

crops of paddy.

#### 4.3.3 Proposed Cropping Pattern and Cropping Area

Through the alternative study, cropping pattern of Type-B was proposed to be introduced in the Project area. The cropping areas of paddy and palawija under with project were decided through the study on optimum project scale, and are summarized as follow. Multi-cropping intensity is 229%. The proposed cropping pattern is presented in Figure A.6.11 with meteorological data.

	(Unit: ha)	
	Without Project	With Project
<b>Rainfed Paddy Field</b>		
Wet Season Paddy	7,220	-
Dry Season Paddy	-	-
Palawija and Vegetables*1	720	-
<b>Irrigated Paddy Field - Gravity</b>		
Wet Season Paddy	-	5,880
Dry Season Paddy	-	5,880
Palawija and Vegetables*1	-	1,680
<b>Irrigated Paddy Field - Pump</b>		
Wet Season Paddy	-	1,120
Dry Season Paddy*4	480	1,120
Palawija and Vegetables*1	-	320
<b>Total</b>	<b>8,580</b>	<b>16,000</b>
<b>Multi-Cropping Intensity</b>	<b>117%</b>	<b>229%</b>

\*1 Vegetables: 10% of total palawija area.

A land preparation period of one month is allowed for preparing of land for both of wet and dry season paddy, and 5 to 10 days for palawija and vegetable crops. The growing period for both of wet and dry season paddy is put at 85-100 days from transplanting to harvesting, following a nursery period of 20 days. Irrigation water is not required during the last two weeks of the growing period when the crop is in the ripening stage. Ninety days on an average are allowed for the palawija and vegetable crops from seeding to harvesting.

#### 4.4 Proposed Farming Practices and Farm Inputs

##### 4.4.1 Proposed Farming Practices

Proper farming practice is one of the essential factors for realizing full exploitation of agricultural potential in the Project area. The farming practices of paddy and palawija crops to be introduced in the area are proposed as follows.

##### (1) Paddy

Early maturing and high yielding varieties like PB 64, PB 66, Bengawan Solo and Ciliwung are proposed, which have been recommended by the Maros Research Station. The growing periods of these varieties are as follows.

##### Recommended Varieties of Paddy

Wet Season Paddy	Dry Season Paddy
- Bengawan Solo (105-110 days)	- Ciliwung (120 days)
- Ciliwung (120 days)	- PB64 (115 days)
- PB64 (115 days)	- PB66 (110-120 days)
- PB66 (110-120 days)	

The seed requirement is 30 kg per ha. Although the seed treatment is not commonly carried out at present, the paddy seeds to be used in the area will have to be the certificate seeds and be selected by using a solution of 1.13 specific gravity before pre-germination. The selected seeds will also have to be disinfected by using adequate seed disinfectant like Benrate. Pre-germination practice is recommendable for increasing the germination percentage.

The nursery has to be prepared as flat as possible. The size of nursery is about 1/20 of the paddy field to be transplanted. Fertilization to nursery bed is essential for healthy growth of seedlings. The recommendable dosage is 5 kg of urea. The nursery period is 20 days after seeding.

Ploughing is carried out by animal power, at least 10 days before transplanting. After ploughing, harrowing and puddling are required for land levelling. These works are generally carried out by using animal power. In the Project area, there exist sufficient number of cattle and buffaloes for these purposes, which is estimated to be 0.98 head per farm household at present<sup>9</sup>.

Transplanting is carried out by manual labour. The spacing of transplanting is set to be 25 x 15 cm<sup>10</sup> with 3 seedlings per hill, and planting depth of 2-3 cm is recommended. The soils of the Project area are generally poor in plant nutrient, especially nitrogen and phosphate. These chemical elements have to be supplemented by fertilizers. Considering the soil condition, the suitable fertilizers are urea, triple superphosphate (TSP) and potassium chloride (KCl). The total fertilizer requirement for sustaining the target yields would be 200 kg/ha of urea, 50 kg/ha of TSP and 50 kg/ha of KCl. The basic fertilizer application is 65 kg/ha of urea, 50 kg/ha of TSP and 50 kg/ha of KCl when field preparation is practiced. Top dressing is made in two times; i.e. at the initial tillering stage of about 15 days after transplanting, and at the spikelet differentiation stage corresponding to 20 days before heading. The amount of fertilizer to be applied per ha is about 65 kg of urea at each top dressing time. In the paddy fields, where the percentage of ripened grain is low, top-dressing with the same dosage of urea at the full heading stage is often quite effective.

For the control of insects and weeds, ecological control is recommended. In the proposed cropping pattern, 4 months of fallow period or palawija cultivation are set in the dry season from August to November (see Figure A.6.11). This pattern would bring a good results to control insects and weeds. Such long fallow and dry period is effective to cut life cycle of insects and control aquatic weeds.

At present, almost no herbicide has been sprayed by the farmers in the project area. Present weeding has been carried out by manual method and weeds have been eradicated completely by this method. It is proposed that this method is continued in the future. As the proposed practice, weeding is carried out manually 3 times after transplanting, depending on the condition of weed growth. For effective weeding, it is recommended that rotary weeder, namely "landak" being widely used in Java, is introduced in the area.

As for plant protection, application of some insecticides will be required for the control of brown plant hoppers, stem borers, etc. Considering life cycle of these insects, 1 lit./ha of insecticides is estimated to be sprayed during one cropping season. In addition, spraying of fungicides will also be recommended, if outbreak or appearance of diseases is shown in the area. For ratting, it is necessary to apply 0.5 kg/ha of rodenticides for each cropping season. These chemicals should be sprayed, when serious damage by pests, diseases and rats is estimated in the area. It is proposed that plant protection works should be carried out in a systematic way through the farmer's cooperatives. Individual protection is not recommended because insects and diseases are not limited to the individual farm plot which re-infected, unless protection is undertaken on as wide an area as possible.

<sup>9</sup> Excluding cow of 0.44 heads.

<sup>10</sup> Recommended planting space of BIMAS package program is 20 x 20 cm, but more wide space is recommended to the project area, considering the introduction of rotary weeder. Planting density is same with that BIMAS recommendation.

In selecting suitable insecticides and fungicide, chemical toxicity which directly or indirectly affects the human being should be taken into consideration. For enhancing the control of brown hoppers/locusts of paddy plants, fifty seven types of insecticides have been prohibited by the Presidential Decree No. 3 (November 5, 1986). The recommended insecticides are Applaud 10 WP (Buprofezin) for brown plant hoppers, and Furadan 3G, Dharmafur 3G and Curate 3G for stem borers. Mipcin 50 WP, Bassa 50 EC and Hopin 50 EC are proposed, if there is no Applaud 10 WP. Zink Phosphate and Clerat are recommended as rodenticides.

Proper water control is very important for paddy cultivation. There are periods in the live of the paddy plant in which water supply is critical, i.e., just after sowing time or transplanting time, the panicle initiation stage, reduction division stage and flowering stage. Careful water management is required particularly for the cultivation of dry season paddy.

Harvesting and threshing are carried out by manual labour. The harvested paddy is dried on the home yard or sun-drying floor. For the threshing, it is recommended the use of treadle thresher, instead of traditional hand threshing, because a lot of grains is presently lost by this method.

## (2) Mungbeans

High yielding varieties such as Walet, Parkit, Bakti, and No. 129 are proposed to the Project area. The land preparation is carried out by animal power, into two sessions of ploughing and harrowing required. Planting is made b manual labour with at spacing of 30 x 20 cm and sowing of 2 to 3 seeds per hole, which is drilled about 3cm deep with a 2cm diameter stick, is recommended. After the sowing, the holes are covered with soil. The seed requirement is 25 kg per ha.

The total fertilizer requirement for sustaining the target yield would be 50kg/ha of urea, 50 kg/ha of TSP and 50 kg/ha of KCl. These fertilizers are applied between holes at a depth of 5 cm. After planting, weeding should be carried out twice by hand or using tools such as a sickle, depending on the condition of weed growth. The use of herbicides is not recommended, because their cost is too expensive. As regards plant protection, two to three applications of insecticide are required during a crop season, amounting to 1 lit./ha, if necessary. Harvesting is carried out by manual labour when about 90% of the grains have turned brown. Harvested grains are dried on the floor for about 2 to 3 days or until the moisture content reaches about 14%.

## (3) Soybeans

High yielding variety of Berumur Sedang is recommended. The growing period of these varieties is from 2.5 to 3 months. Land preparation is assumed to be the same as for mung beans. Seeds will be dibbled by hand at a spacing of 40 x 15 cm, giving roughly 160,000 plant hills per hectare. Seed requirement is taken as 45 kg/ha.

Total fertilizer requirement is 50 kg/ha of urea, 100 kg/ha of TSP and 50kg/ha of KCl, and one broadcast application is recommended during land preparation. As for weeding, three sessions of hand weeding area recommended. For the plant protection, two to three insecticide sprayings are recommended using the same insecticides as discussed for mungbeans.

Harvesting will involve pulling the plants by hand, and the whole plants will then be dried in the sun. The beans will be threshed out by hand using flails. Finally the beans will be winnowed by hand ready for marketing as dry clean beans.

## (4) Groundnuts

High yield varieties such as Gajah, Macan, Banteng and Kijang are recommended generally with about 3 months growing period. Land preparation will be carried out by animal power in a similar method to that described for mungbeans. Seed is assumed to be dibbled by hand at a

spacing of 30 x 20 cm, giving roughly 160,000 plant hills per ha. Seed requirement is 60 kg/ha.

Total fertilizer requirements would be applied in one fertilizer application to be broadcast during land preparation. Two times of manual weeding and one to two spraying of insecticide are recommended. It is envisaged that harvesting would involve pulling up the plants by hand, bundling and transporting them to the homestead. The nuts would then be picked off by hand, dried and winnowed by hand, ready for marketing.

#### (5) Chillies (Large)

The land preparation consisting of each one time of ploughing, harrowing and furrowing is proposed to chilli cultivation. The introduction of setting practice is recommended. The rate of seeding is 0.4 kg/ha of planting area, and setting of seedling is carried out within one month after seeding. The space of seedling is 45 x 60 cm.

The application amount of fertilizer is estimated at 300 kg/ha of urea, 250 kg/ha of TSP, 250 kg/ha of KCl and 100 kg/ha of ZA (ammonium sulphate). In order to control overgrowth, the exhaustive split dressing is recommended, which consists of a basic dressing and 3 times of side dressing. The control of insects and diseases is the most important practice in the cultivation of chilli. The dosage for insecticides is estimated at 2.5 lit./ha, and spraying of fungicides is recommended, if it will appear the outbreak of diseases. Harvesting is carried out by manual labour.

### 4.4.2 Proposed Farm Inputs and Labour Requirement

#### (1) Proposed Farm Inputs

The proposed farm inputs and labour requirement under the future with project condition are summarized as follows.

Farm Inputs Requirement per Ha (With Project)

		Paddy		Mung-beans	Soy-beans	Ground-nuts	Chillies (Large)
		WS	DS				
1) Seed	(kg)	30	30	25	45	60	0.4
2) Fertilizers							
- Urea	(kg)	250	200	50	50	30	300
- TSP	(kg)	50	50	50	100	50	250
- KCl	(kg)	100	100	50	50	50	250
- ZA	(kg)	25	25	-	-	-	150
3) Agro-chemicals							
- Insecticides	(lit.)	1.0	1.0	1	1.5	1	2.5
- Herbicides	(lit.)	-	-	-	-	-	-
- Rodenticides	(kg)	0.5	0.5	-	-	-	-
4) Labour	(man-day)	103	103	67	83	97	285
- Family				43	54	59	200
- Hired				24	29	38	85
6) Animal Power	(day)	2.04	2.04	5.22	5.22	12.43	13.04
7) Mech. Power	(day)	2.03	2.03	-	-	-	-

Note: Proposed farm inputs were estimated on the basis of the recommendation of BIMAS package technology in 1994/1995 and 1995. (Rekomendasi, Paket Teknologi Tanaman Pangan Propinsi Sulawesi Selatan - MT 1994/1995 dan 1995, Tim Teknis BIMAS Propinsi Sulawesi Selatan, Agustus 1994)

These were basically designed on the basis of the recommendations of the Agricultural Services Office in Kab. Wajo and the BIMAS package technology in 1994/1995 and 1995. As for farm inputs and labour requirement under future without project condition, it is estimated that there would be no substantial changes and still remain at present level.

The supply of farm inputs to be required under the future with project would be supplied by the existing suppliers (PT. PUSRI and PT. PERTANI). The seeds would also be supplied through PT. PERTANI and existing extension system of the Government.

## (2) Labour Requirement

The result of labor balance study for farming under the proposed cropping pattern (future with project condition) is summarized as follows, and the details are shown in Table A.6.26. The family labour will be mainly used for all farm works throughout the year, and temporary labour (seasonal labour) will also be employed during the peak time in both harvesting seasons.

### Labour Balance Study for a Typical Farmer

(Unit: man/day/household)

	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
A	2.7	1.7	1.6	0.9	2.2	2.4	2.6	2.2	2.9	2.7	1.7	1.6	0.9	3.6	2.8	1.9	0.4	0.4	0.2	0.0	2.7	1.0	2.3	2.9
B	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1
C	0.4	1.4	1.5	2.2	0.9	0.7	0.5	0.9	0.2	0.4	1.4	1.5	2.2	-0.5	0.3	1.2	2.7	2.7	2.9	3.1	0.4	2.1	0.8	0.2

Remarks: A = Total peak labor requirement for farming per household.

B = Available labor force per a household

C = Labor balance

Note: (1) Holding size of a typical farmer = 2.27 ha. (2) Total workable day per a month = 24 days

As seen in the above table, labour shortage will occur in harvesting season in July, which is estimated to be 0.5 man/day/household. This shortage will be covered by the hired labour from the outside area. Almost all farmers in the Project area are now carrying out harvesting work under the contract base, even though they have enough family labors. In the harvesting season, a lot of contractors for harvesting coming from outside are working in the Project area.

## 4.5 Anticipated Crop Yields and Production

After completion of the Project, it is expected that unit yields of crops would increase considerably on account of adequate irrigation water supply and improved farming practices. The anticipated unit yields of crops under the future with project condition are estimated on the basis of the best judgement to actual yield record, experimental data and target yields of Repelita VI in South Sulawesi Province. These yield data are summarized as follows.

	Present Yields* <sup>1</sup>	South Sulawesi* <sup>2</sup>	Maros* <sup>3</sup>	* <sup>4</sup> Repelita VI	Anticipated Yield
Paddy	3.0	5.0	6.3 - 7.0	6.4	6.0
Mungbeans	0.8			1.5	1.5
Soybeans	0.9	1.2	1.3 - 2.4	1.5	1.5
Groundnuts	1.1	2.2		1.5	1.5
Chillies (Large)* <sup>5</sup>		3.9			3.0

\*1 Figures indicates the yields at present condition in the project area (Household Survey, JICA Study Team, 1994)

\*2 Present yields investigated by the Provincial Agricultural Service Office. Source: Laporan Analisa Usahatani Padi, Palawija dan Hortikultura 1993/94, Dinas Pertanian Tanaman Pangan, Propinsi Sulawesi Selatan.

\*3 Yields at experimental fields of the Maros Research Station. Source: Laporan Tahunan 1992/93, Balai Penelitian Tanaman Pangan Maros.

\*4 Target yields of Repelita-VI in 1998 in South Sulawesi Province. Source: Repelita-VI Propinsi Sulawesi Selatan, Dinas Pertanian Tanaman Pangan, Propinsi Sulawesi Selatan.

\*5 Dry pods

Based on the above data, a yield of 6 tons/ha for both wet and dry seasons can be anticipated under the future with project condition. As for palawija crops, the anticipated yields are estimated to be 1.5 tons/ha for mungbeans, soybeans and groundnuts, and 3.0 tons/ha for

vegetables (as chillies).

In order to achieve the anticipated unit yields, the optimum application of farm inputs must be required together with effective water supply. With the advance and extension of these conditions, the unit yields will increase gradually from the present level to the anticipated yield in the 5th year after completion of the Project. The annual crop production under the future with project condition is estimated by multiplying the anticipated unit yields with the future cropping areas is shown in the following table.

Crops	Area (ha)	Unit Yield (ton/ha)	Production (ton)
Paddy*1	14,000	6.0	84,000
Palawija*2	1,800	1.5	2,700
Vegetables (As Chillies)*3	200	3.0	600

\*1 Dry grain    \*2 Shelled    \*3 Dry pods

The yields of these crops under the future without project condition would be estimated to remain at present level.

#### 4.6 Crop Budget and Farm Budget

##### 4.6.1 Crop Budget

In order to grasp the profitability of proposed crops and total net production value under the future with project condition, crop budget analysis is made as shown below. The details are presented in Table A.6.27.

(Unit: Rp.1,000/ha)

Crops	Gross Income	Production Cost	Net Production Value
<u>Gravity Irrigation</u>			
1) Wet season	1,920	852	1,068
2) Dry season	1,920	838	1,082
3) Mung beans	1,035	453	582
4) Soybeans	1,425	584	841
5) Groundnuts	1,500	826	674
6) Vegetables (As chillies)	3,300	1,761	1,539
<u>Pump Irrigation</u>			
1) Wet season	1,920	924	996
2) Dry season	1,920	910	1,010
3) Mung beans	1,035	488	547
4) Soybeans	1,425	618	807
5) Groundnuts	1,500	861	639
6) Vegetables (As chillies)	3,300	1,795	1,505

Based on the above result, total net production value under the future with project condition is estimated to be Rp.16.4 billion, which increase over six (6) times as compared with that of present condition (Rp.2.5 billion).

	Harvested Area (ha)	Net Return per Ha (Rp.1,000/ha)	Net Production Value (Rp.Million)
<b>Gravity Irrigation</b>			
1) Wet season	5,880	1,068	6,280
2) Dry season	5,880	1,082	6,362
3) Palawija	1,510	699	1,055
4) Vegetables (Chillies)	170	1,539	262
<b>Pump Irrigation</b>			
1) Wet season	1,120	996	1,116
2) Dry season	1,120	1,010	1,131
3) Palawija	290	665	193
4) Vegetables (Chillies)	30	1,505	45
<b>Total</b>	<b>16,000</b>		<b>16,444</b>

#### 4.6.2 Farm Budget

After implementation of the irrigation facilities, year round irrigation would be provided to all farmers in the Project area, thereby, making possible an increase in yield and production of crops. As a result, a significant increase in farm income would be expected in the future with project condition. On the other hand, no substantial increase in farm income would be incurred in the future without project condition.

The typical farm budgets for the both future without and the with project conditions are analyzed as shown in Tables A.6.28 and are summarized as follows.

(Unit: Rp.1,000/ha)

	Without Project		With Project	
	Rainfed	Pump	Gravity	Pump
1) Gross Income	<u>3,037</u>	<u>5,840</u>	<u>10,199</u>	<u>10,199</u>
- Farm Income	2,624	5,427	9,904	9,904
- Off-Farm Income	237	237	119	119
- Others	176	176	176	176
2) Gross Outgoing	<u>2,804</u>	<u>4,348</u>	<u>6,336</u>	<u>6,663</u>
- Production Cost	1,564	3,108	4,477	4,804
- Living Expenses	1,240	1,240	1,859	1,859
3) Net Reserve	<u>233</u>	<u>1,492</u>	<u>3,863</u>	<u>3,536</u>

- Note: 1) It is assumed that living expense under with project increase 1.5 times from the present level.  
2) The average farm size under the future with project condition will decrease from 2.34 to 2.27 ha, because some farm lands will be converted into the right of way.

The farm incomes of farmers under the future with project condition would be expected to increase remarkably as compared with the future without project condition, and the net reserves would also be improved from Rp.230,000 (rainfed) to Rp.3,860,000 (gravity irrigation) on an average. The increase in net reserve will offer incentives to the farmers, and will enable them to pay the water charge, if it is imposed on the farmers.

#### 4.7 Marketing of Products

As far as paddy products are concerned, the existing processing and marketing facilities are fairly well arranged in South Sulawesi Province as well as in Kab. Wajo. Accordingly, the future agro-processing and marketing plans should be formulated within the frame of the

existing system which is managed mostly by the private sector.

### (1) Marketing of Paddy

The marketable surplus of crops produced in the Project area and these domestic demand to be expected in the whole country in 2003 are analyzed, in order to assess the marketability. The result of analyses is summarized as follows:

Item		2003
- Marketable surplus in the Project area	(ton)	80,100
Total paddy production		84,000
Population (3,100 household x 5.14 )		15,900
Per-capita consumption of paddy (220 kg)		
Total consumption in the area		3,500
Seeds and loses (10%)		400
- Surplus in South Sulawesi	(ton)	739,000
- Deficit in the whole country	(ton)	4,600,000
- Percentage of marketable surplus	(%)	1.7

The domestic demand of rice is estimated on the basis of JICA Study Team on Formulation of Irrigation Development Program in the Republic of Indonesia (see Table A.6.5). Unless the Government pays to effort such as extension of crop intensification programs and expansion of irrigation area through the newly implementing irrigation projects, the deficit of rice supply coming from the increase in domestic demand along with population growth is estimated at least 4.6 million tons in 2003. On the other hand, the marketable surplus of rice produced in the Project area in 2003 will expected to be about 80,000 tons which account for about 1.7 % of the rice deficit of the whole country. Considering the marketable surplus produced in the Bila and Langkeme projects which are now under the construction, the paddy produced in the Gilirang project area will be marketed in the country without problem.

### (2) Marketing of Palawija and Vegetables

The future expected surplus of palawija and vegetable crops will also be marketable through the existing marketing channels for paddy. The important subject to be involved in the agro-processing and marketing plans will be the quality improvement of the products at farmers level particularly for palawija and vegetables. It is expected that quality of palawija crops is improved after completion of the irrigation project with introduction of intensive extension activities.

### (3) Processing Facilities

About 84,000 tons of paddy will be produced in the Project area. Part of them will be milled within Kabupaten for local consumption and surplus will flow to the outside area by grain paddy. It seems that processing of paddy in the future is not serious problem. The present milling capacity for paddy in three Kecamatan (Majauleng, Sajoanging and Maniangpajo ) related to the project area and the Kabupaten was estimated as below. The details are shown in Table A.6.17.

	No. of Rice Mill (No.)	Milling Capacity per Day (t/day)	Work Days (day/year)	Total Milling Capacity (t/year)	Present Production (t)	Production in Project Area (t)	Total Production (t)
Three Kecamatan	174	609	292	178,000	174,000	84,000	258,000
Kabupaten Wajo	350	1,225	292	358,000	355,000	84,000	439,000



Assuming that working days for milling are 292 days (365 days x 80%) in a year, these existing milling facilities in 3 Kecamatans can mill about 178,000 tons of paddy. On the other hand, production of paddy under with project condition is expected to reach 258,000 tons in a year, which includes 84,000 tons in the Project area. Consequently, the present rice mills in the Kecamatans have insufficient capacity for milling paddy produced at the full development stage of the Project. Kabupaten Wajo has however 350 mills with a total capacity of 358,000 tons per a year. Those operation hours are estimated to be 7 hours/day. If they will extent it more 1-2 hours, it is possible to mill all products including paddy of the Project.

With regarding the storage facilities in 3 Kecamatans, although there are 186 warehouses which have storage capacity of about 68,900 tons in total, these storage facilities will be insufficient for store of marketable surplus to be produced in the area. The required storage capacity in and around the project area under future with project condition is analyzed as shown in the following table.

Under the future with project condition, existing warehouse can cover about 70% of total marketable surplus produced in three Kecamatans including project area. But it is not serious problem, because the existing warehouses in the whole Kabupaten have capacity to stock those surplus. However, some expansion and/or new construction of storage facilities would be required in or around the Project area. The sufficient storage facilities to meet the increase in crop production will be required not only for the purpose of its store but also for keeping a high quality of products and minimizing storage losses at the farmer's level. Such storage facilities will be expected to be possessed by KUD. Since the irrigation development would be afford a powerful incentive to farmers' cooperative movement in the area, many KUDs having warehouse will be established over the development area.

Present Storage Capacity Comparing with Required Storage Capacity

		Study Area	Kab. Wajo
1. Existing Storage Capacity	(ton)	68,900	130,500
2. Marketable Surplus			
a. Present wet season production	(ton)	149,500	305,300
b. Future wet season production without the Project	(ton)	21,700	21,700
c. Future wet season production with the Project	(ton)	42,000	42,000
d. Farm population	(prn)	72,600	269,500
e. Per capita consumption *1	(kg)	242	242
f. Total consumption (2d x 2e)	(ton)	17,600	65,200
g. Marketable surplus (2a+ 2c- 2b)	(ton)	152,200	260,400
3. Required Storage Capacity			
a. Marketable surplus	(ton)	152,200	260,400
b. Period for collection	(day)	45	60
c. Period for shipping	(day)	120	120
d. Required capacity *2	(ton)	95,100	130,200
4. Balance (1 - 3.d)	(ton)	26,200	310
(1 / 3.d x 100)	(%)	72.4	100.2

\*1: Including seeds and losses. Assumed that farmers keep their paddy for their annual home consumption including use for seeds and losses.

\*2:  $(3.a / 3.b) - (3.a / 3.c) \times 3.b$

#### 4.8 Agricultural Support Services

From the survey result, it can be said that institutional structure of supporting system for crop agriculture development is considerably well established in Kab. Wajo as well as in South Sulawesi Province. Under the BIMAS program, SUPRA INSUS, INSUS and INMUM have

been implemented in the project area. A total of three BPPs has also been organized in the project area to provide extension services to the farmers. Three KUDs are responsible for marketing of farm inputs and outputs, and BRI has various agricultural credits to meet borrowers' requirement.

From the above viewpoint, the agricultural supporting plan would be programmed within the present framework of institutional structure for the services. The followings are pointed out to improve and strengthen the supporting services in the project area, from the standpoint of sustainable project and further development on farmers' living and regional socio-economy.

#### 4.8.1 Extension Services

The Government has paid much efforts to agricultural extension activities, and the extension system is already established over the project area. In addition, the farmers in the project area have relatively high technique for crop cultivation. It will however requires some strengthening programmes to the existing extension activities, in order to make them more efficiently. Those are as follows:

- 1) PPLs in the area have not so much experience on irrigation farming, though they have those basic knowledge. It therefore requires to conduct training courses for PPLs, in order to enable them to carry out their duties effectively.
- 2) It would requires at least two or three demonstration farms in each village. BPP appoints several excellent farmers as demonstration farm, who cultivate crops with advanced and suitable practices, and demonstrate them to neighbouring farmers in the village. PPL always contacts them and provide technical and managing guidance with some farm inputs (recommended varieties).
- 3) As one of the activities, the extension office is now issuing various leaflets for advanced farming practices to the farmers, but contents of those leaflets have difficulty in farmers' understanding. It is proposed to issue leaflets mentioned more visually.
- 4) In order to make effective extension works and take a good and easy understanding of farmers for recommended practices, it is proposed to issue farming calendar which is mentioned visually as well as the leaflet. A sample of proposed farming calendar is presented in Figure A.6.12. The main proposed practices during the period from sowing to harvesting are mentioned in one paper with calendar, and important practices are mentioned visually by figures and tables. In order to simplify the practice adopted by the farmers, the units of quantity are indicated by bag and bottle, and figures of required quantity are mentioned by 0.2 to 0.5 ha indent. The farmers will paste this paper on wall and show every day with calendar. They cultivate crops according to the proposed practices mentioned visually on the paper. If farmers have questions on farming practices, PPL explains to them based on the calendar.
- 5) The Government is now implementing the extension by the use of radio and TV broadcasting. In addition, it is recommended to issue local newspaper or bulletin for agricultural extension to the farmers, which are issued weekly or bi-weekly. The main contents of these papers consist of articles on marketing and credits information, recommended practices and introduction of new varieties, water management news, homestead development news, cooperatives' activities, official notice from the Government Agency such as cultivation schedule decided by irrigation committee or Manre Sipulung<sup>11</sup>, farmers' living and medical news, and so on. All subscripts are written by easy word and simple sentence, because the papers are mainly for farmers.

<sup>11</sup> See 2.1.2 (4) in Annex 8.

At present, there are three BPPs which cover the project area, and these offices have almost no extension equipment and facilities. It is necessary to equip them to make effective extension activities. These are estimated as follows.

- a) Printing machine (electric stencil cutting machine and rotary mimeograph)
- b) Photo copy machine
- c) Overhead projector
- d) Video and TV set
- e) Motorcycle for each PPL to ensure adequate mobility and effectiveness of the services.
- f) Several pick-ups for transportation of seeds and farm inputs to be provided to the demonstration farmers.

The printing and photo copy machinery are for the preparation of leaflets, farming calendar and news paper. Each BPP prepares such handmade and original papers which connects closely with the local farming and living, and all PPLs would join to issue those papers. This would produce a good result to improve PPLs' moral more or less. Video and TV set is for the visual training to the farmers. At present, the Government has broadcasting TV programmes for agricultural extension. Those programmes are recorded by each BPP, and shown to the farmers at the training.

#### 4.8.2 Agricultural Cooperative

The present farm inputs supply and marketing of products are handled mainly by the private sector including PT. PUSRI, PT. PERTANI, traders/brokers, etc. It seems that they can also handle those marketing to meet with the new irrigation scheme in expansion of irrigation area. It is however recommended that KUD should play an important role to those marketing business, in order to increase farmers' benefit. The existing KUDs have to be expanded their business in order to provide better service for farmers in the Project area. In the initial stage, the cooperation business may concentrate their efforts on the service of supply and marketing. For instance, in cooperation with KUT credit system, KUD can take the charge of handling all the fertilizers and agro-chemicals needed in the Project area. On the harvesting season of crops, KUD may strengthen the purchasing and marketing commodities for the farmers.

With the realization of irrigation project, it is sure that crop production will be greatly increased and the requirement of input supply too. In order to meet such new situation, improvement of KUD facilities are also indispensable. It means that each KUD will have an adequate facilities such as warehouse and concrete drying court.

The full support of the members as well as the Government is needed to enable KUDs being become more viable organization for agricultural and rural development, and to make them being self-sustaining in business activities. The Government's support may be provided either through policy measures or in the form of financial help as subsidies or low-interest loans. However, government financial assistance to KUD should be given on annual decreasing basis to aim at self-sustaining. In addition, it is recommended to implement and adopt the following plans;

- 1) KUD are still weak in accounting transaction which is at the bottom of cooperative activities. It is necessary to implement training on accounting them intensively.
- 2) As on of the activation plan of KUD, it is proposed to involve young generation in the cooperative activities, who are successors of the farmers. It seems that they have relatively high education level than that of the old generations. They will gain various experiences for cooperative activities through their jobs, and it could be said that they are hopeful as the leaders for not only farmers' organization but also village community in near future.

- 3) It is recommended to establish one KUD in each Desa. At present, one KUD related to the Project area covers 5-6 Desas. In this case, the leaders can't have a good communication with members, and have no or little familiarity with them. In the project area, no telephone is available, and communication between Desas is done by motor cycle. It seems that possible management unit of leaders is Desa level.

