

**THE STUDY ON THE IMPROVEMENT  
IN QUALITY OF THE TROPICAL FRUITS**

**Appendix D**  
**Marketing**



## APPENDIX D MARKETING

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## **APPENDIX D MARKETING**

### **1. INTRODUCTION**

Any report on marketing aspects, as an integral part of a comprehensive report on related crops development, would start with describing present condition and end up with future prospects, when project development is completed. The main part of report would comprise analyses of present situation, resulting in recommended direction and priorities, should the project be implemented in the near future. This report is no exception to the phenomena just mentioned.

Following Chapter 1, which introduces the methodology of presentation, Chapter 2 contains profiles of present marketing situation in each of the proposed site of fruit development of the four Provinces, North Sumatra, West Java, East Java and South Sulawesi in the Study Area. It includes data on the number of local markets within 50 km distance surrounding the site, related marketing channel destination and forms of marketed products.

Present condition of target fruits market in terms of demand-supply relations will be analysed in Chapter 3 for the national level, and for each of the four Provinces, which should form the basis of all movement of related fruit commodities. The potentials for expanding production and marketing activities are described in details and proposed in Chapter 4. These should give some basic ideas in the recommended production and movement of related fruit commodities, both for intra and extra region and for export purposes.

Chapter 5 contains trends of expected temporal results of related marketing activities development, profiles of marketing prospectives when project development is completed in the future and prospective reasons for export increase. Finally, Chapter 6 would explain the needs for marketing institutional development, which are conditional for the project to improve quantity and quality of fruit production, both by small-holding farmers and the larger agro-business interests.

As the purpose of marketing report is to produce some background and reasoning for the development of the proposed project sites for fruit quality improvement, no concluding chapter with general recommendation and specific remarks are provided here.

Source of collected data varied from secondary data of the Central Bureau of Statistics (BPS) publication and Provincial Agriculture Services Office, like yearly consumption, production and price data, to those first hand data collected during so-called Rapid Rural Appraisal to the four Provinces, like profile data of marketing condition. Some of the yearly data were incomplete which must be supplemented by data from other sources, so that more complete data set may be obtained for the present analyses.

### **2. PRESENT CONDITION OF FRUIT MARKETS**

Four components of marketing practices are taken to indicate the existing present market situation, which include : (i) the number of local markets within 50 km distance surrounding proposed project sites of target fruit development, (ii) the marketing channel reflecting the flows of fruit commodities through the agents, (iii) destination of fruit products by using the marketing channel, and (iv) the form of fruit commodities being marketed. Profile matrices of present marketing situation on each of the four Provinces may, respectively, be observed in Tables D-2-1 to D-2-4.

As seen in these Tables, the average number of local markets surrounding each site was more in Java Provinces, i.e., 11.7 units in West Java and 11.6 in East Java, when compared to that in outer Provinces, i.e., 9.8 units in North Sumatra and 7.1 in South Sulawesi, which reflected the relatively more developed markets in the first than in the second cases. The remaining components did not show any important differences among the two groups of Provinces. Thus, in general, the channel of Farmers-Collectors-Cities (retailers and consumers), and sometimes Exports and Processors, were similarly found presently in all four Provinces. Also, all potential development sites in all Provinces have similar destination and forms of fruit products being marketed, except a few of those for exports and in processed forms. These are the existing present conditions, which have to be changed or improved in the future, when project development is completed.

### **3. SUPPLY AND DEMAND SITUATION**

#### **3.1 General**

Comparison of data on per capita consumption (or demand) of fruits and their availability (or supply) from domestic (local production) should give some idea how large are the potentials for other uses, including those for domestic markets, raw materials for processing into other commodities and for export expansion purposes. The availability data are equal to production data minus 25% allowances for losses in post-harvest handling<sup>1</sup>. The following discussion will be based on related potentials with regard to relative sizes of gaps between consumption and availability through production of fruits, and not on actual estimated numeric figures.

As a whole, the gaps between consumption and availability data showed the needs for either local production or market expansion only, or for both expansions of production of new improved varieties and their product markets simultaneously. Effort to expand market should not be limited only to looking for new buyers/consumers, both domestic and foreign, but also for processing possibilities into new products. In a wider sense, the improvement of marketing activities, including the whole range of applying more efficient post-harvest handling, transporting practices and effective promotional activities, should also be considered as effort of market expansion. Production increases should not only mean area expansion, but also applications of improved variety seedlings, including related agronomic and harvesting practices as well.

#### **3.2 All Indonesia Market Situation**

As all Indonesia data from Table D-3-1 showed, all target fruits consumption have resulted in deficit production, which should mean the need for increasing production of all fruits in Indonesia. The largest deficit was found in banana, followed by salak, mango, rambutan and durian, in order.

Since fresh marquisa consumption data is not available, not much could be said about its marketing prospects. However, in its processed form as fruit juice, according to the two largest processors-cum-distributors (i.e., PT. Pintu Besi or Pyramid Unta and PT. Pohon Pinang) in Medan, it has great prospects because of its specific aroma and taste unmatched by other fruits. Moreover, with technological invention of a cool process for canning, instead of the hot one that tends to remove the precious aroma, the prospects for exports would be even greater as modern people in the world prefer drinking syrups and juices from cans.

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[1] : G.L. Johnson, ACIAR Proceedings No. 58, published in 1994. ISBN 1.86320 132 7

### **3.3 North Sumatra Market Situation**

Data from Table D-3-2 showed that, although not on the list of provincial target fruits, avocado, banana and mango each appeared to have deficit in consumption, which seemed to be filled in by moving fruits from Java Island. From the remaining fruits targeted for North Sumatra, only rambutan appeared to have a production deficit, which means its production should be increased. In connection with this, it is suggested here that improved quality rambutan should be planted to strongly support viability of existing export. Meanwhile, not too surprising, durian and salak both appeared to have surplus of production, meaning that marketing promotion should be enhanced in the Province and for export and interregional trade. If new opening in those various markets could be established, the idea for increasing their production with high quality clonal seedlings may be considered. No consumption data was obtained for mangosteen and marquisa (juice), although both were reported to be traded within and outside the Province (interregional, inter-insular and export markets).

### **3.4 West Java Market Situation**

Fruit availability and consumption levels were presented in Table D-3-3 where all target fruits consumption, except salak, have shown deficits in production. The largest deficit was found in banana, followed by mangosteen, mango, avocado and rambutan which, in general, means the need for production increase. Although showing fairly large deficit, mangosteen has been reported to be exported to Hongkong and Taiwan, thus pointing to existing higher quality of the exported portion. It is also clear that mangosteen needs expansion of production and, as such, its quality should also be enhanced by using improved clonal seedlings.

### **3.5 East Java Market Situation**

True to its agro-climatological condition, as data in Table D-3-4 showed, East Java has a very large surplus of mangoes, together with the other target fruits except bananas and rambutans, which have deficits because their growth requirements did not fit to relatively dryer climate. Thus, it is clear that mango and mangosteen which so far have been exported, were actually derived more from surpluses of production rather than of specially allocated higher quality portion. Hence it is also clear that promotional activities for export are still necessary in the short run, before considering improvement of present quality by replacing old trees.

### **3.6 South Sulawesi Market Situation**

The situation of current fruits availability and consumption levels in South Sulawesi are presented in Table D-3-5. Except salak which is deficit, all other target fruits are in surpluses, especially banana, mango and duku appeared to have very large surpluses of production. It is thus clear that very large potentials existed for moving banana and mango out of the Province, particularly to fill-in fruit markets of the Moluccas and West Irian. In this regard, the proposal made by the Provincial Agricultural Services Office for expanding mango in five Kabupatens totalling some 2,500 ha appear to be redundant and should be reconsidered to change into other fruits like durian and salak. Without additional information on interregional movement of the fruit, the same reasoning would also apply for not expanding rambutan production in four Kabupatens totalling some 3,850 ha. Meanwhile, not much could be said with regard to marquisa since no consumption data was obtained, except that its production could be expanded if export prospects are still wide open.

## **4. POTENTIALS FOR PRODUCTION AND MARKETING EXPANSION**

### **4.1 General**

Decision whether to expand production and/or marketing based on knowledge of supply-demand situation, could be made more convincing by the help of regression analysis of the existing relationship between annual total production and related average price during the last 5 to 10 years. For this purpose, a simple regression line model of  $y = a + bx$  will be fitted to the corresponding data series of production (x) and its deflated price (y). If correlation coefficient is sufficiently high ( $\geq 60\%$ ) which is supported by existing significance level of  $\geq 95\%$ , then highly relevant conclusion may be drawn with respect to whether to expand production or marketing, or to recommend some combination of both. If any lower correlation coefficient ( $< 60\%$ ) and/or lower significance level ( $< 95\%$ ) are indicated from the analysis, some educated judgment would be necessary to interpret the result.

### **4.2 Potentials in North Sumatra**

Annual production and deflated price data of target fruits in North Sumatra for the year 1987 to 1996 are presented in Table D-4-1. It is clearly shown that all correlation coefficients are reasonably high (60 to 94%) which are also of highly significant levels (95 to 99%), thus permitting relevant recommendation be made with respect to future production and/or marketing activities. The signs of all correlation coefficients are positive, indicating the trend of price which had been increasing with production and would likely to be so in the near future.

In other words, the annual increases in production had taken place while their prices were also increasing. These have occurred for durian and salak, even though they had surpluses in production in those years (see Section 3.3). It should be clear that, together with mangosteen and marquisa, the proposals for increasing their production could still be implemented without possible reduction in their prices. Nevertheless, it would be prudent to look for more opening to move them out of the Province, like promoting interregional/inter insular trade and exports.

### **4.3 Potentials in West Java**

Correlation coefficients of the relationships between annual production and deflated price of target fruits in West Java are presented in Table D-4-2. While all fruits had positive signs of relationship, only avocado appears to have high coefficient (92%) and high significance level (99%), where the remainders (duku, salak, durian, mangosteen and mango) had both rather low coefficients (30 to 52%) and lower significance (all are 80%). Thus, obviously, only avocado production could be increased without reducing price within the Province.

Actually only salak should first be considered to have market expansion activities both within and outside the Province, particularly for exports, before implementing production increases originally proposed by the Provincial Agricultural Services Office. It is obvious that all target fruits production, except salak, should first be increased, since it showed deficit in its production (see Section 3.4), while also enhancing its quantity and quality of those for exports and interregional market.

### **4.4 Potentials in East Java**

Table D-4-3 presents annual production and deflated price of target fruits in East Java for the year 1989 to 1996. Among target fruits, only banana and avocado had shown sufficiently high correlation coefficients of 81% and 95%, coupled with high significance levels of 98% and 99%, respectively. The remaining four (durian, mango, duku and salak) did not show high enough correlation (i.e., 9, 66, 6 and 37%, respectively), with only lower significance level between 80 to 90%. Nevertheless, all fruits showed positive signs of relationships, which should not create problems of price decreases when the proposed production expansion by the Provincial Agricultural Services Office is carried out. However, it would always be



wise and prudent to first consider market opening for expansion in both domestic interregional and export trade (see Section 3.5), before deciding on direct implementation of the proposal on production expansion.

#### **4.5 Potentials in South Sulawesi**

Table D-4-4 presents correlation coefficients of relationships between yearly production and deflated price of target fruits in South Sulawesi. Data from the table showed only mango and rambutan which have high significance levels (99% and 95%, respectively), where each of which has high coefficient of correlation (78% and 68%, respectively). The remaining target fruits (avocado, mangosteen and fresh marquisa) showed both lower correlation (19%, 18% and 52%, respectively) and lower significant levels (all 80%). Meanwhile, all target fruits had shown positive signs of relationships, except fresh marquisa which had negative sign.

Thus, while mango and rambutan appeared to have surpluses in production (see Section 3.6), their production could still be increased without possible decreases in prices. Apparently, those provincial surpluses so far had found market outlet outside the region (i.e., interregional or interinsular trade). Here again it should be noted that, for prudent reasoning, their market opening for expansion should still first be considered before embarking upon enhancing their production capacity or areas. Meanwhile, as far as marquisa fruit is concerned, although its coefficient of correlation is not very significant, the negative sign should mean increasing its production would entail lowering of its price, which may not be attractive to farmers.

### **5. PROSPECTS OF FRUIT QUALITY IMPROVEMENT**

#### **5.1 General**

As a development process in general, the effort to improve fruit quality will take time, which may be sequenced in temporal phases like Short Term (ST), Medium Term (MT) and Long Term (LT). It is of interest here to present some important activities in fruit production which have impacts on marketing practices and how they can be reflected in those three temporal phases. More specifically, the anticipated results of quality improvement on some marketing practices will also be presented, which may be compared with profiles of present condition in Chapter II. Further, many of the anticipated marketing channel development will end with export and its promotion, which very likely would happen because more quality fruits would be available. It is not by chance that effort to boost export of tropical fruits has its own merit, as will be shown later.

#### **5.2 Expected Temporal Results**

The effort to improve quality of target fruits would have only limited results in ST, but begins to be observed during MT, while the full impact would be seen in LT, which temporal results were summarised in Table D-5-1 for consideration. About the only fast development in ST would be the increasing input application in the widest sense, including chemical and technological inputs, but still result in wide variation of practices. With the passing of ST, the quality improvement effort would have reached almost all aspects, so that less variation in practices is commonly found in MT. Standard practices and clonal trees would generally be the rule in LT, including cost-effective consideration in every activities. All expected results as shown in Table D-5-1 would be observable only if all components/activities related to the effort of fruit quality improvement would be operating and started in ST, which continue through MT and end up at the close of LT.

### 5.3 Prospective Changes in Marketing Profile

In order to cope with the increasing commercialisation of agribusiness and the need to enhance efficiency which means enlarging the size of business, many changes on the current marketing practices should be anticipated and implemented at the right time according to phases of project development. It should be reminded here that the proposed expansion area on average would amount to 500 to 1,000 ha per district (kabupaten) which, in turn, would produce some additional 5,000 to 10,000 tons fresh fruits per year within the district area. Hence, development and/or adjustment to existing marketing institutions and activities to deal effectively with the business of large increases in fruit production is necessary. Profiles of marketing prospectives are presented in Tables D-5-2 to D-5-5 for each of the four Provinces, which may be compared with those in Tables D-2-1 to D-2-4.

Common features of changes in the marketing channel are development of farmers groups (which may compete with collectors, wholesalers and export agents) for each target fruit. In the case of marquis fruit, only farmers group development is necessary to enhance individual farmer's bargaining position. Wholesalers may have existed before, but the emphasis here is because of their important role in handling such massive fruits and for catering to export agents. Increasing export itself becomes one of the objective of the Indonesian Government.

Packaging house (including sorting and grading facilities), storage and cooling rooms are the marketing infrastructure needed by each target fruit. Of course, the objective is to increase prices received by producers and prolong shelf lives of fruits. For some kind of fruits (avocado, durian and banana) cooling facilities should be optional, meaning it will be needed when fruits bulk are so large that some time for storing and sending of fruits are necessary that might damage quality while waiting.

Crop product destinations are similar to the current marketing practices, except exports are now included in the list. However, local markets and towns retailing probably would be too small destinations for the improved fruit production, except where super markets or self service stores are present. The forms of marketed products would not change much from the current market situation except, where feasible, processing products should also be added to the fresh forms.

### 5.4 Valid Reason for Increasing Exports

From a set of data series 1965-1985, aggregated functions of fruit commodities both in groups of tropical, non tropical fruits, and in some representative fruit commodities like banana (typically of tropical fruits) and oranges (typically of non-tropical fruits), were estimated by Nurul Islam in 1990<sup>2</sup>. By comparing price and income elasticity coefficients of the world export fruit demand, as presented in Table D5.1, important conclusions and implications may be derived.

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<sup>2</sup> : Nurul Islam, "Horticultural Export of Developing Countries: Past Performances, Future Prospects and Policy Issues", IFPRI Research Report No. 80, April 1990.

**Table D5.1 Price and income elasticity of demand for fruit exports of the world, estimated from world aggregate data series of 1965-1985.**

Fruits Commodity Group	Price Elasticity of Demand (PED) <sup>1)</sup>	Income Elasticity Of Demand (IED) <sup>1)</sup>	Coefficient of Determination (R <sup>2</sup> )
<b>1. Fresh forms</b>	- 0.71 *	0.74 *	0.96
a. Tropical	- 1.04 **	0.38 *	0.84
b. Non-tropical	- 0.85	1.32 *	0.93
c. Bananas	- 1.60	0.67 *	0.84
d. Oranges	- 0.60 **	0.96 *	0.96
<b>2. Processed forms</b>	- 0.98	1.78 *	0.98
a. Tropical juices	- 2.24 *	2.09 *	0.94
b. Non-tropical juices	- 5.35 *	6.97 *	0.96
c. Other tropical fruits	- 1.50	1.39 *	0.10
d. Other non-tropical fruits	- 1.38	1.37 *	0.97
<b>3. Total (all forms)</b>	0.51 *	0.95 *	0.98

Source: Islam, N. "Horticultural Exports of Developing Countries: Past Performances, Future Prospects and Policy Issues". IFPRI Research Report No. 80 April 1990.

