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BANANAS AND PLANTAINS, 2ND EDITION

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DISTRIBUTION AND IMPORTANCE

ORIGINS AND EARLY DISTRIBUTION

Modern bananas and plantains originated in South-east Asian and western Pacific regions where their inedible, seed-bearing, diploid ancestors can still be found in the natural forest vegetation. Over many years, various inedible diploid subspecies of *Musa acuminata* Colla crossed naturally resulting in the production of numerous intraspecific hybrids. Some of these hybrids were parthenocarpic, female sterile and triploid in genomic structure, and local inhabitants discovered that such plants had edible fruits and could be propagated vegetatively by suckers. In this manner, superior edible crosses of *M. acuminata* would have been selected, cultivated, propagated and distributed locally as a food crop. Edible triploid bananas in South-east Asia were further selected according to vigour, fruit size and adaptability, and were developed at the expense of the original diploid types which were inferior. However, in certain areas (e.g. New Guinea) various edible diploids of *M. acuminata* were also preserved over the years.

Diploid and triploid selections of *M. acuminata* were taken by man to drier monsoon areas (India, the Philippines) where another wild and seeded diploid, *Musa balbisiana*, was growing naturally. In these areas, interspecific hybridization occurred to produce diploid and triploid crosses of *M. acuminata* × *M. balbisiana*. The early history of banana cultivation away from its centre of origin remains uncertain. The establishment of these hybrid clones on the periphery of the centres of origin would have occurred in prehistoric times, and the earliest records of cultivation are from India about 2500 years ago.

The introduction of *M. balbisiana* genes from the drier monsoon regions into *M. acuminata* clones from the humid tropics of South-east Asia conferred a measure of hardiness and drought tolerance into the hybrids. In addition, the *M. balbisiana* genes induced greater disease resistance, improved nutritional value, increased starchiness and provided hybrids suitable for cooking, as opposed to the pure *M. acuminata* cultivars which are sweeter and more suited to dessert use.

The distribution of edible bananas and plantains outside Asia is thought to have been via vegetative planting material transported by man. Any further diversification would then have occurred by natural somatic mutations.

The possible dates and routes for distributing *Musa* outside Asia are discussed in detail by Simmonds (1962) and Purseglove (1972). Bananas may have been taken from Indonesia across the Indian Ocean to Madagascar about AD 500 and thereafter into East Africa, Zaire and West Africa. Plantains arrived much later. Both bananas and plantains were known on the west coast of Africa in the 14–15th century when the Portuguese arrived. Somatic mutations obviously occurred, resulting in a large number of clones and a secondary centre of diversity in Africa. The Portuguese took bananas from West Africa to the Canary Islands, then in the 16th century bananas were taken from the Canary Islands to Santo Domingo (Dominican Republic) in 1516. This was the forerunner of further introductions into the Caribbean and Central America, where currently most dessert bananas for export are produced (Box 1.1).

Bananas and plantains have achieved greater importance as cash or subsistence crops in regions away from their primary centres of origin. The larger export trade in dessert bananas from Central America and the Caribbean began in the late 19th century and developed rapidly with the introduction of refrigerated shipment. This trade is based almost entirely on a small number of triploid cultivars of *M. acuminata*, of which around 95% are

Box 1.1. Main milestones of banana distribution and trade.

- c.AD 500 – Introduction to Africa from Indonesia (via Madagascar).
- c.AD 1000 – Distribution throughout Polynesia and introduction to Mediterranean areas during Muslim expansion.
- 1300s–1400s – Introduction to the Canary Islands from West Africa.
- 1516 – First recorded introduction to the New World (Santo Domingo) from the Canary Islands.
- 1500s–1800s – Distribution of bananas and plantains throughout tropical America.
- Early 1800s – Introduction to the New World of cultivars ‘Dwarf Cavendish’ and ‘Gros Michel’ from South-east Asia.
- Late 1800s– Beginning of international trade.
- 1900s – Banana becomes a major food item in the temperate-zone markets of the Western world as well as the Far East.
- 1993 – Establishment of the Common Market Organization (CMO) for banana in the European Union (EU), based on a quota system and other compensatory aids for European producers and African, Caribbean and Pacific (ACP) countries.
- 21st century – Continuous complaints from dollar banana countries towards the tariff-only system in EU markets. Lower tariff fees for banana from the dollar area accentuate the trend towards a more free banana market. Final agreement has been reached in 2010.