#### 4.8.3 Agricultural Credit

At present, inactive credit services are shown in the project area, and almost all farmers are now cultivating crops with no or a little credit. It can be said that such situation is attributable to inactive agricultural production due to natural disaster that drought damage. However, such constraint would be settled by the project, and the farmers' requirement for credits would increase more. Especially the following credits are required to make further development.

- 1) For group or individual farmers: Credit for maintenance of pumping facilities and those replacement
- 2) For KUD and individual farmers: Funds for purchasing farm inputs such as fertilizers and agro-chemicals.
- 3) For KUD: Working capital for handling of products.

To the above 1), KUPEDDES is applicable. This credit is lent to individual farmers. In the case of group operation, a representative will manage its credit. The maximum credit amount is Rp.25,000,000 with an interest of 18%. KUT will be lent to individual farmers for purchasing farm inputs through KUD. It seems that the bank has no objection to release KUT to the farmers who have irrigation farming. KPP is available for working capital of KUD. Since 1989, BRI has released Rp.3.4 billion to 79 KUDs in Kabupaten Wajo. It will also be possible to release this credit to KUDs in the project area.

To make smooth implementation of the above credit services, the following matter will be recommended to the Banks and Government Agencies concerned.

- 1) The delinquent repayment is one of the problems to develop the agricultural credit services. To settle this problem, it is proposed to adopt a system of mutual guarantee of repayment by group farmers. For the borrowing loan, the farmers make a group and select a representative. The members of group are jointly and severally responsible to repay loan of defaulters. KUD release a loan to the group in a lump. The representative collect the loan from each member and repay it to KUD in a lump, and KUD doesn't collect the loan from individual farmers.
- 2) The procedure for credit application is better to be simplified as well as possible either for individual or group farmers, so that the realization of agricultural credit will meet the need of farmers in time. Thereby, the provision of simplified application form with easy procedure and readiness of farmers' background data are necessary in making rapid procedure for credit application.
- 3) To develop the advanced agriculture in the integrated way is feasible only under the strengthening of all activities of BRI, PPL and KUD in good coordination and function. By mean of linking up all the activities, the farmers will become more capable and effective in performing their production.

#### 4.9 Women in Development

After the implementation of the Project, more intensive farming would be introduced over the project area, and the multi-cropping intensity would increase from 117% to 229%. Under such

situation, it will be foresaw that the following merit and demerit appear in the women's' living.

The Project will induces to activate and strengthen the supporting services on marketing of farm inputs and products, post harvest, transportation, institutional activities, etc. In parallel with such economic and social development in the rural area, farmers' women will have much opportunity to join into these activities. In addition, a lot of water user's associations (P3A) would be established over the project area, and they would play an important role to develop and maintain the Project. It is proposed to appoint women's power to these associations. This would bring a good result to greater participation of women in public affair in the feature. It is expected that PKK and LKMD promote and coordinate these opportunities.

Heavy farm works such as transplanting and weeding would increase more from the present level, and farmers' women will be forced to these hard works. though these works are carried out commonly by both male and female labour forces. To lighten such hard works for women, it will be proposed to introduce a manual transplanting machine with rotary weeder. Although a lot of labour requirement for transplanting itself can't be reduced by the use of this machine, it is possible to lighten those heavy works. This machine is assembled from the parts of bicycle, and its maintenance is done easily by the farmers.

#### **4.10 Settlement Plan**

The Project requires the settlement to about 220 households in the reservoir area of the Paseloreng Dam, and its implementation is carried out by the Indonesian Government which has a lot of experience for such plan with its fixed procedure. In general, the settlement of such case consists of three types, i.e., i) rural transmigration, ii) self choice, and iii) employment by the Government offices.

- 1) Rural transmigration: The Government prepares a new land with farm field for settlers. The settlement place is selected within the Province, and the contents of settlement plan are almost same with that of national transmigration plan. Namely, the Government carry out the following works for settlement; i) land acquisition of settlement area, ii) land clearing in new village area, iii) construction of roads, public facilities, wells, and farm fields, iv) supporting to construction of settlers' houses, and v) providing of subsidy during the 12 months after settlement.
- 2) Self choice: The settlers receive cash money from the Government as the compensation, and they transfer to other places where are selected by themselves. Namely, the Government pays only compensation money to them, and has no any other arrangement and supporting services to them.
- 3) Employment by the Government: The Government offices employ settlers.

The settlers can choice above 1) or 2), but for 3), the Government can not respond to all of settlers' requests, because its employment capacity is limited. As for the rural transmigration, the Government has a following procedure (see Figure A.6.13). The Government offices related to this rural transmigration are i) the project executing agency (Kanwil PU/Dinas PU Pengailan), ii) BAPPEDA, iii) PEMDA (local government office of Province and Kabupaten, and iv) the transmigration office.

- 1) The project executing agency requests at first the preparation of the settlement plan to PEMDA through BAPPEDA with all data such as boundary and area of reservoir area, land use and construction schedule.
- 2) In response with the request of the project executing agency, PEMDA prepares the settlement plan. This plan consists of location of the settlement area and people's acceptance for settlement. Provincial PEMDA select a new land in the Province, and Kabupaten's PEMDA contacts with all of people, and investigates their acceptance

with settlement type (rural transmigration, self choice and government employee). The result report to BAPPEDA as the settlement plan, and is submitted to the Transmigration Office. The budget necessary for these activities is allocated from the project executing agency.

- 3) The Transmigration Office establish a transmigration committee which comprises the Transmigration Office (chairman), PEMDA, BPN, Forest office, Camat, and Kepala Desa. The committee evaluates the settlement plan with environmental aspect, and result is reported to BAPPEDA and the project executing agency.
- 4) The project executing agency commence D/D of the Project and inform it to the Transmigration Office. The rural transmigration plan is incorporated with the plans of the Transmigration Office, and necessary budget for D/D and construction is allocated by this Office as the national project (The Transmigration Office requests its budget to the central office).
- 5) BAPPEDA coordinates all of the above activities.

The successful settlement is prerequisite for the implementation of the Gilirang Irrigation Project. At present, the Provincial Government and the Transmigration Office are implementing the settlement plan of over 2,000 households related to the Biri-Biri Multipurpose Dam Project. In the case of the Gilirang Irrigation Project, it seems that the settlement of the about 220 households will be implemented smoothly by the Government Offices concerned. The Transmigration Office said that main factor for successful implementation is the acceptance of all people living in the reservoir area, and it is requested that PEMDA would takes it before the commencement of D/D of the project works. In November 1994, the PEMDA commenced the preparation of the settlement plan in accordance with the above procedure.



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**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

No.	Questions	Unit	Total	N	Average	Min.	Max.	STD
1	<b>1. FAMILY MEMBERS</b>							
2	1.1 Age	years	10964.0	250	43.86	20.00	75.00	11.87
3	1.2 Total number of family members	persons	1285.0	250	5.14	2.00	14.00	1.95
4	1.2.1 Age 65 or over	persons	33.0	250	0.13	0.00	2.00	0.39
5	1.2.2 Age 50 - 64	persons	166.0	250	0.66	0.00	3.00	0.76
6	1.2.3 Age 15 - 49	persons	682.0	250	2.73	0.00	9.00	1.51
7	1.2.4 Age 0 - 14	persons	404.0	250	1.62	0.00	5.00	1.29
8	(Age distribution)				(%)			
9	(Age 65 or over)	%			2.57			
10	(Age 50 - 64)	%			12.92			
11	(Age 15 - 49)	%			53.07			
12	(Age 0 - 14)	%			31.44			
13	(Total)	%			100.00			
14	1.2.5 Male in total	persons	644.0	250	2.58	1.00	8.00	1.34
15	1.2.6 Female in total	persons	641.0	250	2.56	0.00	8.00	1.33
16	(% distribution)				(%)			
17	(Male in total)	%			50.12			
18	(Female in total)	%			49.88			
19	(Total)	%			100.00			
20	1.3 Working population per family							
21	1.3.1 Male	persons	377.0	250	1.51	1.00	5.00	0.75
22	1.3.2 Female	persons	33.0	250	0.13	0.00	8.00	0.60
23	= Total	persons	410.0	250	1.64	1.00	10.00	0.96
24	1.4 Working for on-farm activities							
25	1.4.1 Full time	persons	339.0	250	1.36	0.00	5.00	0.79
26	1.4.2 Part time	persons	25.0	250	0.10	0.00	2.00	0.35
27	= Total	persons	364.0	250	1.46	0.00	5.00	0.80
28	1.5 Working in other off-farm activities							
29	1.5.1 Full time	persons	19.0	250	0.08	0.00	2.00	0.29
30	1.5.2 Part time	persons	39.0	250	0.16	0.00	2.00	0.38
31	= Total	persons	52.0	201	0.26	0.00	2.00	0.49
32	1.6 Family Off-farm Income							
33	(1) Works in other farm	Rp/year	1356400	250	5426	0	640000	48064
34	(2) Carpenter/mason	Rp/year	1560000	250	6240	0	420000	44464
35	(3) Business	Rp/year	16860000	250	67440	0	6480000	457940
36	(4) Rent-out of machinery	Rp/year	3860001	250	15440	0	500000	80295
37	(5) Remittance from relatives	Rp/year	0	250	0	0	0	0
38	(6) Others	Rp/year	35669000	250	142676	0	3600000	416136
39	= Total	Rp/year	59305401	250	237222	0	6480000	606252
40	<b>2. LAND TENURE AND HOLDING</b>							
41	2.1 Land Holding Characteristics							
42	2.1.1 Total Owned (ha)							
43	1) Irrigated sawah	Ha	0.0	250	0.00	0.00	0.00	0.00
44	2) Rainfed Sawah	Ha	317.3	250	1.27	0.00	13.00	1.58
45	3) Upland	Ha	10.9	250	0.04	0.00	4.00	0.33
46	4) Tree crops land	Ha	94.4	250	0.38	0.00	3.00	0.54
47	5) Grass land	Ha	18.2	250	0.07	0.00	4.80	0.40
48	6) Others	Ha	34.0	250	0.14	0.00	9.00	0.69
49	7) Total	Ha	474.7	250	1.90	0.00	15.02	2.01
50	2.1.2 Rented-in (ha)							
51	1) Irrigated sawah	Ha	0.0	1	0.00	0.00	0.00	0.00
52	2) Rainfed Sawah	Ha	317.8	250	1.27	0.00	10.00	1.54
53	3) Upland	Ha	0.0	250	0.00	0.00	0.00	0.00
54	4) Tree crops land	Ha	2.2	250	0.01	0.00	1.00	0.08
55	5) Grass land	Ha	0.0	250	0.00	0.00	0.00	0.00
56	6) Others	Ha	2.2	250	0.01	0.00	2.00	0.13
57	7) Total	Ha	322.2	250	1.29	0.00	10.00	1.54
58	2.1.3 Rented-out (ha)							
59	1) Irrigated sawah	Ha	0.0	250	0.00	0.00	0.00	0.00
60	2) Rainfed Sawah	Ha	49.0	250	0.20	0.00	10.00	0.91
61	3) Upland	Ha	0.0	250	0.00	0.00	0.00	0.00
62	4) Tree crops land	Ha	1.2	250	0.00	0.00	1.20	0.08
63	5) Grass land	Ha	0.0	250	0.00	0.00	0.00	0.00
64	6) Others	Ha	9.0	250	0.04	0.00	9.00	0.57
65	7) Total	Ha	59.2	250	0.24	0.00	10.00	1.07
66	2.2 Annual Income from Rented-out							
67	2.2.1 By Cash							
68	1) Irrigated sawah	Rp.	0	250	0	0	0	0
69	2) Rainfed Sawah	Rp.	4390000	250	17560	0	1500000	125603
70	3) Upland	Rp.	0	250	0	0	0	0
71	4) Tree crops land	Rp.	250000	250	1000	0	250000	15780
72	5) Grass land	Rp.	0	250	0	0	0	0
73	6) Others	Rp.	1500000	250	6000	0	1500000	94678
74	7) Total	Rp.	6140000	250	24560	0	1500000	157262
75	2.2.2 By Production							
76	1) Irrigated sawah	Rp.	0	250	0	0	0	0
77	2) Rainfed Sawah	Rp.	11354150	250	45417	0	2500000	244268

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

	No.	Questions	Unit	Total	N	Average	Min.	Max.	STD
78	3)	Upland	Rp.	0	250	0	0	0	0
79	4)	Tree crops land	Rp.	0	250	0	0	0	0
80	5)	Grass land	Rp.	0	250	0	0	0	0
81	6)	Others	Rp.	0	250	0	0	0	0
82	7)	Total	Rp.	11354150	250	45417	0	2500000	244268
83	2.2.3	Others							
84	1)	Irrigated sawah	Rp.	0	250	0	0	0	0
85	2)	Rainfed Sawah	Rp.	0	250	0	0	0	0
86	3)	Upland	Rp.	0	250	0	0	0	0
87	4)	Tree crops land	Rp.	0	250	0	0	0	0
88	5)	Grass land	Rp.	0	250	0	0	0	0
89	6)	Others	Rp.	0	250	0	0	0	0
90	7)	Total	Rp.	0	250	0	0	0	0
91	2.2.4	Total							
92	1)	Irrigated sawah	Rp.	0	250	0	0	0	0
93	2)	Rainfed Sawah	Rp.	15744150	250	62977	0	2500000	272737
94	3)	Upland	Rp.	0	250	0	0	0	0
95	4)	Tree crops land	Rp.	250000	250	1000	0	250000	15780
96	5)	Grass land	Rp.	0	250	0	0	0	0
97	6)	Others	Rp.	1500000	250	6000	0	1500000	94678
98	7)	Total	Rp.	17494150	250	69977	0	2500000	287585
99	*	Average rented-out income per ha							
100	* 1)	Irrigated sawah	Rp/ha	0	8	0	0	0	0
101	* 2)	Rainfed Sawah	Rp/ha	9304847	19	489729	0	1500000	368861
102	* 3)	Upland	Rp/ha	0	8	0	0	0	0
103	* 4)	Tree crops land	Rp/ha	208333	4	52083	0	208333	90211
104	* 5)	Grass land	Rp/ha	0	8	0	0	0	0
105	* 6)	Others	Rp/ha	166667	9	18519	0	166667	52378
106	* 7)	Total	Rp/ha	9679847	20	483992	162500	1500000	355540
107	3.	FARMLAND							
108	3.1	Total cultivated area	Ha	711.9	250	2.85	0.05	18.00	2.17
109	3.1.1	Irrigated sawah	Ha	2.5	250	0.01	0.00	2.50	0.16
110	3.1.2	Rainfed sawah	Ha	582.0	250	2.33	0.00	18.00	1.92
111	3.1.3	Upland	Ha	2.9	250	0.01	0.00	1.50	0.11
112	3.1.4	Tree crops	Ha	95.6	250	0.38	0.00	3.00	0.59
113	3.1.5	Grass land	Ha	5.1	250	0.02	0.00	2.50	0.17
114	3.1.6	Others	Ha	23.7	250	0.09	0.00	9.00	0.67
115	3.2	Fallow land	Ha	33.3	250	0.13	0.00	4.84	0.52
116	4.	WET SEASON CROP PRODUCTION							
117	4.1	Wet Season Paddy							
118	4.1.1	Cultivation area	Ha	582.6	250	2.33	0.30	18.00	1.92
119	4.1.2	Yield	Ton/ha	765.0	250	3.06	0.85	6.00	0.84
120	4.1.3	Production	tons	1772.9	250	7.09	0.80	72.00	6.68
121	4.1.4	Unit price	Rp/kg	78767.0	250	315.07	300.00	325.00	7.67
122		=Gross income	Rp'000	559370.0	250	2237.48	240.00	23400.00	2145.76
123		=Gross income /ha	Rp'000	241276.7	250	965.11	263.50	1920.00	267.81
124	4.2	Palawija				(%)			
125		- Maize	No.	0.0	250	0.00			
126		- Soybean	No.	0.0	250	0.00			
127		- Groundnut	No.	0.0	250	0.00			
128		- Mungbeans	No.	0.0	250	0.00			
129		- Sweet potato	No.	0.0	250	0.00			
130		- Cassava	No.	0.0	250	0.00			
131		- Others	No.	0.0	250	0.00			
132		(Total)	No.	0.0	250	0.00			
133	4.2.1	Palawija cultivation area	Ha	0.2	250	0.00	0.00	0.20	0.01
134	4.2.2	Palawija Yield	Ton/ha	0.0	250	0.00	0.00	0.00	0.00
135	4.2.3	Palawija Production	tons	0.0	250	0.00	0.00	0.02	0.00
136	4.2.4	Palawija Unit price	Rp/kg	1000.0	250	4.00	0.00	1000.00	63.12
137		=Gross income	Rp'000	20.0	250	0.08	0.00	20.00	1.26
138		=Gross income /ha	Rp'000	100.0	250	0.40	0.00	100.00	6.31
139	4.3	Vegetables				(%)			
140		- Chilli	No.	0.0	250	0.00			
141		- Tomato	No.	0.0	250	0.00			
142		- Okra	No.	0.0	250	0.00			
143		- Cucumber	No.	1.0	250	0.00			
144		- String beans	No.	2.0	250	0.01			
145		- Egg plant	No.	0.0	250	0.00			
146		- Pumpkin	No.	0.0	250	0.00			
147		- Water melon	No.	0.0	250	0.00			
148		- Others	No.	0.0	250	0.00			
149		(Total)	No.	0.0	250	0.00			
150	4.3.1	Vegetables cultivation area	Ha	0.1	250	0.00	0.00	0.05	0.00
151	4.3.2	Vegetables yield	Ton/ha	14.0	250	0.06	0.00	7.70	0.56
152	4.3.3	Vegetables production	tons	0.2	250	0.00	0.00	0.08	0.01
153	4.3.4	Vegetables unit price	Rp/kg	3500.0	250	14.00	0.00	2000.00	144.24
154		=Gross income	Rp'000	200.0	250	0.80	0.00	100.00	8.02

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

No.	Questions	Unit	Total	N	Average	Min.	Max.	STD	
155	=Gross income /ha	Rp'000	7000.0	250	28.00	0.00	3750.00	278.78	
156	<b>5. DRY SEASON CROP PRODUCTION</b>								
157	5.1 Dry Season Paddy								
158	5.1.1 Cultivation area	Ha	5.0	250	0.02	0.00	2.00	0.16	
159	5.1.2 Yield	Ton/ha	11.0	250	0.04	0.00	3.00	0.33	
160	5.1.3 Production	tons	9.5	250	0.04	0.00	3.00	0.28	
161	5.1.4 Unit price	Rp/kg	1570.0	250	6.28	0.00	320.00	43.97	
162	=Gross income	Rp'000	2995.0	250	11.98	0.00	960.00	89.26	
163	=Gross income /ha	Rp'000	3460.0	250	13.84	0.00	960.00	102.54	
164	5.2 Palawija				(%)				
165	- Maize	No.	3.0	250	1.20				
166	- Soybean	No.	96.0	250	38.40				
167	- Groundnut	No.	24.0	250	9.60				
168	- Mungbeans	No.	70.0	250	28.00				
169	- Sweet potato	No.	0.0	250	0.00				
170	- Cassava	No.	0.0	250	0.00				
171	- Others	No.	0.0	250	0.00				
172	(Total)	No.	193.0		77.20				
173	5.2.1 Palawija total								
174	Cultivation area	Ha	113.3	250	0.45	0.00	2.00	0.41	
175	5.2.2 Yield	Ton/ha	266.9	250	1.07	0.00	95.00	5.98	
176	5.2.3 Production	tons	169.8	250	0.68	0.00	66.50	4.20	
177	5.2.4 Unit price	Rp/kg	163425.0	250	653.70	0.00	1300.00	412.21	
178	=Gross income	Rp'000	169995.4	250	679.98	0.00	66500.00	4199.36	
179	=Gross income /ha	Rp'000	283891.9	250	1135.57	0.00	95000.00	6026.24	
180	*5.2.1 Palawija total								
181	* Cultivation area	Ha	113.3	192	0.59	0.00	2.00	0.38	
182	*5.2.2 Yield	Ton/ha	266.9	192	1.39	0.00	95.00	6.79	
183	*5.2.3 Production	tons	169.8	192	0.88	0.00	66.50	4.77	
184	*5.2.4 Unit price	Rp/kg	163425.0	192	851.17	0.00	1300.00	230.58	
185	*Gross income	Rp'000	170001.5	192	885.42	0.00	66500.00	4772.82	
186	*Gross income /ha	Rp'000	283913.5	192	1478.72	0.00	95000.00	6839.48	
187	*5.2.1 Maize								
188	* Cultivation area	Ha	1.3	53	0.02	0.00	0.70	0.12	
189	*5.2.2 Yield	Ton/ha	4.8	53	0.09	0.00	3.00	0.44	
190	*5.2.3 Production	tons	1.3	53	0.02	0.00	0.70	0.11	
191	*5.2.4 Unit price	Rp/kg	550.0	53	10.38	0.00	200.00	42.73	
192	*Gross income	Rp'000	810.0	53	15.28	0.00	450.00	69.46	
193	*Gross income /ha	Rp'000	9605.7	53	181.24	0.00	9000.00	1224.31	
194	*5.2.1 Soybeans								
195	*5.2.1 Cultivation area	Ha	68.1	95	0.72	0.00	2.00	0.43	
196	*5.2.2 Yield	Ton/ha	89.2	95	0.94	0.00	3.00	0.43	
197	*5.2.3 Production	tons	63.8	95	0.67	0.00	2.33	0.51	
198	*5.2.4 Unit price	Rp/kg	92850.0	94	987.77	0.00	1300.00	117.53	
199	*Gross income	Rp'000	72128.3	95	759.24	0.00	2330.00	514.71	
200	*Gross income /ha	Rp'000	117229.0	95	1233.99	0.00	6600.00	999.66	
201	*5.2.1 Groundnut								
202	* Cultivation area	Ha	10.2	74	0.14	0.00	1.00	0.25	
203	*5.2.2 Yield	Ton/ha	116.5	74	1.57	0.00	95.00	10.95	
204	*5.2.3 Production	tons	77.4	74	1.05	0.00	66.50	7.67	
205	*5.2.4 Unit price	Rp/kg	24200.0	74	327.03	0.00	1250.00	477.76	
206	*Gross income	Rp'000	78092.1	74	1055.30	0.00	66500.00	7670.94	
207	*Gross income /ha	Rp'000	117270.5	74	1584.74	0.00	95000.00	10950.37	
208	*5.2.1 Mungbeans								
209	* Cultivation area	Ha	33.8	120	0.28	0.00	1.00	0.31	
210	*5.2.2 Yield	Ton/ha	56.4	120	0.47	0.00	1.80	0.47	
211	*5.2.3 Production	tons	27.4	120	0.23	0.00	1.10	0.28	
212	*5.2.4 Unit price	Rp/kg	45825.0	120	381.88	0.00	1200.00	340.24	
213	*Gross income	Rp'000	18971.2	120	158.09	0.00	675.00	187.69	
214	*Gross income /ha	Rp'000	40908.2	120	340.90	0.00	3000.00	414.87	
215	5.3 Vegetables				(%)				
216	- Chili	No.	5.0	250	2.00	0.00	1.00	0.14	
217	- Tomato	No.	2.0	250	0.80	0.00	1.00	0.09	
218	- Okra	No.	0.0	250	0.00	0.00	0.00	0.00	
219	- Cucumber	No.	2.0	250	0.80	0.00	1.00	0.09	
220	- String beans	No.	13.0	250	5.20	0.00	1.00	0.22	
221	- Egg plant	No.	2.0	250	0.80	0.00	1.00	0.09	
222	- Pumpkin	No.	6.0	250	2.40	0.00	1.00	0.15	
223	- Water melon	No.	0.0	250	0.00	0.00	0.00	0.00	
224	- Others	No.	0.0	250	0.00	0.00	0.00	0.00	
225	(Total)	No.	30.0	150	12.00	0.00	1.00	0.36	
226	5.3.1 Vegetables								
227	5.3.1 Cultivation area	Ha	2.4	250	0.01	0.00	0.50	0.04	
228	5.3.2 Yield	Ton/ha	92.3	250	0.37	0.00	10.00	1.25	
229	5.3.3 Production	tons	8.2	250	0.03	0.00	2.00	0.17	
230	5.3.4 Unit price	Rp/kg	26325.0	250	105.30	0.00	2500.00	351.92	
231	=Gross income	Rp'000	4242.0	250	16.97	0.00	1000.00	79.79	

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

No.	Questions	Unit	Total	N	Average	Min.	Max.	STD	
232	=Gross income /ha		72613.3	250	290.45	0.00	10000.00	1052.04	
233	*5.3.1 Vegetables								
234	*5.3.1 Cultivation area	Ha	2.4	31	0.08	0.01	0.50	0.10	
235	*5.3.2 Yield	Ton/ha	90.3	31	2.91	0.40	10.00	2.24	
236	*5.3.3 Production	tons	8.2	31	0.26	0.01	2.00	0.43	
237	*5.3.4 Unit price	Rp/kg	25825.0	31	833.06	100.00	2500.00	621.37	
238	*Gross income	Rp'000	4232.0	31	136.52	5.00	1000.00	187.15	
239	*Gross income/ha		58313.3	29	2010.80	120.00	6250.00	1538.50	
240	<b>6. PERENNIAL CROPS</b>								
241	6.1 Cloves								
242	6.1.1 Cultivation area	Ha	2.3	250	0.01	0.00	1.00	0.09	
243	6.1.2 Yield	Ton/ha	1.4	250	0.01	0.00	1.00	0.07	
244	6.1.3 Production	tons	1.2	250	0.00	0.00	0.50	0.04	
245	6.1.4 Unit price	Rp/kg	10500.0	250	42.00	0.00	5000.00	398.44	
246	=Gross income	Rp'000	3980.0	250	15.92	0.00	1500.00	145.78	
247	6.2 Coconuts								
248	6.2.1 Cultivation area	Ha	24.9	250	0.10	0.00	10.00	0.75	
249	6.2.2 Yield	Ton/ha	133.0	250	0.53	0.00	6.00	1.18	
250	6.2.3 Production	tons	74.0	250	0.30	0.00	36.00	2.77	
251	6.2.4 Unit price	Rp/kg	9450.0	250	37.80	0.00	200.00	74.84	
252	=Gross income	Rp'000	12744.2	250	50.98	0.00	5400.00	464.42	
253	6.3 Others								
254	6.3.1 Cultivation area	Ha	60.2	250	0.24	0.00	3.00	0.44	
255	6.3.2 Yield	Ton/ha	104.0	250	0.42	0.00	19.00	1.37	
256	6.3.3 Production	tons	37.6	250	0.15	0.00	2.86	0.37	
257	6.3.4 Unit price	Rp/kg	157850.1	250	631.40	0.00	2500.00	909.12	
258	=Gross income	Rp'000	61395.4	250	245.58	0.00	6578.00	725.45	
259	=Total Perennial crops								
260	=Cultivation area	Ha	87.3	250	0.35	0.00	10.04	0.88	
261	=Gross income	Rp'000	78119.5	250	312.48	0.00	6578.00	886.76	
262	=Gross income/ha	Rp'000	132614.1	250	530.46	0.00	7000.00	1011.65	
263	<b>7. PRODUCTION COST OF WET SEASON PADDY</b>								
264	7.1 Cultivated area	Ha	817.4	250	3.27	0.00	240.00	15.13	
265	7.2 Seeds								
266	7.2.1 Variety				(%)				
267	- IR28	No.	0.0	250	0.00				
268	- IR66	No.	6.0	250	2.40				
269	- IR72	No.	0.0	250	0.00				
270	- PB42	No.	237.0	250	94.80				
271	- PB36	No.	0.0	250	0.00				
272	- Ciliung	No.	6.0	250	2.40				
273	- Ceka pundung	No.	0.0	250	0.00				
274	- Local	No.	0.0	250	0.00				
275	- Others	No.	1.0	250	0.40				
276	(Total)	No.	250.0		100.00				
277	7.2.2 Seed rate	Kg/ha	7346.0	249	29.50	0.00	90.00	8.11	
278	7.2.3 Place issued				(%)				
279	- Own seed	No.	134.0	250	53.60				
280	- PT.Pertani	No.	112.0	250	44.80				
281	- KUD	No.	0.0	250	0.00				
282	- Seed Center	No.	0.0	250	0.00				
283	- Market	No.	2.0	250	0.80				
284	- Others	No.	2.0	250	0.80				
285	(Total)	No.	250.0		100.00				
286	7.2.4 Purchasing price	Rp/kg	112850.0	250	451.40	300.00	600.00	101.13	
287	7.3 Fertilizer Application								
288	7.3.1 Urea	Kg/ha	45794	250	183	0	1400	117	
289	- Rp/kg	Rp/ha	64740	250	259	0	280	27	
290	7.3.2 TPS	Kg/ha	7995	250	32	0	350	39	
291	- Rp/kg	Rp/ha	45530	250	182	0	540	170	
292	7.3.3 KCL	Kg/ha	800	250	3	0	150	15	
293	- Rp/kg	Rp/ha	4760	250	19	0	460	82	
294	7.3.4 Others	Kg/ha	13570	250	54	0	350	52	
295	- Rp/kg	Rp/ha	48550	250	194	0	360	115	
296	=Total application rate/ha	Kg/ha	65107	250	260	0	2100	172	
297	=Total fertilizer cost/ha	Rp'000/ha	3623530	250	14494	0	156000	32070	
298	7.4 Application of Agro-chemical								
299	7.4.1 Liquid type								
300	1) Name A								
301	2) Total bottle used/ha	No.	359.0	250	1.44	0.00	6.00	1.16	
302	3) Qty (ml)/bottle	ml	61270.0	250	245.08	0.00	5000.00	432.72	
303	4) Price/bottle	Rp/bottle	1014150.0	250	4056.60	0.00	17000.00	2656.01	
304	1) Name B								
305	2) Total bottle used/ha	No.	56.0	250	0.22	0.00	5.00	0.74	
306	3) Qty (ml)/bottle	ml	5590.0	250	22.36	0.00	500.00	85.83	
307	4) Price/bottle	Rp/bottle	85100.0	250	340.40	0.00	5500.00	1181.65	
308	1) Name C								