Notes: 1) \* = Significant at 95% level.  
 \*\* = Significant at 90% level

In order to facilitate discussion on the effect of a price change on consumption expenditure of a fruit commodity, which indicated whether potential profit or loss may accrue to suppliers, a logical relationship of a price change on the consumer expenditures will first be derived. Assume P is the price of Q commodity and P x Q is the size of consumer expenditure at a certain time. The effect of a change in P can be estimated by the first differential of P x Q, where Q is a function of P or, mathematically Q = f (P), as follows :

$$\frac{d(P.Q)}{dP} = Q + P \frac{dQ}{dP} = Q(1 + \frac{P}{Q} \frac{dQ}{dP})$$

where  $\frac{P}{Q} \cdot \frac{dQ}{dP}$  is none other than the price elasticity of demand (PED), which in most cases would have negative values as ween in Table D5.1. Thus, if PED is larger than minus one, consumption expenditure (P.Q) will change (i.e.; d(PQ)) with price (dP). On the other hand if PED is less than minus one (P.Q) will change in the opposite direction with P.

As it is shown in Table D5.1, although PED of fresh fruits as a whole is -0.71 (i.e.: "inelastic"), PED of tropical fruits is -1.04 (i.e.: "elastic"), which is also hinted by bananas PED of -1.60. Meanwhile, non tropical fruits appear to have PED = -0.85, which is significantly exemplified by oranges with PED = -0.60. All these tend to indicate favorable condition for greatly enhancing exports of tropical fruits in the long run. When prices tend to go down because of increases in exports, consumption expenditures by buyers/consumers, who mostly come from high income countries, will increase more than proportionally in response to the price decreases. Similar, but more pronounced, cases are found in processed forms of tropical fruits, which is represented by fruit juices with PED = -2.24.

Hence, as one of the tropical countries, Indonesia should not be hesitant to expand its fruit exports any where and take the opportunity to exploit the resulting large consumption expenditure of high-income importing countries. They include those especially with relatively low level per capita fruits consumption per year such as Russian Countries (former USSR) and

Eastern Europe with an average about 55 kg and Japan about 65 kg. With tougher competition among exporting countries, importing countries with relatively high level fruit consumption such as the United States of America and Western Europe, respectively 155 and 105 kg per capita per year, should also be considered. It should be noted that increasing consumption of useful and nutritional fruits are generally save and healthy, since virtually no limitation on their consumption have ever been conceived.

Existing simultaneously with favorable condition of price change due to fruit export expansion, the rising per capita income in both developing and developed countries have also indicated promising opportunity. As can be observed from Table D5.1, all signs of income elasticity of demand (IED) for fruits are positive, indicating that all demand for fruits would be increasing with income. Note also that IED for processed forms of fruits are far greater than those for fresh forms.

## **6. NEEDS FOR MARKET STRUCTURAL DEVELOPMENT**

### **6.1 General**

In discussing the marketing channel and infrastructures in Chapter 5, new agents (farmers' group and wholesaler) were stated as prospective together with new infrastructures like packaging house, storage and cooling room. They need to be created at the appropriate time or, at least, be promoted to develop themselves when fruits quantity and quality increase with time, whether in short term, medium term or in long term. How prospective they are and what are the reasons behind their recommendations will be discussed in the followings.

### **6.2 Farmers' Group**

The main advantage of having a farmers group as an agent in the fruit marketing channel, instead of dealing with individual farmers, is the increase in bargaining position of individual farmers who become members of the group, specifically in purchasing farm inputs and in selling farm products including fruits. Another advantage is efficiency in extension communication and in agribusiness dealing, when the farmers group could actually represent the real interest of member-farmers. As an agent of marketing channel it could replace the functions of collectors, wholesalers and even exporters, but preferably by competitive method.

More specifically, the group could decide to request member-farmers to harvest their fruits according to maturity and with appropriate methods. As sorting and grading, which are usually done by collectors, are taken over by the farmers' group, farm-gate prices may increase greatly. Buying fruits on trees by "tebasan" or "borongan" (i.e., all fruits are harvested mostly at one time only) would disappear or could be avoided, since the farmers group could be expected to replace the individual collectors. When the group also embarked upon processing of fruits, profitable fruit marketing (including those over-ripening, deformed and second grades) would be highly attractive.

### **6.3 Wholesaler**

Wholesaling activities were already existing in some proposed project sites but, due to limited amount of fruits, usually are not done in special way. With massive increases in fruits quantities and betterment of their quality by the project in next 5 to 10 years, more specialised wholesalers would be needed. Particularly, in its function as a relay-station between consumers' preferences in demand and farmers' capability in production of intended quality fruits, the wholesaler has a key position to relay "messages" both from buyers and producers.

#### **6.4 Exporter**

By profession, virtually every wholesaler, and even a large collector, could become an exporter if he has business contacts in the importing countries. One requirement is that he should be able to meet the high quality fruits on demand and continue their exports when requested. The job is now made easier by the existence of many freight-forwarders operating in the exporting cities.

#### **6.5 Packaging House**

Due to the limited number of fruits they handled, most small holders currently did not have any special packaging house and fruits were sold with minimum effort of sorting and grading. Obviously, a complete line of post-harvest handling would be required when large quantities of fruits from project sites start coming from the harvest.

#### **6.6 Storage**

Similarly with packing house, the limited quantity of currently harvested fruits did not need any special storage place to keep for more than one or two days. With large quantity of fruits coming out of packing house, which derive from the large harvest from project sites, graded and packed fruits should be stored a few days to wait for transportation to the next market channel destinations. Understandably, some storage may need to be fitted with some cooling machines, if larger storing is necessary.

#### **6.7 Cooling Room**

Waiting for handling after harvest, keeping fruits to wait for further movement along marketing channel, long hauling of fruits before reaching destinations and controlling of ripening process of fruits after harvest/graded and for retailing will require cooling room facilities with varying constant temperatures. All these are really the consequences of having large quantity (and high quality) of fruits developed in project sites. Hopefully the larger quantity of higher quality fruits could pay for the investment and maintenance costs to operate cooling rooms of various sizes, designs and structures.

#### **6.8 Processing Factory**

In a progressive fruit agribusiness, having a processing factory is almost a must, when the fruits may be subjected to processing into other commodities. It should be clear that processing is one of the means to expand marketability of any raw (fresh) commodity notwithstanding fruits, in addition to increase value-added to the corresponding original commodity. Over-ripened, off-type, deformed and damaged fruits oftentimes may still be processed, thus reducing wastage after grading. For the benefit of small holders whose number are many, factory units for processing should be of small to medium sized capacities, which would be suitable for farmers groups or their association of those groups to operate efficiently.

Table D-2-1 Profile of Present Marketing Situation in North Sumatra

Market Situation		Target Fruits in Kabupatens							
		Durian in Dairi (1)	Durian in Tapanuli Tengah (2)	Durian in Tapanuli Utara (3)	Mangosteen in Tapanuli Selatan (4)	Mangosteen in Tapanuli Utara (5)	Marquisa in Karo (6)	Rambutan in Langkat (7)	Salak in Tapanuli Selatan (8)
1.	Number of local markets within 50 km circular distance to the proposed site	10	6	15	8	15	9	9	6
2.	Marketing Channel	Farmer - Collector - Cities.	Farmer - Collector - Cities.	Farmer - Collector - Cities.	Farmer - Collector - Cities/Export.	Farmer - Collector - Cities/Export.	Farmer - Collector - Processor.	Farmer - Collector - Cities/Export.	Farmer - Collector - Cities.
3.	Destination of Crop Products	Districts, Province, Cities.	Districts, Province, Cities.	Districts, Province, Cities.	Province, Cities, Export.	Province, Cities.	Local, Processor.	Districts, Province, Cities, Export.	District, Province, Towns, Cities.
4.	Form of Marketed Products	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh, Processed	Fresh	Fresh

Table D-2-2 Profile of Present Marketing Situation in West Java

Market Situation	Target Fruits in Kabupatens					
	Avocado in Bandung (1)	Duku in Ciamis (2)	Durian in Bogor (3)	Mango in Sumedang (4)	Mangosteen in Purwakarta (5)	Salak in Tasikmalaya (6)
1. Number of local markets within 50 km circular distance to the proposed site	16	12	9	11	8	14
2. Marketing Channel	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Cities/Export.	Farmer - Collector - Towns, Cities.
3. Destination of Crop Products	Districts, Province, Towns, Cities.	Districts, Province, Towns, Cities.	Subdistricts, Districts, Province, Towns, Cities.	Local, Subdistricts, Districts, Province, Towns, Cities.	District, Province, Towns, Export.	District, Province, Towns, Cities.
4. Form of Marketed Products	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh

Table D-2-3 Profile of Present Marketing Situation in East Java

	Target Fruits in Kabupatens							
	Avocado in Lumajang (1)	Cavendish Banana in Jombang (2)	Banana in Lumajang (3)	Duku in Tulungagung (4)	Durian in Jombang (5)	Durian in Trenggalek (6)	Manggo in Pasuruan (7)	Salak in Malang (8)
1. Number of local markets within 50 km circular distance to the proposed site	9	13	9	15	13	9	10	15
2. Marketing Channel	Farmer - Collector - Towns, Cities.	Farmer - Processor.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Cities.	Farmer - Collector - Cities.	Farmer - Collector - Cities/Export.	Farmer - Collector - Towns, Cities.
3. Destination of Crop Products	Districts, Province, Towns, Cities.	Cities, Exports.	Local Subdistricts, Districts, Province, Towns, Cities.	Districts, Province, Cities.	Local, Districts, Towns, Cities.	Local, Subdistricts, Districts, Province, Towns, Cities, Export.	Local, Subdistricts, Districts, Towns, Cities.	District, Province, Towns, Cities.
4. Form of Marketed Products	Fresh	Fresh, Processed	Fresh	Fresh	Fresh	Fresh.	Fresh Processed	Fresh



Table D-2-4 (1/2) Profile of Present Marketing Situation in South Sulawesi

Market Situation	Target Fruits in Kabupaten							
	Avocado in Gowa (1)	Avocado in Soppeng (2)	Mango in Sidrap (3)	Mango in Majene (4)	Mango in Bone (5)	Mango in Maros (6)	Mango in Wajo (7)	Mangosteen in Tana Toraja (8)
1. Number of local markets within 50 km circular distance to the proposed site	8	8	7	9	6	3	9	7
2. Marketing Channel	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.
3. Destination of Crop Products	Towns, Cities	Local, Towns, Cities.	Local, Districts, Province.	Local, Districts, Towns.	Local, Districts, Province, Cities, Interregion.	Towns, Cities.	Local, Districts, Towns.	District, Province, Cities.
4. Form of Marketed Products	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh	Fresh

Table D-2-4 (2/2) Profile of Present Marketing Situation in South Sulawesi

Market Situation		Target Fruits in Kabupaten						
		Mangosteen in Polmas (9)	Marquisa in Gowa (10)	Marquisa in Tana Toraja (11)	Rambutan in Mamuju (12)	Rambutan in Enrekang (13)	Rambutan in Pinrang (14)	Rambutan in Barru (15)
1.	Number of local markets within 50 km circular distance to the proposed site	4	8	7	8	4	11	8
2.	Marketing Channel	Farmer - Collector - Cities.	Farmer - Collector - Processors.	Farmer - Processors.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.	Farmer - Collector - Towns, Cities.
3.	Destination of Crop Products	Local, Subdistricts, Cities.	Local, Cities, Processor.	Local, Cities, Processor.	Local, Districts, Interragional.	Local, Subdistricts, Towns.	Local, Subdistricts, Towns.	Local, Subdistricts, Towns, Cities.
4.	Form of Marketed Products	Fresh	Fresh, Processed	Fresh, Processed	Fresh	Fresh	Fresh	Fresh

**Table D-3-1 Per Capita Production and Consumption of Target Fruits in Indonesia, 1993**

No.	Selected Target Fruits of Study	Kilograms per Capita per Year		
		Availability <sup>2)</sup>	Consumption	Surplus (+) Deficit (-)
1.	Avocado	0.629	0.750	-0.121
2.	Banana	9.495	11.270	-1.775
3.	Duku	0.334	0.400	-0.066
4.	Durian	0.914	1.100	-0.186
5.	Mango	1.117	1.340	-0.223
6.	Mangosteen	0.139	0.189	-0.050
7.	Marquisa	0.134	na <sup>3)</sup>	na
8.	Rambutan	1.026	1.230	-0.204
9.	Salak	1.330	1.600	-0.270

Notes : 1) Fruit Marketing Comprehensive Handbook (Vademekum Pemasaran Buah),  
2) Equals to production minus 25% losses by post-harvest handling,  
3) na = data not available.

**Table D-3-2 Per Capita Production and Consumption of Target Fruits in North Sumatra, 1989**

No.	Selected Target Fruits of Study	Kilograms per Capita per Year		
		Availability <sup>2)</sup>	Consumption	Surplus (+) Deficit (-)
1.	Avocado	0.175	0.240	-0.065
2.	Banana	8.182	12.240	-4.058
3.	Duku (Lanzon)	0.400	na <sup>2)</sup>	na
4.	Durian	2.653	0.360	+2.293
5.	Mango	0.235	1.680	-1.445
6.	Mangosteen	0.055	na <sup>3)</sup>	na
7.	Marquisa	0.110	na	na
8.	Rambutan	0.839	1.080	-0.241
9.	Salak	1.593	0.090	+1.503

Notes : 1) Cost of living Survey, 1989, Central Bureau of Statistics (BPS), Jakarta  
2) Equals to production minus 25% losses by post-harvest handling,  
3) na = data not available.

**Table D-3-3 Per Capita Production and Consumption of Target Fruits in West Java, 1995**

No.	Selected Target Fruits of Study	Kilograms per Capita per Year		
		Availability <sup>2)</sup>	Consumption	Surplus (+) Deficit (-)
1.	Avocado	1.468	1.700	-0.232
2.	Banana	21.773	24.880	-3.107
3.	Duku (Lanzon)	0.426	0.550	-0.124
4.	Durian	0.583	0.740	-0.157
5.	Mango	2.829	3.710	-0.881
6.	Mangosteen	0.385	1.480	-1.095
7.	Marquisa	-	-	-
8.	Rambutan	1.286	1.500	-0.214
9.	Salak	6.670	5.570	+1.100

Notes : 1) Consumption Expenditures, 1995, Regional Office of Statistic (BPS), Bandung, West Java  
2) Equals to production minus 25% losses by post-harvest handling.

**Table D-3-4 Per Capita Production and Consumption of Target Fruits in East Java, 1993**

No.	Selected Target Fruits of Study	Kilograms per Capita per Year		
		Availability <sup>2)</sup>	Consumption	Surplus (+) Deficit (-)
1.	Avocado	0.807	0.260	+0.547
2.	Banana	8.371	9.984	-1.095
3.	Duku (Lanzon)	0.090	0.052	+0.038
4.	Durian	0.372	0.028	+0.344
5.	Mango	9.171	0.720 <sup>3)</sup>	+8.451
6.	Mangosteen	0.331	0.114	+0.217
7.	Marquisa	-	-	-
8.	Rambutan	1.342	3.692	-1.095
9.	Salak	0.580	0.520	+8.451

Notes : 1) Data collected from DIPERTA Province of East Java.  
2) Equals to production minus 25% losses by post-harvest handling.  
3) Cost of Living Survey, 1989, Central BPS, Jakarta.

**Table D-3-5 Per Capita Production and Consumption of Target Fruits in South Sulawesi, 1993**

No.	Selected Target Fruits of Study	Kilograms per Capita per Year		
		Availability <sup>2)</sup>	Consumption	Surplus (+) Deficit (-)
1.	Avocado	0.634	0.052	+0.582
2.	Banana	23.251	5.321	+17.930
3.	Duku (Lanzon)	1.590	0.052	+1.538
4.	Durian	0.727	0.728	-0.001
5.	Mango	17.274	3.068	+14.206
6.	Mangosteen	0.003	na <sup>3)</sup>	na
7.	Marquisa	3.693	na	na
8.	Rambutan	0.505	0.104	+0.401
9.	Salak	0.511	0.728	-0.217

Notes : 1) Consumption Expenditures, 1993, Regional Office of Statistics (BPS),  
Ujung Pandang, South Sulawesi.  
2) Equals to production minus 25% losses by post-harvest handling.  
3) na = data not available

**Table D-4-1 Trends of Relationships between Yearly Total Production and Deflated Price of Target Fruit in North Sumatra**

Target Fruits of Study	Yearly data										$a$ and $b$ estimators for regression line $y = a + bx$	Correlation coefficient and significant levels
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996		
(1) Durian	Production (tons)	22.638	34.248	33.968	31.965	45.581	37.255	43.961	38.737	47.116	48.546	+0.76 (98%)
	Price (Rp./kg)	351	228	358	444	588	731	851	1.086	1.199	1.315	
(2) Fresh Marquisa	Production (tons)	225	209	211	755	2.472	2.181	3.289	8.244	18.730	15.750	+0.71 (95%)
	Price (Rp./kg)	297	191	226	311	418	518	793	1.213	1.043	647	
(3) Mangosteen	Production (tons)	-	-	-	713	818	611	926	1.027	1.128	2.084	+0.94 (99%)
	Price (Rp./kg)	-	-	-	451	334	408	472	558	893	1.279	
(4) Salak	Production (tons)	30.065	36.969	72.584	68.200	72.028	61.258	59.306	57.355	110.243	117.657	+0.60 (90%)
	Price (Rp./kg)	655	510	585	693	735	816	853	977	997	913	
(5) Rambutan	Production (tons)	5.068	7.621	12.129	10.394	11.985	12.846	12.821	12.955	13.954	15.628	+0.77 (99%)
	Price (Rp./kg)	437	346	384	428	588	726	770	940	1.092	1.102	

