina Faso, Tanzania, Mozambique.

#### **Place of West Africa**

Exports and productions of raw nuts have been strongly rising in these last years, particularly because of the production of Guinea Bissau and Côte d'Ivoire.

Raw nuts producers have an increasingly important role in the supply of India (approximately 1/3 of imports) since the end of raw exports from Vietnam .

The main producers of West Africa are Guinea Bissau, the Côte d'Ivoire, Nigeria, Benin, Togo, Mali, Burkina , Faso, Senegal , Guinea

In most countries, the price increase creates a great interest for this product.

The processing capacity of West African countries is very weak (as compared to India 200 000 tons of raw nuts).

### **b) The Date**

It is a Saharan Africa fruits, especially of Chad, Mauritania, Niger, Mali. It does not give truly place to industrial operations. In 1969, the production of these countries were estimated at 61 000 tons ,with about 45 % exported. The auto - consumption is 55 %.

### c) Citrus fruit

In sub-Saharan Africa, citrus is produced in South Africa, Zimbabwe, Mozambique and Swaziland. Small to medium scale producers include Zambia, Kenya, Côte d'Ivoire and Madagascar. In 1992, 12 African countries exported oranges to European Union markets, while 14 countries supplied lemons or limes, 13 finished grapefruit, and only 5 exported tangerines.

The citrus sector is not an attractive target for an expansion of exports, for several reasons. The market for imports does not appear to be growing. Spain's entry into the European Union, and investments in that country and Italy, mean that the Union is likely to become increasingly self-sufficient in citrus products. Efforts by the U.S. to gain access to Union markets for U.S. citrus products ( Barnes et al ) are likely to increase the competition within what is left of the import market.

Table 3 European Union Imports of selected tropical fruits and Share of African Producers 1990-1992-value (\$000)

	1990	1991	1992	Share of African Producers 1992	Principal African Suppliers
Bananas	2 366 232	2 674 326	2 880 041	7.21%	Côte d'Ivoire, Cameroun, Cap Verde
Pineapple	221 751	206 062	220 807	50.76%	Côte d'Ivoire, Ghana, South Africa
Avocado	199 768	190 090	198 489	27.48%	South Africa, Kenya
Mango	73 863	86 354	92 135	23.69%	South Africa, Côte d'Ivoire, Burkina Faso, Mali
Papaya	15 223	16 752	21 418	3.24%	Côte d'Ivoire

Source :Adapted from Eurostat NIMEXE Tables

### d) Bananas

Britain, France and Spain have traditionally protected banana imports from certain former colonies or overseas possessions from competition from Latin American producers. Other countries, including Germany and the Benelux countries, have allowed free access to all banana imports. The opening of the single European

market would have opened all the Union markets to cheaper bananas, but a pan-Union tariff scheme was devised to continue the protection offered to favored countries and territories (The Economist). African countries such as Côte d'Ivoire and Cameroun have benefited from protected access, as have some of their principal competitors, including the Canaries 'the largest single exporter to Union markets), Madeira, Crete, Martinique and Guadeloupe, and the former British possessions in the Caribbean. It has been argued, however, that the net effect has been to eliminate incentives to increase the efficiency of African banana exports will increase substantially in the foreseeable future. In the short term, preferential access is shared with other, larger producers.

#### **e) Pineapples**

African producers accounted for just over half of European Union import of fresh pineapple as of 1992 . In that year, 22 African countries furnished fresh pineapples to Union markets, of which the largest exporters were Côte d'Ivoire and Ghana . Between 1982 and 1986, imports of fresh pineapples into the principal European increased in volume by 98 percent, the largely to the increased use of refrigerated sea transport, which is much less expensive than air shipment. Côte d'Ivoire, which accounted for nearly 90 percent of African exports in 1992, has begun cutting back on planting and requiring export licenses in an attempt to control what it sees as an excessive supply of exports, after increasing production and exports during the early 1980s.

#### **f) Avocados**

In 1992, 15 African countries exported avocados to the European Union. In addition to South Africa and Kenya, Côte d'Ivoire, Cameroun, Kenya, Swaziland and Mozambique have traditionally exported significant quantities of avocados : European imports of avocados follow a seasonal pattern, and are primarily concentrated between October and April. Paradoxically, the share of African countries is highest between the beginning of June and the end of November. During this period in 1992, they accounted for 38.9 percent of European Union imports, as against 17.2 percent during the rest of the year.

#### **g) Mangoes**

The market for mangoes increased rapidly during the 1980s, a trend which is expected to continue . In Africa, Kenya, Madagascar, Mali, Senegal , Congo, Burkina Faso and the countries of southern Africa have been significant exporters of mangoes, 26 African countries exported mangoes to the European

Union, led by South Africa, Côte d'Ivoire and Burkina Faso. While the absolute level of mango exports from the ACP countries to the European Union increased during the 1980s, their share of that market fell from 44 percent to 30 percent between 1982 and 1986. Part of this is due to regional differences in seasonal pattern of production (and thus does not represent direct competition). Another factor is the use of sea transport by Latin American countries, which increases the price competitiveness of their product and avoids the capacity limitations of air transport (ibid).

#### **h) Papayas**

Brazil is the primary supplier of papayas to European Union markets, with an 80 percent share. THE remainder is primarily supplied by African countries, typically including Côte d'Ivoire, Burkina Faso, Kenya and Mauritius (FAO). Nine African countries furnished papayas to Union markets, of which Côte d'Ivoire by far the largest producer with 87.2 percent of African exports. In Africa, papayas have traditionally been grown on an artisanal level, except in Tanzania, which is a major producer of papain. Exports are generally shipped via air freight, which is seen as a significant constraint to the expansion of the market for that fruit. Fruit shipped by sea would be between 20 and 25 percent less expensive (FAO).

### **1-11 PROCESSED PRODUCTS**

Almost all the fruits are subjected to a form of processing. The table n°2 shows for each fruit its final form after processing. The following pages give details about the processing of the main fruits.

#### **Pineapple**

- Canned pineapple.      Deep-frozen pineapple in pieces or in slices.  
   Dehydrated pineapple, pineapple in the form of pulp,  
   extract of Bromine.
- Pineapple Juice
- Dried pineapple.

#### **Mango**

The processing gives :

- The concentrate of mango

- The pulp of mango
- Frozen mango pulp for yogurt and frozen cream.
- Mango juice.
- Dried mango.

### **Citrus fruits**

- The species processed are lemon, lime, bergamot, bigarade..
- Products obtained : essential oil and secondarily the juice and the peel
- The concentrate , which is a raw material universally known intended for industry of non alcoholic drinks.
- The pectin of citrus fruits

### **Plantain.**

It is transformed into beer highly appreciated in countries of the great lakes.

Papaya and grenadine are transformed into juice and jam. Papaya is transformed into dried fruit.

## **1-12 MAJOR CONSTRAINTS OF THE FRUITS SECTOR**

Many constraints hinder the development of African agriculture in general and the sector of fruits in particular. These constraints are of several orders. This study has focused on four of them. There are related to the following items :

- Production
- Processing
- Marketing
- Financing

### **a) Constraints relating to production**

They are numerous . The study has enumerated some of them :

#### **1 - Meteorological or climatic conditions**

It concerns the aridity, the bad distribution of rains, and disturbance caused by floods, winds, and bush fire.

## 2 - Damages caused by animals.

It concerns threats of insects, particularly in Sahelian region.

It also concerns devastation of great herbivorous (such as elephants). This phenomenon is observed principally in the zones of forests and Savannah of eastern Africa and central Africa.

## 3 - Deficient Road infrastructures.

In sub-Saharan Africa, there are very few asphalt roads and they are in a state of degradation so advanced that they are worse than some paths.

The paths remain the main means of connection between cities, villages and camps. Unfortunately they are not well maintained. They are practically impracticable. Producers can not transport their products to consumers or marketing places. Productions get spoiled in some places, while the famine rages in a nearby region, distant of approximately 200 km.

## 4 - Cultural habits.

Almost all the farmers work with a hoe. They do not use selected seeds, nor manure or phytosanitary products because of their high cost. It is obvious that, in these conditions, outputs are very weak.

## 5 - The scarcity and/or high cost of the workforce.

There is less and less workforce in villages. The youth migrate to cities. Those remaining in villages, charge their manpower at very high price.

## 6 - The production cost is extremely high.

Costs of the inputs : (fuels, herbicides, fertilizer, wrapping, seeds, phytosanitary products) are out of the reach of the farmers, whether big or small.

## 7 - The supervising weakness.

Supervising here means : technical supervising, financial supervising, commercial supervising.

Public owned supervising companies and cooperatives are already operating. However, the real impact of these companies and these cooperatives is so limited that its effects are hardly perceptible.

8 - The high cost of the transportation.

By transportation, we mean transportation by road, by air and by boat. Concerning road transportation, trucks are usually used. Here again, the bad state of road infrastructures is one of the main reasons for the high cost of the transportation.

9 Inadequate Research / Development

In all the countries, there is at least an institution of research . However, most of the time, Research / Development do not take fully into account the needs of local populations.

According to the world Bank, agricultural technologies in sub-Saharan Africa are at the lowest level.

#### **b) Constraints relating to processing**

These Constraints can be summarized as follows :

1 - The age of industrial equipment .

Installations have an average age of 25 years in all countries where there are processing units. They are no longer effective and generate high production costs.

2 - Traditional processing.

There are many small traditional processing units. They lack financing means . They lack adequate equipment . Although, the demand for these products exists, the supply remains very limited due to the techniques and material used.

3 - Packaging.

Good packaging is very expensive even for the industrials in the sector. For the artisans, it is simply inaccessible, and they have to work with any wrapping that is available to them.

4 - The raw material is perishable.

### **c) Constraints related to the marketing**

They are numerous . The study has classified them into five categories.

1 - The weakness , even the absence , of a reliable information system.

At the regional and national level, information is not always available concerning items like quantities, places, and prices.

2 - The OCM -OCM Banana conflict.

3 - Fall in prices

This fall is the consequence of the pressure created by Latin America producing countries.

4 - Quality of the fruits.

This quality has declined because of still existing financing problems. Processing are no longer done correctly.

5 -Importers influences.

Some producers are financed by importers. Therefore, the producers are kept under control and the importers can speculate on the predictability of the fruit supply.

### **d) Constraints relating to the financing.**

They are relating to the following points :

1 - Lack / weakness of financing institutions.

Most of sub-Saharan countries (such as the Côte d' Ivoire) have no financing institution for the agricultural sector. Hence, producers do not receive financing according for their need.

Countries with financing institutions in the agricultural sector, have difficulties to provide the adequate level of financing to the farmers because of the limited capacities of these institutions

## 2 -The subordination created by Informal financing

Some large producers or important companies receive cash advances on production from the importers. They are therefore forced to sell to these importers ; and sometimes at a low price. This situation leads to the subjection of producers.

## 1-13 MEASURES RELATING TO THE SECTOR OF FRUITS SINCE 1980

The decade 80 has been manifestly that of the revival of the agriculture. The main objectives were :

Food security

The fight against desertification.

Curtail rural exodus

Sub-Saharan Countries have been committed in this way, they have noticeably increased the share of agriculture in their budget. They have put in place important programs for restructuration and liberalization of the agricultural sector.

### a) Nature

The sector of fruit was well concerned. These measures translated into :

- The structuring of sectors around professionals in charge of coordinating actions of development.

- The trend toward building production and marketing policies based on regions.

- The installation of a panel of importers and a good behavior code between exporters.

- The implementation of a policy aiming at tax exemption for export and import of some inputs and wrapping cardboard in temporary admission.

## **b)The reasons for these measures**

The reasons that have motivated these decisions are of several orders.

### Strategic

Since independence in 1960, sub-Saharan Africa. countries have adopted a policy of industrialization. Unfortunately the results did not reach the expectations.

Since 1960, the food production has considerably degraded. It has dropped by 20% in 20 years.

It was therefore necessary to react and adopt another policy. This drop of the production concerns also the sector of fruits.

### Economic and financial Reasons

The fall of the production has been followed by a fall of exports revenues, creating a deficit in the trade balance. Consequently, famine took place .

It was therefore necessary to develop a courageous policy. It was also necessary to improve the financial welfare of the producers, whose situation has deeply degraded. Herewith are some illustrations of the effects of the measures taken by some countries concerning the main fruits of export.

#### ■ Products concerned

Measures concerning the main fruits of export : bananas, pineapple, and other fruits that are taking advantage of these measures.

#### ■ The impact of these measures on production

These measures have allowed the creation of professional organizations of producers.

The impact of these measures have allowed to discipline producers, and improve the quality of fruit.

## **Measures in Côte d'Ivoire**

Côte d'Ivoire is an important producer of fruits. In order to remedy to the drop in production, a correcting plan was put in place in 1983 by the company supervising fruit production .

### The sector pineapple - banana.

The pineapple and bananas sector has been declining since the beginning of years 1980. Currently, there is a noticeable improvement. The sector has benefited from measures that have allowed to improve competitiveness on European markets.

### The pineapple

Between 1980 and 1983 the production has declined. It has begun an increase during the following periods :

1983 - 1986, 30000 T

1987, 186700T ; the exported production was 149 700 T .

The increase of the production, following the restructuring plan put in place , since 1980, has been accompanied by a degradation of the quality, a significant drop in prices and a weakening of demand of pineapple of Côte d'Ivoire.

### Bananas

Côte d'Ivoire is the first African producer ahead of Cameroon and Kenya.

The production , that had fallen until 1983, has gradually raised because of big producer, but also of the small farmers who represent 90%of the profession. The cooperatives are in charge of the marketing

### The other fruits.

There are, for the main part, citrus fruits , avocado, mango.

### Papaya.

Let us signal that these fruit have benefited since 1985 of a financing from the World Bank.

### **Measures in Cameroon**

The two main export fruits are banana and pineapple.

### banana.

The production has known difficult years. During the year 1983-1984 an improvement was noticed. But the country had deeply suffered falls of export.

The restructuring has required the move of some producers to the culture of pineapple.

The cooperatives are in charge of the marketing

### The pineapple

4000 T in 1983, the production is 5300 T in 1987.

## **1-14 CONTRIBUTION OF THE SECTOR OF FRUIT TO THE ECONOMY**

For geographical and historical reasons, the Western Europe and the European Union represents the main market of export for tropical fruits. They have benefited from a preferential advantage up to the years 1990. Then fruits coming from Americas have competed with them. The OCM has liberated the international trade. The advantages given to sub-Saharan Africa countries are undermined.

Quantities have begun to diminish . Fortunately, quantities have begun to rise again since 1993 in part because of the devaluation of the franc CFA. Thus, we have noticed an increase of exports from 1993 to 1997.

Banana and pineapple occupy a relatively important place in the economy of countries as Côte d'Ivoire, Cameroon, Kenya, Nigeria.

The rate of integration in the national economy ( that is the indicator of the net gain in currencies ) shows a deep involvement in the national economy of the activities of fruits production of Cameroon. ( rate of 52 % ) and the Côte d'Ivoire ( 58 % ). This fact is even more noticeable because it concerns the fruit section that is among the most intensive and therefore the most users of chemical. These induced effects make the fruits sector in Cameroon and in Côte d'Ivoire one the main sources of foreign currencies for actors in the sector. They also are real vectors of development.

The weak rate obtained in countries are the reflection of the rarity of links between these sectors and the other economical activities. However, all these sectors appear to be source of income to households ( in % of the gross added value )

- 45 % for Cape Verde by taking into account income coming from farms of the small producers
- 32 % for Cameroon
- 39 % for Côte d'Ivoire in which more than one third are indirect salaries induced in the economy, therefore outside of plantations.

These sectors participate strongly in the whole region economy. The regularity of these income for producers is another advantage that very few agricultural speculations can offer. The sector of export banana is therefore strongly income generating in regions where alternatives in terms of production are rare.

More than the simple survival of some national banana export sector, the challenge here is to maintain of an activity that is a strong source of income. It is therefore urgent to increase the productivity of these sectors to avoid their bankruptcy.

### Example of Côte d'Ivoire

During the last three years , the couple Banana-Pineapple has generated the following export financial resources :

Amount (in million of franc CFA)

Year	Receipt	% GDP	Tax
1996	176 599	9.50	5 926
1995	151 460	8.11	5 082
1994	121 346	6.50	4 072

At a macro-economic level, the sector of fruit represents approximately 9 % the GDP for countries such as Kenya, Côte d'Ivoire, Nigeria, Cameroon.

As far as micro-economics, two distinctions are to be made.

The banana - pineapple sector.

The big banana and pineapple producers, live relatively well with the products of their farms.

An important work force is remunerated.

The small producers encounter some difficulties and they are particularly indebted.

Other fruits sectors

Producers live well enough.

## 1-15 CONTRIBUTION OF FRUITS TO THE FOOD SECURITY.

In sub-Saharan Africa, traditional sources of food are :

Cereals

The main cereals are the corn, rice, the fonio, the millet

Areas of culture :

The corn grows in all sub-Saharan Africa, a great number of people use them to make a well appreciated beer. It grows in forest zone as well as in region of Savannah. The millet ,the sorghum , the fonio grow generally in region of Savannah and in the Saharan region.

They enter the confection of some important dishes (Tô) and Porridge. They can equally served as « couscous ».

The carbohydrates,

Main carbohydrate are yam , potato, plantain ,and sweet potato .

Areas of culture.

The carbohydrate grow generally in forest zone and in zone of Savannah.

Zone of consumption.

Traditionally, the carbohydrate are consumed in forest region and in region of Savannah. But the move of populations has carried the consumption to all Africa.

Vegetables.

They are consumed in all Africa.

Fruit

They are consumed as dessert. Non traditional sources are made of products of import, vestige of the past colonial period.

They are :

cereals and their by-products « couscous », dough's., fruit vegetables (Lentils, pea, spray)

The carbohydrate.

## **SECOND PART : FINANCING OPPORTUNITIES**

Financing in the sector of fruits is very weak. The principal financial support remains, in 1998 , the European Union. However, when compared to the great needs of the sector, its financial contribution remains very weak. It concerns mainly production.

It is desirable to widen the field of financing. Investment opportunities and areas of development that can benefit from financing are listed. It concerns Research/Development, production, sales and the processing industry.

### **2 -1 AREAS OF DEVELOPMENT NEEDING FINANCING**

#### **a) Research and Development.**

Sub-Saharan Africa needs programs of research aiming at selecting new variety to diversify the fruit production, developing new technology in the processing of fruit, developing new techniques to preserve the sole humidity, the improvement of irrigation methods, the fight against the adventitious, fungus, and perks.

Research and Development also aims at the adaptation and the improvement of local agricultural practices. It concerns well known fruits as well as fruits that are less known.

Research and Development concerns all aspects relating to the plant, notably the genetic, the physiology, the biology, the defense of cultures...

The study, in five points summarizes sectors to finance .

-Creation and Selection of varieties for local consumption and export which satisfy the standards of quality and resistance to sicknesses.

- Improvement of production and productivity with low cost work force.

- Improvement of production and selling systems of plantain in the west African forest zone.

- Improvement and development of new techniques of processing or valorization of processed products.

- Sanitary improvement through the fight against fungus, viruses, and mosaics.

## **b) Production**

### **b1 – Agricultural inputs**

The improvement of the productivity depends on the utilization of an effective and selected seed, an manure that is adapted and brought at the right time. To achieve this improvement, phytosanitary follow-up is needed, as well as the use of a well paid work force. The small, medium size and big agricultural producers, do not necessary have the resources to correctly address these needs.

### **b2 - Agricultural mechanization**

Archaic tools used in agriculture of subsistence need to be improved or replaced by more effective tools.

All modern farms have to be mechanized (tractors and tools).

The financing will focus on the acquisition or the renewal of the agricultural machine park.

### **b3 - Conditioning**

In this area, financing should focus on conditioning infrastructures as well as wrapping (bag ,cardboard boxes)

### **b4 - Transportation**

Financing will focus on the acquisition heavy duty vehicles for long distances as well as light vehicles destined for the gathering of crops. It will also focus on the remuneration of transportation services offered by private operators.

### **b5 - Rural Arrangement**

The fruit production requires arrangement , particularly in banana. production . Investment expenses necessitate large financing that only a financing institution can satisfy.

### **b6 Training**

It is an investment in the long term. It concerns the producers themselves as well as all their employees.

### **c) The financing of the industry of processing.**

The processing of fruits is made at an artisanal level and at an industrial level .

Generally, tools used in industrial processing are old, or even out of use.

Artisanal processing generates little profit. It takes time. Given the current state of the economy, it does provide enough revenue to allow the artisans to earn a decent living. It is therefore desirable, at the industrial and the artisanal level to research and develop new technologies.

The financing will concern :

- The development of new technology and new products.
- The adaptation or the improvement of the artisanal methods of fruit processing .
- The renewal , the improvement and the extension of processing equipment.

### **d) Marketing**

Two types of financing can be imagined.

In one hand, the financing of the main fruits exports (banana and pineapple). And in the other the financing of less important fruits.

The financing of banana and pineapple.

The needs are generally very important. Resources are to be looked for beside financing institutions such as classic banks or agricultural credit institutions.

International financing institutions , such as the World Bank group , the ADB can finance the marketing only in the framework of a medium to long term integrated project of development .

Less important fruits or fruits of diversification.

The World Bank and donors states finance this type of marketing through projects such as the PPDEA in Côte d'Ivoire , in Senegal, in Cameroon.

The challenge is to improve and diversify the resources.

Medium to long term investment expenses can be financed by IRDB, the ADB , the EDF.

Short term farm expenses can be financed by private investments, commercial partners, and EDF.

In conclusion many financing opportunities in the fruits sector exist. The main lessors of funds are identified. Now, the challenge is to convince them of the management ability and adaptability of professionals. Well conceived financial requests, good financial results, effective financial and technical assistance will seduce lessors of fund and will unhook the financing desired.

New financing opportunities in Research/Development

### **The PROMUSA Program.**

It is a means of connecting the work done in the sector with the problems of producers, the different initiatives directed toward the improvement of banana and plantain for the small subsistence, and the improvement of banana. A large participation insures a world perspective.

Specific objectives :

- Increase the productivity of banana and plantain,
- Promote the development of improved bananas acceptable by the consumer,
- Increase the efficiency and the profitability of the global efforts for improvement.

## 2 - 2 PROPOSAL OF FINANCING TO POTENTIAL FUND LESSORS

Areas of fund lessor	R/D	P	IP	M
Group world Bank (++BIRD)	+		+	+
African development bank	+		+	+
European Fund of Development	+	+	+	+
Investment of the private partner of the sector of fruit (Importers)		+		

Legend : R/D : Research/Development  
P : Production  
IP : Industry of processing  
M : Marketing

## **THIRD PART : PERSPECTIVES**

This brief overview of the current situation of the sector of fruits in sub-saharan Africa has relieved the numerous constraints it is submitted to. However the general situation of sub-Saharan African countries leaves room for hope that these constraints be lifted. And this through the following perspectives. There are briefly summarized in production, processing, marketing, and financing.

### **3-1 AT THE PRODUCTION LEVEL**

#### **a) At the multinational level**

A policy focusing on regions is to be put in place. Sub-Saharan Africa should therefore be subdivided in eastern Africa, west Africa, central Africa, South Africa, and south west Africa.

Common policies should be initiated for each region. These policies will target production, transportation and marketing. The project of creation of a common line for sea transportation in west and central Africa is an eloquent demonstration of this policy of at the regional level.

#### **b) At the national level**

Each State will facilitate the production by the implementation of a policy aiming at the alleviation of a certain number of constraints. It will concern among others fundamental reforms, a good policy of price in production, road infrastructure improvement, lower taxes on inputs and agricultural equipment.

The political stability of African countries is a powerful factor of agricultural development. The implementation of a policy of good governance, strongly sustained by international financing institutions, would represent a good news for producers.

The fall of production costs

The dispositions are relating to :

Searching for new types of less costly wrappings

Reducing taxes on inputs, wrappings and production equipment.

Utilization of effective seedling seeds (culture plants banana)

Grouping of producers in cooperative or companies.

Improvement of transportation conditions.

Repairing and maintenance of roads serving plantations.

The elaboration of common researches programs by the intermediary of the CIRAD and putting in common results will constitute powerful levers for the production.

### **3 -2 AT THE PROCESSING LEVEL**

The perspectives at the processing level are analyzed only at the state level .  
They focus on :

The creation, the strengthening, the redynamization of industrial units.

The output of factories

The disposition of less costly wrapping .

The improvement artisanal units.

The increase of the processing capacity of artisanal and industrial units.

### **3-3 AT THE MARKETING LEVEL**

#### **a) At the multinational level.**

Countries producing fruits get together in order to solve the problem of marketing. This disposition will allow them to obtain a right remuneration of their products.

The exploitation of a common line of maritime transportation will insure the regularity of the European market supply and will allow term to obtain a competitive cost.

#### **b) At the national level.**

Perspectives focus on :

The decline of maritime or aerial transportation cost by

- A liberalization of the freight
- Using the right palette profile
- Using containers etc. ..

The installation of a panel of importers whose number would be reduced in order to improve the quality of the negotiations

The widening of the markets by :

New market prospecting in the sub region and in countries of the Eastern Europe , the South of the Mediterranean basin.

■ The improvement of the regional and national distribution by the creation and strengthening of imports commercial exchange centers such the whole sale market at Bouaké in Ivory Coast.

A unique and common action plan for the marketing of each origin (example KENYA, MALI, CHAD, COTE IVOIRE).

### **3-4 AT THE FINANCING LEVEL**

Perspectives of financing rest among others on :

The initiative of the World Bank and private fund lessors to finance the fruit diversification. Examples exist in Côte d'Ivoire, Senegal ,and Cameroon.  
Financed fruits are mango , papaya, avocado.

The creation of financing institution and its strengthening.

The effectiveness of this perspective of financing resides in the full implication of public authorities and their considering the gravity of the situation.

In fact, producers, small or big benefit from no financing from private banks. The situation is particularly dramatic for the small producers whose surviving is to be insured.

## CONCLUSION

Increased investment , and institutional changes in the European Union and the GATT, are likely to further increase the level of competition in the market for fruit exports. Most African producers are not in a position to develop new markets for mass consumption commodities. Markets for these commodities are in general approaching saturation, so that increasing efficiency and cutting cost are likely to be more important than expanding production. As a result, incumbent producers will have to pursue increased efficiency if they are to retain their position in the market, while new entrants will succeed only if they are able to deliver their products at lower cost than the incumbents. Most new producers would do better to concentrate on niche markets, defined in terms of the products produced or the season in which that are brought to market.

### Established producers and Commodities

For countries with existing export industries, an appropriate approach would probably involve investments in improved efficiency, such as improvements in the infrastructure for bringing products to the point of embarkation and for storing them prior to shipment. In some cases elements of cost which are beyond the control of the exporting country, such as a lack of access to maritime shipping, could undermine the long-term viability of a given export industry. This could put existing producers in the position of having to develop new exports or markets. Vertical integration through investments in processing activities may or may not be appropriate. For certain products, such as canned and frozen fruits, processing is less a source of value-added than a storage technology. In other case processing is an integral step in producing the exportable commodity. In the former case, the cost of processing must be balanced against the increased revenue which can be earned during the local off-season. In the other case, the processing decision is essentially contemporaneous with the decision to produce the original crop.

### Development of New Markets

Countries trying to develop new export products must try to identify niche markets which they can address, based on climate, seasonally or cost factors. At early stages investments should focus on infrastructure (e.g., internal transportation) which could promote the efficiency of a wide variety of activities . Outside investment (e.g., in the form of out-going contracts) can be useful organizing production and providing access to markets for mass consumption commodities. Ethnic markets can provide an entry for new or

unusual fruit products, and are able to handle smaller lots of commodities. These markets typically serve immigrant populations, but also attract individuals interested in trying new products. Products which were initially imported to meet the demand of immigrant populations and which have begun to find a larger market include tropical fruits such as mangoes and papaya.

ATTACHMENT N° 1

The main BANANA exporters  
(Quantity in 1000 T)

YEAR	1996		1995		1994		1993		1992		1991		1990	
COUNTRY	P	E	P	E	P	E	P	E	P	E	P	E	P	E
COTE D'IVOIRE	219	193	195	172	179	156	192	173	175	148	174	118	146	94
CAMEROON		NA		NA		NA		174		111		116		78
KENYA	225	NA	220	NA	220	NA	220	199	220	122	210	142	200	80
<b>TOTAL</b>	<b>444</b>		<b>415</b>		<b>399</b>		<b>412</b>	<b>546</b>	<b>395</b>	<b>381</b>	<b>384</b>	<b>376</b>	<b>346</b>	<b>252</b>

Sources : OCAB, FAO

Legend :

P : Production

E : Export

NA : Non Available

## ATTACHMENT N°2

The main PLANTAIN exporters  
(Quantity in 1000 T)

YEAR	1996		1995		1994		1993		1992		1991		1990	
COUNTRY	P	E	P	E	P	E	P	E	P	E	P	E	P	E
COTE D'IVOIRE	1450		1366		1276		1233		1282		1232		1185	
CAMEROON	1000		970		950		930		900		870		870	
GHANA	1823		1637		1475		1322		1082		1178		799	
NIGERIA	1750		1712		1665		1623		1417		1339		1215	
KENYA	370		370		360		360		360		350		340	
GUINEA	429		429		429		429		420		410		400	
RWANDA	2105		2002		1489		2316		2316		2123		2747	
TOTAL	8927		8486		7644		8213		7777		7499		7556	

Sources : OCAB , FAO

Legend :

P : Production

E : Exportation

### ATTACHMENT N°3

The main PINEAPPLE exporters  
(Quantity in 1000 T)

YEAR	1996		1995		1994		1993		1992		1991		1990	
	P	E	P	E	P	E	P	E	P	E	P	E	P	E
COTE D'IVOIRE	235	175	217	147	205	143	190	133	202	131	202	135	233	150
CAMEROON	48	NA	44	NA	42	NA	40	19	38	5	37	4	35	6
BENIN	3	1	3	1	3	0.6	3	0.2	3	1	3	0.4	3	0.2
GHANA	20	NA	20	12	18	14	15	11	11	8	11	7	11	6
GUINEA	65	NA	67	6	67	6	58	7	57	7	48	30	51	16
KENYA	270	NA	270	NA	270	NA	270	127	270	156	245	174	225	196
NIGERIA	800	NA	800	NA	800	NA	800	17	800	27	800	189	763	125
ANGOLA	38	NA	36	NA	34	NA	34	2	35	9	34	93	32	17
TOTAL	1479		1457		1439		1410	316.2	1416	207	1380	632.4	1353	516.2

Sources : OCAB , FAO

Legend :

P : Production

E : Exportation

NA : Non Available

ATTACHMENT N°4

The main MANGOES exporters  
(Quantity in 1000 T)

YEAR	1996		1995		1994		1993		1992		1991		1990	
COUNTRY	P	E	P	E	P	E	P	E	P	E	P	E	P	E
COTE D'IVOIRE	8.5	6	7.5	7.5	7	4	7	2.6	14	2.6	14	1.4	14	1
SENEGAL	66	NA	66	NA	70	NA	58	25	57	7	54	34	56	24
BURKINA FASO	5	NA	5	0.5	5	0.7	5	0.9	5	1.2	5	1	5	1
MALI	51	NA	23	0.8	15	0.8	15	1	15	1.2	14	2	14	1.2
CHAD	32	NA	32	NA	32	NA	32	9	32	8	32	2	32	
GUINEA	76	NA	80	NA	105	NA	77	6	93	4	70	4	50	'
KENYA	24	NA	24	NA	24	NA	24	2	24	4	23	4	22	9
NIGERIA	500	NA	500	NA	500	NA	500	9	500	8	500	12	500	9
TOTAL	762.5		737.5		758		718		740	36	712	60.4	693	49.2

Sources : OCAB, FAO

Legend :

P : Production

E : Export

ATTACHMENT N°5

SITUATION OF THE CASHEW NUT IN THE WORLD  
(Quantities in 1000 T)

PAYS PPRODUCTEURS	PRODUCTION				EXPORT RAW NUT	
	1966	1976	1986	1996	1985	1995
INDIA				150		
BRASIL				165		
EASTERN AFRICA						
TANZANIA	83	84	19	82	26	76
MOZAMBIQUE	119	122	30	32	NA	NA
KENYA	10	28	10	15	2.5	NA
	20	3	4	5	0.5	3
MADAGASCAR						
TOTAL EASTERN AFRICA	232	237	63	134	3	79
ANGOLA	11	14	12	12	NA	NA
WEST AFRICA						
GUINEA	2.4	3	13	35	7	29
NIGER	23	25	25	25	1	8
COTE D'IVOIRE	0.4	0.4	6	10	3	26
BENIN	0.06	0.4	1.2	10	NA	9
MALI			0.1		0.06	NA
BURKINA FASO				1	NA	NA
SENEGAL				1	NA	1
TOGO				0.5	NA	0.5
TOTAL WEST AFRICA	25.86	28.8	46	82.5	11.06	73.5
WORLD TOTAL						

Sources : FAO  
: Ministry of Agriculture in Côte d'Ivoire  
Legend : NA : Non Available

May 1998



منظمة الأغذية  
والزراعة  
للأمم المتحدة

联合国  
粮食及  
农业组织

Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### SUPPLY AND DEMAND PROSPECTS FOR TROPICAL FRUITS IN LATIN AMERICA

## SUPPLY SITUATION

Latin America is one of the most important regions of the world in the production of tropical fruits, ranking first in the production of oranges, bananas for export, avocados, papayas, limes, guavas and passionfruit.

