

ANNEX A : AGRICULTURE

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A.1 Agriculture in Indonesia

A.1.1 Land Use

Land use in Indonesia is shown in Table A.1.1. It shows that the agricultural land including wet, dry land and agricultural estate occupies about 351,000km² or 58.7% of land area in 1997. It increased 30% comparing with 1985. While the forest area decreased 7,300 km² (7.5%) within these 12 years, it means the forest area decreased 610 km² every year. Also *Sawah* (wet land) increased 11.7% because of the irrigation development.

A.1.2 Food Crop Production

Major food crops in Indonesia are, paddy, maize, cassava, soybeans, groundnuts and sweet potatoes. Their harvested area, production and yield together with vegetable between 1984 and 1999 are shown in Table A.1.2.

(1) Rice

Rice is a most important staple food, and socio-economically important crop in Indonesia. Unit yield of rice increased 4.43 ton/ha in 1997, but it did not increase after 1997.

About half of its production comes from Java Island, it occupies 48% of production area, and 55% of production in Indonesia as shown in Table A.1.3.

(2) Other Food Crops (*Palawija*)

Other food crops are called as *palawija* in Indonesia. Maize is the most important crop among them. Its production tends to increase steadily in recent years in order to meet an increased demand for animal feed. On the other hand, production of other *palawija* is stagnant or decreasing (see Table A.1.2).

(3) Vegetables

In the last decade, the vegetable cultivation increased rapidly compare with other crops. Its area and products increased 34% and 55% as shown in Table A.1.2.

A.1.3 Land Holding and Tenures

(1) Land Holding Size

Land holding per farm household shown in Agricultural census 1993 is summarized in Table A.1.4. The average size of control land is estimated 0.87 ha per farm household. It reduced 0.12 ha from 0.99 ha of 1983 census. Also the area controlled by a farm household in Java shows very small less than 0.5 ha comparing with outer Java.

(2) Land Tenures

According to the Agricultural Census 1973, farm household cultivating their own land, tenant, and mixed farmers (cultivating own land and rent land) are 74.8%, 3.2% and 22.0%, respectively. The data on the land tenures are not available since then. From Table A.1.4, it is possible to say that 6.7% of landowner lending 4.9% of their land to the tenant, and 28.3% of farmers among total farmers rent 13.5 % of total controlled land.

A.1.4 Agricultural Inputs

(1) Seed

Some study reports indicate that rice-breeding research work in Indonesia has been rather stagnant especially during the 1990s. This results in limited choice for the farmers and can explain why there have been minimal rice yield increases in recent years. IR-64 which was released in 1987 is still the most popular variety, occupying around 50% or more of the rice planted area in the country. High yielding varieties of rice for wetland released during the 1990s are as follows:

Rice High Yielding Varieties(HYV) for Wetland Released in 1991 - 2000

No.	Variety	Year	Crop Life (days)	Potential Yield (ton/ha)
1	Barumun	1991	125 - 130	5.0 - 6.0
2	Atomita 4	1991	110 - 120	5.0 - 7.0
3	Cenranae	1991	110 - 115	4.5 - 5.5
4	Lariang	1991	111 - 115	4.5 - 5.5
5	IR 68 (introduced)	1993	125	5.0 - 6.0
6	IR 74 (introduced)*	1994	125 - 130	5
7	Memberamo*	1995	115 - 120	6.5
8	Cibodas	1995	117 - 126	6.9
9	Batang Anai	1996	115	6.4 (4.0 - 10.0)
10	Digul*	1996	115 - 125	5.0 - 7.0
11	Maros*	1996	115	6.3 (4.5 - 9.0)
12	Cilamaya Muncul*	1996	126 - 130	5.0 - 6.0
13	Cilosari	1996	110 - 120	5.0 - 6.5
14	Way Apo Buru*	1998	115 - 125	5.0 - 8.0
15	Widas	1999	115 - 125	5.0 - 7.0
16	Ketonggo	1999	120	5.0 - 6.0
17	Ciherang	2000	116 - 125	5.0 - 7.0
18	Cisantana	2000	118	5.8 (5.0 - 7.8)
19	Tukad Petanu	2000	120	4.0 - 7.0
20	Tukad Balian	2000	110	4.0 - 7.0
21	Tukad Unda	2000	110	4.0 - 7.0

Source: Central Rice Research Institute in Sukamandi, Indonesia

Note: *widely planted in Indonesia in recent years

(2) Fertilizer

Fertilizer especially Urea input for the paddy cultivation has close correlation with unit yield in Indonesia, while seed quality and irrigation have substantial correlation, and agro-chemicals do not, as shown in Fig A.1.1 to A.1.4. The fertilizer price increased based on the increase of paddy prices before economic crisis in 1997/98.

A.1.5 Farm Budgets

Farm budget of the model farm household with one ha cultivation area are cultivated as shown in Table A.1.5 to A.1.9. The basis of analysis are described below:

(1) Cropping Patterns and Intensities

As with farmers everywhere, incomes range widely depending on the prevailing conditions. In the Study Area it is possible to identify a limited number of scenarios which provide a reasonable indication of the range within which most farmers' incomes will be found.

The main interest is with irrigated areas where farmers almost always grow a wet season rice crop. This crop is generally successful, unless there are major floods or pest attacks. Water shortages can occur, but are generally not highly significant. Most farmers plant HYVs and apply reasonable levels of fertilizers and can expect to obtain yields of between 4.5 and 5.5 tones of dry paddy (*gabah kering giling* – GKG).

Activities during the remaining eight months of the year vary widely; if water is reasonably plentiful farmers will grow at least one further rice crop and maybe two. Success depends primarily on the water supply situation, although, of course, the other potential hazards can also cause losses. If, as is often the case, the supply of water is somewhat constrained, farmers can adopt a number of planting options. They can attempt to utilise the whole of the irrigated area by restricting the areas of high water demanding cropping, primarily rice, and by planting other less water-demanding crops such as soybean, groundnuts, green gram or maize in the remaining area. Alternatively, they can utilise all the water to produce rice, and leave the remaining area fallow.

Although it is generally expected that most irrigation systems have been designed to allow most farmers to achieve at least a 200% cropping intensity, in four years out of five, in reality there is not always sufficient water available to allow farmers to double crop rice. It is normal for part of the second season crop to be non-rice, and for most of the area to be planted. In the third season, the driest season, many farmers cannot grow rice and they tend to either produce a *palawija* crop or leave all or part of their land fallow. To achieve 300% rice cropping, even if water conditions are favourable, is difficult; such intensities require a very quick turn around between crops.

Except where there is stored water, the dry season water supply situation cannot be guaranteed. Because most holdings are very small and farmers are generally poor, they tend to take risks and to plant as large an area as they can, in the hope that the water supply situation will be adequate. Average yields, over the years, tend to be lower than in the wet season because of the impacts of partial or total crop failure.

Whilst cropping intensities can range from less than 100% to around 300%, it is suggested that most farmers who achieve a cropping intensity of around 235% would consider themselves to be quite fortunate. In many areas less intensive cropping is achievable and, as an example, an intensity of 195% has been selected.

In the attached analysis, these two cropping intensities have been used. Two different cropping patterns have been applied, one where rice is dominant in both the wet and second seasons, and one where there is a greater proportion of *palawija* crop in the second season. Soybean has been used as the representative *palawija* crop.

(2) Crop Returns

During the study, as is generally the case, it was noted that conditions were not always favorable and a number of additional problems faced the farmers. In particular, farmers were finding that crop prices were not as high as they had been in the previous year whilst input prices were increasing quite rapidly. These problems were particularly severe in the remoter areas, where transport costs impacted negatively on both produce and input prices.

In the analysis, details of which are presented in Tables A.1.5 to A.1.9, two conditions have been used to cover the spectrum, a favourable one where yields are reasonable, crop prices are at the top of the range encountered and input prices are at the low end of the range encountered, and an unfavourable one where the opposite assumptions have been applied.

Crop budgets, (utilising the favourable and unfavourable value and yield assumptions) were prepared and a series of net incomes per hectare were calculated. Two factors have particularly significant impacts on the net return accruing to the farmer, the extent to which the farm family provide labour and the tenure system.

Over the years it appears that, unless the farmer himself owns the required asset, there is an increasing tendency for farmers to contract out the task of land preparation to others, using draft animal or tractors. There is little manual land preparation, and for many farmers, land preparation is a costly process involving little family labour. The other major labour demanding activity is the rice harvest, where as in the past, the task of harvesting, threshing, winnowing and bagging is often contracted out to a harvesting gang who collect a proportion of the produce as payment. Again there is only limited use of family labour during this activity. It appears that the proportion of total product demanded by the harvesters as payment for their services has increased over the years. In some cases the payment seems excessive if the value of the proportion taken is compared to the number of workdays involved.

It is suggested that on an average farm, the farming family would have limited involvement in land preparation and in the rice harvest, some involvement in transplanting and complete involvement in

most of the other activities. In the analysis this scenario is identified as the partial family labour one. Other cases will be found where all labour is hired or where all labour is provided by the farming family; the net returns to these conditions are also presented

Although numerous arrangements can be found, it is normal for land owners who allow share croppers to cultivate their land, to collect half the product (having shared the cost of harvesting with the share cropper) and not to make any other contribution towards costs. Net returns to the share cropper have been calculated; it will be noted that such deals often leave very little return to the share cropper.

On a per hectare per season basis, with partial family labour and favourable conditions, net returns of around Rp.3.9 million can be expected for rice and Rp.2.4 m for Soya. The returns are, however, extremely sensitive to modest changes in product price and to yields and it is quite common to find much lower net returns. In the analysis it can be seen that the aforementioned net returns for rice and soybeans can easily fall to around Rp.1.2 million and Rp.0.8 million respectively, if less favourable conditions are applied.

As mentioned above, returns to share croppers are much lower; in the favourable condition a share cropper can expect a net return of around Rp.0.8 million for rice and Rp.0.5 million for soybean. With less favourable conditions, the calculated returns are negative, reinforcing the common contention by many share croppers that they are losing money.

(3) Farm Budgets

On an annual basis, by applying the per hectare returns to the selected cropping patterns and intensities mentioned above, estimates of annual net income can be generated. Farm income for a one hectare holding could be expected a maximum of around Rp 8.3 million a year. Numerous other lower net returns have been calculated and presented, indicating, at the lower end, that it would be very easy for share-croppers to make losses.

Summary of Farm Return

Cropping pattern	Cropping intensity %	Conditions	Family labour use	Family days/yr	Tenure status	Net income Rp1000/yr/ha
Rice dominant	235%	Favourable	Partial	123	Owner	8,252
Mixed	235%	Favourable	Partial	123	Owner	8,050
Rice dominant	195%	Favourable	Partial	102	Owner	6,907
Mixed	195%	Favourable	Partial	102	Owner	6,598
Rice dominant	235%	Unfavourable	Partial	136	Owner	2,643
Mixed	235%	Unfavourable	Partial	135	Owner	2,587
Rice dominant	195%	Unfavourable	Partial	113	Owner	2,210
Mixed	195%	Unfavourable	Partial	112	Owner	2,124
Rice dominant	235%	Favourable	Partial	123	Share	1,594
Mixed	235%	Favourable	Partial	123	Share	1,552
Rice dominant	195%	Favourable	Partial	102	Share	1,336
Mixed	195%	Favourable	Partial	102	Share	1,271
Mixed	195%	Unfavourable	Partial	112	Share	-1,688
Rice dominant	195%	Unfavourable	Partial	113	Share	-1,814
Mixed	235%	Unfavourable	Partial	135	Share	-2,074
Rice dominant	235%	Unfavourable	Partial	136	Share	-2,156

Because of small cultivation area, farmers cannot get the enough income from their cultivation, therefore they have to seek other source of income. As shown in Table A.1.10, 12% of farm household who cultivating their own land got their main income sources from the second jobs, but it increases, about 47% of small-scale land-own farmers. Around 60% of tenant farmers needed more effort to find off farm works.

It needs to be appreciated that for most farmers, their irrigated holding size is much less than 1 ha and that for many of those in Java, the average size would lie between 0.25 and 0.4 ha.

A.2 National Food Security

A.2.1 Food Consumption

Food consumption and income will have some correlation, i.e. the higher income causes the higher consumption of food, but rice has already lost income elasticity in Indonesia. Also, as shown in Fig. A.2.1, the middle income (Rp.80,000 to 200,000 of monthly income) shows the highest rice consumption, therefore the demand of rice can be increased at some amount of monthly income level, but it will be reduced at higher level.

Contrary to rice consumption, wheat, soybeans, vegetables, fruits, meat and eggs show positive income elasticity in Fig. A.2.2.

A.2.2 Rice Production and Demand Model

The Government does not provide future supply and demand trends, there have been several studies which have looked into the issues, including the ADB Study on the “Assessment of Options for Sustainable Irrigation Development in Indonesia”¹, it is summarized in Table A.2.1. It estimated based on assumptions that the production area will be decreased 20,000 ha/year in Java and increased 60,000ha/year. The table indicates the rice balance between production and consumption will be minus the year 2015, after that surplus of rice will be achieved.

This Study considered several rice consumption and production scenarios up to 2020, and the results are discussed below.

(1) Food Consumption Trends

Table A.2.2 shows per capita food consumption changes between 1983 and 1998. It appears that the people had just started to diversify their food consumption patterns as a consequence of the remarkable economic growth experienced during the last decade.

(2) Rice Consumption

The ADB study report made the following assumptions regarding rice consumption trends. Rice consumption trends were based on the following assumptions:

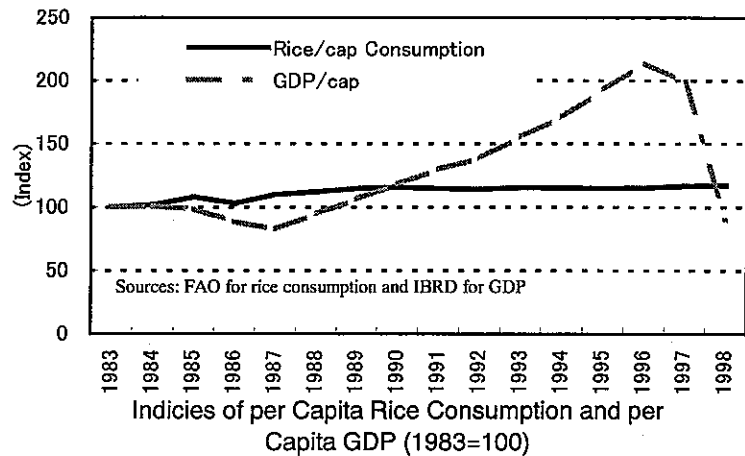
- Total population will expand with a stable growth rate from 198 million in 1996 to 262 million in 2020;
- Per capita rice consumption will expand from around 152 kg/capita/year to a peak 154 kg/capita/year around 2006 and then decline to 147 kg/capita/year as incomes increase and further urbanization takes effect. (Actual per capita consumption seems to be less than these figures, because losses and seed allocation were not taken into account in the calculations);
- Total milled rice consumption will increase from 30 million tons in 1996 to 39 million tons in 2020, which will require 59 million tons of paddy in 2020;
- The conversion rate for paddy to rice (milling recovery) is 65%.

According to the above scenario, it is estimated that overall rice consumption will increase at an average rate of slightly less than 1.0 % per year. In consideration of other relevant data, it is considered that other scenarios might be more appropriate.

The figure below shows the past trends of per capita rice consumption and per capita GDP from 1983 to 1998. Both figures show that the per capita rice consumption was very stable after 1990 and its income elasticity has become almost negligible.

¹ ADB TA 2679-INO, December 1998

Recent statistical data also shows that people who spend between Rp.100,000 and 150,000/month² have the highest per capita rice consumption; with those in the higher expenditure categories having lower per capita rice consumption. Although it is difficult to estimate precise income levels, considering the present average GDP per capita level (US\$478/year in 1998), it is expected that the rice consumption is almost at a peak level and is unlikely to increase future.



Based on the above-mentioned trend and considerations, the Study Team reviewed the per capita rice consumption estimation made in the ADB study report with the following two scenarios.