**Table D-4.2 Trends of Relationships between Yearly Total Production and Deflated Price of Target Fruit in West Java**

Target Fruits of Study	Yearly data							<i>a</i> and <i>b</i> estimators for regression line $y = a + bx$	Correlation coefficient and significant levels
	1990	1991	1992	1993	1994	1995	1996		
(1) Duku	Production (tons)	12,569	11,594	21,209	16,745	22,113	18,666	<i>a</i> = +732.28 <i>b</i> = +0.066	+0.39 (80%)
	Price (Rp./kg)	1,214	978	1,141	1,741	2,250	2,898		
(2) Salak	Production (tons)	39,397	67,849	96,300	78,661	61,022	118,207	<i>a</i> = +690.08 <i>b</i> = +0.2804	+0.53 (80%)
	Price (Rp./kg)	716	584	582	691	968	1,786		
(3) Durian	Production (tons)	49,678	67,111	44,724	33,208	47,185	135,693	<i>a</i> = +1735.2 <i>b</i> = +0.0159	+0.43 (80%)
	Price (Rp./kg)	1,755	1,311	1,313	2,144	3,714	4,523		
(4) Mangosteen	Production (tons)	-	23,808	26,595	14,002	14,875	20,038	<i>a</i> = +905.25 <i>b</i> = +0.0301	+0.30 (80%)
	Price (Rp./kg)	-	1,250	1,121	1,121	1,353	1,894		
(5) Avocado	Production (tons)	41,130	42,853	39,811	43,304	43,975	105,163	<i>a</i> = -193.24 <i>b</i> = +0.0162	+0.92 (99%)
	Price (Rp./kg)	427	198	382	594	852	1,492		
(6) Mango	Production (tons)	86,634	179,219	90,998	114,564	188,624	146,925	<i>a</i> = +1369.6 <i>b</i> = +0.0012	+0.07 (80%)
	Price (Rp./kg)	1,051	865	1,091	1,409	1,656	2,721		

**Table D-4-3 Trends of Relationships between Yearly Total Production and Deflated Price of Target Fruit in East Java**

Target Fruits of Study	Yearly data								<i>a</i> and <i>b</i> estimators for regression line $y = a + bx$	Correlation coefficient and significant levels
	1989	1990	1991	1992	1993	1994	1995	1996		
(1) Banana	Production (tons)	403.085	465.439	594.592	507.199	461.757	537.999	673.999	685.604	$a = -1947.7$ $b = +0.0054$ (98%)
	Price (Rp./kg)	505	321	433	602	782	1.002	1.784	2.176	
(2) Durian	Production (tons)	9.613	43.860	16.751	19.059	15.995	23.724	24.822	31.120	$a = +1768$ $b = +0.0072$ (80%)
	Price (Rp./kg)	1.313	915	1.185	1.559	2.233	2.455	2.193	3.620	
(3) Mango	Production (tons)	184.305	202.500	291.136	350.668	393.907	459.192	478.118	534.741	$a = -3.3298$ $b = +0.0045$ (90%)
	Price (Rp./kg)	1.561	1.142	791	978	1.280	1.393	2.334	3.451	
(4) Duku	Production (tons)	2.337	2.340	2.303	8.076	3.881	3.408	6.506	3.339	$a = +15003$ $b = +0.2571$ (80%)
	Price (Rp./kg)	1.100	895	1.067	990	1.289	1.586	2.278	3.625	
(5) Avocado	Production (tons)	21.247	24.170	24.204	21.638	34.678	28.675	41.163	67.711	$a = -178.88$ $b = +0.0255$ (99%)
	Price (Rp./kg)	388	285	378	400	534	767	1.018	1.510	
(6) Salak	Production (tons)	10.166	24.624	32.142	20.218	24.949	8.393	48.298	-	$a = +937.21$ $b = +0.0108$ (80%)
	Price (Rp./kg)	952	775	910	1.042	1.254	1.578	1.876	-	



**Table D.4-4 Trends of Relationships between Yearly Total Production and Deflated Price of Target Fruit in South Sulawesi**

Target Fruits of Study	Yearly data										$a$ and $b$ estimators for regression line $y = a + bx$	Correlation coefficient and significant
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996		
(1) Mango	Production (tons)	81,337	22,446	79,364	99,965	110,380	118,832	169,201	172,516	152,675	168,944	+0.78 (99%)
	Price (Rp./kg)	424	203	264	314	508	892	1,122	1,734	2,590	2,877	
(2) Rambutan	Production (tons)	1,582	1,681	2,439	2,206	2,821	4,471	4,947	4,325	4,112	3,850	+0.64 (95%)
	Price (Rp./kg)	672	550	621	689	779	824	985	1,242	1,543	1,722	
(3) Avocado	Production (tons)	3,389	2,470	1,791	7,476	9,658	10,304	11,208	9,953	8,034	8,407	+0.19 (80%)
	Price (Rp./kg)	284	261	277	304	303	282	259	283	319	423	
(4) Mangosteen	Production (tons)	-	-	-	-	4,25	4,82	3,97	4,82	5,65	5,00	+0.18 (80%)
	Price (Rp./kg)	-	-	-	-	1,900	1,911	2,465	2,700	2,347	2,119	
(5) Fresh Marquisa	Production (tons)	8,830	11,469	8,372	8,270	18,624	18,694	28,541	30,333	29,523	34,206	-0.52 (80%)
	Price (Rp./kg)	479	532	925	1,021	1,063	1,018	667	437	440	370	

**Table D-5-1 Expected Temporal Results of Fruit Quality Improvement and Related Activities of Production, Post-Harvest Handling and Marketing**

Activities Proposed and Cost Involved	Period or Term Consideration <sup>1)</sup>		
	Short term	Medium term	Long term
1. Fruit trees	existing and heterogeneous	existing but less variation	similar, clonal trees
2. Kinds of inputs	large variation	low variation	similar, standard
3. Input doses	medium and increasing	high	as required
4. Agronomic practices	large variation	low variation	standard
5.a. Harvest, Post-harvest handling and Marketing	large variation	low variation	similar, standard
b. Cost per unit output	high	medium	low
6. Cost of product transports	high (pick ups, trucks and passenger planes)	medium (trucks, cargo planes, container ships)	low (large trucks, container ships, and cargo planes)
7.a. Size of business	small	medium	large
b. Investment cost per unit output	high	medium	low
8.a. Promotional and extension activities	large variation	small variation	standard
b. Cost per unit output	high	medium	low
9. Off-season production	not efficient	break-even	efficient
10. Financing source	difficult	easy	easy

Notes: 1) Short-term means a period of up to 2003 (Pelita VII)

Medium-term applies for 2004-2008 (Pelita VIII)

Long-term applies for 2009-2018 (Pelita IX and X)

Table D-5-2 Profile of Prospective Marketing Practices in North Sumatra

Marketing Practices	Target Fruits in Kabupatens				
	<u>Durian</u> in Daiiri, Tapanuli Tengah and Tapanuli Utara (1)	<u>Mangosteen</u> in Tapanuli Utara and Tapanuli Selatan (2)	<u>Marquisa</u> in Karo (3)	<u>Rambutan</u> in Langkat (4)	<u>Salak</u> in Tapanuli Selatan (5)
1. Marketing Channel	Farmers-collectors/farmer's group-wholesaler-cities/ exports	Farmers-collectors/farmer's group-wholesaler-cities/ exports	Farmer/farmer's group-processor	Farmers-farmer's group/collectors-whole saler-cities/exports	Farmers-farmer's group/ collectors-wholesaler- cities/exports
2. Market Infrastructures	Packaging. Storage. Cooler (optional).	Packaging. Storage. Cooler.	Facilities, Owned by, Factory.	Packaging. Storage. Cooler.	Packaging. Storage. Cooler.
3. Destination of crop products	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.	Cities, Processors, Exports.	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.
3. Form of marketed products	Fresh and processed	Fresh	Fresh and processed	Fresh	Fresh

Table D-5-3 Profile of Prospective Marketing Practices in West Java

Marketing Practices	Target Fruits in Kabupatens					
	Avocado in Bandung (1)	Duku in Ciamis (2)	Durian in Bogor (3)	Mango in Sumedang (4)	Mangosteen in Purwakarta (5)	Salak in Tasikmalaya (6)
1. Marketing Channel	Farmers-farmer's group/collectors- wholesaler-cities/ exports	Farmers-farmer's group/collectors- wholesaler-cities/ exports	Farmers-farmer's group/collectors- wholesaler-cities/ exports	Farmers-farmer's group/collectors- wholesaler-cities/ exports	Farmers-farmer's group/collectors- wholesaler-cities/ exports	Farmers-farmer's group/collectors- wholesaler-cities/ exports
2. Market Infrastructures	Packaging, Storage, Cooler (optional).	Packaging, Storage, Cooler.	Packaging, Storage, Cooler (optional).	Packaging, Storage, Cooler.	Packaging, Storage, Cooler.	Packaging, Storage, Cooler.
3. Destination of crop products	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.	Districts, Province, Cities, Exports.
3. Form of marketed products	Fresh	Fresh	Fresh and processed	Fresh and processed	Fresh	Fresh

Table D-5-4 Profile of Prospective Marketing Practices in East Java

Marketing Practices	Target Fruits in Kabupatens						
	<u>Avocado</u> in Lumajang (1)	<u>Cavendish Banana</u> in Jombang (2)	<u>Banana</u> in Lumajang (3)	<u>Duku</u> in Tulungagung (4)	<u>Durian</u> in Jombang and Trenggalek (5)	<u>Mango</u> in Pasuruan (6)	<u>Salak</u> in Malang (7)
1. Marketing Channel	Farmers-farmer's group/collectors- wholesaler-cities /exports	Farmers-farmer's group/processor- cities/exports	Farmers-farmer's group/collectors- wholesaler-cities	Farmers-farmer's group/collectors- wholesaler-cities/ exports	Farmers-farmer's group/collectors- wholesaler-towns/ cities	Farmers-farmer's group/collectors- wholesaler-towns/ cities/exports	Farmers-farmer's group/collectors- wholesaler-towns/ cities
2. Market Infrastructures	Packaging, Storage, Cooler (optional).	Packaging, Storage, Cooler.	Packaging, Storage, Cooler (optional).	Packaging, Storage, Cooler.	Packaging, Storage, Cooler (optional).	Packaging, Storage, Cooler.	Packaging, Storage, Cooler.
3. Destination of crop products	Districts, Province, Cities, Exports.	Cities, Exports.	Districts, Province, Cities,	Districts, Province, Cities, Exports.	Districts, Province, Cities,	Districts, Province, Cities, Exports.	Districts, Province, Cities,
3. Form of marketed products	Fresh	Fresh and processed	Fresh and processed	Fresh	Fresh	Fresh and processed	Fresh

Table D-5-5 Profile of Prospective Marketing Practices in South Sulawesi

Marketing Practices	Target Fruits in Kabupaten				
	Avocado in Gowa and Soppeng (1)	Mango in Sidrap, Majene, Bone, Maros and Wajo (2)	Mangosteen in Tana Toraja and Polewali-Mamasa (3)	Marquise in Gowa and Tana Toraja (4)	Rambutan in Mamuju, Enrekang, Pinrang and Barru (5)
1. Marketing Channel	Farmers-farmer's group/ collectors-wholesaler- cities/inter regions	Farmers-farmer's group/ collectors-wholesaler- cities/inter regions	Farmers-farmer's group/ collectors-wholesaler- cities/inter regions/exports	Farmers-farmer's group/ collectors-processors- exports/cities/inter regions	Farmers-farmer's group/ collectors-wholesaler- cities-inter regions/exports
2. Market Infrastructures	Packaging, Storage, Cooler (optional).	Packaging, Storage, Cooler.	Packaging, Storage, Cooler.	Facilities, Owned by, Factory.	Packaging, Storage, Cooler.
3. Destination of crop products	Districts, Province, Cities, Inter regions	Districts, Province, Cities, Inter regions	Districts, Province, Cities, Inter regions, Exports	Districts, Province, Cities, Inter regions, Exports	Districts, Province, Cities, Inter regions, Exports
3. Form of marketed products	Fresh	Fresh and processed	Fresh	Fresh and processed	Fresh

**THE STUDY ON THE IMPROVEMENT  
IN QUALITY OF THE TROPICAL FRUITS**

**Appendix E**  
**Infrastructure**

## APPENDIX E INFRASTRUCTURE

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## **APPENDIX E INFRASTRUCTURE**

### **1. PRESENT CONDITION OF INFRASTRUCTURE**

#### **1.1 North Sumatra Province**

##### **(1) Transportation Infrastructure**

Total length of State, Provincial, District, and Municipality roads is estimated at 30,990 km in 1996. Road density to geographical area and road ratio per 1,000 persons are 438 m/km<sup>2</sup> and 2.74 km/1,000 persons respectively, and both are more than the national level i.e. 202 m/km<sup>2</sup> and 1.95 km/1,000 persons. Aceh-Jakarta State road via Medan with well maintained runs across Province longitudinally, passing three potential Districts, i.e. Langkat, North Tapanuli and South Tapanuli. Other three potential Districts have also well-maintained road. All access roads to the proposed sites in the Districts are asphalted except two salak sites in South Tapanuli District with gravel pavement of about 30 km.

Six commercial sea ports and 15 non-commercial sea ports are operated for inter-island transportation, out of which four commercial and two non-commercial sea ports operate international trading in 1995. The largest sea port is Belawan located about 30 km north of Medan, which deals with about 50 % of inter-island cargo and 80 % of international cargo in North Sumatra in 1995. All the sea ports are not equipped with cold storage, while only Belawan can support refrigerated container for loading and unloading. Medan airport is 2nd largest airport in Indonesia following Soekarno-Hatta International airport in Jakarta in terms of volume of import and export freights.

##### **(2) Production Infrastructure**

In six potential Districts, no watering facilities for fruit trees are provided, and water is highly dependent on rainfall. But, some sites in Central Tapanuli District do not require watering facilities thanks to the good rainfall volume and distribution, but drainage facilities. Water source enabling gravity flow to production area are not available in all the proposed sites. Farm roads are not sufficiently developed, and not in a good condition. Some sites presently planted with upland crops, Palawija, or fruit trees have earthen farm roads, but very hard to pass by vehicles especially in the rainy season. No collection houses or packing houses for target fruits are available in all the proposed sites, while one home industry processing factory for marquisa is being operated by farmers' group in Karo District.

##### **(3) Living Infrastructure**

Drinking water in the proposed sites is secured from groundwater in lowland areas, and spring water by gravity in mountain and hilly areas. All the proposed sites are electrified from grid.

#### **1.2 West Java Province**

##### **(1) Transportation Infrastructure**

Total length of the roads is 28,329 km in 1996, and road density and ratio are 612 m/km<sup>2</sup> and 0.71 km/1,000 persons respectively. Road density is rather higher in Indonesia, while road ratio is lowest because of highest population. State road network extended from DKI Jakarta to both west and east parts is well established and maintained. All the six potential Districts are located along the State roads, and access to the proposed sites in the Districts is also fair except Bogor durian site, which requires rehabilitation of about 10 km access road for smooth traffic and transportation.

Two commercial sea ports at Cigading and Cirebon are operated for inter-island and international trading, while 5 non-commercial sea ports handle only inter-island trading in 1995. Besides, two commercial sea ports located in DKI Jakarta, i.e. Tanjung Priok and Sunda Kelapa, are also functioned as sea gate of West Java Province. Domestic and international trading by air is made through the largest Soekarno-Hatta International airport located in Jakarta DKI, handling about 60 % of international air freight of Indonesia recently.

## **(2) Production Infrastructure**

Some advanced farmers own watering facilities for fruit trees, but in general, no watering facilities are provided for fruit trees, and water is highly dependent on rainfall. Water source with gravity flow is available in Bogor durian sites, Purwakarta mangosteen sites, and some in Tasikmalaya salak sites, while other sites need exploitation of groundwater. As for farm roads, in spite of high road density, farm roads are still insufficient for smooth access and transportation. No collection houses or packing houses for target fruits are available in all the proposed sites.

## **(3) Living Infrastructure**

Drinking water in the proposed sites is secured from groundwater in lowland areas and spring water by gravity in mountain and hilly areas. All the proposed sites except some of Bogor durian site are electrified from grid.

# **1.3 East Java Province**

## **(1) Transportation Infrastructure**

Total road length is 33,066 km, and similar to West Java Province, road density is higher (690 m/km<sup>2</sup>), while road ratio is lower (0.98 km/1,000 persons). Networks of State roads down to village roads are sufficiently established, and maintained in a good condition. Road condition in the potential Districts and access to the proposed sites in Districts are satisfactory.

Seven commercial sea ports and eight non-commercial sea ports operate inter-island trading, out of which four commercial sea ports deal with international freight in 1995. The largest sea port is Tanjung Perak located in Surabaya city, handling more than 70 % of inter-island and international freights. Juanda Surabaya airport deals with the 3rd largest volume of international air freight in Indonesia following Medan airport.

## **(2) Production Infrastructure**

Distinct contrast concerning water availability is observed in the potential Districts located in eastern part and western part. Eastern Districts, represented by Pasuruan District, has longer dry season, and only deep groundwater is available in the proposed site, resulting in high operation cost of pumping. While, western Districts enjoy shallow groundwater in lowland enabling low operation cost of pumping, and spring water in mountain and hill land with gravity flow for watering fruit trees. In Jombang banana site, some farmers are carrying out rotational watering to banana plantation even in dry season by use of wheeled pump and engine set being managed by farmers group. While, no cultivation is carried out in Pasuruan District. Although the road network is well established, farm roads still need extension or rehabilitation for smooth access and transportation. No collection houses or packing houses for target fruits are available in all the proposed sites.

## **(3) Living Infrastructure**

Drinking water in the proposed sites is secured from groundwater in lowland areas and spring water by gravity through pipeline in mountain and hilly areas. All the proposed sites are electrified from grid.