**PINEAPPLES.** The region has almost doubled its output in the last two decades, having increased its share in world production from 15.7% to 21.6% (Table 1). Brazil and Colombia have become the main producers and are still increasing production, while Mexico, the top producer in 1980, has been in a steady decline since then but is still in third position. Other important producers include Costa Rica, Venezuela, the Dominican Republic, Peru and Honduras.

The region has been switching to 'Smooth Cayenne', the main export variety, but there are still old varieties in use for the local market. In the last years Del Monte has introduced 'MD-2' or 'Golden Ripe' a more attractive selection, that will probably replace part of 'Smooth Cayenne' in the export market.

**MANGOES.** In spite of having almost doubled production during the last years the region has been fairly stable in maintaining around a 15% of total world production (Table 2). From this table it can be seen that Mexico is by far the largest producer followed by Brazil, Haiti, the Dominican Republic, Venezuela and Peru. Colombia that launched an ambitious expansion program of mango production had to face some adverse growing condition problems.

The region grows a lot of mangos of the Philippine group, while new and export oriented plantations have been made using varieties originated in Florida of the Indian group of mangoes, like 'Haden', 'Tommy Atkins', 'Kent', 'Keitt', 'Van Dyke', etc. Only Haiti produces large amounts of 'Madame Francis', a yellow mango of excellent quality.

**AVOCADOS:** In this fruit, native to Mexico and Central America, the region has kept a share of around 70% of world production (Table 3). This is due basically to Mexico, the largest world producer, with about half of the total production of the region and about 35% of world output. Far behind are the Dominican Republic, Brazil and Chile, the second largest exporter in the region, followed by a lot of medium size producers.

Production in the area has almost doubled in the last 25 years, but that from Mexico increased 3 times and that from Chile 5 times in relation to 1970 levels, while Brazil and the Dominican Republic remained stable.

The region produces mainly the called "greenskin" varieties, that originated mainly in Florida and are for the tropics, but have little export demand. Only Mexico, Chile and Peru produce sizable amounts of the subtropical varieties like 'Hass' and 'Fuerte', due to their climatic conditions and these are the ones most wanted by the importing countries.

**PAPAYAS.** In this fruit the region has gone from 33 to 50% of world total production (Table 4), with Brazil as the largest producer with almost 33% of world production, followed at considerable distance by Mexico and further down by Peru.

The production has more than doubled in the last 25 years. Except for Mexico and Brazil, most of the plantings are made with local selections, more disease resistant and with a large and not very uniform shaped fruit, but not adapted for export markets, that prefer the Hawaiian types or some of the hybrids developed in Taiwan or the 'Maradol' variety from Cuba because of uniformity and smaller size.

**LIMES.** The region is the major producer of 'Tahiti' and 'West Indian' or 'Mexican' limes. No exact statistics are available due to the fact that lemons and limes are lumped together. Mexico again is the leading producer, followed by Brazil, Peru and smaller producers (Table 5).

**GUAVAS.** Although no good statistical data exist, Brazil with around 7,000 hectares, and Mexico, are the main producers, with smaller productions in practically all other countries with tropical conditions, Cuba is an important producer in the caribbean area. There are few commercial plantings and most of the production comes from scattered or backyard trees or very small plantings. There are no standard varieties and each country uses its own selections. Growing is normally done with little or no technical aid and yields are fairly low.

**CARAMBOLAS.** This is similar to the case of guavas, few technically conducted plantings exist, most of the plants are seedlings with very few trees grafted with selected varieties. Brazil and Mexico are probably the largest producers but there are many scattered plants in the rest of the countries. It is not an important crop in most of the area, and not very known among the population.

**PASSIONFRUIT.** Brazil is the main producer in the region of a fruit destined mainly to the juice industry, with 30,000 hectares and produces around 400,000 t yearly, which is a fairly low yield per area actually. Other leading producers are Colombia, Peru and Ecuador. Local consumption of fresh fruit is fairly limited and most of it goes to the juice industry.

**MANGOSTEEN, RAMBUTAN, LONGAN, LYCHEE AND DURIAN.** These fruits are practically unknown in most of the countries of the region. There are few and very small commercial plantings of certain species.

## SUPPLY PROSPECTS

Except for the latter mentioned fruits of Asian origin, there are very good prospects for an increasing supply for the national and international markets in the region. This can be seen from the fact that production of all of the known fruits has grown significantly during the last decades and this is a consequence of an increasing demand at the local and foreign markets.

Export possibilities will play an important role in the increased supply of many fruits, since it means high use of labor, intensive use of land, better incomes for farmers and hard currency for the countries, thus the governments are trying to promote these exports. This activity also results in non exportable surpluses that reach the local markets normally at reasonable prices. The local market is also interesting for many of these fruits and generally it is more profitable to plant fruit trees than any other crop if the climate and soil are suited and financing is available.

## DEMAND SITUATION

### LOCAL DEMAND

This demand will rise basically because of population growth. The improvement of income levels should also be a factor although of lesser impact and a minimum effect will come from the change of dietary habits occurring mainly in the higher classes, that account for a minimal percentage of the population.

In many countries, that are going through an economic crisis, local fruit prices have remained stable or even dropped because of low income levels, this makes fruits the last option in a purchase list of food, becoming almost a luxury item.

In the case of rambutan, litchi, longan, mangosteen and durian, if they would be planted, demand would grow as supplies become available, especially in the higher income groups, since initially the prices of these fruits would be high like it happens in Central America when the little amounts available are in season.

### INTRA REGIONAL DEMAND

Except for a few fruits, demand for products from neighboring countries is almost non-existent. The most notable exception are pineapples, where practically all of the production of Brazil goes to the countries of the MERCOSUR, especially Argentina and to a lesser extent Chile. Ecuador also exports some pineapples to these countries, and Bolivia is shipping small amounts to Argentina. Some avocados from Chile and some papayas from Brazil are going to Argentina. Mexico ships some avocados to Central America. Guatemala also ships small amounts of them to Honduras and El Salvador. Other than this there is very little trade among the countries of the region.

One of the reasons is that having very similar growing conditions most of these countries except the ones of the southern tip, produce the same fruits at a similar times at each side of the equatorial line. Transport costs of filling the counter season needs of markets in the opposite hemisphere would make them too expensive.

Another aspect is that average population income of these countries is very low and thus no large volumes of fruits are imported, especially of the tropical type, since they would be almost unaffordable for most of the population.

Several of these fruits like papayas, pineapples, passion fruit, carambola and limes are available almost all year or as in the case of mangoes, avocados and guavas, by using different cultivars or microclimates, fruit is available 5 to 7 months/yr.

## EXPORT STATUS

**PINEAPPLES.** In fresh fruit the region has almost tripled its exports with an increase in share of total world exports from 25.5 to 32.6% (Table 6). Costa Rica, Honduras and Brazil are the main contributors, in the first 2 cases this is the result of the activity of multinationals like "Del Monte" and "Dole", while in Brazil production is more scattered among many farmers. The production of Central America goes basically to the U.S. and to a lesser extent to Europe. More of 90% of the production of Brazil goes to Argentina and its MERCOSUR partners, with a small but increasing amount going to Europe.

All of these exports are of the 'Smooth Cayenne' type, although in the last years "Del Monte" has introduced 'MD-2' or 'Golden Ripe', with better color and flavor. "Dole" is following these steps in Honduras.

**MANGOES.** The region has increased its share of total world exports from 40 to 53% in the past 20 years, increasing its exported volume by 8 times. Mexico again is the largest world exporter with about 40% of total exports that go mainly to the U.S. and Canada. Behind at quite a distance are Brazil, Haiti, Venezuela and Peru, with Brazil and Peru on the rise while Venezuela and Haiti are reducing their participation in total exports. Mexico also supplies about 25% of the imports of Japan.

Most of the countries export the Florida originated varieties, while only Haiti uses 'Madame Francis', an excellent mango. Mexico exports some of its 'Manila' mango.

**AVOCADOS.** The region in spite of exporting 4 times more than in 1980, has only increased its export share from 28.1% in 1980 to around 31% in 1994, of which Mexico contributed about one half (Table 7), Mexico has been increasing its share in the export market constantly, the same as Chile, while the Dominican Republic has dropped to almost half of its share in spite of being the second largest producer in the world and Guatemala has practically vanished from the export market.

Avocado exports from Mexico have been destined basically to Europe and Japan, because they were banned from entering to the U.S. for phytosanitary reasons, the approval of a measure that allows Mexican avocados to enter into non avocado producing states in the U.S. will no doubt result in increasing avocado exports from this country. Mexico also supplies about 60% of Japan imports.

**PAPAYAS.** The region has a 40% share of the export market up from less than 1% in 1980, or 21% in 1985 (Table 9). Mexico is the leading exporter basically to the U.S. and Canada, followed by Brazil and Jamaica that ship to the E.C.. Jamaica is doing air shipments for more ripe fruits that reach the consumer with a much better appearance and flavor, being preferred in spite of higher prices, to the almost green harvested fruits that are sent by ship. Belize has also started shipments to the U.S..

These countries export the Hawaiian or 'Solo' type of papaya or some medium sized varieties like the 'Maradol' from Cuba or some hybrids developed in Taiwan.

**LIMES.** The region is the largest exporter of them, with Mexico filling about 90 of U.S. imports, and Brazil filling the largest part of the E.C. demand. Peru is a large producer but exports very little fresh fruit, because practically all of its limes are of the 'West Indian' type, not 'Tahiti', being the second exporter in the world, after Mexico, of essential oil from limes. A lot of other countries in the region export small amounts of fresh limes either to the U.S. or Europe.

**GUAVAS.** There is very little export of fresh fruit from the region. Brazil is the largest exporter to the E.C.. The main exports from Mexico, Brazil and other countries are in the form of concentrated juice or puree, but no large amounts are involved and statistics are not clear.

**CARAMBOLA.** Exports are very small, mainly from Brazil to the E.C., since no permit exists to export them into the U.S. because of phytosanitary reasons. The market is very small and statistics are not clear

**PASSIONFRUIT.** This fruit is also exported mainly as concentrated juice and very little amounts as fresh fruit. Brazil, Colombia and Mexico are shipping some fresh fruit to the E.C.. As concentrated juice Brazil, Colombia, Ecuador and Peru are exporting around 11,000 to 12,000 t per year.

### **EXPORT PROSPECTS**

The export potential for most of these fruits is there and as stated earlier a growing interest exists among the governments of the region in promoting this activity because it has a lot of positive implications to the economies of their countries. There are several aspects to cover and they will be treated on a species by species basis.

**PINEAPPLES.** It seems that small operations lacking the proper infrastructure will have a tough time to succeed in this business, thus only well equipped organizations of a certain size have a chance to survive. The multinationals have the transport and marketing infrastructure that allow them to survive in a very competitive and difficult market, where margins are usually very low.

On the other hand, especially in the E.C. demand is not growing as fast as desired and no spectacular growth is expected and most of it will be filled by the multinationals and by the recovery of Ivory Coast, except in the case of Brazil that is aiming to become more important in this market, although its main exports go to its MERCOSUR partners and face very little competition. By estimates from FAO the export market should grow around 3% during the next years.

One interesting case is the export by plane of ripe pineapples from El Salvador to specialty markets in the U.S.. This approach could become more important in the future

**MANGOES.** The demand for mangoes has grown tremendously in the U.S. and Europe, it is estimated that the U.S. market is growing around 15 to 20% per year having doubled from 1990 to 1994. Global export market growth is estimated by FAO at 4.5% for the next years. The main problem in the case of Latin America is that this species has been over planted in the region, especially by the countries in the Northern Hemisphere, so that supplies are growing faster than demand. Prices in the U.S. market have dropped sharply in the peak seasons of 1996 and 1997, reaching lows of about 2 dollars per box. This season there were practically no exports from Peru and Ecuador at the end of 1997 and beginning of 1998 due to "El Niño", so that prices during those months were very good, but this is temporary.

The scene is a bit brighter for the countries that produce on counter season like Peru, Ecuador and part of Brazil, whose exports cover from November to February, where due to winter temperatures demand is not at its highest but competition is much lower than for the northern hemisphere mangoes.

**AVOCADOS.** The region has a good share of the world market based mainly on the exports from Mexico and Chile. According to FAO the market should grow around 5.1% the next years, but it seems the U.S. market is going to grow moderately. Mexico with the

opening of the U.S. market and Chile, should continue to increase their exports, while Brazil, Colombia and Perú could enter with small amounts of the 'Hass' and 'Fuerte' types, but the U.S. market would be closed to them for the time being and they would have to export to Canada or Europe, where shipping costs would be a factor like it is for Chile when it has to send to Europe. The E.C. market, on the other hand, is well supplied by Spain, Israel, South Africa, Mexico, California and Chile, so that competition is going to be very hard and margins rather slim for such distant shipments, thus export growth for the region is not going to be very high.

The main problem for other Latin-American countries with tropical climate is that these conditions favor the growth of varieties developed for this climate, the so called "greeskins" which are not in high demand in Europe and the west coast of the U.S. thus there is no large export expansion in sight for these countries.

**PAPAYAS.** The export market is growing spectacularly. According to FAO estimates global export growth should be around 4.4% the next years. Brazil and Jamaica should be the largest participants in filling the growing demand in Europe, while Mexico and Belize should participate more in the rising U.S. demand.

The Hawaiian type is the standard, although some varieties from Taiwan and the Cuban selection called 'Maradol' are being accepted, especially by the Latin population in the U.S.. Air shipments of more mature and tastier fruit, like what Jamaica is doing, should become more common, especially for the E.C..

**LIMES.** They are slowly replacing true lemons in many European countries, and a growing demand exists, but price margins are small as well as volumes. The U.S. and E.C. markets are fairly well supplied. Mexico fills about 90% of the U.S. demand, with Florida filling the gap during half of the year and even exporting to Europe. Central America contributes to fill the small balance left. Any future growth will be filled largely by Mexico.

Brazil fills most of the demand of Europe, together with Israel, Kenya, Cuba, Central America, Ecuador, Colombia, and Venezuela that ship the balance. Mainly Brazil will fill any growth in demand and there seems to be little space for newcomers.

**GUAVA.** This popular fruit should increase its exports mainly in the form of juice or guava "meat", a jelly type preparation that uses the pulp. No much growth as fresh fruit from the region is foreseen, any growth would probably come from Brazil, Mexico and perhaps Colombia.

**CARAMBOLA.** There is no access to the U.S. market for carambola from the region due to phytosanitary barriers, nor is there a big demand in this market, so there is no significant growth foreseen. Europe is supplied by ship or air with excellent fruit from Malaysia and demand is fairly limited. There are some shipments from Israel and Brazil, but it will be very difficult to fight against the quality of Malaysia.

**PASSIONFRUIT.** It has very little demand in the fresh form either in the U.S. or Europe. Brazil, Colombia, Ecuador and Peru are the largest exporters of concentrated juice, with Peru having the best quality. Market growth will be slow but steady, especially for use in juices of mixed flavors, so that there should be some room for increasing exports, especially

by these 4 countries, but volumes are not going to be very large, around 12,000 to 14,000 t per year of concentrated juice.

**MANGOSTEEN, RAMBUTAN, LONGAN, LYCHEE, DURIAN.** There is practically no production in the area, nor is there experience in how to grow these species, so that any attempt would have to start by their introduction, testing of varieties, studying cultural practices, etc, a process that would take no less than 10 years. The other aspect would be to familiarize the local public with these fruits, since initial production would be sold locally. It is too soon to talk about exporting these fruits, but the potential is there.

## **ISSUES AND CONSTRAINTS TO PRODUCTION**

### **Natural conditions:**

Most of these countries have climatic situations that allow them to produce many fruits and harvest them at different times of the year. For those of the Southern Hemisphere the counter season factor is a big advantage.

### **Governmental:**

- Political and economic stability. In many countries rules are changed continuously relating to tax levels, interest rates, import duties, etc. with a negative effect on long term investments.
- Production priorities. Most governments are aware of the importance of these perennial crops, but they usually are more pressed by the staple crops in order to insure food supplies and in many cases votes. With tight budgets little is left for fruits which results in little or no research and extension in most of the countries, with the exception of the most successful ones, where even growers help finance some of this effort.
- Credit policies. In only a few cases promotional credit is given for installing orchards and in fewer cases an initial period with no repayment is allowed, considering that production starts after a few years and initial investments are high.
- Scarcity and/or high cost of credit are also important factors.
- Poor statistical information or availability makes people unaware of possible opportunities, prices, tendencies, etc.

### **Human:**

- Relatively cheap and abundant labor, but mostly not well trained and with little sense of responsibility.
- Little tradition in fruit growing among most of the farmers, which means education and training efforts.
- Lack of enough people with entrepreneurial abilities willing to risk in this business. Many potential producers want immediate returns. Political and economical unstability worsens this.
- Dietary habits of the population or lack of familiarity with some of these fruits reduces potential local consumption.
- Low per capita consumption related mainly to low incomes.
- Widespread idea among farmers that fruit trees should be planted in the worst areas of the farm.

### **Production factors:**

- Low or medium technical levels of production result in lower yields. Research and extension are a must in this case.

- Presence of diseases and pests complicates production and many times lowers quality. Research and extension are also the basis.
- Low quality planting material results in lower yields. There should be more care in this area by providing first class material or by enforcing nursery inspection procedures.

**Infrastructure.**

- Roads. In many countries the road systems are bad or very poor, this complicates transport or prevents products from reaching the market at certain times.
- Cold storage facilities. They are normally poor or inexistant, causing post harvest losses.

**ISSUES AND CONSTRAINTS TO TRADE**

**Governmental:**

- Promotion. Governments are aware that exports will create better paid jobs, improve farmer income and bring hard currency, so that most of them have created export promoting agencies to help this effort. Many of these agencies receive financial help from developed countries. They do a good job in analyzing markets; contacting importers; keeping statistics on prices, market windows, demand, etc.. They also provide potential or actual producers with lists of importers. In many cases they hire consultants to help the producer in agricultural aspects or to do a better handling or packing job. As a part of this promotion temporary import permits are issued for packing material, etc.. or duty free imports are allowed for raw materials or equipment needed. There is usually very little red tape in order to make the exporting process easier and faster.
- Incentives. In some countries the government returns some money to the exporter to compensate for taxes and duties he had to pay during the process. This is objected by some importing countries as an unfair practice.
- Statistical and market information. It has improved significantly in the last decade, especially with the electronic mail and other forms. The above-mentioned agencies or the exporters associations normally have up to date information on these aspects.

**Human factors.**

- Lack of knowledge. Many would be exporters do not have a real idea about products, prices, seasons, potential buyers, etc. The promoting agencies help a lot in this aspect.
- Informality. Many producers or exporters do not honor deals, sometimes they sell to the person that just made them an offer disregarding previous deals or do a poor job in producing, harvesting, sorting or packing, this hurts not only their reputation but that of others.
- Lack of gremial sense. In many countries producers are not associated, which does not allow them to negotiate as a block for better prices or lower transport costs, etc.
- Indifference or lack of pride in what they are doing makes many laborers and foremen do sloppy jobs in growing, harvesting, packing, etc. It is important that they feel proud of their work, to improve quality and results.

**Infrastructure.**

- Transport. Many roads are in bad shape or inexistant, so certain areas can not be incorporated into production. Some countries are landbound, some lack proper port facilities and have to ship from neighboring countries. Space in planes and ships is not always available, especially if volumes are small. In other cases there are no direct flights or shipping routes and cargo transfers have to be made.

Transportation costs can be very high, especially if volumes are small or there are no strong associations of exporters fighting for better deals.

In many large countries only 1 or 2 international airports exist complicating exports.

- Cold "chains". These include farm-cooling facilities, refrigerated transport to the ports, and cold storage areas for products before loading. In many countries one or more of these links are missing, reducing postharvest life or quality. Some governments and/or the exporters have built cold storage facilities at the main airports to improve this aspect.
- Treatment plants. Some mango exporting countries, do not have a hot water treatment facility, so they can not ship to the U.S..
- Processing facilities. In many cases non-exportable fruit could be processed if plants were available, instead of giving it away at minimal prices to local middlemen.

#### **Product:**

- Availability. Most importers prefer an all year availability. Latin America, given its position at both sides of the equatorial line and its number of microclimates is able to do this with most fruits.
- Quality. The quality of the fruits exported by the region has improved in the last decades and there are less problems with this factor, but there are always exceptions.

#### **Barriers.**

- Tariff. They are not really a problem even for the countries that do not have a special treatment.
- Non Tariff.

Phytosanitary. The U.S. rules are very tough on requirements for pest free fruits. The fruit fly is probably the most important pest and is the main reason that some of these fruits are not allowed into the U.S. unless they have had a specific treatment, like the hot water for mangoes. For other fruits different problems exist and a special permit has to be obtained from the U.S. government in each case. This complicates things, rises costs, reduces quality or simply prevents from shipping to the U.S.. The E.C. is not that strict with fruit flies and other pests because they assume that they will not survive their harsh winter.

Human health. This refers to residue types or levels. Most of the importing countries have set standards for maximum residue levels allowed in the fruit and what type of products can or can not be used.

#### **Importing countries.**

- There is not enough awareness about the existence or use of certain fruits, although increased travelling is subjecting many persons to become familiar with them. More advertising is needed in the form of tasting demos, pamphlets with information and promotional campaigns, etc. Sometimes the exporting country government finances this, in other cases the importers alone or with the exporters do the financing or put out beautiful posters of the fruits. Some governments help exporters and/or producers to participate in fairs.
- Consumption of fruits per person is growing. The higher the income the more percentage of food budgets is used for exotic fruits, this goes coupled with the health and fitness awareness. The market is growing faster than the population
- Big competition from snacks, soft drinks, chocolates and fruit juice industries that spend large amounts in advertising, sums that the fruit industry is unable to spend.

**Table 1. Pineapple production in Latin America (in 1000 t).**

	1970	1980	1985	1990	1995
Costa Rica	5	10	27	160	192
Dominican Republic	13	20	39	70	116
Guatemala	17	32	37	33	37
Honduras	6	33	90	130	96
Martinica	8	18	29	24	7
México	262	623	320	455	230
Nicaragua	18	34	39	42	46
Puerto Rico	18	35	44	47	34
Brasil	437	377	764	736	925
Colombia	85	127	152	342	380
Ecuador	57	135	70	34	66
Perú	63	58	65	68	107
Venezuela	37	77	66	81	137
Others	80	116	172	150	134
TOTAL	1106	1672	1833	2302	2500
% of World Production		15.7	19.5	21.5	21.6

(Source: FAO STAT)

**Table 2. Mango production in Latin America (in 1000 t).**

	1970	1980	1985	1990	1995
Cuba	18	59	86	85	80
Dominican Republic	153	176	189	190	185
El Salvador	10	14	15	17	18
Haiti	257	326	363	300	230
Honduras	4	13	14	15	5
México	298	638	1109	1074	1362
Sta. Lucia	15	29	26	24	27
Brazil	668	442	376	389	400
Colombia	14	20	22	46	98
Paraguay	10	16	20	23	37
Perú	62	59	87	61	127
Venezuela	76	101	107	131	140
TOTAL	1630*	1954	2458	2429	2792
% of World Production		13.5	15.3	14.9	14.6

(Source:FAO STAT)

**Table 3. Avocado production in Latin America (in 1000 t).**

	1970	1980	1985	1990	1995
Costa Rica	17	28	22	23	24
Cuba	15	15	9	9	8
Dominican Republic	122	125	129	163	150
El Salvador	20	31	34	38	41
Guatemala	18	21	26	26	23
Haiti	48	58	52	57	45
Jamaica	2	3	3	3	4
Mexico	222	442	566	686	740
Bolivia	1	3	4	5	6
Brazil	122	134	126	119	115
Chile	12	22	30	38	60
Colombia	13	16	33	57	74
Ecuador	20	25	28	19	26
Perú	66	54	42	55	53
Venezuela	44	45	42	51	52
Others	30	35	41	31	29
TOTAL	872*	1059	1197	1379	1450*
% of World Production		68.5	70.0	71.8	71.2*

(Source: FAO STAT)

**Table 4. Papaya producción in Latin America (in 1000 t).**

	1970	1980	1985	1990	1995
Costa Rica	3	3	8	16	23
Cuba	19	38	37	32	28
Dominican Republic	17	6	8	14	15
Mexico	130	155	660	250	460
Bolivia	5	7	13	18	20
Brazil	108	569	1410	1285	1800
Colombia	39	65	53	40	64
Perú	56	46	46	66	138
Venezuela	31	35	33	32	46
Others	30	40	54	50	57
TOTAL	428*	1004	2322	1803	2651
% of World Production		33.1	53.6	42.0	50.5

(Source: FAO STAT)

**Table 5. Estimated lime production in Latin America (in 1000 t).**

	1980	1990	1995
Cuba	25	68	58
Dominican Republic	13	9	9
El Salvador	19	23	24
Haiti	25	25	22
Honduras	1	1	4
Jamaica	22	24	24
México	577	612	850
Brazil	197	456	470
Ecuador	17	29	12
Perú	79	130	250
Venezuela	11	15	15
ESTIMATED TOTAL*	887	1432	1728

\* Includes West Indian lime

**Table 6. Estimated share of Latin America in fresh pineapple world exports (in 1000 t).**

	1980	1985	1990	1995
World Total	366	467	578	723
Latin America Total	95.2	90.6	203.8	236.9
% Share	25.9	19.2	35.1	32.6

**SHARE OF MAIN L. A. EXPORTERS IN WORLD TRADE**

Costa Rica	0	3.5	16.4	19.7
Honduras	7.6	6.4	6.4	5.8
Dominican Republic	0	1.4	8.1	2.2
México	11.2	2.7	1.5	0.9
Brazil	6.2	3.6	1.3	3.1

Source: FAO STAT

**Table 7. Estimated share of Latin America in mango world exports (in 1000 t).**

	1980	1985	1990	1995
World Total	50.5	114.1	156.9	315
Latin America Total	20.3	52.3	80.4	169.1
% Share	40.7	45.8	51.2	53.6

**SHARE OF MAIN L.A. EXPORTERS IN WORLD TRADE**

Costa Rica	-	-	-	0.27
Haiti	6.3	5.2	5.1	3.2
México	29.7	28.0	37.1	40.8
Brazil	0.4	2.6	2.9	4.3
Perú	-	1.3	0.8	2.1
Venezuela	-	5.7	3.5	2.7

**Table 8. Estimated share of Latin America in avocado world exports (in 1000 t).**

	1980	1985	1990	1995
World Total	57.5	111.3	141.3	204.6
Latin America Total	16.2	14.4	36.5	64.3
% Share	28.1	12.9	25.5	31.3

**SHARE OF MAIN L.A. EXPORTERS IN WORLD TRADE**

México	1.5	0.6	12.3	16.1
Dominican Republic	4.5	1.7	1.9	2.4
Chile	-	1.0	8.2	7.1
Guatemala	17.5	4.2	1.1	0.8

**Table 9. Estimated share of Latin America in papaya world exports (in 1000 t)**

	1980	1985	1990	1995
World Total	22.5	20.2	62.3	85.8
Latin America Total	0.2	4.4	13.2	33.8
% Share	0.8	21.7	21.1	39.3

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**SHARE OF MAIN L.A. EXPORTERS IN WORLD TRADE**

Belize	-	-	-	2.4
Costa Rica	-	0.5	3.3	1.1
Dominican Republic	4.4	1.5	3.0	2.2
Jamaica	-	-	-	4.7
México	4.4	6.4	7.8	19.6
Brazil	-	13.8	6.4	6.8
Venezuela	-	-	0.4	1.1

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March 1998



منظمة الأغذية  
والزراعة  
للأمم المتحدة

联合国  
粮食及  
农业组织

Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### TROPICAL FRUIT DEMAND IN THE EUROPEAN UNION

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EXECUTIVE SUMMARY

1. The EU is the world's largest tropical fruits importer with 491,000 T imported in 1996. The main products are pineapples (56% of imports), avocados (22%) and mangoes (14%). Also imported in smaller volumes are lychees, papayas, limes, carambolas and passion fruits. The principal import markets are France (pineapples, avocados, lychees, limes), Belgium (pineapples) and the Netherlands (mangoes, papayas). There is a significant intra-EU trade in tropical fruits: 272,000 T, i.e., 55% of extra-EU imports. The main consumption markets are France, Germany, the United Kingdom (UK) and the Netherlands. Consumption is the highest during holidays (Christmas and New Year, Easter) although it tends to be more evenly spread over the year.

The overall tendency in the EU market since the 1980s is a substantial rise in imported quantities paralleled by a sharp fall in prices. Imports rose by 32% over the 1991-96 period, more rapidly than total fruits imports (+5%). The competition is increasingly high as the number of suppliers has expanded strongly. Added to the shift from air-transportation to massive sea-freighted deliveries, this development has led to a fall in prices for all commodities. Consequently, the main challenges ahead for exporting countries are to improve exports coordination and to enhance quality in order to ease the price decline.

2. France is by far the leading tropical fruits importer in the EU. French imports amounted to more than 260,000 T in 1996. France is prominent in pineapples (almost 50% of overall EU imports), avocados (56%) and lychees (83%). It is not only the largest consumption market, it is also a key entry point to other European countries' markets as it supplies them with pineapples (45,000 T in 1995), avocados (15,000 T), lychees (over 5,000 T) and mangoes (3,500 T).
3. The EU is the world's largest market for pineapples which account for 56% of EU imports of tropical fruits. Overall EU imports of pineapples (including significant intra-EU imports) amounted to 417,000 T in 1996 valued at \$307 million. Imports have grown rapidly over the past 15 years (+224%). However, prices have fallen dramatically as average quality has decreased and new competitors (Costa-Rica, Ghana) to Côte d'Ivoire, the leading supplier, have emerged.

France, Europe's largest market for pineapples, imported a record 133,000 T in 1996, mainly from Côte d'Ivoire (yellow Cayenne type) which has a quasi-monopoly over this market. The rise in imports (+62% from 1990 to 1996) has been higher than the EU average (+47%). France is the leading European country for pineapple consumption, estimated at 1 kg per capita per annum. The main issue for pineapples exporters is the sharp fall in prices on the French market since the early 1990s (-23% from 1992-93 to 1995-96).

4. The EU is by far the largest avocados importer (110,000 T in 1996, over 60% of global imports). Imports have risen by 80% since 1988. There is a substantial intra-EU trade (74,000 T) as Spain is a major avocados supplier, beside Israel, Mexico and South Africa. Competition among suppliers is fierce but the partial opening of the American avocados market to Mexico is likely to affect Mexican exports to Europe.

France is the key European market for avocados. It imported 106,000 T in 1996 (almost 60% of overall EU imports) mainly from Israel (40,500 T), Spain (23,500 T) and Mexico (18,500 T). Over the past 4 years imports have increased by 60%. Individual consumption has soared from 0.4 kg in 1980 to 1.5 kg.

5. The EU imports of mangoes (69,000 T in 1996) account for 20% of global trade, far behind the USA (45%). From 1991 to 1996, imports experienced a massive increase of 74%. The main markets are the Netherlands (40% of EU imports), France (23%), the UK (17%) and Belgium (11%). Intra-EU trade has soared by 267% since 1991. There are numerous suppliers, the largest ones being Brazil (19% marketshare in 1996), Côte d'Ivoire (9%), the USA (9%), Mexico (9%) and South Africa (8%).

## The EU and French Markets for Tropical Fruits

France is the second largest market after the Netherlands. From 1990 to 1996, mangoes imports rose from 8,000 T to 20,500 T. France's main suppliers are Côte d'Ivoire and Israel, although 22% of the imports originate from EU countries. Individual consumption was at 0.20 kg in 1996, a 5-fold increase since 1980. Although green varieties from Africa are of better quality, they are increasingly challenged by colored varieties from Latin America. Prices have fallen since 1986 (-50% on average) as sea-transportation has given rise to bulk deliveries of lower quality products.

6. Papaya is a minor product in Europe: 8,800 T were imported in Europe in 1996, i.e., less than 2% of tropical fruits imports. The major markets are the Netherlands, the UK and Germany. After a surge in the 1980s, imports have increased at a lower pace (+31%) since 1991. The principal suppliers are Brazil (56% of imports) and Jamaica (16%).

France is only a minor market for papayas and French imports have been stable at an annual average of 800 T since 1991. Individual consumption is very low (below 0.02 kg a year). Due to its extreme fragility and the lack of consumer familiarity, papaya remains a niche market; as a result, France is among the European countries where prices are the highest.