- Scenario-A: Economic growth 4.0% per annum (with constant population increase)
- Scenario-B: Economic growth 5.0% per annum (with constant population increase)

In Scenario-A per capita rice consumption will expand to a peak of 153.2 kg/capita/year around 2002 and then decline to 145.0 kg/capita/year by 2020. Total milled rice consumption will increase to 38.06 million tons in 2020, requiring 58.55 million tons of paddy in 2020.

In Scenario-B, per capita rice consumption will expand to a peak 152.7 kg/capita/year around 2000 and then decline to 140.7 kg/capita/year in 2020. Total milled rice consumption will increase to 36.91 million tons by 2020, requiring 56.78 million tons of paddy by 2020. Table A.2.3 presents the estimated demand increases in paddy and compares them to those estimated by ADB.

The Study Team's estimated paddy demands by 2020 will be lower than the ADB estimate in both scenarios, by 0.91 million tons in Scenario A and by 2.68 million tons in Scenario B. There is, however, no doubt that a continuous and substantial rice production increase must be realized over the next 20 years if Indonesia is going to achieve and is sustain a position of rice self sufficiency.

(3) Rice Production

The ADB study made the following assumptions for the base model of rice production trends.

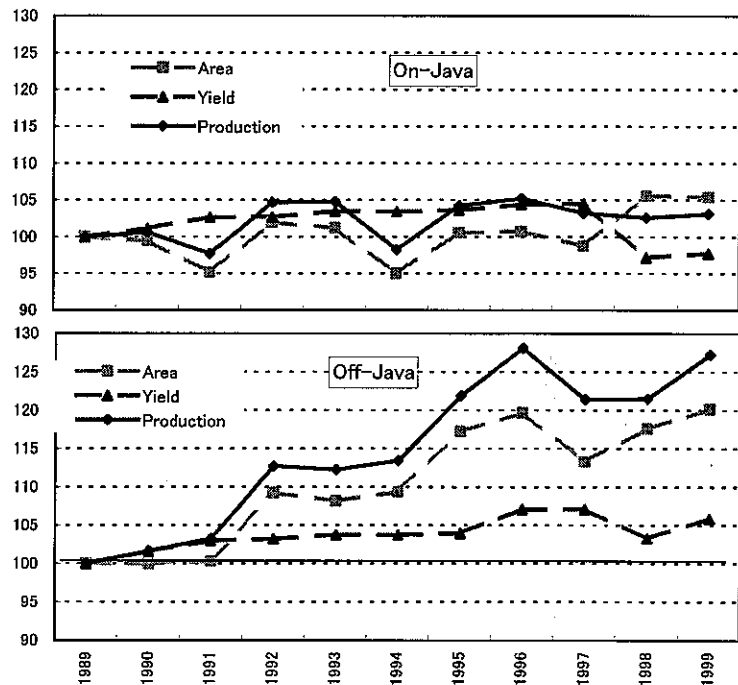
- Paddy yield and cropping intensity both on- and off-Java will continue growing until 2020 at the same slower rate as during the past two years;
- Annual rice yield growth rates would be 0.36% on-Java and 0.96% off-Java;
- Annual rice land cropping intensity growth rate are assumed at 0.76% on-Java and 0.68% off-Java;
- Annual paddy land changes are assumed to be -20,000 ha/year on-Java and +60,000 ha/year off-Java (for standard model);
- New land development off-Java takes four years to become fully productive – this land is 25% productive in the first year, 50% productive in the second year, 90% productive by the end of the third year and 100% productive by the end of the fourth year; and
- Historic fluctuations in production (impacted by climatic conditions) compared to consumption are repeated in the future.

² Rp.150,000 /month is equivalent to US\$225/year (at the rate of US\$1 = Rp.8,000).

With the above production assumptions and the rice consumption trend, the ADB study estimated that Indonesia would continue to fluctuate around self-sufficiency until 2015 when it would start to generate surpluses as the consumption demand growth flattens. If the Study Team's assumption for rice consumption is considered, Indonesia could start to generate substantial surpluses from 2008, with 4% per annum economic growth, or from 2005 with 5% /year economic growth.

The following figures show indices (1989=100) of harvested area, yield and production of rice from 1989 to 1999. The basic concept of the rice production scenario in the ADB study report, which expects a considerable off-Java rice production increase, is quite reasonable, because on-Java rice production is stagnant in contrast to the remarkable increase of off-Java production which has occurred during last 10 years. The assumptions regarding the trend of planted area (paddy land and CI) seems to be very reasonable.

The ADB rice production scenario may, however, be a little bit optimistic regarding on-Java yields, if the recent rice production situation is taken into consideration. The above figures show a moderate increase in yield for both on- and off-Java and their decrease after 1998. Even if the rice production scenario were to use annual rice yield growth rates based on the recent trends, it seems unlikely that such growth rates would continue for the next 20 years under present conditions, especially in Java.



Source: Statistik Indonesia, BPS
Indices of Rice Production Factors of Java and Off-Java (1989=100)

The average rice yield in 1998 was 4.20 ton/ha (wetland rice: 4.44 ton/ha). On Java, it was 4.82 ton/ha (wetland rice: 4.97 ton/ha). These are reasonably high yields by world standards, and amongst developing countries Indonesia ranks amongst the highest in terms of rice productivity.

The conventional approach regarding rice yield increases off-Java, appears to be reasonable given that current average yields are around 3.70 ton/ha and are low in comparison to the potential yield of prevailing rice varieties in Indonesia. There is still a large gap between the present yield and the potential yield. Conditions on-Java are different from off-Java, with those on-Java yield being nearly reaching close to their potential.

To achieve further yield increases on-Java calls for an integrated approach including the introduction of new varieties, advanced farming technology, more inputs, intensive extension, and improved marketing. Whilst these are the basic requirements throughout the country, in Java the most important factor to improve yield is to develop farmer's original farming system in a manner which is most appropriate to the farmer's particular situation. The time has past when standardized farming systems are appropriate. More incentives should be given to farmers to develop their own systems or technologies. Without the incentives, farmers cannot afford to introduce new farming systems, to use more inputs or to make efforts to improve their technology. The incentives are more critical for increasing the rice yield for on-Java at this time, even they are important factors for off-Java, too. The strongest incentive would be a reasonable rice price to farmers, but the present situation is tending to weaken such incentives.

Farmers' incentives are also negatively impacted as the economy shifts towards manufacturing and away from agriculture. In Java especially, farmers are rapidly losing their interest in farming, with the younger generation moving to other economic sectors, in search of easier and higher incomes. Whilst this movement has been interrupted by the economic crisis, with the economic recovery, such movement is likely to gather momentum, once again.

It is assumed that the on-Java yield increase will be somewhat stagnant without strong incentives to farmers. Government should, therefore, shift its interest in rice production policy from on-Java to off-Java. If off-Java production were to increase in line with the ADB scenario, and rice demand were to increase in line with the Study Team's assumptions, it is considered likely that Indonesia could recover rice self-sufficiency by around 2010 – 2015, even without yield increase on-Java.

(4) Conclusion

The conclusion of the above analysis are summarized in Table A.2.3.

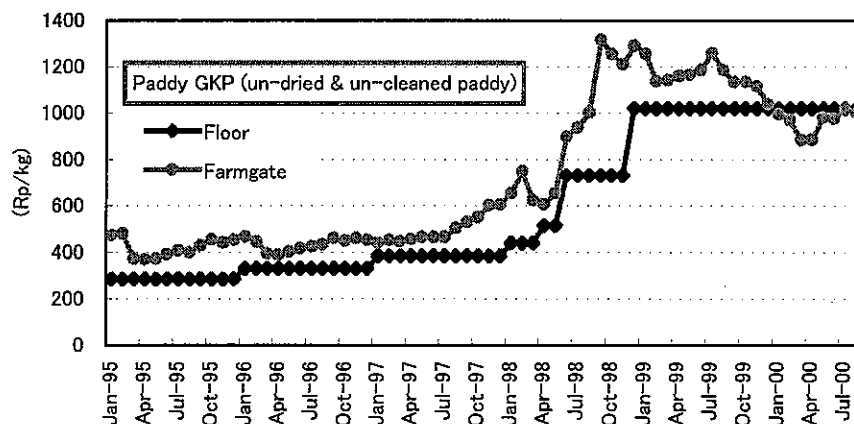
A.2.3 Rice Price

Pricing of rice in Indonesia is partially controlled by BULOG. It sets the quality standards of paddy by tree categories as shown in Table A.2.4. Based on these paddy categories, the floor prices to be a guideline for purchasing paddy by KUD and other agencies from farmers are announced by BULOG. BULOG also sets its buying price of white rice. Table A.2.5 shows the floor prices of paddy and white rice after 1993. During the stage of economic crisis in 1998, the floor prices increased more than twice comparing with price before the crisis.

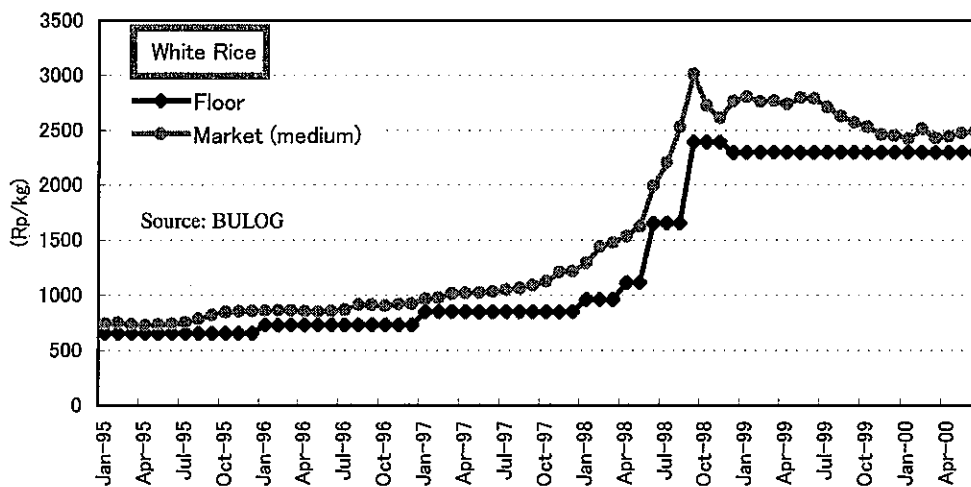
(1) Rice Price

Many farmers complain low price of paddy in 2000's main harvest season (around April). In some area, paddy farm gate price decreased to Rp.700/kg.

As shown in the figures below, GKP paddy (un-dried and un-cleaned) price decreased to about Rp.850/kg in 2000's main harvest season, though it was around Rp.1,200/kg in the first half of 1999. Rice price both for paddy and white rice tends to decrease after a skyrocketing hike during the economic crisis. It is considered that the recent price decrease is a rebound movement for adjusting the hike. The figure also shows that prices of paddy and white rice were always higher than the floor price since 1995, except the paddy price in 2000. It seems to indicate that the rice floor price policy functioned well before the economic crisis. The policy was, however, actually not well functioning as explained above. That is also proved by the decrease of farm gate price of paddy in the main harvest season every year.



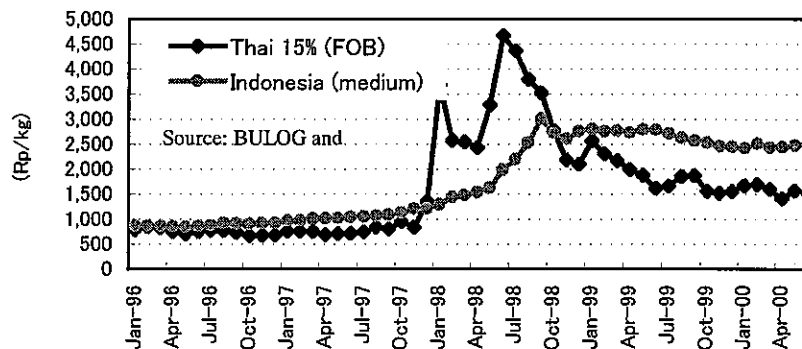
Floor Price (Zone I) and Actual Price of Rice (1/2)



Floor Price (Zone I) and Actual Price of Rice(2/2)

Rice price in Indonesia has been closely linked with the global market price, even though legal rice trade was controlled by Government until November 1998. Indonesian rice price has been hovering a little bit higher than the international price in recent years, except during the period of the sharp depreciation of Rupiah in 1998 (ref. the following figure).

It is considered that the linkage with the international market price was the only practical rice price policy taken by Government. The gap between the actual price and the floor price was, before 1998, generally closer at the beginning of the year and wider at the end of the year.



International and Indonesian Rice Prices

Because of moderate changes of the exchange rate and the international rice price in recent years, the government rice price policy seemed to be functioning quite well before 1998. However, the rice crisis in 1998 revealed that the easygoing policy failed to function properly in stabilizing rice price and in securing domestic rice supply when the market became unstable.

Farmers consider that the present rice price is too low. It is regrettable, but true that the Indonesian rice price is higher than the world price. The rice cost structure in Indonesia has already become too expensive to allow it to compete on the world market. The high cost structure might constrain Government's room to maneuver with regard to its rice policies. The high cost structure is not only a problem of rice, but also the other major crops. That could be a big burden in the future if the Government does not take the necessary measures to reduce production cost by improving production efficiency in agriculture. It is desirable that Government should immediately start to come to terms with major issues for a comprehensive structural reform in agricultural.

Indonesian government has imposed an approximate 30% of tariff on imported rice since January 2000. This provides an indication of the lengths to which Government will go to protect domestic rice production.. However, this message does not reach the farmers.

(2) Post-harvest Rice Prices

Previous figures also shows how, in most years, market prices decrease after the main harvest, and explains why it is generally recommended that farmers try to store their produce after harvest and sell it when the price levels improve. It is appreciated, however, that this is often impossible, for a number of reasons, as follows:

- Farmers are very busy harvesting rice and other crops, and preparation for the next crop.
- During the harvesting season there can be substantial rains, which make it difficult for farmers to dry and clean the harvested paddy.
- Farmers do not have enough space or the facilities to dry and store paddy for long time.

The government gives farmers a price incentive for their post-harvest activities. The paddy floor price is classified into 3 categories, GKP (un-dried and un-cleaned), GKS (half-dried and half-cleaned) and GKG (well-dried and well-cleaned). A price difference between GKP and GKG is Rp.380/kg at present. Then KUD is (was?) expected to function as a center for post-harvest including storing and marketing activities. However, actual KUD's activities are far weaker than was expected and provide little service.

Despite the above difficulties and constraints, the improvement of post-harvest activities of farmers is one sure way to increase their income. This not only requires guidance from Government; farmers, themselves need to make the effort to improve their post-harvest activity, as means of counteracting low prices.

A.3 Agriculture in Study Province

A.3.1 Outline of Agriculture in Study Province

(1) Outline of Agriculture

As described in main report 2.4.3 of Chapter 2, the outline of the Study Provinces are summarized as Table A.3.1.

(2) Cropping Pattern of Rice and *Palawija*

Based on the field observation and statistic data, the cropping pattern of paddy and *palawija* in each Study Province is shown in Fig. A.3.1.

A.3.2 Agriculture Production

(1) Food Crops and Vegetables

1) West Sumatra Province (see Table A.3.2 and A3.3)

Harvested area of rice was 0.41 million ha, which occupied 84.3% of the total area of major food crops in 1998. In terms of paddy, West Sumatra produced 1.81 million ton in 1998. Rice is very dominant food crop in West Sumatra. The yield is relatively high among off-Java provinces and is almost as same as Java. Rice production does not show a significant change in recent years.

Palawija seems to be not so important in West Sumatra. Its harvested area occupied only 11.5% of the total area of major food crops in 1998. Among *palawija* crops, maize is widely produced and its production tends to increase in recent years. As same as rice, *palawija* does not show a significant change in recent years.

Vegetables production is still very small and their production also does not change much. Among

vegetables, chili, cabbage, shallot, tomato and potato are widely planted.

2) West Java Province (see Table A.3.4 and A3.5)

West Java is the largest rice-producing province in Indonesia. Its harvested area and production in paddy in 1998 were 2.18 million ha and 9.80 million ton respectively. The production slightly tends to decrease in recent years because of the decreased planted area before 1998 and the slumped yield after 1998.