## **1.4 South Sulawesi Province**

### **(1) Transportation Infrastructure**

Total road length is 27,772 km, and road density and ratio are 382 m/km<sup>2</sup> and 3.6 km/1,000 persons respectively, which are similar to North Sumatra Province. Road networks connecting capitals of potential Districts is asphalted, and well established. Road condition is good except Mamuju District, in which about 20 km State road before capital Mamuju is severely deteriorated. No access roads to the proposed sites in the Districts are paved with asphalt except Soppeng avocado site and Majene Mango site. Poorer conditioned access roads are Polmas mangosteen site, Mamuju rambutan site, and Tana Toraja marquisa site.

Two commercial sea ports at Makassar and Pare-Pare, and 16 non-commercial sea ports are operational for inter-island trading, out of which 2 commercial ports and 7 non-commercial sea ports handle international freights in 1995. The largest sea port is Makassar located in Ujung Pandang city, dealing with about 40 % of inter-island cargo and about 15% international cargo in 1995. Hasanuddin airport located in the suburb of Ujung Pandang recently handles the 6th largest volume of international freight in Indonesia following Bali airport .

### **(2) Production Infrastructure**

In the whole South Sulawesi except mountain area, the duration of dry season is rather longer, and from the viewpoint of plant physiology, watering can contribute to faster growth of fruit seedlings. However, at present watering for fruit trees is highly dependent on rainfall, and no watering facilities are found in all the potential Districts. Actually, the water resources are not sufficient even for domestic and animal water use, and consequently the conjunctive use of available water resources is needed. Out of 15 potential Districts, only Soppeng avocado site can enjoy spring water by gravity flow, and part of Mamuju rambutan site can exploit shallow groundwater. Remaining Districts need exploitation of rather deep groundwater or intake from river by pumps. Almost no proposed sites are provided with farm roads. No collection houses or packing houses for target fruits are available in all the proposed sites, while two home industry processing factories for marquisa are being operated by farmers' group in Gowa proposed site.

### **(3) Living Infrastructure**

Much effort to secure drinking water is done by farmers in the proposed site except mountain area. Main water source is groundwater. In Wajo mango site, farmers buy drinking water transported by water tanker, in Maros mango site fetch water from river, or in Bone mango site, fetch water from far spring. Out of 15 proposed sites, 4 sites, i.e. Wajo mango site, Maros mango site, Tana Toraja marquisa site, and Bone mango site, are not electrified from grid.

## **2. BASIC DEVELOPMENT PLAN**

### **2.1 Infrastructure Development Plan**

In order to develop the promising areas for orchard and sustain the project, development of infrastructure and facilities, directly relating to the quantity and quality of the production, is important and indispensable in parallel with the improvement of farming technique through extension services as well as establishment of post-harvest and marketing system. The infrastructure and facilities to be required will be i) land preparation , ii) watering facilities, iii) drainage facilities, iv) farm road, v) animal protection fence, and vi) post-harvest facilities, which will be planned depending on the conditions of the proposed sites. The basic development plan for these facilities is explained as below.

### (1) Land Preparation

Necessity of land preparation depends on the site condition of the proposed sites. In case of new development of land, clearing and stripping will be required, while the developed land may not require land preparation. In steep slope area of mountain and hill, spot terracing will be applied. Spot sorjan system by filling soil around the fruit tree will be applied for swampy area, and wet paddy inter-cropping area to avoid inundation or waterlogging.

### (2) Watering Facilities

Water is an essential constituent for living plant, and if the soil is dry or lack of water, the growth of fruit tree will be disturbed, resulting in poor shoot and root development, hindrance of leaves development and thus harvest of smaller fruit. Therefore, watering will be required time to time especially in the dry season. To conduct watering, development of water resources is indispensable. Possible water resources are river surface water, spring water or groundwater, duly depending on the physical condition of the site. To develop such water resources, following structure and equipment will be required:

	Source	Structure	Equipment
1.	River	Intake structure (gravity)	Nil
		Intake structure (lift)	Suction pump
2.	Spring	Collection/storage tank (gravity)	Nil
		Collection/storage tank (lift)	Suction pump
3.	Groundwater	Shallow well (lift)	Suction pump
		Deep well (lift)	Submersible pump

From the viewpoint of operation and maintenance aspects by smallholding farmers, the development of spring or river with gravity flow is most suitable and sustainable, even though the initial investment cost for the construction of such facilities becomes more expensive. In the dry area in the eastern part of East Java and the whole South Sulawesi where to secure drinking water is rather difficult, conjunctive use of water should be considered.

Required volume of water is differed by climate and soil conditions as well as planting density of fruit tree. Banana and salak will be planted in high density, which require water more than 10 times compared with the other fruit trees. In case of utilizing shallow groundwater, required number of well is preliminarily estimated at every 10 ha at least for salak and banana, while other fruit trees require every 100 ha. Development of water resources should be made in consideration of such requirement.

Water storage tank will be provided in a certain density to enable farmers to access and fetch water easily. Water source to water storage tank will be connected by water conveyance facilities such as earthen canal, lined canal or pipeline, which will be selected judging from technical and economical viability. The earthen canal can be constructed with relatively less construction cost in the flat plain, but higher water conveyance loss and unsuitable in the steep slope area because of possible occurrence of erosion. While, lined canal or pipeline is suitable in such a steep area, but the construction cost is more expensive. From a viewpoint of an operation and maintenance and minimization of water conveyance loss, the pipeline is most recommendable, followed by lined canal, and in case of earthen canal, regular maintenance such as weeding and desilting will be required. Depending of topographic condition, combination of such conveyance facilities will be considered.

### (3) Drainage Facilities

Drainage facilities will be required for removing excess water from the farm land especially in the wet low land, which is suitable for growing avocado, marquisa, durian, mangosteen,

rambutan and salak. Drainage facilities also contribute to avoid waterlogging harmful to the plant and to secure accessibility to the farm land for harvesting and maintenance of fruit trees especially in the rainy season. The facilities will be earthen drainage canal and related structure such as drainage culvert and drops depending on the site topographic conditions.

#### **(4) Farm Road**

In order to transport the products from production sites to market, post-harvest facilities, sea port or airport smoothly, establishment of road network is the most essential and important, benefiting minimization of handling loss. The road network consists of the public road and farm road. The public road is of state, provincial, district and village roads under responsibility of central or local government for their development and maintenance. In parallel to the orchard development, the public roads should be improved for smooth access to market. The farm road is to connect the production site to site, to post-harvesting facilities or to public road. Road related facilities such as culvert and bridge will be also required to prolong the life of farm road through smooth drainage.

#### **(5) Animal Protection Fence**

Wild animal sometimes enter farm yard, and eat inter-cropped vegetation or leaves of fruit plants, especially in mountain and hill area. To avoid such disturbance, animal protection fence made of wood will be provided.

#### **(6) Post-harvest Handling Facilities and Equipment**

In order to improve handling after harvest, and increase value added of fruits and farm gate price, post-harvest activities such as cleaning, sorting, grading, packing and transportation will be required. Such activities can decrease post-harvest losses, so far occurred considerably. But, few smallholding farmers realize necessity and advantage of such activities, so that training and education of such farmers is important though training program as well as extension service. Facilities will be collection house equipped with some equipment and tools for cleaning, sorting and grading activities, packing house for transportation of products, and processing house and equipment on a home industry scale, especially for marquisa and banana for processing. Collection house will be functioned as office of farmers' group.

### **2.2 Development Plan in Four Provinces**

Based on the infrastructure development plan, the required infrastructure for each proposed site are examined on a basis of proposed site conditions identified through field reconnaissance survey. Brief explanations are given below for four Provinces.

#### **(1) North Sumatra Province**

Five fruit commodities such as durian, mangosteen, marquisa, rambutan and salak are proposed in six Districts. List of required infrastructure of each site is shown in Table E2.1, and major features of each project site is described in Table E-2-1.

**Table E2.1 List of Infrastructure in North Sumatra Province**

Project Code	District	Commodity	Land Preparation	Watering Facilities	Drainage System	Road Facilities	Animal Protection Fence	Post-harvest Facilities
NS(DR)-1	Dairi	Durian	0	0	.	0	.	0
NS(DR)-2	Tapanuli Tengah	Durian	0	.	0	0	.	0
NS(DR)-3	Tapanuli Utara	Durian	0	0	.	0	.	0
NS(MN)-1	Tapanuli Selatan	Mangosteen	0	0	.	0	.	0
NS(MN)-2	Tapanuli Utara	Mangosteen	0	0	.	0	.	0
NS(MA)-1	Karo	Marquisa	0	0	.	0	.	0
NS(RB)-1	Langkat	Rambutan	0	0	0	0	.	0
NS(SK)-1	Tapanuli Selatan	Salak	0	0	.	0	.	0

Source : JICA Study Team

**(2) West Java Province**

Six fruit commodities such as avocado, duku, durian, mango, mangosteen and salak are proposed in six Districts. List of required infrastructure of each site is shown in Table E2.2, and major features of each project site is described in Table E-2-2.

**Table E2.2 List of Infrastructure in West Java Province**

Project Code	District	Commodity	Land Preparation	Watering Facilities	Drainage System	Road Facilities	Animal Protection Fence	Post-harvest Facilities
WJ(AV)-1	Bandung	Avocado	0	0	.	0	.	0
WJ(DK)-1	Ciamis	Duku	0	0	.	0	.	0
WJ(DR)-1	Bogor	Durian	0	0	.	0	.	0
WJ(MO)-1	Sumedang	Mango	0	0	.	0	.	0
WJ(MN)-1	Purwakarta	Mangosteen	0	0	.	0	.	0
WJ(SK)-1	Tasikmalaya	Salak	0	0	.	0	.	0

Source : JICA Study Team

**(3) East Java Province**

Six fruit commodities such as avocado, banana, duku, durian, mango and salak are proposed in six Districts. List of required infrastructure of each site is shown in Table E2.3, and major features of each project site is described in Table E-2-3.

**Table E2.3 List of Infrastructure in East Java Province**

Project Code	District	Commodity	Land Preparation	Watering Facilities	Drainage System	Road Facilities	Animal Protection Fence	Post-harvest Facilities
EJ(AV)-1	Lumajang	Avocado	0	0	-	0	-	0
EJ(BA)-1	Jombang	Banana	-	0	-	0	-	0
EJ(BA)-2	Lumajang	Banana	-	0	-	0	-	0
EJ(DK)-1	Tulungagung	Duku	-	0	-	0	-	0
EJ(DR)-1	Jombang	Durian	0	0	-	0	-	0
EJ(DR)-2	Trenggalek	Durian	0	0	-	0	-	0
EJ(MO)-1	Pasuruan	Mango	-	0	-	0	-	0
EJ(SK)-1	Malang	Salak	-	0	-	0	-	0

Source : JICA Study Team

#### (4) South Sulawesi Province

Five fruit commodities such as avocado, mango, mangosteen, marquisa and rambutan are proposed in 13 Districts. List of required infrastructure of each site is shown in Table E2.4, and major features of each project site is described in Table E-2-4.

**Table E2.4 List of Infrastructure in South Sulawesi Province**

Project Code	District	Commodity	Land Preparation	Watering Facilities	Drainage System	Road Facilities	Animal Protection Fence	Post-harvest Facilities
SS(AV)-1	Gowa	Avocado	0	0	-	0	-	0
SS(AV)-2	Soppeng	Avocado	0	0	-	0	0	0
SS(MO)-1	Sidenreng Rappang	Mango	0	0	-	0	-	0
SS(MO)-2	Majene	Mango	0	0	-	0	-	0
SS(MO)-3	Bone	Mango	0	0	-	0	-	0
SS(MO)-4	Maros	Mango	0	0	-	0	-	0
SS(MO)-5	Wajo	Mango	0	0	-	0	-	0
SS(MN)-1	Tana Toraja	Mangosteen	0	0	-	0	-	0
SS(MN)-2	Polewali Mamasa	Mangosteen	0	0	-	0	0	0
SS(MA)-1	Gowa	Marquisa	0	0	-	0	-	0
SS(MA)-2	Tana Toraja	Marquisa	0	-	-	0	-	0
SS(RB)-1	Mamuju	Rambutan	0	0	0	0	-	0
SS(RB)-2	Enrekang	Rambutan	0	0	-	0	0	0
SS(RB)-3	Pinrang	Rambutan	0	0	-	0	-	0
SS(RB)-4	Baru	Rambutan	0	0	-	0	0	0

Source : JICA Study Team

**Table E-2-1 Main Feature of Project Infrastructure in North Sumatra Province**

Districts	Commodity	Main Features
NS(DR)-1 Dairi	Durian	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- Rehabilitation of existing farm roads</li> <li>- Collection and packing house</li> </ul>
NS(DR)-2 Tapanuli Tengah	Durian	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- No watering facilities due to good rainfall</li> <li>- Drainage facilities</li> <li>- New farm roads</li> <li>- Collection and packing house</li> </ul>
NS(DR)-3 Tapanuli Utara	Durian	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- Possible development of spring and groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm roads</li> <li>- Collection and packing house</li> </ul>
NS(MN)-1 Tapanuli Selatan	Mangosteen	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of river intake and spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm roads</li> <li>- Collection and packing house</li> </ul>
NS(MN)-2 Tapanuli Utara	Mangosteen	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- Possible development of spring and groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm roads</li> <li>- Collection and processing house with packing room</li> </ul>
NS(MA)-1 Karo	Marquisa	<ul style="list-style-type: none"> <li>- Spot terracing</li> <li>- Possible development of spring and groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- Rehabilitation of existing farm roads</li> <li>- Collection and packing house</li> </ul>
NS(RB)-1 Langkat	Rambutan	<ul style="list-style-type: none"> <li>- Development of shallow groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- Drainage facilities</li> <li>- Rehabilitation and new farm roads</li> <li>- Collection and packing house</li> </ul>
NS(SK)-1 Tapanuli Selatan	Salak	<ul style="list-style-type: none"> <li>- Need rehabilitation of access road by local government</li> <li>- Land clearing</li> <li>- Possible development of river water and spring by pump</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>



**Table E-2-2 Main Feature of Project Infrastructure in West Java Province**

Districts	Commodity	Main Features
WJ(AV)-1 Bandung	Avocado	<ul style="list-style-type: none"> <li>- Need rehabilitation of access road by local government</li> <li>- Possible development of groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- Rehabilitation and new farm roads</li> <li>- Collection and packing house</li> </ul>
WJ(DK)-1 Ciamis	Duku	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of spring and groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
WJ(DR)-1 Bogor	Durian	<ul style="list-style-type: none"> <li>- Development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
WJ(MO)-1 Sumedang	Mango	<ul style="list-style-type: none"> <li>- Sorjan system</li> <li>- Development of groundwater and river intake</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- Rehabilitation of farm road</li> <li>- Collection and packing house</li> </ul>
WJ(MN)-1 Purwakarta	Mangosteen	<ul style="list-style-type: none"> <li>- Spot terracing</li> <li>- Development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
WJ(SK)-1 Tasikmalaya	Salak	<ul style="list-style-type: none"> <li>- land clearing and spot terracing</li> <li>- Possible development of spring, groundwater and river</li> <li>- Installation of pipeline &amp; lined canal, and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>

**Table E-2-3 Main Feature of Project Infrastructure in East Java Province**

Districts	Commodity	Main Features
EJ(AV)-1 Lumajang	Avocado	<ul style="list-style-type: none"> <li>- Possible development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
EJ(BA)-1 Jombang	Banana	<ul style="list-style-type: none"> <li>- Development of shallow groundwater</li> <li>- Installation of pipeline</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
EJ(BA)-2 Lumajang	Banana	<ul style="list-style-type: none"> <li>- Development of spring and shallow groundwater</li> <li>- Installation of pipeline</li> <li>- Rehabilitation of farm road</li> <li>- Collection and packing house, processing house for chips</li> </ul>
EJ(DK)-1 Tulungagung	Duku	<ul style="list-style-type: none"> <li>- Development of shallow groundwater</li> <li>- Installation of pipeline</li> <li>- Rehabilitation of farm road</li> <li>- Collection and packing house, processing house for chips</li> </ul>
EJ(DR)-1 Jombang	Durian	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Development of spring and river intake</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
EJ(DR)-2 Trenggalek	Durian	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and foot step</li> <li>- Collection and packing house</li> </ul>
EJ(MO)-1 Pasuruan	Mango	<ul style="list-style-type: none"> <li>- Development of deep groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and rehabilitation</li> <li>- Collection and packing house</li> </ul>
EJ(SK)-1 Malang	Salak	<ul style="list-style-type: none"> <li>- Possible development of groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- Rehabilitation of farm road</li> <li>- Collection and packing house</li> </ul>

**Table E-2-4 Main Feature of Project Infrastructure in South Sulawesi Province (1/2)**

Districts	Commodity	Main Features
SS(AV)-1 Gowa	Avocado	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of groundwater and spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
SS(AV)-2 Soppeng	Avocado	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Animal protection fence</li> <li>- Collection and packing house</li> </ul>
SS(MO)-1 Sidenreng Rappang	Mango	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of groundwater and river intake</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and rehabilitation</li> <li>- Collection and packing house</li> </ul>
SS(MO)-2 Majene	Mango	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of river intake and groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
SS(MO)-3 Bone	Mango	<ul style="list-style-type: none"> <li>- Possible development of groundwater or river intake</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
SS(MO)-4 Maros	Mango	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- Possible development of groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and rehabilitation</li> <li>- Collection and packing house</li> </ul>
SS(MO)-5 Wajo	Mango	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- Possible development of deep groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and rehabilitation</li> <li>- Collection and packing house</li> </ul>
SS(MN)-1 Tana Toraja	Mangosteen	<ul style="list-style-type: none"> <li>- Spot terracing</li> <li>- Possible development of spring and groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and rehabilitation</li> <li>- Collection and packing house</li> </ul>