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

No.	Questions	Unit	Total	N	Average	Min.	Max.	STD
309	2) Total bottle used/ha	No.	0.0	250	0.00	0.00	0.00	0.00
310	3) Q'ty (ml)/bottle	ml	50.0	250	0.20	0.00	50.00	3.16
311	4) Price/bottle	Rp/bottle	130.0	250	0.52	0.00	130.00	8.21
312	=Total Q'ty(ml)/ha	ml/ha	121247.2	250	484.99	0.00	12812.50	976.25
313	=Total cost/ha	Rp.000/ha	1605259.3	250	6421.04	0.00	375000.00	7362.81
314	7.4.2 Powder type							
315	1) Name A							
316	2) Total Q'ty/ha	kg/ha	286.8	250	1.15	0.00	10.00	1.82
317	3) Price/kg	Rp/kg	464200.0	250	1856.80	0.00	9000.00	2490.15
318	1) Name B							
319	2) Total Q'ty/ha	kg/ha	13.0	250	0.05	0.00	8.00	0.52
320	3) Price/kg	Rp/kg	9200.0	250	36.80	0.00	5000.00	411.35
321	1) Name C							
322	2) Total Q'ty/ha	kg/ha	0.0	250	0.00	0.00	0.00	0.00
323	3) Price/kg	Rp/kg	0.0	250	0.00	0.00	0.00	0.00
324	=Total Q'ty(kg)/ha	kg/ha	282.2	250	1.13	0.00	10.00	1.84
325	=Total cost/ha	Rp.000/ha	842837.5	250	3371.35	0.00	40000.00	5666.66
326	7.4.3 Estimated cost of agro-chemicals							
327	1) Insecticide (Rp/ha/crop season)	Rp.	2919469.7	250	11677.88	0.00	65000.00	10796.47
328	2) Fungicide (Rp/ha/crop season)	Rp.	21500.0	250	86.35	0.00	12500.00	972.29
329	3) Rodenticide (Rp/ha/crop season)	Rp.	113300.0	250	453.20	0.00	9000.00	1197.65
330	=Total	Rp/ha	3054269.7	250	12217.08	0.00	65000.00	10852.93
331	7.5 Man Power Requirement: Area	Ha	886.4	250	3.55	0.30	300.00	18.88
332	7.5.1 Total Labor							
333	(1) Nursery preparation	MD	1615.0	243	6.65	0.00	42.00	5.29
334	(2) Land preparation	MD	7802.0	243	32.11	0.00	280.00	31.12
335	(3) Seeding	MD	3583.0	243	14.74	0.00	84.00	12.31
336	(4) Transplanting	MD	5874.0	243	24.17	2.00	140.00	18.52
337	(5) Fertilizer application	MD	1290.0	243	5.31	0.00	36.00	4.24
338	(6) Chemical application	MD	1043.0	243	4.29	0.00	36.00	4.09
339	(7) Weeding	MD	9522.0	243	39.19	0.00	250.00	29.05
340	(8) Harvesting	MD	9518.0	243	39.17	4.00	210.00	34.36
341	=Total		40247.0	243	165.63	40.00	955.00	110.99
342	7.5.2 Family Labor							
343	(1) Nursery preparation	MD	1604.5	243	6.60	0.00	42.00	5.33
344	(2) Land preparation	MD	7741.0	243	31.86	0.00	280.00	31.26
345	(3) Seeding	MD	3573.0	243	14.70	0.00	84.00	12.31
346	(4) Transplanting	MD	688.0	243	2.83	0.00	75.00	8.98
347	(5) Fertilizer application	MD	1290.0	243	5.31	0.00	36.00	4.24
348	(6) Chemical application	MD	1043.0	243	4.29	0.00	36.00	4.09
349	(7) Weeding	MD	9481.0	243	39.02	0.00	250.00	29.12
350	(8) Harvesting	MD	344.0	243	1.42	0.00	84.00	7.81
351	=Total		25764.5	243	106.03	0.00	640.00	71.79
352	7.5.3 Hired Labor							
353	(1) Nursery preparation	MD	10.5	243	0.04	0.00	3.00	0.34
354	(2) Land preparation	MD	61.0	243	0.25	0.00	40.00	2.63
355	(3) Seeding	MD	10.0	243	0.04	0.00	10.00	0.64
356	(4) Transplanting	MD	5186.0	243	21.34	0.00	140.00	19.46
357	(5) Fertilizer application	MD	0.0	243	0.00	0.00	0.00	0.00
358	(6) Chemical application	MD	0.0	243	0.00	0.00	0.00	0.00
359	(7) Weeding	MD	89.0	243	0.37	0.00	48.00	3.60
360	(8) Harvesting	MD	9126.0	243	37.71	0.00	210.00	34.93
361	=Total		14482.5	243	59.60	0.00	315.00	52.04
362	7.5.4 Hired Labor (Unit price)							
363	(1) Nursery preparation	Rp/MD	0	243	0	0	0	0
364	(2) Land preparation	Rp/MD	70000	243	288	0	70000	4481
365	(3) Seeding	Rp/MD	0	243	0	0	0	0
366	(4) Transplanting	Rp/MD	1864257	243	7672	0	250000	19651
367	(5) Fertilizer application	Rp/MD	0	243	0	0	0	0
368	(6) Chemical application	Rp/MD	0	243	0	0	0	0
369	(7) Weeding	Rp/MD	2500	243	10	0	2500	160
370	(8) Harvesting	Rp/MD	4113465	243	16928	0	685000	51980
371	7.5.5 Hired Labor (Amount)							
372	(1) Nursery preparation	Rp.	0	243	1296	0	0	0
373	(2) Land preparation	Rp.	331500	243	1235	0	160000	13582
374	(3) Seeding	Rp.	0	243	1683	0	0	0
375	(4) Transplanting	Rp.	27780441	243	112640	0	899976	110872
376	(5) Fertilizer application	Rp.	0	243	0	0	0	0
377	(6) Chemical application	Rp.	0	243	0	0	0	0
378	(7) Weeding	Rp.	290000	243	1193	0	250000	16198
379	(8) Harvesting	Rp.	66290430	243	272800	0	1485750	229479
380	=7.5 Man Power Requirement per Ha							
381	=7.5.1 Total Labor Requirement							
382	= (1) Nursery preparation	MD/ha	776.6	243	3.20	0.00	21.21	1.90
383	= (2) Land preparation	MD/ha	3855.0	243	15.86	0.00	47.62	11.00
384	= (3) Seeding	MD/ha	1812.9	243	7.46	0.00	36.00	5.99
385	= (4) Transplanting	MD/ha	2688.8	243	11.07	0.06	45.00	5.14

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

	No.	Questions	Unit	Total	N	Average	Min.	Max.	STD
386	= (5)	Fertilizer application	MD/ha	616.7	243	2.54	0.00	8.00	1.28
387	= (6)	Chemical application	MD/ha	486.6	243	2.00	0.00	6.06	1.17
388	= (7)	Weeding	MD/ha	4899.0	243	20.16	0.00	100.00	11.88
389	= (8)	Harvesting	MD/ha	4133.9	243	17.01	0.00	56.00	7.42
390		=Total	MD/ha	19269.6	243	79.30	0.56	228.00	27.44
391	=7.5.2	Family Labor							
392	= (1)	Nursery preparation	MD/ha	770.9	243	3.17	0.00	21.21	1.92
393	= (2)	Land preparation	MD/ha	3826.3	243	15.75	0.00	47.62	11.09
394	= (3)	Seeding	MD/ha	1811.7	243	7.46	0.00	36.00	6.00
395	= (4)	Transplanting	MD/ha	536.8	243	2.21	0.00	45.00	6.45
396	= (5)	Fertilizer application	MD/ha	616.7	243	2.54	0.00	8.00	1.28
397	= (6)	Chemical application	MD/ha	486.6	243	2.00	0.00	6.06	1.17
398	= (7)	Weeding	MD/ha	4865.7	243	20.02	0.00	100.00	11.79
399	= (8)	Harvesting	MD/ha	285.2	243	1.17	0.00	56.00	5.61
400		=Total	MD/ha	13199.8	243	54.32	0.00	228.00	28.48
401	=7.5.3	Hired Labor							
402	= (1)	Nursery preparation	MD/ha	5.7	243	0.02	0.00	2.40	0.21
403	= (2)	Land preparation	MD/ha	28.7	243	0.12	0.00	20.00	1.30
404	= (3)	Seeding	MD/ha	1.2	243	0.00	0.00	1.18	0.08
405	= (4)	Transplanting	MD/ha	2152.1	243	8.86	0.00	24.00	4.76
406	= (5)	Fertilizer application	MD/ha	0.0	243	0.00	0.00	0.00	0.00
407	= (6)	Chemical application	MD/ha	0.0	243	0.00	0.00	0.00	0.00
408	= (7)	Weeding	MD/ha	33.3	243	0.14	0.00	24.00	1.60
409	= (8)	Harvesting	MD/ha	3848.7	243	15.84	0.00	48.00	7.54
410		=Total	MD/ha	6069.7	243	24.98	0.00	66.00	10.07
411	=7.5.5	Hired labor cost/ha							
412	= (1)	Nursery preparation	Rp/ha	0	243	0	0	0	0
413	= (2)	Land preparation	Rp/ha	70000	243	288	0	70000	4481
414	= (3)	Seeding	Rp/ha	0	243	0	0	0	0
415	= (4)	Transplanting	Rp/ha	11116867	243	45748	0	110000	23269
416	= (5)	Fertilizer application	Rp/ha	0	243	0	0	0	0
417	= (6)	Chemical application	Rp/ha	0	243	0	0	0	0
418	= (7)	Weeding	Rp/ha	45412	243	187	0	29412	2140
419	= (8)	Harvesting	Rp/ha	29586334	243	121754	0	1350000	93058
420		=Total	Rp/ha	40969896	243	168600	0	1440000	100899
421	=	Average cost of hired labor	Rp/MD	1705626	243	7019	0	51429	4175
422		(Average cost of hired labor)	Rp/MD	379665	47	8078	2205	19133	3794
423	7.6	Animal and Mechanical Power: Ar	Ha	584.8	250	2.34	0.30	18.00	1.91
424	7.6.1	Animal Power (Owned)							
425	(1)	Land preparation	days	779.5	249	3.13	0.00	50.00	9.17
426	(2)	Threshing	days	15.0	249	0.06	0.00	15.00	0.95
427	(3)	Transportation	days	79.0	249	0.32	0.00	12.00	1.21
428	(4)	Irrigation	days	3.0	249	0.01	0.00	3.00	0.19
429	7.6.2	Animal Power (Hired days)							
430	(1)	Land preparation	days	59.0	249	0.24	0.00	40.00	2.71
431	(2)	Threshing	days	0.0	249	0.00	0.00	0.00	0.00
432	(3)	Transportation	days	738.0	249	2.96	0.00	14.00	2.19
433	(4)	Irrigation	days	0.0	249	0.00	0.00	0.00	0.00
434	7.6.3	Animal Power (Hired cost)							
435	(1)	Land preparation	Rp/ha	0	250	0	0	0	0
436	(2)	Threshing	Rp/ha	0	250	0	0	0	0
437	(3)	Transportation	Rp/ha	7298113	250	29192	0	84000	14051
438	(4)	Irrigation	Rp/ha	0	250	0	0	0	0
439	*7.6.3	Animal Power (Hired price)							
440	* (1)	Land preparation	Rp/ha	0	92	0	0	0	0
441	* (2)	Threshing	Rp/ha	0	92	0	0	0	0
442	* (3)	Transportation	Rp/ha	7298113	232	31457	6000	84000	11895
443	* (4)	Irrigation	Rp/ha	0	92	0	0	0	0
444	7.6.4	Animal Power (Hired total cost)							
445	(1)	Land preparation	Rp.	0	250	0	0	0	0
446	(2)	Threshing	Rp.	0	250	0	0	0	0
447	(3)	Transportation	Rp.	17130165	250	68521	0	494200	65117
448	(4)	Irrigation	Rp.	0	250	0	0	0	0
449		=Total	Rp.	17130165	250	68521	0	494200	65117
450	=	Average Animal Power Requirement/ha							
451		=Land preparation	AD/ha	209	249	1	0	24	3
452		=Threshing	AD/ha	5	249	0	0	5	0
453		=Transportation	AD/ha	1164581	249	4677	0	54000	11272
454		=Irrigation	AD/ha	8	249	0	0	8	0
455	7.6.5	Mechanical Power (Owned)							
456	(1)	Land preparation	days	648.0	250	2.59	0.00	54.00	6.63
457	(2)	Threshing	days	0.0	250	0.00	0.00	0.00	0.00
458	(3)	Transportation	days	2.0	250	0.01	0.00	1.00	0.09
459	(4)	Irrigation	days	0.0	250	0.00	0.00	0.00	0.00
460	7.6.6	Mechanical Power (Hired days)							
461	(1)	Land preparation	days	1009.5	250	4.09	0.00	42.00	4.81
462	(2)	Threshing	days	0.0	250	0.00	0.00	0.00	0.00

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

	No.	Questions	Unit	Total	N	Average	Min.	Max.	STD
463	(3)	Transportation	days	10.0	250	0.04	0.00	2.00	0.23
464	(4)	Irrigation	days	1.0	250	0.00	0.00	1.00	0.06
465	7.6.7	Mechanical Power (Hired price)							
466	(1)	Land preparation	Rp/ha	14987901	250	59952	0	900000	68460
467	(2)	Threshing	Rp/ha	0	250	0	0	0	0
468	(3)	Transportation	Rp/ha	173250	250	693	0	40000	4095
469	(4)	Irrigation	Rp/ha	0	250	0	0	0	0
470	*7.6.7	Mechanical Power (Hired price)							
471	* (1)	Land preparation	Rp/ha	18147768	185	98096	0	722500	83026
472	* (2)	Threshing	Rp/ha	0	78	0	0	0	0
473	* (3)	Transportation	Rp/ha	229000	84	2726	0	45000	9057
474	* (4)	Irrigation	Rp/ha	0	78	0	0	0	0
475	7.6.8	Mechanical Power (Hired total cost)							
476	(1)	Land preparation	Rp.	29037129	250	116149	0	1260000	141098
477	(2)	Threshing	Rp.	0	250	0	0	0	0
478	(3)	Transportation	Rp.	261050	250	1044	0	45000	5962
479	(4)	Irrigation	Rp.	0	250	0	0	0	0
480	7.7	Post Harvest							
481	7.7.1	Drying							
482	1)	Family labor	days	677.0	250	2.71	0.00	8.00	1.53
483			tons	250.5	250	1.00	0.00	2.50	0.44
484	2)	Hired labor	days	10.0	250	0.04	0.00	7.00	0.48
485			tons	11.0	250	0.04	0.00	8.00	0.54
486	7.7.2	Transportation of paddy from sawah		29000.0	2	29000.00	29000.00	29000.00	0.00
487			Rp.	17116690	249	68742	0	494200	70653
488			tons	8251.4	249	33.27	0.00	6750.00	427.43
489		*Unit transport. cost of paddy	Rp/ton	3178948.0	244	13028.48	0.00	315000.00	21037.94
490	7.7.3	Transportation of paddy from home		1.0	4	0.33	0.00	1.00	0.47
491			Rp.	12000.0	250	48.00	0.00	12000.00	757.43
492			tons	1.0	250	0.00	0.00	1.00	0.06
493	7.7.4	Million cost	Rp/kg	9515.0	249	38.21	0.00	50.00	4.88
494	7.8	Cultivated Loan for the Above Paddy							
495	7.8.1	Borrowed from BRI	Rp.	0	250	0	0	0	0
496	7.8.2	Borrowed from KUD	Rp.	0	250	0	0	0	0
497	7.8.3	Borrowed from private Bank	Rp.	0	250	0	0	0	0
498	7.8.4	Borrowed from middle man	Rp.	1239700	250	4959	0	672000	46208
499	7.8.5	Borrowed from relatives	Rp.	1098800	250	4395	0	390600	31658
500	7.8.6	Others	Rp.	104000	250	416	0	104000	6564
501		=Total cultivation loan	Rp.	2442500	250	9770	0	672000	57530
502		=Total cultivation loan/ha	Rp/ha	1652170	250	6609	0	672000	47630
503	8.	PRODUCTION COST OF OTHER CROPS							
504	8.1	Palawija							
505	8.1.1	Seeds	Kg	3270	248	13	0	100	16
506		Price	Rp/kg	239050	248	964	0	24000	1598
507		=Total seeds cost	Rp.	4346450	248	17526	0	240000	27338
508	8.1.2	Total cost of fertilizer	Rp.	180500	248	728	0	75000	3716
509	8.1.3	Total cost of chemical	Rp.	1069650	248	4313	0	45000	6290
510	8.1.4	Total cost of hired labor	Rp.	13500	248	54	0	9000	637
511	8.1.5	Total cost of animal labor	Rp.	278000	248	1121	0	24000	3729
512	8.1.6	Total cost of machinery	Rp.	0	248	0	0	0	0
513		=Total cost	Rp.	5888100	248	23742	0	289000	32056
514		=Total cost /ha	Rp/ha	11096433	248	44744	0	963333	86269
515	*8.1	Palawija							
516	*8.1.1	Seeds	Kg	3270	179	18	1	100	16
517	*	Price	Rp/kg	239050	179	1335	0	24000	1744
518	*	Total seeds cost	Rp.	4346450	179	24282	0	240000	29519
519	*8.1.2	Total cost of fertilizer	Rp.	180500	179	1008	0	75000	6707
520	*8.1.3	Total cost of chemical	Rp.	1069650	179	5976	0	45000	6699
521	*8.1.4	Total cost of hired labor	Rp.	13500	179	75	0	9000	748
522	*8.1.5	Total cost of animal labor	Rp.	278000	179	1553	0	24000	4312
523	*8.1.6	Total cost of machinery	Rp.	0	179	0	0	0	0
524	*	Total cost	Rp.	5888100	179	32894	450	289000	33506
525	*	Total cost /ha	Rp/ha	11096433	179	61991	0	963333	96136
526	*8.1	Palawija; Maize							
527	*8.1.1	Seeds	Kg	6.0	2	3.00	3.00	3.00	0.00
528	*	Seed price	Rp/ha	350.0	2	175.00	150.00	200.00	25.00
529	*	Total seeds cost	Rp.	1050.0	2	525.00	450.00	600.00	75.00
530	*8.1.2	Total cost of fertilizer	Rp.	0.0	2	0.00	0.00	0.00	0.00
531	*8.1.3	Total cost of chemical	Rp.	0.0	2	0.00	0.00	0.00	0.00
532	*8.1.4	Total cost of hired labor	Rp.	0.0	2	0.00	0.00	0.00	0.00
533	*8.1.5	Total cost of animal labor	Rp.	0.0	2	0.00	0.00	0.00	0.00
534	*8.1.6	Total cost of machinery	Rp.	0.0	2	0.00	0.00	0.00	0.00
535	*	Total cost	Rp.	1050.0	2	525.00	450.00	600.00	75.00
536	*	Total cost/ha	Rp/ha	10200.0	2	5100.00	1200.00	9000.00	3900.00
537	*8.1	Palawija; Soybeans							
538	*8.1.1	Seeds	Kg	2292.5	92	24.92	0.50	100.00	16.52
539	*	Seed price	Rp/ha	145300	92	1579	1000	24000	2368



**Table A.6.2 Result of Household Survey -**

**Answers from 5 Villages**

No.	Questions	Unit	Total	N	Average	Min.	Max.	STD	
540 *	Total seeds cost	Rp.	2967266	92	32253	500	192000	31948	
541 *8.1.2	Total cost of fertilizer	Rp.	158200	92	1720	0	75000	8781	
542 *8.1.3	Total cost of chemical	Rp.	597061	92	6490	0	40000	6601	
543 *8.1.4	Total cost of hired labor	Rp.	0	92	0	0	0	0	
544 *8.1.5	Total cost of animal labor	Rp.	179487	92	1951	0	24000	4756	
545 *8.1.6	Total cost of machinery	Rp.	0	92	0	0	0	0	
546	Total cost	Rp.	3902014	92	42413	2100	231200	36107	
547	Total cost/ha	Rp/ha	7552431	92	82092	0	963333	126420	
548 *8.1	Palawija; Groundnuts								
549 *8.1.1	Seeds	Kg	313.0	19	16.47	4.50	30.00	7.38	
550 *	Seed price	Rp/ha	27400	19	1442	1200	1750	257	
551 *	Total seeds cost	Rp.	443950	19	23366	7875	36000	10211	
552 *8.1.2	Total cost of fertilizer	Rp.	13000	19	684	0	13000	2903	
553 *8.1.3	Total cost of chemical	Rp.	58500	19	3079	0	9000	3881	
554 *8.1.4	Total cost of hired labor	Rp.	0	19	0	0	0	0	
555 *8.1.5	Total cost of animal labor	Rp.	6000	19	316	0	6000	1340	
556 *8.1.6	Total cost of machinery	Rp.	0	19	0	0	0	0	
557	Total cost	Rp.	521450	19	27445	7875	40000	10101	
558	Total cost/ha	Rp/ha	1437337	19	75649	30000	160000	42069	
559 *8.1	Palawija; Mungbeans								
560 *8.1.1	Seeds	Kg	660.5	67	9.86	0.50	93.00	12.51	
561 *	Seed price	Rp/ha	67000	67	1000	0	2200	410	
562 *	Total seeds cost	Rp.	514801	67	7684	0	42000	7599	
563 *8.1.2	Total cost of fertilizer	Rp.	0	67	0	0	0	0	
564 *8.1.3	Total cost of chemical	Rp.	370007	67	5522	0	45000	6437	
565 *8.1.4	Total cost of hired labor	Rp.	13500	67	201	0	9000	1213	
566 *8.1.5	Total cost of animal labor	Rp.	72810	67	1087	0	18000	3096	
567 *8.1.6	Total cost of machinery	Rp.	0	67	0	0	0	0	
568 *	Total cost	Rp.	971117	67	14494	1000	57100	12513	
569 *	Total cost/ha	Rp/ha	1920589	67	28666	2400	168000	25263	
570 8.2	Vegetable								
571 8.2.1	Seeds	Kg	51.0	249	0.20	0.00	30.00	1.92	
572	Price	Rp/kg	34825	249	140	0	2500	488	
573	=Total seeds cost	Rp.	50738	249	204	0	15000	1153	
574 8.2.2	Total cost of fertilizer	Rp.	0	249	0	0	0	0	
575 8.2.3	Total cost of chemical	Rp.	83900	249	337	0	9000	1303	
576 8.2.4	Total cost of hired labor	Rp.	0	249	0	0	0	0	
577 8.2.5	Total cost of animal labor	Rp.	0	249	0	0	0	0	
578 8.2.6	Total cost of machinery	Rp.	0	249	0	0	0	0	
579	=Total	Rp.	134638	249	541	0	15000	1900	
580	=Total /ha	Rp/ha	4971625	249	19966	0	620000	80674	
581 *8.2	Vegetable								
582 *8.2.1	Seeds	Kg	51.0	27	1.89	0.00	30.00	5.55	
583 *	Price	Rp/kg	34825	27	1290	0	2500	843	
584 *	=Total seed cost	Rp.	50738	27	1879	0	15000	3019	
585 *8.2.2	Total cost of fertilizer	Rp.	0	27	0	0	0	0	
586 *8.2.3	Total cost of chemical	Rp.	83900	27	3107	0	9000	2655	
587 *8.2.4	Total cost of hired labor	Rp.	0	27	0	0	0	0	
588 *8.2.5	Total cost of animal labor	Rp.	0	27	0	0	0	0	
589 *8.2.6	Total cost of machinery	Rp.	0	27	0	0	0	0	
590 *	=Total	Rp.	134638	27	4987	350	15000	3337	
591 *	=Total /ha	Rp/ha	4971625	27	184134	4000	620000	172605	
592 8.3	Other crop								
593 8.3.1	Seeds	Kg	3661.7	250	14.65	0.00	1300.00	105.86	
594	Price	Rp/kg	173945	250	696	0	25000	2392	
595 =	Seeds cost	Rp.	2733550	200	13668	0	500000	54945	
596 8.3.2	Total cost of fertilizer	Rp.	612126	250	2449	0	169000	13127	
597 8.3.3	Total cost of chemical	Rp.	213000	250	852	0	20000	2817	
598 8.3.4	Total cost of hired labor	Rp.	300000	250	1200	0	300000	18936	
599 8.3.5	Total cost of animal labor	Rp.	0	250	0	0	0	0	
600 8.3.6	Total cost of machinery	Rp.	10000	250	40	0	10000	631	
601	=Total	Rp.	3868676	250	15475	0	570000	63619	
602	<b>9. LIVESTOCK PRODUCTION</b>								
603 9.1	Number of Livestock Owned								
604 9.1.1	Buffaloes	head	167.0	250	0.67	0.00	16.00	1.90	
605 9.1.2	Cattle	head	77.0	250	0.31	0.00	12.00	1.14	
606 9.1.3	Caw	head	110.0	250	0.44	0.00	16.00	1.48	
607 9.1.4	Goat/sheep	head	36.0	250	0.14	0.00	12.00	0.92	
608 9.1.5	Chicken	head	40777.0	250	163.11	0.00	38500.00	2429.54	
609 9.2	Income from Livestock per Year								
610 9.2.1	Income from Milk and Egg								
611 (1)	Buffaloes	Rp.	0	250	0	0	0	0	
612 (2)	Cattle	Rp.	0	250	0	0	0	0	
613 (3)	Caw	Rp.	0	250	0	0	0	0	
614 (4)	Goat/sheep	Rp.	0	250	0	0	0	0	
615 (5)	Horse	Rp.	0	250	0	0	0	0	
616 (6)	Chicken	Rp.	904400	250	3618	0	40000	6875	

**Table A.6.2 Result of Household Survey -  
Answers from 5 Villages**

	No.	Questions	Unit	Total	N	Average	Min.	Max.	STD
617		=Total	Rp.	904400	250	3618	0	40000	6875
618	9.2.2	Income from sale of animal							
619	(1)	Buffaloes	Rp.	9235000	250	36940	0	1150000	149285
620	(2)	Cattle	Rp.	545000	250	2180	0	250000	22435
621	(3)	Caw	Rp.	6585000	250	26340	0	1315000	118839
622	(4)	Goat/sheep	Rp.	60000	250	240	0	60000	3787
623	(5)	Horse	Rp.	10000	250	40	0	10000	631
624	(6)	Chicken	Rp.	5845000	250	23380	0	300000	34808
625		=Total	Rp.	22280000	250	89120	0	1340000	194441
626	9.2.3	Rent-out of Draft Power							
627	(1)	Buffaloes	Rp.	0	250	0	0	0	0
628	(2)	Cattle	Rp.	0	250	0	0	0	0
629	(3)	Caw	Rp.	10000	250	40	0	10000	631
630	(4)	Goat/sheep	Rp.	0	250	0	0	0	0
631	(5)	Horse	Rp.	600000	250	2400	0	600000	37871
632	(6)	Chicken	Rp.	25000	250	100	0	20000	1300
633		=Total	Rp.	635000	250	2540	0	600000	37890
634		=Total Income from Livestock	Rp.	19118900	200	95595	0	1340000	199776
635		<b>10. MARKETING</b>							
636	10.1	Paddy							
637		- KUD	No.	3.0	250	1.20			
638		- Brokers	No.	239.0	250	95.60			
639		- Market	No.	6.0	250	2.40			
640		- Others	No.	0.0	250	0.00			
641		- No sale	No.	2.0	250	0.80			
642		(Total)	No.	250.0		100.00			
643	10.2	Palawija							
644		- KUD	No.	0.0	244	0.00			
645		- Brokers	No.	162.0	244	66.39			
646		- Market	No.	26.0	244	10.66			
647		- Others	No.	0.0	244	0.00			
648		- No sale	No.	61.0	250	24.40			
649		(Total)	No.	249.0		101.45			
650	10.3	Vegetables							
651		- KUD	No.	0.0	250	0.00			
652		- Brokers	No.	4.0	250	1.60			
653		- Market	No.	18.0	250	7.20			
654		- Others	No.	1.0	250	0.40			
655		- No sale	No.	227.0	250	90.80			
656		(Total)	No.	250.0		100.00			
657		<b>11. LIVING COST</b>							
658	11.1	Living cost usually spend for the family							
659		Rp/Month	Rp/Month	25826109	250	103304	17500	417000	58942
660		Rp/Year	Rp/Year	309913308	250	1239653	0	5004000	701537
661	11.2	Breakdown							
662	(1)	Food	Rp/Year	179569500	250	718278	90000	2880000	403722
663	(2)	Clothes	Rp/Year	33238476	250	132954	15000	1920000	139221
664	(3)	Medical care	Rp/Year	9522156	250	38089	0	996000	89821
665	(4)	Education	Rp/Year	28599588	250	114398	0	2463996	239484
666	(5)	Electricity	Rp/Year	5561700	250	22247	0	156000	26480
667	(6)	Ceremonial occasion	Rp/Year	8068212	250	32273	0	420000	38580
668	(7)	Remittance to relatives	Rp/Year	458400	250	1834	0	96000	10442
669	(8)	Fuel, gas & fire weed	Rp/Year	8521896	250	34088	0	660000	59237
670	(9)	Transportation	Rp/Year	21164052	250	84656	0	1320000	108177
671	(10)	Loan repayment	Rp/Year	708396	250	2834	0	261996	21451
672	(11)	Others	Rp/Year	18224532	250	72898	0	2162004	160800
673		Total	Rp/Year	309913308	250	1239653	0	5004000	701537
674		(% distribution)				(%)			
675	(1)	(Food)	%			57.94			
676	(2)	(Clothes)	%			10.73			
677	(3)	(Medical care)	%			3.07			
678	(4)	(Education)	%			9.23			
679	(5)	(Electricity)	%			1.79			
680	(6)	(Ceremonial occasion)	%			2.60			
681	(7)	(Remittance to relatives)	%			0.15			
682	(8)	(Fuel, gas & fire weed)	%			2.75			
683	(9)	(Transportation)	%			6.83			
684	(10)	(Loan repayment)	%			0.23			
685	(11)	(Others)	%			5.88			
686		(Total)	%			100.00			
687		<b>12. PADDY CONSUMPTION</b>							
688	12.1	Family size	persons	1374.0	250	5.50	2.00	99.00	6.23
689	12.2	Total paddy consumption/month	kg/month	16024.0	250	64.10	20.00	168.00	25.46
690		=Annual consumption/person	kg/psn	37868.2	250	151.47	12.12	240.00	30.36
691		<b>13. FARMERS INTENTION</b>							
692	13.1	Cropping Pattern with Irrigation				(%)			
693	(1)	Paddy-Palawija/vegc.-Paddy	No.	156.0	250	62.40			