Palawija seems to be not so important in West Java, too. Its harvested area in recent years is only one-fourth of the area of rice. Maize and cassava are widely planted and only maize shows a substantial production increase among *palawija* crops.

As West Java is a vegetable production center in Indonesia, many kinds of vegetables are widely produced. However, their harvested area occupied only 7.1% of the total area of major food crops in 1998.

3) D.I.Yogyakarta Province (see Table A.3.6 and A.3.7)

Rice harvested area, 0.14 million ha occupied 37.1% of the total area of major food crops and the production was 0.62 ton in 1998. The harvested area and production both tend to decrease in recent years.

Plawija is still very important among farmers. Harvested area of *palawija* is almost two times bigger than the area of rice. Its harvested area is harboring 0.23 million ha in recent years.

Vegetables production is still very small and chili, cabbage, shallot, string beans and spinach are widely planted.

4) East Java Province (see Table A.3.8).

East Java is the second largest rice-producing province next to West Java. Its yield is always on the highest level in Indonesia. Its harvested area and production in paddy in 1998 were 1.72 million ha and 8.69 million ton respectively. The harvested area and production slightly tend to increase in recent years.

Palawija is also important crops in East Java. Its harvested area is always bigger than the area of rice. Though maize is the dominant crop among *palawija*, East Java is also famous in soybeans production.

Even there is a substantial production of vegetables its harvested area is still not much among major food crops (Detailed data about vegetables is not available in provincial statistics).

5) NTB Province (see Table A.3.9 and A3.10).

Harvested area of rice was 0.32 million ha, which occupied 59.6% of the total area of major food crops in 1998. In terms of paddy, NTB produced 1.34 million ton in 1998. The harvested area and production still show a substantial increase trend in recent years. As same as West Sumatra, the yield is relatively high among off-Java provinces.

In contrast to rice, *palawija* production tends to decrease in recent years. Its harvested area in 1998 was 0.19 million ha. Soybeans are widely produced among *palawija* crops.

Vegetables production is still very small and chili, shallot, beans and tomato are widely planted.

(2) Estate Crops

Even it is expected that estate crops contribute to farmers' income more or less in Indonesia it is difficult to get clear pictures about their production because of insufficient data. Table A.3.11.shows the planted area of major smallholder estate crops in 5 provinces.

1) West Sumatra Province

In West Sumatra, estate crops could be one of the major income sources to farmers. Total planted area of major estate crops is as big as about 70% of rice-harvested area. It is more than 5 times bigger than the harvested area of *palawija* crops. Estate crops mainly consist of perennial crops. Rubber, coconuts, cassiavera, coffee and *gambir* are widely planted among them.

2) West Java Province

Other than coconuts, estate crops are not widely grown by farmers. Next to coconuts, clove, tea, coffee, rubber and sugarcane are relatively common among farmers. Perennial estate crops are still dominant.

3) D.I. Yogyakarta Province

As same as West Java, estate crops are not widely grown by farmers other than coconuts. Next to coconuts, cashew, clove, cocoa, kapok and sugarcane are relatively popular among farmers.

4) East Java Province

Estate crops are widely grown and seem to provide substantial income to farmers. Coconuts, kapok, sugarcane and tobacco are the major crops among them and planted areas of tobacco and cashew have remarkably increased in recent years. Annual estate crops are common among farmers in contrast to West Sumatra.

5) NTB Province

The total planted area of major estate crops is almost same as the area of *palawija* crops. Estate crops seem to contribute to farmers' income in NTB province, too. They consist of various kinds of perennial crops as well as annual crops. Coconuts, cashew, coffee, caster oil plant and tobacco are the major estate crops. Planted areas of tobacco, cashew and caster oil plant have remarkably increased in recent years.

A.3.3 Prospective farming in irrigated areas in the Study area

The contribution of the agricultural sector to GDP and the labor force employed in agriculture are steadily reducing as the agricultural sector is losing its economic competitiveness to the other sectors. The agricultural sector has remarkably reduced its economic status over the last few decades. Many farmers cannot depend only on farming to support their life due to inefficient crop production and marketing at present. They are also losing their confidence in farming for the future. There is a trend for farmers, particularly the younger generation, to leave farming, although the other sectors are not sufficiently developed to absorb all of them.

It is unavoidable that the agriculture sector will reduce its economic status over the long-term; this is a historical and worldwide phenomenon. Therefore, Government should have a balanced economic policy to develop non-agriculture sectors to absorb the labor force from agriculture sector, and to develop an efficient farming and marketing system to increase production and profits for the remained farmers.

The prospective farming in irrigated areas in the Study area is shown below based on the Study results.

1) West Sumatra Province

West Sumatra is blessed with water resources due to favorable rainfall pattern and rich forest reserves in the watershed. Most of farmers in irrigated areas can enjoy the water resources by growing rice twice or more in a year. Farmers try to concentrate rice farming in the irrigated areas for the following reasons, even though rice is becoming less profitable.

- People still have respect for traditional values,
- Farmland is relatively well secured through the traditional land inheritance system. Many farmers own areas of upland in addition to paddy field.
- Farmers grow various kinds of crops, mainly perennial estate crops and *Palawija* crops, other than rice in dry land (Female farmers mainly take care of rice. Male farmers spend much time in the upland, except during the planting and harvesting season of rice.)
- There is less opportunity to find other employment in the rural areas.
- Many farmers receive money from family members working away from their villages, as people from West Sumatra are well known in the other parts of Indonesia and overseas.

2) West Java Province

West Java is also blessed with substantial water resources even though they are not as abundant as they are in West Sumatra. Farmers in irrigated areas can usually grow rice twice a year. In spite of the favorable water resources, the centrifugal force from farming is greater than the centripetal force to farming, for the following reasons.

Farmers in irrigated areas would accelerate giving up farming or concentrate on rice farming for their own consumption only.

- a. It seems that many farmers have less interest in farming.
 - A cropping pattern in irrigated area is very simple, only rice and very few *Palawija* or vegetable crops are planted in dry season, despite the small holding size and relatively favorable rainfall conditions
 - Cropping intensities are very low in upland areas
 - Investment in farm mechanization by the private sector is relatively small
- b. Farmland has been fragmented into very small parcels
- c. There are many job opportunities and it is relatively easy to earn cash income.

3) D.I. Yogyakarta Province

Water resources and land resources are scarce in comparison to West Sumatra and West Java. Many farmers grow *Palawija* in the second crop season even in irrigated areas. Because of a shortage of rainfall and farmland, the upland cropping system has become highly developed. However, farmers' efforts have already reached to the limits. Some farmers are losing interest in farming while they supplement their income with other jobs. Some farmers in irrigated areas would accelerate giving up farming or concentrate on rice farming for their own consumption only. On the other hand, some others try to continue farming by growing high value crops in the dry season.

4) East Java Province

Water resources are also scarce and farmland is very small in East Java. Many farmers grow *Palawija* in the second crop season even in irrigated area as in D.I. Yogyakarta. In spite of such severe farming conditions, many farmers try to maximize profit from their limited holdings. Triple cropping, combining rice and *Palawija*, is commonly observed in irrigated areas. Several data sources show that farmers in East Java still have the intention to continue farming. Many farmers try to continue farming with the best combination of crops, sometimes without special attention to rice in irrigated areas. Most crops would be possible because big markets are within a short distance from production area.

A.4 Feasibility of Agri-business Expected to be Operated by Farmers and/or Farmer Group

A.4.1 Crop Diversification and Agribusiness

(1) Crop Diversification

Government states the two main objectives in the present agricultural development plan are increased rice production and crop diversification. Domestic demand for vegetables, fruits, meats and ornamental plants and flowers has been steadily growing year by year. Although the economic crisis in 1997/1998 had a negative impact on economic growth and there are still uncertainties regarding the short-term, it would appear that demand will increase again once the economy gets back on its feet. Wheat, soybeans, vegetables, meats and eggs have relatively higher positive income elasticity in Indonesia.

Farmers could expect a substantial profit from the vegetables, if they do not mind paying larger investment, doing intensive management and accessing market information (see Table A.4.1).

Agricultural Commodity Prices and Price Projections (in constant 1990 US\$)

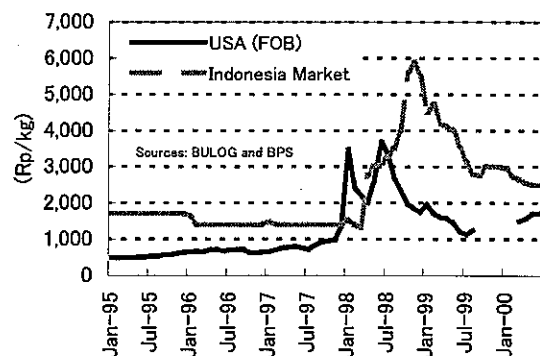
Commodity	Unit	Actual				Projections	
		1970	1980	1990	1999	2005	2010
Beverages							
Cocoa	cent/kg	269.1	361.7	126.7	109.6	125.5	125.8
Coffee, robusta	cent/kg	364.3	450.6	118.2	143.8	136.5	138.7
Tea, 3-auction ave.	cent/kg	332.9	230.5	205.8	177.6	163.2	155.5
Fats and Oils							
Coconuts oil	\$/mt	1,538.7	936.1	336.5	711.8	518.8	481.2
Copra	\$/mt	896.5	629.0	230.7	445.6	384.9	357.5
Palm oil	\$/mt	1,036.9	810.9	289.8	421.0	355.6	340.5
Soybeans	\$/mt	466.2	411.5	246.8	194.7	209.2	203.6
Grains							
Maize	\$/mt	232.9	174.0	109.3	87.1	104.6	96.2
Rice, Thai 5%	\$/mt	503.6	570.6	270.9	239.9	263.6	255.4
Wheat, US HRW	\$/mt	218.9	240.0	135.5	108.2	133.9	125.8
Other Food							
Bananas, US	\$/mt	662.2	524.1	540.9	360.4	465.8	420.2
Oranges	\$/mt	670.0	556.0	531.1	416.0	472.8	444.2
Sugar, world	cent/kg	32.8	87.8	27.7	13.3	16.7	17.8
Raw Materials							
Cotton	cent/kg	269.7	286.5	181.9	113.1	132.8	133.8
Rubber, RSS1 Malaysia	cent/kg	162.4	197.9	86.5	60.7	73.8	73.4
Tobacco	\$/mt	4,290	3,162	3,392	2,922	2,719	2,443

Source: World Bank, Department Economics, Development Prospects Group

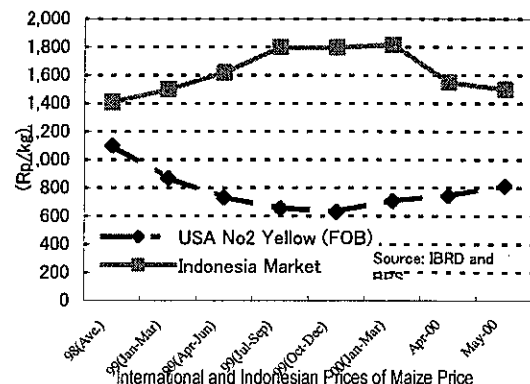
(2) Agribusiness

Whilst agribusiness promotion is one of the current in-vogue concepts, it appears that it is often mentioned without serious consideration of the requirements and implications. In the Indonesian context it appears that agribusiness development is mainly related to the export market and to the rewards that could be obtained from foreign exchange earnings. Mention is often made of the successful experiences in Thailand, where a number of export oriented agribusinesses have been established; it would, however, be prudent to look into the background of this success and assess the negative environmental impacts and the limited impact that they have had on farmers' incomes.

International prices of agricultural commodities always fluctuate in the short term and sometimes this can create nervousness with producers; sometimes these fluctuations result from speculation. The values of the main agricultural commodities have fallen remarkably over last 20 years, with the prices of many commodities being less than 50% of what they were in 1980. According to the World



International and Indonesian Price of Soybeans



International and Indonesian Prices of Maize Price

Bank's Commodity Price projections, few increases are foreseen during the next decade. (ref table below). This situation should be appreciated by who is considering to venture into export-oriented agriculture.

High crop production costs are another problem facing the export-oriented market in Indonesia. As a result, for example, Indonesian rice cannot compete on the world market at this time, neither can maize nor soybean.(ref. figures).

Whilst these crops do not represent all the crops in Indonesia, their cost structures tend to reflect the overall situation. Costs tend to be high by world standards, because of such factors as small landholdings, unfavorable sharecropping systems, low productivity, high inputs cost and inefficient marketing. It is very difficult for Government to take all the necessary countermeasures in the short time, to put Indonesian farmers in a more favorable situation.

Whilst there are some obvious advantages in the promotion of export orientated agribusiness it is recommended that emphasis is placed on the huge market in Indonesia with more than 200 million people. Demand for processed foods will increase as incomes rise. It is also expected that a domestic market oriented policy would contribute to the development of agro-industries which should generate more direct farmers' income than would an export oriented one.

There are many kinds of agribusiness such as farm mechanization business, seed business, primary processing of foods and handicrafts made from byproducts. Without considering sophisticated machinery and facilities, such agribusiness could operate in rural areas.

As with crop diversification, it is considered that a joint operation with private enterprises is the most practical way to promote agribusiness in rural areas. Unfortunately, most farmers do not have the capability to manage every aspect of agribusiness; they also tend to have negative perceptions of past Government attempts to promote agribusiness through the *KUD* promotion policy. It seems that private sector participation is probably the best approach which could be used to promote agribusiness development.

A.4.2 Farm Mechanization Services

Hand tractor hiring service and rice threshing service are considerable farm mechanization services in Indonesia at present. The detailed calculation of cost and profit of the both services are shown in Table A.4.2 and 4.3.

According to the calculation, hand tractor service is not a much profitable business, even though it does not make a loss. The profit is expected to be only Rp.2,005,920/year. In contrast to hand tractor service, it seems that rice thresher service makes a certain profit, Rp.8,732,320/year. However, the calculation does not include a cost for transportation of thresher. As the service is expected to cover about 100 - 110 ha (50 - 55 ha x 2 seasons)/year, some transportation measure, maybe track, is needed. If the cost for transportation is calculated together with, the profit should be minimal or minus in some occasion.

Moreover, a traditional harvesting system, *Bawon*, hinders the rice threshing service from spreading in many areas in Indonesia. As long as *Bawon* is prevailing, it is difficult to consider introducing a power thresher in rice harvesting. According to MOA's data, power threshers have relatively spread among private sector only in D.I. Aceh, E. Java, South Kalimantan and South Sulawesi.

It seems that the both farm mechanization services are not so profitable business at present.

A.4.3 Post-harvest Activity of Rice

As described in the Main Report, a rice market structure in processing and marketing in Indonesia seems to hamper farmers from getting their fair shares. If farmers will enter into the market to some extent, they could enjoy more profit from rice. Even though there are many socioeconomic obstacles in farmers' entry into the market, it would be the most practical and effective way to increase farmers' income from rice at present. Farmers in Indonesia have to change their attitude, which is selfish and suspicious, so that they will unite themselves in extending their presence in the market.

It is recommendable that farmers start from easy business like a joint marketing at the beginning in order to avoid getting them into trouble of complicated management. Moreover, farmers could remarkably increase their profit, if they dry and clean their paddy before selling. According to the data of BULOG, price of wet and un-cleaned paddy was Rp.885.01/kg in April 2000, while price of dry and cleaned paddy was Rp.1,221.67/kg. The price difference was Rp.336.66/kg. If the yield was 4.5 ton/ha, farmers could get additional income of Rp.1,514,970/ha from only drying and cleaning. This profit seems to be quite enough to compensate them for troublesome work of rice drying in main rice harvesting season around April, while farmers, in general, are very busy for preparing next crop and getting trouble with rain.

Rice milling business is one of the ultimate agri-business implemented by farmers at present. According to the study result, rice milling is very profitable business in Indonesia (see Table A.4.4). If farmers will collect a certain amount of raw paddy in compete with the existing rice mills, they could get substantial profit from rice milling. The amount seems to be very small if farmers keep a solid sense of cooperative and a strong mind to increase their income.

