

MANGO PRODUCTION AND INDUSTRY IN INDONESIA

Yuniarti and Pudji Santoso

Karangploso Assessment Institute of Agriculture Technology

PO Box 188

Malang 65101, East Java, Indonesia

Tel. 0341-494052, Fax. 0341-471255

Keywords: East Java, export, extension effort, extension problems, mango production and industry

Abstract

East Java is the main producer province for mango in Indonesia. Besides Java, the prospective zones for mango extension are South Sulawesi, South East Sulawesi, West Nusa Tenggara, East Nusa Tenggara and East Kalimantan. Commercial varieties in Indonesia are Arumanis, Manalagi, Golek, Lalijiwo. These varieties are mostly produced in East Java, and Gedong, Indramayu which are produced in West Java. The main varieties sold for export market are Arumanis and Gedong. Within 1987 to 1996, the highest export volume in 1995 from Indonesia reached 694 ton to Taiwan, Singapore and Brunai Darussalam, but at that same year Indonesia also imported mango from Thailand and Australia by 45 ton. Pasuruan regency is the biggest production centre for mango in East Java, it contributed as much as 21.1% of the total mango production in East Java in 1996. There are not so many mango industry in East Java, even the raw material is abundant during the season, on volume and variety.

To support extension program of mango industry in Indonesia, it need a government involvement in preparing a complete packing house in several production centre, funding small farmers or entrepreneurs with low interest credit for improving cultivation management and increasing market connection for export, to secure the success of farming system on mango.

1. Introduction

Mango trees grow well in any soil type, at the altitude of 3-500 a.s.l, with D, E and F climate type (Schmidt and Ferguson, 1952). East Java is the biggest province on mango production in Indonesia, followed by Yogyakarta, Central Java and West Java. Mango production of each province in Indonesia in 1995 is presented in Table 1. For provinces outside Java, Aceh is the leader, followed by Bali and East Nusa Tenggara. Mango season in Java are on January-March and August-December, while in the other islands it shows high variation (Table 1).

Based on the result of land-suitability mapping, there are still many possible extension zones for mango in South Sulawesi, South East Sulawesi, West Nusa Tenggara, East Nusa Tenggara and East Kalimantan (Table 2).

Commercial mango varieties in Indonesia are Arumanis, Manalagi, Golek, Lalijiwo. These are mostly produced in East Java, and Gedong, Indramayu which are produced in West Java. Varieties that are mostly exported included Arumanis and Gedong.

Nutrient content of main varieties of Indonesian mango is presented in Table 3.

There are 302 mango varieties as germplasm at Cukurgondang Research and Assessment Installation for Agricultural Technology (Cukurgondang RAIAT), Pasuruan, East Java, they were obtained from local and overseas. Trees in this collection had been selected and resulted in 18 promising varieties that are potential to be exported and processed (Purnomo, 1988).

During the peak season, plenty of local varieties can be found at the traditional market such as Endog, Podang, Kopyor, Madu, Bapang in East Java; Sengir, Nanas, Malam in Central Java and Yogyakarta. Price of these local varieties are lower than the commercial ones. Some of them can be used as processed fruit, such as juice or concentrated juice for Podang. Combination of Kopyor and Kweni (*Mangifera odorata*) resulted in a delicious taste of juice. Dehydrated sugar coated fruit usually made from these local variety which are easily found in supermarket or foodstore.

2. Export potential

Mango was placed the third rank for fruit export volume and value during 1995 in Indonesia (Table 4). First rank was fresh banana followed by mangosteen. Export for mango in Indonesia in 1995 was the highest for the period of 1987-1996 decade, with the volume of 1694 ton for US\$ 1,311,728. The main destination countries were Taiwan, Singapore and Brunai Darussalam. The main export port was Sukarno-Hatta airport, Jakarta as much as 994 ton valued at US\$ 598,726 followed by Juanda airport, Surabaya for 337 ton valued at US\$ 538,576 and Tanjung Perak harbour, Surabaya for 261 ton valued at US\$ 114,848 (Anonymous, 1997b).