Table A.6.2 Result of Household Survey -									
Answers from 5 Villages									
No.	Questions	Unit	Total	N	Average	Min.	Max.	STD	
694	(2) Paddy-Paddy	No.	90.0	250	36.00				
695	(3) Paddy-Palawija/vegetable	No.	3.0	250	1.20				
696	(4) Paddy (one time)	No.	1.0	250	0.40				
697	(Total)	No.	250.0		100.00				
698	13.2 Crop Selection with Irrigation								
699	(1) Palawija				(%)				
700	- Maize	No.	3.0	250	1.20				
701	- Soybeans	No.	166.0	250	66.40				
702	- Groundnut	No.	23.0	250	9.20				
703	- Mungbeans	No.	56.0	250	22.40				
704	- Sweet potato	No.	1.0	250	0.40				
705	- Cassava	No.	0.0	250	0.00				
706	- Others	No.	1.0	250	0.40				
707	(Total)	No.	250.0		100.00				
708	(2) Vegetables				(%)				
709	- Chili	No.	32.0	250	12.80				
710	- Tomato	No.	22.0	250	8.80				
711	- Okra	No.	2.0	250	0.80				
712	- Cucumber	No.	8.0	250	3.20				
713	- String beans	No.	97.0	250	38.80				
714	- Egg plant	No.	17.0	250	6.80				
715	- Pumpkin	No.	16.0	250	6.40				
716	- Water melon	No.	39.0	250	15.60				
717	- Others	No.	1.0	250	0.40				
718	(Total)	No.	234.0		93.60				
719	14. DOMESTIC WATER AND ELECTRICITY SUPPLY								
720	14.1 Domestic Water				(%)				
721	(1) Wet season - Piped	No.	1.0	250	0.40				
722	- Well	No.	179.0	250	71.60				
723	- River	No.	45.0	250	18.00				
724	- Rain	No.	25.0	250	10.00				
725	- Buying	No.	0.0	250	0.00				
726	- Others	No.	0.0	250	0.00				
727	(Total)	No.	250.0		100.00				
728	(2) Dry season - Piped	No.	0.0	250	0.00				
729	- Well	No.	174.0	250	69.60				
730	- River	No.	70.0	250	28.00				
731	- Rain	No.	2.0	250	0.80				
732	- Buying	No.	4.0	250	1.60				
733	- Others	No.	0.0	250	0.00				
734	(Total)	No.	250.0		100.00				
735	14.2 Electricity Supply				(%)				
736	- Exists	No.	127.0	250	50.80				
737	- Does not exist	No.	123.0	250	49.20				
738	(Total)	No.	250.0		100.00				
739	15. SOURCE OF NEW FARMING TECHNOLOGY				(%)				
740	(1) Extension services including BIMA	No.	205.0	250	82.00				
741	(2) KUD	No.	0.0	250	0.00				
742	(3) Broakers	No.	2.0	250	0.80				
743	(4) Other farmers/friends	No.	40.0	250	16.00				
744	(5) Others	No.	3.0	250	1.20				
745	(Total)	No.	250.0		100.00				
746	16. FARMERS INTENTION ON PUMP IRRIGATION				(%)				
747	(1) Invest for all the cost	No.	143.0	250	57.20				
748	(2) Does not invest for any cost	No.	61.0	250	24.40				
749	(3) Invest with a subsidy	No.	46.0	250	18.40				
750	(Total)	No.	250.0		100.00				

**Table A.6.3 National and Regional Socio-Economic Indicator (1/2)**

		1987	1988	1989	1990	1991	1992
<b>1. Demography (National and Regional)</b>							
1) Population							
- Indonesia	(1,000)	169,149	172,492	175,902	179,379	182,925	186,541
- South Sulawesi	(1,000)	6,692	6,787	6,884	6,982	7,081	7,182
2) Population Growth Rate							
- Indonesia	(%)	1.98	1.98	1.98	1.98	1.98	1.98
- South Sulawesi	(%)	1.42	1.42	1.43	1.42	1.42	1.43
3) Land Area							
- Indonesia	(Km2x1,000)	1,919.3	1,919.3	1,919.3	1,919.3	1,919.3	1,919.3
- South Sulawesi	(Km2x1,000)	62.5	62.5	62.5	62.5	62.5	62.5
4) Population Density							
- Indonesia	(prn/Km2)	88	90	92	93	95	97
- South Sulawesi	(prn/Km2)	107	109	110	112	113	115
<b>2. National Economy</b>							
1) Gross Domestic Product (GDP)							
- GDP at Current Market Prices	(Rp. billion)	124,817	142,021	167,185	196,919	227,163	n.a.
- GDP at 1983 Constant Prices	(Rp. billion)	94,518	99,936	107,437	115,110	122,705	n.a.
- Growth Rate (GDP)	(%)	4.95	5.73	7.51	7.14	6.60	-
- Per Capita GDP at Current Market Price	(Rp. 1,000)	738	823	957	1,105	1,250	n.a.
	(US\$)	449	488	541	600	641	n.a.
- GDP Agriculture at Current Market Price	(Rp. billion)	29,116	34,193	39,164	42,149	44,218	n.a.
- GDP Agriculture at 1983 Constant Price	(Rp. billion)	20,224	21,168	21,918	22,357	22,657	n.a.
- Growth Rate (GDP Agriculture)	(%)	2.15	4.67	3.54	2.00	1.34	-
2) GDP by Industry at Current Market Price	(%)	100.0	100.0	100.0	100.0	100.0	-
- Agriculture	(%)	23.3	24.1	23.4	21.4	19.5	-
- Mining	(%)	13.8	12.1	13.1	12.9	13.6	-
- Manufacturing	(%)	16.9	18.5	18.1	20.3	21.3	-
- T Construction	(%)	4.9	5.0	5.3	5.5	5.7	-
- Trade	(%)	16.9	17.2	17.3	17.2	16.6	-
- Transportation & Communication	(%)	6.0	5.7	5.6	5.6	5.9	-
- Others	(%)	18.2	17.4	17.2	17.1	17.5	-
4) Agriculture GDP at Current Market Price	(%)	100.0	100.0	100.0	100.0	100.0	-
- Farm food crops	(%)	60.2	61.8	62.5	61.5	58.4	-
- Food non-food crops	(%)	14.2	12.8	12.0	11.9	12.6	-
- Estate crops	(%)	3.4	3.4	3.8	3.9	4.5	-
- Livestock and production	(%)	10.4	10.4	9.7	10.4	11.4	-
- Forestry	(%)	4.3	4.2	4.2	4.4	4.5	-
- Fisheries	(%)	7.5	7.4	7.7	8.0	8.6	-
5) Price Index							
- Consumer Price Index (April 1977 - March 1978 = 100) a/							
Jakarta		n.a.	283.8	301.0	112.3	123.8	134.3
(Annual Change)		-	4.44	5.56	11.26	10.38	5.46
Ujung Pandang		n.a.	285.6	300.6	111.0	118.9	125.9
(Annual Change)		-	3.08	5.40	7.37	8.21	3.66
- Wholesale Price Index in Agriculture Sector (1983 = 100)		n.a.	163.0	177.0	191.0	206.0	224.0
6) Exchange Rate (equivalent; US \$1.00) b/	(Rp)	1,644	1,686	1,770	1,843	1,950	2,033

**Table A.6.3 National and Regional Socio-Economic Indicator (2/2)**

	1987	1988	1989	1990	1991	1992
<b>3. Regional Economy (South Sulawesi)</b>						
1) Gross Regional Domestic Product (GRDP)						
- GRDP at Current Market Price (US\$ billion)	2,870	3,299	4,036	4,477	5,282	n.a.
- GRDP at 1983 Constant Price (US\$ billion)	2,167	2,363	2,609	2,785	3,062	n.a.
- Growth Rate (GRDP) (%)	-	9.06	10.39	6.74	9.96	-
- Per Capita GRDP at Current Market Price (Rp. 1,000)	429	486	586	641	746	-
(US \$)	261	288	331	348	383	-
- GRDP Agriculture at Current Market Price (Rp. billion)	1,226	1,441	1,635	1,895	2,240	n.a.
- GRDP Agriculture at 1983 Constant Price (Rp. billion)	919	1,027	1,110	1,179	1,283	n.a.
- Growth Rate (GRDP Agriculture) (%)	-	11.75	8.12	6.16	8.80	-
2) GRDP by Industry at Current Market Price (%)	100.0	100.0	100.0	100.0	100.0	-
- Agriculture (%)	42.7	43.7	40.5	42.3	42.4	-
- Mining (%)	0.9	0.8	6.8	4.1	4.5	-
- Manufacturing (%)	5.9	6.3	7.3	7.8	7.9	-
- Construction (%)	3.7	3.7	3.5	3.6	3.5	-
- Trade (%)	19.8	19.2	17.8	18.1	18.6	-
- Transportation & Communication (%)	8.7	8.5	7.8	8.0	7.7	-
- Others (%)	18.4	17.9	16.3	16.1	15.5	-
3) GRDP by Industry at Constant 1983 Market Price (%)	100.0	100.0	100.0	100.0	100.0	-
- Agriculture (%)	42.4	43.5	42.6	42.3	41.9	-
- Mining (%)	0.8	0.8	2.3	2.2	2.5	-
- Manufacturing (%)	6.2	6.3	7.5	8.2	8.2	-
- T Construction (%)	3.9	3.9	3.8	3.8	3.8	-
- Trade (%)	18.2	17.7	17.0	16.8	17.8	-
- Transportation & Communication (%)	9.7	9.4	9.1	9.2	8.9	-
- Others (%)	18.9	18.4	17.6	17.5	17.0	-
4) Agriculture GRDP at Current Market Price (%)	100.0	100.0	100.0	100.0	100.0	-
- Food crops (%)	57.6	58.0	58.0	57.4	56.4	-
- Non-food crops (%)	8.8	9.6	10.5	12.1	12.5	-
- Estate crops (%)	0.0	0.0	0.2	0.3	0.3	-
- Livestock and production (%)	11.9	11.4	11.3	11.1	10.3	-
- Forestry (%)	0.6	0.7	0.6	0.6	0.5	-
- Fisheries (%)	21.1	20.2	19.4	18.6	20.1	-
5) Agriculture GRDP at Constant 1983 Market Price (%)	100.0	100.0	100.0	100.0	100.0	-
- Food crops (%)	58.1	59.1	59.3	58.9	56.7	-
- Non-food crops (%)	9.6	10.4	11.0	12.0	13.1	-
- Estate crops (%)	0.0	0.0	0.3	0.3	0.4	-
- Livestock and production (%)	11.2	10.6	9.9	9.7	9.4	-
- Forestry (%)	0.6	0.7	0.5	0.6	0.6	-
- Fisheries (%)	20.5	19.2	18.9	18.5	19.9	-
6) Growth Rate of Agriculture GRDP at Constant 1983 Market Price (%)	-	11.75	8.12	6.17	8.79	-
- Food crops (%)	-	13.61	8.48	5.42	4.84	-
- Non-food crops (%)	-	21.24	14.17	15.92	18.17	-
- Estate crops (%)	-	-	-	6.06	28.57	-
- Livestock and production (%)	-	5.54	1.57	4.26	4.53	-
- Forestry (%)	-	28.85	-11.94	10.17	9.23	-
- Fisheries (%)	-	4.94	6.33	3.67	17.23	-

a/ Since April 1990, the new CPI has been used (1988/89 = 100)

b/ Data up to June 1992

Source: Statistical year book of Indonesia, 1992. Central Bureau of Statistic South Sulawesi in Figures, 1990 and 1992, Statistic Office, South Sulawesi.

**Table A.6.4 Crop Production in Indonesia**

(Unit: 1,000 tons)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1) Food Crops										
Paddy	35,303	38,136	39,033	39,727	40,078	41,676	44,726	45,179	44,683	39,769
Maize	5,087	5,288	4,330	5,920	5,156	6,652	6,193	6,734	6,256	6,149
Groundnuts	460	535	528	642	533	589	620	651	652	546
Soybeans *1	536	769	870	1,227	1,161	1,270	1,315	1,487	1,556	1,251
Cassava	12,103	14,167	14,057	13,312	14,356	15,471	17,117	15,830	15,955	10,221
Sweet Potatoes	2,213	2,157	2,162	2,091	2,013	2,159	2,224	1,972	2,039	1,319
2) Cash Crops										
Rubber *2	982.1	3,849.1	1,054.6	1,095.3	1,141.3	1,173.3	1,180.2	1,228.4	1,263.6	*
Palm Oil	894.9	1,083.5	1,202.1	1,285.4	1,506.1	1,723.7	1,978.2	2,353.6	2,675.2	*
Coconuts *3	1,590.2	1,737.5	1,895.2	2,090.9	2,054.5	2,144.0	2,212.9	2,316.1	2,321.4	*
Palm Kernel	157.1	230.5	243.5	260.5	319.0	350.3	428.1	502.2	565.0	*
Coffee *4	304.0	329.1	312.7	360.9	388.6	391.1	409.0	410.0	394.9	*
Tea *5	111.6	126.1	132.3	129.5	127.9	133.8	146.8	160.5	154.7	*
Cane Sugar	1,572.1	1,500.0	1,766.5	2,012.9	2,085.8	2,004.1	2,071.4	2,173.2	2,233.3	*
Tobacco	109.4	91.7	162.5	159.0	112.6	116.9	80.9	81.2	83.1	*
Pepper *4	45.8	43.0	40.4	39.6	49.3	65.3	67.8	69.9	76.9	*
Cashew nuts	18.0	19.4	21.1	30.2	24.0	23.2	27.9	29.6	30.4	*
Cloves	40.4	42.7	42.7	53.3	69.7	81.2	56.4	66.3	83.2	*

Remarks: \*1 Shelled \*4 Dry Beans  
 \*2 Dry rubber \*5 Dry leaf  
 \*3 Equivalent copra

Source: Statistik Indonesia 1984-1993, Biro Pusat Statistik.

**Table A.6.5 Estimated Supply and Balance of Paddy under  
Without New Irrigation Development Condition**

(Unit: rough rice, thousand tons)

Region	1990	1993	1998	2003	2008	2013	2018
<b>Demand</b>							
Sumatera	10,585	11,484	12,936	14,374	15,661	16,698	17,397
Jawa	25,814	27,338	29,660	31,481	32,926	33,814	34,054
Bali & Nusa Tenggara	2,611	2,780	3,032	3,250	3,433	3,570	3,651
Kalimantan	2,506	2,758	3,189	3,642	4,064	4,424	4,690
Sulawesi	3,444	3,700	4,114	4,503	4,844	5,119	5,304
Maluku & Irian Jaya	556	620	725	835	943	1,046	1,136
Indonesia	45,516	48,680	53,656	58,085	61,871	64,671	66,232
<b>Supply</b>							
Sumatera	9,469	10,000	11,106	11,685	12,092	12,382	12,539
Jawa	27,032	28,068	30,130	31,133	30,964	30,338	29,164
Bali & Nusa Tenggara	2,444	2,557	2,746	2,814	2,866	2,908	2,934
Kalimantan	2,147	2,229	2,387	2,513	2,633	2,770	2,878
Sulawesi	4,116	4,384	4,873	5,242	5,497	5,647	5,727
Maluku & Irian Jaya	36	40	52	55	59	62	66
Indonesia	45,244	47,278	51,294	53,442	54,111	54,107	53,308
<b>Balance</b>							
Sumatera	-1,116	-1,484	-1,830	-2,689	-3,569	-4,316	-4,858
Jawa	1,218	730	470	-348	-1,962	-3,476	-4,890
Bali & Nusa Tenggara	-167	-223	-286	-436	-567	-662	-717
Kalimantan	-359	-529	-802	-1,129	-1,431	-1,654	-1,812
Sulawesi	672	684	759	739	653	528	423
Maluku & Irian Jaya	-520	-580	-673	-780	-884	-984	-1,070
Indonesia	-272	-1,402	-2,362	-4,643	-7,760	-10,564	-12,924

Source: The study for Formulation of Irrigation Development Program in the Republic of Indonesia, Draft Final Report, JICA, August 1993.

**Table A.6.6 (1/2) Crop Production in South Sulawesi Province**

	1988	1989	1990	1991	1992	Average (1988-1992)	Growth Rate (% p.a.)
<b>Gross Harvested Area (ha)</b>							
1) Wet Land Paddy	704,999	800,871	750,050	724,961	806,946	757,565	3.43
2) Dry Land Paddy	15,347	15,909	11,013	14,767	16,029	14,613	1.09
3) Maize	337,673	241,906	272,301	288,862	339,126	295,974	0.11
4) Soybeans	39,688	24,650	42,477	65,923	70,355	48,619	15.39
5) Groundnuts	56,633	37,114	43,355	52,316	68,379	51,559	4.82
6) Mung Beans	58,883	36,483	43,464	41,446	60,242	48,104	0.57
7) Cassava	39,475	50,616	42,623	42,579	50,232	45,105	6.21
8) Sweet Potatoes	8,619	8,774	77,336	7,277	9,207	22,243	1.66
9) Shallots (Bawang Merah)	3,000	2,612	3,089	2,118	4,584	3,081	11.18
10) Onions (Bawang Putih)	44	70	75	65	130	77	31.11
11) Spring Onions (Bawang Daun)	707	803	878	917	1,132	887	12.49
12) Potatoes (Kentang)	1,374	1,727	1,422	1,217	2,682	1,684	18.20
13) Cabbages (Kubis)	1,001	1,087	1,118	908	1,456	1,114	9.82
14) Mustard Greens (Petsai)	1,223	1,168	1,035	991	1,375	1,158	2.97
15) Carrots (Wortel)	216	325	430	485	323	356	10.58
16) Radishes (Lobak)	17	5	9	10	17	12	0.00
17) Red/Ridney Beans	8,380	9,546	4,281	3,679	3,631	5,903	-18.87
18) Kacang Panjang	4,256	3,182	3,918	4,155	4,563	4,015	1.76
19) Cabe/Lombok	3,955	3,468	5,251	4,406	6,169	4,650	11.76
20) Tomatoes	3,215	3,102	4,131	3,643	4,224	3,663	7.06
21) Terung	3,746	3,853	4,157	3,473	3,687	3,783	-0.40
22) Buncis	1,864	1,774	1,237	1,300	1,538	1542.6	-4.69
23) Ketimun	1,162	1,185	1,262	1,289	1,156	1,211	-0.13
24) Labu Siam/Labu Kuning	369	281	744	659	492	509	7.46
25) Kankung	1,363	1,290	2,126	1,825	1,871	1,695	8.24
26) Bayam	1,601	1,294	1,844	1,846	1,724	1,662	1.87
<b>Net Harvested Area (ha)</b>							
1) Wet Land Paddy	682,324	777,661	725,779	701,657	780,917	733,668	3.43
2) Dry Land Paddy	15,347	15,909	11,013	14,767	16,209	14,649	1.38
3) Maize	336,404	235,526	271,621	287,152	338,407	293,822	0.15
4) Soybeans	39,063	24,361	41,794	64,833	69,265	47,863	15.40
5) Groundnuts	55,645	36,682	42,809	51,426	67,485	50,809	4.94
6) Mung Beans	57,898	35,771	42,850	40,820	58,343	47,136	0.19
7) Cassava	39,473	50,616	42,623	42,579	50,232	45,105	6.21
8) Sweet Potatoes	8,559	8,725	7,716	7,246	9,176	8,284	1.76
9) Shallots (Bawang Merah)	3,000	2,612	3,089	2,118	4,584	3,081	11.18
10) Onions (Bawang Putih)	44	70	75	65	130	77	31.11
11) Spring Onions (Bawang Daun)	707	803	878	917	1,132	887	12.49
12) Potatoes (Kentang)	1,374	1,727	1,422	1,217	2,682	1,684	18.20
13) Cabbages (Kubis)	1,001	1,087	1,118	908	1,456	1,114	9.82
14) Mustard Greens (Petsai)	1,223	1,168	1,035	991	1,375	1,158	2.97
15) Carrots (Wortel)	216	325	430	485	323	356	10.58
16) Radishes (Lobak)	17	5	9	10	17	12	0.00
17) Red/Ridney Beans	8,380	9,546	4,281	3,679	3,631	5,903	-18.87
18) Kacang Panjang	4,256	3,182	3,918	4,155	4,563	4,015	1.76
19) Cabe/Lombok	3,955	3,468	5,251	4,406	6,169	4,650	11.76
20) Tomatoes	3,215	3,102	4,131	3,643	4,224	3,663	7.06
21) Terung	3,746	3,853	4,157	3,473	3,687	3,783	-0.40
22) Buncis	1,864	1,774	1,237	1,300	1,538	1542.6	-4.69
23) Ketimun	1,162	1,185	1,262	1,289	1,156	1,211	-0.13
24) Labu Siam/Labu Kuning	369	281	744	659	492	509	7.46
25) Kankung	1,363	1,290	2,126	1,825	1,871	1,695	8.24
26) Bayam	1,601	1,294	1,844	1,846	1,724	1,662	1.87



**Table A.6.6 (2/2) Crop Production in South Sulawesi Province**

	1988	1989	1990	1991	1992	Average 1988-1992	Growth Rate (% p.a.)
<b>Production (ton)</b>							
1) Wet Land Paddy	3,519,461	4,075,929	3,935,550	3,777,238	4,303,386	3,922,313	5.16
2) Dry Land Paddy	38,384	31,507	27,966	35,631	38,609	34,419	0.15
3) Maize	565,947	362,454	447,120	498,949	619,529	498,800	2.29
4) Soybeans	52,222	30,937	59,668	88,289	99,633	66,150	17.53
5) Groundnuts	57,533	38,042	44,759	60,297	81,382	56,403	9.06
6) Mung Beans	51,785	30,904	39,767	40,316	56,967	43,948	2.41
7) Cassava	415,474	505,799	464,851	447,291	597,821	486,247	9.52
8) Sweet Potatoes	68,216	71,055	56,872	50,069	80,406	65,324	4.20
9) Shallots (Bawang Merah)	16,967	15,455	17,933	11,556	25,277	17,438	10.48
10) Onions (Bawang Putih)	174	300	319	339	600	346	36.27
11) Spring Onions (Bawang Daun)	6,507	7,601	7,626	1,724	2,528	5,197	-21.05
12) Potatoes (Kentang)	11,708	20,050	11,495	8,099	19,904	14,251	14.19
13) Cabbages (Kubis)	23,726	28,732	24,356	16,204	29,669	24,537	5.75
14) Mustard Greens (Petsai)	7,405	7,005	5,952	6,421	10,079	7,372	8.01
15) Carrots (Wortel)	1,259	3,550	5,518	3,924	3,411	3,532	28.30
16) Radishes (Lobak)	81	14	26	78	103	60	6.19
17) Red/Ridney Beans	6,700	7,326	3,990	3,109	4,839	5,193	-7.81
18) Kacang Panjang	8,483	10,670	10,415	10,663	10,071	10,060	4.38
19) Cabe/Lombok	10,303	11,286	20,165	13,221	18,183	14,632	15.26
20) Tomatoes	9,576	11,608	21,814	15,546	15,203	14,749	12.25
21) Terung	15,770	12,425	18,527	15,908	14,388	15,404	-2.27
22) Buncis	2060.0	1,588	2,099	1,728	2,309	1956.8	2.89
23) Ketimun	3,684	6,424	5,435	4,490	4,292	4,865	3.89
24) Labu Siam/Labu Kuning	1,855	2,168	5,120	4,259	2,898	3,260	11.80
25) Kankung	3,236	5,865	5,371	5,898	4,669	5,008	9.60
26) Bayam	2,523	2,663	3,350	3,300	3,195	3,006	6.08
<b>Unit Yield (ton/ha)</b>							
1) Wet Land Paddy	5.16	5.24	5.42	5.38	5.51	5.35	1.65
2) Dry Land Paddy	2.50	1.98	2.54	2.41	2.38	2.35	-1.22
3) Maize	1.68	1.54	1.65	1.74	1.83	1.70	2.16
4) Soybeans	1.34	1.27	1.43	1.36	1.44	1.38	1.82
5) Groundnuts	1.03	1.04	1.05	1.17	1.21	1.11	4.11
6) Mung Beans	0.89	0.86	0.93	0.99	0.98	0.93	2.44
7) Cassava	10.53	9.99	10.91	10.50	11.90	10.78	3.10
8) Sweet Potatoes	7.97	8.14	7.37	6.91	8.76	7.89	2.39
9) Shallots (Bawang Merah)	5.66	5.92	5.81	5.46	5.51	5.66	-0.67
10) Onions (Bawang Putih)	3.95	4.29	4.25	5.22	4.62	4.49	3.99
11) Spring Onions (Bawang Daun)	9.20	9.47	8.69	1.88	2.23	5.86	-29.83
12) Potatoes (Kentang)	8.52	11.61	8.08	6.65	7.42	8.46	-3.40
13) Cabbages (Kubis)	23.70	26.43	21.79	17.85	20.38	22.03	-3.70
14) Mustard Greens (Petsai)	6.05	6.00	5.75	6.48	7.33	6.37	4.91
15) Carrots (Wortel)	5.83	10.92	12.83	8.09	10.56	9.92	16.01
16) Radishes (Lobak)	4.76	2.80	2.89	7.80	6.06	5.00	6.22
17) Red/Ridney Beans	0.80	0.77	0.93	0.85	1.33	0.88	13.55
18) Kacang Panjang	1.99	3.35	2.66	2.57	2.21	2.51	2.66
19) Cabe/Lombok	2.61	3.25	3.84	3.00	2.95	3.15	3.11
20) Tomatoes	2.98	3.74	5.28	4.27	3.60	4.03	4.84
21) Terung	4.21	3.22	4.46	4.58	3.90	4.07	-1.89
22) Buncis	1.11	0.90	1.70	1.33	1.50	1.27	7.82
23) Ketimun	3.17	5.42	4.31	3.48	3.71	4.02	4.01
24) Labu Siam/Labu Kuning	5.03	7.72	6.88	6.46	5.89	6.40	4.02
25) Kankung	2.37	4.55	2.53	3.23	2.50	2.95	1.34
26) Bayam	1.58	2.06	1.82	1.79	1.85	1.81	4.02

Source: Laporan Tahunan Statistik Tanaman Pangan, 1988-1992. Provincial Agricultural Services, Ujung Pandang.

**Table A.6.7 List of Kecamatan and Desa related to the Study Area**

Kecamatan		Desa		
Name	Area (km <sup>2</sup> )	Name	Area (km <sup>2</sup> )	(% of Kec.)
<b>Desa Involved in the Study Area</b>				
Kec. Sajoanging	321.9	1. Akkajeng	68.2	21.2
		2. Padaelo	24.3	7.5
		3. Doping	20.7	6.4
		4. Lawesso	23.3	7.2
		5. Tammabarang	35.1	10.9
		6. Sakkoli	38.6	12.0
		7. Salo Bulu	25.2	7.8
		8. Barang Mamase	21.0	6.5
		9. Akotengeng	32.3	10.0
		Sub-total	288.7	89.7
Kec. Majauleng	225.9	1. Laerung	16.0	7.1
		2. Botto Benteng	20.1	8.9
		3. Rumpia	14.3	6.3
		4. Lamiku	12.2	5.4
		5. Botto Tanre	9.3	4.1
		Sub-total	71.9	31.8
Kec. Maniangpajo	323.0	1. Poleonro	17.4	5.4
		2. Mamminasae	27.1	8.4
		3. Gilirang	17.9	5.5
		4. Arajang	20.2	6.3
		5. Paselloreng	88.1	27.3
		Sub-total	170.8	52.9
<b>Total or Average</b>	<b>870.8</b>		<b>531.3</b>	<b>61.0</b>
<b>Desa Excluded from the Study Area</b>				
Kec. Sajoanging	321.9	1. Penrang	33.2	10.3
		Sub-total	33.2	10.3
Kec. Majauleng	225.9	1. Tua	25.2	11.2
		2. Tosora	12.3	5.4
		3. Chinno Tabi	17.9	7.9
		4. Tengnga	17.1	7.6
		5. Paria	58.2	25.8
		6. Tajo	23.4	10.4
		Sub-total	154.1	68.2
Kec. Maniangpajo	323.0	1. Anabanua	55.7	17.3
		2. Mattirowalie	38.1	11.8
		3. Kalola	38.1	11.8
		4. Lamata	20.3	6.3
		Sub-total	152.2	47.1
<b>Total or Average</b>	<b>870.8</b>		<b>339.5</b>	<b>39.0</b>

Source: Dalam Angka, Kabupaten Wajo, 1992, Statistic Office and BAPPEDA, Wajo  
 Dalam Angka, Kec. Sajoanging, Majauleng and Maniangpajo, 1992

**Table A.6.8 Present Demographic Condition  
in the Study Area (1992)**

Kecamatan/ Desa	Area (km <sup>2</sup> )	Total Population (Persons)	Population		Total Household (No.)	Population Density (prns/Km <sup>2</sup> )	Average	Total
			Male (Persons)	Female (Persons)			Family Size (Persons)	Farm Household (No.)
<b>KEC. SAJOANGING</b>								
1. Akkajeng	68.2	6,534	3,137	3,397	1,300	95.8	5.03	1,132
2. Padaelo	24.3	3,029	1,417	1,612	652	124.9	4.65	568
3. Doping	20.7	4,178	1,984	2,194	798	201.7	5.24	695
4. Lawesso	23.3	3,265	1,477	1,788	714	140.1	4.57	622
5. Tammabarang	35.1	3,212	1,484	1,728	733	91.5	4.38	638
6. Sakkoli	38.6	3,499	1,630	1,869	755	90.6	4.63	658
7. Salo Bulo	25.2	2,918	1,373	1,545	635	115.8	4.60	553
8. Barang Mamase	21.0	2,627	1,260	1,367	549	125.2	4.79	478
9. Akotengeng	32.3	3,641	1,722	1,919	761	112.7	4.78	663
Sub-total	288.7	32,903	15,484	17,419	6,897	114.0	4.77	6,007
<b>KEC. MAJAULENG</b>								
1. Laerung	16.0	2,513	1,128	1,385	571	157.6	4.40	423
2. Botto Benteng	20.1	1,488	741	747	307	74.2	4.85	227
3. Rumpia	14.3	3,557	1,633	1,924	802	248.2	4.44	593
4. Lamiku	12.2	1,911	867	1,044	421	156.5	4.54	312
5. Botto Tanre	9.3	1,548	727	821	325	166.3	4.76	241
Sub-total	71.9	11,017	5,096	5,921	2,426	153.3	4.54	1,795
<b>KEC. MANIANGPAJO</b>								
1. Poleonro	17.4	1,751	786	965	293	100.6	5.98	239
2. Mamminasae	27.1	1,792	883	909	307	66.0	5.84	250
3. Gilirang	17.9	2,246	1,116	1,130	381	125.8	5.90	310
4. Arajang	20.3	1,217	573	644	263	60.0	4.63	214
5. Paselloreng	88.1	2,466	1,172	1,294	419	28.0	5.89	341
Sub-total	170.8	9,472	4,530	4,942	1,663	55.5	5.70	1,354
Total or Average	531.3	53,392	25,110	28,282	10,986	100.5	4.86	9,156
<b>Memo. Item</b>								
Kec. Sajoanging	323.9	35,009	16,484	18,525	7,373	108.1	4.75	6,272
Kec. Majauleng	225.9	31,157	14,631	16,526	6,786	138.0	4.59	4,832
Kec. Maniangpajo	323.0	24,029	11,362	12,667	4,622	74.4	5.20	4,014
Total or Average	872.8	90,195	42,477	47,718	18,781	103.3	4.80	15,118
<b>Kab. Wajo</b>								
Total or Average	2,506.2	369,337	173,083	196,254	77,268	265.3	4.78	56,375

Source:

1. Office Kec. Majauleng, Maniangpajo dan Sajoanging 1992
2. Statistical Kec. dalam angka Majauleng, Maniangpajo dan Sajoanging 1992
3. Kabupaten Wajo dalam angka tahun 1992 hal. 51

**Table A.6.9 Planted Area, Harvested Area, Production and Yield of Major Crops in Kab. Wajo (1988-1992)**

Crop	Unit	1988	1989	1990	1991	1992	Average	Growth Rate (% p.a.)
<b>1. Wet land paddy</b>								
Harvested area	(ha)	84,180	107,330	88,046	83,343	102,227	93,025	4.98
Production	(ton)	341,563	410,408	351,104	290,846	381,077	355,000	2.77
Yield	(t/ha)	4.06	3.82	3.99	3.49	3.73	3.82	2.14
<b>2. Dry land paddy</b>								
Harvested area	(ha)	18	26	13	141	190	78	80.25
Production	(ton)	41	47	30	254	194	113	47.49
Yield	(t/ha)	2.28	1.81	2.31	1.80	1.02	1.46	22.21
<b>3. Maize</b>								
Harvested area	(ha)	4,857	1,122	2,452	6,906	7,023	4,472	9.66
Production	(ton)	6,936	4,199	6,417	13,946	13,152	8,930	17.35
Yield	(t/ha)	1.43	3.74	2.62	2.02	1.87	2.00	7.01
<b>4. Cassava</b>								
Harvested area	(ha)	1,017	748	772	778	921	847	2.51
Production	(ton)	12,945	7,789	10,076	8,900	7,611	9,464	14.20
Yield	(t/ha)	12.73	10.41	13.05	11.44	8.26	11.17	11.40
<b>5. Sweet potato</b>								
Harvested area	(ha)	553	281	355	189	274	330	19.19
Production	(ton)	3,764	1,925	2,411	1,480	1,627	2,241	23.33
Yield	(t/ha)	6.81	6.85	6.79	7.83	5.94	6.78	3.47
<b>6. Groundnuts</b>								
Harvested area	(ha)	1,434	88	1,384	3,416	6,594	2,583	46.44
Production	(ton)	1,318	105	2,841	5,343	10,745	4,070	68.98
Yield	(t/ha)	0.92	1.19	2.05	1.56	1.63	1.58	15.39
<b>7. Mung beans</b>								
Harvested area	(ha)	12,546	4,667	6,487	9,337	9,240	8,455	7.95
Production	(ton)	10,218	3,630	5,207	9,385	9,539	7,596	1.73
Yield	(t/ha)	0.81	0.78	0.80	1.01	1.03	0.90	6.11
<b>8. Soybeans</b>								
Harvested area	(ha)	1,349	66	2,728	10,989	5,588	4,144	42.66
Production	(ton)	896	103	3,802	15,666	7,484	5,590	70.00
Yield	(t/ha)	0.66	1.56	1.39	1.43	1.34	1.35	19.16

Source: Statistical Yearbook of Kab. Wajo, 1988 - 1992.