Table A.1.1 Land Utilization in Indonesia

Land Type	1985		1990		1994		1995		1996		1997	
	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)	(ha)	(%)
Wet Land	7,600,588	14.5	8,215,541	14.8	8,439,305	14.9	8,484,687	14.7	8,519,110	14.4	8,490,042	14.2
Dry Land	11,027,309	21.0	12,155,755	21.9	11,244,722	19.8	11,368,507	19.6	11,562,812	19.5	11,608,194	19.4
Agri. Estate	8,380,593	16.0	10,863,588	19.6	13,045,811	23.0	13,835,746	23.9	14,488,415	24.5	15,016,014	25.1
Sub-total	27,008,490	51.5	31,234,884	56.2	32,729,838	57.8	33,688,940	58.2	34,570,337	58.4	35,114,250	58.7
Wood Land	9,866,452	18.8	9,128,596	16.4	9,506,558	16.8	9,555,010	16.5	9,446,070	16.0	9,133,621	15.3
Fallow Land	7,922,910	15.1	7,799,390	14.0	6,920,650	12.2	6,967,938	12.0	7,335,586	12.4	7,577,909	12.7
Housing	4,447,318	8.5	4,678,441	8.4	5,005,739	8.8	5,155,422	8.9	5,291,375	8.9	5,331,489	8.9
Others	3,241,506	6.2	2,701,096	4.9	2,499,731	4.4	2,494,119	4.3	2,575,445	4.3	2,692,313	4.5
Total	52,486,676	100.0	55,542,407	100.0	56,662,516	100.0	57,861,429	100.0	59,218,813	100.0	59,849,582	100.0

Source: Statistik Indonesia, Central Bureau of Statistics Indonesia

Note: Maluku and Irian Jaya are excluded from the calculation because of incomplete data

Table A.1.2 Major Food Crops Harvested Area and Production Indonesia

Harvested Area ('000 ha)

Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	8,547.1	9,364.9	9,494.0	10,081.2	10,251.4	9,881.8	10,475.6	10,688.3
Upland Rice	1,216.4	1,156.3	1,239.9	1,357.5	1,318.3	1,258.8	1,254.8	1,165.5
(Rice)	9,763.6	10,521.2	10,733.8	11,438.8	11,569.7	11,140.6	11,730.3	11,853.8
Maize	3,086.2	2,944.2	3,109.4	3,651.8	3,743.6	3,355.2	3,847.8	3,434.9
Cassava	1,350.4	1,407.9	1,356.6	1,324.3	1,415.1	1,243.4	1,205.4	1,340.8
Sweet Potatoes	263.9	240.2	197.2	228.7	211.7	195.4	202.1	167.9
Groundnuts	537.6	620.8	643.0	739.3	688.9	628.1	651.1	613.7
Soybeans	858.9	1,198.1	1,406.9	1,477.4	1,279.3	1,119.1	1,095.1	1,143.0
(Palawija)	6,097.0	6,411.2	6,713.1	7,421.5	7,338.6	6,541.2	7,001.5	6,700.3
Vegatables	184.9	221.8	304.5	312.5	349.8	308.1	320.3	297.2
(Total)	16,045.5	17,154.2	17,751.4	19,172.8	19,258.1	17,989.9	19,052.1	18,851.3

Production ('000 ton)

Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	36,017.3	42,371.3	43,959.2	46,805.7	48,188.3	46,591.9	46,482.8	47,756.0
Upland Rice	2,119.1	2,354.3	2,682.3	2,938.5	2,913.2	2,785.2	2,753.9	2,645.8
(Rice)	38,136.4	44,725.6	46,641.5	49,744.1	51,101.5	49,377.1	49,236.7	50,401.8
Maize	5,287.8	6,192.5	6,868.9	8,245.9	9,307.4	8,770.9	10,169.5	9,172.3
Cassava	14,167.1	17,117.2	15,729.2	15,441.5	17,002.5	15,134.0	14,696.2	16,346.7
Sweet Potatoes	2,156.5	2,224.3	1,845.2	2,171.0	2,017.5	1,847.5	1,935.0	1,627.4
Groundnuts	534.8	619.6	632.0	760.1	737.8	688.3	692.4	647.8
Soybeans	769.4	1,315.1	1,564.8	1,680.0	1,517.2	1,356.9	1,305.6	1,371.6
Vegatables	1,565.6	2,603.6	3,893.9	4,330.4	4,673.2	3,721.2	4,139.3	4,044.7

Yield (ton/ha)

Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	4.21	4.52	4.63	4.64	4.70	4.72	4.44	4.47
Upland Rice	1.74	2.04	2.16	2.17	2.21	2.21	2.20	2.27
(Rice)	3.91	4.25	4.35	4.35	4.42	4.43	4.20	4.25
Maize	1.71	2.10	2.21	2.26	2.49	2.61	2.64	2.67
Cassava	10.50	12.20	11.60	11.70	12.00	12.20	12.20	12.20
Sweet Potatoes	8.20	9.30	9.40	9.50	9.50	9.50	9.60	9.60
Groundnuts	1.00	1.00	0.98	1.03	1.07	1.10	1.06	1.06
Soybeans	0.90	1.10	1.11	1.14	1.19	1.21	1.19	1.20

Source: Statistik Indonesia, Central Bureau of Statistics Indonesia

Note: Vegetables include shallots, spring onions, potatoes, cabbage, mustard green and Carrot only

Table A.1.3 Regional Rice Production in Indonesia (1989-1999)

	Year	Area (ha)	Yield (ton/ha)	Production (ton)	Indices in Indonesia (1989=100)			
					Year	Area	Yield	Production
Indonesia	1989	10,531,207	4.247	44,725,582	1989	100.0	100.0	100.0
	1990	10,502,357	4.302	45,178,751	1990	99.7	101.3	101.0
	1991	10,281,519	4.346	44,688,247	1991	97.6	102.3	99.9
	1992	11,103,317	4.345	48,240,009	1992	105.4	102.3	107.9
	1993	11,012,776	4.375	48,181,087	1993	104.6	103.0	107.7
	1994	10,733,830	4.345	46,641,524	1994	101.9	102.3	104.3
	1995	11,438,764	4.349	49,744,140	1995	108.6	102.4	111.2
	1996	11,569,729	4.417	51,101,506	1996	109.9	104.0	114.3
	1997	11,140,594	4.432	49,377,054	1997	105.8	104.4	110.4
	1998	11,730,325	4.197	49,236,692	1998	111.4	98.8	110.1
	1999	11,853,729	4.252	50,401,783	1999	112.6	100.1	112.7
On-Java	1989	5,448,548	4.958	27,011,257	1989	100.0	100.0	100.0
	1990	5,418,824	5.015	27,177,422	1990	99.5	101.1	100.6
	1991	5,183,947	5.091	26,392,552	1991	95.1	102.7	97.7
	1992	5,552,565	5.092	28,274,421	1992	101.9	102.7	104.7
	1993	5,514,744	5.131	28,296,673	1993	101.2	103.5	104.8
	1994	5,176,237	5.128	26,545,565	1994	95.0	103.4	98.3
	1995	5,479,396	5.138	28,154,898	1995	100.6	103.6	104.2
	1996	5,488,947	5.177	28,414,056	1996	100.7	104.4	105.2
	1997	5,380,976	5.181	27,878,934	1997	98.8	104.5	103.2
	1998	5,752,012	4.819	27,717,293	1998	105.6	97.2	102.6
	1999	5,747,041	4.848	27,863,357	1999	105.5	97.8	103.2
Off-Java	1989	5,082,659	3.485	17,714,325	1989	100.0	100.0	100.0
	1990	5,083,533	3.541	18,001,329	1990	100.0	101.6	101.6
	1991	5,097,572	3.589	18,295,695	1991	100.3	103.0	103.3
	1992	5,550,752	3.597	19,965,588	1992	109.2	103.2	112.7
	1993	5,498,032	3.617	19,884,414	1993	108.2	103.8	112.3
	1994	5,557,593	3.616	20,095,959	1994	109.3	103.8	113.4
	1995	5,959,368	3.623	21,589,242	1995	117.2	104.0	121.9
	1996	6,080,782	3.731	22,687,450	1996	119.6	107.1	128.1
	1997	5,759,618	3.733	21,498,120	1997	113.3	107.1	121.4
	1998	5,978,313	3.600	21,519,399	1998	117.6	103.3	121.5
	1999	6,106,751	3.691	22,538,426	1999	120.1	105.9	127.2

Source: Statistik Indonesia, BPS

Table A.1.4 Number of Land Holding Farm Household, Size of Controlled and Land Status

	Land owned			Land originated from other parties			Land held by other parties			Area controlled		
	No. of HH	Area	average	No. of HH	Area	average	No. of HH	Area	average	No. of HH	Area	average
DI. Aceh	477,570	516,443.79	1.081	175,993	75,775.47	0.431	37,128	22,245.17	0.599	497,151	570,046.39	1.15
Sumatera Utara	928,088	842,534.58	0.908	346,150	145,448.60	0.420	61,341	43,012.22	0.701	1,017,915	945,046.99	0.93
Sumatera Barat	484,690	350,859.43	0.724	206,866	83,765.69	0.405	41,592	25,382.30	0.610	510,257	409,336.51	0.80
Riau	342,992	745,070.18	2.172	49,339	45,425.80	0.921	11,639	21,879.36	1.880	349,430	768,671.81	2.20
Jambi	267,526	542,010.69	2.026	59,761	36,330.38	0.608	23,129	42,669.54	1.845	275,246	535,735.45	1.95
Sumatera Selatan	742,024	1,130,712.65	1.524	155,483	115,307.77	0.742	30,199	34,684.11	1.149	774,313	1,211,370.84	1.56
Bankulu	176,783	270,655.76	1.531	28,780	18,403.43	0.639	6,351	5,464.09	0.860	181,568	283,601.55	1.56
Lampung	874,138	1,018,313.12	1.165	248,603	139,136.87	0.560	65,070	48,624.32	0.747	934,476	1,108,844.25	1.19
DKI Jakarta		0.00 -			0.00 -							
Jawa Barat	3,023,769	1,269,879.32	0.420	1,185,001	379,352.93	0.320	214,124	89,048.84	0.416	3,172,219	1,561,021.11	0.49
Jawa Tengah	3,184,443	1,337,282.62	0.420	1,033,025	333,949.24	0.323	251,241	117,814.62	0.469	3,254,415	1,554,343.27	0.48
DI. Yogyakarta	324,741	148,646.14	0.458	105,896	28,401.46	0.268	27,204	11,273.02	0.414	331,742	165,801.40	0.50
Jawa Timur	3,722,949	1,651,221.48	0.444	886,745	306,798.03	0.346	252,783	104,750.29	0.414	3,813,763	1,853,834.99	0.49
Bali	288,132	195,288.96	0.678	116,639	63,525.59	0.545	28,189	20,798.40	0.738	319,858	238,025.01	0.74
Nusa Tenggara Barat	403,428	298,127.73	0.739	123,094	53,761.91	0.437	38,737	21,001.41	0.542	412,834	330,910.64	0.80
Nusa Tenggara Timur	509,463	566,801.04	1.113	80,151	36,828.48	0.459	21,073	12,107.65	0.575	529,602	591,543.03	1.12
Timor Timur	125,082	194,239.94	1.553	8,064	6,150.84	0.763	3,132	3,278.69	1.047	126,503	197,112.59	1.56
Kalimantan Barat	455,236	1,144,155.97	2.513	94,360	64,222.17	0.681	16,993	32,767.61	1.928	469,422	1,175,636.20	2.50
Kalimantan Tengah	201,368	447,778.95	2.224	19,431	15,890.29	0.818	5,631	6,964.31	1.237	203,606	456,734.12	2.24
Kalimantan Selatan	323,123	324,752.34	1.005	120,671	58,371.49	0.484	18,328	10,995.13	0.600	339,477	372,579.27	1.10
Kalimantan Timur	131,435	256,909.19	1.955	16,715	14,131.66	0.845	1,605	2,153.65	1.342	134,102	268,891.90	2.01
Sulawesi Utara	289,498	297,020.38	1.026	86,743	48,804.27	0.563	13,338	11,739.00	0.880	312,185	334,118.29	1.07
Sulawesi Tengah	230,188	371,633.44	1.614	38,432	25,852.14	0.673	11,300	11,398.47	1.009	235,653	386,093.04	1.64
Sulawesi Selatan	823,155	858,354.34	1.043	321,433	189,262.09	0.589	88,130	61,826.26	0.702	860,758	985,804.72	1.15
Sulawesi Tenggara	170,162	245,407.34	1.442	16,702	8,926.54	0.534	3,935	4,093.40	1.040	173,648	250,341.39	1.44
Maluku	239,092	400,339.28	1.674	19,189	8,871.74	0.462	2,234	1,921.02	0.860	245,535	407,299.44	1.66
Irianjaya	228,990	175,777.35	0.768	45,558	9,433.92	0.207	7,436	2,982.85	0.401	238,128	182,291.83	0.77
INODONESIA	18,968,065	15,600,216.01	0.822	5,588,824	2,312,128.80	0.414	1,281,862	770,875.73	0.601	19,713,806	17,145,036.03	0.87

Source: 1993 Agricultural Census, Seri-B1 Land Holding Farmers Sample Census, BPS

Table A.1.5 Summary of Output and Input Values, 2000

Item	Unit	Favourable	Unfavourable	Item	Unit	Favourable	Unfavourable
OUTPUTS				INPUTS-2			
Main product				Mechanisation:			
- Paddy (HYV) GKG	kg	1.20	0.90	- Draft power	ha	350	450
- Paddy (local) GKG	kg	1.32	0.99	- Tractor	ha	250	350
- Maize (improved)	kg	0.98	0.70	- Thresher	tonne	60	45
- Soybeans	kg	2.70	1.80	- Sprayer	day	5	5
- Groundnuts	kg	4.05	2.70	- Other		0	0
- Cassava	kg	0.32	0.20	Other physical inputs:			
- Vegetables	kg	2.00	1.50	- Bags/sacks	tonne	1	1
INPUTS-1				- Equipment	ha	10	10
Seeds/planting material				- Private irrigation	application	70	70
- Rice (HYV) purchased	kg	3.00	3.00	- Other		0	0
- Rice (local)	kg	1.45	1.09	Labour:			
- Maize (improved)	kg	4.00	6.00	- Male (non-harvest) hired	workday	10	14
- Soybeans	kg	4.05	2.70	- Male (non-harvest) family	workday	10	14
- Groundnuts	kg	6.08	4.05	- Female (non-harvest) hired	workday	8	9
- Cassava	kg	0.03	0.03	- Female (non-harvest) family	workday	8	9
- Vegetables	kg	400.00	400.00	- Male (harvest) hired	workday	10	14
Fertilisers:				- Male (harvest) family	workday	10	15
- Urea	kg	1.12	1.20	- Female (harvest) hired	workday	8	9
- TSP	kg	1.30	2.00	- Female (harvest) family	workday	8	9
- DSP	kg	0.98	1.50	Other:			
- KCL	kg	1.90	2.00	- Land tax	ha	25	25
- ZA	kg	0.90	1.10	- Tertiary water fee	ha	10	10
- Other	kg	0.00	0.00	- Ulu-ulu charge	ha	20	20
- FYM	kg	0.00	0.00	- Other		0	0
Agrochemicals:							
- Fungicide	ls	10.00	12.00				
- Pesticide	ls	10.00	12.00				
- Herbicide	ls	10.00	12.00				
- Rodenticide	ls	10.00	12.00				

Table A.1.6 Summary of Crop Yield

Crop	Irrigated/rainfed	Season 1/	Variety	Crop form	Good	Poor
- Rice	Irrigated	MH/MK	HYV	GKG	5.00	4.00
- Rice (sawah)	Rainfed	MH	HYV	GKG	3.00	2.50
- Rice (upland)	Rainfed	MH	LV	GKG	2.25	2.00
- Maize	Irrigated	MK	Improved	Dry grain	3.50	2.50
- Soybeans	Irrigated	MK	Improved	Dry bean	1.20	0.90
- Groundnuts	Irrigated	MK	Improved	Shelled	0.90	0.70
- Cassava	Rainfed	MH/MK	Local	Fresh root	10.00	8.00
- Vegetables	Irrigated	MH	Improved	Fresh	5.00	5.00

Note 1/ MH = Musim hujan (wet season), MK = Musim kering (dry season)