In the same year (1995), Indonesia also imported mango as much as 45 ton valued at US\$ 83,591, that consisted of 37 ton (82%) coming from Thailand for US\$ 69,500 and Australia of 8 ton valued at US\$ 13,140 (Anonymous, 1997b).

3. Extension prospect of mango in East Java

From 1981 to 1990, numbers of mango trees in East Java increased by 6.93% each year. In early 1981, number of trees was 1.3 million, and increased to 3.4 million at the end of 1990. From 1.3 million trees in East Java, 18% of them are located in Pasuruan, Bangkalan and Probolinggo. In 1981, Pasuruan contributed 40% of East Java production, while in 1996 it decreased into 21.1% (Anonymous, 1996a). This was caused by existing of young trees with low productivity. Nevertheless, Pasuruan is still as the leader mango producer in East Java.

Usually, mangoes are cultivated in lowland of the north coastal area of Java. Nowadays, mangoes are cultivated in marginal area, but no perfect data were given on the numbers and land characterization. Besides growing as backyard tree, mango is also managed as an orchard with intensive culture technique by some big entrepreneurs.

Average land ownership by farmer is 0.87 ha (from the range of 0.5-2.0 ha), as rainfed-land. Usually, mangoes are mixed with foodcrops such as rice, maize, soybean and cassava. Land ownership by big entrepreneurs for orchard form ranged from 52 to 250 ha with the average of 100 ha in 1993.

Planting density of mango trees by the farmers is around 66-500 plants/ha, using spacing of 12 × 12 m to 4 × 5 m, with the average of 9 × 9 m. Planting space of mango monoculture orchard is 4 × 4 m. Characteristics of mango farming system by the farmers are presented in Table 5.

Farmers' participation on culture technique of mango in East Java is presented in Table 6. Most of the farmers used budding trees. Fertilizer used are organic and an-organic fertilizer.

Arumanis, Golek and Manalagi are the most popular varieties which are cultivated in East Java. Production of this three varieties in East Java is presented in Table 7.

Lately, the extension of mango by the government of East Java province is directed into carpet-orchard form, with the smallest acreage of 50 ha, which is objected to marginal and lowland area. There are 3,256,697 ha of lowland area in East Java, and still around 11,791 ha uncultivated.

4. Marketing of East Java mango

Most of East Java mango are sold in local market and only little of them are sold

for export. Although mango export from East Java is considered small compared to their production, but its' contribution to Indonesian export is relatively high (Table 8).

The main destination countries for export of East Java mango were Singapore, Hongkong and Kingdom of Saudi Arabia. The main variety sent was Arumanis as much as 75% and the rest (25%) were others varieties. In 1997 East Java mango dominated export market in Malaysia. It was predicted that the total volume of East Java export to Malaysia was around 100 ton (Indrawan, 1998). Those mangoes came from Gresik, Pasuruan, Bangil and Mojokerto regency. The other destination countries in 1997 were Singapore and the Netherlands. Total export of East Java mango sent by Juanda airport was around 600 ton in 1997 (Indrawan, 1998).

Central domestic markets for East Java mango are wholesale market in Kramat Jati, Jakarta and Genteng, Surabaya for good quality fruits and local market around the production centre for low quality ones. Grade classified for Arumanis mango based on consumers' preference is presented in Table 9. Eventhough, grading criteria for export market can be changed based on importers' preference.

There are 11 mango orchards owned by some big entrepreneurs at the production centre in Pasuruan, Probolinggo, Gresik, Mojokerto, Jombang, Situbondo and Bangil. All of them are intensively managed and directed for export market.

Only few mango processing industries are found in East Java, even there are abundant of fruits produced. Some of the processing industries are mango juice industry located in Surabaya, concentrated mango juice industry in Kediri, mango chips industry in Probolinggo and dehydrated sugar coated mango industries in some places. Some of these products have been exported to Europe such as juice and concentrated juice.

5. Extension problems of mango industry in East Java

One problem in extension effort of mango industry in East Java is most of mango plants in East Java are cultivated as backyard mixed with others plants, so that cultivation can not be optimally managed. The use of monoculture system on planting technique will improve this cultivation management. Spreading location of the production centre causes the difficulty in handling and controlling quality of harvested fruits, consequently quality of fruits are varied and hard to meet the qualification for export market. Preparing a packing house in some production centre which is provided with cooling facilitate will be useful for handling and controlling quality, storing and packing harvested fruits before distribution.