**Table E-2-4 Main Feature of Project Infrastructure in South Sulawesi Province (2/2)**

Districts	Commodity	Main Features
SS(MN)-2 Polewali Mamasa	Mangosteen	<ul style="list-style-type: none"> <li>- Need rehabilitation of access road by local government</li> <li>- Spot terracing</li> <li>- Possible development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Animal protection fence</li> <li>- Collection and packing house</li> </ul>
SS(MA)-1 Gowa	Marquisa	<ul style="list-style-type: none"> <li>- Land clearing and terracing</li> <li>- Possible development of spring</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road, rehabilitation and foot step</li> <li>- Collection and processing house with packing room</li> </ul>
SS(MA)-2 Tana Toraja	Marquisa	<ul style="list-style-type: none"> <li>- Need grading-up of access road by local government</li> <li>- Spot terracing</li> <li>- New farm road, rehabilitation and foot step</li> <li>- Collection and processing house with packing room</li> </ul>
SS(RB)-1 Mamuju	Rambutan	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- Development of shallow groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road and rehabilitation</li> <li>- Collection and packing house</li> </ul>
SS(RB)-2 Enrekang	Rambutan	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of spring and river intake</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Animal protection fence</li> <li>- Collection and packing house</li> </ul>
SS(RB)-3 Pinrang	Rambutan	<ul style="list-style-type: none"> <li>- Land clearing</li> <li>- Possible development of groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Collection and packing house</li> </ul>
SS(RB)-4 Barru	Rambutan	<ul style="list-style-type: none"> <li>- Land clearing and spot terracing</li> <li>- Possible development of groundwater</li> <li>- Installation of pipeline and concrete farm pond</li> <li>- New farm road</li> <li>- Animal protection fence</li> <li>- Collection and packing house</li> </ul>

**THE STUDY ON THE IMPROVEMENT  
IN QUALITY OF THE TROPICAL FRUITS**

**Appendix F**  
**Socio-economy**



## APPENDIX F SOCIO ECONOMY

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## APPENDIX F SOCIO ECONOMY

### 1. NATIONAL DEVELOPMENT PLANS AND POLICY

#### 1.1 National Development Plans

Since both the first long-term development program and five year development plan started in 1969, there exist two principal development plans in Indonesia: one is for medium-term (5 years) and the other is for long-term (25 years).

##### (1) The Second Long-Term Development Plan

The two "Long-Term (25-year) Development Plans" called "PJP-I & -II" were formulated to provide the country with direction in its socio-economic development efforts. These long-term plans have served as a guiding framework for preparation of the short and medium-term policies, strategies and plans. Even though the past successes have enabled the Government to build up a strong economic foundation, there still exist the formidable challenges of sustaining development that lie ahead. While past achievements have opened up new opportunities for development, they have also given rise to new challenges.

##### (2) The Sixth Five-Year Development Plan

The Government of Indonesia (GOI) is implementing the Sixth Five-Year Development Plan (Repelita VI: 1994/95 to 1998/99). The development policy of Repelita VI is referred to *Pancasila*, UUD (*Undang-Undang Dasar* = Constitution) in 1945 and GBHN (Guidelines of State Policy) in 1994/95-1998/99. Challenges Indonesia is facing during Repelita VI are among others:

- The high population growth even the percentage is going down to 1.7% per year from 192 million, still the demand of food continues to increase;
- With the opening of the world market and the existence of GATT, agricultural development activities should be more competitive, productive and efficient;
- The image of the people that rice is nutritious and prestigious food;
- The reduction of irrigated paddy field in Java at the rate of 47,000 ha per year could reduce food production, and bring about less labor force in agriculture, decrease in size of agricultural land for soil water retention, and distortion of environmental balance; and
- Small size land ownership causes difficulties in increasing income and welfare of farmers community.

The main targets to be reached are the following:

- |   |   |
|---|---|
| - Average annual economic growth rate   | : 7.1% (revised in August 1995 from the initial target set at 6.2%)                       |
| - Annual population growth rate         | : 1.5% at the final plan year (1999)  |
| - Per capita GNP                        | : Over US\$1,280 at the final plan year (1999)  |
| - Population living in absolute poverty | : Less than 1.2 million people (6% of the total population) at the final plan year (1999) |

### (3) The Seventh Five-Year Development Plan, 1999-2003

The Indonesian Government is preparing the next Seventh Five-Year Development Plan to be put into execution from 1999/00 to 2003/04. During the next 5 years, the GOI intends to maintain the high growth with equity through overcoming the current financial crisis coupled with currency turmoil. Emphasis will be placed to ensure rapid growth in incomes and jobs, including in the Eastern Islands.

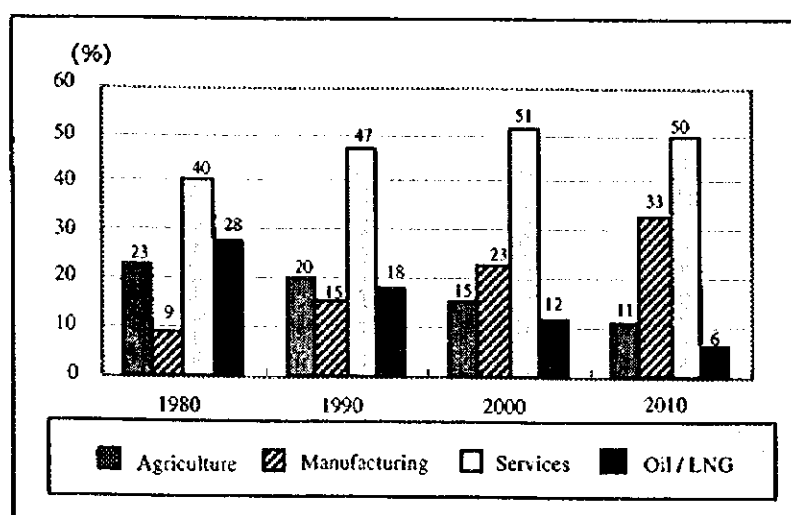
#### 1.2 Agricultural Development Policy and Strategies

As the first Five-Year Development Plan for the Second Long Term (25 Year) Development Program (PJP-II), the Repelita VI stipulates that the agriculture development is to be directed to develop human resources in agriculture sector and promote the agro-industry, in order to establish more effective and efficient agricultural system. The major policy objectives in agricultural sector are as indicated below:

- Agricultural human resources development;
- Natural resources management;
- Agricultural research development and adoption of appropriate science and technology;
- Strengthening of agricultural institutions including public agencies, farmers' organizations and economic institutions;
- Food self-sufficiency and promotion of food and nutrition diversification;
- Betterment of integrated farming system, especially the small scale farming;
- Alleviation of poverty;
- Improvement of agro-industry, marketing and trading, focusing upon agricultural products processing, quality and standard, information and promotion, marketing system, export and market expansion, and pricing policy;
- Intensification of agricultural investment;
- Establishment of administration and control system; and
- Strengthening of sectoral and international cooperation.

Regarding the prospect of agriculture sector, the share of agriculture in GDP would be expected to continue to decline, from about 20% in 1990 to 15% by 2000 and further to 11% by 2010 (see Figure F1.1).

Figure F1.1 Outlook of Economic Structure



Source: Indonesia - Sustaining Development, 1994, The World Bank.

Nevertheless, the sector will continue to play a vital role in the economy, as the main source of employment as well as the producer of critical wage goods, industrial raw materials and commodity exports. Also, given supportive policies, agricultural growth, while slowing, could still average 3% per annum during 1990-2010, exceeding population growth and thereby continuing to contribute to raising living standards and reducing poverty. As to the development expenditure for agriculture and forestry sector, it is gradually decreasing from 9% in Repelita V to 4% in Repelita VI.

### **1.3 Horticultural Development Policy and Target**

#### **(1) Present Horticultural Development**

In Indonesia, horticulture sub-sector administratively consists of four crops, namely vegetables and upland crops other than secondary crops (*palavija*), fruits, ornamental plants, and each consists of many kind of crops. In the past, the horticultural development has been constrained by the GOI's concentration on the policy of rice self sufficiency. Since the rice self sufficiency was achieved in 1984 and subsidies are being progressively removed, the GOI is directing efforts toward diversification into higher value crops such as horticulture.

The horticultural development has been assisted recently by the government development incentives such as reduction of tariffs on manufactured goods used in the processing of horticultural products. The government policy of moving toward a more competitive agricultural sector has had a direct bearing on the future of horticulture. It also has taken several positive initiatives to directly stimulate production. These include budgetary support in research, extension, training and credit areas.

The horticultural development has more attention during Repelita VI, because horticultural commodities, particularly fruits have a big opportunity as one of the sources for major growth in food crop subsector. Horticulture development in the future is directed to meet the domestic requirement to support the effort to increase the nutrition of the people, also for export to increase foreign exchange.

#### **(2) Development Targets and Problems**

The targets of food crops and horticulture development during the Repelita VI are to:

- increase farmers' welfare;
- maintain food self-sufficiency;
- produce sufficient food and raw material to meet the people's need;
- improve people's nutrition through food diversification;
- broaden job opportunities;
- broaden the market share, domestic as well as abroad; and
- create linkage and dependence with industrial and service sectors toward productive agribusiness and agro-industry networks.

The development of food crops and horticulture during PJP-I faced problems, among others as follows:

- The quality of commodity produced is not yet of prime quality, especially horticultural crops;
- The quality of commodity produced is variable not homogenous, and therefore not suitable for export;
- The volume of commodity produced is small and the problem to assure the constant supply;
- The capacity for product processing, sorting and packing is weak;
- High quality seed growers able to produce substantial amount are limited;
- Capability and skill of farmers and agricultural officers need to be increased;

- Limited number of agro-processing firms;
- Conversion of rice field to non-rice field;
- Sub-optimal utilization of land;
- Function of KUD, political community organization; mismatches with provision of agricultural supporting services;
- Limited personnel for agricultural extension related to horticulture;
- Utilization of marginal land outside Java needs specific technology and high cost;
- Limited infrastructure and scare people outside Java, caused difficulties for agricultural development, especially in Eastern Indonesia; and
- Limited development fund in the form of budget as well as subsidy.

Based on the past achievements, the GOI set the following GDP targets for food crops and horticulture productions during Repelita VI (see Table F1.1).

**Table F1.1 GDP Targets for Food Crops and Horticulture Productions during Repelita VI**

Description	1993	1994	1995	1996	1997	1998	Growth Rates 1993-1998 (%)
<b>- GDP of Food and Horticultural Crops (Rp. billion)</b>							
• Constant Price 1983	14,598	14,963	15,337	15,736	16,129	16,533	2.52
• Constant Price 1989	26,573	27,237	27,918	28,644	29,360	30,094	2.52
<b>- Share of Crops</b>							
<b>1) Rice</b>	54.67	54.35	54.02	53.68	53.33	52.95	-
<b>2) Palawija</b>	25.78	25.75	25.73	25.71	25.71	25.74	-
• Corn	8.28	8.37	8.47	8.56	8.65	8.74	-
• Soybean	4.65	4.68	4.70	4.73	4.75	4.77	-
• Cassava	7.27	7.69	6.92	6.76	6.59	6.43	-
• Sweet potato	1.31	1.31	1.30	1.29	1.28	1.27	-
• Peanut	3.38	3.38	3.39	3.42	3.46	3.54	-
• Mungbean	0.90	0.92	0.94	0.96	0.98	1.00	-
<b>3) Horticulture</b>	19.55	19.90	20.25	20.61	20.96	21.31	-
• Vegetables	6.69	6.68	7.02	7.19	7.36	7.53	-
• Fruits	12.86	13.04	13.23	13.42	13.60	13.78	-
<b>Total</b>	100.00	100.00	100.00	100.00	100.00	100.00	-

Source : Policy and Development Pattern of Food Crop and Horticulture Crops, DGFCH, Ministry of Agriculture.

With such weight and development, food and horticultural crops have the highest contribution, nearly 53% to agricultural sector compared to the other subsectors (estate, livestock, fishery, etc.). During the period 1994-1996, GDP of the food crops sub-sector including horticulture productions increased with higher growth rate (3.5%) than the target (2.52%) set in Repelita VI. As to the data on GRDP in the Study Area, they are given in Table F1-1.

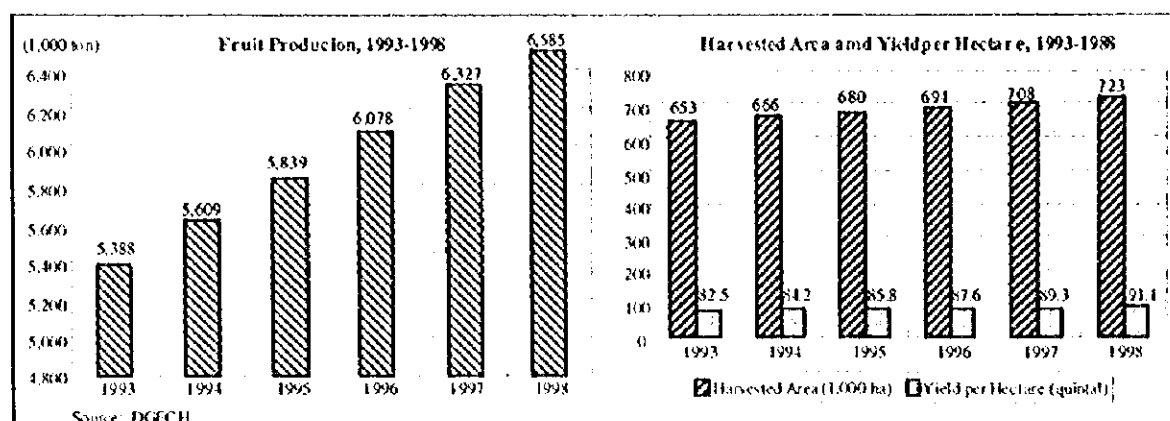
### (3) Fruit Production

The fruit production shows annual fluctuations as seen in Table F-1-2. These are mostly due to the alternate bearing caused by lack of farmers' knowledge and skills of fruit tree management. Based on the actual results in 1993 (last year of Repelita V), the DGFCH set the targets of fruit production, yield and harvested area for the period of 1993-1998 as shown in Figure F1.2.

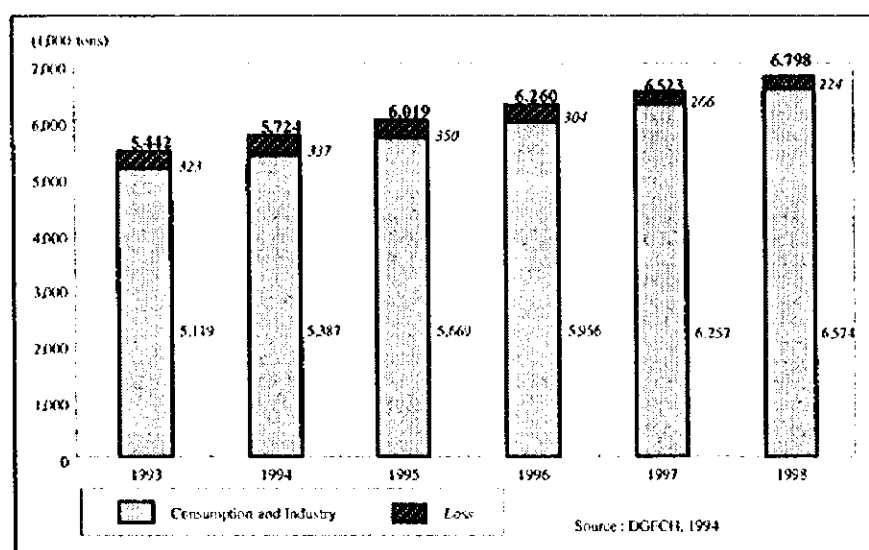
As observed in other countries, the demand per capita of horticultural products increases in proportion to the increase of income and community education. The same trend is also forecast

for Indonesia. Due to the gradual decrease of loss, the demand for vegetables and fruits for direct consumption and processing during the period of 1993-98 is projected to increase 5.1% per year as shown Figure F1.3.

**Figure F1.2 Fruit Production, Yield and Harvested Area, 1993-1998**



**Figure F1.3 Fruit Demand Projection, 1993-1998**



#### 1.4 Horticulture and Orchard Development Plans and Projects

Due to the latest critical financial situation in Indonesia, many programs and projects are to be rescheduled and/or postponed. In line with the agricultural development policy and strategies described in Section 1.2, the Directorate General of Food Crops and Horticulture (DGFCH) started, since 1989/90, to implement the following horticulture development programs, by allocating the local budget of receipts and expenditure (APBN).

- Fruit Crops Production Center (*Sentra Produksi Buah-Buahan*);
- Farm Operation in Special Area (*Usahatani di Wilayah Khusus*);
- Integrated Farm Operation in Marginal Area (*Usahatani Terpadu di Lokasi Marginal*);
- and
- Integrated Rural Agricultural Project (*Proyek Pertanian Rakyat Terpadu*).

As to the "Fruit Crops Production Center" Program, a part of the program was realized with the OECF Sector Program Loan (SPL). Main purposes of the above programs are:

- to promote production of horticulture crops on farmers land;
- to improve the quality of crops and their commodities; and
- to assure stable supply of fresh crops (or raw materials) to the markets and processing industries.