2/ HYV = High Yielding Variety, LV = Local Variety

3/ GKG = Gabah Kering Giling (dry paddy, ready for milling)

Table A.1.7 Physical Output and Input of Irrigated Rice, HYV, and Soybean

Crop	Rice		Soybean		Crop	Rice		Soybean			
	Irrigated	HYV	Irrigated	Improved		Irrigated	HYV	Irrigated	Improved		
Remarks	GKG		Dried bean		Remarks	GKG		Dried bean			
Yield form	GKG		Dried bean		Yield form	GKG		Dried bean			
Conditions	Favourable	Unfavourable	Favourable	Unfavourable	Conditions	Favourable	Unfavourable	Favourable	Unfavourable		
OUTPUTS											
Main product	tonne	5	4	1.2	0.9						
INPUTS-1											
Seeds/planting material	kg	30.00	35.00	40.00	45.00	Other:					
Fertilisers:						- Land tax	ha	1.00	1.00	0.50	0.50
- Urea	kg	230.00	230.00	60.00	60.00	- Tertiary water fee	ha	1.00	1.00	0.50	0.50
- TSP	kg	100.00	100.00	50.00	50.00	- Ulu-ulu charge	ha	1.00	1.00	0.50	0.50
- DSP	kg	-	-	-	-	- Other		-	-	-	-
- KCL	kg	50.00	50.00	15.00	15.00						
- ZA	kg	-	-	-	-	Labour breakdown					
- Other	kg	-	-	-	-	- Land preparation	workday	10.00	15.00	15.00	18.00
- FYM	kg	-	-	-	-	- Seedbed preparation	workday	1.00	1.00	-	-
Agrochemicals:						- Seed planting	workday	4.00	4.00	4.00	4.00
- Fungicide	ls	-	-	-	-	- Transplanting	workday	20.00	30.00	-	-
- Pesticide	ls	9.00	10.00	8.00	8.00	- Fertiliser application	workday	7.60	7.60	2.50	2.50
- Herbicide	ls	-	-	-	-	- Agrochemical application	workday	5.50	6.00	4.00	4.00
- Rodenticide	ls	2.00	2.00	-	-	- Weeding	workday	20.00	25.00	10.00	12.00
Mechanisation:						- Irrigating	workday	5.00	5.00	3.00	3.00
- Draft power	ha	0.50	1.00	-	-	- Threshing	workday	-	-	-	-
- Tractor	ha	0.50	-	-	-	- Clearing	workday	-	-	-	-
- Thresher	tonne	-	-	-	-	- Processing	workday	-	-	3.00	3.00
- Sprayer	day	5.50	6.00	4.00	4.00	- Drying	workday	7.00	7.00	3.00	3.00
- Other	-	-	-	-	-	- Transporting	workday	-	-	1.20	1.20
Other physical inputs:						- Canal/bund maintenance	workday	2.00	2.00	2.00	2.00
- Bags/sacks	tonne	5.00	4.00	1.20	0.90	- Canal/bund construction	workday	-	-	-	-
- Equipment	ha	1.00	1.00	1.00	1.00	- Gotong Royong (O&M)	workday	3.00	3.00	2.00	2.00
- Private irrigation	application	-	-	-	-	- Other	workday	2.00	2.00	2.00	2.00
- Other	-	-	-	-	-	Total labour (excluding harvest)		87.10	107.60	51.70	51.70
Labour:											
- Male (non-harvest) hired	workday	5.00	7.50	7.50	7.50	Labour (equivalent)- harvesting	workday	83.33	52.17	14.40	14.40
- Male (non-harvest) family	workday	38.60	41.60	31.20	31.20	Total labour	workday	170.43	159.77	66.10	66.10
- Female (non-harvest) hired	workday	30.00	41.25	5.00	5.00						
- Female (non-harvest) family	workday	13.50	17.25	8.00	8.00	Harvester's share	l:	7.00	5.00	ns	ns
- Male (harvest) hired	workday	41.67	26.09	-	-	Seed purchasing frequency	no seasons	5.00	5.00	1.00	1.00
- Male (harvest) family	workday	-	-	7.20	7.20						
- Female (harvest) hired	workday	41.67	26.09	-	-	Sharecropping deal	%	50.00	50.00	50.00	50.00
- Female (harvest) family	workday	-	-	7.20	7.20						
Total		170	160	66	66						

Table A.1.8 Net Return of Irrigated Rice and Soybean

(unit: Rp.'000/ha)

Crop Irrigated/rairfed Yield form	Rice (H/V)							Soybean					
	Irrigated							Irrigated					
	GKG							Threshed bean					
Conditions	Favourable			Less favourable				Favourable			Less favourable		
	Unit	Units	Unit Value Rp.000	Total Rp.000	Units	Unit Value Rp.000	Total Rp.000	Units	Unit Value Rp.000	Total Rp.000	Units	Unit Value Rp.000	Total Rp.000
OUTPUTS													
Main product	kg	4,900.0	1.2	5,880.0	4,000.0	0.9	3,600.0	1,200.0	2.7	3,240.0	900.0	1.8	1,620.0
INPUTS													
Seeds/planting material	kg	30.0	1.8	52.6	35.0	1.5	51.2	40.0	6.1	243.0	40.0	2.7	108.0
Fertilisers:													
- Urea	kg	230.0	1.1	257.6	230.0	1.2	276.0	90.0	1.1	67.2	60.0	1.2	72.0
- TSP	kg	100.0	1.3	130.0	100.0	2.0	200.0	90.0	1.3	65.0	50.0	2.0	100.0
- DSP	kg	-	1.0	-	-	1.5	-	-	1.0	-	-	1.5	-
- KCL	kg	50.0	1.9	95.0	50.0	2.0	100.0	15.0	1.9	28.5	15.0	2.0	30.0
- ZA	kg	-	0.9	-	-	1.1	-	-	0.9	-	-	1.1	-
- Other	kg	-	-	-	-	-	-	-	-	-	-	-	-
- FYM	kg	-	-	-	-	-	-	-	-	-	-	-	-
Agrochemicals:													
- Fungicide	ls	-	10.0	-	-	12.0	-	-	10.0	-	-	12.0	-
- Pesticide	ls	9.0	10.0	90.0	10.0	12.0	120.0	8.0	10.0	80.0	8.0	12.0	96.0
- Herbicide	ls	-	10.0	-	-	12.0	-	-	10.0	-	-	12.0	-
- Rodenticide	ls	2.0	10.0	20.0	2.0	12.0	24.0	-	10.0	-	-	12.0	-
Mechanisation:													
- Draft power	ha	0.5	360.0	175.0	1.0	450.0	450.0	-	360.0	-	-	450.0	-
- Tractor	ha	0.5	250.0	125.0	-	360.0	-	-	250.0	-	-	360.0	-
- Thresher	ton	-	60.0	-	-	45.0	-	-	60.0	-	-	45.0	-
- Sprayer	day	5.5	5.0	27.5	6.0	5.0	30.0	4.0	5.0	20.0	4.0	5.0	20.0
- Other	-	-	-	-	-	-	-	-	-	-	-	-	-
Other physical inputs:													
- Bags/sacks	ton	5.0	1.0	5.0	4.0	1.0	4.0	1.2	1.0	1.2	1.2	1.0	1.2
- Equipment	ha	1.0	10.0	10.0	1.0	10.0	10.0	1.0	10.0	10.0	1.0	10.0	10.0
- Private irrigation	application	-	70.0	-	-	70.0	-	-	70.0	-	-	70.0	-
- Other	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total (a)				987.7			1,265.2			514.9			437.2
Labour:													
- Male (non-harvest) hired	day	5.0	10.0	50.0	7.5	14.0	105.0	7.5	10.0	75.0	7.5	14.0	105.0
- Male (non-harvest) family	day	38.6	10.0	386.0	41.6	14.0	582.4	31.2	10.0	312.0	31.2	14.0	436.8
- Female (non-harvest) hired	day	30.0	8.0	240.0	41.3	9.0	371.3	5.0	8.0	40.0	5.0	9.0	45.0
- Female (non-harvest) family	day	13.5	8.0	108.0	17.3	9.0	155.3	8.0	8.0	64.0	8.0	9.0	72.0
- Male (harvest) hired	day	41.7	10.0	416.7	26.1	14.0	365.2	-	10.0	-	-	14.0	-
- Male (harvest) family	day	-	10.0	-	-	15.0	-	7.2	10.0	72.0	7.2	15.0	108.0
- Female (harvest) hired	day	41.7	8.0	333.3	26.1	9.0	234.8	-	8.0	-	-	9.0	-
- Female (harvest) family	day	-	8.0	-	-	9.0	-	7.2	8.0	57.6	7.2	9.0	64.8
Sub-total (b)	day	170.4		1,534.0	199.8		1,813.9	66.1		620.6	66.1		831.6
Other:													
- Land tax	ha	1.0	25.0	25.0	1.0	25.0	25.0	0.5	25.0	12.5	0.5	25.0	12.5
- Tertiary water fee	ha	1.0	10.0	10.0	1.0	10.0	10.0	0.5	10.0	5.0	0.5	10.0	5.0
- Ulu-ulu charge	ha	1.0	20.0	20.0	1.0	20.0	20.0	0.5	20.0	10.0	0.5	20.0	10.0
- Other	-	-	-	-	-	-	-	-	-	-	-	-	-
Sub-total (c)				55.0			55.0			27.5			27.5
Total costs				2,576.7			3,134.1			1,163.0			1,296.3
Net revenue - all hired labour				3,303.3			465.9			2,077.0			323.7
Net revenue - part family labour				3,797.3			1,203.5			2,453.0			832.5
Net revenue - all family labour				4,837.3			2,279.8			2,897.6			1,165.3
Returns per work day/ha				28.4			14.3			40.8			17.5
Returns to share cropper (part family labour)				738.3			- 1,034.1			457.0			- 486.3

Table 4.2.5 Farm budgets. Typical irrigated small holding, per hectare. Rp '000. Year 2000.

1 Cropping - mixed, Conditions - favourable, Tenure - owner operator, Labour - part family, Intensity - high

Season	Crop	Cropping Intensity	Conditions Favourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	3,917	3,917	1.0	3,917	52
Second wet/First dry	HYV Rice	70%	3,917	2,742	1.0	2,742	36
	Soya	25%	2,453	613	1.0	613	13
Dry or Second dry	Soya	40%	2,453	981	1.0	981	21
Total		235%				8,254	123
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return				2.4%			

2 Cropping - mixed, Conditions - favourable, Tenure - owner operator, Labour - part family, Intensity - medium

Season	Crop	Cropping Intensity	Conditions Unfavourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	3,917	3,917	1.0	3,917	52
Second wet/First dry	HYV Rice	35%	3,917	1,371	1.0	1,371	18
	Soya	34%	2,453	834	1.0	834	18
Dry or Second dry	Soya	26%	2,453	638	1.0	638	14
Total		195%				6,760	102
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return				3.0%			

3 Cropping - mixed, Conditions - unfavourable, Tenure - owner operator, Labour - part family, Intensity - high

Season	Crop	Cropping Intensity	Conditions Unfavourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	1,204	1,204	1.0	1,204	59
Second wet/First dry	HYV Rice	70%	1,204	842	1.0	842	41
	Soya	25%	833	208	1.0	208	13
Dry or Second dry	Soya	40%	833	333	1.0	333	21
Total		235%				2,587	135
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return				7.7%			

4 Cropping - mixed, Conditions - unfavourable, Tenure - owner operator, Labour - part family, Intensity - medium

Season	Crop	Cropping Intensity	Conditions Unfavourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	1,204	1,204	1.0	1,204	59
Second wet/First dry	HYV Rice	35%	1,204	421	1.0	421	21
	Soya	34%	833	283	1.0	283	18
Dry or Second dry	Soya	26%	833	216	1.0	216	14
Total		195%				2,124	112
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return				9.4%			

continued. Farm budgets.

5 Cropping - mixed, Conditions - favourable, Tenure - share cropper, Labour - part family, Intensity - high

Season	Crop	Cropping Intensity	Conditions Favourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	798	798	1.0	798	52
Second wet/First dry	HYV Rice	70%	798	559	1.0	559	36
	Soya	25%	457	114	1.0	114	13
Dry or Second dry	Soya	40%	457	183	1.0	183	21
Total		235%				1,654	123
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						12.1%	

6 Cropping - mixed, Conditions - favourable, Tenure - share cropper, Labour - part family, Intensity - medium

Season	Crop	Cropping Intensity	Conditions Favourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	798	798	1.0	798	52
Second wet/First dry	HYV Rice	35%	798	279	1.0	279	18
	Soya	34%	457	155	1.0	155	18
Dry or Second dry	Soya	26%	457	119	1.0	119	14
Total		195%				1,352	102
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						14.8%	

7 Cropping - mixed, Conditions - unfavourable, Tenure - share cropper, Labour - part family, Intensity - high

Season	Crop	Cropping Intensity	Conditions Unfavourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	-1,034	-1,034	1.0	-1,034	59
Second wet/First dry	HYV Rice	70%	-1,034	-724	1.0	-724	41
	Soya	25%	-486	-122	1.0	-122	13
Dry or Second dry	Soya	40%	-486	-195	1.0	-195	21
Total		235%				-2,074	135
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						-9.6%	

8 Cropping - mixed, Conditions - unfavourable, Tenure - share cropper, Labour - part family, Intensity - medium

Season	Crop	Cropping Intensity	Conditions Unfavourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	-1,034	-1,034	1.0	-1,034	59
Second wet/First dry	HYV Rice	35%	-1,034	-362	1.0	-362	21
	Soya	34%	-486	-165	1.0	-165	18
Dry or Second dry	Soya	26%	-486	-126	1.0	-126	14
Total		195%				-1,688	112
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						-11.8%	

Farm budgets.