7. The EU is the world's largest market for lychees. From 1991 to 1996 imports rose from 7,500 T to 13,200 T, a 75% surge. Global trade in lychees is dominated by two key players: Madagascar and France. Madagascar, the world's largest lychees exporter, has an 85% share of the European market, far ahead of South Africa (6%). France accounts for 83% of European lychees imports, with 10,800 T in 1996. It re-exports significant volumes to other European countries. Intra-EU trade in lychees amounted to 7,000 T in 1996. Individual consumption in France has risen by 117% since 1991 to 0.13 kg per annum. Lychee is primarily a seasonal fruit, mainly consumed in Dec-Jan. Demand is the highest for South African lychees, in much lower supply but of higher quality. The main issue is the lack of coordination, quality control and self-discipline by Madagascar's exporters that results in frequent price collapses.
8. The EU imported 3,600 T of Queen-type pineapples in 1996, a 92% increase since 1991. Three countries account for more than 90% of EU imports: France (36%), the Netherlands (36%) and Germany (19%). The major suppliers are South Africa (2,350 T in 1996) and the Réunion French island (1,060 T). French imports have doubled over the past four years, hitting 1,300 T in 1996. They mainly originate from La Réunion (over 1,000 T) and Mauritius (200 T). In spite of its convenient size, its attractive color and its fine taste, the Queen pineapple is still a niche market. The main impediment to large-scale exports is its extreme fragility that prevents sea-transportation.
9. The EU imported 11,500 T of limes in 1996, mainly from Latin America (Mexico, Brazil, Venezuela). Moreover, intra-EU exchanges exist as Spain has expanded its production and its exports (over 3,000 T) since the early 1990s. France is the leading importer (36% of EU imports) with more than 4,000 T in 1996, the bulk of which sourced from Mexico. However, the expansion of French imports (+21% since 1991) has been lower than the growth of EU imports (+80%).
10. Approximately 4,000 T of carambolas, passion fruits and other non-traditional tropical fruits were imported into the EU in 1995. Carambolas (about 2,300 T) are mainly supplied by Malaysia. Purple passion fruits make up the bulk of passion fruits imports (1,300 T out of 1,600 T) and are sourced from Africa (Kenya, Zimbabwe, and, to a lesser extent, South Africa and Burundi), while yellow passion fruits are imported from Colombia (250 T) and sell at higher prices. France imports carambolas from Malaysia (about 300 T) and passion fruits from Africa and Colombia (approximately 300 T).

## The EU and French Markets for Tropical Fruits

### Introduction

Global trade in tropical fruits has rapidly expanded since the early 1980s. It grew from 500,000 T in 1980 to 1.5 million T in 1995 generating a turnover of US\$ 1 billion. The main fruits traded are pineapples (56%), mangoes (22%), avocados (16%) and papayas (6%).

As the world's largest tropical fruits importer, the European Union (EU) plays a key role in this trade. This survey examines the EU market for tropical fruits with a particular focus on France, which is the largest European importer.

Here, the term "tropical fruits" refers to fresh fruits produced in tropical countries excluding bananas, citrus (except limes), treenuts and dates. "EU imports" means **extra-EU imports** when nothing else is specified.

Prices are indicated in dollars of the USA (\$) or in the currency of the importing nation.

The exchange rates used are the following: ECU 1= \$ 1.114; \$1 = FF5.9. Volumes are indicated in metric tonnes (T).

### I. THE EU MARKET FOR TROPICAL FRUITS: OVERVIEW

In 1996, overall EU imports of fresh fruits accounted for 9.2 million of tonnes, valued at more than \$11 billion. The net trade deficit in fresh fruits was 7 million of tonnes, valued at \$6.7 billion.

EU imports of tropical fruits represented 494,000 T in 1996, i.e., 5% of overall fresh fruits imports (see Table 1). The principal commodities imported were pineapples (56%), avocados (22%) and mangoes (14%). Also imported in smaller volumes were non-traditional tropical fruits such as lychees, limes, papayas, passion fruits, pitahayas, guavas, carambolas, rambutans and mangosteens (Fig 1).

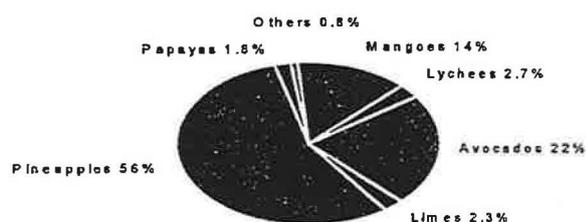
Table 1: EU import of tropical fruits 1996 (tonnes)

Year	1991	1996	Variation 1991-96 (%)
Pineapples	215,244	274,292	+28
Avocados	90,408	110,172	+ 22
Mangoes (*)	39,498	68,874	+ 74
Lychees	7,516	13,188	+ 75
Limes	6,420	11,529	+ 80
Papayas	6,708	8,789	+ 31
Carambolas, passion fruits and pitahayas	--	4,025 (**)	--
Total	365,794	490,869	+ 34

( Source: COLEACP; Eurostat) (\*) : including very low volumes of guavas (\*\*): 1995

## The EU and French Markets for Tropical Fruits

Fig 1: EU imports of tropical fruits 1996



Consumption has risen steadily across European countries. Tropical fruits imports increased by one third over the 1991-96 period while overall fruits imports rose by only 5% (bananas +8%). However, the rise in value is not as high as in volumes since commodity prices have tended to decrease.

The main markets within the EU are France, Belgium and the Netherlands as primary import markets. These countries play a role as entry points by re-exporting imported tropical fruits to other European countries. There are therefore significant intra-EU exchanges, reinforced by the fact that Spain itself produces some tropical fruits (avocados, mangoes, papayas, limes). The main consumption markets (final markets) are France, the United Kingdom (UK), Germany and, to a lesser extent, Italy. As the number of suppliers has strongly increased, the EU has become a highly competitive market. Profits have shrunk as prices have fallen.

## II. THE FRENCH MARKET FOR TROPICAL FRUITS: OVERVIEW

France is the third largest fruits and vegetables importer in Europe after Germany and the Netherlands. In 1995, overall fresh and dried fruits imports accounted for 2.76 million tonnes, valued at \$2.36 billion. Moreover, France is the largest European market for tropical fruits (excluding bananas). In 1996, France imported approximately 260,000 T of tropical fruits (see Table 2). France is number one for imports of pineapples, avocados, lychees and limes and number two for mangoes imports (Table 3).

Table 2: Principal French imports of tropical fruits 1996

Fruit	Volumes (T)	Share of total tropical fruits imports in France
Pineapples	132,811	50.4 %
Avocados	100,554	38.2 %
Mangoes	13,019	5.0 %
Lychees	10,825	4.1 %
Limes	4,441	1.7%
Papayas	842	0.3%
Passion fruits, Carambolas and Pitahayas (*)	853	0.3 %
Total	263,345	100 %

## The EU and French Markets for Tropical Fruits

(Source: CIRAD-FLHOR; French customs)

Table 3: Share of French imports in overall EU imports of tropical fruits 1996

Pineapples	Avocados	Mangoes	Lychees	Limes	Papayas
48.4 %	56.4%	21.6 %	83.0 %	36%	9.6 %

(Source : CIRAD-FLHOR/Eurostat)

Since the mid-1980s there has been a steady increase in tropical fruits imports. However, the rise is less sharp in value than in volume as commodity prices have tended to fall (especially pineapple prices). Due to the increasingly high number of suppliers, the French market has become extremely competitive, notably for pineapples, avocados and mangoes.

Consumption rapidly rose from the early 1980s to 1995. Since then, there has been a slight decrease for several products (pineapples, mangoes, lychees). This phenomenon may be due to the bleak economic situation prevailing in the 1995-96 period (high unemployment and several tax increases). France is nonetheless the European country where tropical fruits consumption is the highest (especially for avocados, pineapples and lychees). Over 95% of French households are usual consumers of tropical fruits and citrus.

Large-scale retailers are prominent in the distribution of tropical fruits: together, hypermarkets and supermarkets account for 70% of the sales (Table 4). Interestingly, the domination of large-scale retail is stronger in tropical fruits than in the overall fresh fruits distribution (58%). This can be explained by the fact that tropical fruits marketing requires more advertising and stronger organization and logistics than temperate climate fruits marketing. From 1992 to 1995, the share of hypermarkets increased more rapidly than supermarkets' share: it rose from 28.6% to 33%, while the share of the latter increased from 36.2% to 37.3%.

Table 4: Shares of different distribution channels in tropical fruits sales in France 1995

Hypermarkets	Supermarkets	Open-air markets	Fruits and veg. stores	Others
33%	37.3%	14%	5.9%	9.8%

(Source: FLD/CTIFL)

### III. MARKET SURVEY FOR THE MAJOR TROPICAL FRUITS

#### 1. PINEAPPLES

##### **1.1 THE EU MARKET FOR PINEAPPLES**

###### *a) Imports*

The EU is the world's largest pineapples importer with roughly 50% of global imports. Pineapple is Europe's most imported tropical fruit and makes up 56% of EU's imports. There is a significant intra-EU trade (see Table 5) as several European countries (notably France and Belgium) re-export pineapples. In 1996, the value of total EU imports (intra-EU imports included) was \$307 million.

Table 5: EU imports of pineapples 1996 (Source: COLEACP)

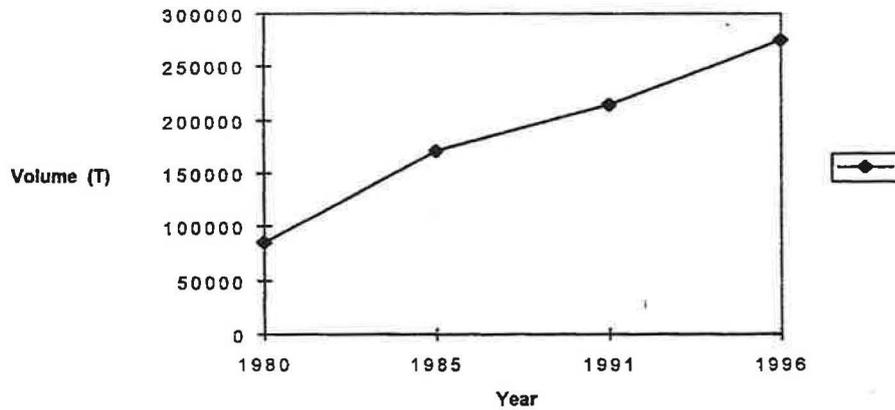
Extra-EU imports	274,692 T	66 %
Intra-EU imports	142,313 T	34 %

## The EU and French Markets for Tropical Fruits

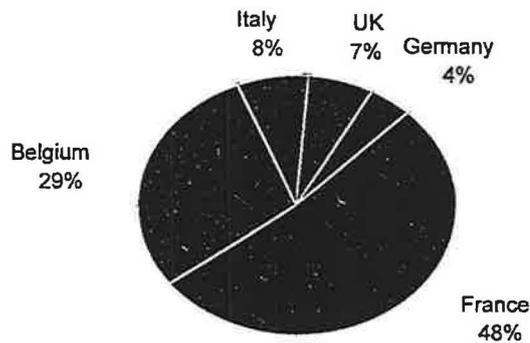
Total EU imports	417,005 T	100 %
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Pineapples imports have soared for the last 15 years. From 1980 to 1996, imports increased by 224% in volume (Fig 2). As Fig 3 illustrates, France is by far the leading importer in Europe (almost 1 fruit in 2 imported), followed at a distance by Belgium (27%).

**Fig 2: EU imports of pineapples 1980-96**



**Fig 3 : Main EU importers 1996**



### ***b) Suppliers***

Europe's main supplier is Côte d'Ivoire, which had a marketshare of more than 90% in the late 1980s. Since then, the market has become extremely competitive; new competitors emerged in the early 1990s, notably Costa-Rica (see Table 6 and Fig 4). In Western Africa, Ghana has rapidly increased its exports, while Cameroon and Benin are trying to develop their pineapples export industry. Conversely, Honduras and the Dominican Republic have lost marketshares since 1990. Côte d'Ivoire is now trying to recover through the setting up of a more effective marketing organization, quality enhancement and the liberalization of the transportation industry. It has also benefitted from the devaluation of its currency (Franc CFA) in 1994.

## The EU and French Markets for Tropical Fruits

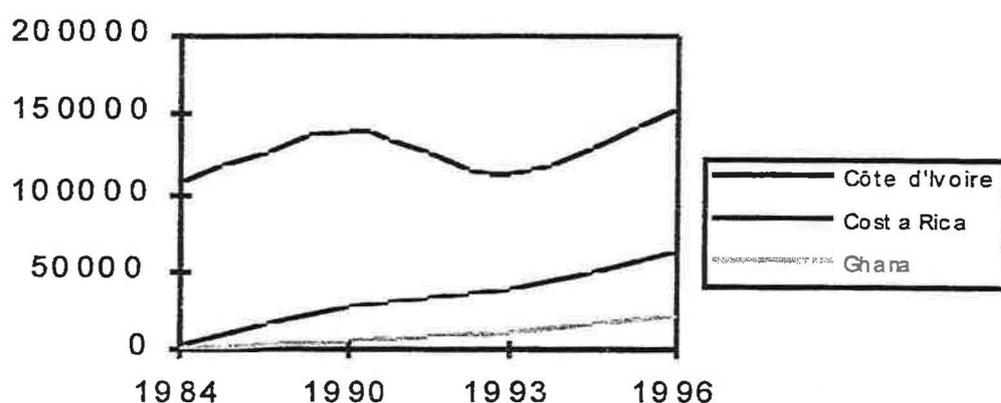
Côte d'Ivoire primarily supplies France and, to a lesser extent, Belgium. While Costa-Rica exports to Belgium, the UK, Italy and Germany, Ghana's exports target Belgium, the Netherlands and Germany. Additionally, France, Belgium and the Netherlands re-export pineapples to their European neighbors.

Table 6: Main non-EU pineapples suppliers to the EU market 1996

Country	Volumes (T)	Share of total-EU imports
Côte d'Ivoire	153,692	56 %
Costa Rica	64,314	23 %
Ghana	22,199	8 %
Honduras	10,308	3.8 %
Dominican Republic	9,528	3.5 %
Cameroon	3,156	1 %
Others	11,495	4.2 %
Total	274, 692	100 %

( Source : COLEACP)

**Fig 4 : Evolution of EU imports (T) by supplier 1984-1996**



(Eurostat:/ CIRAD-FLHOR)

### *c) Consumption*

Consumption has been multiplied by 2.6 over ten years: on average, it rose from 0.25 kg per capita per annum in 1981-83 to 0.7 kg in 1991-93. However, there are significant disparities across countries. While in Greece and Portugal individual consumption is almost negligible, it ranges from 0.5 to 0.7 kg in Germany, the Netherlands, Spain, Italy and Denmark and peaks at 1.1 kg in France and Belgium. Despite the strong increase in the recent past, consumption of fresh pineapple is still low in absolute value, especially if compared with canned pineapple consumption which amounts to 1.7 kg p.c. a year.

## The EU and French Markets for Tropical Fruits

Consumption peaks are in December (Christmas and new year's holidays) and March-April (Easter). The lowest demand is in summer from June to September. Among the different groups of pineapples, the Smooth Cayenne variety is by far the most imported. Consumers tend to prefer the West African colored type to the Latin American green type. Recently Del Monte has marketed a new extra-sweet cultivar (Gold) that is increasingly in demand (a reported 30% share of the UK market). There is also a small niche market for the Queen pineapple, which is quite a different product (see section 6 below).

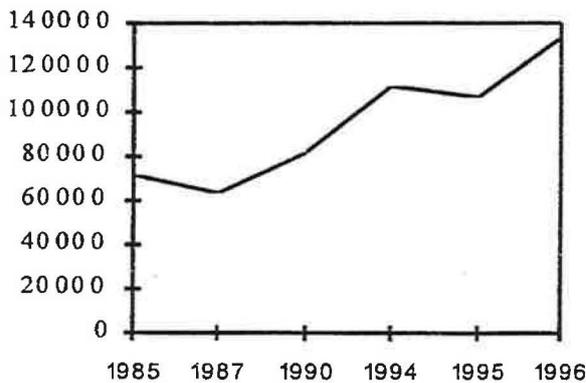
### 1.2 THE FRENCH MARKET FOR PINEAPPLES

#### a) Imports

France is the largest European market for pineapples (48.4% of total European imports in 1996). In 1996, 132,811T were imported (approximative value: \$91 million). Pineapple is the second most imported tropical fruit in France after banana. A substantial share of the imported pineapples is shipped to other countries (45,000 T in 1995, on increase). In this respect, France is the EU's third supplier.

There has been a strong rise in French imports : +62% from 1990 to 1996 (Fig 5), higher than the European average.

Fig 5 : Evolution of french imports of pineapples (T)



b) *Suppliers* : Côte d'Ivoire has a quasi-monopoly over the French market that derives from the historical economic and political ties between the two countries. The other suppliers (Table 7) are mostly former French colonies in West Africa or overseas territory (Réunion island for Queen-type pineapples). There has been a strong increase in Cameroon's exports: +116% in 3 years.

Table 7: Pineapple suppliers to France 1996

Country	Volumes (T)	Share of total French imports
Côte d'Ivoire	127,223	95 %
Cameroon	2,365	1.8 %
Reunion	1,050	0.7 %
Benin	709	0.5 %
Others	1,464	1 %
Total	132,811	100 %

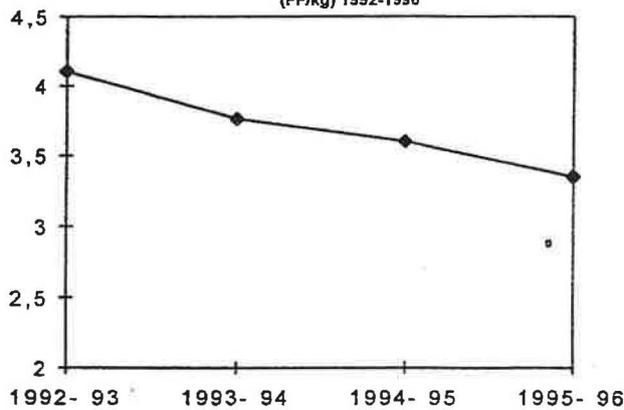
## The EU and French Markets for Tropical Fruits

( Source : CIRAD-FLHOR/Eurostat)

*c) Consumption* : There has been a sharp increase in annual individual consumption : 0,5 kg in 1982 to 1,3 kg in 1993 . More recently, there was a slight decrease and consumption was around 1 kg in 1996. Consumption is the highest in December (Christmas and New Year's holidays) and in March-April (Easter). The most sought-after types are the yellow Cayenne pineapples, while demand for green Cayenne is lesser. This is a problem for Costa-Rica, which is trying to switch a part of its green pineapples production to yellow varieties.

*d) Market prices*: There has been a sharp decrease in pineapples prices since the early 1990s (Fig 6). Prices logically fall at the periods when supply is too high for the existing demand. However, when supply decreases, prices do not fully return to their previous year's peak, which is worrying for producers. The price fall is witnessed at all levels of the marketing process: import, wholesale and retail. In 1997, though, prices were substantially higher due to quality enhancement and supply limiting efforts made by Côte d'Ivoire's exporters.

Fig 6 : Variations in pineapple prices at importer level  
(FF/kg) 1992-1996



(CTIFL/ CIRAD)

## 2. AVOCADOS

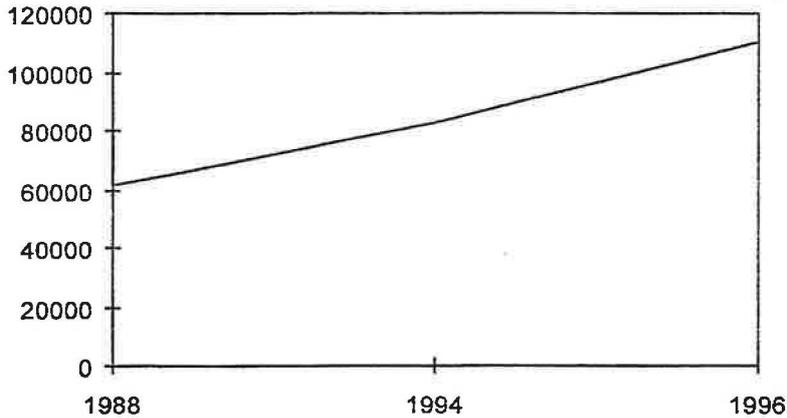
### 2.1 THE EU MARKET

#### *a) Imports:*

Between 1993 and 1995, world trade in avocados grew by 30%. The EU is the world's second market behind the USA and the world's first importer with 69% of global imports in 1996. Avocados are Europe's second most imported tropical fruit after pineapples, representing 22% of imports. From 1988 to 1995, EU imports rose from 61,000 T to 110,000 T, i.e., an 80% surge (Fig 7).

## The EU and French Markets for Tropical Fruits

Fig 7 : Variation in EU imports of avocados



(Afrique Agriculture 1996)

In addition, there is a significant intra-EU trade estimated at 74,260 T in 1996. Spain is a major avocados producer and ranks between second and third (depending on the year) among suppliers to the EU (Table 8).

Table 8: Main avocados suppliers to the EU 1996

Country	Volumes (T)	Share of EU imports (%)
Israel	42,504	23.9
Spain	32,235	18.1
Mexico	28,338	15.9
South Africa	23,428	13.2
Netherlands	16,898	9.5
France	15,501	8.7
Kenya	6,757	3.8
Belgium- Luxemburg	5,362	3

( Source : CIRAD- FLHOR/ Eurostat)

The largest importer is France with more than 100,000 T, far ahead of other European countries .

### **b) Suppliers**

Non-EU suppliers account for 60% of overall EU purchases. The ranking of the suppliers varies from one year to another. Israel was the leading supplier in 1996. This country initiated the avocados market in the 1980s. It was then prominent with a 64% marketshare. Now, its marketshare is around 25%. Israeli production is frequently affected by climatic problems (excessive heat, frost). The second largest extra-EU supplier is Mexico, the world leading producer (750,000 T). Mexico has doubled its exports to Europe in the last 3 years. South Africa exports irregular quantities to the EU (from 20,000 T to 35,000 T) on an upward tendency.

## The EU and French Markets for Tropical Fruits

Although a minor supplier, Kenya is rapidly expanding its exports: from 1990 to 1995, deliveries trebled, rising from 3,000 T to 9,000 T.

There is a significant intra-EU trade in avocados, EU suppliers representing 40% of overall EU imports. The leading European supplier is Spain, with 15% to 25% of the market according to the year. Spain accounts for 97% of the European production. Spain has benefited from its EU membership since 1986: its exports rose from 9,000 T in 1985 to 32,000 T in 1996, a massive 250% increase. There are substantial re-exports by non-producing EU countries: France, the Netherlands (around 15,000 T each), and to a lesser extent, Belgium (5,000 T) and the UK (2,000 T). Re-exports account for more than 20% of overall EU imports.

### *c) Consumption*

There has been a significant increase in consumption throughout Europe since the early 1980s. Overall consumption amounted to 140,000 T in 1995 (186,000 T in the USA), representing on average 0.38 kg per capita.

### *d) Market prices*

There has been a steady decline in market prices since the late 1980s. This phenomenon is due to the surge in traded volumes and the fierce competition between an increasing number of suppliers.

### *e) Prospects*

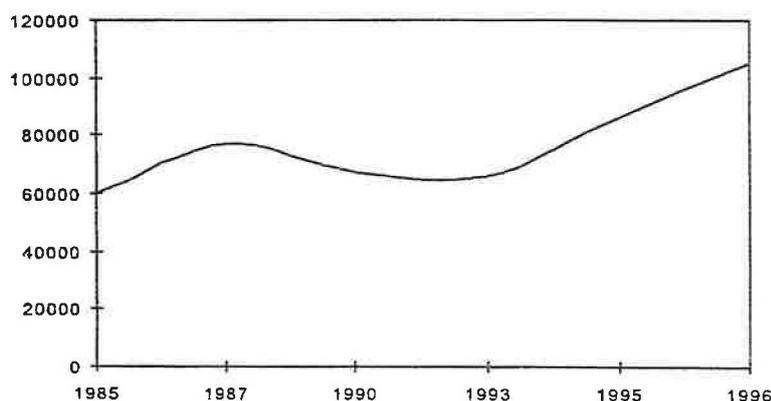
The current upward trend in avocados consumption should continue during the next decade as avocado is now regarded as a mass consumption product. The increase in EU demand will not be offset by the rise in the Spanish supply, so there is scope for non-EU exporters, notably South Africa and Kenya. As regards Mexico, the partial opening of the US avocados market may change the pattern of Mexican exports to the EU, easing competition there. However, market prices are most likely to fall in the forthcoming years as other countries will increase their supplies.

## 2.2 THE FRENCH MARKET FOR AVOCADOS

### *a) Imports*

France is by far the largest European market for avocados. In 1996, it imported 105,500 T, i.e. almost 60% of overall EU imports (intra-EU imports included). The European avocados market was initiated by France in the 1980s. Avocado is France's second most imported tropical fruit after pineapple. The rise in imports accelerated in the early 1990s: over the last 4 years, imports have increased by 60% (Fig 9).

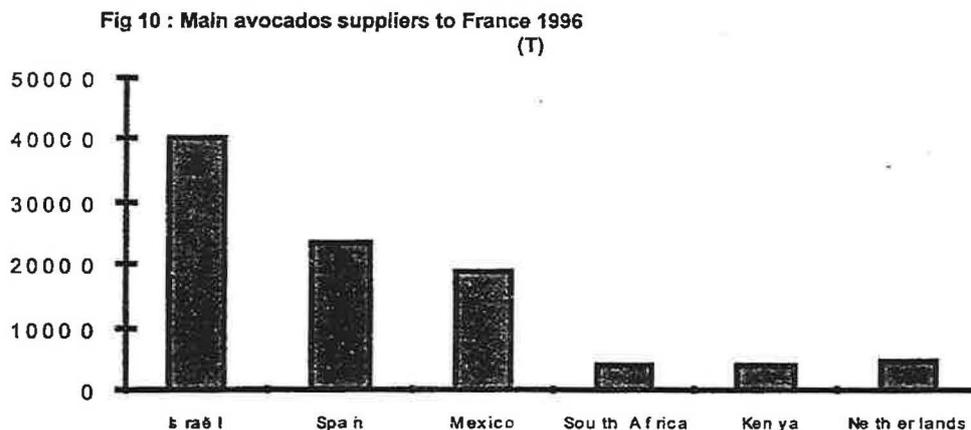
Fig 9 : French imports of avocados (T) 1985-96



### *b) Suppliers*

## The EU and French Markets for Tropical Fruits

As Fig 10 illustrates, France mainly imports from non-EU countries (67,700 T in 1996 accounting for 64% of imports). Israel has been the leading supplier since it initiated this market in the early 1980s. In 1996, it held 40% of the French market. However, due to climactic risks, Israeli exports may substantially vary over time. For example, the 1994 marketshare was only 23%.



(Eurostat/ CTIFL)

Spain is France's second supplier, closely followed by Mexico. It benefits from its EU membership (no trade barrier) and its advantageous location close to France that enables exports by trucks. Over the last 3 years, Spanish supply oscillated between 14,000 T and 23,000 T. France also purchases avocados from other EU countries that are not producers. In 1996, the Netherlands were its fourth largest supplier, before Kenya and South Africa. Together with Belgium (2,800 T exported to France) and the UK (1,200 T), Holland accounted for 8% of the French imports.

### c) Consumption

France is the largest consumer market in the EU. Individual consumption soared by 275% from 0.4 kg in 1980 to 1.5 kg in 1996. Although consumption traditionally concentrates in the last quarter of the year and in Spring, it tends to spread more evenly over the year as prices fall and supply takes place 12 months a year. French consumers prefer avocados with a dark rough skin to avocados with a bright-green smooth skin. Accordingly, demand is the highest for the Hass variety supplied by Spain and Israel. The Fuerte variety is second in sales.

The main distribution channels are supermarkets (37.2% of total sales) and hypermarkets (29.1%). Open-air markets and Fruits and Vegetables stores account for respectively 17.6% and 6.3%. Interestingly, the dominance of large-scale retail in the distribution of avocados is lower than their average position in total tropical fruits distribution.

### d) Market prices

The same downward trend as in the rest of the EU is observed. The fall in prices seems to be sharper in France, where competition is the highest.

### e) Prospects

Prospects for market expansion in France are difficult to assess. On the one hand, individual consumption is already high for a tropical fruit. On the other hand, avocado may well become a common consumption commodity as banana now is. In this respect, the room for increasing imports would be considerable (individual consumption of bananas is over 8 kg a year). Moreover, as France acts as an entry point to the whole European market, where the potential for growth in consumption is still substantial, the French importers deserve a particular attention.

## 3. MANGOES

### 3.1 THE EU MARKET

#### a) Imports

EU imports of mangoes represented approximately 20% of global imports in 1995, far behind the USA with their 45% share. From 1991 to 1996, mangoes imports into the EU enjoyed a massive increase of 74%, rising from 39,500 T to 69,000 T (Fig 11). Mangoes represent 14% of EU imports of tropical fruits and are the third most imported tropical fruit. With intra-EU trade being taken into account, overall EU imports reached 100,180 T valued at \$145 million in 1996. The main importers are the Netherlands, France, the UK and Belgium (Table 9).

Fig 11 : EU imports of mangoes (T) 1980-1996

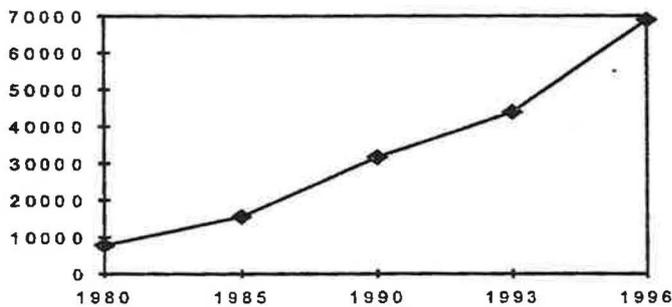


Table 9: Main EU importers of mangoes 1996

Country	Netherlands	France	U.K	Belgium-Lux	Germany	Portugal	Spain
Volumes (T)	27,462	15,931	11,777	7,640	2,421	1,890	1,176
Share of EU imports (%)	39.9	23.1	17.1	11.0	3.5	2.7	1.7

(Source : COLEACP)

The most dynamic markets for mangoes are Belgium-Luxemburg (imports rose by 350% from 1991 to 1996), the Netherlands (+209%), Spain (+380%), and France (+72%). Conversely, extra-EU imports by the UK, Germany and Italy fell by respectively 10%, 43% and 75% over the 1991-96 period. These countries have been increasingly purchasing mangoes to European countries rather than to third countries. The rise in extra-EU imports has been paralleled by a 267% rise in intra-EU trade since 1991. The EU market for mangoes is therefore highly dynamic, with the Netherlands, France and Belgium acting as internal suppliers. Internal trade in the EU accounted for 31,000 T in 1996, nearly 50% of overall imported volumes.

#### b) Suppliers

There are more than 70 mangoes suppliers to the EU. Brazil is the leading exporter with a 19% share of the European market (Table 10). It ships the bulk of its Florida varieties (mainly Keitt and kent) to the Netherlands, the remainder going to the UK and France. Brazil exports during the highly profitable October-December period. Its exports have continuously increased since 1980 despite a slight slowdown in 1996.

The USA chiefly exports its Florida varieties to the Netherlands from March to November. Côte d'Ivoire ships the bulk of its green-variety mangoes (Amelie) to France from March to April and exports Florida varieties (Kent, Keitt, Brooks) from April to July. Over the 1991-1995 period, Côte d'Ivoire's exports rose by 376%.

Similarly to Brazil and the USA, Mexico mainly supplies the Netherlands with colored varieties and, to a lesser extent, France. South Africa exports to the Netherlands and Belgium, while Pakistan, India and Venezuela mainly supply the UK. Israel exports only to France. There are also significant EU exporters. In 1995, the

## The EU and French Markets for Tropical Fruits

Netherlands were the second largest supplier after Brazil (9,100 T exported), France exported 3,500 T and Belgium more than 1,500 T. In 1996, Germany, Italy, Ireland, Greece, Austria and the Scandinavian countries all purchased more than 80% of their mangoes to EU countries.

Table 10 : Main mangoes suppliers to the EU market 1996

Country	Volumes (T)	Share of EU market (%)
Brazil	13,095	19.0
U.S.A	6,490	9.4
Côte d'Ivoire	6,466	9.4
Mexico	6,359	9.2
South Africa	5,483	8.0
Peru	4,860	7.1
Israel	4,657	6.8
Venezuela	4,081	5.9
Ecuador	3,541	5.1
Pakistan	2,830	4.1
Costa-Rica	2,674	3.9

(Source : COLEACP)

### *c) Consumption*

France, the UK, Germany and the Netherlands are the leading markets for mangoes. Consumption is very low in southern Europe, albeit in rapid expansion in Spain. Mangoes consumption has considerably increased since 1980. Individual consumption is estimated at 200 g a year, with large disparities across European countries. Mango has become a popular fruit, almost an ordinary fruit. Due to the shift from air to sea transportation, bulk deliveries at competitive prices are now well-established practices. Mangoes are now on supermarkets' shelves 12 months a year, at relatively low prices. There was a shift from a connoisseur or ethnic market to a large distribution market.

Among the 5 families of mangoes, the most consumed are the colored varieties (also called Florida): Kent (the most popular), Keitt, Tommy Atkins and Haden are the principal. African green varieties (Amelie, Julie) are more sought for their finer taste on the French and Dutch markets. Other varieties from Asia and the Carribeans are more appreciated by the ethnic markets in the UK and the Netherlands. Consumption peaks are in the end of the year (November-December) and from March to May.

### *d) Market prices*

Until 1985, real prices were rising. From 1985 to 1995, they dropped by 50% due to the shift to sea transportation and the subsequent increase in imported volumes. Yet, these developments have not affected all the suppliers in the same way. Mangoes from Mexico, Brazil, South Africa, the USA and Israel are Florida varieties shipped in massive quantities. As a result, they are not considered as top quality products and their prices have fallen. Conversely, mangoes from Africa (Côte d'Ivoire, Mali) enjoyed a 15% increase in sale prices over the last decade due to their superior quality.