**Table A.6.10 (1/3) Planted Area, Harvested Area, Production and Yield of Major Crops by Kecamatan related to the Study Area (1984-1992)**

Crop/ Kecamatan	Unit	1984	1985	1986	1987	1988	1989	1990	1991	1992	5 Years Average (1988-92)	Growth Rate (1984-1992) (% p.a.)
<b>HARVESTED AREA</b>												
1. Paddy												
Kec. Sajoanging	(ha)	13,945	15,312	16,930	16,560	16,823	20,651	15,227	15,371	16,766	16,968	2.33
Kec. Majauleng	(ha)	10,305	9,382	12,230	12,822	12,781	13,534	11,842	10,047	11,588	11,958	1.48
Kec. Maniangpajo	(ha)	5,976	5,904	7,229	5,712	7,061	8,018	6,794	6,398	8,249	7,304	4.11
Total	(ha)	30,226	30,598	36,389	35,094	36,665	42,203	33,863	31,816	36,603	36,230	2.42
2. Maize												
Kec. Sajoanging	(ha)	29	103	104	0	84	0	108	780	27	200	-0.89
Kec. Majauleng	(ha)	73	203	243	15	284	12	96	170	301	173	19.37
Kec. Maniangpajo	(ha)	7	17	42	56	196	32	132	664	459	297	68.69
Total	(ha)	109	323	389	71	564	44	336	1,614	787	669	28.03
3. Cassava												
Kec. Sajoanging	(ha)	41	38	127	44	83	88	14	22	69	55	6.72
Kec. Majauleng	(ha)	19	11	27	26	143	85	85	93	52	92	13.41
Kec. Maniangpajo	(ha)	4	0	5	37	50	50	55	57	149	72	57.18
Total	(ha)	64	49	159	107	276	223	154	172	270	219	19.71
4. Sweet Potatoes												
Kec. Sajoanging	(ha)	7	2	27	21	63	30	13	12	29	29	19.44
Kec. Majauleng	(ha)	8	11	21	6	31	8	81	29	33	36	19.38
Kec. Maniangpajo	(ha)	0	1	7	23	31	40	36	35	102	49	
Total	(ha)	15	14	55	50	125	78	130	76	164	115	34.85
5. Groundnuts												
Kec. Sajoanging	(ha)	0	6	218	27	110	0	109	262	274	151	
Kec. Majauleng	(ha)	133	82	709	45	82	14	32	262	947	267	27.81
Kec. Maniangpajo	(ha)	30	42	134	31	40	8	39	560	1,286	387	59.96
Total	(ha)	163	130	1,061	103	232	22	180	1,084	2,507	805	40.72
6. Mung Beans												
Kec. Sajoanging	(ha)	284	498	383	46	1,355	0	70	1,269	555	650	8.74
Kec. Majauleng	(ha)	199	424	1,054	29	1,145	12	156	193	602	422	14.84
Kec. Maniangpajo	(ha)	28	60	512	266	747	33	429	717	424	470	40.45
Total	(ha)	511	982	1,949	341	3,247	45	655	2,179	1,581	1,541	15.16
7. Soybeans												
Kec. Sajoanging	(ha)	0	0	27	0	7	0	3	29	68	21	
Kec. Majauleng	(ha)	0	0	22	6	15	0	5	531	550	220	
Kec. Maniangpajo	(ha)	0	30	26	20	452	6	2	320	165	189	
Total	(ha)	0	30	75	26	474	6	10	880	783	431	

**Table A.6.10 (2/3) Planted Area, Harvested Area, Production and Yield of Major Crops by Kecamatan related to the Study Area (1984-1992)**

Crop/ Kecamatan	Unit	1984	1985	1986	1987	1988	1989	1990	1991	1992	5 Years Average (1988-92)	Growth Rate (1984-1992) (% p.a.)
<b>PRODUCTION</b>												
<b>1. Paddy</b>												
Kec. Sajoanging	(ton)	62,615	61,144	74,644	56,354	75,359	93,954	71,015	73,183	92,066	81,115	4.94
Kec. Majauleng	(ton)	46,271	37,465	53,922	43,633	57,246	61,444	55,256	49,414	63,635	57,399	4.06
Kec. Maniangpajo	(ton)	26,840	23,578	31,852	19,438	31,626	36,402	31,758	31,399	45,308	35,299	6.76
Total	(ton)	135,726	122,187	160,398	119,425	164,231	191,800	158,029	153,996	201,009	173,813	5.03
<b>2. Maize</b>												
Kec. Sajoanging	(ton)	48	123	143	0	114	0	330	1,721	49	443	0.26
Kec. Majauleng	(ton)	125	242	335	22	387	34	289	375	552	327	20.40
Kec. Maniangpajo	(ton)	10	20	58	77	267	91	316	1,406	842	584	74.05
Total	(ton)	183	385	536	99	768	125	935	3,502	1,443	1,355	29.45
<b>3. Cassava</b>												
Kec. Sajoanging	(ton)	660	493	1,278	460	1,057	878	185	236	578	587	-1.64
Kec. Majauleng	(ton)	336	143	272	272	1,821	848	1,109	999	437	1,043	3.34
Kec. Maniangpajo	(ton)	64	0	50	387	637	499	719	644	1,249	750	44.98
Total	(ton)	1,060	636	1,600	1,119	3,515	2,225	2,013	1,879	2,264	2,379	9.95
<b>4. Sweet Potatoes</b>												
Kec. Sajoanging	(ton)	46	13	168	137	428	204	88	78	175	195	18.18
Kec. Majauleng	(ton)	53	71	131	39	210	54	550	187	200	240	18.06
Kec. Maniangpajo	(ton)	0	6	44	150	210	275	245	239	617	317	33.39
Total	(ton)	99	90	343	326	848	533	883	504	992	752	33.39
<b>5. Groundnuts</b>												
Kec. Sajoanging	(ton)	0	8	271	41	121	0	230	544	554	290	34.02
Kec. Majauleng	(ton)	186	106	881	68	91	18	77	546	1,936	534	67.47
Kec. Maniangpajo	(ton)	42	55	166	47	44	10	68	1,161	2,599	776	47.43
Total	(ton)	228	169	1,318	156	256	28	375	2,251	5,089	1,600	12.78
<b>6. Mung Beans</b>												
Kec. Sajoanging	(ton)	206	350	290	37	1,076	0	55	1,006	539	535	19.15
Kec. Majauleng	(ton)	145	299	797	24	915	9	123	153	589	358	46.14
Kec. Maniangpajo	(ton)	20	42	388	216	597	26	336	569	416	389	19.51
Total	(ton)	371	691	1,475	277	2,588	35	514	1,728	1,544	1,282	19.51
<b>7. Soybeans</b>												
Kec. Sajoanging	(ton)	0	0	30	0	10	0	4	58	152	45	463
Kec. Majauleng	(ton)	0	0	25	8	22	0	7	1,055	1,229	463	337
Kec. Maniangpajo	(ton)	0	27	29	25	675	10	3	630	369	337	845
Total	(ton)	0	27	84	33	707	10	14	1,743	1,750	845	

Table A.6.10 (3/3) Planted Area, Harvested Area, Production and Yield of Major Crops by Kecamatan related to the Study Area (1984-1992)

Crop/ Kecamatan	Unit	1984	1985	1986	1987	1988	1989	1990	1991	1992	5 Years Average (1988-92)	Growth Rate (1984-1992) (% p.a.)
		<b>UNIT YIELD</b>										
<b>1. Paddy</b>												
1) Kec. Sajoanging	(ton/ha)	4.49	3.99	4.41	3.40	4.48	4.55	4.66	4.76	5.49	4.78	2.55
2) Kec. Majauleng	(ton/ha)	4.49	3.99	4.41	3.40	4.48	4.54	4.67	4.92	5.49	4.80	2.55
3) Kec. Maniangpajo	(ton/ha)	4.49	3.99	4.40	3.40	4.48	4.54	4.67	4.91	5.49	4.83	2.55
4) Total or Average	(ton/ha)	4.49	3.99	4.41	3.40	4.48	4.54	4.67	4.84	5.49	4.80	2.55
<b>2. Maize</b>												
1) Kec. Sajoanging	(ton/ha)	1.66	1.19	1.38	-	1.36	-	3.06	2.21	1.81	2.22	1.09
2) Kec. Majauleng	(ton/ha)	1.71	1.19	1.38	1.47	1.36	2.83	3.01	2.21	1.83	1.90	0.85
3) Kec. Maniangpajo	(ton/ha)	1.43	1.18	1.38	1.38	1.36	2.84	2.39	2.12	1.83	1.97	3.13
4) Total or Average	(ton/ha)	1.68	1.19	1.38	1.39	1.36	2.84	2.78	2.17	1.83	2.02	1.07
<b>3. Cassava</b>												
1) Kec. Sajoanging	(ton/ha)	16.10	12.97	10.06	10.45	12.73	9.98	13.21	10.73	8.38	10.63	-7.84
2) Kec. Majauleng	(ton/ha)	17.68	13.00	10.07	10.46	12.73	9.98	13.05	10.74	8.40	11.38	-8.88
3) Kec. Maniangpajo	(ton/ha)	16.00	-	10.00	10.46	12.74	9.98	13.07	11.30	8.38	10.38	-7.77
4) Total or Average	(ton/ha)	16.56	12.98	10.06	10.46	12.74	9.98	13.07	10.92	8.39	10.86	-8.15
<b>4. Sweet Potatoes</b>												
1) Kec. Sajoanging	(ton/ha)	6.57	6.50	6.22	6.52	6.79	6.80	6.77	6.50	6.03	6.62	-1.07
2) Kec. Majauleng	(ton/ha)	6.63	6.45	6.24	6.50	6.77	6.75	6.79	6.45	6.06	6.60	-1.12
3) Kec. Maniangpajo	(ton/ha)	-	6.00	6.29	6.52	6.77	6.88	6.81	6.83	6.05	6.50	-1.08
4) Total or Average	(ton/ha)	6.60	6.43	6.24	6.52	6.78	6.83	6.79	6.63	6.05	6.56	-1.08
<b>5. Groundnuts</b>												
1) Kec. Sajoanging	(ton/ha)	-	1.33	1.24	1.52	1.10	-	2.11	2.08	2.02	1.92	4.82
2) Kec. Majauleng	(ton/ha)	1.40	1.29	1.24	1.51	1.11	1.29	2.41	2.08	2.04	2.00	4.69
3) Kec. Maniangpajo	(ton/ha)	1.40	1.31	1.24	1.52	1.10	1.25	1.74	2.07	2.02	2.01	4.75
4) Total or Average	(ton/ha)	1.40	1.30	1.24	1.51	1.10	1.27	2.08	2.08	2.03	1.99	4.75
<b>6. Mung Beans</b>												
1) Kec. Sajoanging	(ton/ha)	0.73	0.70	0.76	0.80	0.79	-	0.79	0.79	0.97	0.82	3.62
2) Kec. Majauleng	(ton/ha)	0.73	0.71	0.76	0.83	0.80	0.75	0.79	0.79	0.98	0.85	3.75
3) Kec. Maniangpajo	(ton/ha)	0.71	0.70	0.76	0.81	0.80	0.79	0.78	0.79	0.98	0.83	4.11
4) Total or Average	(ton/ha)	0.73	0.70	0.76	0.81	0.80	0.78	0.78	0.79	0.98	0.83	3.75
<b>7. Soybeans</b>												
1) Kec. Sajoanging	(ton/ha)	-	-	1.11	-	1.43	-	1.33	2.00	2.24	2.09	2.09
2) Kec. Majauleng	(ton/ha)	-	-	1.14	1.33	1.47	-	1.40	1.99	2.23	2.10	2.10
3) Kec. Maniangpajo	(ton/ha)	-	0.90	1.12	1.25	1.49	1.67	1.50	1.97	2.24	1.79	1.79
4) Total or Average	(ton/ha)	-	0.90	1.12	1.27	1.49	1.67	1.40	1.98	2.23	1.96	1.96

Source: Kab. Wajo Agriculture Services.

**Table A.6.11 (1/2) Monthly Cropping Area and Damage - Wet Land Paddy**

	Planted Area (ha)												Harvested Area (ha)				Area by Damage (ha) #1		
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total	Area (ha)	PD	DR	FL	(%)	
1988/89-1989													(1)	(2)					
Maniangepajo	923	655	934	0	0	0	0	92	1,459	4,610	0	0	0	8,673	8,262	0	411	0	4.7
Sajoangng	727	3,969	1,662	0	0	0	0	1,946	10,480	2,449	0	0	0	21,233	20,651	0	582	0	2.7
Majauleng	2,524	1,035	756	0	0	0	0	1,381	4,836	3,794	0	0	0	14,326	13,534	0	792	0	5.5
Total	4,174	5,659	3,352	0	0	0	0	3,419	16,775	10,853	0	0	0	44,232	42,447	0	1,785	0	4.0
1989/90-1990																			
Maniangepajo	0	220	171	0	173	0	0	23	5,763	431	0	0	0	6,781	6,781	0	0	0	0.0
Sajoangng	0	24	285	60	0	0	5	6,081	8,794	0	0	0	0	15,249	15,227	0	22	0	0.1
Majauleng	0	410	1,053	79	0	0	0	196	10,104	0	0	0	0	11,842	11,842	0	0	0	0.0
Total	0	654	1,509	139	173	0	5	6,300	24,661	431	0	0	0	33,872	33,850	0	22	0	0.1
1990/91-1991																			
Maniangepajo	0	0	214	182	0	0	0	2,101	4,146	0	0	0	0	6,643	6,384	0	259	0	3.9
Sajoangng	0	0	400	184	0	0	12	8,266	6,602	0	0	0	0	15,464	15,371	0	93	0	0.6
Majauleng	0	0	123	72	139	0	0	6,309	4,013	0	0	0	0	10,656	10,040	0	616	0	5.8
Total	0	0	737	438	139	0	12	16,676	14,761	0	0	0	0	32,763	31,795	0	968	0	3.0
1991/92-1992																			
Maniangepajo	0	0	186	797	847	0	0	5,058	1,318	0	0	0	0	8,206	8,206	0	0	0	0.0
Sajoangng	0	0	0	637	904	0	325	13,754	1,146	0	0	0	0	16,766	16,766	0	0	0	0.0
Majauleng	0	0	58	557	521	0	71	8,819	1,562	0	0	0	0	11,588	11,588	0	0	0	0.0
Total	0	0	244	1,991	2,272	0	396	27,631	4,026	0	0	0	0	36,560	36,560	0	0	0	0.0
1992/93-1993																			
Maniangepajo	0	157	336	402	0	0	0	625	5,798	0	0	0	0	7,318	4,046	0	3,272	0	44.7
Sajoangng	0	1,267	2,458	925	0	0	0	10,936	4,289	0	0	0	0	19,875	19,400	0	475	0	2.4
Majauleng	28	714	301	0	0	0	0	3,025	7,122	201	0	0	0	11,391	7,359	0	4,032	0	35.4
Total	28	2,138	3,095	1,327	0	0	0	14,586	17,209	201	0	0	0	38,584	30,805	0	7,779	0	20.2
1993/94-1994																			
Maniangepajo	0	212	250	151	45	0	0	4,143	2,288	0	0	0	0	7,089	7,089	0	0	0	0.0
Sajoangng	0	225	285	510	135	0	860	14,365	0	0	0	0	0	16,380	16,380	0	0	0	0.0
Majauleng	4	17	274	652	0	0	0	8,615	2,031	136	0	0	0	11,729	11,729	0	0	0	0.0
Total	4	454	809	1,313	180	0	860	27,123	4,319	136	0	0	0	35,198	35,198	0	0	0	0.0
Average	701	1,484	1,624	868	461	0	212	15,956	13,625	1,937	0	0	0	36,868	35,109	0	1,759	0	4.8

Remarks: PD = Pests and Diseases, DR = Drought, FL = Flood Source: Agricultural Services Office, Kabupaten Wajo.



**Table A.6.11 (2/2) Monthly Cropping Area and Damage - Palawija**

	Planted Area (ha)											Harvested Area Damaged (ha) *1						
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Total Area (ha)	PD	DR	FL	(%)	
												(1)	(2)					
<b>MAIZE</b>																		
<b>1988/89-1989</b>																		
Maniangpajc	0	2	8	0	2	2	4	4	2	0	4	2	30	30	0	0	0	0.0
Sajoanging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Majauleng	0	0	0	0	0	0	8	3	1	0	0	0	12	12	0	0	0	0.0
Total	0	2	8	0	2	2	12	7	3	0	4	2	42	42	0	0	0	0.0
<b>1989/90-1990</b>																		
Maniangpajc	6	2	5	38	8	36	2	2	21	3	4	2	129	129	0	0	0	0.0
Sajoanging	0	3	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0.0
Majauleng	0	27	1	1	5	0	0	17	11	0	0	0	62	57	0	5	0	8.1
Total	6	32	6	39	13	36	2	19	32	3	4	2	194	189	0	5	0	2.6
<b>1990/91-1991</b>																		
Maniangpajc	7	92	124	346	24	4	34	29	7	4	4	0	675	675	0	0	0	0.0
Sajoanging	1,050	0	0	0	0	0	0	0	0	0	0	0	1,050	885	0	165	0	15.7
Majauleng	67	0	78	17	0	0	47	0	0	0	0	0	209	207	0	2	0	1.0
Total	1,124	92	202	363	24	4	81	29	7	4	4	0	1,934	1,767	0	167	0	8.6
<b>1991/92-1992</b>																		
Maniangpajc	0	60	258	59	37	29	9	7	0	0	0	15	474	474	0	0	0	0.0
Sajoanging	1	11	15	0	0	0	0	0	0	0	0	10	37	37	0	0	0	0.0
Majauleng	0	141	191	0	0	0	0	52	0	0	0	12	396	304	0	92	0	23.2
Total	1	212	464	59	37	29	9	59	0	0	0	37	907	815	0	92	0	10.1
<b>1992/93-1993</b>																		
Maniangpajc	67	29	0	72	0	5	0	0	0	0	0	0	173	173	0	0	0	0.0
Sajoanging	129	23	0	0	0	5	7	25	0	8	19	30	246	231	0	15	0	6.1
Majauleng	30	0	0	0	0	0	14	7	5	0	0	0	56	41	0	15	0	26.8
Total	226	52	0	72	0	10	21	32	5	8	19	30	475	445	0	30	0	6.3
Average	271	78	136	107	15	16	25	29	9	3	6	14	710	652	0	59	0	8.3
<b>SOYBEANS</b>																		
<b>1988/89-1989</b>																		
Maniangpajc	0	0	0	2	0	1	1	2	0	0	0	0	6	6	0	0	0	0.0
Sajoanging	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Majauleng	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0
Total	0	0	0	2	0	1	1	2	0	0	0	0	6	6	0	0	0	0.0
<b>1989/90-1990</b>																		
Maniangpajc	0	0	2	0	0	0	0	0	0	0	0	0	2	2	0	0	0	0.0
Sajoanging	0	0	8	0	0	0	0	0	0	0	0	0	8	3	0	5	0	62.5
Majauleng	0	0	0	3	0	0	0	0	0	0	0	0	3	3	0	0	0	0.0
Total	0	0	10	3	0	0	0	0	0	0	0	0	13		0	5	0	38.5
<b>1990/91-1991</b>																		
Maniangpajc	54	334	62	0	0	0	0	0	0	0	0	41	491	230	0	261	0	53.2
Sajoanging	41	132	0	0	0	0	0	0	0	0	0	0	173	29	0	144	0	83.2
Majauleng	111	716	0	0	0	0	0	0	0	0	23	15	865	662	0	203	0	23.5
Total	206	1,182	62	0	0	0	0	0	0	0	23	56	1,529	921	0	608	0	39.8
<b>1991/92-1992</b>																		
Maniangpajc	147	133	745	0	0	3	0	0	0	0	0	45	1,073	201	0	872	0	81.3
Sajoanging	75	20	263	0	0	0	0	0	0	0	0	45	403	97	0	306	0	75.9
Majauleng	85	382	810	0	0	0	0	0	0	0	0	41	1,318	604	0	714	0	54.2
Total	307	535	1,818	0	0	3	0	0	0	0	0	131	2,794	902	0	1,892	0	67.7
<b>1992/93-1993</b>																		
Maniangpajc	510	0	0	25	0	0	0	0	0	0	0	0	535	535	0	0	0	0.0
Sajoanging	91	2	0	0	0	0	0	0	0	0	0	30	123	40	0	83	0	67.5
Majauleng	8	166	0	0	0	0	0	0	0	0	0	47	221	17	0	204	0	92.3
Total	609	168	0	25	0	0	0	0	0	0	0	77	879		0	287	0	32.7
Average	224	377	378	6	0	1	0	0	0	0	5	53	1,044	366	0	558	0	53.4

\*1 PD = Damages of insects and diseases, DR = Drought damage, FL = Flood damage  
 Source: Agricultural Services Office, Kabupaten Wajo.

**Table A.6.12 (1/2) Crop Budget per Hectare for Paddy and Palawija Crops (Present Condition)**

		Rainfed Paddy		Irrigated Paddy*1		
<b>1. Gross Income</b>						
- Unit Yield	(t)		3.0		4.0	
- Unit Price	(Rp./kg)		320		320	
- Gross Income	(Rp.)		<u>960,000</u>		<u>1,280,000</u>	
<b>2. Production Cost</b>						
		Unit Price (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)
1) Seed	(kg)	600	30	18,000	30	18,000
2) Fertilizers						
- Urea	(kg)	260	183	47,580	183	47,580
- TSP	(kg)	480	32	15,360	32	15,360
- KCl	(kg)	350	3	1,050	3	1,050
- ZA	(kg)	295	54	15,930	54	15,930
3) Agro-chemicals						
- Liquid type	(lit.)	13,200	0.48	6,336	0.48	6,336
- Powder type	(kg)	3,000	1.1	3,300	1.1	3,300
4) Labor						
- Nursery	(man-day)	3,400	3.2	10,880	3.2	10,880
- Land Preparation	(man-day)	5,400	15.8	85,320	15.8	85,320
- Transplanting	(man-day)	5,400	18.6	100,440	18.6	100,440
- Fertilizing	(man-day)	3,400	2.5	8,500	2.5	8,500
- Spraying	(man-day)	3,400	2.0	6,800	2.0	6,800
- Weeding	(man-day)	3,400	20.1	68,340	20.1	68,340
- Irrigating	(man-day)	3,400	-	-	2.0	6,800
- Harvesting	(man-day)	7,300	17.0	124,100	17.0	124,100
- Drying	(man-day)	3,400	3.0	10,200	4.0	13,600
5) Transportation of Products				39,000		52,000
6) Animal Power	(day)	23,000	2.04	46,920	2.04	46,920
7) Mech. Power	(day)	29,000	2.03	58,870	2.03	58,870
8) Operation Cost of Pump*2			-	-		46,600
9) Others (5%)				33,346		36,836
Total				<u>700,272</u>		<u>773,562</u>
<b>3. Net Return</b>				<u>259,728</u>		<u>506,438</u>

\*1 Pump irrigation.

\*2 Operation cost of pump is estimated to be Rp.46,600/season/ha, based on the existing pump irrigation system.

**Table A.6.12 (2/2) Crop Budget per Hectare for Paddy and Palawija Crops (Present Condition)**

		Maize		Mungbeans		Soybeans		Groundnuts		
<b>1. Gross Income</b>										
- Unit Yield	(t)		2.0		0.8		0.9		1.1	
- Unit Price	(Rp./t)		250		690		950		1,000	
- Gross Income	(Rp.)		<u>500,000</u>		<u>552,000</u>		<u>855,000</u>		<u>1,100,000</u>	
<b>2. Production Cost</b>										
		Unit Price (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)
1) Seed*1	(kg)		20	6,000	20	13,800	40	48,000	120	216,000
2) Fertilizers										
- Urea	(kg)	260	-	-	-	-	25	6,500	40	10,400
- TSP	(kg)	480	-	-	-	-	100	48,000	60	28,800
- KCl	(kg)	350	-	-	-	-	25	8,750	-	-
- ZA	(kg)	295	-	-	-	-	-	-	-	-
3) Agro-chemicals										
- Insecticides	(lit.)	13,200	-	-	-	-	1.5	19,800	-	-
4) Labor	(man-day)									
- Family Labour		3,400	76	258,400	36.0	122,400	45.0	153,000	49	166,600
- Hired Labour		3,400	-	-	19.6	66,640	24.5	83,300	32	108,800
5) Animal Power	(day)	23,000	4.35	100,000	5.22	120,000	5.22	120,000	12.43	286,000
6) Mech. Power	(day)		-	-	-	-	-	-	-	-
7) Others (5%)				18,220		16,142		24,368		40,830
Total				<u>382,620</u>		<u>338,982</u>		<u>511,718</u>		<u>857,430</u>
<b>3. Net Return</b>										
				<u>117,380</u>		<u>213,018</u>		<u>343,282</u>		<u>242,570</u>

\*1 Unit prices of seeds (Rp./kg):

Maize	300
Mungbeans	690
Soybeans	1,200
Groundnuts	1,800

Note: Production costs of palawija were estimated on the basis of the Household Survey (JICA Survey Team, 1994) and the "Laporan Analisa Usahatani Padi, Palawija dan Hortikultura 1993/94 (Dinas Pertanian Tanaman Pangan, Propinsi Sulawesi Selatan).

**Table A.6.13 Farm Budget Analysis - Present Condition**

	Rainfed Paddy Area				Pump Irrigation Area			
	Area	Yield	Unit Price	Amount	Area	Yield	Unit Price	Amount
	(ha)	(t/ha)	(Rp./kg)	(Rp.1,000)	(ha)	(t/ha)	(Rp./kg)	(Rp.1,000)
1. Gross Income				3,037				5,840
1.1 Farm Income								
- Wet season paddy*1	2.34	3.0	320	2,246	2.34	3.0	320	2,246
- Dry season paddy					2.34	4.0	320	2,995
- Palawija & vegetables	0.23			192				
- Perennial crops	0.35			186	0.35			186
1.2 Livestock Income*2				96				96
1.3 Off-farm Income				237				237
1.4 Credit				10				10
1.5 Others				70				70
2. Gross Outgoing				2,804				4,348
2.1 Production Cost				1,564				3,108
- Wet season paddy*3	2.34	403		943	2.34	403		943
- Dry season paddy*3					2.34	467		1,093
- Palawija & vegetables*3	0.23	422		97				
- Others				113				113
- Land rent*4	1.07			411	1.07			959
2.2 Living Expenses				1,237			*5	1,237
- Food				718				718
- Other than food				519				519
2.3 Loan Repayment				3				3
3. Net Reserve				233				1,492

\*1 Land holding size = Cultivated area

\*2 Including income of draft power rented to other farmers.

\*3 Costs of family labor, own animal and machine were excluded from the farm budget analysis.

\*4 Land rent = 40% of products

\*5 Adopted living expense of rainfed paddy farmers, because of no detailed data. It seems that living standard of pump irrigation farmers is higher than that of rainfed farmers.