9 Cropping - rice dominant, Conditions - favourable, Tenure - owner operator, Labour - part family, Intensity - h

Season	Crop	Cropping Intensity	Conditions Favourable	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	3,917	3,917	1.0	3,917	52
Second wet/First dry	HYV Rice	85%	3,917	3,330	1.0	3,330	44
	Soya	10%	2,453	245	1.0	245	5
Dry or Second dry	Soya	40%	2,453	981	1.0	981	21
Total		235%				8,474	123
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						2.4%	

10 Cropping - rice dominant, Conditions - favourable, Tenure - owner operator, Labour - part family, Intensity - n

Season	Crop	Cropping Intensity	Conditions Unfavourabl	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	3,917	3,917	1.0	3,917	52
Second wet/First dry	HYV Rice	58%	3,917	2,272	1.0	2,272	30
	Soya	11%	2,453	270	1.0	270	6
Dry or Second dry	Soya	26%	2,453	638	1.0	638	14
Total		195%				7,097	102
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						2.8%	

11 Cropping - rice dominant, Conditions - unfavourable, Tenure - owner operator, Labour - part family, Intensity

Season	Crop	Cropping Intensity	Conditions Unfavourabl	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	1,204	1,204	1.0	1,204	59
Second wet/First dry	HYV Rice	85%	1,204	1,023	1.0	1,023	50
	Soya	10%	833	83	1.0	83	5
Dry or Second dry	Soya	40%	833	333	1.0	333	21
Total		235%				2,643	136
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						7.6%	

12 Cropping - rice dominant, Conditions - unfavourable, Tenure - owner operator, Labour - part family, Intensity

Season	Crop	Cropping Intensity	Conditions Unfavourabl	Net return/ha Rp'000/ha	Farm size ha	Net return Rp'000/farm	Family work days/yr
Wet	HYV Rice	100%	1,204	1,204	1.0	1,204	59
Second wet/First dry	HYV Rice	58%	1,204	698	1.0	698	34
	Soya	11%	833	92	1.0	92	6
Dry or Second dry	Soya	26%	833	216	1.0	216	14
Total		195%				2,210	113
O&M charge				Per ha/yr			
Total				200	1.0	200	
% of net return						9.1%	

Table A.1.10 Number of Land Holding Household by Size Controlled and Main Source of Income

Land Size Controlled		Size of land (ha)																		Total	
		< 0.05	0.09	0.14	0.19	0.24	0.49	0.74	0.99	1.24	1.49	1.99	2.99	3.99	4.99	7.49	9.99	14.99	15.00		>
Total Land Holding Farm Household		646,372	948,296	1,218,949	1,200,783	1,150,639	4,417,121	2,934,876	1,438,870	1,644,860	662,624	1,004,734	1,457,561	506,676	211,212	188,602	43,299	24,007	13,839	19,713,330	
Main Income Sources	Employment	Land holding farm household	174,756	410,376	697,397	781,764	804,141	3,436,578	2,467,749	1,253,291	1,425,859	581,772	892,731	1,274,297	446,876	183,335	160,388	37,049	19,394	10,940	15,038,893
		Other agriculture sector	34,941	26,401	22,885	17,492	14,378	53,473	42,109	19,039	33,226	10,012	18,766	35,106	15,402	6,764	8,484	1,454	1,117	674	361,745
		Mining / Quarrying	2,295	3,658	4,526	4,103	3,164	10,453	4,448	2,134	2,553	1,312	1,193	3,836	783	345	339	76	23	11	45,252
		Industry/handicraft	20,560	34,474	39,289	33,305	27,006	87,844	36,151	14,972	14,238	5,864	7,319	10,309	3,332	1,506	1,228	315	154	90	337,956
		Trade	69,972	95,967	100,093	86,505	74,561	210,325	97,136	36,921	39,212	13,916	18,642	27,224	9,421	5,171	5,062	1,234	1,139	911	893,432
		transport	12,820	11,482	13,002	11,518	8,607	23,965	11,437	3,940	4,297	1,528	2,768	3,338	1,125	497	423	122	103	96	111,068
		Services	10,999	14,751	14,520	12,795	10,658	32,115	18,708	7,106	8,695	2,979	4,539	6,286	2,026	959	876	184	149	55	148,400
		others	5,385	5,906	4,035	3,411	3,597	9,449	5,936	2,396	4,011	1,332	2,728	3,779	1,074	428	424	83	74	67	54,115
		Sub-total	331,728	603,015	895,747	950,893	946,112	3,864,204	2,683,674	1,339,819	1,532,091	618,715	948,686	1,364,175	480,039	199,005	177,444	40,517	22,153	12,844	17,010,861
	Share (%)	52.7%	68.1%	77.9%	82.2%	85.0%	88.9%	92.0%	93.5%	93.1%	94.0%	94.1%	93.4%	93.1%	92.1%	90.5%	91.4%	87.5%	85.2%	88.5%	
	Labour	Land holding farm household	162,192	155,939	141,052	101,828	78,575	185,936	71,189	25,593	29,594	13,002	14,843	27,282	7,421	3,246	3,164	892	343	157	1,022,248
		Other agriculture sector	16,047	14,223	11,585	8,853	7,279	23,857	13,511	5,053	7,849	2,998	3,888	6,622	1,651	850	803	70	51	38	125,228
		Mining / Quarrying	5,037	5,910	5,263	4,445	3,518	10,963	5,383	1,846	2,166	659	1,446	4,742	526	356	197	58	24	7	52,546
		Industry/handicraft	24,392	30,650	30,115	24,628	18,485	46,599	17,472	5,690	5,125	2,419	2,192	4,537	1,066	377	332	50	12		214,141
		Trade	5,074	6,527	5,271	4,673	3,833	10,149	2,913	1,076	1,042	361	460	702	242	93	48	101	11	11	42,587
		transport	10,576	11,427	12,290	9,382	7,592	19,758	9,442	2,947	3,737	1,101	1,642	2,327	663	245	131	33			93,493
		Services	56,796	72,519	73,858	61,563	55,428	168,881	87,734	37,477	41,987	16,367	21,924	30,970	10,569	4,956	4,618	914	696	270	747,527
		income Earner	18,947	25,798	23,101	17,273	16,112	51,631	27,899	13,484	14,623	4,626	7,027	10,857	3,262	1,532	1,636	633	597	500	289,538
		others	13,640	19,245	16,589	13,443	10,262	25,149	10,159	3,540	4,302	1,519	1,507	4,113	747	311	32	12	37	12	124,821
not answered		1,943	3,043	4,078	3,600	3,443	9,994	5,500	2,345	2,144	357	1,119	1,234	490	241	197	19	83		40,330	
Sub-total	314,644	345,281	323,202	249,890	204,527	552,917	251,202	99,051	112,769	43,909	56,048	93,386	26,637	12,207	11,158	2,782	1,854	995	2,702,459		
Share (%)	51.5%	45.2%	40.6%	40.7%	38.4%	33.6%	28.3%	25.8%	26.2%	29.6%	26.5%	29.2%	27.9%	26.6%	28.4%	32.1%	18.5%	15.8%	37.8%		

source: Agriculture census 1993, PES

Table A.2.1 Rice Production and Demand Model
(Constant CI and yield growth and land area; Java -20,000ha/year and Off Java +60,000ha/year)

Year	Yield		Cropping Intensity (CI)		Paddy Area		Total Production ('000ton)	Total Consumption ('000ton)	Balance ('000ton)
	Java (ton/ha)	Off-Java (ton/ha)	Java	Off-Java	Java ('000ha)	Off-Java ('000ha)			
1982	4.46	3.53	1.35	0.92	3,336	3,868	31,882,743	32,932,308	-1,049,565
1983	4.69	3.50	1.36	0.92	3,300	3,965	33,031,545	35,135,385	-2,103,840
1984	4.72	3.54	1.37	0.92	3,549	4,022	35,133,397	34,681,538	451,859
1985	4.73	3.57	1.37	0.93	3,630	4,040	35,825,355	36,161,538	-336,183
1986	4.75	3.60	1.38	0.93	3,621	4,342	36,981,744	37,963,077	-981,333
1987	4.89	3.61	1.38	0.94	3,531	4,729	38,600,696	38,686,154	-85,458
1988	5.00	3.70	1.39	0.94	3,496	4,657	39,402,987	40,423,077	-1,020,090
1989	5.13	3.79	1.39	0.94	3,668	4,781	41,814,890	38,893,846	2,921,044
1990	5.19	3.83	1.40	0.95	3,616	4,795	42,409,086	41,358,462	1,050,624
1991	5.27	3.88	1.41	0.96	3,438	4,795	42,122,232	41,661,538	460,694
1992	5.29	3.91	1.42	0.96	3,633	4,969	44,848,982	42,604,615	2,244,367
1993	5.31	3.91	1.42	0.96	3,638	5,068	45,135,825	43,538,462	1,597,363
1994	5.31	3.29	1.42	0.97	3,402	5,043	43,736,197	44,460,000	-723,803
1995	5.31	3.95	1.44	0.97	3,561	5,121	45,819,988	45,366,154	453,834
1996	5.36	3.99	1.45	0.98	3,532	5,212	46,571,590	46,258,462	313,128
1997	5.24	3.90	1.40	0.91	3,644	5,234	44,326,607	47,133,846	-2,807,239
1998	5.23	3.70	1.37	0.86	3,623	5,298	42,091,672	47,990,769	-5,899,097
1999	5.35	3.90	1.45	0.98	3,603	5,313	48,863,745	48,821,538	42,207
2000	5.38	3.94	1.47	1.01	3,582	5,357	48,492,350	49,627,692	-1,135,342
2001	5.40	3.99	1.49	1.01	3,562	5,411	49,888,887	50,420,000	-531,113
2002	5.43	4.03	1.51	1.02	3,541	5,470	49,005,177	51,196,923	-2,191,746
2003	5.47	4.07	1.53	1.02	3,521	5,530	52,274,354	51,950,769	323,585
2004	5.47	4.12	1.54	1.03	3,501	5,589	50,598,663	52,681,538	-2,082,875
2005	5.48	4.16	1.56	1.04	3,481	5,648	53,808,608	53,389,231	419,377
2006	5.47	4.21	1.58	1.04	3,461	5,708	53,342,268	54,069,231	-726,963
2007	5.48	4.26	1.59	1.05	3,442	5,767	53,467,770	54,718,462	-1,250,692
2008	5.49	4.30	1.60	1.05	3,422	5,827	55,836,166	55,338,462	497,704
2009	5.50	4.35	1.61	1.06	3,403	5,886	55,854,741	55,915,385	-60,644
2010	5.51	4.40	1.62	1.07	3,383	5,945	54,809,197	56,453,846	-1,644,649
2011	5.54	4.45	1.62	1.07	3,364	6,005	57,246,536	56,956,923	289,613
2012	5.58	4.50	1.63	1.08	3,345	6,064	58,889,976	57,418,462	1,471,514
2013	5.62	4.55	1.64	1.09	3,326	6,124	57,482,811	57,841,538	-358,727
2014	5.65	4.60	1.65	1.09	3,307	6,183	58,399,932	58,212,308	187,624
2015	5.69	4.65	1.66	1.10	3,288	6,242	58,373,522	58,538,462	-164,940
2016	5.73	4.70	1.66	1.11	3,269	6,302	60,891,298	58,818,462	2,072,836
2017	5.76	4.72	1.67	1.11	3,250	6,361	62,884,832	59,050,769	3,834,063
2018	5.79	4.76	1.68	1.12	3,232	6,421	61,923,133	59,235,385	2,687,748
2019	5.81	4.79	1.69	1.13	3,213	6,480	62,376,598	59,375,385	3,001,213
2020	5.84	4.83	1.70	1.13	3,195	6,539	62,981,755	59,463,077	3,518,678

Source: Assessment of Options for Sustainable Irrigation Development in Indonesia (ADB TA.2679-INO), Final Report Vol.III, Dec.1998

Table A.2.2 Food Consumption in Indonesia

(kg/cap/year)

Year	Rice	Wheat	Maize	Soy-beans	Root Crops	Vegetables	Fruits	Meat	Milk	Eggs	Fish
1983	127.4	10.6	25.1	4.3	72.9	14.9	26.1	5.3	7.8	1.6	13.0
1984	129.6	8.4	25.9	6.5	73.0	16.0	28.8	5.7	7.3	1.8	13.3
1985	137.3	7.6	20.7	6.5	72.6	17.6	26.6	6.0	5.5	1.8	13.5
1986	131.3	9.1	28.0	7.7	72.1	20.5	30.1	6.4	5.2	2.1	13.8
1987	139.8	9.4	23.7	6.9	66.2	21.2	28.2	6.5	5.1	2.1	14.0
1988	142.7	8.6	29.6	7.7	67.5	20.2	28.2	6.8	5.0	2.2	14.6
1989	145.9	9.9	25.9	7.6	64.6	22.2	24.1	7.3	4.0	2.2	15.0
1990	147.4	9.3	28.4	8.6	57.8	22.0	28.5	7.8	3.9	2.1	14.7
1991	146.0	12.1	27.5	10.0	66.0	20.9	28.6	8.3	4.7	2.2	15.4
1992	145.5	13.1	29.3	11.2	69.9	23.3	27.9	8.9	5.4	2.4	15.8
1993	147.1	13.3	31.0	10.4	67.7	22.7	27.3	9.5	5.3	2.3	16.2
1994	146.8	16.8	32.3	10.7	66.2	24.0	29.7	10.1	6.1	2.8	17.0
1995	146.3	21.2	37.4	10.4	70.1	26.3	42.7	9.8	7.4	3.0	17.3
1996	146.7	20.3	38.8	10.5	74.9	27.1	34.7	10.3	6.4	3.1	18.2
1997	148.7	17.5	38.1	9.0	69.7	24.0	36.4	10.4	6.2	3.1	18.1
1998	149.3	16.5	37.0	7.3	67.7	23.4	33.6	9.1	5.4	2.0	17.9

(Source) FAO Statistics

Table A.2.3 Projection of Rice Demand in Indonesia (1998- 2020)

Year	Population (000')	4% of Economic Growth						5% of Economic Growth					
		Per Capita Consumption (kg/year)	Team Estimation		ADB Estimation		Per Capita Consumption (kg/year)	Team Estimation		ADB Estimation			
			Milled Rice (ton)	Paddy (ton)	Milled Rice (ton)	Paddy (ton)		Milled Rice (ton)	Paddy (ton)				
1998	204,423	152.6	31,195	47,992	31,194	47,991	152.6	31,195	47,992	31,194	47,991		
1999	207,440	152.9	31,712	48,788	31,734	48,822	152.7	31,680	48,738	31,734	48,822		
2000	210,439	153.1	32,209	49,552	32,258	49,628	152.7	32,144	49,452	32,258	49,628		
2001	213,424	153.2	32,687	50,287	32,773	50,420	152.7	32,588	50,136	32,773	50,420		
2002	216,399	153.2	33,146	50,993	33,278	51,197	152.6	33,014	50,790	33,278	51,197		
2003	219,351	153.1	33,584	51,668	33,768	51,951	152.4	33,418	51,413	33,768	51,951		
2004	222,273	153.0	34,002	52,311	34,243	52,682	152.1	33,801	52,001	34,243	52,682		
2005	225,159	152.8	34,399	52,922	34,703	53,389	151.7	34,161	52,555	34,703	53,389		
2006	228,005	152.5	34,774	53,499	35,145	54,069	151.3	34,498	53,074	35,145	54,069		
2007	230,808	152.2	35,128	54,043	35,567	54,718	150.8	34,812	53,557	35,567	54,718		
2008	233,569	151.8	35,462	54,557	35,970	55,338	150.3	35,103	54,005	35,970	55,338		
2009	236,283	151.4	35,775	55,039	36,345	55,915	149.7	35,372	54,418	36,345	55,915		
2010	238,949	150.9	36,068	55,490	36,695	56,454	149.1	35,618	54,797	36,695	56,454		
2011	241,563	150.4	36,342	55,912	37,022	56,957	148.4	35,842	55,141	37,022	56,957		
2012	244,123	149.9	36,598	56,304	37,322	57,418	147.6	36,043	55,451	37,322	57,418		
2013	246,628	149.4	36,835	56,669	37,597	57,842	146.9	36,223	55,727	37,597	57,842		
2014	249,074	148.8	37,055	57,007	37,838	58,212	146.1	36,381	55,970	37,838	58,212		
2015	251,461	148.2	37,258	57,320	38,050	58,538	145.2	36,518	56,182	38,050	58,538		
2016	253,784	147.5	37,446	57,609	38,232	58,818	144.4	36,635	56,361	38,232	58,818		
2017	256,043	146.9	37,619	57,875	38,383	59,051	143.5	36,732	56,510	38,383	59,051		
2018	258,234	146.3	37,778	58,119	38,503	59,235	142.5	36,809	56,630	38,503	59,235		
2019	260,357	145.7	37,924	58,345	38,594	59,375	141.6	36,868	56,720	38,594	59,375		
2020	262,408	145.0	38,059	58,552	38,651	59,463	140.7	36,909	56,784	38,651	59,463		

Source: JICA Study Team's Estimation

Table A.2.4 Quality Specification and Floor Price of Paddy

Specifications (upper limit)	GJP	GKS	GKG
	Un-cleaned & -dried	Half-cleaned & -dried	Well-cleaned & -dried
Moisture Contents (%)	25	18	14
Foreign Matters (%)	10	6	3
Green/Chalky Kernels (%)	10	7	5
Yellow/Damaged Kernels (%)	3	3	3
Red Kernel (%)	3	3	3
Floor Price (Rp/kg)			
Zone I	1,020	1,200	1,400
Zone II	1,060	1,240	1,450
Zone III	1,095	1,285	1,500

Source: BULOG

Table A.2.5 Floor Price of Rice

Year	Base Price (Rp/kg)	Actual Buying Price (Rp/kg)				Date of Announcement	Date in effect	
		Paddy		White Rice				
		KUD	non-KUD	KUD	non-KUD			
1993	340	356	351	551	545	22/10/92	01/01/93	
1994	360	376	371	592	586	13/10/93	01/01/94	
1995	400	416	411	657	652	06/10/94	01/01/95	
1996	450	466	460	738	730	07/02/96	01/01/96	
1997	525	541	535	856	848	24/01/97	24/01/97	
1998	600	616	610	971	961	29/01/98	29/01/98	
1998	700	716	710	1,125	1,115	13/04/98	01/04/98	
1998	1,000	1,016	1,010	1,660	1,650	10/07/98	01/06/98	
1998				2,400	2,390	15/09/98	15/09/98	
1998	(Zone-I)	1,400	1,419	1,410	2,310	2,295	31/12/98	01/12/98
	(Zone-II)	1,450	1,469	1,460	2,390	2,375		
	(Zone-III)	1,500	1,519	1,510	2,470	2,455		