Cavendish types. Other speciality or exotic bananas, particularly red-coloured types, but also 'Apple' ('Manzano'), baby banana ('Bocadillo' or 'Pisang Mas') and ice cream ('Lady Finger') types are also exported on a small scale to fulfil niche markets. In the case of plantains, 73% of the world crop is grown and consumed in West and Central Africa and the cultivars are mostly triploid crosses between *M. acuminata* and *M. balbisiana*.

PRESENT DISTRIBUTION OF BANANA AND PLANTAIN

Tropical banana countries which produced dessert fruit for export in 2006 were, in order of importance, Ecuador, the Philippines, Costa Rica, Brazil, Colombia and Guatemala (Table 1.1).

Table 1.1. World trade statistics – major importers and exporters of dessert bananas in 2006 (from FAOSTAT, 2010).

Major importing countries	Volume (× 1000 t)	Major exporting countries ^a	Volume (× 1000 t)
USA	3,839	Ecuador	4,908
Germany	1,292	The Philippines	2,312
Belgium	1,180	Costa Rica	2,183
Japan	1,044	Brazil	1,943
UK	925	Colombia	1,568
Russian Federation	894	Guatemala	1,055
Italy	646	Honduras	515
China/Hong Kong	459	Panama	431
Canada	458	Ivory Coast	286
France	408	Cameroon	256
Argentina	295	Dominican Republic	187
Iran	294	Bolivia	81
South Korea	280	Belize	73
The Netherlands	279	Mexico	67
Ukraine	272	Yemen	60
Saudi Arabia	235	Surinam	45
Sweden	188	Nicaragua	38
Chile	166	Saint Lucia	35
Algeria	147	Sri Lanka	35
Portugal	142	Lebanon	34
Spain	133	Jamaica	32
Austria	130	Malaysia	24
Czechoslovakia	122	St Vincent and the Grenadines	24
Others	2,023	Others	597
World imports (total)	15,851	World exports (total)	16,789

^a Excluding re-exporting, non-producing countries and ultraperipheral regions of the European Union (RUPS).

Export-producing countries do not differ much from those referred to for the year 1992 in the first edition of this book. The important exception is Brazil which ranked 15th in 1992 and now occupies 4th position. Global export volumes have increased by around 56% (from $10,765 \times 10^3$ t in 1992 to $16,789 \times 10^3$ t in 2006). Cultivars are usually triploids of the *M. acuminata* (AAA) genome, which form the basis of world export trade in bananas. However, similar to 1992, this amounts to only 14.75% of all *Musa* production worldwide (Tables 1.1, 1.2 and 1.3).

Export operations in Latin America are usually controlled by multinational companies, but these companies, in contrast with last century, when they started operations in Third World countries, have mostly left plantation management in the hands of individuals or local company producers. Cultivation systems are generally orientated towards very large plantations, flat topography, extended plantation life, extensive technical

Table 1.2. World production statistics for bananas in 2006 (from FAOSTAT, 2010).

Country	Production ($\times 1000$ t)	Country	Production ($\times 1000$ t)
Asia		Central America and Caribbean	
India	20,858	Costa Rica	2,220
China	7,115	Mexico	2,196
The Philippines	6,795	Guatemala	1,001
Indonesia	5,037	Honduras	890
Thailand	2,000	Dominican Republic	548
Vietnam	1,350	Panama	440
Bangladesh	909	Others	1,464
Malaysia	530	Total	8,759
Others	1,051		
Total	45,645		
		Africa	
South America		Burundi	1,600
Brazil	6,956	Egypt	885
Ecuador	6,127	Cameroon	860
Colombia	1,750	Uganda	615
Venezuela	509	Kenya	600
Others	481	South Africa	344
Total	15,823	Others	3,235
		Total	8,139
Oceania		Europe	
Papua New Guinea	870	Spain	362
Australia	181	Others	38
Others	163	Total	400
Total	1,214		
		Total (world)	79,980

Table 1.3. World production statistics for plantains in 2006 (from FAOSTAT, 2010).