**Table A.6.14 Movement of Rice from DOLOG  
South Sulawesi to Other DOLOG**

(Unit: tons)

DOLOG	1987/88	1988/89	1989/90	1990/91	1991/92	5 Years Avg.	
						Rice	Paddy
1. Cental Sulawesi	9,975	3,489	575	1,250	1,600	3,378	5,197
2. South Sulawesi	11,300	0	5,600	26,150	10,800	10,770	16,569
3. South East Sulawesi	6,700	11,050	14,780	8,075	6,250	9,371	14,417
4. North Sulawesi	11,350	2,900	0	27,500	14,750	11,300	17,385
5. East Kalimantan	19,585	20,620	14,550	27,250	23,055	21,012	32,326
6. West Kalimantan	13,450	17,810	21,900	24,281	26,250	20,738	31,905
7. South Kalimantan	2,965	14,450	14,100	31,500	19,404	16,484	25,360
8. Riau	0	9,200	15,500	0	0	4,940	7,600
9. Jakarta	65,780	54,367	50,746	72,879	39,405	56,635	87,131
10. West Jawa (Cirebon)	5,000	0	0	0	3,000	1,600	2,462
11. Bali	0	0	0	3,150	0	630	969
12. East Nusa Tenggara	0	1,500	0	7,300	4,980	2,756	4,240
13. East Timor	1,500	0	0	5,000	0	1,300	2,000
14. Maluku	16,350	9,250	4,500	12,600	5,200	9,580	14,738
15. Irian Jaya	3,000	0	2,700	10,300	4,900	4,180	6,431
Total	166,955	144,636	144,951	257,235	159,594	174,674	268,730

Source: DOLOG South Sulawesi

**Table A.6.15 Assessment of Rice/Paddy Supply and Demand  
by Kabupaten in South Sulawesi Province (1990)**

Kabupaten	Calculation of Demand				Calculation of Supply					Balance			
	Population		Consumption a/		Paddy Production in 1990		Seed, Feed & Losses b/ (ton)	Rice Equivalent (ton)	Rice (supply - demand)				
	Urban	Rural	Total	Urban	Rural	Total			Wetland	Dry land	Total	Rice	Paddy
	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)	(ton)		
1. Selayar	13,636	85,067	98,703	2,183	14,820	17,003	3,784	1,414	5,198	431	3,046	-13,957	-21,473
2. Buiukumba	34,398	302,485	336,883	5,507	52,697	58,204	137,683	0	137,683	11,428	80,671	22,467	34,565
3. Bantaeng	15,931	129,023	144,954	2,550	22,478	25,028	53,426	0	53,426	4,434	31,303	6,275	9,654
4. Jeneponto	11,300	279,736	291,036	1,809	48,734	50,543	36,354	997	37,351	3,100	21,885	-28,658	-44,090
5. Takalar	23,947	182,686	206,633	3,834	31,826	35,660	74,332	907	75,239	6,245	44,084	8,424	12,959
6. Gowa	63,110	366,901	430,011	10,104	63,919	74,023	164,082	50	164,132	13,623	96,168	22,145	34,069
7. Sinjai	16,690	177,477	194,167	2,672	30,919	33,591	60,546	0	60,546	5,025	35,475	1,884	2,899
8. Maros	27,021	213,354	240,376	4,326	37,169	41,495	168,936	33	168,969	14,024	99,002	57,507	88,472
9. Pangkep	15,685	231,055	246,741	2,511	40,253	42,764	117,986	27	118,013	9,795	69,146	26,382	40,587
10. Baru	26,639	120,199	146,838	4,265	20,940	25,205	66,997	43	67,040	5,564	39,280	14,075	21,654
11. Bone	64,244	547,823	612,067	10,285	95,438	105,723	417,282	3,514	420,796	34,926	246,551	140,828	216,659
12. Soppeng	18,602	207,190	225,792	2,978	36,095	39,073	168,611	0	168,611	13,995	98,792	59,719	91,875
13. Wajo	64,653	293,310	357,964	10,351	51,099	61,449	351,104	30	351,134	29,144	205,735	144,286	221,979
14. Sidrap	36,888	195,796	232,684	5,906	34,110	40,016	319,995	0	319,995	26,560	187,490	147,475	226,884
15. Pinarang	35,520	262,216	297,736	5,687	45,682	51,368	273,018	274	273,292	22,683	160,126	108,758	167,321
16. Enrekang	9,580	138,046	147,626	1,534	24,049	25,583	49,146	398	49,544	4,112	29,029	3,446	5,301
17. Luwu	83,118	602,310	685,428	13,307	104,930	118,237	340,893	1,125	342,018	28,387	200,394	82,157	126,395
18. Tator	26,053	337,936	363,990	4,171	58,873	63,044	122,512	0	122,512	10,168	71,782	8,738	13,443
19. Polmas	72,642	328,277	400,920	11,630	57,190	68,820	121,627	791	122,418	10,161	71,727	2,907	4,472
20. Majene	29,683	81,542	111,225	4,752	14,206	18,958	10,050	2,904	12,954	1,075	7,590	-11,368	-17,489
21. Mamuju	14,739	163,651	178,390	2,360	28,510	30,870	31,422	9,986	41,408	3,437	24,262	-6,608	-10,166
22. Ujung Pandang	898,587	31,649	930,236	143,858	5,514	149,372	15,523	0	15,523	1,288	9,095	-140,277	-215,810
23. Pare Pare	82,776	17,416	100,192	13,252	3,034	16,286	4,541	34	4,575	380	2,681	-13,605	-20,932
<b>Total</b>	<b>1,685,443</b>	<b>5,295,146</b>	<b>6,980,589</b>	<b>269,829</b>	<b>922,485</b>	<b>1,192,314</b>	<b>3,109,850</b>	<b>22,527</b>	<b>3,132,377</b>	<b>259,987</b>	<b>1,835,312</b>	<b>642,998</b>	<b>989,228</b>

Note: a/ Per capita consumption of rice applied is 160.1 kg/year in urban and 174.2 kg/year in rural in South Sulawesi according to FIDP report (JICA, 1993)

b/ Calculated by using the same factors of Food Balance Sheet

Source: Central Bureau of Statistics

Statistic Office of South Sulawesi (results of 1990 Population Census)

**Table A.6.16 Farm Gate Prices of Farm Products and Inputs (1994)**

(Unit: Rp.)

		Financial Price*1
1) Farm Products		
Paddy *3	(Rp./kg)	320
Maize *3	(Rp./kg)	250
Mungbeans *3	(Rp./kg)	690
Soybeans *3	(Rp./kg)	950
Groundnuts *3	(Rp./kg)	1,000
Chillies	(Rp./kg)	1,100
2) Seeds		
Paddy	(Rp./kg)	600
Maize	(Rp./kg)	300
Mungbeans	(Rp./kg)	690
Soybeans	(Rp./kg)	1,200
Groundnuts	(Rp./kg)	1,800
Chillies	(Rp./kg)	112,500
3) Fertilizers		
Urea	(Rp./kg)	260
TSP	(Rp./kg)	480
KCl	(Rp./kg)	350
ZA	(Rp./kg)	295
4) Agro-chemicals		
Insecticides	- Liquid type (Rp./liter)	13,200
	- Powder type (Rp./kg)	3,000
Rodenticides	(Rp./kg)	3,000
5) Hired Labor		
Land preparation	(Rp./man-day)	5,400
Nursery preparation	(Rp./man-day)	3,400
Transplanting	(Rp./man-day)	5,400
Fertilizing	(Rp./man-day)	3,400
Weeding	(Rp./man-day)	3,400
Spraying	(Rp./man-day)	3,400
Harvesting	(Rp./man-day)	7,300
Other farm work	(Rp./man-day)	3,400
6) Hired Animal	(Rp./day)	23,000
7) Hired Machinery (2-wheel Tractor)	(Rp./day)	29,000
8) Transportation of Products (Paddy)	(Rp./ton)	13,000

Remarks: \*1 As of 1994

\*2 Projected prices in 2005 at 1994 constant.

\*3 Dry grain

\*4 Fresh roots

Source: Household Survey, JICA Study Team, 1994.

**Table A.6.17 (1/2) Processing and Storage Facilities  
in the Study Area (1992)**

Kecamatan/ Desa	Name of KUD/ Location	Rice mill		Warehouse	
		(No.)	Capacity (ton/day)	(No.)	Capacity (ton)
<b>(1) KUD's Facilities</b>					
<b>KEC. SAJOANGING</b>					
1. Akkajeng	Pajung Parse	1	7	0	0
2. Doping	Tonralipu	0	0	1	300
3. Tammabarang	Latemmabarang	0	0	1	300
4. Barang Mamase	Mapangile	1	7	1	300
Sub-total		2	14	3	900
<b>KEC. MAJAULENG</b>					
1. Laerung	Laerung	0	0	1	300
2. Rumpia	Atapange	1	7	1	300
Sub-total		1	7	2	600
<b>KEC. MANIANGPAJO</b>					
1. Gilirang	Gilirang	1	4	1	300
Sub-total		1	4	1	300
Total		4	25	6	1,800
<b>(2) Private Facilities</b>					
<b>KEC. SAJOANGING</b>					
1. Akkajeng	Akkajeng	17	4	17	5,100
2. Doping	Doping	8	4	8	2,400
3. Tammabarang	Tammabarang	7	25	7	2,100
4. Barang Mamase	Barang Mamase	2	7	2	600
Sub-total		34	39	34	10,200
<b>KEC. MAJAULENG</b>					
1. Laerung	Laerung	7	25	7	2,100
2. Rumpia	Atapange	35	123	35	10,500
Sub-total		42	147	42	12,600
<b>KEC. MANIANGPAJO</b>					
1. Gilirang	Gilirang	8	56	8	2,400
Sub-total		8	56	8	2,400
Total		84	242	84	25,200
<b>(3) DOLOG Facilities</b>					
<b>KEC. SAJOANGING</b>					
Sub-total		0	0	0	0
<b>KEC. MAJAULENG</b>					
1. Laerung	Tarung Pakkae	0	0	2	7,000
2. Rumpia	Atapange	0	0	1	1,000
Sub-total		0	0	3	8,000
<b>KEC. MANIANGPAJO</b>					
Sub-total		0	0	0	0
Total		0	0	3	8,000
<b>Grand Total</b>		<b>88</b>	<b>266</b>	<b>93</b>	<b>35,000</b>



**Table A.6.17 (2/2) Processing and Storage Facilities  
in the Study Area (1992)**

Kecamatan/ Desa	Name of KUD/ Location	Rice mill		Warehouse	
		(No.)	Capacity (ton/day)	(No.)	Capacity (ton)
Memo. Item: Total in Kecamatan Related to the Study Area					
(1) KUD's Facilities					
	Kec. Sajoanging	3	11	5	1,500
	Kec. Majauleng	2	7	4	1,200
	Kec. Maniangpajo	5	18	5	1,500
	Total	10	35	14	4,200
(2) Private Facilities					
	Kec. Sajoanging	45	158	45	13,500
	Kec. Majauleng	70	245	70	21,000
	Kec. Maniangpajo	49	172	49	14,700
	Total	164	574	164	49,200
(3) DOLOG Facilities					
	Kec. Sajoanging	0	0	0	0
	Kec. Majauleng	0	0	3	8,000
	Kec. Maniangpajo	0	0	5	7,500
	Total	0	0	8	15,500
	Grand Total	174	609	186	68,900
Memo. Item: Total in Kabupaten Wajo					
	(1) KUD's Facilities	18	63	28	8,400
	(2) Private Facilities	332	1,162	332	99,600
	(3) DOLOG Facilities	0	0	16	22,500
	Total	350	1,225	376	130,500

Source: Office Koperasi Kabupaten Wajo (Cooperative Office, Kab. Wajo)

**Table A.6.18 Status of Brackish Water Pond Fishery  
Subsector in Related Kecamatan and Kab. Wajo**

**(1) Total Production Value**

	Total of 3 Kec. a/ (Rp. MIL)	% Distri- bution (Total=100)	Share of 3 Kec. in Wajo (%)	Total of Kab. Wajo (Rp. MIL)	% Distri- bution (Total=100)
Brackish water pond	13,011	81.3	42.4	30,651	51.3
Fresh water pond	34	0.2	27.2	125	0.2
Open water	850	5.3	4.1	20,733	34.7
Marine Fishery	2,113	13.2	25.5	8,285	13.8
Total	16,008	100	26.8	59,794	100

**(2) Per Capita Production Value**

	Total of 3 Kec. a/ (Rp. MIL)	% Distri- bution (Total=100)	Comparison 3 Kec. & Wajo (Wajo=100)	Total of Kab. Wajo (Rp. MIL)	% Distri- bution (Total=100)
Brackish water pond	0.979	81.3	180	0.544	51.3
Fresh water pond	0.003	0.2	150	0.002	0.2
Open water	0.064	5.3	17	0.368	34.7
Marine Fishery	0.159	13.2	108.0	0.147	13.8
Total or Average	1.204	100.0	113.0	1.061	100.0

Source: Kab. Wajo Dalam Angka, 1992  
Sulawesi Selatan Dalam Angka, 1992

**Table A.6.19 (1/3) Present Condition of Fishery in Related  
Kecamatan and Kabupaten Wajo (1988-1992)**

Category/Kecamatan	Unit	1988	1989	1990	1991	1992	5 Years Average (1988-92)	Growth Rate (% p.a.)
<b>1. Brackish Water Pond</b>								
1) Kec. Sajoanging								
Area	(ha)	3,433	3,433	3,433	4,210	4,385	3,779	6.31
Production	(ton)	2,969	3,088	1,208	4,895	4,746	3,381	12.44
Establishment (household)	(No.)	517	517	577	579	576	553	2.74
Production value	(Rp.MIL)	4,432	5,791	9,189	10,566	13,011	8,598	30.90
Yield	(ton)/ha)	0.86	0.90	0.35	1.16	1.08	0.87	5.77
Pro. value/establishment	(Rp.MIL/H.hold)	8.57	11.20	15.93	18.25	22.59	15.31	27.41
Pro.value/ha	(Rp.MIL/ha)	1.29	1.69	2.68	2.51	2.97	2.23	23.12
2) Kec. Majauleng								
Area	(ha)	-	-	-	-	-	-	-
Production	(ton)	-	-	-	-	-	-	-
Establishment (household)	(No.)	-	-	-	-	-	-	-
Production value	(Rp.MIL)	-	-	-	-	-	-	-
Yield	(ton)/ha)	-	-	-	-	-	-	-
Pro. value/establishment	(Rp.MIL/H.hold)	-	-	-	-	-	-	-
Pro.value/ha	(Rp.MIL/ha)	-	-	-	-	-	-	-
3) Kec. Maniangpajo								
Area	(ha)	-	-	-	-	-	-	-
Production	(ton)	-	-	-	-	-	-	-
Establishment (household)	(No.)	-	-	-	-	-	-	-
Production value	(Rp.MIL)	-	-	-	-	-	-	-
Yield	(ton)/ha)	-	-	-	-	-	-	-
Pro. value/establishment	(Rp.MIL/H.hold)	-	-	-	-	-	-	-
Pro.value/ha	(Rp.MIL/ha)	-	-	-	-	-	-	-
4) Total or Average								
Area	(ha)	3,433	3,433	3,433	4,210	4,385	3,779	6.31
Production	(ton)	2,969	3,088	1,208	4,895	4,746	3,381	12.44
Establishment (household)	(No.)	517	517	577	579	576	553	2.74
Production value	(Rp.MIL)	4,432	5,791	9,189	10,566	13,011	8,598	30.90
Yield	(ton)/ha)	0.86	0.90	0.35	1.16	1.08	0.87	5.77
Pro. value/establishment	(Rp.MIL/H.hold)	8.57	11.20	15.93	18.25	22.59	15.31	27.41
Pro.value/ha	(Rp.MIL/ha)	1.29	1.69	2.68	2.51	2.97	2.23	23.12
<b>2. Fresh Water Pond</b>								
1) Kec. Sajoanging								
Area	(ha)	21	21	21	21	23	21	1.90
Production	(ton)	5	5	6	6	6	5	4.22
Establishment (household)	(No.)	33	33	15	32	32	29	-0.77
Production value	(Rp.MIL)	8	9	11	11	16	11	18.54
Yield	(ton)/ha)	0.24	0.24	0.27	0.27	0.26	0.26	2.28
Pro. value/establishment	(Rp.MIL/H.hold)	0.25	0.28	0.71	0.34	0.51	0.42	19.46
Pro.value/ha	(Rp.MIL/ha)	0.39	0.44	0.50	0.52	0.72	0.52	16.34
2) Kec. Majauleng								
Area	(ha)	15	15	15	36	39	24	27.51
Production	(ton)	4	4	4	4	4	4	4.66
Establishment (household)	(No.)	22	22	73	22	21	32	-1.17
Production value	(Rp.MIL)	6	6	7	7	11	8	17.54
Yield	(ton)/ha)	0.24	0.24	0.27	0.11	0.11	0.19	-21.83
Pro. value/establishment	(Rp.MIL/H.hold)	0.26	0.29	0.10	0.34	0.53	0.30	18.91
Pro.value/ha	(Rp.MIL/ha)	0.39	0.43	0.49	0.20	0.28	0.36	-8.48
3) Kec. Maniangpajo								
Area	(ha)	7	7	7	7	8	7	1.32
Production	(ton)	2	2	2	2	3	2	17.13
Establishment (household)	(No.)	11	11	14	11	11	12	0.00
Production value	(Rp.MIL)	3	3	4	4	6	4	21.47
Yield	(ton)/ha)	0.23	0.26	0.28	0.28	0.41	0.29	15.60
Pro. value/establishment	(Rp.MIL/H.hold)	0.26	0.31	0.28	0.37	0.56	0.36	21.47
Pro.value/ha	(Rp.MIL/ha)	0.38	0.47	0.53	0.55	0.79	0.54	19.88
4) Total or Average								
Area	(ha)	43	43	43	65	69	53	12.60
Production	(ton)	10	11	12	12	13	11	6.86
Establishment (household)	(No.)	66	66	102	65	64	73	-0.77
Production value	(Rp.MIL)	17	19	22	22	34	23	18.71
Yield	(ton)/ha)	0.24	0.24	0.27	0.18	0.19	0.22	-5.37
Pro. value/establishment	(Rp.MIL/H.hold)	0.26	0.29	0.21	0.34	0.52	0.33	19.63
Pro.value/ha	(Rp.MIL/ha)	0.39	0.44	0.51	0.35	0.48	0.43	5.43

**Table A.6.19 (2/3) Present Condition of Fishery in Related  
Kecamatan and Kabupaten Wajo (1988-1992)**

Category/Kecamatan	Unit	1988	1989	1990	1991	1992	5 Years Average (1988-92)	Growth Rate (% p.a.)
<b>3. Open Water</b>								
1) Kec. Sajoanging								
Production	(ton)	18	20	16	20	30	21	13.40
Establishment (household)	(No.)	15	24	46	30	27	28	15.83
Production value	(Rp.MIL)	16	20	15	49	64	33	42.47
Pro. value/establishment	(Rp.MIL/H.hold)	1.04	0.82	0.33	1.65	2.37	1.24	23.00
2) Kec. Majauleng								
Production	(ton)	500	504	397	496	536	487	1.71
Establishment (household)	(No.)	40	86	61	114	102	81	26.37
Production value	(Rp.MIL)	427	488	8	581	784	458	16.39
Pro. value/establishment	(Rp.MIL/H.hold)	10.67	5.68	0.13	5.09	7.68	5.85	-8.57
3) Kec. Maniangpajo								
Production	(ton)	0	1	1	1	1	1	13.62
Establishment (household)	(No.)	0	8	11	14	13	9	12.91
Production value	(Rp.MIL)	0	1	1	2	3	1	20.98
Pro. value/establishment	(Rp.MIL/H.hold)	0.00	0.16	0.12	0.12	0.21	0.12	7.15
4) Total or Average								
Production	(ton)	519	525	414	517	567	508	2.24
Establishment (household)	(No.)	55	118	118	158	142	118	26.76
Production value	(Rp.MIL)	442	509	25	632	850	492	17.74
Pro. value/establishment	(Rp.MIL/H.hold)	8.04	4.32	0.21	4.00	5.99	4.51	-7.66
<b>4. Marine Fishery</b>								
1) Kec. Sajoanging								
Production	(ton)	1,252	1,274	1,208	1,260	1,281	1,255	0.58
Establishment (household)	(No.)	236	263	273	250	248	254	1.25
Production value	(Rp.MIL)	1,607	1,084	1,174	667	2,113	1,329	7.08
Pro. value/establishment	(Rp.MIL/H.hold)	6.81	4.12	4.30	2.67	8.52	5.28	5.76
2) Kec. Majauleng								
Production	(ton)	-	-	-	-	-	-	-
Establishment (household)	(No.)	-	-	-	-	-	-	-
Production value	(Rp.MIL)	-	-	-	-	-	-	-
Pro. value/establishment	(Rp.MIL/H.hold)	-	-	-	-	-	-	-
3) Kec. Maniangpajo								
Production	(ton)	-	-	-	-	-	-	-
Establishment (household)	(No.)	-	-	-	-	-	-	-
Production value	(Rp.MIL)	-	-	-	-	-	-	-
Pro. value/establishment	(Rp.MIL/H.hold)	-	-	-	-	-	-	-
4) Total or Average								
Production	(ton)	1,252	1,274	1,208	1,260	1,281	1,255	0.58
Establishment (household)	(No.)	236	263	273	250	248	254	1.25
Production value	(Rp.MIL)	1,607	1,084	1,174	667	2,113	1,329	7.08
Pro. value/establishment	(Rp.MIL/H.hold)	6.81	4.12	4.30	2.67	8.52	5.28	5.76
<b>5. Total or Average</b>								
1) Kec. Sajoanging								
Production	(ton)	4,245	4,387	2,437	6,180	6,064	4,662	9.33
Establishment (household)	(No.)	801	837	911	891	883	865	2.47
Production value	(Rp.MIL)	6,062	6,904	10,389	11,293	15,204	9,970	25.84
Pro. value/establishment	(Rp.MIL/H.hold)	7.57	8.25	11.40	12.67	17.22	11.42	22.81
2) Kec. Majauleng								
Production	(ton)	504	508	401	500	540	491	1.73
Establishment (household)	(No.)	62	108	134	136	123	113	18.68
Production value	(Rp.MIL)	433	495	15	588	795	465	16.41
Pro. value/establishment	(Rp.MIL/H.hold)	6.98	4.58	0.12	4.32	6.46	4.49	-1.91
3) Kec. Maniangpajo								
Production	(ton)	2	3	3	3	4	3	25.37
Establishment (household)	(No.)	11	19	25	25	24	21	21.54
Production value	(Rp.MIL)	3	5	5	6	9	5	33.09
Pro. value/establishment	(Rp.MIL/H.hold)	0.26	0.25	0.21	0.23	0.37	0.26	9.51
4) Total or Average								
Production	(ton)	4,750	4,898	2,841	6,683	6,608	5,156	8.60
Establishment (household)	(No.)	874	964	1,070	1,052	1,030	998	4.19
Production value	(Rp.MIL)	6,498	7,403	10,410	11,886	16,007	10,441	25.28
Pro. value/establishment	(Rp.MIL/H.hold)	7.43	7.68	9.73	11.30	15.54	10.34	20.24

**Table A.6.19 (3/3) Present Condition of Fishery in Related  
Kecamatan and Kabupaten Wajo (1988-1992)**

Category/Kecamatan	Unit	1988	1989	1990	1991	1992	5 Years Average (1988-92)	Growth Rate (% p.a.)
<b>Kab. Level Data (Kab. Wajo)</b>								
1) Brackish Water Pond								
Area	(ha)	10,476	10,834	10,869	10,870	12,144	11,039	3.76
Production	(ton)	6,490	7,113	10,850	11,406	11,063	9,384	14.26
Establishment (household)	(No.)	954	1,585	1,770	1,776	1,766	1,570	16.64
Production value	(Rp.MIL)	6,422	13,343	19,902	25,302	30,651	19,124	47.81
Yield	(ton)/ha	0.62	0.66	1.00	1.05	0.91	0.85	10.12
Pro. value/establishment	(Rp.MIL/H.hold)	6.73	8.42	11.24	14.25	17.36	11.60	26.72
Pro. value/ha	(Rp.MIL/ha)	0.61	1.23	1.83	2.33	2.52	1.71	42.45
2) Fresh Water Pond								
Area	(ha)	153	157	157	157	193	163	5.98
Production	(ton)	34	41	43	44	52	43	11.31
Establishment (household)	(No.)	237	237	235	235	234	236	-0.32
Production value	(Rp.MIL)	53	75	81	82	125	83	23.92
Yield	(ton)/ha	0.22	0.26	0.27	0.28	0.27	0.26	5.03
Pro. value/establishment	(Rp.MIL/H.hold)	0.22	0.32	0.34	0.35	0.53	0.35	13.98
Pro. value/ha	(Rp.MIL/ha)	0.35	0.48	0.52	0.52	0.65	0.50	16.93
3) Open Water								
Production	(ton)	16,613	16,741	13,181	13,810	14,791	15,027	-2.95
Establishment (household)	(No.)	2,438	3,101	2,619	2,636	2,322	2,623	-1.23
Production value	(Rp.MIL)	13,924	16,231	12,438	15,672	20,733	15,800	10.46
Pro. value/establishment	(Rp.MIL/H.hold)	5.71	5.23	4.75	5.95	8.93	6.11	11.82
4) Marine Fishery								
Production	(ton)	5,387	5,494	5,205	5,362	5,453	5,380	0.30
Establishment (household)	(No.)	825	961	1,026	985	977	955	4.32
Production value	(Rp.MIL)	4,747	4,580	5,060	6,540	8,285	5,842	14.94
Pro. value/establishment	(Rp.MIL/H.hold)	5.75	4.77	4.93	6.64	8.48	6.11	10.18
5) Total or Average								
Production	(ton)	28,524	29,389	29,279	30,622	31,359	29,835	2.40
Establishment (household)	(No.)	4,454	5,884	5,650	5,632	5,299	5,384	4.44
Production value	(Rp.MIL)	25,146	34,229	37,481	47,596	59,794	40,849	24.18
Pro. value/establishment	(Rp.MIL/H.hold)	5.65	5.82	6.63	8.45	11.28	7.57	18.90

Source: 1) Source: Kabupaten Wajo Dalam Angka, 1988 - 1992

2) Sulawesi Selatan Dalam Angka, 1988 - 1992

**Table A.6.20 General Scope and Credit System of KUT**

Category	KUT	Credit to Cooperatives		
Credit Requirements	Framing Business Credit for the Intensified Cultivation of Paddy/Second Crops through KUD	Credit to KUD the Procurement of Rice/Second Crops. Cloves and Fertilizers.		Credit to Primary Cooperatives for their Members.
1 Objectives	To meet working capital needs of farmers in financing their farming business of paddy/Second crops.	To meet the working capital needs of KUD in procuring rice/second crops, cloves and fertilizers at the basic prices fixed by the government.		To meet the working capital and investment needs of productive business of primary cooperative members (included the program of smallholder sugarcane intensification) outside of trade and service sectors.
2 The Maximum of Credit	Based on the actual needs of farmers while the indicative needs of credit per ha is just a guidance	Based on the actual needs of KUD and its ability to repay the credits.		Adjusted to the needs and the capabilities of members in repaying the credits and linked to their saving with a maximum credit of Rp. 30 million/member.
3 Share of Financing	BI 100%	BI 75% and Bank 25%		BI 75% and Bank 25%
4 Interest Rate	a) Kebdubg rate 17% included fee for KUD 6% b) Liquidity Credits 3.50%	19%, except for cloves 17%  13%, except for cloves 17%		19% incl. fee for cooperative 4%  8.50%
5 The period of Credits	a) Bank to KUD = 12 months b) KUD to Farmer = 2 weeks after harvest or max. 7 months	1 year		WCC: max. 1 year except for seasonal crops could be > 1 year  IC: max. 10 yrs (g.p max. 4 yrs)
6 Collateral	A financed business, Additional guarantee if only needed	Goods which are funded by the credits		Project viability, business or goods financed, members saving
7 The Share of Credit Risk	Bank 5%, the rest of 95% will be paid by the government 55% and BI 45%	Rice/Sec. Cr Gov. 50% BI 25% Bank 25%	Cloves Perum PKK /Gov. 50% BI 25% Bank 25%	Fertilize Bank 10% rest 90% - Gov. 50% - Bank 50%
8 Handling Bank	BR1 and other banks with approval of BI	BPI and banks with approval of BI		a) A sound/fairly sound banks b) In evaluating projects, bank should pay attention on the impact analysis of environment
9 The Eligibilities of Cooperative	a) At least Category-B, if none, could be Category-C b) Sound organization & business c) Well-experience in credits d) Board & manager age able to manage and secure the credits e) The credit arrears of the two previous PS max. 20%, and the others must be paid off. A3 max. correction can be made for the other ineligible KUD.	a) At least belong to Category-B b) Free of credit arrears expect if: - they can still be covered by the stock value - sue to force major legalized by a Cooperatives Ministry Official - KUD is still able to make an effort and has a good will to pay the areas		a) At least Category-B b) Able to present project proposal and balance sheet/financial report c) Having capability to guide and control members
10 The System of Liquidity Credit Providing	a) Supplied for 2 PS at once b) Dislocated to BI's branches in line with the request of the bank's head office	a) Accordingly supplied to the 1-year Procurement plan of handling bank. b) Dislocated to BI's branches in line with the request of the ban's head office		a) Supplied a main ceiling based on 1-year credit allocation plan of bank. b) The main ceiling will be dislocated to BI's branches following the bank request. c) Of the dislocated main ceiling, bank can apply for a individual ceiling. d) The individual ceiling must be disbursed to cooperative not later than 3 months.
11 The Withdrawal and Disbursement of Liquidity Credit	a) Based on the credit withdrawal schedule arranged by bank b) The credit disbursement is done by a transfer forms c) The first and second disbursement is 100%, the next disbursement will be linked to the credit realization from banks to customer.	a) Based on the credit withdrawal schedule arranged by bank b) The credit disbursement is done by a transfer forms c) The first and second disbursement is 100%, the next disbursement will be linked to the credit realization from banks to customer.		a) The withdrawal of credit investment according to withdrawal is done by a "giro bilyet" (check). b) If 1 month since the liquidity credit was withdrawn by bank but it wasn't disbursed to cooperative, bank will be changed as much as 3 months deposit rate prevailing at the bank concerned

Sources: KUD Office

Table A.6.21 Status of KUD and Non-KUD in Kabupaten Wajo (1992)

Kecamatan	*1									
	KUD					Non-KUD				
Total House-hold	Farm House-hold	No. of KUD	No. of Mem-ber	Average Mem-ber-ship	Partici-pation Rate	Shaving Amount per Member	No. of Non-Mem-ber	Average Mem-ber-ship	Partici-pation Rate	Shaving Amount per Member
(No.)	(No.)	(No.)	(No.)	(No./KUD)	(%)	(Rp.10^6)	(No.)	(No.)	(%)	(Rp.10^6)
(1)	(2)	(3)	(4)	(4)/(3)	(4)/(2)	(5)	(6)	(7)	(7)/(6)	(8)
1) Sabbangparu	6,916	6,700	1	1,206	18.0	1.83	2	180	90	2.6
2) Tempe*1	10,049	2,500	1	2,939	117.6 *3	15.48	37	5,600	151	55.7
3) Pammana	7,067	5,200	1	1,813	34.9	12.27	1	103	103	1.5
4) Takkalalla	8,218	6,900	4	891	12.9	8.55	0	0	0	0.0
5) Sajoanging *2	7,373	5,300	5	1,691	31.9	16.65	2	297	149	4.0
6) Majauleng *2	6,786	4,100	4	1,064	26.0	4.00	1	24	24	0.4
7) Tanasitolo	7,964	4,500	3	3,401	75.6	16.46	0	0	0	0.0
8) Belawa	6,806	4,400	2	2,599	59.1	26.12	1	235	235	3.5
9) Maniangpajo *2	4,622	3,900	2	2,922	74.9	36.23	1	227	227	4.9
10) Pitumpanua	11,467	12,100	5	3,206	26.5	27.00	1	350	350	3.1
Three Kecamatan: *2	18,781	13,300	11	5,677	42.7	56.88	4	548	137	2.9
Kab. Wajo 1992	77,268	55,600	28	21,732	39.1	164.59	46	7,016	153	9.1
Kab. Wajo 1991	76,749	*	28	20,148	*	124.51	43	5,655	132	7.4
1990	76,272	*	28	18,479	*	107.69	37	5,655	153	7.4
1989	72,613	*	28	21,191	*	44.83	36	5,620	156	7.7
1988	71,906	*	27	14,830	*	39.33	35	5,082	145	7.1

\*1 Figures in 1993. (Source: Agricultural Census 1993. Statistic Office Kabupaten Wajo.)