Source: BULOG

Notes: Zone I : Java island, Bali, NTB, S.Sulawesi, N.Sulawesi and S.E Sulawesi

Zone II : Sumatra island

Zone III : others

Table A.3.1 Outline of Agricultural Conditions in Five Study Provinces (1/3)

Province	Agricultural Sector	Food Crop Production	Farming in Irrigated Area
West Sumatra	a The GDP share of agricultural sector (agriculture, fishery and forestry) is 22.5% (1998). The share of the sector is almost same to the share of mining + manufacturing sector. The share is stable in recent years even after economic crisis.	a Rice is highly dominant crop among the food crops. Rice harvested area occupies 84.3% of total major food crop harvested area (1998). Palawija and vegetable production is not so popular among farmers.	a Percentage of paddy field irrigated is 65.5% (1999). However, rice grows well whole year in some areas even in rainfed area because of a favorable annual rainfall pattern.
	b In terms of labor force, agricultural sector has a share of 45.3% of the total. This share is almost equal to the share of service (other than agriculture, mining and manufacturing) sector (1999).	b Harvested area of rice (mainly wetland paddy) has increased by about 25% in last 15 years. Increase a land utilization efficiency has mainly contributed to the increase. However, the increase in last 5 years is not so favorable.	b The average productivity of wetland rice is 4.46 ton/ha (1998). It is higher than the average of Indonesia and close to the average of Java island. However, the productivity has slightly decreased after 1998.
	c Since 1990, the labor share of agriculture sector has decreased by 17.0%. The number of labors in the sector has also decreased by around 125,000.	c Harvested area of palawija and vegetables tends to increase since last 15 years. Among palawija, the harvested area of maize and soybeans has significantly increased in last 15 years.	c In most irrigated area, farmers are highly depend on rice and it is continuously planted whole year (2 - 2.5 times/year). Rice has also no particular cropping season.
	d Agricultural production land (paddy field, dryland and estate land) occupies 56.6% of the total land. Also wood land occupies 30.6% (1997).	d The palawija crops are planted mostly in dryland area (shifting cultivation is still widely observed in hill area). It is not common that they are planted in paddy field in dry season as a substitute for rice.	
	e Food crops sub-sector occupies 57.8% of agriculture sector GDP. Estate crops sub-sector has a substantial share, 14.8% (1997).	e Productivity of most food crops has increased since last 15 years.	
	f Estate crops mainly consist of perennial crops such as rubber, coconuts, coffee, etc.	f The increase of productivity of rice, maize and soybeans has highly contributed the increase of food production.	
	g Population density, 107 person/km ² , is not so high in compare to Java Island. Average size of agricultural production land is estimated at 2.63ha/household (paddy field 0.52ha, dryland 0.97ha, estate crop land 1.14ha).	g Because of a favorable annual rainfall pattern, there is not particular cropping season for many crops.	
	West Java	a The GDP share of agricultural sector is 16.1% (1998) only. The share of agriculture sector is less than a half of the share of manufacturing sector.	a Rice is highly dominant crop among the food crops. Rice harvested area occupies 76.2% of total major food crop harvested area (1998).
b The share of agriculture sector tends to decrease continuously in recent years in contrast with the manufacturing sector. However, the share rebounded by 1.5% in 1998.		b Paddy field area is bigger than dryland area only in West Java among 5 provinces.	b The average productivity of wetland rice is 4.77 ton/ha (1998). The productivity has significantly decreased after 1998, after economic crisis. It is supposed that farmers started to plant rice even in a marginal area after economic crisis (No more suitable land).
c In terms of labor force, agricultural sector has a share of only 30.3% of the total (1999).		c Even West Java is the biggest production center in vegetable crops, the percentage of harvested area occupies only 7.1% of total major food crop harvested area (1998).	c In irrigated area, farmers commonly grow rice twice in a year. Triple or 2.5 times cropping per year is not common.
d Since 1990, the labor share of agriculture sector has decreased by 13.5%. The number of labors in the sector has also decreased by around 463,000, even though the number increased by around 1 million after the economic crisis in 1997.		d Harvested area of rice (mainly wetland paddy) has increased by about 7% in last 15 years. Increase a land utilization efficiency has contributed to the increase. However, the increase in last 10 years is not so favorable.	d In most irrigated area, farmers are highly depend on rice and crop diversification is poor.
e Agricultural production land occupies 74.1% of the total land. Wood land occupies 4.9% only (1997).		e Harvested area of palawija tends to decrease since last 15 years, besides the area of vegetables tends to increase.	
f Land occupancy percentage of paddy field is continuously decreasing year by year even in a small ratio. On the contrary, the percentage of housing compounds is increasing.		f The palawija crops are planted mostly in dryland area (There are 2 major crop seasons in a year). It is not so common that they, except soybeans are planted in paddy field in dry season as a substitute for rice.	
g The agricultural production in terms of value highly depends on food crops (79.6% in 1998)		g Productivity of most food crops has increased since last 15 years.	
h Population density is very high, 980 persons/km ² . Average size of agricultural production land is estimated at 0.60ha/household (paddy field 0.27ha, dryland 0.24ha, estate crop land 0.09ha).			

Table A.3.1 Outline of Agricultural Conditions in Five Study Provinces (2/3)

Province	Agricultural Sector	Food Crop Production	Farming in Irrigated Area
Yog Yakarta	a The GDP share of agricultural sector is 19.1% only (1998). However, the share of agriculture sector is higher than the share of manufacturing sector.	a Palawija harvested area occupies 60.1% of total major food crop harvested area. Rice occupies 37.1% of them (1998).	a Percentage of paddy field irrigated is 82.1% (1999). However, palawija crops are planted in the second crop season in many areas even in irrigated area.
	b The share is stable in recent years (However, the share increased by 1% in 1998).	b Rice harvested area tends to decrease even in small ratio. However, the total production of rice is stable because of the increased productivity.	b In the latter dry season (Jul - Sep), many area are in fallow.
	c In terms of labor force, agricultural sector has a share of only 29.8% of the total (1999).	c Palawija harvested area is stable in recent years. Only vegetables increase its harvested area among food crops.	c The average productivity of wetland rice is 5.16 ton/ha (1998). The productivity has decreased after 1998, as same as West Java.
	d Since 1990, the labor share of agriculture sector has decreased by 18.8%. The number of labors in the sector has also decreased by around 273,000.	d The increase of productivity of palawija crops has contributed the increase of their production.	d The followings are common cropping pattern in irrigated area. Rice - Rice Rice - Soybeans or Groundnuts
	e Agricultural production land occupies 62.8% of the total land.	e The palawija crops are planted in dryland in main rainy season. They, commonly soybeans and groundnuts are also planted in paddy field in dry season as a substitute for rice.	
	f Land occupancy percentages of paddy field and dry land are stable in recent years. The percentage of wood land has significantly increased (however, only 6.3% in 1997) in contrast with the decrease of estate crop area since last 15 years.		
	g The agricultural production in terms of value highly depends on food crops (85.0% in 1998).		
	h Population density is too high, 958 persons/km ² . Average size of agricultural production land is estimated at 0.43ha/household (paddy field 0.15ha, dryland 0.28ha, estate crop land 0.00ha).		
East Java	a The GDP share of agricultural sector is 20.9% only (1998).	a Palawija harvested area occupies 53.7% of total major food crop harvested area. Rice occupies 43.3% of them (1998).	a Percentage of paddy field irrigated is 76.3% (1999). However, palawija crops, mainly soybeans and groundnuts are planted after main crop (rainy) season in many areas even in irrigated area.
	b The share of agriculture sector tends to decrease continuously in recent years in contrast with the manufacturing sector. However, the share rebounded by 2.0% in 1998.	b Rice harvested area has increased by about 12% in last 15 years even paddy field area is decreasing. Total production of rice is also increasing.	b Even in the latter dry season (Jul - Sep), still many food crops and sometimes tobacco are observed in irrigated area. Land use intensity is high.
	c In terms of labor force, agricultural sector has a share of 44.0% of the total (1999).	c Palawija harvested area tends to decrease, on the contrary. Vegetables have increased their harvested area since last 15 years, even its harvested area is stable in recent years.	c The average productivity of wetland rice is 5.20 ton/ha (1998). The productivity has slightly decreased after 1998.
	d Since 1990, the labor share of agriculture sector has decreased by 12.7%. The number of labors in the sector has also decreased by around 1,273,000, even though the number increased by around 925,000 after the economic crisis in 1997.	d Among the palawija crops, maize and soybeans increased production mainly due to increase of their productivity. Tuber crops decreased production due to decrease of their harvested area.	d The following various cropping patterns are commonly observed in irrigated area. Rice - Rice - Palawija Rice - Palawija - Palawija Rice - Rice - Rice Rice - Palawija Rice - Rice
	e Agricultural production land occupies 77.1% of the total area. Wood land occupies 1.6%, the worst among 5 provinces, only (1997).	e Productivity of major food crops has increased since last 15 years.	
	f Land occupancy percentage of paddy field and dryland is continuously decreasing year by year even in a small ratio. On the contrary, the percentage of housing compounds is increasing.	f The palawija crops are planted in dryland in main rainy season, as well as in paddy field in dry season as a substitute for rice.	
	g Food crops sub-sector occupies 61.2% of agriculture sector GDP. Estate crops sub-sector has a substantial share, 19.9% (1997).		
	h Estate crops mainly consist of sugarcane and tobacco. They grow in dry land and paddy field, too.		
	i Population density is too high, 734 persons/km ² . Average size of agricultural production land is estimated at 0.60ha/household (paddy field 0.25ha, dryland 0.35ha, estate crop land 0.00ha).		

Table A.3.1 Outline of Agricultural Conditions in Five Study Provinces (3/3)

Province	Agricultural Sector	Food Crop Production	Farming in Irrigated Area
NTB	a The GDP share of agricultural sector is 43.6% (1998). Agriculture sector has still higher share. So, per capita income is the smallest among 5 provinces, less than a half of national average.	a Rice harvested area occupies 59.6% of total major food crop harvested area. Palawija occupies 36.4% of them (1998).	a Percentage of paddy field irrigated is 79.2% (1999). However, palawija crops are planted after main crop (rainy) season in many areas even in irrigated area.
	b The share of agriculture sector tends to decrease in recent years. However, the share rebounded by 1.4% in 1998.	b Rice harvested area has increased by about 72% in last 15 years even paddy field area is not so increased. Land use intensity has been improved by developing irrigation facilities.	b Even in the latter dry season (Jul - Sep), still many food crops and sometimes tobacco are observed in irrigated area. Land use intensity is high.
	c In terms of labor force, agricultural sector has a share of 47.4% of the total (1999).	c Though palawija harvested area has also increased significantly last 15 years, the harvested area tends to decrease in recent years.	c The average productivity of wetland rice is 4.44 ton/ha (1998). It is equal to the average of Indonesia. The productivity has not changed much even after 1998.
	d Since 1990, the labor share of agriculture sector has decreased by 12.6%. The number of labors in the sector has also decreased by around 46,000. Influence of the economic crisis in 1997 seems to be negligible on labor force changes.	d Among the palawija crops, maize, ground nuts and soybeans increased production due to increase of their harvested area as well as productivity. On the contrary, tuber crops decreased production due to decrease of their harvested area.	d The followings are common cropping pattern in irrigated area. Rice - Rice - Soybeans or Groundnuts Rice - Rice - Rice Rice - Soybeans - Soybeans or Groundnuts Rice - Rice or Soybeans
	e Agricultural production land occupies 48.0% of the total land. Also wood land occupies 35.2% (1997).	e Productivity of major food crops has increased since last 15 years.	
	f Land occupancy of paddy field seems to be stable since 1990. The land occupancy of dryland and estate crop land tends to increase in last 15 years. The increase of estate crop area, even land occupancy percentage is very small, is remarkable in recent years.	f The palawija crops are planted in dryland in main rainy season, as well as in paddy field in dry season as a substitute for rice.	
	g Food crops sub-sector occupies 68.4% of agriculture sector GDP. Estate crops sub-sector has 9.9% of share (1997).		
	h Estate crops consist of various kind of crops. Coconut, cashew, tobacco, coffee and castor beans are major crops in terms of planted area.		
	i Population density is 195 persons/km ² . Average size of agricultural production land is estimated at 0.90ha/household (paddy field 0.39ha, dryland 0.44ha, estate crop land 0.07ha).		

Table A.3.2 Harvested Area and Production of Food Crops in West Sumatera

Harvested Area ('000 ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	324.7	341.5	366.6	384.8	411.7	376.3	398.3	411.0
Upland Rice	9.1	13.5	16.1	15.9	18.6	19.4	14.5	12.1
(Rice)	336.8	363.5	382.7	400.6	430.3	395.7	412.8	423.1
Maize	6.4	12.0	15.8	20.6	23.7	20.8	29.1	26.1
Cassava	6.7	11.1	7.9	7.0	8.1	7.8	7.5	8.9
Sweet Potatoes	2.7	4.3	3.1	3.3	3.4	3.2	3.5	3.8
Groundnuts	6.8	11.8	9.6	10.3	10.0	9.3	8.4	8.1
Soybeans	3.2	13.9	13.2	12.1	11.6	8.4	7.7	10.2
(Palawija)	25.9	53.0	49.6	53.3	56.8	49.5	56.2	57.1
Vegetables	5.0	9.0	7.5	8.3	10.4	8.7	7.2	6.8
(Total)	367.7	425.5	439.8	462.2	497.5	454.0	476.2	487.0

Production ('000 ton)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	1,335.4	1,543.6	1,709.7	1,794.5	1,929.6	1,744.0	1,777.4	1,828.3
Upland Rice	18.4	30.7	37.8	34.7	41.6	43.7	30.2	27.2
(Rice)	1,353.8	1,574.3	1,747.5	1,829.2	1,971.2	1,787.7	1,807.6	1,855.6
Maize	11.0	28.1	36.1	48.1	53.4	47.0	65.7	60.8
Cassava	83.5	142.0	96.1	84.8	100.7	94.7	92.1	108.2
Sweet Potatoes	26.9	37.1	34.4	33.0	36.0	33.4	36.2	39.0
Groundnuts	6.8	10.3	9.5	9.8	10.7	10.0	8.8	8.8
Soybeans	2.6	11.6	12.6	13.4	13.1	10.1	8.9	12.5
Vegetables	53.7	87.0	126.5	130.9	168.1	131.9	142.3	139.5

Yield (ton/ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	4.08	4.52	4.66	4.66	4.69	4.63	4.46	4.45
Upland Rice	2.02	2.27	2.35	2.19	2.23	2.25	2.08	2.26
(Rice)	4.02	4.44	4.57	4.57	4.58	4.52	4.38	4.39
Maize	1.72	2.35	2.29	2.33	2.26	2.26	2.26	2.33
Cassava	12.40	12.80	12.10	12.20	12.40	12.20	12.20	12.20
Sweet Potatoes	9.80	8.60	11.20	10.00	10.70	10.30	10.40	10.30
Groundnuts	1.00	0.87	0.99	0.95	1.07	1.07	1.05	1.09
Soybeans	0.81	0.83	0.96	1.10	1.13	1.20	1.16	1.22

(Source) Statistik Indonesia, Central Bureau of Statistics Indonesia

(Note) Vegetables include shallots, spring onions, potatoes, cabbage, wintered green and Carrots only

Table A.3.3 Vegetable Harvested Area in West Sumatera

(unit/ha)					
Crops	1994	1995	1996	1997	1998
Shallot	2,413	2,922	3,542	3,404	1,443
Garlic	675	958	675	443	247
Onion Spring	652	721	652	714	596
Potatoes	2,017	1,722	1,764	1,584	1,250
Cabbage	2,076	2,331	2,076	2,340	3,076
Mustard	671	667	671	5,934	423
Cow Peas	1,493	1,716	1,559	1,384	1,461
Chili	7,753	8,087	8,244	7,289	6,612
Tomato	1,604	1,656	1,518	1,184	1,234
Egg Plant	892	1,133	977	920	932
Bean	498	699	791	612	725
Cucumber	1,019	980	864	965	987
Swamp Cabbage	363	515	473	390	309
Spinach	681	665	650	640	558
Others	909	366	227	119	261
Total	23,716	25,138	24,683	27,922	20,114