Country	Production (× 1000 t)	Country	Production (× 1000 t)
Africa		Central America and Caribbean	
Uganda	9,054	Guatemala	1,049
Ghana	2,900	Cuba	532
Nigeria	2,785	Dominican Republic	413
Rwanda	2,653	Honduras	287
Ivory Coast	1,500	Haiti	280
Cameroon	1,400	Others	470
Democratic Republic of Congo	1,203	Total	3,031
Tanzania	600	Asia	
Others	1,794	Myanmar	625
Total	23,889	Sri Lanka	504
South America		Others	0
Colombia	3,400	Total	1,129
Peru	1,772	Oceania	
Ecuador	581	4	
Bolivia	450	Total (world)	
Venezuela	335	34,623	
Others	32		
Total	6,570		

infrastructure and high quality fruit. The main importers of this fresh fruit are USA, EU countries, Russia, Japan, China/Hong Kong and Canada (Table 1.1).

Other tropical production areas, besides those in Latin America and the Philippines, grow dessert bananas for export. They are in the Caribbean (Windward Islands, Martinique, Guadeloupe) and West Africa (Ivory Coast, Cameroon). Their export volumes are considerably smaller than those from Latin America (Table 1.1). In these Caribbean/African countries, cultivation systems are orientated to smaller farm units, regular replanting, topographical variations and less permanent infrastructures, but still emphasizing fruit quality for export. A trend towards organic cultivation is being strongly developed in some countries, particularly in the Dominican Republic, which is the leading organic banana export country (Arias *et al.*, 2004; CIRAD, 2007b).

Musa (AAA) dessert bananas are also produced commercially in subtropical and Mediterranean climates, far away from their centres of origin. These areas include New South Wales, Western Australia, South Queensland, South Africa, Israel, Taiwan, the Canary Islands, Morocco, Egypt and parts of Brazil. Such localities are situated at latitudes above 20°N and S, and are

characterized by wide seasonal variations in rainfall and temperature. The industries are intensive but small, being limited by the size of local markets. Export is usually not possible due to either quality, economic or logistical constraints. However, some short-distance regional export does take place to traditional markets, for example, from Taiwan to Japan and from the Canary Islands to mainland Spain. Cultivation systems are orientated towards coping with extremes of heat or cold, competitive influences on the plant and providing efficient supplementary irrigation. In some cases, particularly in Morocco, the Canary Islands, Turkey and Israel, very successful greenhouse cultivation is practised (Galán Saúco *et al.*, 2004). A major advantage of subtropical/Mediterranean areas is that they are usually free of the crippling leaf diseases which plague bananas in the humid tropics.

Subtropical and Mediterranean countries which grow commercial dessert bananas produce very small volumes in comparison with tropical and monsoonal localities. Only Egypt with 885×10^3 t and Spain with 362×10^3 t appear individually on the list in Table 1.2. However, other countries like Australia and South Africa, with 275×10^3 t and 344×10^3 t, respectively, in 2006, have, as with Egypt, significantly increased their levels of production compared with those given for 1992 in the first edition of this book. Israel, with 122×10^3 t has maintained stable production, like the Canary Islands. Compared with this, India, the Philippines, Indonesia, China, Thailand, Brazil, Burundi, Costa Rica, Ecuador or Colombia produce massive volumes of dessert bananas. Colombia, Costa Rica and to a lesser extent Ecuador, the Philippines and Brazil, export most of their production, while the other countries market almost all their bananas internally. It is interesting that a large proportion of the published international research into banana production originates from the marginal subtropical and Mediterranean countries and this research concentrates on AAA (Cavendish subgroup) cultivars. Results have demonstrated that appropriate management can produce very high yields over a wide range of climate in these areas.