\*2 Three Kecamatan related to the study area. (Sajoanging, Majoanging and Maninanjajo)

Source: Office Koperasi Kabupaten Wajo (Cooperative Office, Kab. Wajo)

\*3 Including members living in other Kecamatan.

**Table A.6.22 Social Infrastructure in the Study Area - Road (1993)**

Classification	Passage Town / Village	Total Length in the Study Area (km)	Road Surface	Remarks
1. Provincial Road	1) (Sengkang)* - Paria - Attapange - Sakkoli - (Kulampu)*	20.5	- Asphalt pavement	- Well maintained
	2) (Anabunua)* - Poleonro - Truntpakkaï	3.8	- Asphalt pavement	- Well maintained
	3) Lalangpatae - Jalang - Doping - (Peneki - Solo)*	22.0	- Asphalt/Gravel	- Under rehabilitation
2. Kabupaten Road	1) Attapange - Doping	16.0	- Simple pavement	- Poorly maintained
	2) Tobulelle - Jalang	13.7	- Simple pavement	- Poorly maintained
	3) Paria - Poleonro - Gilirang	10.5	- Simple pavement	- Poorly maintained
3. Main Desa Road	1) Gilirang - Arajang	5.5	Earth road	Passable by 4WD
	2) Pantoe - Sarammae - Allapporeng	8.3	Earth road	Passable by 4WD
	3) Bottodonga - Bencengbenceng - Bacubacue - Padewakeng	9.5	Earth road	Passable by 4WD
	4) Sarammae - Bacubacue	5.5	Earth road	Passable by 4WD
	5) Laerug - Bottodonga	3.5	Earth road	Passable by 4WD

Source : Provincial Road: Kantor DINAS P.U. BINAMARGA, Prop. DAT I Sulawesi Selatan.  
Kabupaten Road: Kantor PUD (Pekerjaan Umum Daerah), Sengkang, Kab. Wajo.

Note : (Sengkang)\*, (Kulampu)\*, (Anabunua)\*, (Peneki - Solo)\*: Out of the Study Area  
Length of the Main Sections (km)

- 1) Sengkang - (23.5) - Paria - (3.0) - Attapange - (8.5) - Sakkoli - (9.0) - Kulampu
- 2) Anabunua - (13.2) - Poleonro - (3.8) - Taruntpakkaï
- 3) Lalangpatae - (16.0) - Jalang - (6.0) - Doping - (23.0) - Solo
- 4) Paria - (7.3) - Poleonro - (3.2) - Gilirang
- 5) Pantoe - (1.5) - Sarammae - (6.8) - Allapporeng
- 6) Bottodonga - (3.3) - Bencengbenceng - (4.2) - Bacubacue - (2.0) - Padewakeng



**Table A.6.23 Social Infrastructure in the Study Area  
- Electricity and Communication**

	*1	*1	Electricity*2		Radio*1		TV*1		*1	*1
	Popula- tion (Persons)	House- hold (No.)	No. of Houses (No.)	Ratio (%)	No.	%	No.	%	Tele- phone (No.)	Post Office (No.)
		(1)	(2)	(2)/(1)	(3)	(3)/(1)	(4)	(4)/(1)		
Kabupaten Wajo	369,337	77,268	36,025	46.6						
Three Kecamatan *3	90,185	18,779	6,879	36.6	4,935	26.3	1,023	5.4	-	1
Study Area	42,891	8,755	3,349	38.3	2,194	25.1	579	6.6	-	-
Kec. Sajoanging										
Desa Doping	4,178	798	558	69.9	83	10.4	70	8.8	-	-
Desa Akkajeng	6,524	1,300	589	45.3	200	15.4	184	14.2	-	-
Desa Padaelo	3,029	652	67	10.3	78	12.0	10	1.5	-	-
Desa Akkotengeng	3,641	761	129	17.0	120	15.8	12	1.6	-	-
Desa Salobulo	2,918	635	242	38.1	90	14.2	20	3.1	-	-
Desa Sakkoli	3,499	755	204	27.0	93	12.3	12	1.6	-	-
Desa Barangmamase	2,627	549	145	26.4	74	13.5	18	3.3	-	-
Kec. Majauleng										
Desa (Rumpia)	3,557	802	708	88.3	395	49.3	147	18.3	-	-
Desa Laerung	2,513	571	164	28.7	75	13.1	18	3.2	-	-
Desa Lamiku	1,911	421	40	9.5	80	19.0	2	0.5	-	-
Desa Botto Benteng	1,488	307	100	32.6	70	22.8	3	1.0	-	-
Kec. Maniangpajo										
Desa Poleonro	1,751	253	158	62.5	155	61.3	12	4.7	-	-
Desa Mamminasae	1,792	307	38	12.4	140	45.6	10	3.3	-	-
Desa Gilirang	2,246	381	207	54.3	376	98.7	59	15.5	-	-
Desa Arajang	1,217	263	*4	-	165	62.7	2	0.8	-	-

Remarks: \*1 Indicate figures in 1992 (Source: Kecamatan Dalam Angka 1992 and Kabupaten Dalam Angka 1992, Staistic Office Kabupaten Wajo)

\*2 Indicate as of October 1994 (Source: data obtained from PLN Sengkang, Kab. Wajo)

\*3 Indicate figures including all area of Desas related to the study area.

\*4 Under construction.

**Table A.6.24 Social Infrastructure in the Study Area  
- Domestic Water Supply (1993)**

	(1)	(2)	(3)	(4)	(5)
<b>Location</b>					
1) Town/Village	Attapange	Jalang	Gilirang	Laerung	Sakkoli
2) Kecamatan	Majauleng	Sajoanging	Maniangpajo	Majauleng	Sajoanging
3) Nos. of Beneficial Family	250	180	70	200	300
<b>System</b>					
1) Water Source	Spring with Checkdam	Spring with Deepwell	Deepwell (Depth=80m)	Deepwell (Depth=60m)	2 Deepwells (Depth=70m)
2) Nos. of Pump	1 unit	1 unit	1 unit	1 unit	Not yet
3) Capacity of Pump	5 lit./sec.	3 lit./sec.	3 lit./sec.	3 lit./sec.	-
4) Length of Pipe Line	6 km	10 km	5 km	2 km	Not yet
5) Diameter of Pipe	2 & 4 inch	3 & 4 inch	2 inch	2 inch	-
6) Construction Year	1985	1987	1989	1992	1992/93
7) Constructed by	Ciptakarya	Ciptakarya	Ciptakarya	Ciptakarya	Ciptakarya
8) Operated by	PDAM*1	Desa Akkajeng*2	Desa Gilirang*2	Desa Laerung*2	Desa Sakkoli*2
9) Operation hour	5 hours/day	-	-	-	-
10) Water Charge	Rp.250/m3	No charge	No charge	No charge	No charge
<b>Extension Plan</b>					
1) Nos. of Extended Family	200	400			
2) Capacity	-	10 lit./sec.			
3) Length of Extended Pipe Line	10 km	-			
4) Additional Water Source	Deep well	-			
<b>Remarks</b>		Pump is out of order. No operation at the moment.	Pump is out of order. No operation at the moment.	No operation yet.	Completed only boring work.

Source: Persahaan Daera Air Minum

Note: 1) PDAM = Persahaan Daerah Air Minum

2) Operated by the village authority , planned to be transferred to PDAM

**Table A.6.25 Proposed Land Use and Cropping Area  
Under Full Development Stage**

	Present Condition		(Unit: ha)	
	Gross Project Area	Net Project Area*1	Net Project Area under With Project	Net Project Area under Without Project
<b>1. Proposed Land Use</b>				
Paddy Field	8,020	7,220	7,000	7,220
Upland Field	670	-	-	-
Orchard	110	-	-	-
Grass Land	170	-	-	-
Bush/Forest	870	-	-	-
Village and Others	390	-	-	-
Right of Way*2	-	-	220	-
<b>Total</b>	<b>10,230</b>	<b>7,220</b>	<b>7,220</b>	<b>7,220</b>
<b>2. Cropping Area</b>				
<b>Rainfed Paddy Field</b>				
Wet Season Paddy	8,020	7,220	-	7,220
Dry Season Paddy	-	-	-	-
Palawija and Vegetables*3	800	720	-	720
<b>Irrigated Paddy Field - Gravity</b>				
Wet Season Paddy	-	-	5,880	-
Dry Season Paddy	-	-	5,880	-
Palawija and Vegetables	-	-	1,680	-
Palawija	-	-	1,510	-
Vegetables	-	-	170	-
<b>Irrigated Paddy Field - Pump</b>				
Wet Season Paddy	-	-	1,120	-
Dry Season Paddy*4	480	480	1,120	480
Palawija and Vegetables	-	-	320	-
Palawija	-	-	290	-
Vegetables	-	-	30	-
Upland Field	670	-	-	-
<b>3. Multi-Cropping Intensity</b>				
Total Farm Land*5	8,690	7,220	7,000	7,220
Total Cropping Area*6	9,970	8,420	16,000	8,420
Multi-Cropping Intensity	1.15	1.17	2.29	1.17

\*1 Indicate area to be irrigated by the Project.

\*2 Land acquisition area for irrigation facilities.

\*3 Area of palawija cultivated in paddy field is estimated as follows, based on those average harvested areas in three Kecamatan related to the project area (Sajoanging, Majauleng and Maniangpajo) from 1988 to 1992.

	Harvested Area in 3 Kecamatan (ha)	%	Gross Project Area (ha)	Net Project Area (ha)
Paddy Field	36,230		10,130	7,220
Palawija	3,446	10.0%	1,010	720

\*4 No expansion of pump irrigation area is estimated under the without project condition, because over 640 ha of pump irrigation is difficult without development of new water resources.

\*5 Paddy Field + Upland Field

\*6 Area cultivated in paddy and upland fields.

**Table A.6.26 Labour Balance for a Typical Farmer (With Project)**

Farm Works	A (m-d/ha)	B (m-d/ha)	C (day)	Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.										
				I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II							
				Proposed Cropping Pattern		Dry Season Paddy (2.27 ha)		Harvesting		Proposed Cropping Pattern		Wet Season Paddy (2.27 ha)		Harvesting		Seeding/Planting		Palawija/Vegetables (0.66 ha)		Harvesting		Transplanting														
Daily Peak Labour Requirement per Half Month Interval (m-d/day)																																				
Nursery	3.2	7.3	36								0.20	0.20	0.20															0.20	0.20	0.20						
- Land Preparation	15.8	35.9	48					0.75	0.75	0.75	0.75	0.75																0.75	0.75	0.75	0.75					
- Seeding/Transplanting	20.0	45.4	36	1.26	1.26	1.26					1.26	1.26	1.26															1.26	1.26	1.26	1.26					
- Basal Application	1.0	2.3	36	0.06	0.06	0.06					0.06	0.06	0.06															0.06	0.06	0.06	0.06					
- 1st Top Dressing	0.5	1.1	36	0.03	0.03	0.03					0.03	0.03	0.03																							
- 2nd Top Dressing	1.0	2.3	36	0.06	0.06	0.06					0.06	0.06	0.06																							
- 1st Spraying	1.0	2.3	36	0.06	0.06	0.06					0.06	0.06	0.06																							
- 2nd Spraying	2.0	4.5	36	0.13	0.13	0.13					0.13	0.13	0.13																							
- 1st Weeding	10.0	22.7	36	0.63	0.63	0.63					0.63	0.63	0.63																			0.63				
- 2nd Weeding	10.0	22.7	36	0.63	0.63	0.63					0.63	0.63	0.63																							
- 3rd Weeding	10.0	22.7	36	0.32	0.63	0.63	0.32				0.32	0.63	0.63	0.32																						
- Irrigating	2.0	4.5	120	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04				
- Harvesting	20.0	45.4	36	1.26	1.26	1.26					1.26	1.26	1.26																				0.04	0.04	0.04	0.04
- Drying	6.0	13.6	36	0.38	0.38	0.38					0.38	0.38	0.38																							
Palawija & Vegetables																																				
- Nursery	1.0	0.7	12																																	
- Land Preparation	24.0	15.8	12																																	
- Seeding/Transplanting	16.0	10.6	12																																	
- Fertilizing	3.0	2.0	12																																	
- Spraying	3.0	2.0	12																																	
- Weeding	17.0	11.2	60																																	
- Irrigating	3.0	2.0	84																																	
- Harvesting	32.0	21.1	12																																1.76	
- Drying	3.0	2.0	12																																0.17	
Total Peak Labor Requirement	(m-d/day)			2.7	1.7	1.6	0.9	2.2	2.4	2.6	2.2	2.9	2.7	1.7	1.6	0.9	3.6	2.8	1.9	0.4	0.4	0.2	0.0	2.7	1.0	2.3	2.9									
Available Labor Force per Household	(m-d/day)			3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	3.1	
Labor Balance	(m-d/day)			0.4	1.4	1.5	2.2	0.9	0.7	0.5	0.9	0.2	0.4	1.4	1.5	2.2	-0.5	0.3	1.2	2.7	2.7	2.9	3.1	0.4	2.1	0.8	0.2									

A = Labour requirement per ha (m-d/ha)      B = Total labor requirement per household (m-d/household)      C = Work days for each farm work (30 days/month x 80% x 1.5 month = 36 days)

**Table A.6.27 (1/2) Crop Budget per Hectare for Paddy and Palawija Crops (With Project)**

	Gravity Irrigation				Pump Irrigation				
	Paddy				Paddy				
	Wet Season	Dry Season	Wet Season	Dry Season					
<b>1. Gross Income</b>									
- Unit Yield (t)		6.0		6.0		6.0		6.0	
- Unit Price (Rp./kg)		320		320		320		320	
- Gross Income (Rp.)		<u>1,920,000</u>		<u>1,920,000</u>		<u>1,920,000</u>		<u>1,920,000</u>	
<b>2. Production Cost</b>	Unit Price (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)	Q'ty	Value (Rp.)
1) Seed (kg)	600	30	18,000	30	18,000	30	18,000	30	18,000
2) Fertilizers									
- Urea (kg)	260	250	65,000	200	52,000	250	65,000	200	52,000
- TSP (kg)	480	50	24,000	50	24,000	50	24,000	50	24,000
- KCl (kg)	350	100	35,000	100	35,000	100	35,000	100	35,000
- ZA (kg)	295	25	7,375	25	7,375	25	7,375	25	7,375
3) Agro-chemicals									
- Insecticides (lit.)	13,200	1.0	13,200	1.0	13,200	1.0	13,200	1.0	13,200
- Herbicides (lit.)	-	-	-	-	-	-	-	-	-
- Rodenticides (kg)	12,000	0.5	6,000	0.5	6,000	0.5	6,000	0.5	6,000
4) Labour (man-day)									
- Nursery	3,400	3.2	10,880	3.2	10,880	3.2	10,880	3.2	10,880
- Land Preparation	5,400	15.8	85,320	15.8	85,320	15.8	85,320	15.8	85,320
- Transplanting	5,400	20.0	108,000	20.0	108,000	20.0	108,000	20.0	108,000
- Fertilizing	3,400	2.5	8,500	2.5	8,500	2.5	8,500	2.5	8,500
- Spraying	3,400	3.0	10,200	3.0	10,200	3.0	10,200	3.0	10,200
- Weeding	3,400	30.0	102,000	30.0	102,000	30.0	102,000	30.0	102,000
- Irrigating	3,400	2.0	6,800	2.0	6,800	2.0	6,800	2.0	6,800
- Harvesting	7,300	20.0	146,000	20.0	146,000	20.0	146,000	20.0	146,000
- Drying	3,400	6.0	20,400	6.0	20,400	6.0	20,400	6.0	20,400
5) Transportation of Products			39,000		39,000		39,000		39,000
6) Animal Power (day)	23,000	2.04	46,920	2.04	46,920	2.04	46,920	2.04	46,920
7) Mech. Power (day)	29,000	2.03	58,870	2.03	58,870	2.03	58,870	2.03	58,870
8) Operation Cost of Pump *1			-		-		68,633		68,633
9) Others (5%)			40,573		39,923		44,005		43,355
<b>Total</b>	<b>103</b>		<u><b>852,038</b></u>		<u><b>838,388</b></u>		<u><b>924,103</b></u>		<u><b>910,453</b></u>
<b>3. Net Return</b>			<u><b>1,067,962</b></u>		<u><b>1,081,612</b></u>		<u><b>995,897</b></u>		<u><b>1,009,547</b></u>

Remarks: \*1 Operation cost of pump is estimated as follows.

	Type 3	Type 4	Type 5	Total
HP of Engine (HP)	10	18	27	
No. of Pump Units (No.)	6	22	13	41
Operation Hour per Year (hr/year)	3,112	3,112	3,112	
<b>Fuel Cost</b>				
- Unit Fuel Consumption (Lit./hr)	1.17	2.11	3.16	
- Total Fuel Consumption (lit.)	21,846	144,459	127,841	294,146
- Unit price of Diesel (Rp./lit)	389.6	389.6	389.6	389.6
- Total Fuel Cost (Rp.)	8,511,202	56,281,226	49,806,854	114,599,282
- Lubricant (20%) (Rp.)	1,702,240	11,256,245	9,961,371	22,919,856
Annual Repair and Maintenance Cost (Rp.)	5% of procurement cost			11,731,200
Annual Depreciation Cost (Rp.)	Useful life 15 years			15,641,600
<b>Total Cost (Rp.)</b>				<b>164,891,938</b>
<b>Irrigation Area</b>	<b>Cropping Area</b>	<b>Double cropping of paddy and palawija (29%)</b>		<b>2,403</b>
- Wet S. Paddy	1,120 (ha)			(1,120)
- Dry S. Paddy	1,120 (ha)	Operation hour of palawija is estimated to be 50% of its paddy.		(1,120)
- Palawija	325 (ha)			(163)
<b>Operation cost per ha</b>				
- Paddy (Rp./ha)				68,633
- Palawija (Rp./ha)				34,317

Note: Proposed farm inputs were estimated on the basis of the recommendation of BIMAS package technology in 1994/1995 and 1995. (Rekomendasi Paket Teknologi Tanaman Pangan Propinsi Sulawesi Selatan - MT 1994/1995 dan 1995. Tim Teknis BIMAS Propinsi Sulawesi Selatan, Agustus 1994)

**Table A.6.27 (2/2) Crop Budget per Hectare for Paddy and Palawija Crops (With Project)**

	Gravity Irrigation						Pump Irrigation					
	Mungbeans	Soybeans	Groundnuts	Chillies (Large)	Mungbeans	Soybeans	Groundnuts	Chillies (Large)	Mungbeans	Soybeans	Groundnuts	Chillies (Large)
<b>1. Gross Income</b>												
- Unit Yield (t)	1.50	1.50	1.50	3.00	1.50	1.50	1.50	3.00	1.50	1.50	1.50	3.00
- Unit Price (Rp./t)	690	950	1,000	1,100	690	950	1,000	1,100	690	950	1,000	1,100
- Gross Income (Rp.)	1,035,000	1,425,000	1,500,000	3,300,000	1,035,000	1,425,000	1,500,000	3,300,000	1,035,000	1,425,000	1,500,000	3,300,000
<b>2. Production Cost</b>												
Unit Price (Rp.)												
1) Seed*1 (kg)	25	45	60	0.4	25	45	60	0.4	25	45	60	0.4
2) Fertilizers (kg)												
- Urea	50	50	30	300	50	50	30	300	50	50	30	300
- TSP	480	100	50	250	480	100	50	250	480	100	50	250
- KCl	350	50	50	250	350	50	50	250	350	50	50	250
- ZA	295	-	-	150	295	-	-	150	295	-	-	150
3) Agro-chemicals (lit.)	13,200	1.5	1	2.5	13,200	1.5	1	2.5	13,200	1.5	1	2.5
- Insecticides (man-day)												
4) Labor (man-day)												
- Family Labor	3,400	54.0	58.8	199.5	3,400	54.0	58.8	199.5	3,400	54.0	59	199.5
- Hired Labor	3,400	29.4	38.4	85.5	3,400	29.4	38.4	85.5	3,400	29.4	38	85.5
5) Animal Power (day)	23,000	5.22	12.43	13.04	23,000	5.22	12.43	13.04	23,000	5.22	12.43	13.04
6) Mech. Power (day)	29,000	-	-	-	29,000	-	-	-	29,000	-	-	-
7) Operation Cost of Pump*2	-	-	-	-	-	-	-	-	-	-	-	-
8) Others (5%)	21,587	27,793	39,349	83,838	21,587	27,793	39,349	83,838	21,587	27,793	39,349	83,838
Total	453,317	583,653	826,329	1,760,588	453,317	583,653	826,329	1,760,588	453,317	583,653	826,329	1,760,588
<b>3. Net Return</b>	581,683	841,347	673,671	1,539,412	581,683	841,347	673,671	1,539,412	581,683	841,347	673,671	1,539,412

\*1 Unit prices of seeds (Rp./kg):  
 Maize 300  
 Mungbeans 690  
 Soybeans 1,200

\*2 50% of operation cost for paddy = Rp.68,633 x 50% = Rp. 34,317 /ha

Note: Production costs of palawija were estimated on the basis of the Household Survey (JICA Survey Team, 1994) and the "Laporan Analisa Usahatani Padi, Palawija dan Hortikultura 1993/94 (Dinas Pertanian tanaman Pangan, Propinsi Sulawesi Selatan).

**Table A.6.28 Farm Budget Analysis - With Project**

	Gravity Irrigation Area				Pump Irrigation Area			
	Area	Yield	Unit Price	Amount	Area	Yield	Unit Price	Amount
	(ha)	(t/ha)	(Rp./kg)	(Rp.1,000)	(ha)	(t/ha)	(Rp./kg)	(Rp.1,000)
1. Gross Income				10,199				10,199
1.1 Farm Income								
Wet season paddy*1	2.27	6.0	320	4,358	2.27	6.0	320	4,358
Dry season paddy	2.27	6.0	320	4,358	2.27	6.0	320	4,358
Palawija & vegetables	0.66			1,002	0.66			1,002
Perennial crops	0.35			186	0.35			186
1.2 Livestock Income*2				96				96
1.3 Off-farm Income*3				119				119
1.4 Credit				10				10
1.5 Others				70				70
		Unit		Amount		Unit		Amount
	Area	Cost		(Rp.1,000)	Area	Cost		(Rp.1,000)
	(ha)	(Rp./ha)			(ha)	(Rp./ha)		
2. Gross Outgoing				6,336				6,663
2.1 Production Cost				4,477				4,804
Wet season paddy*4	2.27	548		1,244	2.27	620		1,407
Dry season paddy*4	2.27	523		1,187	2.27	595		1,351
Palawija & vegetables*4	0.66	508		335	0.66	508		335
Others				113				113
Land rent*5	1.04			1,598	1.04			1,598
2.2 Living Expenses*6				1,856				1,856
2.3 Loan Repayment				3				3
3. Net Reserve				3,863				3,536

\*1 Holding size under with project = 2.34 ha x 97% = 2.27 ha (excluding area of irrigation facilities.)

\*2 Including income of draft power rented to other farmers.

\*3 50% of present condition

\*4 Costs of family labor, own animal and machine were excluded from the farm budget analysis.

\*5 Land rent = 40% of products

\*6 150% up from present condition.

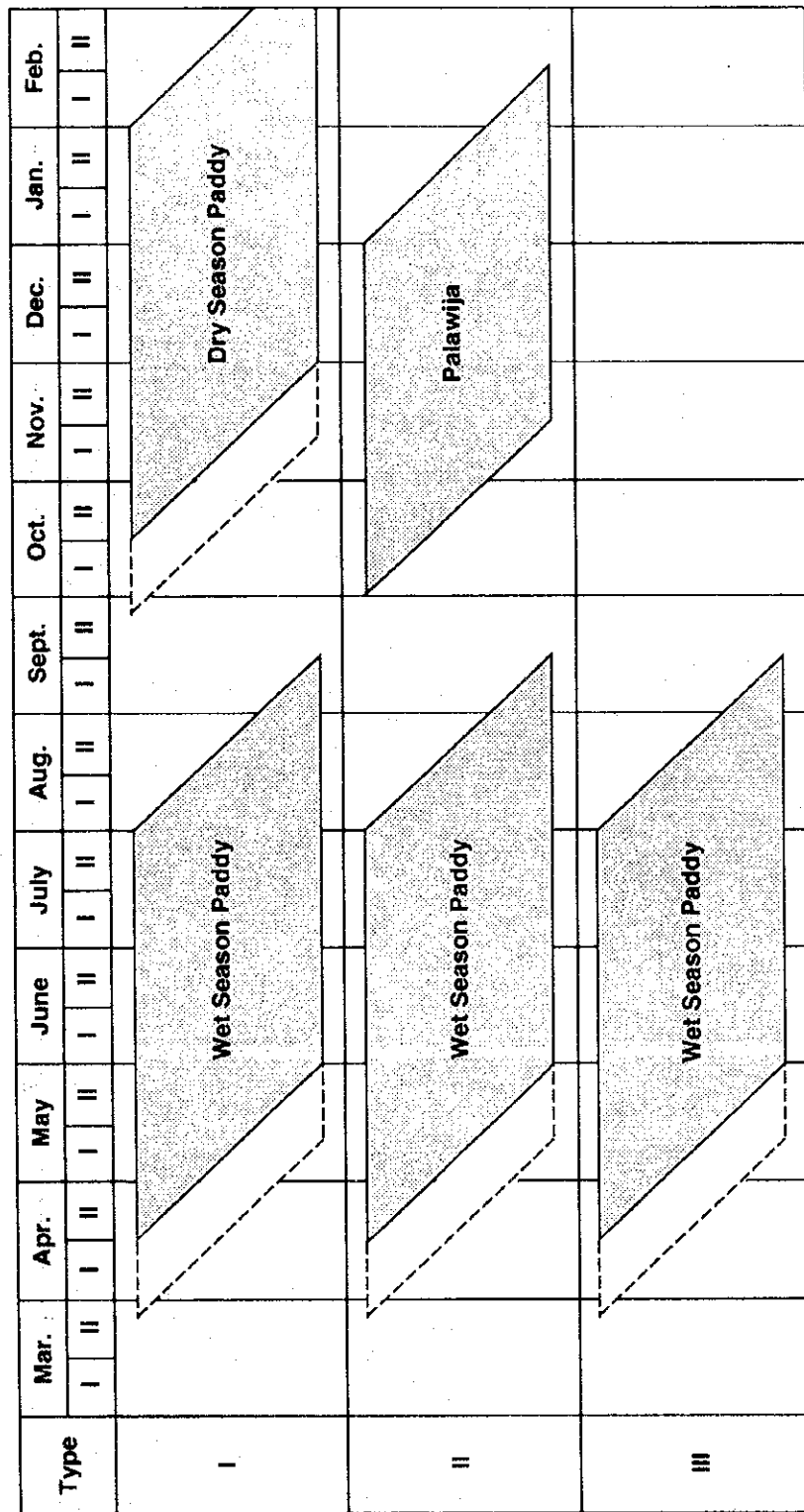
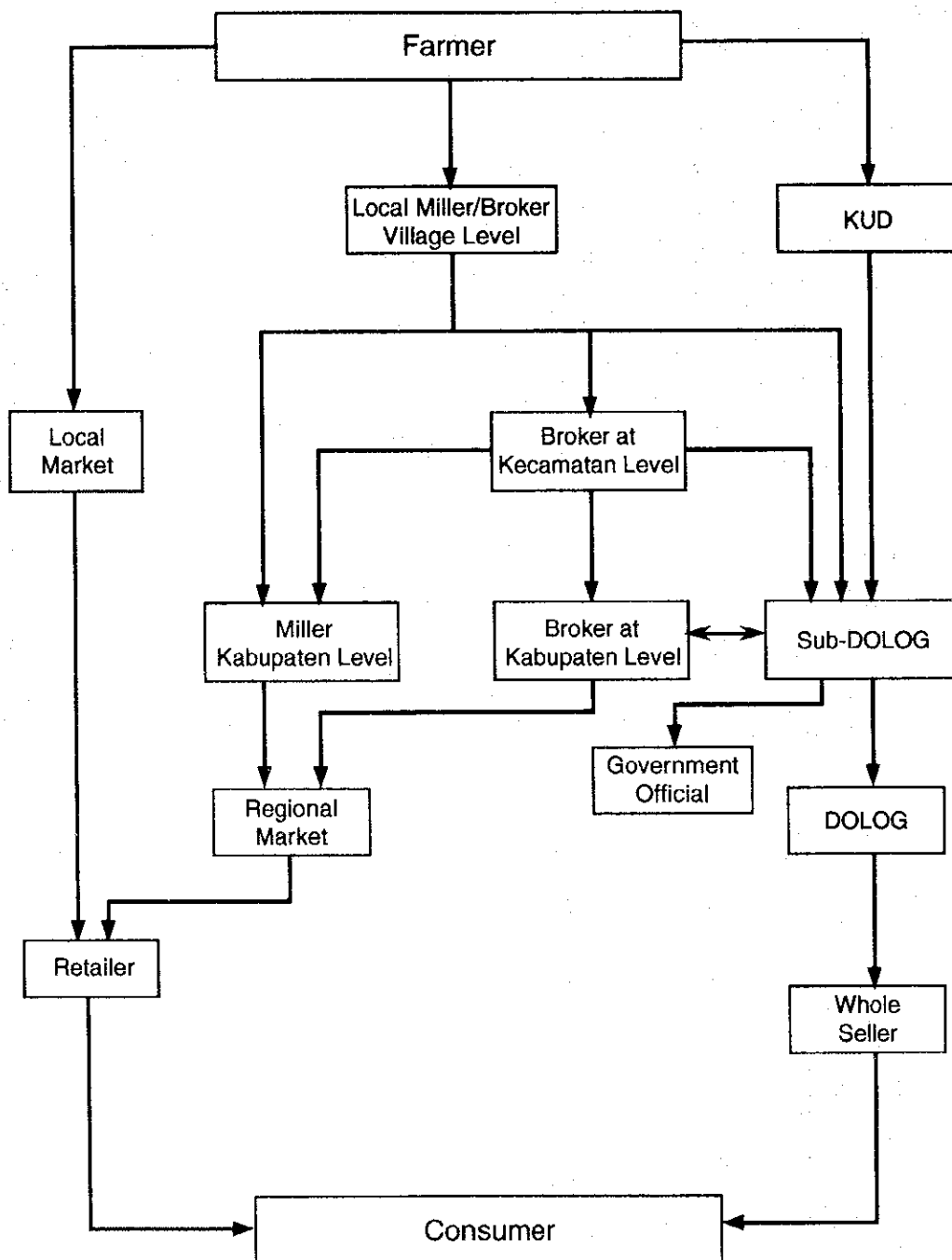