Source: Sumatra Barat Dalam Angka 1998, Statistic of West Sumatera Province

Table A.3.4 Harvested Area and Production of Food Crops in West Java

Harvested Area ('000 ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	1,850.2	1,973.7	1,814.8	1,976.2	1,957.7	1,879.5	2,008.2	2,012.1
Upland Rice	162.4	155.1	145.4	149.5	161.2	161.2	171.8	170.1
(Rice)	2,012.6	2,128.8	1,960.2	2,125.7	2,119.0	2,040.7	2,180.0	2,182.2
Maize	124.0	118.6	113.5	136.3	132.6	128.0	159.0	147.9
Cassava	192.8	172.1	162.3	144.1	141.9	127.8	129.0	148.8
Sweet Potatoes	45.0	48.8	38.3	44.9	37.7	34.9	40.7	39.2
Groundnuts	82.7	102.6	89.4	105.1	93.1	86.3	92.7	87.6
Soybeans	67.1	64.3	80.0	81.6	68.4	59.3	57.4	67.3
(Palawija)	511.7	506.4	483.4	512.0	473.7	436.3	478.8	490.8
Vegetables	49.1	61.4	84.5	78.4	81.3	65.5	82.8	75.8
(Total)	2,573.3	2,696.6	2,528.1	2,716.1	2,673.9	2,542.4	2,741.6	2,748.8

Production ('000 ton)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	8,196.3	9,925.2	9,502.0	10,350.7	10,342.7	9,958.6	9,381.8	9,590.8
Upland Rice	331.3	156.3	358.4	372.0	405.0	394.1	413.9	409.3
(Rice)	8,527.6	10,283.0	9,860.4	10,722.7	10,747.7	10,352.7	9,795.6	10,000.0
Maize	200.8	265.3	273.9	332.2	344.2	336.0	426.4	407.7
Cassava	2,082.4	2,203.2	1,850.2	1,700.3	1,816.5	1,648.9	1,650.9	1,839.3
Sweet Potatoes	396.4	492.7	417.4	489.3	407.3	380.1	443.7	427.8
Groundnuts	80.2	105.5	98.3	117.4	106.1	100.6	104.1	98.1
Soybeans	52.4	71.3	94.9	95.7	81.3	75.2	71.0	85.1
Vegetables	591.7	873.4	1,135.4	1,323.0	1,299.6	1,002.9	1,396.1	1,317.0

Yield (ton/ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	4.43	5.03	5.24	5.24	5.28	5.30	4.67	4.77
Upland Rice	2.04	2.31	2.46	2.49	2.51	2.44	2.41	2.41
(Rice)	4.24	4.83	5.03	5.04	5.07	5.07	4.49	4.46
Maize	1.62	2.24	2.41	2.44	2.60	2.63	2.68	2.76
Cassava	10.80	12.80	11.40	11.80	12.80	12.90	12.80	12.70
Sweet Potatoes	8.80	10.10	10.90	10.90	10.80	10.90	10.90	10.90
Groundnuts	0.97	1.03	1.10	1.12	1.14	1.17	1.12	1.12
Soybeans	0.78	1.11	1.19	1.17	1.19	1.27	1.24	1.26

(Source) Statistik Indonesia, Central Bureau of Statistics Indonesia

(Note) Vegetables include shallots, spring onions, potatoes, cabbage, watercress and Carrots only

Table A.3.5 Vegetable Harvested Area in West Java

Crops	(unit ha)				
	1994	1995	1996	1997	1998
Scallion	NA	12,575	14,297	12,617	13,862
Red Onion	NA	14,055	14,460	9,961	10,563
Potatoes	NA	19,113	17,399	11,418	21,994
Cabbage	NA	17,955	16,531	13,604	18,227
Chinese Radish	NA	516	233	187	319
Mustard greens	NA	13,336	14,493	13,391	13,676
Yard long bean	NA	31,585	28,522	25,463	26,096
Carrot	NA	4,672	4,889	4,385	4,972
French Beans	NA	7,257	7,690	7,881	8,719
Spinach	NA	5,843	5,552	5,396	5,808
Cucumber	NA	21,754	19,940	18,503	19,702
Chili	NA	26,802	22,583	20,631	19,185
Tomatoes	NA	10,826	11,399	9,642	10,510
Egg plant	NA	8,574	8,121	7,666	7,774
Pumpkin Chajota	NA	1,790	1,084	784	1,841
Swamp Cabbage	NA	6,713	5,832	7,125	5,333
Garlic	NA	977	572	330	309
Kidney Beans	NA	11,655	8,506	9,019	12,179
Total	0	215,998	173,346	178,003	201,069

Source: Jawa Barat Dalam Angka 1998, Statistic of West Java Province

Table A.3.6 Harvested Area and Production of Food Crops in DI. Yogyakarta

Harvested Area ('000 ha)

Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	109.8	101.6	97.6	97.5	100.1	98.0	102.0	95.0
Upland Rice	42.0	40.7	38.2	37.9	37.3	36.2	35.7	38.4
(Rice)	151.8	142.2	135.8	135.3	137.4	134.2	137.8	133.4
Maize	84.8	58.0	63.1	68.9	65.8	59.5	62.2	61.1
Cassava	57.5	58.0	59.9	58.5	58.4	58.2	53.6	59.8
Sweet Potatoes	1.2	1.2	0.8	0.9	0.8	0.7	0.9	0.7
Groundnuts	42.1	43.5	46.2	42.4	52.2	48.7	49.4	47.9
Soybeans	58.2	54.2	54.7	60.3	64.7	64.1	57.2	63.9
(Palawija)	243.8	215.0	224.7	231.0	241.9	231.2	223.2	233.5
Vegetables	0.9	0.8	2.1	2.7	3.2	3.8	3.4	3.4
(Total)	396.5	358.0	362.7	369.0	382.5	369.2	364.4	370.3

Production ('000 ton)

Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	550.4	540.6	542.1	541.9	562.0	550.9	526.2	489.8
Upland Rice	90.3	96.7	101.2	100.2	99.2	96.3	95.4	114.6
(Rice)	640.7	637.3	643.3	642.1	661.2	647.2	621.6	604.4
Maize	123.7	114.9	135.4	150.2	143.4	165.4	157.4	145.7
Cassava	604.0	713.8	586.7	584.9	695.5	692.1	648.6	717.6
Sweet Potatoes	9.3	12.8	8.5	9.7	8.8	8.2	8.6	7.7
Groundnuts	33.5	43.6	37.1	35.9	48.9	48.5	43.4	46.2
Soybeans	46.6	65.4	59.1	70.5	78.2	82.3	64.8	80.4
Vegetables	7.2	6.8	20.1	25.4	31.7	33.0	36.0	45.6

Yield (ton/ha)

Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	5.01	5.32	5.55	5.56	5.61	5.62	5.16	5.16
Upland Rice	2.15	2.38	2.65	2.65	2.66	2.66	2.67	2.99
(Rice)	4.22	4.48	4.74	4.74	4.81	4.82	4.51	4.53
Maize	1.46	1.98	2.14	2.18	2.18	2.78	2.53	2.38
Cassava	10.50	12.30	9.80	10.00	11.90	11.90	12.10	12.00
Sweet Potatoes	7.90	10.50	10.60	10.30	11.00	11.00	9.90	10.30
Groundnuts	0.79	1.00	0.80	0.85	0.94	1.00	0.88	0.97
Soybeans	0.80	1.21	1.08	1.17	1.21	1.28	1.13	1.26

(Source) Statistik Indonesia, Central Bureau of Statistics Indonesia

(Note) Vegetables include shallots, spring onions, potatoes, cabbage, mustard greens and Carrots only

Table A.3.7 Vegetable Harvested Area in Yogyakarta

(unit ha)

Crops	1994	1995	1996	1997	1998
Shallot	NA	NA	NA	NA	2,356
Garlic	NA	NA	NA	NA	31
Onion Spring	NA	NA	NA	NA	385
Mustard greens	NA	NA	NA	NA	495
Cabbage	NA	NA	NA	NA	102
Potatoes	NA	NA	NA	NA	48
String Beans	NA	NA	NA	NA	1,480
Chili	NA	NA	NA	NA	3,191
Tomatto	NA	NA	NA	NA	202
Egg Plant	NA	NA	NA	NA	326
Green Beans	NA	NA	NA	NA	109
Cucumber	NA	NA	NA	NA	316
Kidney beans	NA	NA	NA	NA	NA
Swamp	NA	NA	NA	NA	182
Spinach	NA	NA	NA	NA	1,121
Total	0	0	0	0	10,344

Source: Daerah Istimewa Yogyakarta Dalam Angka 1998, Statistik of Yogyakarta Province

Table A.3.8 Harvested Area and Production of Food Crops in East Java

Harvested Area ('000 ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	1,478.8	1,521.0	1,480.2	1,529.8	1,529.3	1,507.7	1,620.4	1,658.6
Upland Rice	85.5	91.6	96.9	97.5	92.7	97.8	96.8	92.7
(Rice)	1,564.3	1,612.5	1,577.1	1,627.3	1,622.1	1,605.5	1,717.2	1,751.2
Maize	1,304.2	1,112.4	1,117.9	1,187.2	1,269.5	1,099.6	1,348.5	1,135.2
Cassava	328.3	338.0	297.4	266.3	264.6	263.9	238.1	245.4
Sweet Potatoes	35.5	25.1	21.6	22.8	20.8	20.0	22.4	20.0
Groundnuts	139.7	142.2	148.8	150.5	151.2	147.1	147.4	157.6
Soybeans	336.4	396.6	427.0	416.0	417.0	414.9	374.2	397.8
(Palawija)	2,144.1	2,014.4	2,012.7	2,042.9	2,123.1	1,945.4	2,130.7	1,956.0
Vegetables	26.8	40.8	53.0	38.8	54.8	54.0	48.8	46.3
(Total)	3,735.2	3,667.7	3,642.8	3,709.1	3,799.9	3,605.0	3,896.7	3,753.5

Production ('000 ton)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	7,405.9	8,004.3	8,039.2	8,312.1	8,377.0	8,266.7	8,420.2	8,643.3
Upland Rice	187.7	228.8	257.2	260.6	251.7	267.1	271.3	290.4
(Rice)	7,593.6	8,233.2	8,296.3	8,572.7	8,628.8	8,533.8	8,691.5	8,933.7
Maize	2,382.8	2,498.5	2,636.0	2,820.9	3,417.5	3,048.0	3,765.1	3,177.6
Cassava	3,414.8	3,988.8	3,717.4	3,381.9	3,546.3	3,536.1	3,190.9	3,264.1
Sweet Potatoes	255.5	251.2	233.2	239.4	220.4	211.6	231.2	209.7
Groundnuts	134.7	142.5	139.4	145.1	161.4	158.6	152.7	160.7
Soybeans	325.9	459.3	493.6	487.2	509.1	511.5	457.3	484.5
Vegetables	206.4	423.8	468.8	406.1	641.9	548.2	546.8	562.9

Yield (ton/ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	5.01	5.26	5.43	5.43	5.48	5.48	5.20	5.21
Upland Rice	2.20	2.50	2.65	2.67	2.71	2.73	2.80	3.13
(Rice)	4.85	5.11	5.26	5.27	5.32	5.32	5.06	5.10
Maize	1.83	2.25	2.36	2.38	2.69	2.77	2.79	2.80
Cassava	10.40	11.80	12.50	12.70	13.40	13.40	13.40	13.30
Sweet Potatoes	7.20	10.00	10.80	10.50	10.60	10.60	10.30	10.50
Groundnuts	0.96	1.00	0.94	0.96	1.07	1.08	1.04	1.02
Soybeans	0.97	1.16	1.16	1.17	1.22	1.23	1.22	1.22

(Source) Statistik Indonesia, Central Bureau of Statistics Indonesia

(Note) Vegetables include shallots, spring onions, potatoes, cabbage, mustard green and Carrots only

Table A.3.9 Harvested Area and Production of Food Crops in NTB

Harvested Area ('000 ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	170.8	250.5	253.2	261.6	268.3	267.5	287.8	293.2
Upland Rice	18.5	17.1	17.9	21.1	25.9	27.2	29.5	31.0
(Rice)	251.1	267.6	271.1	282.7	294.2	294.7	317.3	324.2
Maize	31.7	26.6	27.8	29.6	34.6	36.1	40.0	34.9
Cassava	14.0	16.4	9.9	10.1	11.7	10.7	10.2	8.9
Sweet Potatoes	8.4	8.5	3.9	3.9	2.9	1.5	2.5	1.2
Groundnuts	9.7	19.0	22.5	24.5	24.7	23.3	22.2	20.7
Soybeans	59.1	118.3	132.0	134.6	131.7	118.0	118.8	112.2
(Palawija)	122.9	188.8	196.1	202.8	205.7	189.6	193.6	178.0
Vegetables	8.1	5.5	9.9	6.7	9.4	10.0	6.8	7.0
(Total)	382.2	461.9	477.1	492.2	509.3	494.3	517.7	509.1

Production ('000 ton)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	920.4	1,078.9	1,149.0	1,190.6	1,232.9	1,232.3	1,278.1	1,326.7
Upland Rice	31.7	31.7	38.5	45.2	58.3	62.2	66.7	70.4
(Rice)	952.1	1,110.6	1,187.5	1,235.9	1,291.1	1,294.5	1,344.7	1,397.1
Maize	51.3	48.3	51.6	52.2	65.5	70.7	77.4	68.7
Cassava	138.4	172.0	108.2	111.6	130.3	119.0	113.9	98.6
Sweet Potatoes	78.1	94.0	44.7	43.3	32.2	17.1	28.3	13.6
Groundnuts	10.0	21.0	24.1	25.7	26.3	25.4	23.9	22.2
Soybeans	51.2	127.5	130.3	136.8	135.2	122.3	124.3	114.8
Vegetables	29.0	32.2	65.8	43.3	40.6	34.9	39.5	51.2

Yield (ton/ha)								
Crops	1984	1989	1994	1995	1996	1997	1998	1999
Wetland Rice	3.96	4.31	4.54	4.55	4.60	4.61	4.44	4.53
Upland Rice	1.71	1.85	2.15	2.15	2.25	2.29	2.26	2.27
(Rice)	3.72	4.15	4.38	4.37	4.39	4.39	4.24	4.31
Maize	1.62	1.82	1.86	1.77	1.89	1.96	1.94	1.97
Cassava	9.90	10.50	10.90	11.00	11.10	11.10	11.20	11.10
Sweet Potatoes	9.30	11.10	11.50	11.00	11.10	11.20	11.20	10.90
Groundnuts	1.02	1.10	1.07	1.05	1.06	1.09	1.08	1.07
Soybeans	0.87	1.08	0.99	1.02	1.03	1.04	1.05	1.02

(Source) Statistik Indonesia, Central Bureau of Statistics Indonesia

(Note) Vegetables include shallots, spring onions, potatoes, cabbage, wintered peas and Carrots only

Table A.3.10 Vegetable Harvested Area in NTB

(unit ha)					
Crops	1994	1995	1996	1997	1998
Shallots	9,622	6,810	7,648	9,701	7,461
Garlic	2,208	2,895	1,845	2,690	2,024
Potatoes	2	13	24	53	91
Cabbage	180	306	239	280	194
Beans	3,357	1,650	1,459	NA	3,829
Chinese Cabbage	112	172	147	140	105
Tomatoes	672	780	960	3,068	3,246
Egg plant	354	397	416	1,698	1,391
Spinach	273	164	223	269	297
Radishes	NA	NA	NA	NA	NA
Pumpkin Chajota	64	NA	36,823	NA	NA
Swamp Cabbage	221	1,067	213	2,221	1,823
Chilli	5,931	8,966	7,959	32,478	36,823
Cucumber	934	1,129	1,062	1,275	1,211
Total	23,930	24,349	59,018	53,873	58,495

Source: Nusa Tenggara Barat Dalam Angka 1998, Statistic of Nusa Tenggara Barat Provi