Plantains and other cooking bananas are only produced in tropical countries and are mostly consumed locally. Only 1.62% of the world plantain production is exported (Tables 1.3 and 1.4). Imports are concentrated in the USA (48% of total imports in 2006). In the humid tropics, a wide range of plantains and cooking bananas are grown for local cash cropping and for subsistence. Cultivars grown are mostly triploids and hybrids of *M. acuminata* and *M. balbisiana*, such as AAB plantains and ABB cooking bananas. About one-third of all these cultivars belong to the Horn-type plantain (AAB). Most plantains and cooking bananas are produced in Central and West Africa, although Colombia and Peru are also major producers (Table 1.3). Four African countries together (Uganda, Ghana, Nigeria and Rwanda) accounted for 51% of all plantain production worldwide in 2006. Cultivation systems in these countries are based on low-input sustainable farming methods involving organic fertilization, regular replanting, rotation cropping, hand weed control,

Table 1.4. World trade statistics – major importers and exporters of plantains in 2006 (from FAOSTAT, 2010).

Major importing countries	Volume (× 1000 t)	Major exporting countries ^a	Volume (× 1000 t)
USA	246	Ecuador	167
El Salvador	55	Colombia	130
Colombia	28	Guatemala	75
Belgium	25	Peru	57
Spain	22	Costa Rica	36
UK	21	Nicaragua	26
The Netherlands	16	Belgium	26
France	12	Venezuela	12
Others	69	Others	20
World imports (total)	494	World exports (total)	549

^a Excluding re-exporting, non-producing countries and RUPS.

mulching, and intercropping combinations to increase cash flow. There is a general absence of chemical farming or other inputs of capital and technology (Ddungu, 1987; Jaramillo, 1987; Wilson, 1987). The recent interventions of multinationals (see below) in some African countries can drastically improve this situation.

MAIN BANANA-PRODUCING COUNTRIES

Banana-producing countries, according to world production and trade, are usually classified into four large groups, namely the dollar area, ACP countries, EU producers and other producing countries. They will be treated separately in this chapter.

The dollar area

In 2006, Ecuador was the largest exporter of bananas, doubling the exports it made in 1992 (4908×10^3 t and 2557×10^3 t, respectively) and more than doubling the quantities exported by the Philippines and Costa Rica, which rank second and third, respectively, as banana exporters (Table 1.1). This growth is mainly based on increased plantings and to a lesser degree by increased yields. In contrast with other dollar countries, the trend in Ecuador is small-scale production on farms of 10–50 ha and with local producers. There is only a token presence of multinationals (around 1%). Regarding marketing, local farmers are not well organized and production is bought by intermediaries, either multinationals or other big producers who establish contracts with

the farmers and export to the USA and Europe. There are good prospects for increasing banana exports from Ecuador by upgrading charge terminals and increasing yields. Also, efforts to improve social conditions of banana workers must be prioritized, since Ecuador had the lowest salaries of all Latin American banana export countries in 2000 (Arias *et al.*, 2004).

In 2006, Costa Rica was the second most important export country in the dollar area. Bananas are cultivated in relatively large plantations, controlled by private producers and multinationals. Cobal (Chiquita), Bandeco (Del Monte) and Standard Fruit Co. (Dole) controlled about 80% of banana exports in 2000 (Arias *et al.*, 2004), a figure which has not changed much in recent years. Despite the growing incidence of black Sigatoka during the 1990s, Costa Rica still has the highest productivity in Latin America. It also has the most strict environmental regulations and social standards, and also pays the highest salaries to banana workers. While this enhances increased exports to selected high price markets, it becomes difficult to compete on the normally priced banana market. Reduced production costs are difficult to achieve as a result of: (i) high salaries; and (ii) growing resistance of black Sigatoka to systemic fungicides. Unlike Ecuador, banana exports from Costa Rica have grown only moderately from 1992 to 2006 (1769×10^3 t to 2183×10^3 t, respectively) and future prospects are uncertain. However, in the UK market, three out of every ten bananas consumed are from Costa Rica and supermarkets have recently increased the consumer price (Banana Link, 2008).