High cost investation on monoculture orchard make it difficult to be covered by small farmers or entrepreneurs, therefore to improve mango industry in Indonesia, especially in East Java, it is still need governments' involvement to facilitate credit with low interest. Well managed on cultivation and marketing of the product also need to be improved to secure the success of farming system on mango. Increasing market connection for export market is one important thing to do.

6. Conclusion

East Java is the biggest potential province for producing mango in Indonesia. This province is still possible to be developed for extending mango industry in Indonesia.

Some possible extension zones for mango outside Java are South Sulawesi, South East Sulawesi, West Nusa Tenggara, East Nusa Tenggara and East Kalimantan.

To support extension program of mango industry in Indonesia, governments' involvement in preparing a complete packing house in some production centre, funding small farmers or entrepreneurs with low interest credit for improving cultivation management, and increasing market connection for export are needed.

References

Anonymous. 1992a. Laporan tahunan 1992. Dinas Pertanian Tan Pangan Daerah Prop. Daerah Tk. I Jawa Timur. Surabaya. (in Indonesian)

- Anonymous. 1992b. Prospek pasar mangga dalam dan luar negeri. Kanwil Perdagangan Jawa Timur. Surabaya. (in Indonesian)
- Anonymous. 1996a. Laporan tahunan 1996. Dinas Pertanian Tan. Pangan Daerah Prop. Daerah Tk. I Jawa Timur. Surabaya. (in Indonesian)
- Anonymous. 1996b. Rancang bangun sentra pengembangan agribisnis komoditas unggulan mangga di kabupaten Pasuruan, Propinsi Jawa Timur. Kanwil Deptan Propinsi Jawa Timur. Surabaya. (in Indonesian)
- Anonymous. 1997a. Vademekum pemasaran 1986-1996. Dit. Bina Usaha Tani dan Pengolahan Hasil. Jakarta. (in Indonesian)
- Anonymous. 1997b. Buletin ekspor impor tanaman pangan dan hortikultura. Mangga. Dirjen Tan. Pangan dan Hortikultura, Jakarta. (in Indonesian)
- Anonymous. 1997c. Vademekum buah-buahan. Dirjen Tan. Pangan & Hortikultura, Jakarta. (in Indonesian)
- Indrawan, D.S. 1998. Jatim pemasok mangga terbesar Malaysia. Teras Bisnis Surabaya Post, 5 Mei 1998. (in Indonesian)
- Iswariyadi, A., Supriati, V.T., Manurung Muchjidin, R. and Djauhari. A. 1993. Penelitian agribisnis (Buku V : Mangga). Pusat Penelitian Sosial Ekonomi Pertanian. Bogor. (in Indonesian)
- Kusumo, S. 1989. Mangga. Puslitbang Hortikultura, Jakarta. (in Indonesian)
- Purnomo, S. 1988. Mangga varietas Cukurgondang punya potensi ekspor. Sisipan Trubus. Trubus No. 224 Th. XIX-1 Juli 1988. (in Indonesian)
- Schmidt, F.H. and Ferguson, J.H.A. 1952. Rainfall types based on wet dry period. Ratio for Indonesia with West New Guinea. Kementerian Perhubungan. Jawatan Meteorologi dan Geofisika. Jakarta.

Table 1 Mango fruit production and peak season during 1995 of each province in Indonesia - Source: Anonymous. 1997c

Province	Production (ton)	Peak season (month)
Aceh	85,893.00	1, 3-12
West Sumatra	3,317.00	1-12
Riau	1,727.92	1-3, 8-9
Jambi	992.00	3, 6, 9, 12
South Sumatra	6,217.00	1-2, 7-12
Lampung	2,956.86	1, 7-12
West Java	117,983.48	1-3, 6-12
Central Java	162,954.09	1-3, 6-12
Yogyakarta	202,460.18	8-11
East Java	214,681.00	1-3, 8-12
Bali	15,763.04	1-12
East Nusa Tenggara	7,798.00	1, 9-12
West Kalimantan	510.00	2-3
East Kalimantan	256.00	9-12
South Kalimantan	1,544.65	1-3, 7-12
South East Kalimantan	635.55	1-3, 8-12
North Sulawesi	7,409.00	1-4, 9-12
Central Sulawesi	4,351.00	2-4, 7-12
South Sulawesi	6,461.16	1-3, 10-12
South East Sulawesi	2,277.04	1-4