## 3.2 THE FRENCH MARKET FOR MANGOES

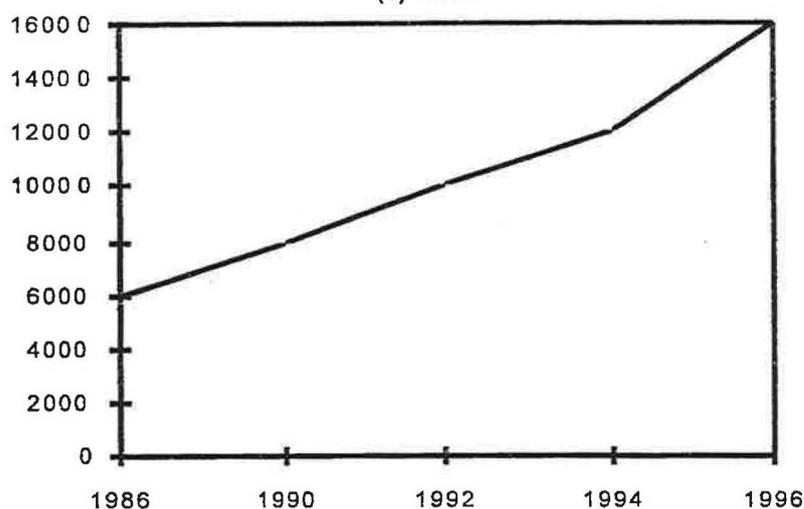
### *a) Imports*

France, Europe's second largest mangoes importer, purchased 20,500 T in 1996. Compared with pineapples or avocados, mangoes are not a major commodity in France. In 1996, 78% of the imports originated from non-EU countries. Extra-EU imports amounted to 16,000 T, up 72% from 9,200 T in 1991. Over the 1985-96 period,

## The EU and French Markets for Tropical Fruits

there was a 220% increase in extra-EU imports (Fig 12). In one year (from 1996 to 1997), there was a 45% increase in imports.

Fig 12 : French extra-EU imports of mangoes  
(T) 1986-1996



(CTIFL/ COLEACP)

### b) Suppliers

Côte d'Ivoire is France's leading supplier with green Amelie varieties exported from March to April and then Kent and Keitt mangoes until late June. From 1990 to 1995, exports increased 7-fold and reached 7,500 T in 1995. Israel is the second largest supplier. It exports from August to late October. Its supply of Florida varieties increased from 917 T in 1994 to 4,458 T in 1996, the highest rate among all mangoes suppliers. Brazil, which had traditionally been the third supplier lost the French market in 1996. While Mexico's marketshare has been stable for 3 years, Peru and Mali have increased their exports to France since 1994. Mali's exports reportedly reached 1,700 T in 1997. There are also European suppliers to France, particularly the Netherlands.

Table 11 : Main mangoes suppliers to France 1996

Country	Côte d'Ivoire	Israël	Mexico	Peru	Mali	EU countries
Volume (T)	5,940	4,458	1,288	1,133	1,070	4,591
Share of French market (%)	28.9	21.7	6.3	5.5	5.2	22.4

(Source : COLEACP)

### c) Consumption

From 1980 to 1995, mangoes consumption soared from 0.04 to 0.24 kg per capita per year, a 6-fold increase. In 1996, though, it fell back to 0.20 kg p.c., close to the European average. Consumption is therefore still very low, far behind avocados or pineapples. Consumption is the highest at the end of the year and during West Africa's production period, i.e., from March to June.

### d) Market prices

The price trend in France is roughly identical to the European market as a whole: a continuous fall since 1986. However, the slope has been less steep than in other EU countries due to the presence of higher quality mangoes from Côte d'Ivoire and Mali that draws prices upward.

## The EU and French Markets for Tropical Fruits

### France : minimum and maximum import prices. Dec 96- May 97

Mangoes	December	January	February	March	April	May
Minimum price/ Air	18.00 FF		—	11.00 FF	11.00 FF	12.50 FF
Minimum price/ Sea	8.00 FF	8.00 FF	—	8.00 FF	5.50 FF	3.50 FF
Maximum price/Air	20 FF		—	17.00 FF	14.00 FF	14.50 FF
Maximum price/Sea	15.00 FF	13.00 FF	—	10.50 FF	8.50 FF	7.50 FF

(Source : COLEACP)

#### *e) Prospects*

Despite the surge in imported volumes, consumption per capita is still extremely low at less than half a mango per person per year. Consequently, there is room for increasing imports. As a comparison, mango consumption in the USA is almost three times higher at 62 g per capita. Further, France has become an entry point to the EU market. Its exports rose from 1,300 T in 1991 to 3,500 T in 1995. As a result, imports should continue to grow in the forthcoming years. Nevertheless, exports to France will be profitable only if high quality standards are achieved since congestion hinders benefits in the low end of the mango market.

## **4. PAPAYAS**

### **4.1 THE EU MARKET**

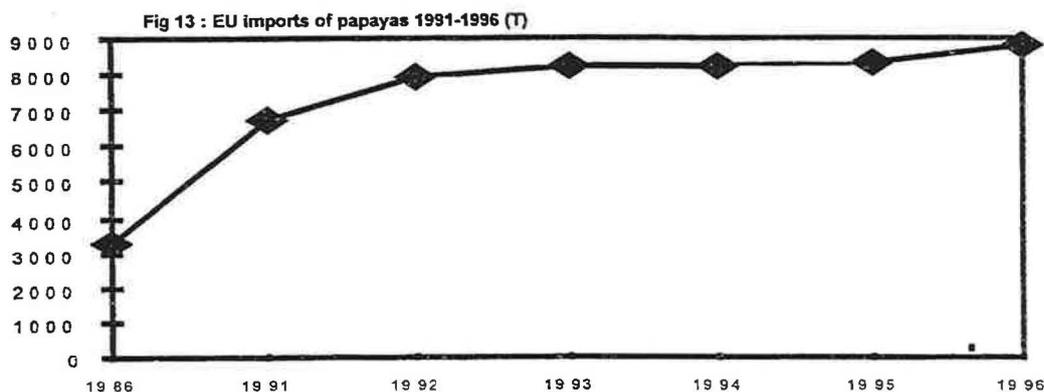
#### *a) Imports*

The EU is not a major importer of papayas: in 1996 it imported only 8,800 T out of 100,000 T traded throughout the world. Papayas represent less than 2% of the EU's tropical fruits imports. However, papayas imports have increased 50-fold since 1980 (Fig 13). The expansion is less rapid now (+31% from 1991 to 1996). Overall EU imports of papayas (intra-EU imports included) amounted to \$24.1 million in 1996. The main European markets are the Netherlands, the UK and Germany (Table 12). While Dutch imports have decreased by 22% since 1994, British imports have steadily risen.

Table 12 : Main EU importers of papayas 1996

Country	Netherlands	U.K	Germany	France	Portugal
Volumes (T)	2,554	2,324	1,537	842	638
Share of EU imports (%)	29.1	26.4	17.5	9.6	7.3

(Source: COLEACP)



## The EU and French Markets for Tropical Fruits

(COLEACP)

### *b) Suppliers*

Brazil, the world's largest producer, is the major supplier to the EU with more than one in two papayas imported (Table 13). It replaced Côte d'Ivoire as Europe's leading supplier and drove the USA out of the market in the early 1980s. In 1983, its marketshare was 90%. Other competitors have emerged since then, notably Costa-Rica and Jamaica. The former had left the second rank group by 1995. Conversely, Jamaica has rapidly expanded its exports from less than 100 T in 1989 to 1,359 T in 1996. Ghana's exports to Europe have enjoyed a 60-fold increase since 1993.

Brazil's main European customers are by decreasing order the Netherlands (1,700 T in 1996), Germany (840 T), the UK (800 T), Portugal (630 T) and France (430 T). The bulk of Jamaica's exports (1,100 T) goes to the UK, while Ghana supplies Germany (350 T), the UK and Belgium (less than 200 T each). Costa-Rica mainly exports to the Netherlands (270 T). Intra-EU trade in papayas amounted to 2,900 T in 1996.

Table 13 : Main papayas suppliers to the EU 1996

Country	Brazil	Jamaica	Ghana	Costa-Rica
Volumes (T)	4,894	1,359	780	308
Share of EU imports (%)	55.7	15.5	8.9	3.5

(Source : COLEACP)

### *c) Consumption*

The leading country for consumption is Spain which produces more than 6,500 T in the Canary Islands. The Netherlands, Germany, the UK, France and Portugal are the other major consumption markets. Average annual individual consumption is very low: 30 g. Papaya is still a niche market consumed during Christmas and Easter holidays.

### *d) Market prices*

Papaya prices may substantially vary from one year to another. They also vary according to origins and transportation modes. Brazilian papayas achieve the highest sale prices in Germany, France and the UK. Jamaican papayas suffer from lower prices. Papayas transported by plane are \$0.9 to \$1.1 per kg more expensive than sea-freighted products.

## 4.2 THE FRENCH MARKET FOR PAPAYAS

### *a) Imports*

France is not a major market for papayas ( less than 10% of EU imports). On average, it imported 820 T a year over the last six years, far behind the Netherlands , the UK and Germany. Unlike other European countries, papayas imports hardly rose over the last six years. The market has stabilized between 800 T and 900 T a year.

### *b) Suppliers*

The bulk of French imports (97%) comes from outside the EU. France primarily imports from Brazil (46% of imports in 1996) and Côte d'Ivoire (17%, mainly air-freighted). Jamaica, South Africa, Thailand and Mexico are minor suppliers (less than 5% each). Brazil replaced Côte d'Ivoire as France 's leading supplier in the early 1980s. Spain has started to export a fraction of its Canary Island production to France (around 100 T).

### *c) Consumption*

## The EU and French Markets for Tropical Fruits

The highest demand is for the Solo-8 variety, while Amazone red and Sunrise sell in lower volumes. Consumption takes place during the end of the year and for Easter.

Individual consumption is extremely low: 16 g a year. The expansion of papayas consumption is impeded by several hurdles. Papaya is a very fragile fruit, ill-suited to large-scale retail methods. Its conservation period is very short (3 to 14 days), thereby hampering sea-transportation. Papaya is highly sensitive to pests, particularly insects and mould. Moreover, most consumers do not know how to use fresh papayas. Papaya, a breakfast fruit, does not correspond to French eating habits (few fruits are eaten for breakfast in France). Finally, papayas retail prices are still relatively high in France although they have started to decrease.

### d) Market prices

France is one of the most profitable markets in Europe for papaya. Although cross-country differences are low, prices there are higher than in northern Europe. Air-freighted papaya's prices are stable over the year. Air-freighted papayas is a high-profile market. Compared with sea-freighted papayas there is a price differential varying from \$0.9 to \$1.1 per kg for Brazilian papayas and from \$1.3 to \$1.7 per kg for Côte d'Ivoire's products. Sea-freighted papaya's prices vary over the year, the highest prices being achieved from December to April.

France : minimum and maximum import prices. Dec 96- May 97

Papayas	December	January	February	March	April	May
Minimum price/ Air	15.50 FF	14.50 FF	—	16.00 FF	13.00 FF	14.00 FF
Minimum price/ Sea	12.50FF		—			
Maximum price/Air	17.00 FF	17.50 FF	—	17.50 FF	19.00 FF	19.00 FF
Maximum price/Sea	15.00 FF		—			

(Source : COLEACP)

### e) Propects

Although France is the leading European market for tropical fruits, its market for papayas has yet to take-off. Papayas imports have not experienced as strong a rise as in other European countries in the recent past. With a very low level of individual consumption, the potential for expansion remains high. As a comparison, annual consumption in the USA is presently at 150 g per capita. Provided production, packaging and sea-transportation techniques are improved, and provided advertising takes place on sales points, the French market could enter a growth phase. Imports could then rise to more than 2,500 T a year.

## 5. LYCHEES

### 5.1 THE EU MARKET

The EU is the world largest lychees importer. Lychee has become the fourth most imported fruit in Europe. From 1991 to 1996, imports soared from 7,500 T to 13,200 T, a 75% surge. The bulk (83%) of lychees imports go to France. The UK, the Netherlands, Belgium and Germany are all minor importers. Intra-EU trade accounts for more than half the extra-EU imports. It rose from 1,350 T in 1991 to 7,650 T in 1996.

Table 14 : Main EU importers of lychees (T) 1996 (Source : Eurostat)

France	UK	Netherlands	Belgium-Lux	Germany
10,825	778	594	381	430

## The EU and French Markets for Tropical Fruits

The prominent supplier to the EU is Madagascar with an 85% marketshare (Table 15). The bulk of Madagascar's supply go to France; minor quantities (100 T to 300 T) are directed to the Netherlands, Germany, Belgium and the UK. Exports (by air and by sea) start in November and finish in February. South Africa is Europe second supplier. Despite good results in 1995 (2,350 T), South African exports dropped to 800 T in 1996 due to climatic problems. The bulk of its exports goes to the UK, Belgium and the Netherlands. South Africa exports by air and by sea, from early December to March. Its lychees are higher quality products, more priced than Madagascar's. Thailand and Israel are trying to initiate the summer lychee market but deliver only limited quantities. Thailand supplies the Netherlands and the UK while Israel exports to France.

Table 15 : Main lychees suppliers to the EU 1996 (T)

Country	Madagascar	South Africa	Thailand	Israël
Volumes (T)	11,155	804	522	281

(Source : Eurostat)

### 5.2 THE FRENCH MARKET

#### *a) Imports and suppliers*

French imports of lychees have expanded rapidly since the late 1980s and accounted for 10,800 T in 1996. France re-exports significant volumes to European countries, particularly Germany, the Netherlands and Belgium.

#### *b) Consumption*

Individual consumption increased by 117% over the 1991-96 period, rising to 0.13 kg a year. There was a slight decrease to 0.11 kg in 1996. This value remains low as compared with pineapples or avocados. This is partly due to the fact that lychee is a highly seasonal fruit, mainly consumed in December-January. Outside the November-March period, lychees are hardly found in the market. Demand is the highest for Mauritius and Kwai Mi varieties. Almost one lychee in two (47.6%) is sold by hypermarkets. Supermarkets have a lower share (22%) than their average position in tropical fruits distribution (37%), while Fruits and Vegetables stores account for 8.5% of the sales.

Demand is the highest for South African lychees, known to be of better quality than Madagascar's. The latter suffer from frequent quality problems (blackspots, mould) even when transported by plane.

#### *c) Market prices*

Owing to massive exports of low quality products by Madagascar, the prices of all origins have been drawn downward. Although imported volumes rose by 4.4% from 1995 to 1996, the value of imports fell by over 15%. The collapse was also obvious during the 1996-97 campaign. Repeated commitments by exporters from Madagascar to limiting the quantities supplied have not been kept. In this context, South African products achieve higher prices thanks to their limited supply and higher quality.

France : minimum and maximum import prices (FF/kg) Dec 96- May 97

Lychees	December	January	February	March	April	May
Minimum price/ Air	22.50 FF		—	—	—	—
Minimum price/ Sea	8.00 FF	4.00 FF	—	—	—	—
Minimum price/ container		8.00 FF	—	—	—	—
Maximum price/Air	37.50 FF		—	—	—	—
Maximum price/Sea	11.50 FF	14.00 FF	—	—	—	—

## The EU and French Markets for Tropical Fruits

Maximum price/ Container	11.00 FF				
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(Source : COLEACP)

### e) Prospects

Imports are likely to continue to rise as consumption is still low in France and in Europe. Since France is the entry point to the European market for lychees, it will remain essential to foreign exporters. However, sufficient prices will be achieved only if exporters practice self-discipline and comply with higher quality standards. In this respect, huge improvements need to be made if Madagascar is to keep its leading position.

## **6. QUEEN PINEAPPLES (VICTORIA)**

### **6.1 THE EU MARKET**

Among pineapple cultivars, the Queen widely differs from the Cayenne: the fruits are rounder, smaller, with a stark yellow pulp and narrow leaves. Their taste is finer and sweeter. In terms of marketing it should therefore be regarded as a different commodity from the traditional Cayenne pineapple.

As yet, the Queen pineapple has only been a niche market. In 1996 it accounted for a mere 1.3% of overall pineapples imports into the EU. From 1976 to 1993, imports traditionally varied between 1,500 T and 2,500 T with rare peaks at 3,000 T, South Africa being the only significant supplier. Since 1993, though, imports have rapidly increased, hitting a record high in 1996 with 3,630 T (+92%) (Fig 13).

Three European countries represent more than 90% of the Queen pineapple market: France (36% of imports in 1996), the Netherlands (36%) and Germany. The Netherlands re-export a significant share of their imports to North European countries.

South Africa, the leading exporter, mainly supplies the Netherlands (1,300 T in 1996) and Germany (700 T). The French overseas territory of La Réunion has increased its exports ten-fold since 1989 and targets France. Mauritius is a minor supplier with average annual deliveries of 200 T over the last 5 years.

Table 16: Main EU suppliers of Queen pineapples 1996

Country	South Africa	Réunion	Mauritius
Volumes (T)	2,350	1,064	218
Market share (%)	64.7	29.3	6

(Source : CIRAD-FLHOR)

Sales are concentrated in November-December (42%). Demand is the highest during the end-of-year holidays and rapidly falls afterwards. The Queen pineapple is a luxury product, exported by plane and aimed at a small fraction of rich European customers. It achieves high prices (up to four times as much as the Cayenne pineapple) in spite of a downward tendency. From 1992 to 1995, its prices oscillated between \$2.7 to \$4 per kg.

### **6.2 THE FRENCH MARKET**

France is a leading market for the Queen pineapple (called Victoria pineapple) on a par with the Netherlands. French imports of Victoria pineapples have doubled over the last 4 years (Table 17).

Table 17: French imports of Victoria pineapples 1992-1996

## The EU and French Markets for Tropical Fruits

Year	1992-94 average	1995	1996
Volumes (T)	686	1,249	1,305

(Source: Eurostat)

France's leading supplier is by far the French overseas island of La Réunion with an 80% marketshare in 1996 (1,050 T). Mauritius ranks second with approximatively 200 T.

Consumption is difficult to assess but it is extremely low, probably lower than 20 g per capita per year. Victoria pineapples sales have experienced a substantial increase. Consumption patterns are the same as in the rest of Europe: a peak in December and a rapid fall after mid-January. Prices are on a downward tendency with a 16% fall in the recent past. This trend is however less sharp than for the average prices of tropical fruits, let alone the Cayenne pineapple's prices.

### ***Prospects:***

The Queen pineapple remains a niche and mass-consumption has yet to take-off. There are several impediments to large-scale exports. First, this cultivar is extremely fragile, which implies air-transportation. As a result volumes are bound to remain limited and prices to be high. Further, there is a lack of quality policies in the exporting countries; organization needs to be enhanced among exporters.

Nevertheless, the excellent taste of the Queen pineapple, its convenient size and its attractive color should earn it a strong development in the near future. It is most likely that major Cayenne pineapple exporters such as Côte d'Ivoire will sooner or later turn to this profitable market segment. Imports will then soar and market prices will decrease

## **7. LIMES**

Although lime belongs in the citrus category, it is usually considered as a tropical fruit and will therefore be briefly dealt with in this survey.

### **7.1 THE EU MARKET**

EU imports of limes amounted to 11,529 T in 1996, an 80% increase since 1991. The strongest import rises have occurred in Belgium (+477%), the Netherlands (+221%) and Germany (+143%). The main importers are France, the UK, the Netherlands and Germany (Table 18). Intra-EU imports account for between 3,000 and 4,000 T as Spain is a significant exporter. Total EU imports (including intra-EU trade) amounted to \$29 million in 1996. The most imported varieties are seedless varieties producing big and juicy fruits ('Tahiti', 'Bears').

Table 18: Main EU importers of limes (T) 1996 (extra-EU imports)

France	UK	Netherlands	Belgium	Germany
4,145	2,455	2,405	1,413	853

(Source: Eurostat)

The leading supplier is Mexico (61% of imports), followed at a distance by Brazil (14%) and Venezuela (12%) (Table 19). Exports from Mexico and Venezuela have risen since 1991 while Brazilian supplies have decreased.

## The EU and French Markets for Tropical Fruits

**Table 19: Main non-EU suppliers of limes 1996**

Country	Mexico	Brazil	Venezuela	El Salvador	USA
Volume (T)	6,992	1,599	1,361	377	260

(Source: Eurostat)

### 7.2 THE FRENCH MARKET FOR LIMES

France is the leading European market for limes and represented 36% of EU imports in 1996. France's imports have risen less rapidly than the European average since 1991: imports have risen by only 21% from 3,418 T. France re-exports limes to other European countries, notably to Italy. The average volume of exports is about 250 T a year.

France's primary supplier is Mexico, far ahead of Brazil and Venezuela (Table 20). Spain, the Netherlands and Belgium annually supply between 20 and 200 T each.

**Table 20: Main limes suppliers to France 1996**

Country	Mexico	Brazil	Venezuela	Netherlands	Belgium
Volume (T)	3,287	364	326	377	260

(Source: COLEACP)

## 8. CARAMBOLAS, PASSION FRUITS AND PITAHAYAS

### 8.1 THE EU MARKET

Due to the limited quantities traded, reliable statistical data lacks as regards the trade in these tropical fruits. Care should be taken when considering the figures indicated below which were obtained from Eurostat and the French customs offices.

In 1995, the EU imported approximately 4,000 T of carambolas, passion fruits and pitahayas. Carambolas are mainly sourced from Asia and accounted for about 2,300 T in 1995. Malaysia is prominent (2,279 T), far ahead of Indonesia (14 T) and Thailand (5 T).

Passion fruits imports amounted to approximately 1,500 T in 1995. There are two types of passion fruits: yellow and purple. Yellow passion fruits are mainly sourced from Colombia. Their supply is low (about 200 T in 1995) and the prices are much higher than for purple passion fruits. Purple fruits are imported from Zimbabwe (560 T), Kenya (510 T), Burundi (130 T) and South Africa (20 T). South African fruits sell at higher prices than East African fruits.

The main EU importers are the Netherlands, the UK, Belgium and France. While the UK and Belgium only import purple fruits, France and the Netherlands import both varieties. Kenya and Zimbabwe supply all four countries.

## The EU and French Markets for Tropical Fruits

Pitahayas are imported in very low volumes (below 100 T in 1995) from Colombia and Vietnam.

### 8.2 THE FRENCH MARKET

In 1996, according to French custom offices, France imported 853 T of Carambolas, Passion fruits and Pitahayas, valued at \$2.2 million. It was a 46% increase since the previous year. Carambolas were imported primarily from Malaysia (286 T), while purple passion fruits were sourced from Kenya (143 T), Zimbabwe (117 T) and South Africa. Colombia supplied minor quantities of yellow passion fruits. Vietnam delivered less than 20 T of pitahayas.

## The EU and French Markets for Tropical Fruits

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**COMMITTEE ON COMMODITY PROBLEMS**

**SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**TROPICAL FRUITS NETWORK: THE MALAYSIAN PROPOSAL**

## PROPOSAL FOR THE FORMATION OF THE TROPICAL FRUITS

### NETWORK

#### A. Background

The FAO International Consultation on Tropical Fruits was held in Kuala Lumpur, Malaysia from the 15-19 July 1996. The Consultation was attended by delegates from 22 countries and observers from three international organisations. The producing exporting countries that attended the Consultation were Brazil, Chile, Colombia, Egypt, Honduras, India, Islamic Republic of Iran, Kenya, Pakistan, Peru, Philippines, Thailand, Uganda, Vietnam, Zimbabwe and the host country, Malaysia. The consumer countries that attended comprise Canada, France, Germany, Greece, Japan and the United Arab Emirates. The three international organisations which sent their observers to this consultation include the International Trade Centre UNCTAD/WTO, the Association of Food Marketing Agencies in Asia and the Pacific (AFMA) and the European Union of the Fruit and Vegetable Wholesale, Import and Export Trade (EUCOFEL).

The Consultation was held as the result of the suggestion put forward by the "Informal Group on Tropical Fruits" that comprised of

Cameroon, Chile, Egypt, India, Sudan, Uganda and Malaysia (as chairman), to the 60th Session of the Committee on Commodity Problems (CCP) of FAO and endorsed by the FAO Council.

The objective of this Consultation is to study and examine the problems faced by producing exporting countries particularly the marketing aspect at the international level. Two main issues were deliberated at the forum. The first being economic and trade issues which centred on the current situation of the tropical fruits industry, future prospects for fresh and processed tropical fruits, tariff, phytosanitary and quarantine measures. The second issue emphasised on the nutritional importance of tropical fruits in providing important and necessary dietary intakes, including vitamins, nutrients, micronutrients and fibre, which are essential for improving human health and welfare.

A number of resolutions were adopted by the Consultation. One of the most important resolution was the creation of a "Tropical Fruits Network", to be possibly known as TFNET. The Consultation unanimously agreed that Malaysia shall be the prime mover towards its formation.

Similar sentiment on importance of the fruits industry, in particular the tropical fruits was also echoed by another conference, the "International Conference on Tropical Fruits" that was held in Kuala Lumpur from 23-26 July 1996.

**B. Rationale**

- i) Acts as an "action plan" that is the direct consequence of the resolution passed at the FAO Consultation on tropical fruits as well as the International Conference on Tropical Fruits held in Kuala Lumpur in July 1996.
- ii) A new and independent Network that is constantly striving to overcome problems face by the tropical fruit industry including matters related to trade barriers.
- iii) The conservation of biodiversity especially of rare and under exploited fruit species that are endangered by development.
- iv) To play an integral part in increasing the income of farmers and the contribution of tropical fruits as an entity to the World

Food Security through availability and affordability.

- v) To create awareness, to promote and to increase the consumption of tropical fruits as one of the main ingredient of a balanced nutrition.
- vi) To handle matters relating to systematic collection of data, analysis and dissemination of information on various aspects of tropical fruits industry, such as production, marketing, consumption and utilization.
- vii) To provide linkage to all member countries, in the field of tropical fruits research and development related to production, post harvest and marketing of tropical fruits.
- viii) To further develop and disseminate technologies in production, post harvest handling, processing, product development and distribution.

### C. Objectives

The objectives of TFNET are:

- i) To encourage, coordinate and support research and development on sustainable tropical fruits production.
- ii) To upgrade human resource development in fields of production, postharvest and marketing for researchers and extension workers in the member countries.
- iii) To monitor the impact of production and trade policies such as those related to the Uruguay Round Agreement including the Agreement on Application of Sanitary and Phytosanitary measures and inform governments of the developments.
- iv) To systematically collect data, to analyze and to disseminate all information to member countries concerning production, marketing and consumption of tropical fruits.

### D. Terms of Reference

- i) To function as an independent network under the auspices of the FAO and report its activities to the proposed Inter

Governmental Group on Tropical Fruits (IGG on Tropical Fruits).

- ii) To encourage the development of tropical fruits industry that are of importance to the member countries.
- iii) To encourage collaboration between producing and consuming countries for the purpose of optimising production and marketing efficiency.

E. Governance

- i) The Network should be governed by a Board of Trustees which shall be made up of a specified number of members that shall be decided by consensus upon the formation of this Network by the member countries.
- ii) The post of Chairman of the Board of Trustees should be rotated among the member countries for a specified term to be decided upon the formation of the Network.

- iii) The composition of the Board of Trustees should consist of members from producing countries, importing countries and the scientific community.
  
- iv) The Board of Trustees should have three *ex-officio*. One shall be the Director of the Network who must be from a member country whereas the second *ex-officio* must be a representative of the host country while the third shall be a representative from FAO.
  
- v) The Board of Trustees shall meet on an annual basis or more frequently based on the resolutions adopted by the member countries upon the formation of the Network or as the Board of Trustees feels necessary.
  
- vi) The role of the Board of Trustees in the governance of the Network are to advice and guide the Directorate on management of the Network.

F. Location of Network

Directorate for the proposed Network shall be based in Malaysia as an acknowledgement and appreciation of the country being the prime mover in the formation of the Network and the willingness of Malaysia to be the host.

G. Membership

The Network is open to all member countries and Associate Member of the FAO that are substantially interested in the production or consumption of, and trade in, tropical fruit and tropical products and to any international organisations that can contribute positively to the aspiration of this Network .

H. Activities

The activities of the Network shall be:

- i) To strengthen data collection, analyze, standardize documentation and improve dissemination of information on tropical fruits in accordance with the decisions of the IGG on Tropical Fruits.

- ii) To analyze and improve the understanding of the tropical fruit markets so as to enable effective planning and development of the industry.
- iii) To monitor the impact of production and trade policies such as those related to the Uruguay Round Agreement including the Agreement on the Application of Sanitary and Phytosanitary measures (especially those related to compliance with SPS requirements of importing countries) and inform member countries of the developments.
- iv) To promote research and development of critical technologies of eco-regional importance in production, post-harvest handling including downstream processing for industrial use.
- v) To improve transfer of appropriate modern technologies in production and marketing to increase sector productivity.
- vi) To promote conservation of biodiversity of rare and under exploited tropical fruits.

- vii) To upgrade human resource development in the tropical fruits sector.
  
- viii) To establish and strengthen linkages between tropical fruit - producing and consuming countries.
  
- ix) To encourage financing agencies including the World Bank and regional banks to render high priority to financing of tropical fruits investments.

I. **Funding**

The Network shall be funded by the:

- i) Member countries.
- ii) Donor countries
- iii) International Institutions/Organisations.

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**COMMITTEE ON COMMODITY PROBLEMS**

**SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**TROPICAL FRUITS NETWORK: THE PHILIPPINE PROPOSAL**

## Concept Proposal

# PHILIPPINE ROLE IN TROPICAL FRUIT NETWORK

## Introduction

The Philippines (4°N-21°N) is one of the major fruit producers and exporters among tropical countries. With a hectareage to fruit of 810,000 hectares and production of 8.65 Million MT/yr., these correspond to 6.4 and 13.3% of agricultural crops, respectively. These fruits are worth P36.87 B/yr. and about 20% of the total value of agricultural crops annually. The growth rates (1991-1995) in hectareage, production volume and value of production are 1.2, 2.0 and 5.1%, respectively. Growth rates in productivity (MT/ha) range from -1.93 in mangosteen, 2% in papaya and 3.2 in mango.

The major commercial fruit species in the country are banana, mango, pineapple, papaya, citrus and durian. A good amount of the productions in banana, mango and pineapple are now exported to the United States, Japan, Hongkong, Canada, Australia, New Zealand, South Korea and Taiwan.

## Development Programs in Fruits

The Philippines, through its Departments of Agriculture (DA), Local Government Units (LGU), Science and Technology (DOST), Trade and Industry and the State Colleges and Universities (SCU), is aggressively pursuing the development of the fruit industry.

The Key Commercial Crops Development Program and the High-Value Crops/*Gintong Ani* Program of the DA are heavily focused on the fruit crops in practically all the provinces. The Department of Science and Technology, through its Council on Agriculture Resource Research and Development (PCARRD) has launched five major integrated programs on the fruits, using about 50% of the fund allocations for agricultural research. Most of the agriculturists of provincial and municipal government units are involved in fruit extension and development. Practically all of the more than 120 State Colleges and Universities are also in fruit research, extension and development. The Department of Trade and Industry is engaged in the export promotion of the commodities.

## Productivity Levels in Major Fruits

The levels of technologicis available in fruit production, postharvest handling, and processing are relatively high. These, however, are not fully reflected on the efficiencies of the above systems because of the general weakness in technology transfer and adoption and the presence of serious technology gaps.

Because of the above, current production levels of major fruit species in the country are still low. As of 1995, the yields (MT) per hectare are about 9.75 for banana, 20.0 for pineapple, 6.1 for mango, 18.3 for papaya, and 43.3 for durian. In many of these crops, the yield can easily be 3-4 times higher as in more progressive farms in the country. If improved, these will significantly increase farm incomes locally and consumption in both local and international markets.

## Concepts and Proposals

### 1. Organization of Tropical Fruit Network

The Tropical Fruit Network shall be organized such that it will have a global and the needed numbers of regional and national components.

Global Network - A Global Network based in one of the four participating regions (Asia, Africa, America, Europe) needs to be established. This Network, whose specific functions/roles shall be defined by its Executive Board in consultation with Regional Network Leaders and public agencies (ministries/department) of participating countries, shall serve as the International Coordinating Body.

Regional Networks - A Regional Network shall be established in each of the participating regions to coordinate activities within each region. An office of reasonable size (for one Regional Director and four fruit experts from the region to be appointed by the Network, and all administrative staff required to be provided by the host country) shall be established on the account on the host country.