Colombia, until recently number three as a dollar banana exporter, and now surpassed by Brazil, has not increased its exports by much (1500×10^3 t in 1992 to 1568×10^3 t in 2006). Despite concerted efforts to improve productivity, develop export infrastructures and reduce pesticide use, Colombia is in a conflict zone, which reduces banana development potential.

Brazil has significantly increased its position in the export market (92×10^3 t in 1992 up to 1943×10^3 t in 2006). Despite this growth, Brazil exported less than 30% of its total production in 2006 and productivity (14.1 t/ha) is low compared with either Costa Rica (55.1 t/ha) or even Ecuador (27.7 t/ha). This is due to an increased internal demand and the wide diversity of banana varieties unsuited to export (Rodrigues and Leite, 2008). Banana is produced in all Brazilian states and is an important source of income for families and private enterprises. Multinationals have only a minor influence, but the recent significant increase in exports is linked to new projects of multinationals (Anon., 2010).

Despite Mexico being an important banana-producing country, ranking fourth in Latin America, exports are low and diminished from 180×10^3 t in 1992 to 67×10^3 t in 2006. This is despite its proximity to the USA export market. As with Brazil, local consumption of banana is high due to: (i) all-year-round production; (ii) low production cost; and (iii) high nutritional value. The presence of multinationals is also minimal. Mexico produces organic bananas and has a high potential for future exports to this high-priced trade.

Guatemala had an unchanged banana surface area of around 20,000 ha during the last 50 years. Exports increased consistently, reaching 1055×10^3 t in 2006, more than doubling that of 1992. Due to poor internal transport and export facilities, its potential for increased exports seems low. Despite this, Guatemala was the largest banana exporter to USA in 2008 (Anon., 2009a).

The main producers in Honduras are multinationals (Chiquita and Dole), and the remainder are independent producers and peasant cooperatives that also market their production through multinationals. Climatic disasters, the most important in recent years being the 'Mitch' hurricane, have reduced both production and export (the latter decreasing from 800×10^3 t in 1992 to 515×10^3 t in 2006).

Panama, once one of the most important banana export countries, has seen a significant reduction in both production and exports since Chiquita sold its largest plantation to a group of workers at the turn of the century (Arias *et al.*, 2004). Nicaragua, also once an important banana export country, continues to lose relevancy in both production and export. Other minor countries in the dollar area are Venezuela, with reduced shipments to Europe, and Peru which has increased its investments in the organic and fairtrade segments (CIRAD, 2007a), thus increasing the value of its banana exports since 2004 (Anon., 2009a).

ACP countries

The term 'ACP' refers to the 48 African, Caribbean and Pacific countries, which are ex-colonies of the EU, or signatories of the 1975 Lomé Convention and later treaties with the EU. Treaties were designed to protect their economies, largely based on agricultural production. Originally 12 banana countries were considered traditional ACP, namely: Saint Lucia, St Vincent and the Grenadines, Jamaica, Belize, Surinam, Dominica, Grenada, Ivory Coast, Cameroon, Somalia, Cape Verde and Madagascar. The three last named ceased banana exports to the EU during the 1990s, while Dominican Republic obtained ACP status in 1990 and Ghana recently began to export bananas to Europe.