Table 2 Possible extension zones for mango outside Java

The use of land	Acreage per province (ha)				
	South Sulawesi	South East Sulawesi	West Nusa Tenggara	East Nusa Tenggara	East Kalimantan
Development area	529,070	659,210	232,515	920,630	1,125,440
Alternative development area	40,040	141,080	-	-	108,745
Non-potential area	1,690,720	1,122,180	878,285	2,124,856	8,481,475
Non-development area	3,795,615	1,568,860	1,039,895	1,183,785	10,755,150
Total	6,055,445	3,491,330	2,153,740	4,229,280	20,470,810

Table 3 Nutrient content of main varieties of Indonesian mango (per 100 g edible portion)

Item	Variety			
	Arumanis	Golek	Gedong	Indramayu
Calorie (cal)	46	63	44	72
Protein (g)	0.4	0.5	0.7	0.8
Fat (g)	0.2	0.2	0.2	0.2
Carbohydrate (g)	11.9	16.7	11.2	18.7
Calcium (mg)	15	14	13	13
Phosphorus (mg)	9	10	10	10
Fe (mg)	0.2	0.7	0.2	1.9
Vitamin A (IU)*	1,200	3,715	16,400	2,900
Vitamin B1 (mg)	0.08	0.08	0.08	0.06
Vitamin C (mg)	6	30	9	16
Water (g)	86.6	82.2	87.4	80.2
Edible portion (%)	65	65	65	65

Source : Kusuma, 1989.

* IU = International Unit.

Table 4 Export volume and value of some fruits from Indonesia in 1995

Kind of fruit	Export volume (kg)	Export value (US\$)
Avocado	3,210	3,999
Mango	1,693,692	1,311,728
Mangosteen	3,283,847	2,688,666
Papaya	3,594	1,055
Durian	97,078	88,181
Duku	4,840	2,724
Fresh banana	55,317,865	8,637,427
Rambutan	234,352	410,717

Source : Anonymous, 1997a.

Table 5 Characteristics of mango farming system by the farmers in East Java (Case study in Pasuruan, 1992)

Item	Average	Range
Acreage (ha)	0.87	0.5-2
Age of plants (year)	9.75	4-17
Number of plants (trees/ha)	116	66-500
Productivity (kg/ha)	4,562	1,897-8,600

Source : Iswariyadi, *et al.*, 1993.

Table 6 Farmers' participation on culture technique of mango in East Java (Case study in Pasuruan, 1992)

Kind of activity	Level of participation (%)
Land cultivation	90
Preparation of planting hole	75
Pruning	90
Weeding	100
Fertilization	100
Pest and diseases control	90
Harvesting	80
Postharvest handling	80

Source : Iswariyadi, *et. al.*, 1993.

Table 7 Production of three main mango varieties in East Java (1992)

Variety	Production (ton)	%
Arumanis	216,994	35.50
Golek	92,290	15.10
Manalagi	132,641	21.70

Source : Anonymous, 1992a.

Table 8 Contribution of mango export from East Java in 1987-1990

Year	Export (kg)		Contribution to national export (%)
	Indonesia	East Java	
1987	342,244	1,026	0.3
1988	1,000,470	143,775	14.3
1989	577,787	108,937	18.8
1990	1,287,835	84,518	6.5

Source : Anonymous, 1992b.

Tabel 9 Grade classified of East Java mango based on consumers' preference (1992)

Grade classified	Weight/fruit (g)	Number of fruits/harvesting (%)	Price/fruit (Rp.)	Buyer classified
I	>400	10	535	Exporter
II	200-400	85	390	Wholesaler in central market
III	<200	5	200	Local saler

Source : Iswariyadi, *et al.*, 1993.