Table F1.2 shows the horticulture development programs which were realized and/or are on-going since 1991/92 up to date.

**Table F1.2 Realized and On-going Horticulture Development Programs**

(Unit : hectare)									
No.	Programs / Projects	1991/92	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98	Total
1.	Fruit Production Center (APBN)	8,000	19,685	31,036	-	-	-	-	58,721
	- PRT DATU	-	-	-	30,538	8,856	5,100	-	44,494
	- Klonalisasi	-	-	-	-	-	21,650	1,050	22,700
	- NON SPAKU	-	-	-	-	-	4,275	4,750	9,025
	- Lembaga Mandiri	-	-	-	-	-	-	155	155
	- SPAKU	-	-	-	-	-	3,580	1,976	5,556
	- Pemeliharaan	-	-	-	-	-	-	1,000	1,000
	- Rehabilitasi Jeruk	-	-	-	-	-	1,225	1,000	2,225
2.	Fruit Production Center (SPL/ OECF)	5,500	1,000	7,700	-	-	-	-	14,200
3.	Special Area Development (APBN/ Wilayah Kusus)	-	1,030	2,325	-	-	-	-	3,355
4.	Marginal Area Development (APBN/ Usaha Tani)	17,926	24,337	16,786	-	-	-	-	59,049
5.	Integrated Rural Agricultural Development (APBN)	-	-	-	4,500	-	-	-	4,500
6.	Upland Farmer Development Project (UFDP)	-	-	-	-	6,500	5,000	500	12,000
7.	Kalimantan Upland Farming (KUF/ Germany)	M	M	M	M	M	M	300	300
8.	Integrated Horticulture Development in Upland Areas (IHUUA/ OECF)	-	-	-	-	-	-	2,190	2,190
Total		31,426	46,052	57,847	35,038	15,356	40,830	12,921	239,470

Note: M = Fruit/horticulture management activities only.

Source: Directorate of Horticulture Production Development (DHPD), Directorate General of Food Crops and Horticulture (DGCH)

According to Table F1.2, the total land size developed in last six years amounts to some 239,500 ha. In addition to the programs listed above, several studies on horticulture development are being carried out by MOA with both the GOI's budget and foreign technical assistance such as JICA, ADB, and others. The ADB study, named "Indonesia Horticulture and Agribusiness Development", aims to examine the potential to establish 10 commercially viable horticulture sub-projects in five Provinces (10 Districts) and to conduct detailed feasibility analysis on selected sub-projects, as well as on the overall investment program. The fund requirement for the proposed development plan is however far below the ADB's minimum standard so that the project finance is under further consideration.

## 2. SOCIO-ECONOMY IN THE STUDY AREA

### 2.1 Administrative System

The GOI promotes the policy to decentralize the present administration system to local authorities in order to transfer for public services as well as operation and maintenance works

of public infrastructures and facilities after completed by the GOI's investment. Decentralization of the administration system aims further to allow greater participation of local governments in a bottom-up planning system to reflect regional development needs in national decision-making processes.

Administratively, Indonesia is divided into central and local levels. The latter comprises (27) Provinces with a relatively high degree of autonomy. Under the Provinces, there are District/Municipalities (*Kabupaten/Kotamadya*), Sub-districts (*Kecamatan*) and Villages (*Desa*). The area and number of administrative units in the Study Areas as of 1996 are shown in Table F2.1 (For further details, refer to Tables F-2-1 to F-2-4).

**Table F2.1 Area and Number of Administrative Units in the Study Area, 1996**

Province (Propinsi)	Area (km <sup>2</sup> )	% to Total Area	No. of Districts (Kabupaten)	No. of Municipalities (Kotamadya)	No. of Sub-districts (Kecamatan)	No. of Villages (Desa)
North Sumatra	70,787	3.69	11	6	252	5,242
West Java	46,300	2.41	20	5	529	7,166
East Java	47,921	2.50	29	8	615	8,426
South Sulawesi	72,781	3.79	21	2	185	2,878
<b>Study Area (% to Total)</b>	<b>237,789 (12.4)</b>	<b>12.39 -</b>	<b>81 (32.8)</b>	<b>21 (33.3)</b>	<b>1,581 (39.3)</b>	<b>23,712 (35.8)</b>
Indonesia	1,919,317	100.00	247	63	4,022	66,158

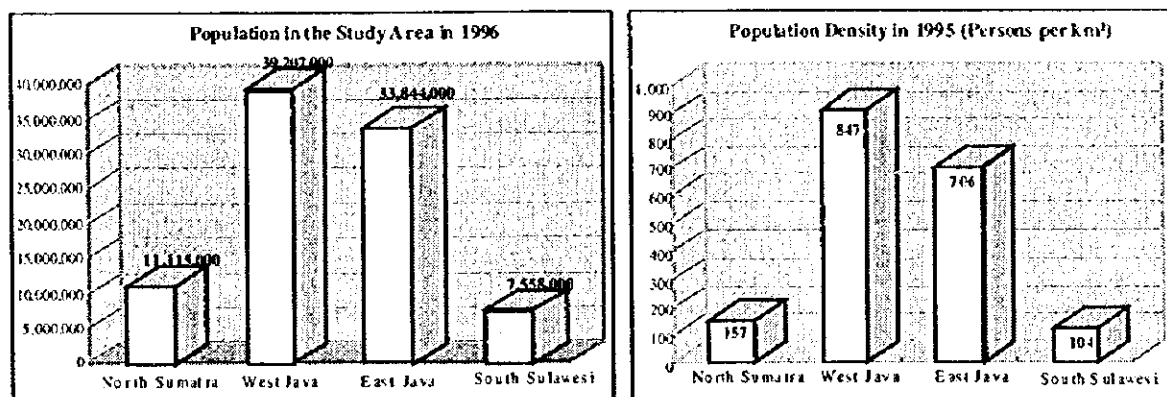
Source: Statistical Year Book of Indonesia, 1996 and Environmental Statistics of Indonesia 1996, BPS.

In all of 27 Provinces, a regional office of each Ministry (*KANWIL-Kantor Wilayah*) is established with a coordination function between the central and local administration units. Under the Governor who is appointed by the State President, Provincial Services (*Dinas Tingkat I*) is set up as an administration unit corresponding to each Directorate General of the Ministry. The administration at District and Sub-district levels is entrusted to District Chief (*Bupati*) and Sub-district Chief (*Camat*), respectively. Under Sub-district (*Kecamatan*), there are a number of villages which are terminal organizations of local administration.

## 2.2 Population and Labor Force

The population in the Study Area is estimated at some 93.2 million in the year 1996 as summarized in Table F-2-5, whilst Figure F2.1 graphically contrasts the difference of population among the provinces in the Study Area.

**Figure F2.1 Population and Its Density in the Study Area, 1996**



Source: Statistical Year Book of Indonesia, 1996

Source: Statistical Year Book of Indonesia, 1996

The Study Area consisting of the four Provinces (North Sumatra, West Java, East Java and South Sulawesi) occupies about 47% of the Indonesia's population, while the land area accounts for only 12.4% of the whole Indonesia's land area.

Average population density in the Study Area is about 392 persons/km<sup>2</sup> with the highest rate of 866 persons/km<sup>2</sup> in West Java followed by 712 persons/km<sup>2</sup>, and the low rates of 106 persons/km<sup>2</sup> in South Sulawesi and 160 persons/km<sup>2</sup> in North Sumatra. Among the four Provinces, West Java and East Java are densely populated, while Sulawesi is sparsely inhabited.

As to the share of urban-rural population distribution in each of the four Provinces, South Sulawesi which is deemed as an agro-based province shows the largest share of rural population (71.7%). To the contrary, North Sumatra presents a remarkable situation with relatively large urban population share at 41.1%, next to that of West Java (42.7%), as shown in Table F2.2.

This implies that in North Sumatra where the estate crops cultivation is active (especially in the eastern part of the Province), a good deal of farm labors dwell in urban areas and frequent the agricultural estates.

**Table F2.2 Population Distribution by Urban-Rural, 1990 & 1995**

(Unit 1,000 persons)

Province	Population Distribution 1990		Population Distribution in 1995				Growth Rate (% in 1990-95)	
	Urban	Rural	(Urban+Rural=100%)		Urban	Rural	Urban	Rural
			Urban (%)	Rural (%)				
North Sumatra	3,639	6,613	4,568 (41.1)	6,547 (58.9)	(6.5)	(5.2)	4.65	-0.20
West Java	12,208	23,170	16,738 (42.7)	22,469 (57.3)	(23.9)	(18.0)	6.51	-0.61
East Java	8,916	23,572	10,850 (32.1)	22,994 (67.9)	(15.5)	(18.4)	4.06	-0.50
South Sulawesi	1,685	5,295	2,137 (28.3)	5,422 (71.7)	(3.1)	(4.3)	4.86	0.47
Study Area (% to Total)	26,448 (47.75)	58,650 (47.37)	34,293 (49.03)	57,432 (46.01)	(49.0)	(46.0)	5.33	-0.42
Indonesia (Total)	55,391	123,808	69,937 (35.9)	124,818 (64.1)	(100.0)	(100.0)	4.77	0.16

Source : Statistical Year Book of Indonesia, 1995 & 1996 and SUPAS 1995.

Population in the Study Area grew at variant rates ranging from 2.12% per year in West Java to 0.82% in East Java between the year 1990 and 1996. The annual growth rates in North Sumatra (1.64%) and South Sulawesi (1.63%) were nearly that of the nation at 1.7% per year for the same period as given in Table F-2-1.

About the urban population growth, it is noticeable that in Provinces or areas neighboring on the major large cities like Medan, Bandung, Surabaya and Ujung Pandang, the high population growth is observed. The average annual urban population growth rate in the Study Area amounted to 5.33% during the period of 1990-1995, while that of rural population resulted in 0.42% during the same period. These figures indicate the alarming situation that numerous rural people continue to flow into the urban areas. Only in South Sulawesi, the rural population grew with "plus" growth rate of 0.47% (see Table F2.2).

Population growth is projected to decline to about 1.4% per annum for 1995-2005 (see Table F2.3). Its continuing decline, together with longer school attendance, will slow labor force growth. Long life expectancy will increase the average age of the population.



While the trend of unemployment is difficult to determine, all data sources provide a fairly consistent picture of the structure of unemployment. Under the current economic crisis, the most effective policies for generating more jobs would be promotion of labor-intensive industries closely related to agricultural sector in rural areas to absorb jobless people.

**Table F2.3 Population Projection and Annual Growth Rate**

(A) Population Projection in the Study Area, 1995-2015

(Unit : 1,000)

Year	Study Area			
	North Sumatra	West Java	East Java	South Sulawesi
1995	11,145.3	39,336.5	33,885.9	7,577.8
2000	11,915.1	43,285.3	34,972.2	8,149.3
2005	12,597.5	47,347.0	35,837.5	8,705.8
2010	13,194.2	51,510.7	36,541.8	9,245.4
2015	13,716.9	55,738.1	37,093.2	9,770.1

(B) Average Annual Population Growth Rate

(Unit : %)

Year	Study Area			
	North Sumatra	West Java	East Java	South Sulawesi
1990-1995	1.62	2.06	0.82	1.61
1995-2000	1.35	1.93	0.63	1.46
2000-2005	1.12	1.81	0.49	1.33
2005-2010	0.93	1.70	0.39	1.21
2010-2015	0.78	1.59	0.30	1.11

Notes: 1) Figures in 1995 and 2000 are the estimates of Central Bureau of Statistics.

2) Populations in 2005 to 2015 are estimated by JICA Team.

Source: Proyeksi - Penduduk Indonesia Per Kabupaten/ Kotamadya, 1990-2000, BPS.

The number of population at the age of 15 to 54 accounts for 35.6% of the total population. Young and abundant labor combined with high adult literacy rate (84%) is the most important resources for economic development. However, there has been an absolute decline in employment in agriculture, which is often interpreted as an important indicator of labor market tightening. Regarding employment, the trend in agricultural sector was remarkable in the 1990s (see Table F2.4 ).

**Table F2.4 Labor Market Trends in Indonesia, 1971/80-1990/95**

(% change, at annual rates)

Population/ Employment	1971/80	1980/90	1990/95
- Total Population	2.3	1.9	1.7
- Working Age Population	2.8	2.5	2.4
- Employment :	3.0	3.2	2.2
• Agriculture	1.2	2.1	-0.6
• Manufacturing	4.7	5.6	4.1
• Trade	4.9	4.6	5.3
• Transport	4.9	5.8	5.4
• Services	6.3	2.7	4.9

Source: Indonesia - Sustaining High Growth with Equity, May 1997, Document of the World Bank.

## 2.3 Land Use and Land Tenure

### (1) Land Use in the Study Area

The land area of the Study Area accounts for 11.6% of the national total as shown in Table F2.1 and Figure F2.2. Among the four Provinces concerned, North Sumatra covers the largest land (71,680 km<sup>2</sup>), followed by South Sulawesi (762,483 km<sup>2</sup>), East Java (47,923 km<sup>2</sup>) and West Java (43,177 km<sup>2</sup>).

As shown in Table F-2-6 and Figure F2.3, the agricultural land is classified into nine categories: 1) House compounds and surroundings, 2) Dryland & garden for crop cultivation, 3) Grass land, 4) Dyke (brackish fishery), 5) Water pond (Inland fishery), 6) Temporarily fallow land, 7) Wood land, 8) Agriculture estates and 9) Wetland (Paddy field).

Figure F2.2 Land Area of the Study Area by Province

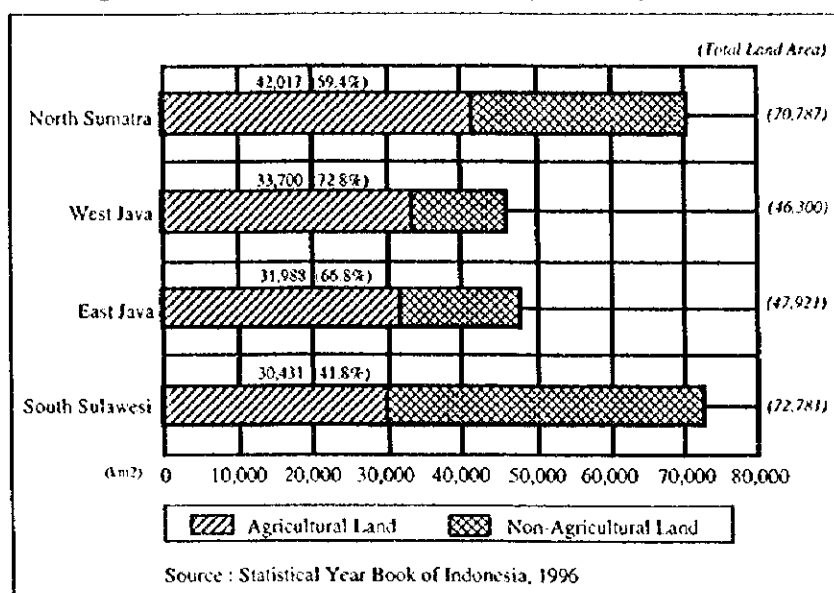
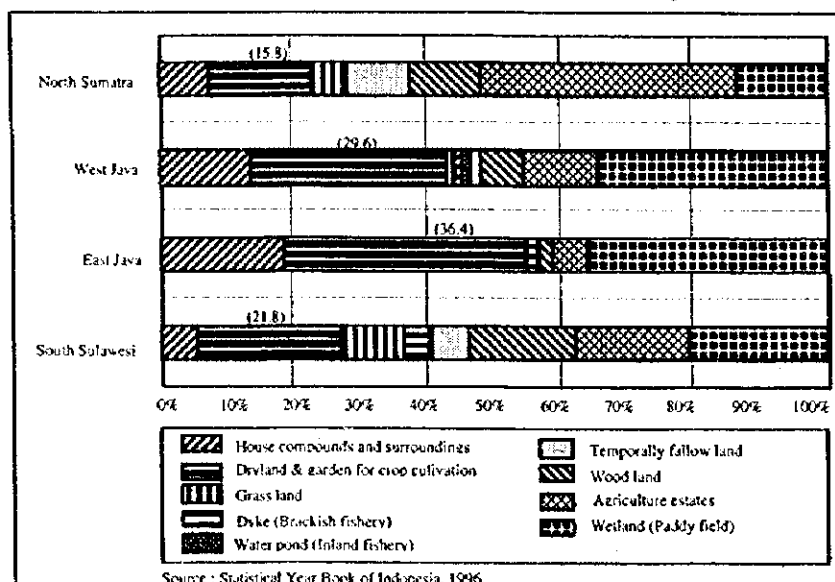


Figure F2.3 Land Utilized for Agricultural Development, 1995



## (2) Land Tenure System

In Indonesia, there are several forms of land ownership, as shown below:

### 1) Absolute ownership with a certificate of title

This is the most secure type of ownership, and is available only to Indonesian citizens.

### 2) Land owned by the GOI

This may be leased to a person or company for orchard development purpose under the land use right (HGU=Hak Guna Usaha) system. The period of the HGU lease is usually 35 years but longer periods may be negotiated depending on the development. Investments in perennial tree crops with a life expectancy exceeding this lease period, or those requiring a large initial investment in infrastructure could argue for an extension of the HGU term.

### 3) Traditional ownership

Such system exists in some Provinces where village or "*clan*" ownership replaces individual ownership. Collectively all the members of a village or family clan are the recognized owners of an area of land although they may not have certificate of title to that land.