Within the Caribbean zone, Dominican Republic has increased its exports (187×10^3 t in 2006) consolidating its position as world leader in organic and fairtrade exports. This is due to: (i) planting in relatively dry areas; (ii) sound cultural practices with reduced pesticide use; and (iii) certified production (about 50% of their production is certified organic; Anon., 2009a). However, their recent outbreak of black Sigatoka is affecting organic exports which decreased by 50% in 2008 compared with 2007 (Reefer Trends, 2008). Banana production is also important in Jamaica and the Windward Islands, which have small plantings of around 1 ha and with lower yields of about 10 t/ha, but this contributes much to their social and economic development. Despite a significant reduction in banana area, production is stabilized with

a core of active, modern growers who obtain good yields and adhere to the market demands for certification (CIRAD, 2007a).

Based until recently on a tariff-free quota for entrance into the EU (see below), ACP countries do not usually exceed this quota after establishment of the 1993 CMO of the EU. However, all ACP countries, including Jamaica, St Lucia and Surinam, recently increased their exports to EU which, if continued, can stabilize production in these countries. Unfortunately, 2007 was characterized by climatic disasters, such as hurricane 'Dean', which seriously reduced Caribbean production. It is difficult to predict the future for these countries although various international organizations and non-governmental organizations (NGOs) continuously emphasize the need to maintain banana production in this region. Recent agreements between Windward Islands producers of 'fairtrade' banana, and the export company WIBDECO (Rose, 2008), and also the unprecedented cooperation between Windward Islands and French West Indies (FWI) producers (Reefer Trends, 2009b), will boost Caribbean banana production.

Within African ACP countries, the situation has not changed much recently, with Cameroon and Ivory Coast (both around $250\text{--}300 \times 10^3$ t) leading the exports to the EU. Most bananas in Ivory Coast are produced on 65 farms with a total surface area of 5500 ha, while in Cameroon, multinationals are established as important producers. Multinationals control the export trade in both countries (Arias *et al.*, 2004). Recently, Ghana entered the export trade and Mozambique and Angola have initiated planting projects with the support of multinationals, to export bananas to Europe from 2010 (Bright, 2008).

Important changes occurred in January 2008 in the EU with the liberalization of the market for ACP countries that signed a European Partnership Agreement (EPA), giving them similar advantages to European banana producers. This gives additional benefits to ACP countries for as long as the customs tariff for other countries remains high enough. However, the expected severe reduction of this tariff (see 'Political issues' in this chapter) in the near future could make this advantage tenuous (Loeillet, 2007a, 2008b).

EU producers

All European banana producers benefited until recently (see 'Political issues' in this chapter) from the CMO, established on 1 July 1993, set up to maintain production of bananas in the outer (ultraperipheral) regions of the EU, also called RUPS (see 'Factors Influencing World Trade' in this chapter).

The Canary Islands (Spain), the main producer of the EU, maintained a steady production area of around 9000 ha, with 400×10^3 t produced annually, and exporting around 90% to mainland Spain with the rest sold locally (Galán Saúco and Cabrera Cabrera, 2006). Banana cultivation in

the Canary Islands is highly intensive, with imported soil and terraces, and small farms, averaging around 1 ha. Producers are grouped in OPPs, the Organisations of Banana Producers, which are further integrated in a regional structure called ASPROCAN, the Association of Canary Islands Producers, created to support banana production in the islands. In turn this is integrated in a supra regional body called APEB, the Association of European Banana Producers, in conjunction with Madeira, Martinique and Guadeloupe. The main advantage of the Canary Islands compared with most other banana-growing regions of the world, is the absence of Sigatoka and *Radopholus similis*, and the relative freedom from other serious banana pests. Another advantage is that they are close to the Spanish market (less than 3 days to any Spanish port).

Cultivation of banana in the Canary Islands is a clear example of how the horticultural sector and research have combined for sustainable and successful production. Research has led to the highest yields in the world, reaching up to 100 t/ha/year on the best farms. This is based on a combination of selected local varieties and improved cultural techniques, including greenhouse cultivation (see Chapter 8) which now occupies one-third of the total banana area. Publicity campaigns have highlighted the excellent taste of speciality bananas, (mostly Dwarf Cavendish cultivars), produced in the Canary Islands. Special efforts were made to change the perception of 'defects' in the external appearance of Canary Islands bananas (small size, irregular yellowing and presence of small black spots) into one of improved internal quality, in contrast to the extremely neat appearance and bright uniform yellow colour of the tropical bananas commercialized by multinationals. In this way, a clear segmentation of the Spanish market has been obtained between 'plátanos' (from the Canary Islands), more-preferred and paid for by the consumer, and 'bananas' (from other regions).