*The Philippines offers to host the Regional Network for Asia to be based at the Bureau of Plant Industry/DA in Los Baños, Laguna - the center of agricultural research and development in the country.*

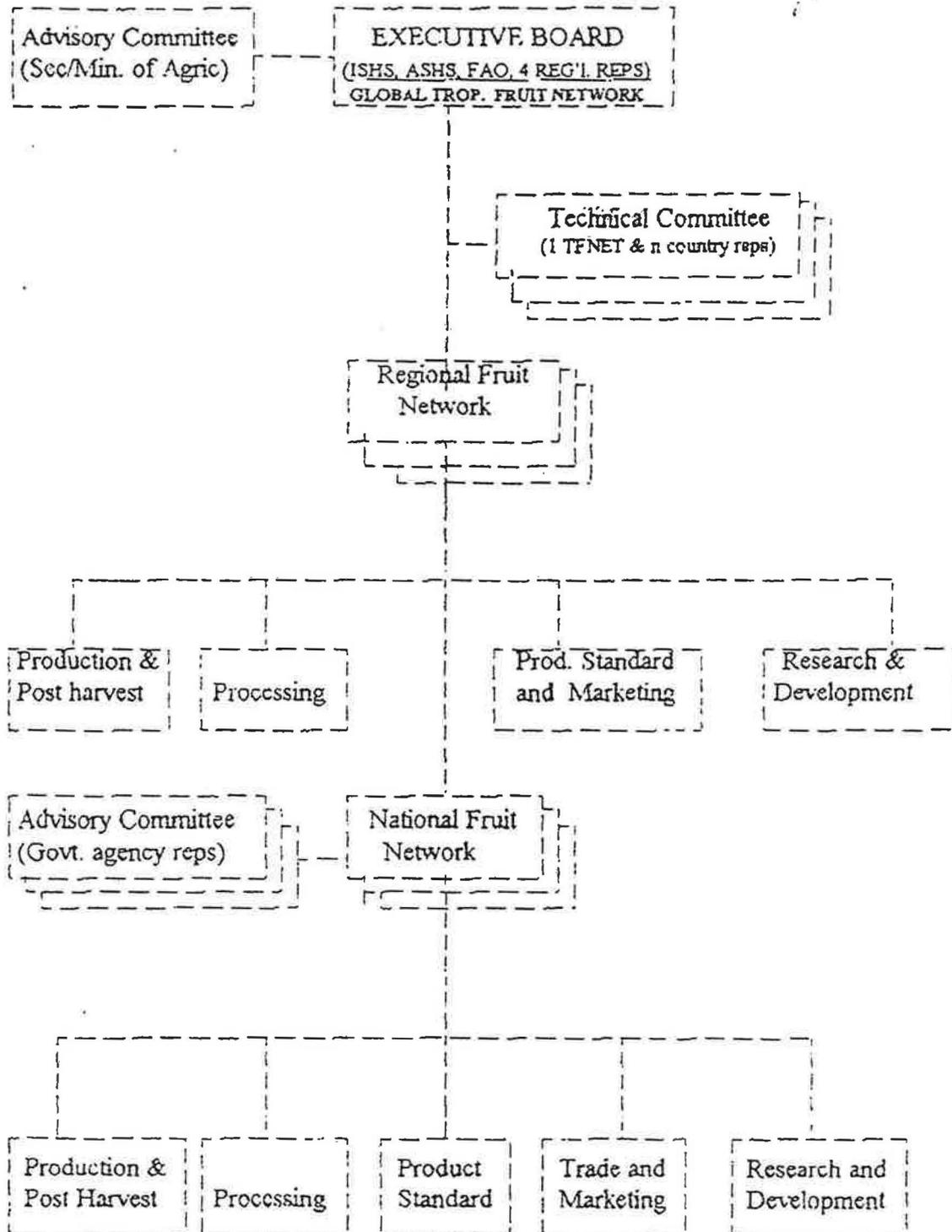
National Network - A National Fruit Network shall be established to coordinate activities within the country. It shall be managed by a National Fruit Expert as the coordinator (to be appointed by the Network) and assisted by at least five local professional staff to be provided by the host institution in the country. The office for the National Network shall also be provided by the host country/institution.

*The Philippines proposes to have the National Network for the country to be hosted by the Crops Research Division of PCARRD/DOST at Los Baños, Laguna.*

Each of the above Networks shall have its own Executive Officer/Director and staff as indicated. All the officers to be appointed in the Network must be well-known experts/specialists on fruits in their respective disciplines, with demonstrated successes in Project Management.

Organizational Chart:

TROPICAL FRUIT NETWORK



A Regional Technical Committee shall be organized for each Regional Network. It will consist of one representative from the Global Network and one from each of the National Networks in the specific region. This will review and monitor the programs of the Regional Network.

2. Tenure of Officers - Appointed officials of the Global, Regional, and National Networks shall be for a period of two years, with one possible re-appointment.

3. Meetings of TFNET

At least one national, regional and global meeting of the Network will be held annually, where National Network leaders attend Regional Meetings and Regional Network Leaders attend Global Meetings. National Network leaders may also attend Global Meetings every two years.

Global and Regional Meetings shall be held in different regions and countries, respectively, to afford higher bodies and officials assess actual situations and program impacts of the Network in participating countries and regions.

4. Research and Development

The Philippines, through the Bureau of Plant Industry and Agricultural Research of the Department of Agriculture, the Phil. Council for Agricultural and Resources Research and Development (PCARRD) of the Dept. Of Science and Technology, the local government units and the State Colleges and Universities, and in addition to current R & D activities, proposes to conduct the following critical research and development programs with the Network:

1. Intensified technology promotion and adoption
2. Transgenic breeding to improve disease resistance and fruit shelf-life
3. Collection, conservation and evaluation of fruit germplasm
4. Fruit fly and seed-weevil management
5. IPM in major fruit crops
6. Development, monitoring and implementation of fruit standards
7. Domestic and International marketing of major tropical fruits

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

#### First Session

Pattaya, Thailand, 25-28 May 1998

### TROPICAL FRUITS NETWORK: THE THAI PROPOSAL

**A Proposed Framework for the  
International Tropical Fruit Network (TFNET)  
Submitted by the Government of Thailand to  
The Food and Agriculture Organization of the United Nations**

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**A. Background Information**

An International Consultation on Tropical Fruits was organized by the U.N. Food and Agriculture Organization (FAO) in Kuala Lumpur, Malaysia on 15 - 19 July 1996 at the suggestion of the Informal Group on Tropical Fruits. The main objective of this Consultation was to examine problems faced by producing and exporting countries, particularly marketing aspect at the international level. One of the most important resolutions adopted by the Consultation was the establishment of an International Tropical Fruit Network (TFNET)\*.

Situated in tropical Southeast Asia with suitable climatic condition for tropical fruit production as well as being already well known for the high quality of her tropical fruits and her production technology, Thailand is in the best position to host the Network. In addition, Thailand possesses several other features which lend support to the proposed TFNET. Among these are:

(1) The existence of a large variety of commercially produced tropical fruits, both indigenous and introduced. Many of these are now being exported, both in fresh state or after processing. In addition, Thailand has a large number of indigenous tropical fruit species many of which have great potential in germplasm enhancement. Many have been conserved in the field genebanks through the country which are available to *bonafide* users.

(2) In addition to tropical fruits, Thailand has the advantage of comprising regions which can accommodate sub-tropical fruit production such as longan, lychee, citrus, etc. In fact, many varieties of Thai sub-tropical fruits have gained international recognition because of their high quality.

(3) Thailand has excellent facilities in research and development of various disciplines such as in production, harvesting, post-harvest technology, storage,

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\* Although this acronym has been adopted by the Consultation on Tropical Fruits, the proposer would like to change it to ITFRUNET at a later date as it is easier to name it, and it also covers the international role the network is playing.

processing, and marketing. A new very large and fully functional central market for tropical fruit auction and marketing (also for other agricultural commodities) has recently been established.

(4) Farmer Groups for the Improvement of Tropical Fruit Quality for Export have been established with full support from the Government providing technical support. They will facilitate the flow of information to member countries of TFNET to satisfy the consumers' preference of products of very high quality standard.

(5) Thailand is geographically situated at the centre of international travel, particularly air transportation, as most airlines of the world route their flights through Bangkok. International links with other countries in the Region have also been established, eg. in the Tetra-partite Economic Group in the North, the Tri-partite Economic Group in the South, and in access to ports within and outside neighbouring countries. This is supplemented by the government's generous policy of non-discrimination against any race, religion, or nation.

(6) Thailand is a popular venue, i.a. chosen by the International Horticultural Society for its several international meetings such as the Third International Workshop on Temperate Zone Fruits in the Tropics and Sub-tropics in Chiang Mai, on 12-16 December 1988; Frontier in Tropical Fruit Research, Pattaya, on 20-24 May 1991; the Fifth International Sago Symposium, Hat Yai, on 27-29 January 1994; the First International Persimmon Symposium, Chiang Mai, on 17-19 July 1996. In addition, a few more have been planned in the near future, e.g. the Third International Pineapple Symposium, Pattaya, on 17-20 November 1998; and the Sixth International Mango Symposium, Pattaya, on 6-9 April 1999.

(7) Thailand possesses excellent training facilities for tropical fruits in various governmental agencies which have in the past organized a number of training/study tours for international participants.

(8) Thailand is the home of many international/national agencies whose role is related to tropical fruits. The FAO Regional Office for Asia and the Pacific has enjoyed its existence in Thailand for almost 45 years with excellent linkage with the host country and has initiated a number of projects on the development of tropical fruits in Thailand. The International Council for the Underutilized Crops (ICUC) with its affiliated network, the Underutilized Tropical Fruits Network (UFTANET) (both of which have just decided to move their headquarters to Thailand); the Tropical Fruit Centre (to be supported by JICA, and located at Chumphon Horticultural Research Centre); the Information Systems and Data

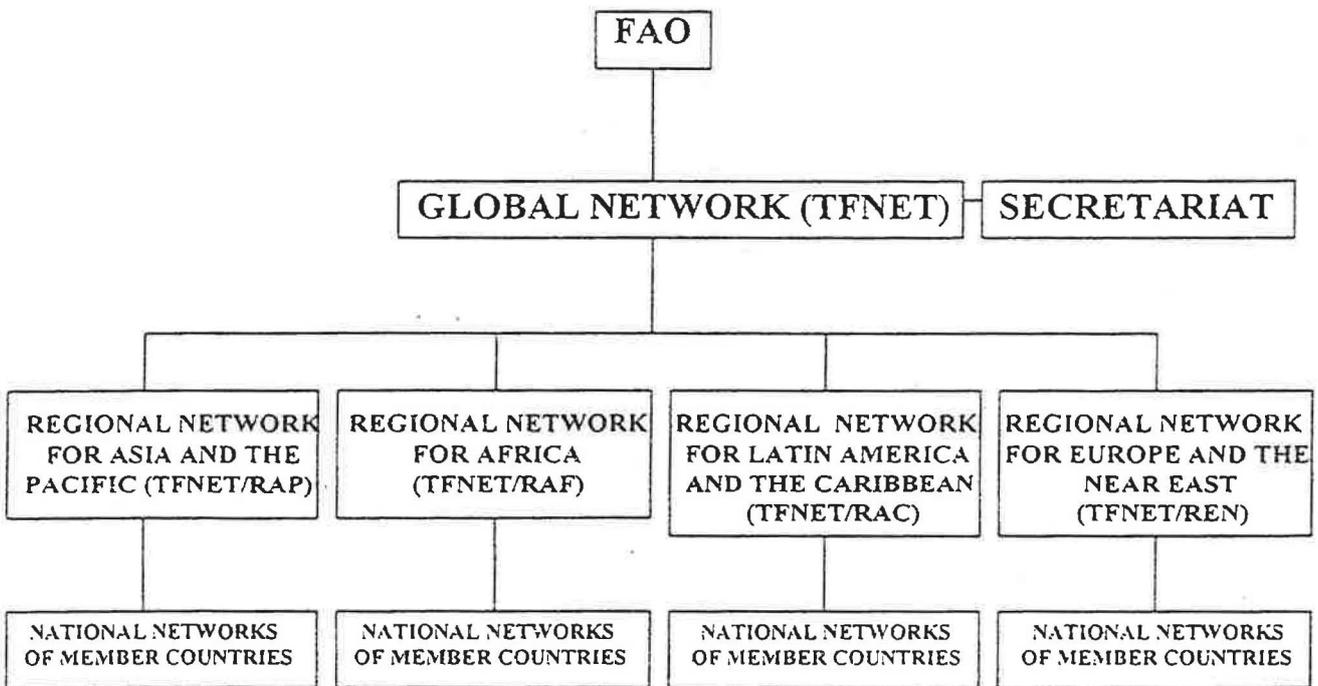
Collection (comprising Kasetsart University's NETTECH, the Department of Agriculture's NETWORK, and the Office of Agricultural Economics' Agricultural Statistics Network. All will be linked together in order to provide better service, including those through the internet, etc.

With all these favourable pre-conditions as well as the willingness of and full support from the Royal Thai Government in providing services to other member countries, the following proposal to establish TFNET in Thailand is submitted for FAO's consideration.

## B. Proposed Framework of TFNET

### 1. Structure of TFNET

The envisaged network will be structured on three levels, namely global, regional and national, as shown in the diagramme below:



### 2. Network Coordination:

The global network, TFNET, will coordinate the global activities directly through its four regional networks, namely the Regional Tropical Fruit Network for Asia and the Pacific (TFNET/RAP), the Regional Tropical Fruit Network for Africa (TFNET/RAF), the Regional Tropical Fruit Network for Latin America and the

Caribbean (TFNET/RAC), and the Regional Tropical Fruit Network for Europe and the Near East (TFNET/REN). Each of the four regional networks will in turn coordinate the national networks of the member countries.

### 3. Governance:

#### 3.1 The Global Network (TFNET):

TFNET will be an independent network under the auspices of the FAO. It will report on its activities to the Inter Sub-Governmental Group of Tropical Fruits, also under the auspices of the FAO.

TFNET will be governed by a Board of Trustees with a total of 12 members composing of two groups, namely: (a) The following six *ex-officio* members: (i) an FAO/HQ representative, (ii) the Regional Coordinators from the four Regional Networks, (iii) the Executive Director of TFNET who is recruited from the national of a member country of TFNET; and (b) Six distinguished scientists and/or administrators nominated from member countries and to be selected by members of the first group on the basis of their experience and performance; geographical distribution of the member countries will be taken into consideration by the selecting committee. The Chairman of the TFNET will be elected from members of the second group, the Vice-chairman from the Regional Coordinators who are members of the first group. The Executive Director of TFNET will serve as the Secretary of TFNET with no voting right.

The Board of Trustees will serve for a term of three years. Members from the first group, being *ex-officio* members, shall continue to serve as members of the Board of Trustees based on their current positions, while members from the second group will be rotated among member countries.

The Board of Trustees shall meet on an annual basis, normally at the Secretariat Office provided by the host country (Thailand), although it may meet at other locations if deemed desirable by the majority of the members during the preceding meeting.

The functions of the Board of Trustees in the governance of TFNET are: (i) to advice and guide the Secretariat on the management of TFNET, (ii) to evaluate the performance of the Executive Director on a three-year-term basis and to elect a new Executive Secretary to replace the old one, and (iii) to represent TFNET in seeking funding and/or technical support from funding agencies, international/regional organizations, etc.

**3.2 Regional Networks:** There shall be four regional networks as stated in Section 2 above. Each is coordinated by the Regional Coordinator who might preferably be the Regional Plant Production and Protection Officer of the respective FAO Regional Office, namely RAP in Bangkok, Thailand; RAF in Accra, Ghana; RAC in Santiago, Chili; and RNE in Cairo, Egypt. National Coordinators nominated by the member countries shall constitute the Regional Coordination Committee of the Regional Network. However, in view of the voluntary contribution of any particular member country to host the Regional Network in its respective country, the Country should specify the facilities and other supports to run the Regional Network it is prepared to give.

**3.3 National Networks:** Each member country of TFNET shall establish the National Coordination Committee consisting of representatives of governmental as well as non-governmental institutes/organizations responsible for research and development in production, post-harvest technology, processing, socio-economic aspect, credits, and trade and marketing of tropical fruits.

#### **4. Membership:**

Members of TFNET are of two types:

(1) *Ordinary Members:* These are any member countries of the FAO that are substantially interested in the production and export of tropical fruits and voluntarily apply to become an ordinary member of TFNET.

(2) *Associate Members:* These are any regional/international organizations, donor agencies, and NGO's able to contribute positively to the aspirations of TFNET who are invited to become associate members.

#### **5. Function of the Secretariat:**

The Secretariat is directed by the Executive Director of TFNET whose role is to manage all activities as instructed/guided by the Board of Trustees. A nominal number of secretariat staff will be recruited to assist the Executive Director. All initial facilities including office space of TFNET will be provided by the host country.

#### **6. Funding Arrangement:**

During the initial period of two years, the host country (Thailand) will bear all costs involved in the operation of TFNET. These include the space (at the

Horticultural Research Institute), all facilities, salary of the Executive Director and his secretariat staff, and operational costs. During the first two years of its existence, the Board of Trustees and particularly the Executive Secretary shall vigorously seek funding support from interested agencies, including FAO, who shall provide seed money to TFNET to start its activities and to support special-activity expenses such as in organizing conferences, training courses, study tours, regional yield trials, etc. Thereafter, part of the operation costs will be derived from fees obtained from the members whose contributions are as follow:

**6.1 Ordinary Members:** Fees to be charged from ordinary members vary according to their total acreage and export value of tropical fruits.

**6.1.1 Total Acreage:** Fees to be charged on the basis of total acreage are calculated from the number of hectares planted to major commercial tropical fruits in the member country. A fee of US\$ 1,000 per annum is charged per 100,000 ha of orchards; acreage in excess of 50,000 ha is to be charged for an additional US\$ 1,000. A minimum of US\$ 1,000 will be charged to any ordinary members irrespective of acreage less than 100,000 ha.

**6.1.2 Export Value:** Fees to be charged on the basis of export value is calculated from the income derived from total export of tropical fruits, both in the fresh and processed states, from any member countries. A fee of US\$ 1,000 per annum is charged per US\$ 100 million export value; income in excess of US\$ 50 million is to be charged for additional US\$ 1,000. A minimum of US\$ 1,000 per annum is to be charged to any ordinary member irrespective of export value less than US\$ 100 million.

**6.2 Associate Members:** In addition to technical supports, Associate Members are expected to contribute financially to TFNET for its sustainability, although there is no definite amount specified. A minimum of US\$ 1,000 per annum is, however, expected from these members.

Ordinary and Associate Members geographically belonging to a particular region (in Section 2) will automatically become members of their respective Regional Network. Half of the total annual fees collected will be retained by the Regional Network for use in regional activities such as in attending annual meetings, support of germplasm exchange, exchange of expertise's, etc., within the region. The other half will be transferred to the Global Network to support expenses of the global activities.

## **7. Objectives:**

*7.1 Overall objectives:* The overall objectives of TFNET are:

- to strengthen and develop the necessary infrastructure and coordinating activities for research and development into the production, post-harvest technology, processing and marketing of tropical fruits of the member countries, and
- to encourage the expansion of consumption of tropical fruits in the world.

*7.2 Immediate Objectives:* The immediate objectives of TFNET are:

- to encourage, coordinate and support research and development on sustainable tropical fruit production, post-harvest technology, and processing
- to upgrade human resources development in the fields of production, post-harvest technology, and marketing of tropical fruits for scientists, extensionists and farmers of the member countries
- to evaluate the impact of production and trade policies such as those of the GATT, AFTA, NAFTA, etc. including various other agreements related to tropical fruit production, post-harvest technology, processing and marketing
- to systematically collect, compile, analyze data on production, processing, consumption, and export of tropical fruits on the world-wide basis, and
- to disseminate information related to the above to member countries in the form of publications, training, study tour, meetings, and homepage internet, etc.

## **8. Activities:**

The following activities will be undertaken:

*8.1 Publications:* As a means of information exchange, the following publications will be prepared, published and distributed to the member countries on the world-wide as well as region-wise bases.

*8.1.1 Newsletter:* A newsletter of TFNET, to be named TFNET NEWS, will be published on a quarterly basis. It will be freely and widely circulated to all member countries of the Network as well as other agencies interested in the activities of TFNET.

*8.1.2 Technical Bulletins:* Occasional technical bulletins on specific subjects related to production, post-harvest technology, processing, socio-economic aspects, and marketing of tropical fruits will be published.

*8.1.3 Reports and Proceedings:* Both the report and the proceedings of every technical meeting organized by TFNET will be published and circulated widely.

*8.1.4 Annual Reports:* The Executive Director will be responsible for the preparation and publication of the Annual Report of TFNET.

*8.2 Training:* Short- and medium-term training courses will be organized by TFNET either through its Regional Network or directly by the Global Network. On-the-job training will also be organized at a centre of excellence within the region.

*8.3 Study Tours:* In order to gain experience from other countries within or outside the region, study tours will be organized to visit successful production orchards, post-harvest technology laboratories, processing factories, packing houses, central markets, auction facilities, etc. within and outside the region.

*8.4 Germplasm Exchange:* TFNET will facilitate exchange of germplasm, including promising varieties of tropical fruits, both within and outside the region, in order to help the member countries to obtain higher quality and yield of tropical fruits.

*8.5 Databases:* The Secretariat will set up a database for tropical fruits at the global as well as the regional levels. They are to be released through internet homepage and other printed documents.

*8.6 Publicity:* In order to encourage the expansion of the consumption of tropical fruits in the world, brochures, leaflets, posters, etc. will be prepared and distributed widely.

March 1998



منظمة الإغذية  
والزراعة  
للأمم المتحدة

联合国  
粮食及  
农业组织

Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

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**COMMITTEE ON COMMODITY PROBLEMS**

**SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**STATISTICS QUESTIONNAIRE**

August 1997/août 1997/agosto de 1997



منظمة الأغذية  
والزراعة  
للامم المتحدة

联合国  
粮食及  
农业组织

Food  
and  
Agriculture  
Organization  
of  
the  
United  
Nations

Organisation  
des  
Nations  
Unies  
pour  
l'alimentation  
et  
l'agriculture

Organización  
de las  
Naciones  
Unidas  
para la  
Agricultura  
y la  
Alimentación

SUB-GROUP ON TROPICAL FRUITS  
SOUS-GROUPE SUR LES FRUITS TROPICAUX  
SUBGRUPO SOBRE LAS FRUTAS TROPICALES

STATISTICS QUESTIONNAIRE  
QUESTIONNAIRE CONCERNANT LES STATISTIQUES  
CUESTIONARIO DE ESTADÍSTICAS

COUNTRY/PAYS/PAIS: \_\_\_\_\_

Area/Superficie/Superficie	: Hectares/en hectares/hectáreas
Quantity of exports or imports	: Net weight in metric tonnes
Volume des exportations ou des importations	: poids net en tonnes
Volumen de exportación o importación	: Peso neto en toneladas
Value of exports or imports	: F.o.b. or c.i.f. according to international definition
Valeur des exportations ou des importations	: prix f.o.b. ou c.a.f. (définition internationale)
Valor de las exportaciones o importaciones	: F.o.b. o c.i.f según la definición internacional

Attached please find our annual questionnaire on tropical fruits (fresh and processed). It would be greatly appreciated if replies could be sent to Rome early enough and not later than 15 October 1997. If no complete data are available, partial data - i.e. for only a number of months - or estimates for the full year will suffice.

Kaison Chang  
Senior Commodity Specialist  
Raw Materials, Tropical and Horticultural Products Service  
Commodities and Trade Division

Je vous prie de trouver ci-joint notre questionnaire annuel concernant les fruits tropicaux (frais et transformés). Nous vous serions très reconnaissants de nous faire parvenir vos réponses à Rome le plus rapidement et de toute façon d'ici le 15 octobre 1997. Si vous ne disposez pas de données officielles complètes, des renseignements partiels (portant sur quelques mois) ou des estimations officielles pour l'ensemble de l'année nous seraient quand même très utiles.

Kaison Chang  
Spécialiste principal des produits  
Service des matières premières et des produits tropicaux et horticoles  
Division des produits et du commerce international

Le adjunto nuestro cuestionario anual sobre el comercio de las frutas tropicales (productos frescos y elaborados). Mucho le agradeceré que envíe la respuesta a Roma con suficiente antelación, a más tardar el 15 de octubre 1997. Si no se dispone de datos oficiales completos, bastará enviar datos parciales -es decir, sólo de varios meses- o una estimación para el año completo.

Kaison Chang  
Especialista superior de productos básicos  
Servicio de Materias Primas, Producto Tropicales y Hortícolas  
Dirección de Productos Básicos y Comercio

PRODUCTION AND TRADE IN FRESH TROPICAL FRUITS  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX FRAIS  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES FRESCAS

CODE NUMBER (H.S.) NUMERO CODE (S.A.) CODIGO NUMERICO (S.A.)	PRODUCTION / PRODUCTION / PRODUCCION	EXPORTS / EXPORTATIONS / EXPORTACIONES	IMPORTS / IMPORTATIONS / IMPORTACIONES
	HA	MT	000 US\$
ex 08.04.30 PINEAPPLES / ANANAS / PIÑAS			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....
ex 08.04.40 AVOCADOS /AVOCATS /AGUACATES(PALTAS)			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....
ex 08.04.50 GUAVA / GOYAVE / GUAYABA			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....
ex 08.04.50 MANGOES / MANGUES / MANGOS			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....
ex 08.04.50 MANGOSTEEN / MANGOUSTAN / MANGOSTAN			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....
ex 08.05.30 LIMES / LIMES / LIMAS			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....
08.07.20 PAPAYAS / PAPAYES / PAPAYAS			
1994	.....	.....	.....
1995	.....	.....	.....
1996	.....	.....	.....
1997 *	.....	.....	.....

PRODUCTION AND TRADE IN FRESH TROPICAL FRUITS  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX FRAIS  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES FRESCAS

CODE NUMBER (H.S.) NUMERO CODE (S.A.) CODIGO NUMERICO (S.A.)	PRODUCTION / PRODUCTION / PRODUCCION		EXPORTS / EXPORTATIONS / EXPORTACIONES		IMPORTS / IMPORTATIONS / IMPORTACIONES	
	HA	MT	MT	000 US\$	MT	000 US\$
ex 08.10.90 STARFRUIT / CARAMBOLE / CARAMBOLA						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
ex 08.10.90 LONGAN / LONGAN / LONGAN						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
ex 08.10.90 RAMBUTAN / RAMBOUTAN / RAMBUTAN						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
ex 08.10.90 DURIAN / DURIAN / DURIAN						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
ex 08.10.90 LYCHEE / LITCHIS / LICHI						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
ex 08.10.90 PASSION FRUIT / GRENADILLE / MARACUYA						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
ex 08.10.90 OTHERS (specify) / AUTRES (à spécifier) / OTRAS (especificque)						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....

PRODUCTION AND TRADE IN PROCESSED TROPICAL FRUITS: PINEAPPLES AND LIMES  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX TRANSFORMES: ANANAS ET LIMES  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES ELABORADAS: PIÑAS Y LIMAS

CODE NUMBER (H.S.) NUMERO CODE (S.A.) CODIGO NUMERICO (S.A.)	PRODUCTION / PRODUCTION / PRODUCCION CR (%) 1/	MT	EXPORTS / EXPORTATIONS / EXPORTACIONES MT	000 US\$	IMPORTS / IMPORTATIONS / IMPORTACIONES MT	000 US\$
<b>ex 08.04.30</b>	<b>PINEAPPLES, DRIED / ANANAS, SECS / PIÑA DESHIDRATADA</b>					
	1994	.....	.....	.....	.....	.....
	1995	.....	.....	.....	.....	.....
	1996	.....	.....	.....	.....	.....
	1997 *	.....	.....	.....	.....	.....
<b>ex 20.07.10</b>	<b>PINEAPPLE JAM / CONFITURE D'ANANAS / MERMELADA DE PIÑA</b>					
	1994	.....	.....	.....	.....	.....
	1995	.....	.....	.....	.....	.....
	1996	.....	.....	.....	.....	.....
	1997 *	.....	.....	.....	.....	.....
<b>20.08.20</b>	<b>PINEAPPLES, CANNED / ANANAS, EN BOITE / PIÑA ENLATADA</b>					
	1994	.....	.....	.....	.....	.....
	1995	.....	.....	.....	.....	.....
	1996	.....	.....	.....	.....	.....
	1997 *	.....	.....	.....	.....	.....
<b>20.09.40</b>	<b>PINEAPPLE JUICE / JUS D'ANANAS / ZUMO DE PIÑA</b>					
	1994	.....	.....	.....	.....	.....
	1995	.....	.....	.....	.....	.....
	1996	.....	.....	.....	.....	.....
	1997 *	.....	.....	.....	.....	.....
<b>ex 20.07.91</b>	<b>LIME JAMS / CONFITURES DE LIME / MERMELADA DE LIMA</b>					
	1994	.....	.....	.....	.....	.....
	1995	.....	.....	.....	.....	.....
	1996	.....	.....	.....	.....	.....
	1997 *	.....	.....	.....	.....	.....
<b>ex 20.09.30</b>	<b>LIME JUICE/ JUS DE LIME / ZUMO DE LIMA</b>					
	1994	.....	.....	.....	.....	.....
	1995	.....	.....	.....	.....	.....
	1996	.....	.....	.....	.....	.....
	1997 *	.....	.....	.....	.....	.....

1/ Conversion ratio from fresh to processed fruit / Taux de conversion de fruit frais en produit transformé / Razón de conversión de fruta fresca a elaborada

\* Forecast / Prévisions / Pronóstico

PRODUCTION AND TRADE IN PROCESSED TROPICAL FRUITS: DRIED FRUITS  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX TRANSFORMES: FRUITS SECHES  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES ELABORADAS: FRUTAS DESHIDRATADAS

CODE NUMBER (H.S.) NUMERO CODE (S.A.) CODIGO NUMERICO (S.A.)	PRODUCTION / PRODUCTION / PRODUCCION	EXPORTS / EXPORTATIONS / EXPORTACIONES			IMPORTS / IMPORTATIONS / IMPORTACIONES	
	CR (%) 1/	MT	MT	000 US\$	MT	000 US\$
<b>ex 08.04.40 AVOCADOS /AVOCATS /AGUACATES(PALTAS)</b>						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
<b>ex 08.04.50 GUAVA / GOYAVE / GUAYABA</b>						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
<b>ex 08.04.50 MANGOES / MANGUES / MANGOS</b>						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
<b>ex 08.04.50 MANGOSTEEN / MANGOUSTAN / MANGOSTAN</b>						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
<b>ex 08.13.40 OTHERS / AUTRES / OTROS:</b> _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
<b>ex 08.13.50 MIXTURES OF DRIED FRUITS / MELANGES DE FRUITS SECHES / MEZCLA DE FRUTAS DESHIDRATADAS</b>						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....

1/ Conversion ratio from fresh to processed fruit / Taux de conversion de fruit frais en produit transformé / Razón de conversión de fruta fresca a elaborada

\* Forecast / Prévisions / Pronóstico

PRODUCTION AND TRADE IN PROCESSED TROPICAL FRUITS: HOMOGENISED PREPARATIONS, JAMS, JELLIES, FRUIT PASTES, ETC.  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX TRANSFORMES: PREPARATIONS HOMOGENEISEES, CONFITURES, PUREES DE FRUITS, ETC.  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES ELABORADAS: PREPARACIONES HOMOGENIZADAS, MERMELADAS, JALEAS, PASTAS DE FRUTAS, ETC.

CODE NUMBER (H.S.) : 20.07.10, 20.07.99 NUMERO CODE (S.A.) : 20.07.10, 20.07.99 CODIGO NUMERICO (S.A.) : 20.07.10, 20.07.99	PRODUCTION / PRODUCTION / PRODUCCION CR (%) 1/	MT	EXPORTS / EXPORTATIONS / EXPORTACIONES MT	000 US\$	IMPORTS / IMPORTATIONS / IMPORTACIONES MT	000 US\$
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....

1/ Conversion ratio from fresh to processed fruit / Taux de conversion de fruit frais en produit transformé / Razón de conversión de fruta fresca a elaborada

2/ Specify / à spécifier / especificque

\* Forecast / Prévisions / Pronóstico

PRODUCTION AND TRADE IN PROCESSED TROPICAL FRUITS NOT ELSEWHERE SPECIFIED  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX TRANSFORMES PAS COMPRIS AILLEURS  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES ELABORADAS NO ESPECIFICADAS EN OTRA PARTE

CODE NUMBER (H.S.) : 20.08.92, 20.08.99 NUMERO CODE (S.A.) : 20.08.92, 20.08.99 CODIGO NUMERICO (S.A.) : 20.08.92, 20.08.99	PRODUCTION / PRODUCTION / PRODUCCION	EXPORTS / EXPORTATIONS / EXPORTACIONES			IMPORTS / IMPORTATIONS / IMPORTACIONES	
	CR (%) 1/	MT	MT	000 US\$	MT	000 US\$
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____						
1994	.....	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....	.....

1/ Conversion ratio from fresh to processed fruit / Taux de conversion de fruit frais en produit transformé / Razón de conversión de fruta fresca a elaborada

2/ Specify / à spécifier / específico

\* Forecast / Prévisions / Pronóstico

PRODUCTION AND TRADE IN PROCESSED TROPICAL FRUITS: JUICE OF OTHER FRUITS, MIXTURES OF JUICES  
 PRODUCTION ET COMMERCE DE FRUITS TROPICAUX TRANSFORMES: JUS DE TOUT AUTRE FRUIT, MELANGES DE JUS  
 PRODUCCION Y COMERCIO DE FRUTAS TROPICALES ELABORADAS: ZUMO DE OTRAS FRUTAS, MEZCLAS DE ZUMOS

CODE NUMBER (H.S.) : 20.09.80, 20.09.90 NUMERO CODE (S.A.) : 20.09.80, 20.09.90 CODIGO NUMERICO (S.A.) : 20.09.80, 20.09.90	PRODUCTION / PRODUCTION / PRODUCCION	EXPORTS / EXPORTATIONS / EXPORTACIONES	IMPORTS / IMPORTATIONS / IMPORTACIONES		
CR (%) 1/	MT	MT	000 US\$	MT	000 US\$
PRODUCT / PRODUIT / PRODUCTO: 2/ _____					
1994	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____					
1994	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____					
1994	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____					
1994	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____					
1994	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....
PRODUCT / PRODUIT / PRODUCTO: 2/ _____					
1994	.....	.....	.....	.....	.....
1995	.....	.....	.....	.....	.....
1996	.....	.....	.....	.....	.....
1997 *	.....	.....	.....	.....	.....