### 4) Vacant GOI and private land

This (sleeping) land is often occupied and farmed by people who have no rights or title to use that land. Such situation may continue for many years or even generations, and can lead to disputes, if developments are proposed by the rightful owner of the land.

The land that is most likely to be available for orchard development is GOI land, for which a land use right may be issued.

## 2.4 Overview of Agriculture and Agro-industry Sector

### (1) Agriculture Sector

Among the primary sectors, agriculture growth declined, despite a quite good harvest, compared to the unusually high rate of expansion recorded in 1995 (see Table F2.5).

Table F2.5 Real Growth in Output

(1993 prices, change in % per annum)

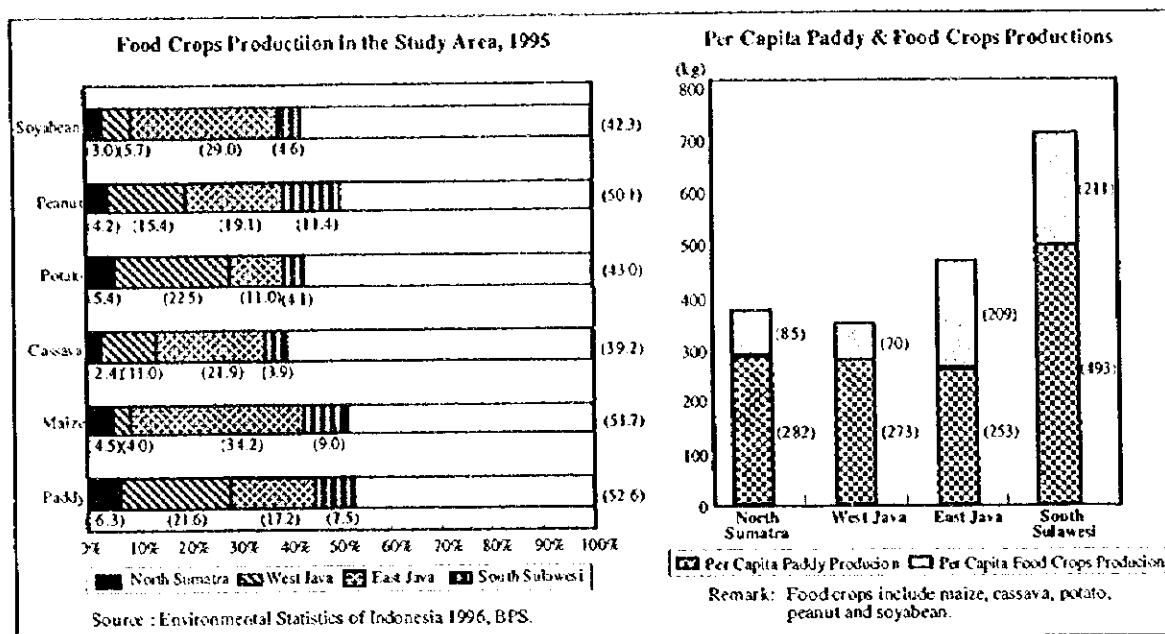
Gross Domestic Product (GDP) / Sector	Share in 1995	1988/91	1991/94	1995	1996
- Agriculture	16.1	3.6	2.8	4.2	1.9
- Manufacturing	21.3	12.0	12.6	13.6	12.0
- Construction	7.6	15.0	13.9	12.9	12.4
- Oil & Gas	8.7	6.7	0.8	-1.4	0.9
- Public Administration	6.0	4.5	2.1	1.3	1.1
- Others	40.3	58.2	67.8	69.4	71.7
GDP Total	100.0	100.0	100.0	100.0	100.0

Source : Indonesia - Sustaining High Growth with Equity, May 1997, World Bank.

According to the 1993 Agricultural Census, the country's agricultural land amounts to 17.7 million ha, out of which 5.2 million ha are in Java. The figure has increased substantially since the 1963 Census, where the agricultural land was 12.8 ha, an increase of 42.4%. However,

compared to the 1983 Census, agricultural land has decreased by 3.73%, much of which were converted to industrial uses, housing, roads, and infrastructure, as a result of the rapid industrialization. As to the food crops production in the Study Area, East Java is the largest producer of food crops among the four Provinces (see Figure F2.4).

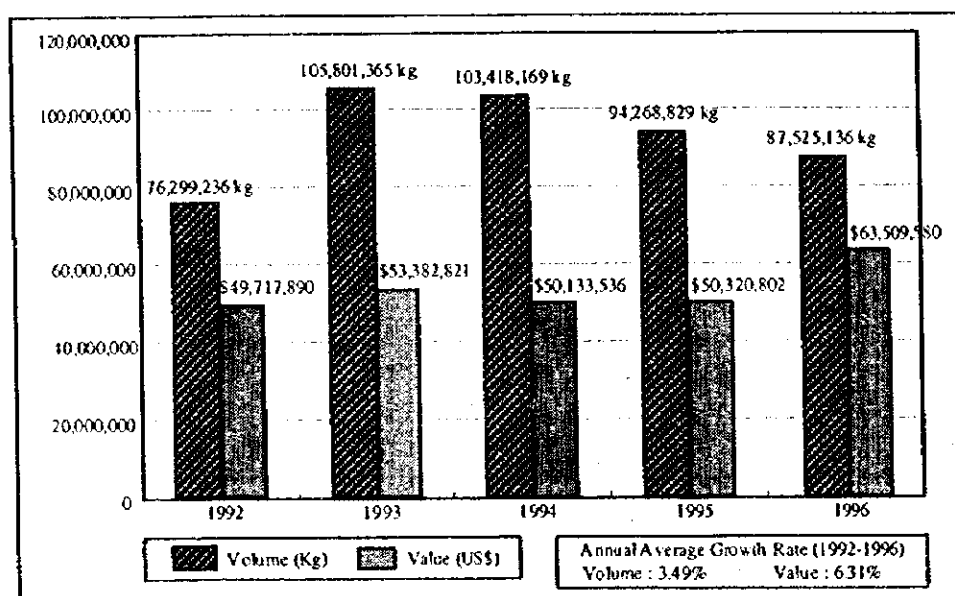
**Figure F2.4 Food Crops Production and Their Per Capita Production in the Study Area**



## (2) Agro-Processing Industry

The agro-processing industry is one of the fastest growing sections of the Indonesia economy. Exports of processed fruits in both volume (kg) and value (US\$) have increased with annual average growth rates of 3.5% and 6.3% respectively between 1992 and 1996 (see Figure F2.5).

**Figure F2.5 Indonesia's Export of the Processed Fruits, 1992-1996**



A feature of the agro-industry is its ability to generate considerable employment and higher earnings through the value-added processing of horticultural crops from both small and medium scale facilities. However, in line with world-wide and Indonesian trends, its growth is mostly urban-based. Primary production in each of the Study Area will continue to decline as a proportion of GRDP and especially about half of 43 million of West Java population in 2000 will live in urban areas, compared to less than a third in 1990.

A non-discriminatory trade and investment regime, in conjunction with increases in human and physical capital, would boost exports. As a consequence of these policies, Indonesia would move up the ladder of higher value-added exports, onto the rungs now occupied by Thailand and Malaysia.

## 2.5 Farm Economy

As shown in Table F2.6, the contribution of agriculture sector to rural household income was still dominant at an average of 45.1%, which ranged between 35.7% in West Java to over 51.6% in South Sulawesi.

**Table F2.6 Agricultural Share in Rural Household Incomes and Real Income per Capita, 1987 and 1990 (at Constant Price 1983)**

Province	Agriculture Share		Income per Capita (Rp.1,000)		
	1987	1990	1987	1990	Growth (%/year)
- North Sumatra	50.8	43.5	190.2	183.2	-1.2
- West Java	28.1	35.7	171.3	188.2	3.2
- East Java	40.7	45.3	170.5	175.2	0.9
- South Sulawesi	58.3	51.6	154.2	176.5	4.6
Indonesia	46.8	45.1	183.5	189.0	1.0

Source : National Economic Census (Susenas) 1987 and 1990, CBS; and  
The Sixth Five Year Agriculture Development Plan (Replita VI Pertanian)

Based on the National Economic Census (*Susenas*) data, the real per capita income of rural households in major Provinces and regions ranged from Rp.175,000 to 210,000 per year. During 1987-1990, real per capita income of Indonesian rural household increased by 1% per annum. The highest increase was recorded in South Sulawesi Province (4.6%) followed by West Java Province (3.2%).

According to the National Socio-Economic Survey data in 1996 (see Table F-2-7), the average per capita fruit expenditure amounted to Rp.1,469 per month in rural areas, whereas that in urban areas reached Rp.3,000. The data also indicate that the people tend to consume more fruits in proportion to the income increase (see Table F-2-8). In terms of quantity, the most consumed (popular preferred) fruits in the country are banana, salak, mango, orange, papaya, pineapple and so on (see Table F-2-9).

Although the country is endowed with rich land resources and agricultural products as well, imports of food/ beverages and their processed goods continue to increase at extremely higher growth rates both in volume and value as shown below (see Table F2.7).

**Table F2.7 Imported Consumption Goods, 1985-1995**

Commodity Group	Imported Consumption Goods											Annual Average Growth Rate (%)
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
<b>I. Food and beverages mainly for households</b>												
• Primary												
- Volume (1,000 ton)	42.7	59.4	56.2	109.7	90.0	138.9	143.0	161.1	217.2	344.7	388.8	(24.7)
- CIF Value (million US\$)	21.2	25.3	24.2	42.6	49.1	70.3	80.3	110.1	139.5	192.5	255.4	(28.3)
• Processed												
- Volume (1,000 ton)	78.5	108.5	229.1	191.0	310.9	123.2	254.8	724.1	172.8	938.8	2,258.0	(39.9)
- CIF Value (million US\$)	70.3	79.1	93.6	98.7	145.4	105.9	155.5	309.8	180.3	375.7	879.9	(28.8)

Source: Statistical Year Book of Indonesia, 1995

## 2.6 Position of the Study Area

It is noteworthy that there exists a distinct contrast between Java and outer-Java in terms of socio-economic features and their endowments and potentials as well. However, this is not simply a Java vs. off-Java issue. For example, D.K.I Jakarta and its surrounding areas are more wealthier than the rest of Java, while remote uplands areas are still lagged behind. Even in Java, there are regional disparities; some areas suffer from much greater concentration of poverty than others.

Due to the geographic characteristics which are long in the west-east direction along the Equator and its undulating terrains, Indonesia consisting of the far-flung archipelagoes, covers a wide variety of agro-ecological and agro-climatic zones. The Study Area includes the following physiographic regions:

### North Sumatra Province (Sumatra Island)

- Western Foothills and Plains
- Barisan Mountains
- Eastern Plains and Hills
- Eastern Coastal Swamplands

### West Java and East Java Provinces (Java Island)

- Northern Alluvial Plains
- Northern Foothills and Plains
- Central Volcanic Mountains
- Southern Dissected Plateaus and Plains

### South Sulawesi Province (Sulawesi Island)

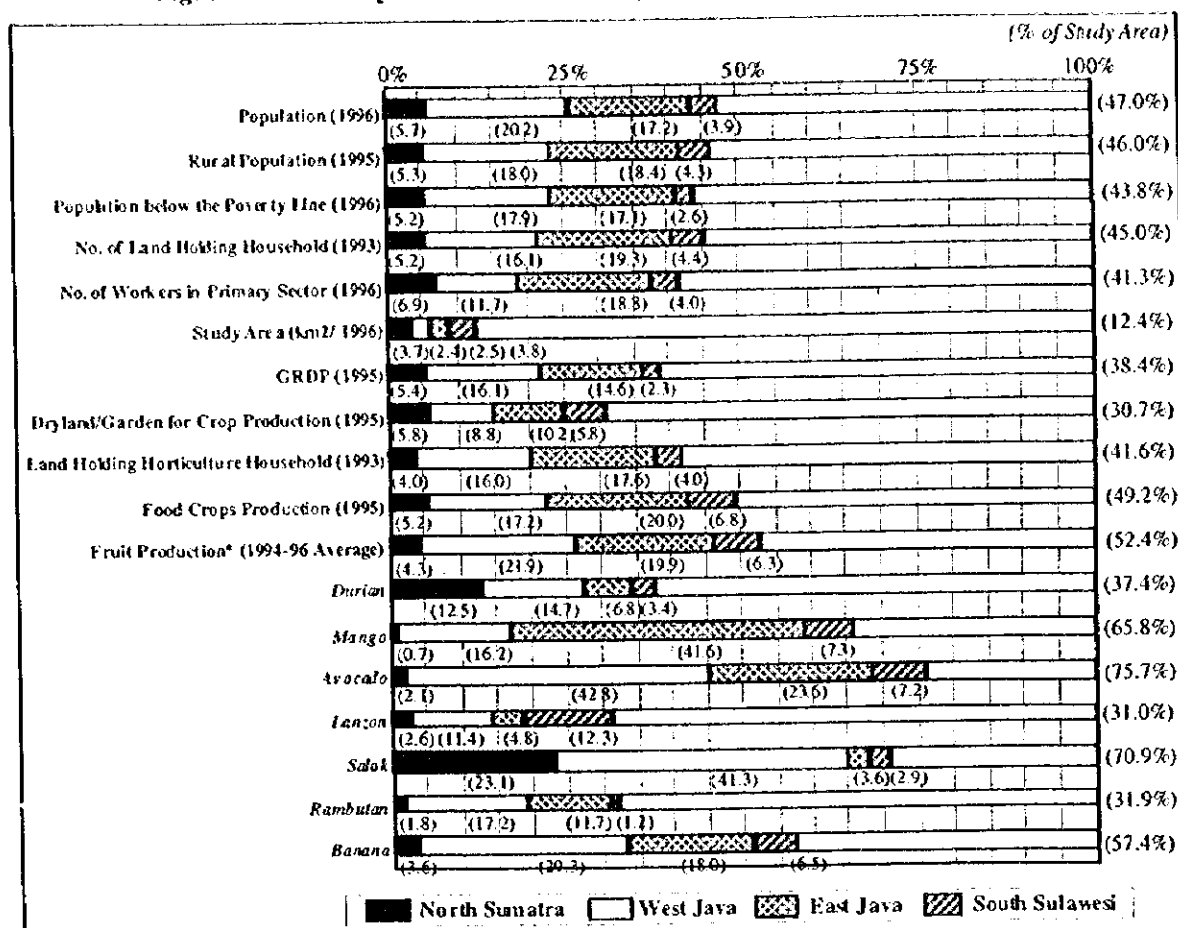
- Central Mountains
- Eastern Mountains and Karst
- Southwestern Plains and Mountains
- Southeastern Mountains and Plains

General socio-economic conditions of the Study Area are summarized in Table F-2-10.

Indonesia's economy, reflecting its physical geography, climate and political history, is significantly different in each region, ecological zone and even in respective areas. Relative position of the Study Area in the national socio-economic and spatial development outlined

above could be perceived or realized with the following key indicators as graphed in Figure F-2-1.

Figure F2.6 Proportions of the Study Area to the Country's Totals



Note: \* 1994-96 Average of the seven fruits : Durian, Mango, Avocado, Lanzon, Salacia, Rambutan and Banana.

### 3. FEATURES OF THE SMALL LANDHOLDING FARMERS

#### 3.1 Fruit Growing Farmers

##### (1) Overview of the Horticultural Farmers

Of all the countries in the tropics and sub-tropics, Indonesia stands out as one that is able to demonstrate a rich variety of fruit growing activities and interest in growing and using trees, especially in rural areas. Traditionally, the farmers of the high potential areas for orchard development, both Java and off-Java regions, have practiced many planting forms of fruit trees. The population pressure is increasing and the associated decrease in the arable land suitable for paddy field (*sawah*) and secondary crop (*palawija*) cultivation has led to an increase in the number of fruit trees grown on farms, rather than decrease.

Generally, a few number of fruit trees are planed by paddy and/or upland crop farmers for their home consumption purposes in the enclosed gardens surrounding every house. They are unconcerned about fruit tree management in contrast to their farming practices of food crops.

The production of fruits depends mainly on a large number of small landholders (or producers) in their home yard gardens, and cultivation and handling techniques are still traditional or primitive. Due to the perishable nature and small harvested volume of fresh fruits, it is almost impossible for individual small landholders to secure their market outlets. In limited advance areas, small landholders have established farmers' group to improve their production and marketing system of fruit by tying up with commercial producers, traders or processors.

## (2) Fruit Growing Farmers

In the Study Area, the total number of farm-households growing horticulture crops amounted to about 2 million in 1993, accounting for 22.6% of the total landholding farm-households (see Table F3.1). In number, East Java (42.4%) ranks first in Study Area, followed by 38.4% in West Java and 9.6% in both North Sumatra and South Sulawesi. The data on the number of farm-households mainly engaging in horticulture in the Study Area are given in Tables F-3-1 to F-3-4. The features which foreshow the perspectives for orchard development in each of the four Provinces could be summarized as described below.