The FWI (Martinique and Guadeloupe) are also important EU producers, but seldom achieve more than 300×10^3 t of production, annually. Although most farms are small, the average size is larger than in the Canary Islands, and some farms exceed 50 ha. Average yields are 35 t/ha, much lower than in the Canary Islands and frequent hurricanes cause serious damage, as in other Caribbean countries. Similar to the other RUPS, banana growing is the main agricultural occupation. Bananas are exported only to the EU and mainly to the French market. The union of banana-producing groups of Guadeloupe and Martinique, UGPBAN, handles the promotion of bananas from FWI and works in close cooperation with ASPROCAN (Canary Islands) and also with producers in Madeira, on technical and policy issues. As in all the other RUPS, agriculture is subjected to strict regulations to protect the environment and especially to reduce pesticide use. Unlike in the Canary Islands, Sigatoka is present in FWI (only yellow Sigatoka until 2009). Nevertheless, combined efforts of growers and research centres, with support from government, have led to an integrated system of banana cultivation, combining: (i) weather forecasting; (ii) pathogen monitoring; (iii) use of vitroplants; and (iv) crop

rotation with sugar cane (Loeillet, 2008a). Through this programme, the FWI sector has reduced pesticide application by 50% in 10 years and in the next 5–10 years a further 50% reduction is projected (Lescott and Loeillet, 2008).

The island of Madeira is the other important EU producer. Average farm size is even smaller than in the Canary Islands and climatic conditions slightly cooler, which reduce banana yields. The industry is based on 'Dwarf Cavendish' but since greenhouses are forbidden due to the undesirable visual impact, the importance of banana production in Madeira has diminished since the 1993 CMO, from around 50×10^3 t to $30\text{--}35 \times 10^3$ t in recent years. Strong competition from Canary Islands bananas in the Portuguese market is another reason for banana decline in Madeira.

Finally in the EU, very minor production of bananas (less than 100 ha) is found in mainland Portugal (El Algarve) and also in Cyprus, Greece and Malta, but they are insignificant and locally consumed.

Other producing countries

Production from Asia and Pacific countries (area of origin of the *Musaceae* family) is mostly directed to local consumption or for regional trade. In the Philippines, bananas constitute the main fruit crop in terms of area, production and exports (428×10^3 ha, 6795×10^3 t and 2312×10^3 t in 2006, respectively, accordingly to Food and Agriculture Organization (FAO) statistics). Small-scale, family-based production with low yields around 10 t/ha predominates in the Philippines and only a small percentage of total production is exported, this from large plantations with high technology and yields around 40t/ha. Exports are in the hands of multinationals who market the bananas in Japan, China, Korea, Taiwan and in the Arabic countries of the Middle East (Arias *et al.*, 2004).

India, the largest producer of bananas in the world (Table 1.2), but also a country with low productivity, has only recently initiated exports to the Middle East. Australia, with production in both the semi-tropical and the subtropical areas of the country, possesses excellent research and technical services which facilitates very high banana productivity. They were able to eradicate a localized outbreak of black Sigatoka disease in 10 years and are busy eradicating bunchy top virus (Lescott, 2008). Besides local consumption, some exports are directed to Asian countries, including Japan. China has increased its production strongly in recent years and despite the importance of their internal market, will probably become an important export country in the near future. Small-scale regional exports are also undertaken by countries like Vietnam, Indonesia, Malaysia and Thailand. Egypt and South Africa are also important subtropical producers of bananas, the latter with a very efficient, high-yielding industry of about 12,000 ha, supported by good research, but with no export outlets.