1/ Conversion ratio from fresh to processed fruit / Taux de conversion de fruit frais en produit transformé / Razón de conversión de fruta fresca a elaborada

2/ Specify / à spécifier / específico

\* Forecast / Prévisions / Pronóstico





FRESH FRUIT PRICES  
 PRIX DE FRUITS FRAIS  
 PRECIOS DE FRUTAS FRESCAS

Fruit / Fruit / Fruta 1/: \_\_\_\_\_

	Farmgate			F.o.b.			C.i.f.			Wholesale			Retail		
	Prix reçus par les agriculteurs			F.o.b.			C.a.f.			En gros			Au détail		
	Precios recibidos por los agricultores			F.o.b.			C.i.f.			Al por mayor			Al por menor		
Currency/unit	.....			.....			.....			.....			.....		
Monnaie/unité	.....			.....			.....			.....			.....		
Moneda/unidad	.....			.....			.....			.....			.....		
	1995	1996	1997	1995	1996	1997	1995	1996	1997	1995	1996	1997	1995	1996	1997
Jan. /Janv. /En.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Feb. /Févr. /Feb.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mar. /Mars / Mar.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Apr. /Avr. /Abr.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May /Mai/ Mayo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jun. /Juin /Junio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jul. /Juil. / Julio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aug. /Août / Ago.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sep. / Sept. / Sept.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. / Oct. / Oct.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. /Nov. /Nov.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dec. / Déc. /Dic.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average/Moyenne/Promedio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

1\_ Please use a separate sheet for each type of fruit / Utiliser une feuille séparée pour chaque type de fruit s.v.p. / Por favor use una página diferente para cada tipo de fruta

NOTES / NOTES / NOTAS:

PROCESSED FRUIT PRICES  
 PRIX DE FRUITS TRANSFORMES  
 PRECIOS DE FRUTAS ELABORADAS

Product/Produit/Producto 1/: \_\_\_\_\_

	Farmgate 2/ Prix reçus par les agriculteurs 2/ Precios recibidos por los agricultores 2/			F.o.b.			C.i.f. C.a.f. C.i.f.			Wholesale En gros Al por mayor			Retail Au détail Al por menor		
Currency/unit Monnaie/unité Moneda/unidad	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	1995	1996	1997	1995	1996	1997	1995	1996	1997	1995	1996	1997	1995	1996	1997
Jan. /Janv. /En.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Feb. /Févr. /Feb.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mar. /Mars / Mar.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Apr. /Avr. /Abr.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
May /Mai/ Mayo	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jun. /Juin /Junio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Jul. /Juil. / Julio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Aug. /Août / Ago.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Sep. / Sept. / Sept.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Oct. / Oct. / Oct.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Nov. /Nov. /Nov.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dec. / Déc. /Dic.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Average/Moyenne/Promedio	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

1\_ / Please use a separate sheet for each type of product (e.g. juices, canned fruit etc.) / Utiliser une feuille séparée pour chaque type de produit s.v.p. ( jus de fruit, fruit en boîte, etc.) /

Por favor use una página diferente para cada tipo de producto ( zumo de fruta, fruta enlatada etc.)

2 / Price of fresh fruit utilized for processing / Prix de fruit frais utilisée pour la transformation / Precio de frutas frescas utilizadas para la transformación

NOTES / NOTES / NOTAS:

May 1998

	<p>منظمة الأغذية والزراعة للأمم المتحدة</p>	<p>联合国 粮食及 农业组织</p>	<p>Food and Agriculture Organization of the United Nations</p>	<p>Organisation des Nations Unies pour l'alimentation et l'agriculture</p>	<p>Organización de las Naciones Unidas para la Agricultura y la Alimentación</p>
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**COMMITTEE ON COMMODITY PROBLEMS**

**SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**TARIFF AND NON-TARIFF BARRIERS ON TROPICAL FRUIT  
TRADE: REGULATIONS OF THE EUROPEAN UNION, JAPAN  
AND THE UNITED STATES <sup>1</sup>**

<sup>1</sup> This document was prepared by Ms Nanae Yabuki, Consultant, The World Bank, for the First Session of the Sub-Group on Tropical Fruits.

## INTRODUCTION

Over the past decade, fruits and fruit products have been one of the most dynamic components of international trade in agriculture. Between 1985 and 1996 world exports for fresh and dried fruits and nuts grew at an average annual rate of 8 percent, rising from US\$9.7 billion to US\$24.9 billion.<sup>1</sup> Many non-traditional tropical fruits are still insignificant in terms of value and volume. Nonetheless, this market is likely to continue to grow as transportation and communication improve in exporting countries and incomes rise in importing countries.

Tariffs on tropical fruits are generally low in major importing countries, partly because many tropical fruits are not grown there so that imports do not compete directly with domestic produce. However, like many other agricultural products, tropical fruits are often traded under complicated trade regimes. Most WTO signatories, except Japan, participate in various preferential agreements and treat trade partners differently. In some cases import regimes are highly complicated for political and historical reasons. One notable example is the EU's banana regime. Also, many countries impose non-tariff barriers such as strict quarantine requirements which effectively function as import restrictions. Japanese quarantine system is one obvious example. Although the Uruguay Round increased the transparency of the market by establishing some new policies such as tariffication and the sanitary and phytosanitary agreement. The impact of these measures on actual openness has been insignificant, however, for the reasons explained in this paper.

The objective of this paper is to clarify and examine the current tariff and non-tariff barriers to world trade of tropical fruit for the purpose of assisting the producing countries to take advantage of this growing market. To this end, the paper attempts to assess transparency of three major tropical fruit importers: the EU, Japan and the US.

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<sup>1</sup> Data from UN COMTRADE Data System

This paper starts with reviewing the impact of the Uruguay Round. It then examines tariff and non-tariff regulations and systems in the three markets. Finally, the paper summarizes major obstacles found in the three markets and raises issues for the next WTO round.

## **IMPACT OF THE URUGUAY ROUND**

The WTO/GATT is founded on four principles: (i) non-discrimination; (ii) reciprocity; (iii) market access commitments; and (iv) fair competition. Since establishment of the GATT, several rounds of negotiations have been taking place. The Uruguay Round was the most recently completed multilateral trade negotiation of the GATT/WTO, which came into force in 1995. One important achievement of the Uruguay Round is that it established rules in agricultural trade which had been less regulated than manufacturing sector because of political sensitivity and the technical complexity of regulating the sector (IATRC 1994).<sup>2</sup> Among the agreements provided for agriculture under the Uruguay Round, perhaps the two most significant for the world trade of tropical fruits has been the market access provisions (tariffication and tariff reduction) and the Agreement on Sanitary and Phytosanitary Measures (the SPS Agreement). The main elements of these provisions which have important implications on tropical fruit imports are summarized below.

### *Tariffication and Tariff Reduction*

All signatory countries agreed to provide “immediate and unconditional” most-favored-nation (MFN) treatment to other signatory countries with two exceptions. First, signatory countries are allowed to treat members of the customs union or free trade areas more favorably than other WTO signatory countries. Second, signatory countries are

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<sup>2</sup> During former rounds agriculture had been treated differently from manufacturing sector. For example, non-tariff quantitative restrictions, which were prohibited in manufacturing sector, were permitted in agriculture under certain circumstances. As a result, agricultural trade had been restricted by various non-tariff measures, such as variable levies, voluntary export restraints, and minimum import prices.

allowed to grant trade preferences to developing countries. As a result of these exceptions, a significant amount of tropical fruits are traded under different tariff rates.

With the exception of a few commodities, each signatory country agreed to convert all existing non-tariff barriers into tariffs based on the average level of protection during 1986-88 and not to introduce new non-tariff barriers on agricultural products. One major objective of tariffication is the increasing transparency of trade measures by replacing various non-tariff restrictions known as 'gray-area measures', such as variable levies and voluntary export restraints, with more straightforward tariff measures.

Also the Uruguay Round clearly spelled out reduction schedules of tariffs on agricultural commodities for all WTO member countries. The new bound tariffs as well as tariffs already bound earlier are to be reduced by 36 percent over the six-year implementation period that begin in 1995, on a simple average basis within a minimum rate of reduction of 15 percent for each tariff line. Developing countries committed themselves to reduction of 24 percent over a ten-year period with a minimum reduction of 5 percent per tariff line. Least developed countries were exempted from reduction commitments (Martin and Winters 1996).

Despite of these changes, actual openness has increased only slightly because initial tariffs were often set above the previously applied tariff equivalents. When calculating tariff equivalents, many countries selected base period price data which result in high initial tariffs compared to actual level of protection. This procedure of converting non-tariff barrier into high initial tariffs is known as "dirty tariffication".<sup>3</sup> Another reason that tariff bindings were often set above the previously applied tariff equivalents is the base period chosen by the Uruguay Round. The base period is 1986-88, a period of very low world prices and generally high rates of agricultural protection. Use of this period afforded a significant increase in protection relative to actual levels.

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<sup>3</sup> For many fruits and vegetables, tariff equivalents (initial tariffs) were about 50 percent of the base period external price (IATRC 1994).

Also, the simple average method of calculating tariff reductions allows countries to allocate reduction rates unequally among commodities. For example, countries can meet their commitment to reduce tariffs by 36 percent (24 percent for developing countries) by reducing tariffs on sensitive products by 15 percent (5 percent for developing countries), a minimum rate of reduction, and applying larger tariff cut on commodities with already low tariff rates and/or low import value.

### *The SPS Agreement*

The SPS Agreement entered into force with the establishment of the WTO on January 1995. Before Uruguay Round, rules for sanitary and phytosanitary measures are so unclear that these measures could be used as a disguised trade protection. The SPS Agreement aims to ensure that sanitary and phytosanitary standards are based on scientific evidence and not used as disguised trade protection measures. The SPS Committee was established to monitor implementation of the SPS Agreement. The Committee is open to all WTO member countries and meets at least twice a year. Representatives of international organizations, including Codex Alimentarius Commission (CODEX), Food and Agriculture Organization (FAO), World Health Organization (WHO), and International Standard Organization (ISO), attend the meetings as observers.

To ensure that sanitary and phytosanitary measures are not used as disguised trade barriers, the SPS Agreement requires that SPS measures be based on risk assessment, i.e., a technical assessment of the nature and magnitude of risk which involves an effort to quantify the specific level of risk posed by a substance or situation. Also, all WTO member governments are required to notify WTO of any changes in SPS measures, which may affect trade, before the implementation so that the information will be circulated to other member countries for comments. In addition, governments are required to set up a "inquiry point" to respond to requests for information on their SPS measures, including the procedures and decisions used in assessing the risk, upon request. These new

requirements are expected to increase transparency and reduce possible arbitrariness of SPS measures.

In the event of a trade dispute, the WTO entails formal consultations between the government involved. If they cannot reach a mutually acceptable bilateral solution, they can ask impartial panel of trade experts for recommendation. The panel seeks scientific expertise wherever possible. If the panel decided that the country is violating WTO principles, the panel recommend the country to change the measure or to negotiate some other form of compensation. If the country fails to take either of these actions, the complaining party will be authorized to retaliate through WTO process.<sup>4</sup>

The SPS Agreement promotes harmonization of SPS standards. The SPS Committee recognizes three organizations--CODEX, the International Office of Epizootic (OIE), and International Plant Protection Convention (IPPC) and member countries are encouraged to set their SPS standards based on the standards set by these organizations. While the Committee encourage the use of international standards, it recognizes the sovereign right of each member country to set its own SPS standard. It allows member countries to use stricter standards than the international standards if justified by scientific risk assessment.

Due to technical difficulty and resource limitations of developing countries, the SPS Agreements set longer time frame for these countries. Least developed countries are required to meet all the requirement under the SPS Agreement by 2000. Countries that need longer time periods may request for further delays.

#### *Impact on the World Trade of Tropical Fruit*

Bringing agriculture under WTO disciplines is one of the most significant achievements of the Uruguay Round. Tariffication of non-tariff measures and tariff

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<sup>4</sup> Information from USDA.

reductions are two concrete commitments. The Round also attempts to improve the transparency of sanitary and phytosanitary regulations. Nevertheless, impact of these achievements on trade of tropical fruit has been modest and issues remain.

Despite its clear reduction schedule, i.e., 36 percent for developed countries and 24 percent for developing countries over the six year implementation period, the impact of the tariff reduction on tropical fruit trade has been insignificant for several reasons. First, large share of tropical fruits imported to major markets are exported from developing countries or countries covered by preferential agreements. Because these countries fall under the exceptions of the MFN clause and have enjoyed low or no tariff rates, reduction of WTO rates does not directly affect these countries. In some countries, which are not a part of any customs union or free trade areas, reduction of the WTO rates has resulted in a reduction in the differential between general and preferential tariffs, i.e., between tariffs for developed and developing countries. Second, because of the simple average method of calculating reduction rates, many countries applied large reduction on small-volume/low-value imports. As a result, tariffs on large-volume/high-value imports, such as bananas and pineapples, have been kept high in some markets.

The SPS Agreement, which attempted to ensure that sanitary and phytosanitary regulations be based on scientific evidence, has represented only a guideline. Because the SPS Agreement allows all member countries to maintain their own national standards, and it does not specify any quantitative requirements, its effectiveness depends on individual countries. The Agreement, nevertheless increase the transparency of sanitary and phytosanitary measures because governments are now required to make public their phytosanitary requirements.

Another element of the Uruguay Round which is not currently a barrier to trade of tropical fruit but could potentially hinder freer trade is the Safeguard Clauses. The Safeguard Clauses allow, where non-tariff barriers were removed, imports to be limited in

the event of an import surge. The Clauses also allow for additional import duties to be charged if the world market price falls below its 1986-88 average (HVH EU 1994).<sup>5</sup>

## EUROPEAN UNION

The European Union is a single market with free movement of goods, services, labor and capital among its member states.<sup>6</sup> The EU has been achieving substantial regulatory harmonization. Despite mutual agreement among EU member countries, member countries still use different regulations including quality standards and testing methods for food safety. These differences could cause lengthy delays in sales when products move among member countries that use different national standards. The delay in sales of fresh products are often critical for exporters.

Most fruits and vegetables grown within the EU are subject to the Common Agricultural Policy (CAP). Selected tropical fruits are subject to the Common Organization of the Market in Fruits and Vegetables and the Common Organization of the Market in Processed Fruit and Vegetable Products. Bananas are subject to the Common Organization of the Market in Bananas (CMOB). The EU removed quantitative restrictions on imports of fresh fruit from other WTO member countries under the Single Market Program of 1992. Nevertheless the EU continues to apply various trade measures to agricultural imports, ranging from quality standards to price arrangements, and some of them have been criticized for their inconsistency with WTO principles. The banana regime is one obvious example. The EU grants preferential treatment to the imports from traditional Africa, Caribbean and Pacific (ACP) states, former colonies of European countries, through discriminatory tariff quotas. This regime limits imports of less expensive bananas from Latin America.

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<sup>5</sup> In nearly all cases where the EU has traditionally used variable levies or similar mechanisms, EU reserves the right to use the Special Safeguard Provision (IATRC 1994).

<sup>6</sup> The 15 members of the EU are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the UK.

Tropical fruits, most of which are not grown in the EU, are not subject to significant intervention arrangements such as minimum entry prices, maximum tariff equivalent and withdrawal compensation. Import licenses may be required but they do not represent a significant barrier to trade. Although tropical fruits are not currently covered, the Safeguard Clauses could allow the EU to limit imports when the EU market is "severely disrupted". The clause, which is rarely used, could trigger voluntary export restraints in export countries if exercised (HVH EU 1994).

### *Tariffs*

Imports to the EU are subject to the common customs tariff, i.e., tariff rates are uniform across member states. Once imported, goods are free to move among the member states and are not subject to further tariffs. Two types of tariff rates are set by the common customs tariff; autonomous and conventional rates. Separate conventional rates are set for the January to June and the July to December seasons. Autonomous duties are applied when they are lower than conventional duties (table 1).

Table 1: Conventional Tariff Schedule of the EU (as of Nov. 1997)

CN Codes	Description	autonomous (%)	conventional (%)	
			Jan.1-Jun.30	Jun.1-Dec.31
0803 00 11	Plantains (Fresh)	20	18	17.3
0803 00 19	Bananas (Fresh)	850 Ecu /1000kg/net	765 Ecu /1000kg/net *	737 Ecu /1000kg/net *
0803 00 90	Bananas, Plantains (Dried)	20	18.7	18
0804 10 00	Dates (Fresh or Dried)	12	9.8	9.1
0804 20 10	Figs (Fresh)	7	6.3	6.1
0804 20 90	Figs (Dried)	10	9	8.7
0804 30 00	Pineapples (Fresh or Dried)	9	7.4	6.9
0804 40 20	Avocados (Fresh or Dried) Jan.1-May 31	8	4	4
0804 40 90	Avocados (Fresh or Dried) Jun. 1-Nov. 30	12	6.6	6.1
0804 40 95	Avocados (Fresh or Dried) Dec.1-Dec. 31	8	4	4
0804 50 00	Guavas, Mangos, and Mangosteens	4	3	2
0807 11 00	Watermelons (Fresh)	11	9.9	9.5
0807 19 00	Melons (Fresh)	11	9.9	9.5
0807 20 00	Papaws (Papayas) (Fresh)	2	3	2
0810 50 10	Kiwi Fruit (Fresh) Jan.1 - May 14	11	9.9	9.5
0810 50 20	Kiwi Fruit (Fresh) May 15- Nov. 15	11	9.1	8.7
0810 50 30	Kiwi Fruit (Fresh) Nov. 16 - Dec. 31	11	9.9	9.5
0810 90 30	Tamarinds, Cashew Apples, Lychees, Jackfruit, Sapodillo Plums (Fresh)	7.5	5.5	3.7
0810 90 40	Passion Fruit, Calambola, Pitahaya (Fresh)	11	5.5	3.7
0811 90 11	Tropical Fruit** uncooked or cooked by steaming or boiling in water, frozen, w/ sugar content exceeding 13 % by weight	26+10.5 Ecu /100kg/net	19.5+7.9 Ecu /100kg/net	17.3+7 Ecu /100kg/net
0811 90 11	Tropical Fruit** uncooked or cooked by steaming or boiling in water, frozen, not w/ sugar content exceeding 13 % by weight	26	19.5	17.3
0812 90 30	Papaws (Papayas), provisionally preserved but unstable in that state for immediate consumption	3	3.9	3.4
0812 90 70	Guavas, mangoes, Mangosteens, Tamarinds, Cashew Apples, Lychees, Jackfruit, Sapodillo Plums, Passion Fruit, Carambola, Pitahaya provisionally preserved but unstable in that state for immediate consumption	11	8.3	7.3
0813 40 50	Papaws (Papayas) (Dried)	2	3	2.7
0813 40 60	Tamarinds (Dried)	Free	3	2
0813 40 70	Cashew Apples, Lychees, Jackfruit, Sapodillo Plums, Passion Fruit, Carambola, Pitahaya (Dried)	8	3	2
0813 50 12	Mixtures of Papaws (Papayas), Tamarinds, Cashew Apples, Lychees, Jackfruit, Sapodillo Plums, Passion Fruit, Carambola, Pitahaya	9	6	5.3

Notes: \* Tariff Quotas: 2 200 000t 75 Ecu/1000 kg/net  
\*\* "Tropical Fruits" include Guavas, Mangoes, Mangosteens, Pawpaws (Papayas), Tamarinds, Cashew Apples, Lychees, Jackfruit, Sapodillo Plums, Passion Fruit, Carambola, and Pitahaya  
Source: Official Journal of the European Communities L312

Various preferential agreements make EU's tariff structure highly complex. Most developing countries are entitled one or more preferential rates under three trade arrangements: Africa Caribbean and Pacific (ACP), Generalized System of Preferences (GSP), and Least Developed Developing Countries (LLDC). When a country is eligible for several arrangements that offer the same tariff rates, it may choose an arrangement. In such a case, countries often choose the ACP arrangement because its procedure is generally simpler than the others.<sup>7</sup>

In addition to the preferential rates for developing countries, the EU grants various preferential tariff rates to countries and groups of countries under various trade programs. Countries and groups of countries that are eligible for EU's preferential tariffs are: Andorra; Bosnia-Herzegovina, Croatia and the Former Yugoslav Republic of Macedonia; Bulgaria, Ceuta and Melilla, Cyprus, Czech and Slovak Republics; Hungary and Poland; EFTA countries (EEA and Switzerland); Estonia; European Economic Area (EEA) (Iceland Liechtenstein, Norway); Faeroes; Israel; Latvia; Lithuania; Maghreb countries (Algeria, Morocco, Tunisia); Malta; Mashreq countries (Egypt, Jordan, Lebanon, Syria); West Bank of the River Jordan and the Gaza Strip; Romania; San Marino; Slovenia; Turkey. Of these, agreements with the Mediterranean countries have the most significant impact on trade in tropical fruit.

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<sup>7</sup> Generally the exporting country's customs and excise department is responsible for handling ACP exports whereas the relevant ministry is responsible for LLDC and GSP exports.

Table 2: Preferential Rates on Selected Tropical Fruits of the EU (as of Aug. 1997)

CN Codes	Description	GSP	EFTA,EE,LT, LV,PHC,BG,RO	AD,SM,TR	CY,FO,IL,LOMAB, MCH,MGB,MT,BCM, SI,XC,XI,YF
0804 30 0	Pineapples (Fresh or Dried)	CL,MX,TH:6.8; SPGA,SPGE: 0; SPGL:6.2 (excl CL, MX, TH)		0	LOMAB:0
0804 40 2	Avocados (Fresh or Dried) Jan.1-May 31	CL,MX,TH:2.7; SPGA,SPGE: 0; SPGL:1.4 (excl CL, MX, TH)		0	CY,LOMAB,MA:0; DZ:0.8; IL:0
0804 40 9	Avocados (Fresh or Dried) Jun. 1-Nov. 30	CL,MX,TH:5.6; SPGA,SPGE: 0; SPGL:4.6 (excl CL, MX, TH)		0	CY,LOMAB,MA:0; DZ:1.3; IL:0
0804 40 9	Avocados (Fresh or Dried) Dec.1-Dec. 31	CL,MX,TH:2.7; SPGA,SPGE: 0; SPGL:1.4 (excl CL, MX, TH)		0	CY,LOMAB,MA:0; DZ:0.8; IL:0
0804 50 0	Guavas, Mangos	CL,MX,TH:1.5; SPGA,SPGE: 0; SPGL:0 (excl CL, MX, TH)		0	EG,IL,LOMAB:0; JO,LB:1.8
0804 50 0	Mangosteens	CL,MX,TH:1.5; SPGA,SPGE: 0; SPGL:0 (excl CL, MX, TH)		0	CY,EG,IL,LOMAB:0; JO,LB:1.8
0807 20 0	Papaws (Papayas) (Fresh)	CL,MX,TH:1; SPGA,SPGE: 0; SPGL:0 (excl CL, MX, TH)		0	LOMAB:0
0807 11 0	Watermelons (Fresh)				
	Jan. 1-Mar. 31	CL,MX,TH:9.1; H) SPGA,SPGE: 0; SPGL:8.4 (excl CL, MX, TH)	BG,RO:5.8; BG, HU-K	AD,SM:0; TR:6.5	LOMAB:0; MT:6.5
	Apr. 1-Apr. 30	CL,MX,TH:9.1; SPGA,SPGE: 0; SPGL:8.4 (excl CL, MX, TH)	BG,RO:5.8; BG, HU-K	0	CY,EG,LOMAB,MA:0; DZ,IL,JO,LB,SY,TN:4.9; MT:6.5
	May 1-Jun. 15	CL,MX,TH:9.1; SPGA,SPGE: 0; SPGL:8.4 (excl CL, MX, TH)	BG,HU-K:0	0	CY,EG,LOMAB,MA:0; DZ,IL,JO,LB,SY,TN:4.9
	Jun. 16-Oct. 31	CL,MX,TH:9.1; SPGA,SPGE: 0; SPGL:8.4 (excl CL, MX, TH)	BG,HU-K:0	AD,SM:0	LOMAB:0
	Nov. 1-Dec. 31	CL,MX,TH:9.1; SPGA,SPGE: 0; SPGL:8.4 (excl CL, MX, TH)	BG,RO:5.8; BG,HU-K:	AD,SM:0; TR:6.5	LOMAB:0; MT:6.5
0810 90 3	Lychees	SPGA,SPGE:0	CZ-K: 0	0	LOMAB:0
0810 90 4	Passion Fruit	CL,MX,TH:5; SPGA,SPGE: 0; SPGL:4.6 (excl CL, MX, TH)	CZ-K: 0	0	CY,LOMAB:0
0810 90 4	Carambola and Pitahaya	CL,MX,TH:5; SPGA,SPGE: 0; SPGL:4.6 (excl CL, MX, TH)	CZ-K: 0	0	LOMAB:0

Notes: K:Tariff quota/Fixed duty-free or reduced duty amount  
GSP: Countries benefiting from the Generalized System of Preferences; CL:Chile; MX:Mexico; TH:Thailand;  
SPGA:Least Developed Countries Benefiting from GSP;  
SPGE:Bolivia, Colombia, Ecuador, Peru, Venezuela, Costa Rica, Guatemala, Honduras, Nicaragua, Panama, El Salvador  
SPGL: Countries benefiting from the Generalized System of Preferences minus the countries of the SPGA  
BG:Bulgaria; HU:Hungary; RO:Romania; CZ:Czech Republic  
AD:Andorra; SM:San Marino; TR:Turkey  
LOMAB:ACP (African, Caribbean and Pacific) states and overseas countries and territories  
CY:Cyprus; MA:Morocco; DZ:Algeria; IL:Israel; EG:Egypt; JO:Jordan; LB:Lebanon; SY:Syria; TN:Tunisia; MT:Malta  
Source: Official Journal of the European Communities L238, C102

*Phytosanitary Requirements*

The EU requires phytosanitary inspection of produce for disease and pests. Fruits produced within the EU are inspected at the place of production. Imported fruits are inspected either at the first place of entry into the EU or in the country of origin before they are exported. For produce inspected outside the EU, document check, instead of physical phytosanitary inspection, is required upon arrival at the EU. Once imported into the EU, all produce is required to comply with national food safety regulations.

#### *Pesticide Residues*

The EU adopted the Regulation on Maximum Residue Levels in 1990. Within the EU, the northern member states have pushed for stricter standards while the southern member states have supported lower standards. The Regulation aims to harmonize pesticide requirements, which vary among member countries. Products with pesticide above the maximum levels or with prohibited products cannot be marketed within the EU.

#### *Quality Standards*

Imported fruits are required to comply with international, EU and/or national quality standards, wherever possible. Commodities covered by the Common Organization of the Market in Fruits and Vegetables are required to comply with the EU's quality standards.<sup>8</sup> The information specified in quality standards must be labeled. The label should include information regarding variety, origin of product, and class (based on quality and size). Also, there are increasing demand for environmentally friendly packaging such as recyclable unwaxed craft board cartons among some EU member states.

#### *Banana Regime*

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<sup>8</sup> As of Nov. 1996, among tropical fruits, following items are subject to EU's quality standard: Fresh plantains; Dried plantains; Figs (fresh); Pineapples, Avocados, Guavas, Mangos, and Mangosteens; and Melons and Pawpaws (fresh).

Until the establishment of the Common Market Organization of Banana (CMOB) in 1993, EU members imported Banana under their national regimes. The EU established CMOB to achieve a single market and to maintain protection of ACP bananas, which are more expensive than bananas from other countries. Under the CMOB regime, bananas are imported under a tariff quota system allocated among traditional exporters (i.e., EU, ACP and Latin America). The COMB also provides compensatory aid for bananas from the EU and technical and financial assistance for ACP states.

For bananas from EU, a compensatory aid is set to cover 854,000 tons which is distributed among the various production regions. For bananas from non-member countries, tariff quotas are set up as follows. Imports from 12 ACP states recognized as traditional suppliers are subject to zero customs duty up to 857,000 tons. A tariff quota of 2.2 million tons is opened each year for imports from non-member states and non-traditional ACP states. Within the quota, imports from non-member states are subject to a duty of ECU 75 per ton while no duty is levied on non-traditional ACP bananas. Beyond these tariff quotas, imports are subject to the common customs tariffs. The tariff rate is ECU 850 per ton for imports from non-member states and ECU 750 per ton for non-traditional ACP bananas. These duties are being reduced on the basis of the conclusions of the Uruguay Round Agreement.

## **JAPAN**

Three ministries are responsible for import of tropical fruits: the Ministry of Finance (MOF) for tariffs, the Ministry of Agriculture, Forestry and Fisheries (MAFF) for plant quarantine, and the Ministry of Health and Welfare (MHW) for food safety. Japan's most significant import barrier is MAFF's quarantine system, which is stricter and more time-consuming than that of other countries.

Japan restricts imports of wide range of fresh fruit from countries where specific diseases and pests are found. These fruits can be imported if a completely effective

disinfection methods proved are established. However, these methods must be applied in the exporting country and the disinfection process must be inspected and confirmed by Japanese plant quarantine inspectors from Japan. A sequence of these procedures tend to be highly time consuming and costly. Quarantine requirements for processed and frozen fruits are simpler. Unfortunately many developing countries lack the technology to produce these commodities. Consequently, only large exporters who can afford to meet these quarantine requirements can benefit from Japan's low tariff rates.

Japan has applied no quantitative restrictions on imports of fruits since the liberalization of trade in oranges in 1991. With a few exceptions, tariff rates on most tropical fruits from developing countries are low or zero. However, Japan's restrictive quarantine system makes it extremely difficult for most developing countries to take advantage of its low tariff rates.

### *Tariffs*

Japan applies five types of tariff rates on imports: general, temporary, WTO, and two types of preferential rates provided to developing countries. Certain preferential rates, many cases duty free, are applied to the goods originating from the least developed countries (LLDC). General, temporary or WTO rates are applied to developed countries. When all three types of tariffs are applicable, the priority is given to the lowest -- in many cases in the order of WTO, temporary then general rates. Temporary rates are rarely applied to tropical fruits.

Tariff rates on fruit have reduced under the Uruguay Round agreement. Reduction rates vary among commodities however substantial reductions are usually found in commodities whose import volumes are small. WTO rates on most tropical fruits are being lowered. On the other hand, tariff rates on bananas and pineapples, two major tropical fruits imported into Japan, remain high. In general, preferential rates for developing countries are low or zero (table 3).