**Table F3.1 Number of Landholding Farm-Households, 1993**

Province	Land Holding Farm Household			Paddy / Secondary crops	Horticulture			Estates Crops	Livestock Breeding
	No. Households	(%)	(%)		No.	(%)	(%)		
- North Sumatra	1,017,915	(11.5)	(5.2)	869,770	191,452	(9.6)	(4.0)	379,420	191,895
- West Java	3,172,219	(35.8)	(16.1)	2,910,659	768,712	(38.4)	(16.0)	503,994	381,240
- East Java	3,813,763	(43.0)	(19.3)	3,306,474	849,068	(42.4)	(17.6)	1,012,523	1,486,334
- South Sulawesi	860,758	(9.7)	(4.4)	743,798	191,273	(9.6)	(4.0)	380,143	285,616
Study Area (% to Total Indonesia)	8,864,655	(100.0)	(45.0)	7,830,701 (45.5)	2,000,505	(100.0)	(41.5)	2,276,080 (36.5)	2,345,085 (45.6)
Indonesia	19,713,806	-	(100.0)	17,213,742	4,817,636	-	(100.0)	6,244,343	5,146,447

Source: Land Holding Farmers Sample Census (1993 Agricultural Census), Biro Pusat Statistik (BPS)

### 1) North Sumatra

The number of total farm-households decreased slightly from 255,207 in 1983 to 238,738 in 1993. Of 17 Districts and Municipalities, only nine Districts consisting of Nias, South Tapanuli, Central Tapanuli, Dairi, Karo, Langkat, Tanjung Balai, Tebing Tinggi and Binjai showed the positive increasing rates, and the rest was negative (see Table F-3-1).

This indicates that the above Districts are generally suitable for horticultural development and several programs have been concentrated in these areas. In North Sumatra, the estate type of agricultural production is prevailing in the eastern part of the Province, while the fruit growing is practiced mostly by the small landholding farmers living in the foot-hills and plateaus in its western part.

### 2) West Java

In West Java, the number of total farm-households reduced to 846,000 in 1993 from 1,422,000 in 1983 (see Table F-3-2). This big drop, with an annual decreasing rate of -5.3%, does not mean that the horticultural production was neglected in most of Districts as a whole, but it is rather due to the higher urbanization ratio of the Province.

Recognizing such circumstances, the strategy for orchard development in West Java should be centered on the increase of productivity and improvement of quality of their crops.



### 3) East Java

Total farm households in East Java increased from 3,745,000 in 1983 to 4,081,000 in 1993 or with an annual average growth rate of 0.86%.

As indicated in Table F-3-3, the horticultural farmers in the Province are concentrated in 10 Districts: Probolinggo, Pacitan, Kediri, Tuban, Lumajang, Malang, Bangkalan, Sampang, Pasuruan and Nganjuk. Each District has its own specific horticultural products.

Especially in the poverty-stricken areas of the Province, most of farmers are facing the problems like fragmented uneconomic farm-holding size and shortage of manpower due to increase of side job dependence. Then the orchard development should be strongly promoted to intensify the optimal use of the limited land and to realize higher value-added productions.

### 4) South Sulawesi

The total farm-households continued to decrease from 1,058,563 in 1983 to 934,512 in 1993 or with an annual decreasing rate of -1.25% (see Table F-3-4). In terms of number of horticultural farmers, the bigger Districts are Gowa (21,702) followed by Luwu (20,972), Bone (18,296), Bulukumba (16,516), Jenepono (14,884), Wajo (13,932) and so on.

Looking at the shares of horticultural farmers to the total farm-households in each District, the higher percentages are observed in Enrekang (37.6%) and southern part of the Province like Bantaeng (36.8%), Gowa (34.1%), Jenepono (30.7%), Bulukumba (30.1%) in the order of importance.

## 3.2 Poverty in Rural Areas and Farmers' Living Condition

It is generally acknowledged in Indonesia that poverty cannot be measured solely in terms of consumption or income, and that a more comprehensive definition must take account of basic needs and of what is considered to be a minimum standard of living. These basic needs include health, life expectancy, primary education, access to clean drinking water, and public services. However, there is no universally accepted set of indicators to measure the extent of poverty.

As to the poverty alleviation, Indonesia has been particularly successful in reducing absolute poverty. The reduction of poverty from 60% of the population in 1979 to about 11.3% in 1996 was a major achievement. In 1996, the official national poverty lines were about Rp.27,413 (\$13.7) per capita per month in rural areas and Rp.38,246 (\$19.1) in urban areas, defined as the minimum income needed to purchase 2,100 kilocalories of food per capita per day plus other essential items (including housing, fuel, clothing, education, health, and transport). However, the poverty lines vary for each province depending on average prices.

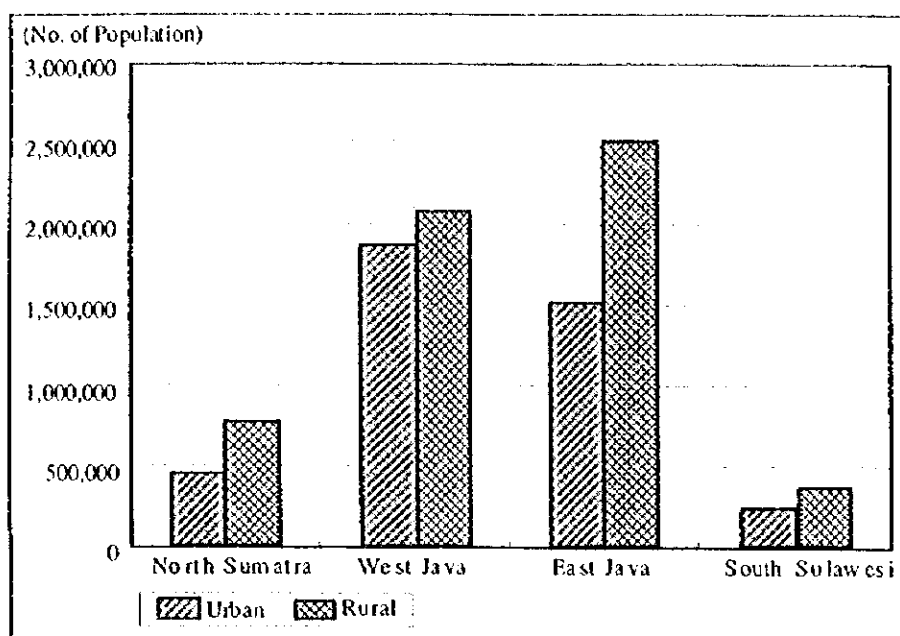
Social indicators also show substantial improvement. Between the periods from 1970/75 and 1988/93, the population growth fell from 2.4% to 1.7%, infant mortality from 114 per thousand births to 56, and the adult illiteracy rate from 43% to 23% (according to the "Social Indicators of Development", World Bank, 1995).

Despite these gains, Indonesia still has about 22.5 million poor or 11.3% of the population, the majority of whom (15.3 million or 68%) live in rural areas. Poverty in Indonesia is now increasingly localized by geographical location, occupation, household size, age, gender, education, and other characteristics.

In Repelita VI, the GOI targets an ambitious further reduction in absolute poverty to 6 % of the population by 1999 and to eradicate it completely by 2004. However, achieving further reductions in poverty will be more difficult than in the past, because the remaining poor are largely isolated in resource-poor areas.

The poverty incidence (both in urban and rural areas) in each of the four Provinces is shown in Figure F3.1.

**Figure F3.1 Number of Population below the Poverty Line in the Study Area, 1996**



Source: Statistical Year Book of Indonesia 1996.

The poverty incidence is more higher in rural areas than in urban areas. It is also noted that East Java has the biggest number of rural poor amounting to over 2.5 million or 16.5% of the country's total (rural poor), followed by 13.6% in West Java, 5.1% in North Sumatra and 2.5% in South Sulawesi (for more detailed information, refer to Table F-3-5).

Table F-3-6 indicates the less developed villages in the Study Area in 1994. According to the data of the Central Bureau of Statistics (BPS), a number of rural villages are designated as "destitute" ones in the Study Area, ranging from 24% to 30% to the respective Provincial totals. To these destitute villages, the GOI is implementing special supporting programs with the Presidential Instruction for Program Aid (IDT: *Inpres Desa Tertinggal*).

In this master plan with the target year of 2018, the above poverty indicators are to be considered as one of the criteria for evaluation and selection of the orchard development sites.

### 3.3 Landholding Size and Features of the Small Landholding Farmers

According to the statistical data of "Land Holding Farmers Sample Census" shown in Table F-3-7, the total number of food crops households in Indonesia increased from 16 million in 1983 to 18 million in 1993 with an annual average rate of 1.2% during 10 years, while the food crops land area decreased from 16.7 million ha in 1983 to 15.4 million ha in 1993, presenting - 7.5 % during the same period.

As the result, the average size of land per farm-household which was at 1.05 ha in 1983 reduced to 0.86 ha in 1993. In view of the current population growth and equal inheritance rule of the property, the landholding size per farm-household will be further fragmented and it is probable that the majority of farm-households will face more serious situation to make a living with their owned lands.

As far as the number of landholding farm-households engaging in horticultural production, 61.3% of them hold less than 1 ha. This table also indicates that 80.1% of them fall under the land size categories between 0.25 to 2.99 ha.

#### (1) Landholding Sizes in the Study Area

The statistical data of the four Provinces, North Sumatra, West Java, East Java and South Sulawesi, indicate that the average land size in the Study Area ranges from 0.48 to 1.10 ha per household. The average land sizes in each of the four Provinces are as shown below.

- North Sumatra	:	0.96 ha
- West Java	:	0.48 ha
- East Java	:	0.48 ha
- South Sulawesi	:	1.10 ha

Source: Biro Pusat Statistik, Sensus Pertanian, 1993.

#### (2) Types of Fruit Growers

Through the observations in each of the four Provinces, the fruit growers in Study Area could be broadly classified into the following four types (each type of the farms has its specific traits, as summarized below):

##### 1) Growers for home consumption

- wide array of fruits;
- fruit trees planted in the home yard;
- harvest is mainly for home consumption and gift to neighbors and/or relatives;
- non-business motivation;
- primitive farming technology; and
- small number of trees with no regular spacing and special cares.

##### 2) Small scale growers (with a bit of business-mind)

- small scale with 5 to 20 trees;
- relatively good farm management;
- fruit sale benefit occupying a important share as income source;
- fruit trees planted in home yard and backyard as well; and
- fruit seedlings are procured by agriculture office or from the private nursery.

##### 3) Intensive fruit growers

- fruit growing is the principal occupation;
- monoculture-oriented farming, one or with additional inter-croppings;
- well established farm management with a relatively high technology;
- a number of fruit trees planted/ cultivated in a medium or large land area; and
- main income from sale of fruit crops.

##### 4) Large scale or corporate-typed growers

- farm is managed by large landholder or corporate body;
- monoculture-typed plantation controlled with advanced technologies and methods; and
- agribusiness with multi-activities covering production to processing and/or marketing of the products.

### (3) Definition of Small Landholding Farmers

In view of the socio-economic features and farming situations of the Study Area, it is recommended, in this master plan, to define the "target small landholding farmers" and select the priority orchard development sites based on the following criteria and/or considering the degrees of fulfilling the following requirements:

- 1) A household engaging in farming for long-term basis, preferably owning a piece of land;
- 2) A household owning a land suitable for fruit growing;
- 3) It is desirable that the land area be enough sizable to sustain at least the average household size of 4 to 5 members;
- 4) It is desirable that the land area be an economic size;
- 5) In the light of the present inheritance rule (equal inheritance among the heirs), a household owing or cultivating the land size not over 5 ha will be treated as "small landholding farm-household";
- 6) The longer experience in fruit growing is much appreciated;
- 7) It is prerequisite that small landholding farmers have strong willingness to participate in group farming to grow a specific variety of fruit; and
- 8) In respect that the small landholding farmers are generally poor and concentrated on the destitute villages, the priority should be given to these villages in selection of the orchard development sites.

### 3.4 Rural Community and Local Trading System

#### (1) Rural Community of Fruit Growers

In Indonesia, there are six types of rural community as categorized below:

- a) Food gathering community (*Masyarakat Peramu*);
- b) Fishing community (*Masyarakat Nelayan*);
- c) Rainfed agriculture community (*Masyarakat Peladang*);
- d) Pastoral community (*Masyarakat Peternak*);
- e) Garden & plantation community (*Masyarakat Pekebun*); and
- f) Irrigated cultivation community (*Masyarakat Pertanian Sawah*).

In the Study Area, most of the target farmers belong to the types of communities of c), e) and f).

Based on the field observations, the impediments to orchard development seem to derive mostly from the socio-cultural ("adat" or "traditional") backgrounds of the respective communities and growers themselves. Major socio-institutional problems and constraints identified through the field investigations could be summarized as follows:

#### 1) North Sumatra

- Conflict for land use between estate crop cultivation and orchard development;
- Poor cooperation among growers and village traders;
- Lack of knowledge on farming practice and quality control;
- Absence of reliable and timely market information;
- For most of farmers, fruit growing is an additional job; and
- Lack of confidence to KUD due to its inefficiency.

#### 2) West Java

- Limited land suitable for orchard development (in case, due to the existence of a lot of land belonging to absentees);
- Weak marketing system;

- Regional disparities and existence of remote isolated villages destitute of basic infrastructure;
- Lack of supporting services (i.e. long-term credit and training) to promote the orchard development; and
- Absence of reliable and timely market information.

### 3) East Java

- Fruit production is generally a sideline for most growers;
- Very limited training occasions to both extension workers and farmers;
- No established marketing channel for the products;
- Lack of fund to improve farming practice (i.e. irrigation facility, storage, etc.);
- Demographic pressure and fragmented farm lots due to the inheritance rule;
- Lack of information and no knowledge on fruit quality in terms of uniformity (color and size), taste, etc.; and
- Poor basic infrastructure in some poverty-stricken or less developed areas.

### 4) South Sulawesi

- Fruit production is an additional job for most of farmers, next to cultivation of estate crops and vegetables;
- Lack of skill in better farming and post-harvest technology;
- Shortage of the skilled agricultural extension workers;
- Shortage of manpower for expansion of fruit growing in some remote areas;
- Difficulties to make access to the credit sources with lower interest rates;
- Lack of basic infrastructure for their living and also for orchard development such as water supply (irrigation) or drainage facilities; and
- Bad road conditions leading to some isolated villages.

## (2) Trading and Marketing Systems in Rural Communities

Relating to the trading and marketing of fruits, the following systems or institutions (sometimes called locally with different appellations) can be observed in rural communities of the Study Area.

### 1) “*Pajak*” system (common only in North Sumatra):

The traders buy the crops from fruit growers, while they are still on the tree(s) and green or near to ripen stage. In this system, the growers have no responsibility on harvest results nor harvesting activities.

### 2) “*Ijon*” system (common in Java and Sulawesi):

The traders buy the crops from fruit growers by paying “long time before” their harvests. This system is based on the good relationship or trust between the both parties.

### 3) “*Tebasan*” system (common in Java and Sulawesi):

This is a buying system of the crops similar to the above “*Ijon*” system. In this system, the traders buy the crops “just before” their harvests.

### 4) “*Kontrak Pilili*” (universal in Indonesia):

This is a contract system for purchasing the specific product with the selected growers. The growers make a promise to sell their harvests, and the trader pays in advance a part of the contracted fee.

In general, the above systems seem to be well functioning in the Study Area, owing to the established communal framework or social bonds respecting the rule of sharing the risk and profit.

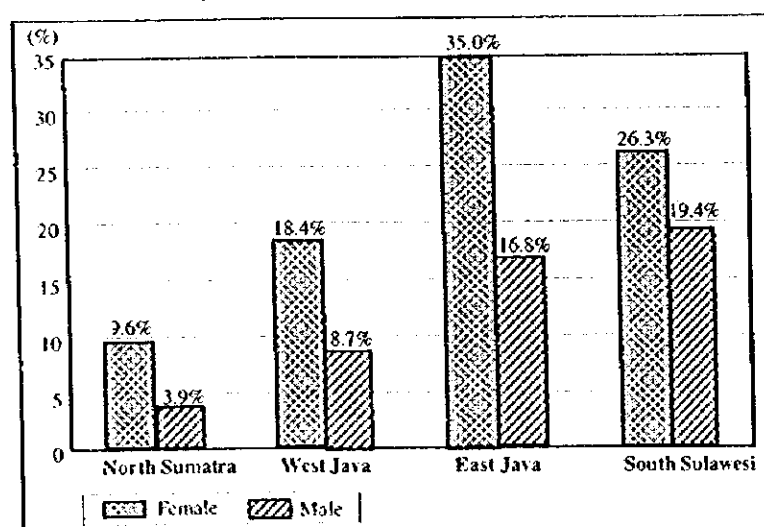
### (3) Women's Role in Fruit Growing and Rural Community

Gender analysis showed women to be relatively disadvantaged in terms of social, economic, and financial opportunities. Undertaking extensive household responsibilities, together with onerous farm activities, women are left with very little time to develop their skills. Many women are engaged in activities of temporary or seasonal nature, and hence, contribute directly to the family budget.

In fruit growing, women play an important role, participating in the planting, weeding and harvesting. Their tasks are mostly specialized in sorting, packaging, plant watering and manuring. Increased fruit production is expected to lead to improved house income and family nutrition. As shown in Figure F3.2, access to non-formal education, extension, and support services is very limited for women.

Since women are always disadvantaged especially in rural areas (refer to Table F-3-8), the orchard development planning should be designed to open up opportunities for them so as to address their critical needs. In this respect, it is recommended to establish the female community organizations (e.g., specialized in post-harvest handling and processing of the fruit crops), where the women can undertake activities separately from the male-dominated groups. The orchard development will enable small-scale fruit growers to exploit the potential of their lands more effectively and allow access to the perceptible economic benefits that will improve the quality of life. A major and clearly perceptible contribution of the orchard development project in the Study Area will be therefore to organize and empower communities, thereby increasing the likelihood of viable and sustainable economic development schemes. Being demand-driven and process-oriented, the project will focus on creating sustainability at the community level.

**Figure F3.2 Illiterate Population (10 Years Old and Over) by Study Province, 1995**



Source: Social Indicators of Women in Indonesia, 1995, BPS.