Table 3 Japanese Tariffs on Tropical Fruits (as of Dec. 1997)

	General	WTO	Preferentia	LLDC
0803 00 100 Bananas incl. Plantains (Fresh) Imported from April 1 - Sep. 9	40	30	10	Free
0803 00 100 Bananas incl. Plantains (Fresh) Imported from Oct. 1 - Mar. 31	50	37.5	20	Free
0803 00 200 Bananas incl. Plantains (Dried)	6	4.5	Free	Free
0804 10 000 Dates (Fresh or Dried)	Free	Free	Free	Free
0804 30 010 Pineapples (Fresh)	20	18.5		
0804 30 090 Pineapples, (Dried)	12	9.6	7.2	Free
0804 40 010 Avocados (Fresh)	6	4.5	3	Free
0804 40 090 Avocados (Dried)	6	(6.5)	Free	Free
0804 50 Guavas, mangoes and mangosteens (Fresh or Dried)	6	4.5	Free	Free
0807 11 000 Watermelons (Fresh)	10	8		
0807 20 000 Papaws (Fresh)	4	3	2	Free
0810 50 000 Kiwifruit (Fresh)	8	7.2		
0810 90 210 Durians, rambutan, passion fruit, litchi and carambola/passion fruit (Fresh)		7.5	2.5	Free
0811 90 110 Pineapple, uncooked or cooked by steaming or boiling in water, frozen, w/ sugar	28	25.9		
0811 90 120 Tropical Fruits*, uncooked or cooked by steaming or boiling in water, frozen, w/ sugar	20	16	12	Free
0811 90 210 Pineapple, uncooked or cooked by steaming or boiling in water, frozen, w/o sugar	28	25.9		
0811 90 120 Tropical Fruits, uncooked or cooked by steaming or boiling in water, frozen, w/ sugar	12	9.6	3.6	Free
0812 90 100 Bananas, provisionally preserved but unsuitable in that state for immediate consumption Imported from April 1 - Sep. 9	40			
0812 90 100 Bananas, provisionally preserved but unsuitable in that state for immediate consumption Imported from Oct. 1 - Mar. 31	50	37.5		
0812 90 420 Tropical Fruits, provisionally preserved but unsuitable in that state for immediate consumption	20	16	10	Free
0813 40 021 Tropical Fruits other than # 0801 to 0806 (Dried)	15	11.3	7.5	Free

Notes: Temporary Rates are not provided for tropical fruits.  
\* "Tropical Fruits" include 23 fruits such as Papayas, Pawpaws, Avocados, Guavas, Durians, Bilimbis, Jackfruit, Mangoes, Mangosteens, Passion Fruit, Litchi

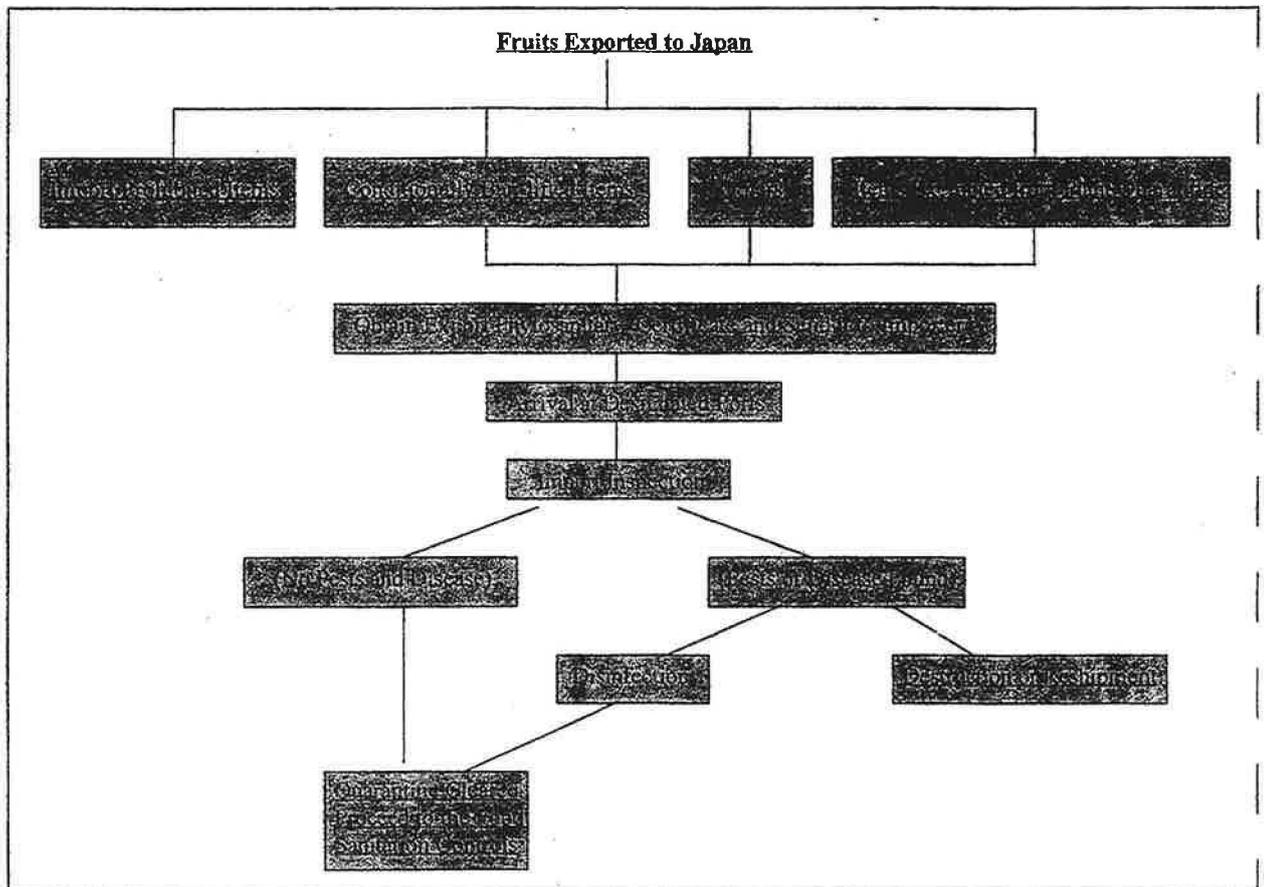
Source: Customs Tariff Schedules of Japan 1997

### *Phytosanitary Requirements*

Japan applies strict quarantine controls. It restricts entry of fresh fruit from countries or regions where specific pests are found. Frozen fruits can be imported from any country if accompanied by an appropriate phytosanitary certificate. Quarantine inspections are not required for preserved fruits and 15 types of dried fruits.

Fresh fruit imports are grouped into three categories in terms of quarantine requirement: import prohibited items, conditionally ban-lifted items and others (figure 1).

Figure 1: Quarantine System in Japan



Source: Plant Protection Division 1995

Japan prohibits import of fruits from countries or regions in which certain pests and diseases are found. Main pests in questions are codling moth, Mediterranean fruit fly, melon fly, oriental fruit fly, and queensland fruit fly. Many types of fresh fruits from various production areas are banned for this reasons (table 4).

Table 4: Prohibited Tropical Fruits and Regions (as of June 1997)

Target pest/disease	Prohibited fruits	Countries/Regions
Mediterranean fruit fly	avocado, kiwifruit, date, plants of the family of papaya*, plants of the family of mango*	Israel, Cyprus, Jordan, Syria, Turkey, Lebanon, Albania, Italy, Austria, the Netherlands, Greece, Switzerland, Spain, Germany, Hungary, France, Belgium, Portugal, Malta, UK, ex-Yugoslavia, Africa, El Salvador, Guatemala, Costa Rica, Nicaragua, Panama, Honduras, Argentina, Uruguay, Ecuador, Colombia, Chile(excl. some regions), Brazil, Peru, Bolivia, Bermuda, West Indies (excl. Cuba), Hawaiian islands, Australia (excl. Tasmania)
Oriental fruit fly	avocado, date, papaya*, litchi,* rambutan, mature banana, plants of the family of mango*	India, Indonesia, Viet Nam, Cambodia, Singapore, Sri Lanka, Thailand, Taiwan, China (excl. Hong Kong), Pakistan, Bangladesh, East Timor, Philippines, Brunei, Hong Kong, Malaysia, Myanmar, Lao, Papua New Guinea, Hawaiian Islan Micronesia
Queensland fruit fly	avocado, kiwifruit, date, lichi, papaya, mature banana plants of the family of mango	Easter Island, Australia (excl. Tasmania), Society Islands, Tubuai Island, New Caledonia, Papua New Guinea
Melon fly	melon*, papaya, plants of the family of mango*	India, Indonesia, Viet Nam, Cambodia, Singapore, Sri Lanka, Thailand, Taiwan, China, Pakistan, Bangladesh, East Timor, Philippines, Brunei, Hong Kong Malaysia, Myanmar, Laos, Kenya, Tanzania, Papua New Guinea, Hawaiian Island, Micronesia

Note: \* Currently imported as "conditionally ban-lifted items"

Source: "Yunyuseikabutsu toukei shiryou Statistics of Fresh Fruit and Vegetable Imports 1996"

Prohibited items can be imported if an exporting country establishes completely effective disinfection methods. Before establishing ban-lifting conditions, the Japanese Ministry of Agriculture Forestry and Fisheries conducts bilateral technical negotiations with the government of the exporting country. Required sterilization procedures vary among products and their origins. The most common procedures are steam heat, cooling and hot water treatments or their combination. These procedures must be applied in the exporting country.

A set of elements required for ban-lifted items tend to be highly time-consuming and costly. These include: (i) Designation of producing areas; (ii) Disinfection and inspection in exporting countries; (iii) Confirmation of the disinfection and inspection by Japanese plant quarantine inspector in exporting country; (iv) Restriction on the method of packaging and transportation; and (v) Preventive measures against recontamination with pests and diseases (Plant Protection Division 1995).

As of April 1997, Japan permitted the imports of five conditionally ban-lifted tropical fruits (i.e., mango, kiwi fruit, litchi, melon and papaya), from seven countries and regions (i.e., Australia, Chile, China, Mexico, Philippines, Taiwan and the US) (table 5). Seasonal restrictions apply to some of these items.

Table 5: Ban-Lifted Tropical Fruits and Key Conditions (as of April 1997)

Country	Items	Variety	Ban Lifted Year	Required Treatment	Import Season
Australia	Mango	Kensington	1994	Vapor Heat Treatment	
Chile	Kwi Fruit	Hayward	1991	Cold Treatment	Mar-Jun
China	Litchi		1994	Combination of Vapor Heat and Cold Treatments	
	Melon	Hami Melon	1988	Confirmation of Domestic Quarantine	Aug- Oct
Mexico	Mango		1991	Hot Water Treatment	Feb-Sep
Philippines	Mango	Manila Super	1975	Vapor Heat Treatment	Year Round
	Papaya	Solo	1994	Vapor Heat Treatment	Year Round
Taiwan	Mango	Keitt	1976	Vapor Heat Treatment	Jun-July
	Papaya	Solo	1991	Vapor Heat Treatment	Jun-July
	Mango	Irwin	1976, 1989	Vapor Heat Treatment	Jun-July
	Mango	Harden	1991	Vapor Heat Treatment	Jun-July
	Litchi		1980, 1988	Combination of Vapor Heat	Jun-July
USA	Papaya	Solo	1969	Vapor Heat Treatment	Year Round
	Mango*		1990	Hot Water Treatment and Cold Treatments	

Source: Data from "Yunyuseikabutsu toukei shiryō Statistics for Fresh Fruit and Vegetable Imports 1996"  
Note: \* sterilization methods are set by the governments of exporting countries

Fruits can be imported into Japan only through designated ports. All fruits except processed and selected dried fruits are subject to import inspection upon arrival. First, inspectors examine a Phytosanitary Certificate from the government of a exporting country and other necessary documents such as the Bill of Lading. Main inspection points for fresh fruits include the port of shipping, the exporter and importer, the country of origin, the types of a fruit (including variety and brand), and the disinfection treatment, if applicable. If documents are missing, the cargo will be held in bond until they arrive. After checking documents, inspectors take samples from the containers and inspect them visually, sometimes with a magnifying glass or a loupe. If pests or diseases are found during inspection, disinfection (e.g., fumigation, sorting, elimination), discard (e.g., incineration, burying) or reshipment is ordered (Plant Protection Division 1995).

Fumigation is one option that exporters often choose when pests or diseases are found. Cyanide and methyl bromide are two chemicals used for fumigation. The choice of chemicals and fumigation method depends on the pest and the fruit. The MAFF inspectors often choose cyanide whenever possible because it is less damaging and dangerous than methyl bromide which is used for tougher pests or pests found inside of the fruits. A major problem of fumigation is loss of product quality, additional cost and delay in sales.

In case of conditionally ban-lifted fresh fruit, if the phytosanitary certificate is not attached, the entire consignment must be discarded or reshipped. And if listed pests are found, in addition to the discard or reshipment of entire consignment, further shipping of the item is suspended until the cause of the infestation is identified and the effective countermeasures are established. If problems regarding packaging or labeling are found, only the package concerned is discarded. Inspection of frozen fresh fruits is conducted simply by confirming the description on the certificate and its frozen condition.

### *Food Safety*

After clearing MAFF inspection, produce must pass MHW food hygiene inspection before entering into the Japanese market. The main focuses are on food additives, chemical residues and labeling. MHW inspectors sign off an Import Notification which includes information on the exporter, importer, and product. Also, samples are taken and examined from every tenth incoming shipment of fresh produce. Once the sample is taken, the product is sent to the market without waiting for the result. If excess residue levels is found, the product will be withdrawn from markets. This happens only once or twice a year.<sup>9</sup>

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<sup>9</sup> Information from USDA.

Two types of national standards are used for hygiene inspection: the Residual Pesticide Standards and the Food Additive Standards. As of April 1997, the Residual Pesticide Standards establish maximum levels of 139 pesticides for a range of agricultural commodities, including 9 tropical fruits. Levels of about 30 pesticides are checked on tropical fruit imports (table 6). This number is not particularly high compared with other agricultural commodities imported into Japan. For example, the number of pesticides in question for orange, grape fruit, strawberry, potato, maize, and tea are 30, 29, 40, 41, 32 and 24, respectively. The Food Additives Standard sets residual levels of food additives. They are divided into two groups, those for which no residue is permitted (e.g., dieldrin, simazine) and those for which maximum residue levels are set. Only four anti-fungal products (diphenyl (DP), orthophenyl (OPP), thiabendazole (TBZ) and imazalil) are permitted as food additives, and their use must be indicated on the label (HVH Japan 1994).

Table 6: Pesticide Residues in Question in Japan (as of April 1997)

(PPM)	avocado	kiwifruit	guava	date	banana	papaya	mango	pineapple	passionfruit
DCIP	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
AMITRAZ	0.2		0.2	0.2		0.2	0.2		0.2
AMITROLE	nil								
ALDICARB					0.5				
ISOFENPHOS					0.02				
IPIRODIONE	10	5	10	10	10	10	10	10	10
IMAZALIL	2	2	2	2	2	2	2	2	2
ETHIOFENCARB	5	5	5	5	5	5	5	5	5
ETHOPROPHOS					0.02			0.02	
ETRIMFOS	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
OXAMYL	0.5	0.5	0.5	0.5	0.2	0.5	0.5	1	0.5
CADUSAFOS					0.01				
CAPTAFOL	nil								
QUINALPHOS	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02
CHINOMETHIONAT	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
GLYPHOSATE	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
GLUFOSINATE	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
CLOFENTEZINE	1	1	1	1	1	1	1	1	1
CHLORPYRIFOS	0.5	2	0.5	0.5	0.5	0.5	0.5	0.5	0.5
CHLORFLUAZURON	2	2	2	2	2	2	2	2	2
CHLORPROPHAM	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
FENBUTATINOXIDE	2	2	2	2	5	2	2	2	2
DIETHOFENCARB	5	5	5	5	5	5	5	5	5
DICHLORFLUANID	15	15	15	15	15	15	15	15	15
DICHLORVOS	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
CYHALOTHRIN	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
DIFENOCONAZOLE					0.5				
DIFLUBENZURON	1	1	1	1	1	1	1	1	1
CYHEXATIN	nil								
CYPERMETHRIN	2	2	2	2	2	2	2	2	2
BROMINE	75	30	20	20	20	20	20	20	20
SETHOXYDIM	1	1	1	1	1	1	1	1	1
DAMINOZIDE	nil								
THIOMETON	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
DELTAMETHRIN		0.05			0.05			0.01	
TERBUFOS					0.05				
COPPER TELEPHTHALATE	5	5	5	5	5	5	5	5	5
TRALOMETHRIN	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
TRIADIMENOL						0.2			
TRICHLORFON	0.5	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5
TRIFLUMIZOLE	2	2	2	2	2	2	2	2	2
TOLCLOPHOS-METHYL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PACROBUTRAZOL	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PARATHIONMETHYL	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
BITERTANOL					0.5				
PYRIDABEN	1	1	1	1	1	1	1	1	1
PYRIFENOX	2	2	2	2	2	2	2	2	2
PIRIMICARB	1	1	1	1	1	1	1	1	1
PIRIMIPHOS-METHYL	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
PYRETHRINS	1	1	1	1	1	1	1	1	1
FENARIMOL	1	1	1	1	1	1	1	1	1
FENITROTHION					0.2			0.05	
FENOBUCARB	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
FENSULFOTHION					0.02			0.05	
FENVALERATE	1	5	1	1	1	1	1	1	1
FENPYROXIMATE	1	1	1	1	1	1	1	1	1
FLUCYTHRINATE	2	2	2	2	2	2	2	2	2
FLUSILAZOLE					0.1				
FLUTOLUANIL	5	5	5	5	5	5	5	5	5
FLUVALINATE		0.2							
PROTHIOPHOS					0.01				
PROPICONAZOLE					0.1		0.05		
PERMETHRIN	5	2	5	5	5	5	5	5	5
MALATHION	8	2	8	8	2	1	8	8	8
MALEICHYDRAZIDE	40	40	40	40	40	40	40	40	40
MYCLOBUTANIL	1	1	1	1	1	1	1	1	1
METHIOCARB	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
MEPRONIL	2	2	2	2	2	2	2	2	2
LENACIL	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
2,4,5-T	nil								
<b>Total number of pesticides</b>	<b>26</b>	<b>28</b>	<b>26</b>	<b>29</b>	<b>33</b>	<b>29</b>	<b>29</b>	<b>29</b>	<b>29</b>

Source: Data from "Yunyuseikabutsu toukei shiryou Statistics of Fresh Fruit and Vegetable Imports 1996"

### *Quality Standards*

Quality standards and packaging requirements are not very strict in Japan. Few tropical fruits such as kiwifruit are subject to the Common Standards for Fruit. The Standards rates fruits by grade--superb, excellent and fine. Packaging guidelines recommend that produce be labeled with the country of origin, the producer's name, and the weight, variety, and grade. More importantly, exporting countries need to know Japanese consumers specific demand in terms of appearance (e.g., size, color, shape). Also, there are increasing demand for organic products.

### **UNITED STATES**

The US offers various preferential treatments. Among them the most important for tropical fruits are: the North American Free Trade Agreement (NAFTA), the Caribbean Basin Economic Recovery Act (CBERA), the Andean Trade Preference Act (ATPA), and the United States-Israel Free Trade Area. Currently most tropical fruits are imported duty free under these agreements. The impact of the Uruguay Round's tariff reduction has been insignificant in the US because tariff rates on tropical fruits prior to the Round were already low or zero. For the same reason, tariff reduction under NAFTA has not particularly affected US imports, though it increased dramatically the horticultural exports from the US to Mexico.<sup>10</sup>

Although SPS requirements in the US in general are less strict than Japanese requirements, the US imposes strict standards on certain fruits grown domestically. The most significant and controversial standards are applied to avocado, fresh citrus, mango, and papaya from Mexico.

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<sup>10</sup> The most significant step in duty reduction took place in 1985, when Mexico joined GATT and started to open up its market. This increased horticultural exports from the US to Mexico from the US increased from \$50 million in the mid-1980s to \$150 million in the early 1990s (IFC 1994).

### *Tariffs and Preferential Agreements*

Most tropical fruits imported into the US are covered by four types of preferential trade programs which offer special tariff treatments. Currently, all tropical fruits from the countries covered by CBERA and ATPA, and Israel, as well as most tropical fruits from Mexico are imported at zero tariff. Also, tariffs on avocados, papayas and guavas<sup>11</sup> from Mexico will be reduced to zero in 2003. Non-preferential rates for tropical fruits are generally low.

On January, 1994 when NAFTA entered into force, all non-tariff barriers to agricultural trade between Mexico and the US were converted to tariffs or tariff quotas. Also, NAFTA has reduced already low US tariffs to zero immediately or gradually, i.e., over a 5-, 10- or 15-year period. Tariffs on many agricultural commodities including most tropical fruits were eliminated immediately.<sup>12</sup> Tariff reduction under NAFTA has had a insignificant effect on US imports of tropical fruits from Mexico because tariff rates in the US prior to the conclusion of the NAFTA agreement were already low. In contrast, tariff reduction in Mexico has dramatically increased US horticultural exports to Mexico.

The planned phase-out of tariffs under NAFTA is generally slow for "sensitive crops" which could compete with domestic products. Also, certain sensitive crops, specifically those harvested in the US particularly in Florida in the early spring, are subject to a special safeguard provision under which tariff will be increased if the volume of imports exceeds the 1989-91 level. Nevertheless, most tropical fruits, except watermelon imported from May to September, will not be affected by this provision. Once the transition period has passed in 2008, all agricultural commodities will be traded freely without special treatments.

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<sup>11</sup> Tariff rate is already zero if imported from September to May.

<sup>12</sup> More than half the value of agricultural trade between Mexico and the US became duty free when NAFTA went into effect (information from USDA).

Another major impact of the NAFTA on agriculture is regarding transportation. By 1999, US and Mexican trucks will be able to travel throughout each country (HVH North America 1994). This would greatly facilitate distribution and marketing of tropical fruits.

Another preferential agreement significant for US tropical fruit imports is CBERA. CEBRA provides for duty free access for most fresh produce from a group of countries and regions in the Caribbean and Central America. Twenty four countries and regions covered by CEBRA are: Antigua and Barbados; Aruba; the Bahamas; Barbados; Belize; Costa Rica; Dominica; Dominican Republic; El Salvador; Grenada; Guatemala; Guyana; Haiti; Honduras; Jamaica; Monserrat; Netherlands Antilles; Nicaragua; Panama; St. Kitts and Nevis; Saint Lucia; Saint Vincent and the Grenadines; Trinidad and Tobago; and the Virgin Islands (British). The 1984 Act (CBI) originally had a 10-year life but the duty-free provisions were expanded and given permanent status in 1990 (CBI II). Costa Rica, the Dominican Republic, Guatemala, and Honduras are the four largest beneficiaries of CBERA, accounting for three-quarters of all imports (HVH North America 1994). Two products which benefit most from CEBRA are pineapples and melons.

Two other important preferential agreements for US tropical fruit trade are the Andean Trade Preference Act (ATPA) and the United States-Israel Free Trade Area Implementation Act of 1985. ATPA grants preferential treatment to Bolivia, Colombia, Ecuador, and Peru. Tropical fruits from ATPA countries and Israel enter into the US at zero tariff.

#### *Phytosanitary Requirements and Quality Standards*

NAFTA modeled after WTO's SPS Agreement in establishing its own SPS measure. Like WTO, NAFTA requires that sanitary and phytosanitary measures be established based on scientific evidence and that they not be used as non-tariff trade barriers. NAFTA encourages the use of international and regional standards. However

member countries are allowed to set their own national standards as long as these standards are based on scientific risk assessment and non-discriminatory. In addition, local governments are allowed to establish standards different from their national standards. The NAFTA Committee on Sanitary and Phytosanitary Measures were established in 1994 to promote harmonization of SPS measures among member countries. Also, the Pesticides Technical Working Group was established in 1995 to facilitate ongoing harmonization of pesticide residue levels. The Committees meet periodically to exchange information and discuss issues on the SPS area.

The Animal and Plant Health Inspection Service (APHIS) of the US Department of Agriculture (USDA) is responsible for sanitary and phytosanitary inspections. Under the Plant Quarantine Act of the USDA prohibitory and restrictive orders can be issued. Prohibitory orders ban the entry of designated plants and plant products. Restrictive orders require import permission through quarantine treatment or import inspection. Many fresh fruits are subject to Restrictive orders. Inspections can be conducted in major exporting countries, including Chile, Mexico, Argentina and Costa Rica, where USDA inspectors are stationed. Strict standards are imposed on certain fruits grown in the US. The most significant and controversial standards are applied to avocado, fresh citrus, mango, and papaya. For example, the US quarantine system requires hot water treatment of mango and papaya that could potentially host fruit flies. Justification of these requirements is questionable, particularly given the fact that neither Canada and nor the EU requires such treatment.

In the US, all food products, except meat and poultry products, are regulated by the US Food and Drug Administration (FDA). FDA examines whether imported food products meet the same safety standards as the US products. Under NAFTA, countries maintain their national quality standards. Fruits from Mexico that does not meet the US grades can be imported only for processing.

## CONCLUSION

Despite a series of new policies introduced under the Uruguay Round Agreement, non-tariff barriers continue to hinder the world trade of tropical fruits. The most significant barriers remain in the area of sanitary and phytosanitary regulations, and on sensitive commodities. Three examples of such barriers are the EU's banana regime, Japan's quarantine system, and, to the less degree, the US's quarantine requirements on some tropical fruit imports. The EU limits the entry of inexpensive bananas from Latin American producers through the allocation of tariff quotas, and the provision of compensatory aid to EU producers, and technical and financial assistance to ACP countries. Japan's quarantine system categorizes various tropical fruits from major production areas as "prohibited items" and bans their entry. The import bans could be lifted if certain procedures are taken but these procedures are complicated and tend to be time-consuming and costly. The US employs strict phytosanitary requirements on imports of fruits grown domestically, including mango, papaya, and avocado. All of these measures, which appear to be inconsistent with WTO principles are the results of Uruguay Round's vague provisions which allow inconsistent interpretation among member countries, and weak enforcement mechanisms to discipline measures inconsistent with the WTO principles.

The Uruguay Round has increased the transparency of agricultural trade mainly through a series of market access provisions. Of these, market access (tariffication and tariff reduction) and the SPS Agreement are two notable achievements. Unfortunately, impact of the tariff reduction has been insignificant mainly because of the low initial tariff rates and existence of preferential tariff rates under special trade agreements. In addition, the simple average method used to calculate tariff reduction and generally high level of protection during the base period allowed countries to minimize reduction rates on sensitive items or fruits with large import shares. Effect of the SPS Agreement has been limited to increasing transparency of member countries SPS standards because of its weak enforcement mechanisms. Because the SPS Agreements simply "encourages" the

use of international standards and recognizes sovereign rights of each country in setting its own SPS standards, it has served only as a guide line.

Further liberalization until the conclusion of the next WTO will depend largely on each importing country's national policy, and the WTO's dispute mechanisms. To ensure that world trade of tropical fruit become more open, the next round should aim at minimizing inconsistent interpretation among member countries and eliminating various non-tariff trade measures currently fallen into exception or a gray area. To do so, the next round needs to provide clear provisions and establish concrete enforcement mechanisms. Specifically, the next round should: (i) spell out specific harmonization schedule for SPS standards, where possible; (ii) identify and ban gray area measures; and (iii) provide a schedule for reducing tariff quotas, especially those with a discriminatory nature.

May 1998



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**COMMITTEE ON COMMODITY PROBLEMS**

**SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**THE FRUIT INDUSTRY IN MALAYSIA: PRESENT STATUS AND  
FUTURE OUTLOOK**

## **THE FRUIT INDUSTRY IN MALAYSIA: PRESENT STATUS AND FUTURE OUTLOOK**

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### **Introduction**

Malaysia, despite the rapid progress in industrialisation, is still dependent on the agricultural sector that contributes about 13.2 % of the total Gross Domestic Product (GDP) of RM 120.5 billion in 1995. Plantation crops like oil palm, rubber and cocoa are the primary commodities that bring in significant export earnings totaling about RM 15.5 billion annually for the country. Compared with these traditional 'giants', the fruit industry appears to be miniscule, both as a revenue earner as well as in acreage cultivated. Fruit exports amounted to about RM 230 million in 1996 and the acreage planted was 262 113 ha, just about 5 % of the total of 4.5 million hectares for the three plantation crops. Despite this overwhelming comparison, fruits have been identified as the fourth crop option for focussed development in the agricultural sector. The National Agricultural Policy (NAP) launched in 1984, had given the necessary impetus for fruit development and it is now evident that the industry is undergoing a metamorphosis from a state of uneconomic-scaled and scattered small-holdings to more efficient, commercially-viable orchards. The fruit industry will be expected to develop more vigorously in the coming years especially with the continued downturn for cocoa and the current economic slowdown that had drastically affected the non-agricultural sectors.

## **Present status of the industry**

### *Area for fruit cultivation*

In the Sixth Malaysia Plan from 1991-1995, the area under fruits grew 6.6 % annually to 244 923 hectares. In the Seventh Malaysia Plan (1996-2000) the area is expected to increase further by 7.1 % annually to reach 345 126 hectares by the year 2000. The most extensively cultivated fruit by far, is durian which occupied 110 079 ha or about 42 % of the total fruit area in 1996 (Table 1). The next important fruit is banana with 29 214 ha followed by rambutan (18 353 ha), duku (16 466 ha) dokong (15 127 ha) and pineapple (11 569 ha).

The geographic locations for cultivation of various fruit types have been identified based on their agro-climatic suitability. Three zones have been classified in Peninsular Malaysia for fruit cultivation according to rainfall distribution patterns (Figure 1). They are: Zone 1 - where distinct, dry periods extend for 3 months or more; Zone 2 - where short, dry spells occur for 1-2 months and Zone 3 - where no distinct drought is experienced. The present distribution of large-scale commercial fruit farms follows the matching of their crop requirements with agro-climatic suitability. Therefore, commercial farms of mango are found in the northern states of Kedah and Perlis and duku langsung in Terengganu which are in the dry Zone 1. Large areas of durian, mangosteen, rambutan and pomelo are found in the state of Perak and Pahang in Zone 2 which has the agro-climatic factors matching the requirements of these fruit types. Finally, commercial farms of non-seasonal fruits like starfruit, banana, papaya and ciku which require equable rainfall distribution of Zone 3 are predominantly found in the southern state of Johor (Figure 1).

### *Production and consumption*

Fruit production over five years from 1990 to 1994 showed an increase of 38% from 1.059 million tonnes to 1.466 million tonnes. Banana, with an annual production of 372 700 tonnes in 1994 was the most popular fruit, contributing to 25 % of the total fruit production (Table 2). Other fruits that have high-volume production, are durian (284 045 tonnes), watermelon (213 862 tonnes) and pineapple (155 200 tonnes).

The consumption figures for fruits over five years from 1990 to 1994 were quite stable ranging from 598 875 tonnes to 689 811 tonnes. These figures estimate the per capita consumption of local fruits to be 35 to 40 kg (based on a 17 million population then). At the present rate of consumption and production, there appears to be no shortfalls to cater for the local market since the production was several folds higher than the consumption for the majority of fruit types (Table 2). However, in the case of papaya, watermelon and pineapple, a shortfall against production existed when the export volume was included with the consumption figure. This reflects the difficulty in estimating the production of these short-term and often transient, crops.

### *Export*

The export of fruits also showed an increasing trend. In 1985, the export value was RM 70 million and this climbed to RM 142 million in 1991 and RM 200 million in 1994 (Figure 2). The most important exporter earner was watermelon which grossed RM 53 million or 26.6 % of the total value fruit exported in 1994. The other important export fruits are durian (RM 44 million), papaya (RM 30 million), banana (RM 27 million) and starfruit (RM

23 million). These 5 fruits together grossed about 90 % of the total revenue derived from fruit export in 1994.

Singapore is still the major export market, accounting for 56 % of the exports while Hong Kong (21.7 %) comes next. The EEC countries imported only 8.5 % in 1994, but there seemed to be potential in this market sector. The major constraint in export of fruit appeared to be high transport charges, limited air cargo space, difficulty in handling and transport and postharvest quarantine restrictions

### *Fruit processing*

Fruit processing is not a very significant industry with the exception of pineapple. In 1985, the export value of processed fruits was RM 66 million and this increased to RM 113 million in 1994. Canned pineapple accounted for 81 % of the total export of processed fruits. The major markets for canned pineapple are Japan (34%), Middle East (18%) U.K. (10%) and USA (9%). The other important processed products are purees and juices from fruits like guava and pickled and dehydrated fruits that are mainly produced as a cottage industry.

### **Research and development support**

There are many constraints confronting the fruit industry and new technologies are vital to provide the incentive, viability and competitive edge for fruit cultivation. To elevate the fruit industry, certain issues relating to R & D need to be addressed. The government, through the Intensification of Research Priority Areas (IRPA), has allocated RM 14.45 million for fruit research in the Seventh Malaysia Plan (1996–2000). A total of 108 projects

are currently being carried out to resolve the pressing issues related to the fruit market.

#### *Expansion of markets*

The present export markets are rather restricted because the primary transport is by air that is expensive and also limited in cargo space. This is the main reason why exports currently are restricted to Singapore and nearby Hong Kong. Postharvest research has been successful in extending the shelf-life of papaya, banana and starfruit and some success has been achieved in transporting them by sea. Research is now also actively pursued in obtaining transgenic varieties with delayed ripening characteristics. Papaya is currently being used as the model fruit type for insertion of the genes that inhibit or delay ripening. Another aspect in market expansion is related to postharvest disinfestation to meet the quarantine regulations of importing countries. There are potential markets in Japan, Australia and USA for tropical fruits. However, these countries have very stringent pest quarantine regulations, especially against the fruit fly. Postharvest disinfestation protocols specified by the importing countries must be followed and these include vapour heat treatment, irradiation, fumigation and cold treatment. MARDI has just completed the protocols for vapour heat disinfestation of Harumanis mango for export to Japan.

#### *Extending availability of fruits*

One of the major difficulties in marketing and promotion of tropical fruits like durian, rambutan and mangosteen is the seasonality of the harvest. Coupled with the fact that these fruits usually have long juvenile periods, many growers will not invest their money on these crops. Techniques in

regulation of flowering and fruiting using plant growth regulators, pruning and training and manipulation of cultural practices may be used to manage crop harvests with a certain degree of predictability. The accuracy in scheduling harvests in pineapple using ethrel for induction of flowering may be exemplary in the pursuit of regulation of cropping in other fruits.

#### *Production systems towards mechanisation*

Fruit production is fastidious and high costs are put in to make its cosmetics appealing, often going to the extent of wrapping the fruits to achieve the desired results. Fruit production, to be sustainable, needs to be cost effective and less labour-dependent. Cropping systems should be geared towards highly efficient, compact and amenable to mechanisation

#### *Pest and disease management*

Pests and diseases are often limiting factors affecting crop growth and fruit production in the humid tropics. Some of them can be managed with proper cultural practices and judicious use of pesticides, but some notably the papaya ringspot virus, citrus greening, *Fusarium* wilt in banana and bacterial dieback in jackfruit may be absolutely devastating. For these diseases, the best long-term solution is through breeding for resistant varieties. The recent successes in development of the FHIA 1 and FHIA 3 bananas resistant to *Fusarium* wilt and the transgenic 'Sunup' papaya resistant to the ringspot virus are testimonies that varietal resistance is the best measure to combat such diseases.

Fruit cultivation invariably uses high amounts of chemicals because of consumers' demand for blemish-free and attractive cosmetics of the fruit. There is a need to develop and adopt Integrated Pest Management (IPM)

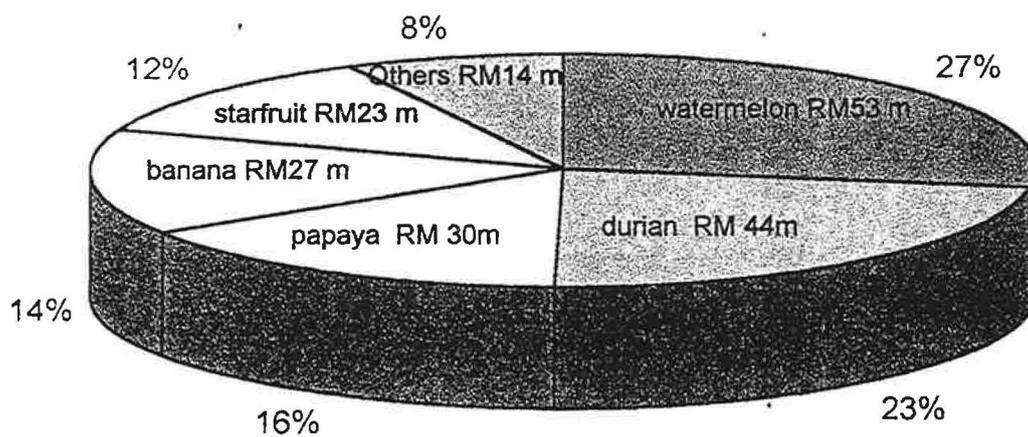
approaches with emphasis on reduced use of pesticides for environment and consumer safety. Such practices will lead to more sustainable fruit cultivation in the long run.

### **The future outlook**

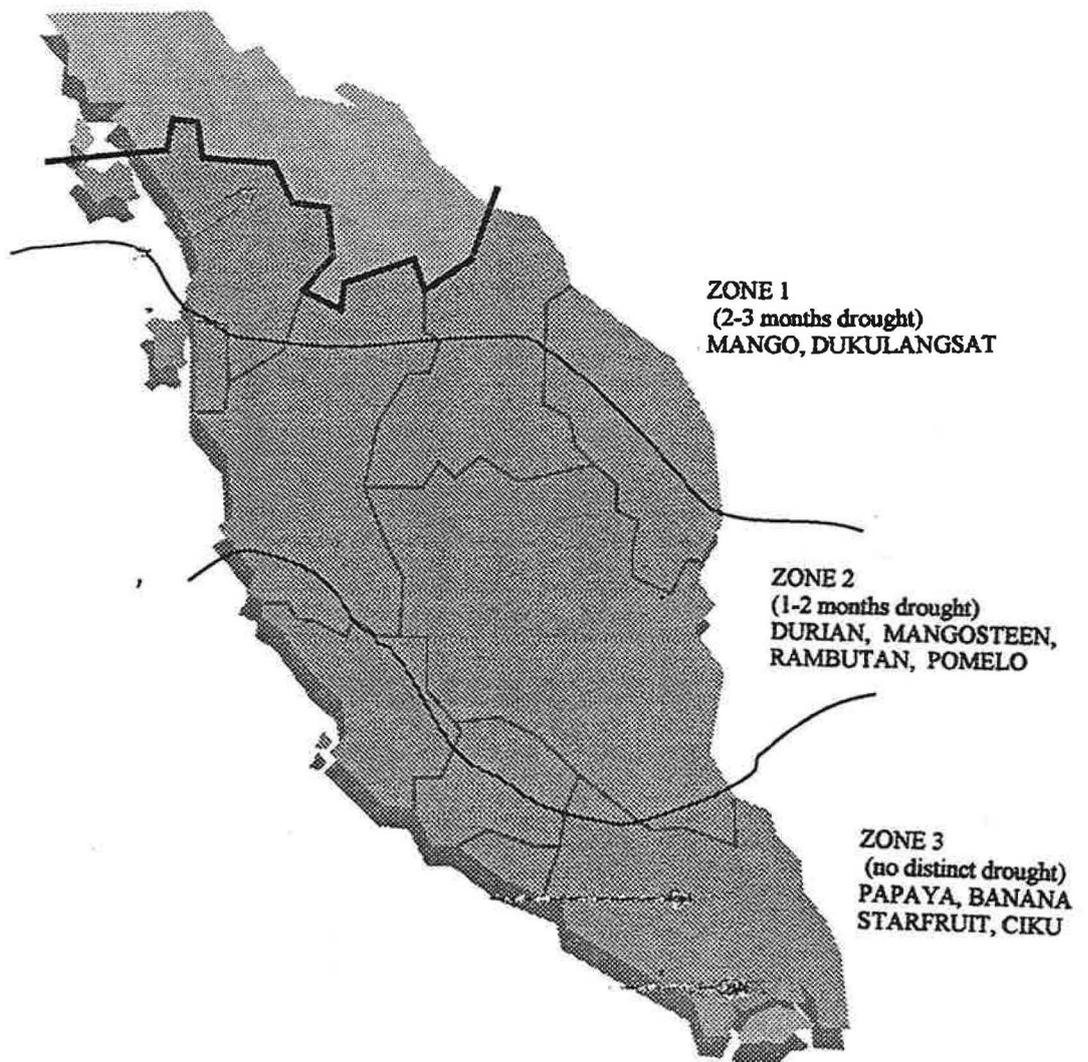
The past years have seen the steady climb in the area, production, consumption and export of local fruits and all indications are there that this increase will sustain for many years to come. The best indicator is that the recent economic slowdown had forced many investors to 'go back to the land'. Further, the plantation sector seemed to have stagnated or in the case of cocoa, appeared to have slid irreversibly, making fruits a strong candidate for development in the agricultural sector.

The speed of advancement of the fruit industry depends of course, on the rate at which the aforementioned issues can be resolved. Some of these do not just exist at the national level only, but are rather shared globally. Therefore, it is sensible that global cooperation should be sought for coordination, information-sharing and decision-making on cohesive actions to resolve common problems. On fruit research, MARDI had worked closely with many international agencies to resolve regional or global problems. Some of the projects include citrus greening integrated management (UNDP-FAO), fruit fly management, quarantine disinfestation, and black heart disorder on pineapple (ACIAR), regional testing of *Musa* varieties (INIBAP), germplasm collection & documentation (IPGRI), global network on conservation of fruit germplasm (REMUFRT) and papaya ringspot virus resistance and delayed ripening (ISAAA). There is also now an opportunity to have a global network on tropical fruits (TFNET).

The future outlook of the tropical fruit industry, not just nationally but globally would indeed depend, in no small measure, on the ability of all countries concerned, to work together and forge a strong understanding that is necessary for the benefit of everyone in this business. There should be complementation rather than competition and global synergism that would help each other's advancement of the fruit industry. The establishment of TFNET would provide the stage for this synergism and ensure that the future outlook for global commercialisation of tropical fruits will be bright.



**Figure 2. Malaysian fruit export**



**Figure 1. Agro-climatic zones for fruit cultivation**

**Table 1. Area of fruit crops in Peninsular Malaysia (1996)**

	Area (ha)	%
<b>Durian</b>	<b>110,079</b>	<b>42.0</b>
<b>Banana</b>	<b>29,214</b>	<b>11.2</b>
<b>Rambutan</b>	<b>18,353</b>	<b>7.0</b>
<b>Duku</b>	<b>16,466</b>	<b>6.4</b>
<b>Dokong</b>	<b>15,127</b>	<b>5.8</b>
<b>Pineapple</b>	<b>11,569</b>	<b>4.4</b>
<b>Cempedak</b>	<b>8,496</b>	<b>3.2</b>
<b>Manggo</b>	<b>8,226</b>	<b>3.1</b>
<b>Mangosteen</b>	<b>7,916</b>	<b>3.0</b>
<b>Duku Langsung</b>	<b>6,179</b>	<b>2.3</b>
<b>Watermelon</b>	<b>5,412</b>	<b>2.0</b>
<b>Guava</b>	<b>3,347</b>	<b>1.2</b>
<b>Papaya</b>	<b>2,682</b>	<b>1.0</b>
<b>Langsat</b>	<b>2,617</b>	<b>1.0</b>
<b>Nangka</b>	<b>2,519</b>	<b>1.0</b>
<b>Others</b>	<b>13,893</b>	<b>5.4</b>
<b>Total</b>	<b>262,113</b>	<b>100</b>

Source: Ministry of Agriculture, Malaysia  
(Agrolink)

**Table 2. Production, consumption and export of fruits (1994)**

	<b>Production (MT)</b>	<b>Consumption (MT)</b>	<b>Export (MT)</b>
<b>Banana</b>	<b>372,700</b>	<b>102,083</b>	<b>46,811</b>
<b>Durian</b>	<b>284,045</b>	<b>92,678</b>	<b>33,350</b>
<b>Watermelon</b>	<b>213,862</b>	<b>91,980</b>	<b>176,299</b>
<b>Pineapple</b>	<b>155,200</b>	<b>136,227</b>	<b>21,312</b>
<b>Rambutan</b>	<b>124,256</b>	<b>37,258</b>	<b>-</b>
<b>Cempedak</b>	<b>64,014</b>	<b>12,672</b>	<b>-</b>
<b>Papaya</b>	<b>60,540</b>	<b>46,400</b>	<b>34,863</b>
<b>Mango</b>	<b>54,395</b>	<b>21,672</b>	<b>-</b>
<b>Starfruit</b>	<b>44,445</b>	<b>11,951</b>	<b>8,218</b>
<b>Guava</b>	<b>39,850</b>	<b>13,318</b>	<b>-</b>
<b>Jackfruit</b>	<b>26,870</b>	<b>4,473</b>	<b>-</b>
<b>Mangosteen</b>	<b>25,960</b>	<b>5,934</b>	<b>3,168</b>
<b>Pomelo</b>	<b>n.a.</b>	<b>2,793</b>	<b>-</b>
<b>Others</b>	<b>n.a.</b>	<b>75,715</b>	<b>6,190</b>
<b>Total</b>	<b>1,466,137</b>	<b>655,154</b>	<b>330,211</b>

**Source: Malaysia Agricultural  
Directory & Index 97/98**

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## COMMITTEE ON COMMODITY PROBLEMS

### SUB-GROUP ON TROPICAL FRUITS

First Session

Pattaya, Thailand, 25-28 May 1998

**REPORT OF THE INFORMAL WORKING GROUP ON THE  
ESTABLISHMENT OF A TROPICAL FRUITS NETWORK**

## **REPORT OF THE INFORMAL WORKING GROUP**

An informal working group comprising representatives of 14 countries namely, Côte d'Ivoire, Cuba, Egypt, Fiji, France, Kenya, Malaysia, Netherlands, Philippines, Spain, Tanzania, Thailand, United Kingdom, and Viet Nam, met on 25 and 26 May 1998. The Group was chaired by Mr. G. Bosma from the Netherlands. It undertook the task of defining the views of interested members concerning (i) organization and governance; (ii) drafting of the constitution and by-laws; and (iii) location of the headquarters of TFNET, a voluntary grouping of producing and consuming countries, and reporting its decisions to the Plenary.

The Working Group decided that:

TFNET should be both inter-institutional (agency) and intergovernmental. The members of TFNET could be concerned national agencies, but they would act in concert through one national lead institution on intercountry decisions.

TFNET is a global network. Regional networks should be set up gradually as each region formed its own country groupings. The present focus should be on the global network. Where a regional network already existed or would soon be established, it might pilot operating linkages with the global TFNET.

There should be two categories of members. Ordinary members with voting rights and associate members. Ordinary members would be tropical fruits research and development agencies in the areas of production, consumption and trade in both producing and consuming countries. Associate members might be international aid agencies, private trading companies and other agencies deemed suitable by the governing body of TFNET.

Membership fees should be determined by the scale of production, consumption and trade, category of membership and other relevant factors. But this could be decided later when the first draft of the constitution and by-laws were ready.

It was agreed that Thailand would prepare the first draft of the constitution and by-laws and send it to member countries, by electronic mail wherever possible, for comment and approval.

Malaysia and Thailand were both acceptable as host countries of TFNET headquarters. They should be given the opportunity to decide among themselves as to which country should be the host. Both delegations undertook to arrive at a decision within three months and communicate it to the participants through FAO.

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**COMMITTEE ON COMMODITY PROBLEMS**

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**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**PRESENTATION BY THE COMMON FUND FOR COMMODITIES**

*Thank you Mr. Chairman,*

Please allow me first to express our thanks to the Intergovernmental Sub-Group on Tropical Fruits for inviting the Common Fund for Commodities to participate in this First Meeting of the Sub-Group. I wish to also express our thanks and appreciation to the host Government for the kind hospitality and excellent facilities made available for this meeting and for the Secretariat of the FAO for the excellent preparation it has made.

Mr. Chairman,

The Common Fund for Commodities was established in 1989 to provide commodity development support to developing countries with a view to maximizing their benefits from the export of primary and processed commodity based products.

It provides such assistance through International Commodity Bodies (ICBs) established on an intergovernmental basis comprising the major producers and consumers of the commodity concerned. To date these are twenty three such ICBs which have established links with the CFC. About half of these ICBs are operating under the auspices of the FAO. The Sub-Group on Tropical Fruits can also establish similar relationship with the CFC so that project proposals which the Sub-Group may wish to sponsor could be considered for financing by the Common Fund. In order to be designated as an ICB, the Sub-Group may take a decision for the Secretariat to apply for such designation. As the current status of Tropical Fruits is a Sub-Group, the meeting may opt between either being considered as an ICB in its own rights or a part of an integrated group with the IGG on Banana. The Fund is prepared to consider the Sub-Group's request either way. Pending the designation of the Sub-Group, however, we would be open to receiving project concepts and project proposals and to provide our comments and suggestion on the potentials of such project concepts and proposals.

Based on our experiences of collaborating with the other IGGs of the FAO, and considering that each meeting of the Sub-Group may take place only once in a biennium, we advise that a mechanism be established to act on project in the interim

between the session of the Sub-Group. These interim arrangement could be that the Chairman of the Sub-Group in consultation with the other members of the bureau act on behalf of the Sub-Group on project submission and on any other related matters.

Please bear with me a little bit more, Mr. Chairman, to say a few words on the types of assistance the Fund provide.

The Fund provides either:

- (a) total grant in which case no repayment of the financial support provided is expected; or
- (b) loans on either ordinary (near market rates); Intermediate (concessional) or highly concessional term (normally benefiting Least Developing Countries); or
- (c) a combination of both grants and loans. In this latter case a grant may be provided to make loan financing leave the desired impact through technical assistance.

As you would appreciate, the CFC is a rather small development financing institution and hence seek to achieve maximum impact from its limited resources. This is attainable in two ways:

- (a) By directing the Fund's resources to supporting priority projects which would have impact on a number of producing countries focusing on replicate measures to alleviate common problem of producers.
- (b) By directing the efforts mainly on small-holder and poorer population groups.

From the discussion yesterday, it was clear that there are apparent needs in all these direction. Value-addition, improvement of quality, productivity, use of wasted resources for by-product development and many other are relevant arise for support.

We see also training of technology and know-how between the producing countries themselves as potentially important also for support.

We will be available for any additional explanations or information during and after this meeting.

I have with me English, French and Spanish copy of our project manual for those interested to take a copy.

Thank you and apologize for being lengthy.

May 1998

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والزراعة  
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Organización  
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Unidas  
para la  
Agricultura  
y la  
Alimentación

**COMMITTEE ON COMMODITY PROBLEMS**

**SUB-GROUP ON TROPICAL FRUITS**

**First Session**

**Pattaya, Thailand, 25-28 May 1998**

**PERSPECTIVE AND PROSPECTS OF FRUIT CROPS IN PAKISTAN**

Pakistan Agricultural Research Council  
(Crop Sciences Division)  
\*\*\*\*\*

Islamabad, the 18th May, 1998.

BRIEF FOR THE 1ST SESSION OF THE SUB-GROUP ON TROPICAL  
FRUITS, BANGKOK - THAILAND

Pakistan is blessed with a variety of agro-ecological conditions ranging from sea level in south, and highest mountain peaks in the north which enable to grow all type of fruits in the country. The major cultivated area falls in the tropical and sub-tropical belt which favours growing of tropical and sub-tropical fruits. The major fruits of the country include Citrus, Mango, Guava, Datepalm and Apple for which the production figures are given as under during 1994-95.

<u>Fruits</u>	<u>Production</u> 000 Tons	<u>Export Million Rs.</u>
Citrus	1953	146
Mango	884	97
Guava	420	-
Datepalm	332	419
Apple	533	-
All fruits	5154	

For all the above fruits there are a number of varieties grown in the country, however, the selections initially were made for local markets but these are equally good for international markets. As the varieties of mango like Sindhri, Langra, Chaunsa, Alphanso, Anwar Rattol, etc. are the best varieties and are very much liked in the international markets. For Pakistan mangoes and other fruits potential markets are the Gulf states, East Asian countries and Europe where these are making good place.

The local marketing system is quite complex where the produce has to pass from many hands to reach the consumer, however, for the export markets, the exporters have organised themselves to get the fruit from the farm and send it to foreign

# Perspective and prospects of fruit crops in Pakistan

A.D. GOPANG\*

For the normal function and development of human body, protein and calories are needed in sufficient quantity. Calories are provided by the cereals, sugars, starchy roots and some vegetables, whereas protein is obtained from meat and egg while vitamins and minerals are secured through fruits. Although some fruits are also rich in carbohydrates, proteins, fats, etc yet they are valued most for vitamins which are indispensable for human health.

The fruit industry is of great benefit to the country as an important enterprise from economic viewpoint, besides providing materials for protective food in the human diet. Since the fruits contain high amount of dietary essentials, the importance of producing them in plenty for feeding the masses, has now been fully realized. Fruits not only ensure a higher income to the growers but also produce bigger yield of

nutritive food as compared to other field crops. It is a matter of satisfaction that pace of fruit production in the country has been encouraging despite some handicaps. Periodical progress achieved in the fruit production is indicated in Table 1.

Table 1. Area and production of fruits in Pakistan (1990-91)

	Area (m ha)	Production (mt)
Punjab	0.296	2.602
Sindh	0.085	0.613
NWFP	0.027	0.299
Balochistan	0.047	0.440
Pakistan	0.456	3.955

As is clear from Table 1, in Pakistan, fruits are being grown on an area of 0.448 million hectares (m.ha) and are returning total production of 3.879 million tonnes (mt). Punjab contributes the major share of 68.56 percent, followed by Sindh, North-West

Frontier Province (NWFP) and Balochistan.

A perusal of Table 2 depicts the periodical developments in area under fruit cultivation, fruit production and per capita availability of fruits. It can be seen that area under fruit cultivation increased from 0.072 m.ha in 1957-58 to 0.294 m.ha in 1985-86, whereas fruit production rose from 0.309 mt to 3.414 mt and per capita availability from about 8 kg/head to 36 kg/head during the corresponding period. Increase in per capita availability of fruit despite rapid increase in production is really encouraging.

Table 3 presents periodical development of fruit production in various provinces of the country. It can be observed that production in Punjab went up from 0.209 mt in 1957-58 to 2.550 mt in 1990-91. In Sindh, fruit production increased from 0.035 to 0.617 mt, in NWFP from 0.008 to 0.293 mt and in Balochistan from 0.067 to 0.419 mt during the same period.

It may be mentioned that area-wise, citrus fruits (0.171 m ha) are leading in the country, followed by mango (0.082 m ha), dates (0.041) m ha), guava (0.026 m ha) and banana (0.023 m ha).

From production viewpoint on country basis, citrus

**Table 2. Periodical development in area, production and per capita availability of fruits in Pakistan**

Year	Area (m ha)	Production (mt)	per capita availability (kg)
1957-58	0.072	0.309	8.50
1960-61	0.100	0.778	17.17
1970-71	0.170	1.574	25.61
1980-81	0.188	2.380	29.14
1981-82	0.226	2.532	30.07
1982-83	0.246	2.942	33.93
1983-84	0.265	3.170	35.46
1984-85	0.279	3.269	35.53
1985-86	0.294	3.414	36.01

**Table 3. Periodical development of fruit production in various provinces of Pakistan**

Year	Punjab	Sindh	NWFP	Balochistan
1957-58	0.209	0.035	0.008	0.067
1960-61	0.511	0.169	0.038	0.020
1970-71	0.923	0.352	0.111	0.188
1980-81	1.425	0.508	0.181	0.265
1981-82	1.551	0.518	0.201	0.262
1982-83	1.953	0.505	0.210	0.270
1983-84	2.135	0.508	0.226	0.300
1984-85	2.227	0.507	0.228	0.306
1985-86	2.347	0.505	0.243	0.317
1986-87	2.489	0.533	0.256	0.328
1987-88	2.704	0.600	0.283	0.346
1988-89	2.323	0.605	0.284	0.372
1989-90	2.510	0.608	0.282	0.390
1990-91	2.350	0.617	0.293	0.419

fruits are on the top (1.576 mt), followed by mango (0.766 mt), guava (0.347 mt), dates (0.284 mt), apples (0.232 mt) and banana (0.209 mt).

A glance through Table 4 reveals that Punjab is by far the

leading province as regard to the fruit production as it contributes 68.56 percent to the national production whereas Sindh shares 16.70 percent, Balochistan 9.09 percent, and NWFP 5.65 percent. The in-

teresting point to note is that the highest per capita availability of fruits is in Balochistan, followed by Punjab.

**Table 4. Contribution and per capita availability of fruits in various provinces of Pakistan**

	Contribution (%)	Per capita availability (kg)
Punjab	68.56	44.09
Sindh	16.70	23.58
NWFP	5.65	19.52
Balochistan	9.09	65.01

For quite some time, strenuous endeavours were made in Pakistan to increase fruit production so that huge amount in foreign exchange, being spent on them, be saved and invested in other nation-building activities. During early seventies, Pakistan started producing substantial quantity of fruits although the fruits at that stage were not surplus to national requirements, if measured on international standards yet, Pakistan had some marketable surplus. Fruit exports, in substantial quantity, started during 1972 and kept on increasing. During 1981, fruits worth Rs. 248.5 million were exported to various countries. Although there is a demand for Pakistani fruits in the international market, but the potential of export is not being fully exploited. If fruits, particularly citrus, mango, dates and

banana are exported after proper grading, treating with wax and packing in presentable packets, they can fetch much higher values and Pakistan can earn reasonable amount of foreign exchange through regulated fruit export (Table 5).

**Table 5. Fruit exports by Pakistan**

Year	Quantity exported (mt)	Value (m. Rs.)
1972-73	0.383	44.90
1973-74	0.212	32.60
1974-75	1.247	72.00
1975-76	0.642	111.00
1976-77	0.930	120.90
1977-78	0.505	88.80
1978-79	0.799	129.30
1979-80	0.797	204.50
1980-81	0.462	116.60
1981-82	0.676	248.50
1982-83	1.017	247.30
1983-84	0.713	277.30
1984-85	0.661	243.20
1985-86	0.964	483.70
1986-87	1.039	542.10
1987-88	1.044	644.40
1988-89	0.960	681.90
1989-90	1.014	785.30
1990-91	0.112	935.10

#### VARIETAL IMPROVEMENT OF SELECTED FRUITS

A brief review of varietal improvement work is presented in the ensuing paragraphs. (The presentation is divided into (i) introduction / selection / acclimatization, and (ii) breeding).

#### Introduction/Selection/ Acclimatization

##### *Citrus*

The following varieties of different citrus species have been recommended for cultivation and are being grown commercially.

##### *Sweet Orange*

Musambi, pineapple, hamlin, jaffa, blood red, ruby red, valencia late.

##### *Mandarin*

Foutrell's early, kinnow.

##### *Grape Fruit*

Foster, marsh seedless and duncan

##### *Lemon*

Eureka, lisbon, mayor.

##### *Sweet Lime*

Kaghzi, local

##### *Acid Lime*

Kaghzi lime

During 1974, 11 varieties of sweet orange were imported from Turkey and planted at the Experimental Garden, Faisalabad. The varieties were Illent, Naval, Hamlin, Akcay Sekari, Parent, Washington Naval, Campbell, Valencial, Shallowtr, Frost Naval, Frost valencial naval, Kozan, Ollnda Valencia, Trablus, etc.

Out of these, two varieties, Akcay Sekari and Trablus are showing good results

(although not superior to the existing varieties) and may show some promise.

Similarly, 81 varieties of different citrus species were imported from California during 1973 and planted at Experimental Orchard, Ayub Agricultural Research Institute, Faisalabad. The plant material was transferred to Horticultural Research Station, Sahiwal, during 1975 for further studies.

In addition, a total number of 23 citrus rootstocks were also imported from the United States during 1975 and are under observation at Sahiwal. The plant material is under trial and is expected to produce some results on nursery performance during the coming years.

##### *Mango*

The following varieties of mango are recommended for cultivation and are being commercially produced:

Malda, Sindhri, Langra, Dusehri, Anwar Ratool, Collector, Began Pali, Ghulab Khas, Samar Bahisht, Fajri, Sobe-di-Ting.

During 1962 and afterwards, 12 varieties of mango were imported and planted at Faisalabad. Out of these, Sensation has yielded good results and can hopefully be adapted as a very late variety. Mango varieties imported are listed hereunder (The United States

is the origin of all the varieties): Sensation, Early Gold, Keitt, Kent, Momi-K, Pope, Joe-welch, Zill, Tommy Atkins, Maya, Haden-Kensington.

As mentioned above, Sensation has given good result as a late variety in Punjab whereas another variety, Early Gold, has been supplied to Sindh and it is expected that it may acclimatize as an early variety there. This variety started flowering in December in the Punjab and it was severely hit by Frost at that time. As Sindh is comparatively free from frost, this variety may prove a success there.

During the recent years, some people started liking seedling type mangoes again. To select the best seedling types from the known mango-growing areas of Punjab and Sindh, a survey was undertaken during 1980-85. As a result, 61 types were collected and planted at Mango Research Station, Shujabad, for trial purposes.

#### Apple

Varieties, at present, recommended for commercial cultivation include Kulu, Kala Kulu Amri, Mashadi, Kandhari, Red Delicious, Golden Delicious, Starking Delicious, Skyspur, etc.

As many as 83 varieties of apple planted at Sunny Bank, Murree, are under trial in Punjab, whereas many more

have been imported from various sources at Agricultural Research Institute, Sariab, Quetta and Agricultural Research Institute, Tarnab, Peshawar. Main objective of the present collections is to introduce dwarf varieties on malling rootstocks so that high density plantation may be introduced.

Two varieties of apple, Skyspur and Nugget, were imported from the United States during 1967. Out of these, Skyspur has given excellent result and has become popular with the growers in Murree area. Plants of this variety have also been supplied to Balochistan during 1982-83. It is expected that this variety will also find favour with the growers in Balochistan.

During 1974, ten varieties of apple were imported from the United States which are as follows.

William Early Red, Tangier, Skyline Supreme, All Red, Mc-Intosh, Grimes Golden, Mangolia Gold, Dwarf 5 in 1, Grimes Golden EM 9, Melrose, and Double Red Lebanon.

Out of these varieties, Double Red Lebanon gave good results.

Recently, work has also been initiated to acclimatize apple under Soan Valley conditions in the Punjab. So far, a variety with low chilling requirement, Tropical Beauty, has borne fruit of good size and

shape.

Other material is still in juvenile stage.

#### Breeding Programme

Breeding programme in citrus was started in 1963-64 to evolve a variety with high yield, better quality and other characteristics. For this purpose, different combinations in citrus species were made which are as follows:

Pineapple x Hamlin, Jaffa x Pineapple, Valencia Late x Jaffa, Pineapple x Jaffa, Jaffa x Valencia Late, Feutrell's Early x King and Pineapple x musambi.

As a result of these efforts, a cross between Pineapple x Musambi produced better quality fruit. Twenty-four plants of this cross has been propagated and transplanted in the experimental progeny garden, Faisalabad, which are under trial.

Since 1977, 3000 reciprocal crosses of the following combinations are being made every year:

Jaffa x Valencia Late, Valencia Late x Jaffa, Valencia Late x Feutrell's Early, Feutrell's Early x Valencia Late, Feutrell's Early x Kinnow, and Kinnow x Feutrell's Early.

Seedlings of these hybrids are under trial. Sixteen plants have been transplanted in the field, 30 are in the nursery while 26 are still in earthen pots at Ayub Agricultural Research Institute, Faisalabad.

From spring, 1967, following inter-specific and inter-varietal crosses were made:

Musambi x Hamlin, Hamlin x Musambi, Jaffa x Musambi, Musambi x Jaffa, Musambi x Kinnow, Kinnow x Musambi, foster x Marsh seedless and Marsh seedless x Foster.

### **Mango**

Efforts were initiated for the first time on hybridization of mango during 1963, but no positive result could be achieved. Fresh efforts are being planned for undertaking crossing work on mango. Following inter-varietal crosses were made at the Mango Research Station, Shujabad:

Malda x Sindhri, Chaunsa x Dusehri, Sensation x Chaunsa and Swarnareka x Langra.

### **APPROPRIATE TECHNOLOGY FOR PRODUCTION**

At independence, majority of the fruit gardens in the country were not in a good shape and technology for the improvement of orchards was also not available. As the fruit cultivation gained popularity, research work on important factors of production was taken up to develop a package of technology for the growers. Important aspects which attracted the priority of research workers were as follows:

Nutrition, cultural practices, pollination in datepalm,

propagation techniques in various fruit plants, plant protection coverage, rootstock studies, post-harvest physiology and handling of fruits, use of growth hormones, and protection of fruits from weather vagaries.

### **Nutrition**

By now, nutritional aspects such as doses of organic manure, N, P and K, their time and methods of application have been worked out for the major fruits such as citrus, mango, guava, dates, banana, apple, etc.

### **Cultural Practices**

Cultural practices for all important fruits have been standardized. These practices include interculture, weed control, irrigation, pruning and intercropping.

### **Pollination in Datepalm**

Being dioecious, pollination in datepalm has always been a problem as somebody has to climb up a male tree for pollen and then again climb on to the female spathes for dusting the pollen. As a result of work done at Jhang, a small hand date pollinator has been developed. By using this pollinator, a man standing on the ground can dust the pollen on the female flowers and also can prune the undesired fronds by a saw which can be attached to the apparatus.

### **Propagation Techniques**

Propagation methods for all the major fruits have been improved and standardized and, in the recent past, efforts were initiated to develop an appropriate technology for multiplication of plants through tissue culture techniques. If these techniques work well, it is expected to revolutionize the propagation practices.

### **Plant Protection**

Major insect pests and diseases attacking and damaging fruit plants have been studied and effective control established. Yet, there are certain diseases which are causing lot of damage to fruit crops and need further investigation for their effective control. Similarly, some sucking moths (insect) attacking plum and apricot fruit, particularly in lower hills of Murree, are still a problem and need detailed investigation to establish effective control measures.

### **Rootstock Studies**

Rootstock plays an important role, particularly in citrus and apple. Keeping in view the importance of rootstock, a comprehensive research programme for rootstock studies on citrus have been started at Sahiwal. Similarly, rootstock studies on apple have been initiated at Murree, Tarnab and Sariab.

### Post-harvest Physiology and Handling of Fruits

Studies on this important aspect were started comparatively recently. Work on the extension of shelf-life of citrus and mango fruits is being carried out at Nuclear Institute for Agriculture and Biology and Ayub Agricultural Research Institute, Faisalabad, and for banana at Mirpur Khas.

### Use of Growth Hormones

Studies being conducted on various aspects of growth regulating substances are chiefly confined to pre-harvest drop in citrus and mangoes.

### Protection from Weather Vagaries

Successful studies have been conducted to minimize the fruit losses due to hailstorm damage in apple in Murree Hills by covering the plants with nylon nets.

Table 6 indicates per ha yield of major fruits in various provinces and also signifies average yield of these fruits on Pakistan basis. It is a matter of concern to note that per acre yields in Pakistan are low and lot of efforts are needed to improve the productivity of fruits

Table 6 Per hectare yield of major fruits in Pakistan (1990-91)

Fruit	Punjab	Sindh	NWFP	Balochistan	Pakistan
Citrus	9.22	8.91	8.46	5.75	8.08
Mango	10.32	7.47	10.33	7.32	8.91
Guava	7.42	5.97	9.73	5.88	7.25
Dates	6.43	5.82	6.68	9.03	6.99
Apple	7.35	2.04	14.16	8.03	7.89
Banana	5.07	9.09	18.04	16.91	12.28
Apricot	4.51	-	11.55	11.88	9.31
Peach	5.42	-	7.55	9.98	7.64
Pear	8.05	-	12.40	10.51	10.32
Plum	8.75	-	10.88	11.81	10.48
Pomegranate	6.24	-	11.38	12.92	10.18
Almond	7.75	-	2.45	4.25	4.81
Grapes	-	1.68	5.71	10.17	5.85

to bring it at par with the developed countries

### MESSAGE TO THE FARMERS

In Pakistan, about 75 percent of the farmers are small landholders and their economic conditions do not permit them to participate in the expensive modern agricultural practices. They want that their small-farm should not only provide them enough to eat but also be a source of

wood for house construction, fuel for cooking and fodder for the drought and milch cattle. In other words, they are in need of such farming techniques that would not only reduce their dependence on costly inputs but also be easy to comprehend and free from risks.

It is, therefore, suggested that the farmers should adapt the low-cost farming technology so as to get maximum benefit out of their small lands.

markets. The exporters are well aware of the grading and packing standards in the potential markets and made their efforts to comply with these standards. Recently mechanised systems have been introduced and are in operation in most producing areas. The market information system is quite weak and need to be strengthened.

The present session is a good opportunity to exchange the ideas and organise the group for achieving better prices. The immediate need is to organise the group for better flow of market information and production strategies. The producing countries can enter into potential markets with cooperation and collaboration. For this purpose the network to be established can play a vital role. Pakistan shall actively participate in these activities to achieve the goals of network.