Figure A.6.1 Major Cropping Patterns under Present Condition





**Figure A.6.2 Paddy/Rice Marketing Flow in South Sulawesi**

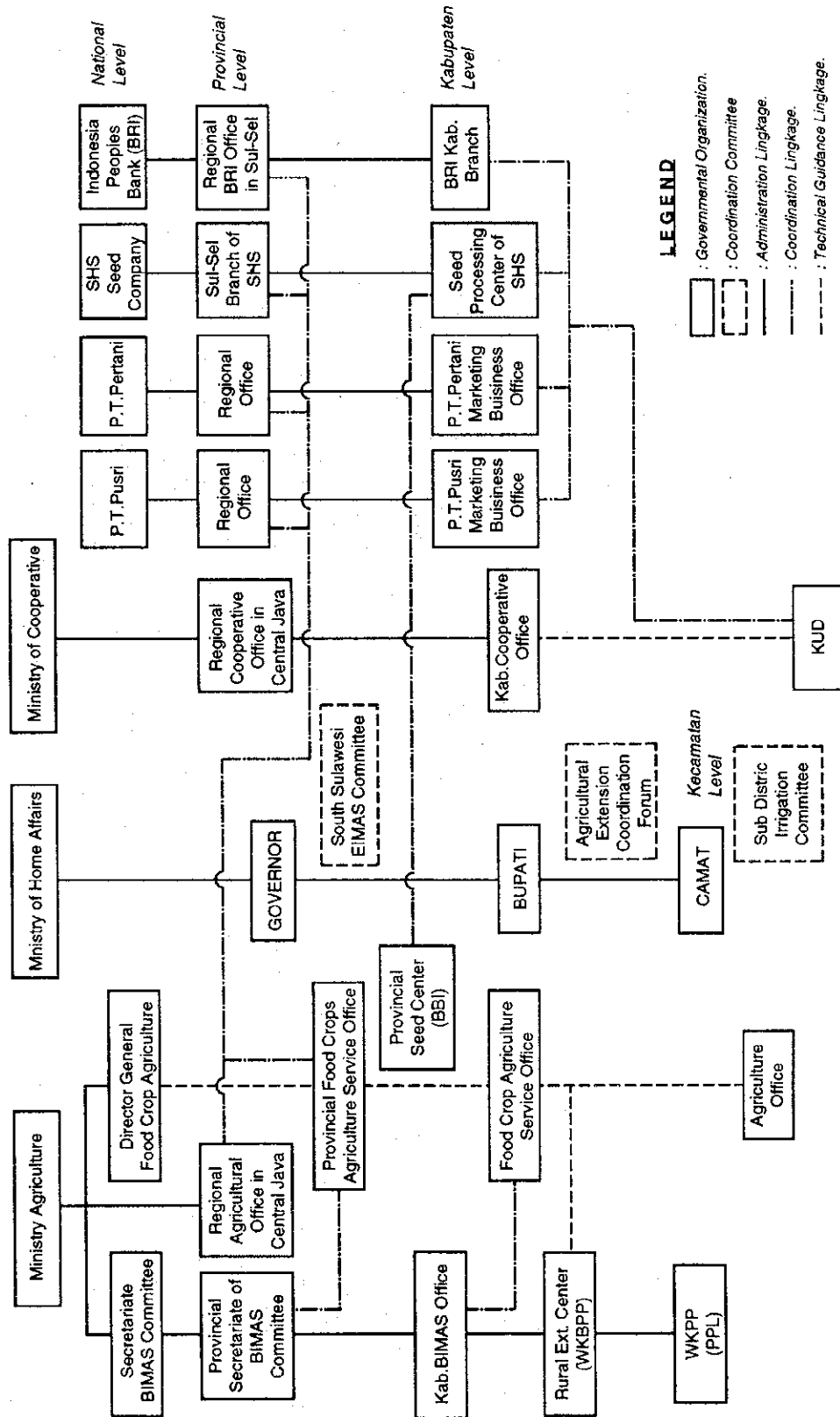


Figure A.6.3 Organizational Structure for Agricultural Development

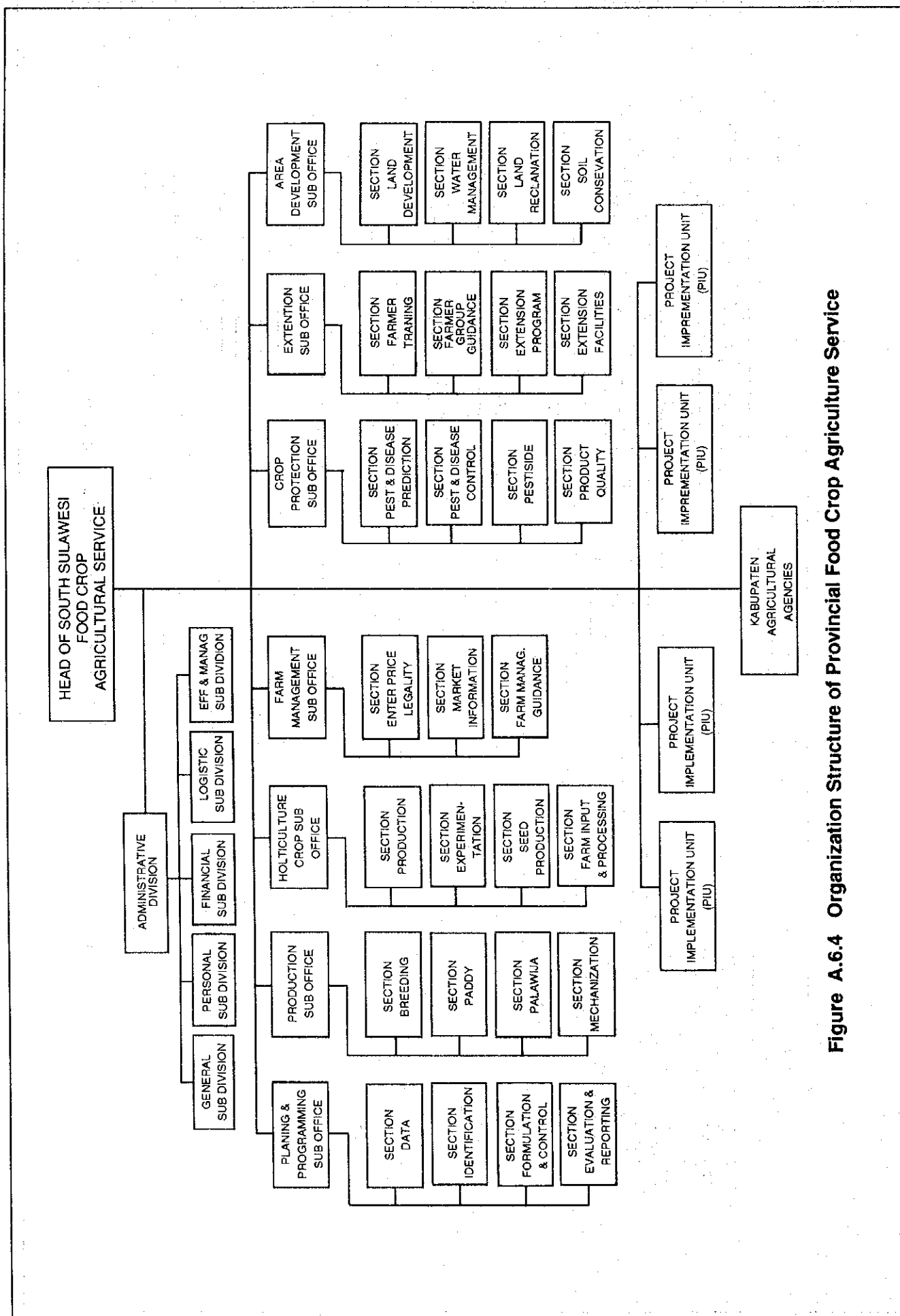
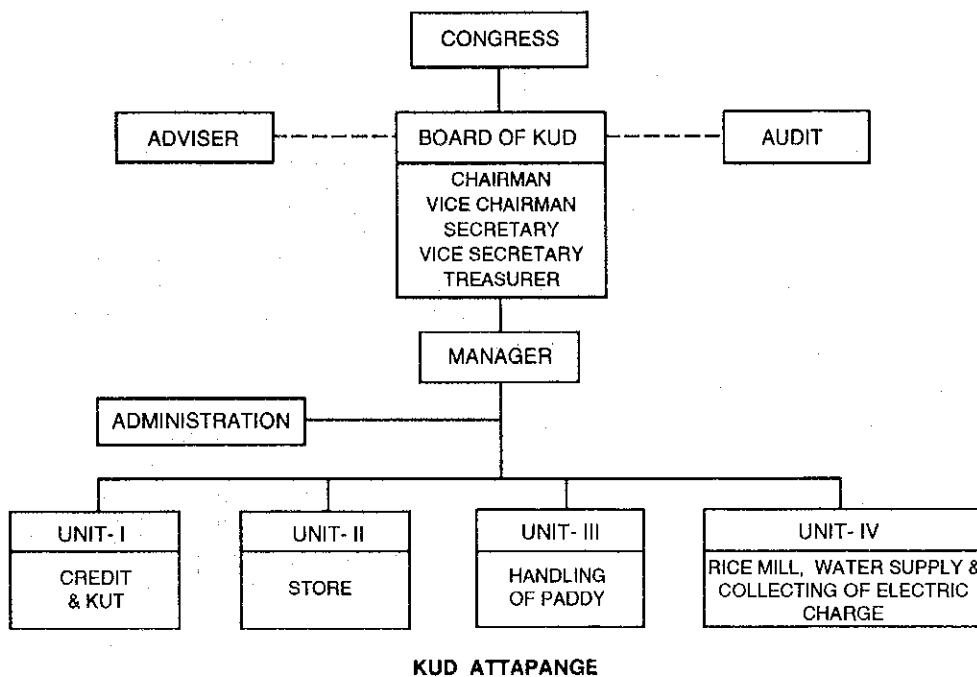
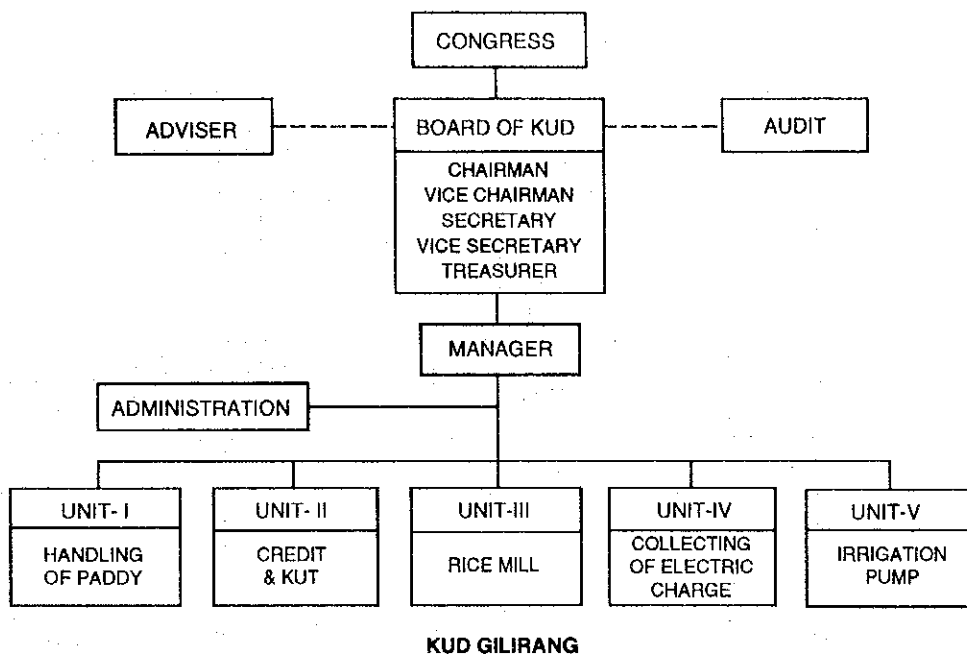


Figure A.6.4 Organization Structure of Provincial Food Crop Agriculture Service



**Figure A.6.5 Typical Organization of KUD**

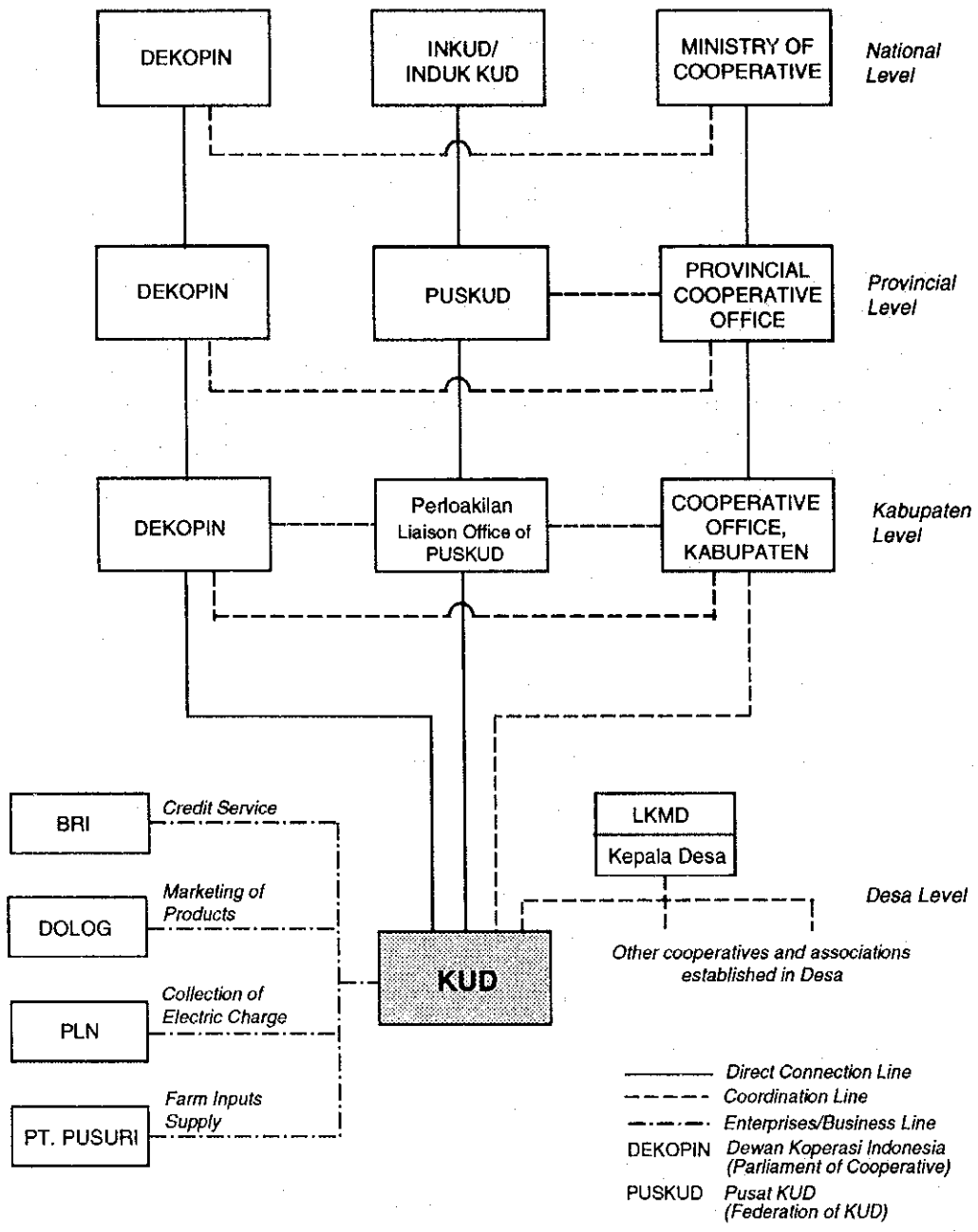


Figure A.6.6 Overall Structure of Cooperatives (KUD)

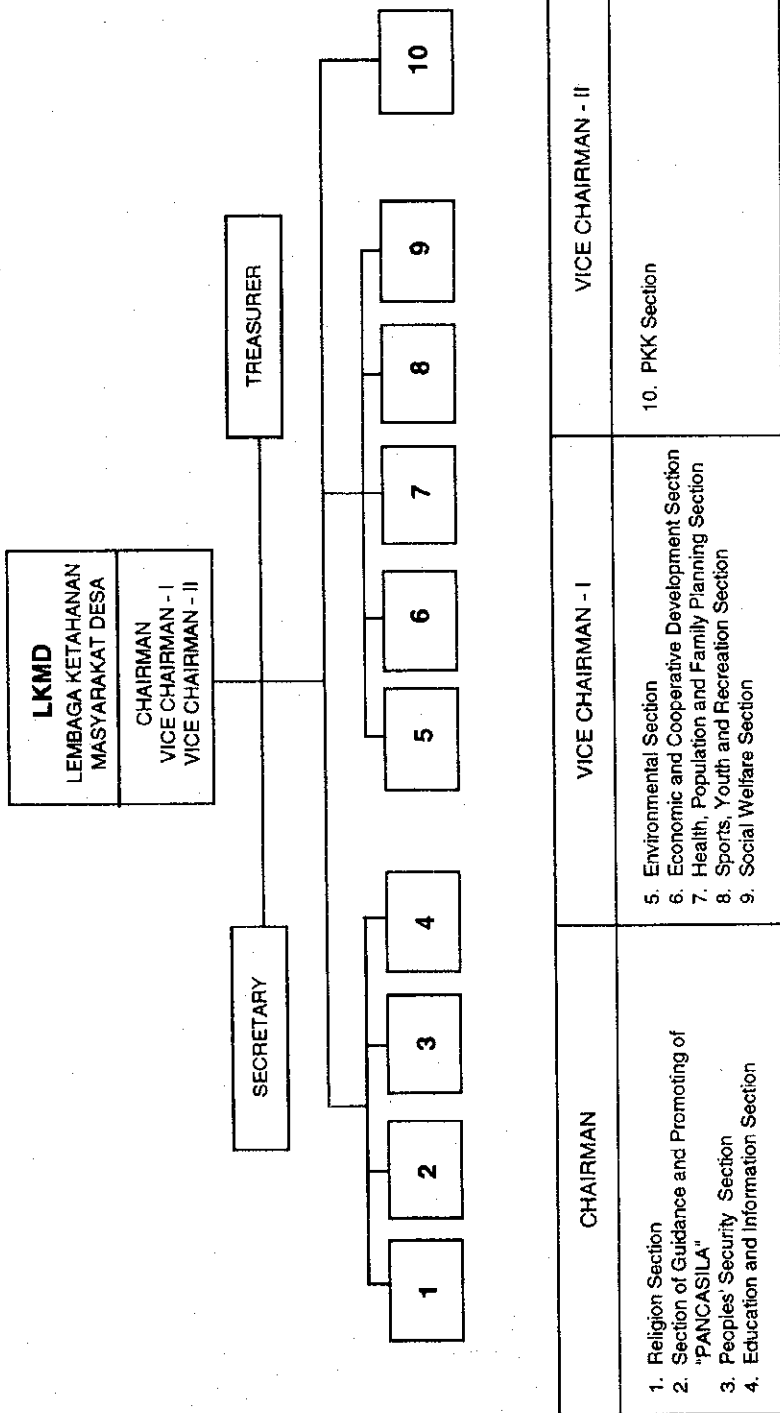


Figure A.6.7 Organizational Structure of LKMD

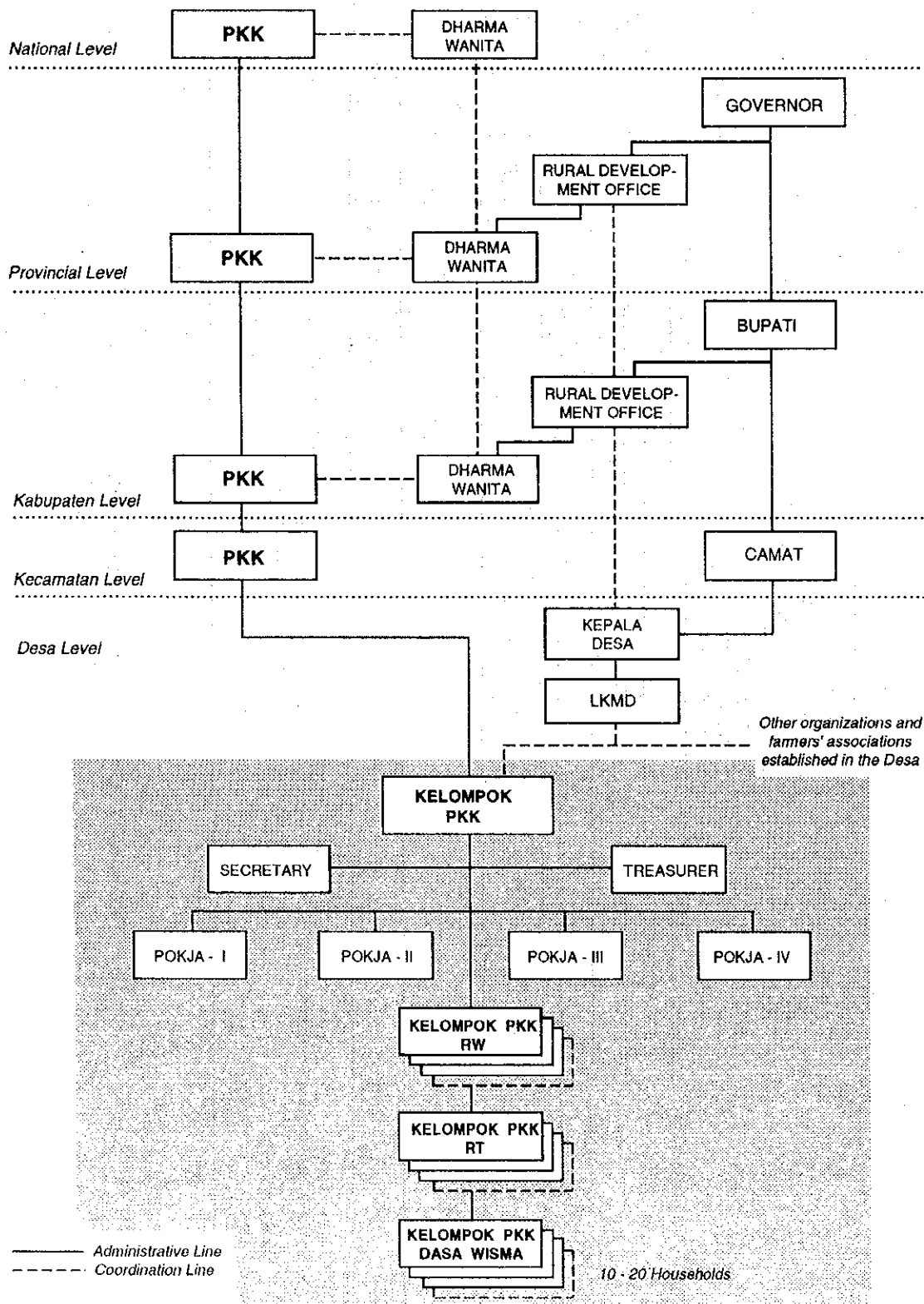


Figure A.6.8 Overall Structure of PKK

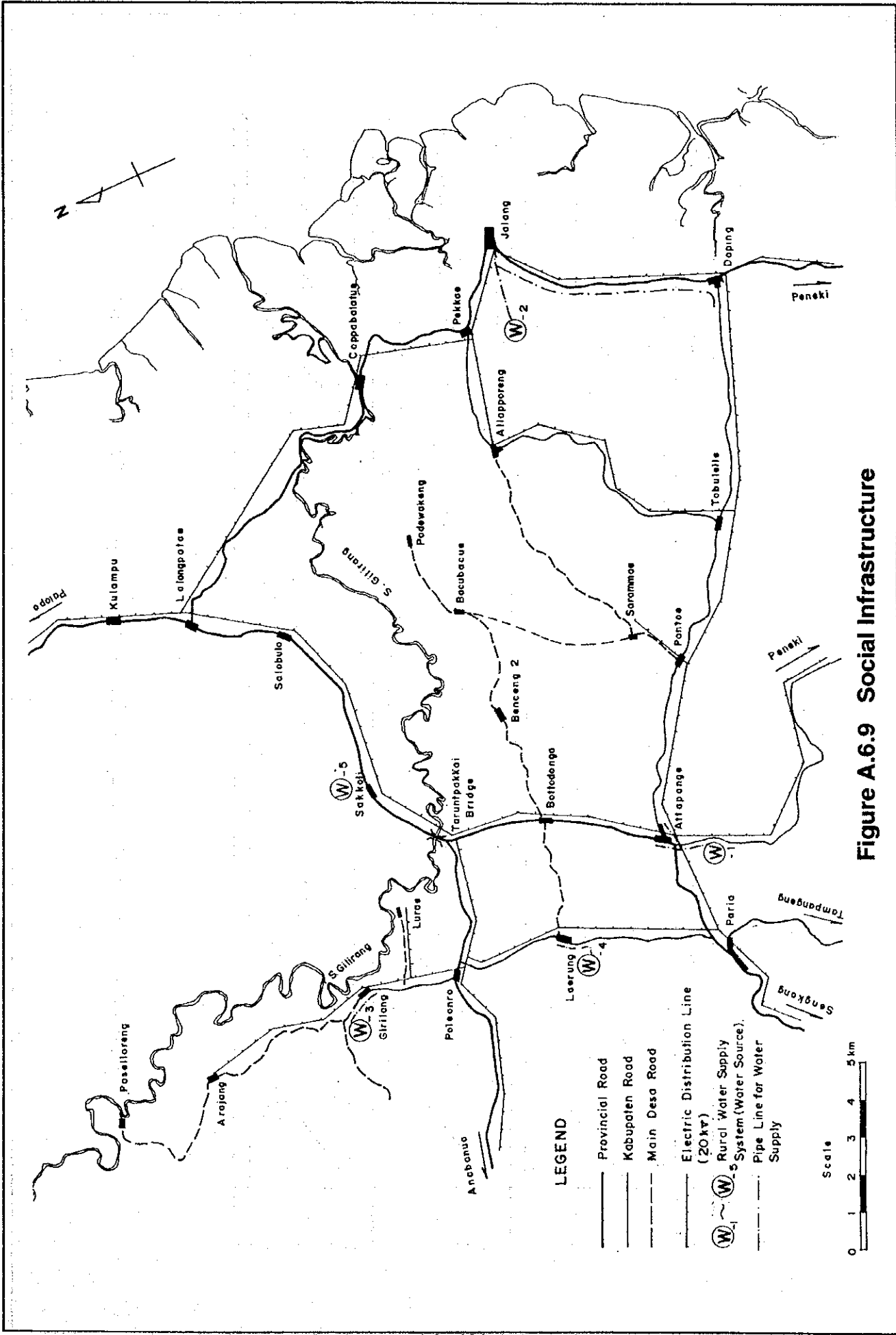


Figure A.6.9 Social Infrastructure



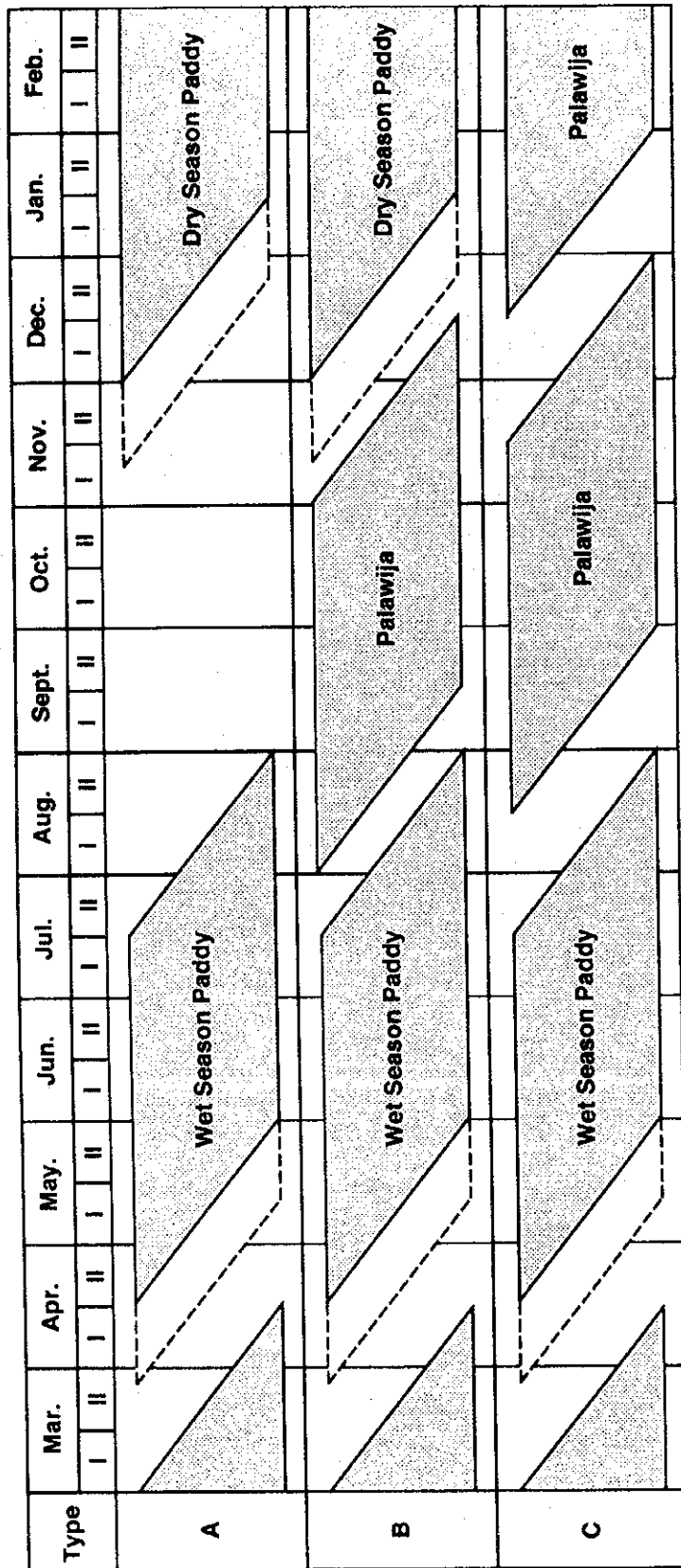
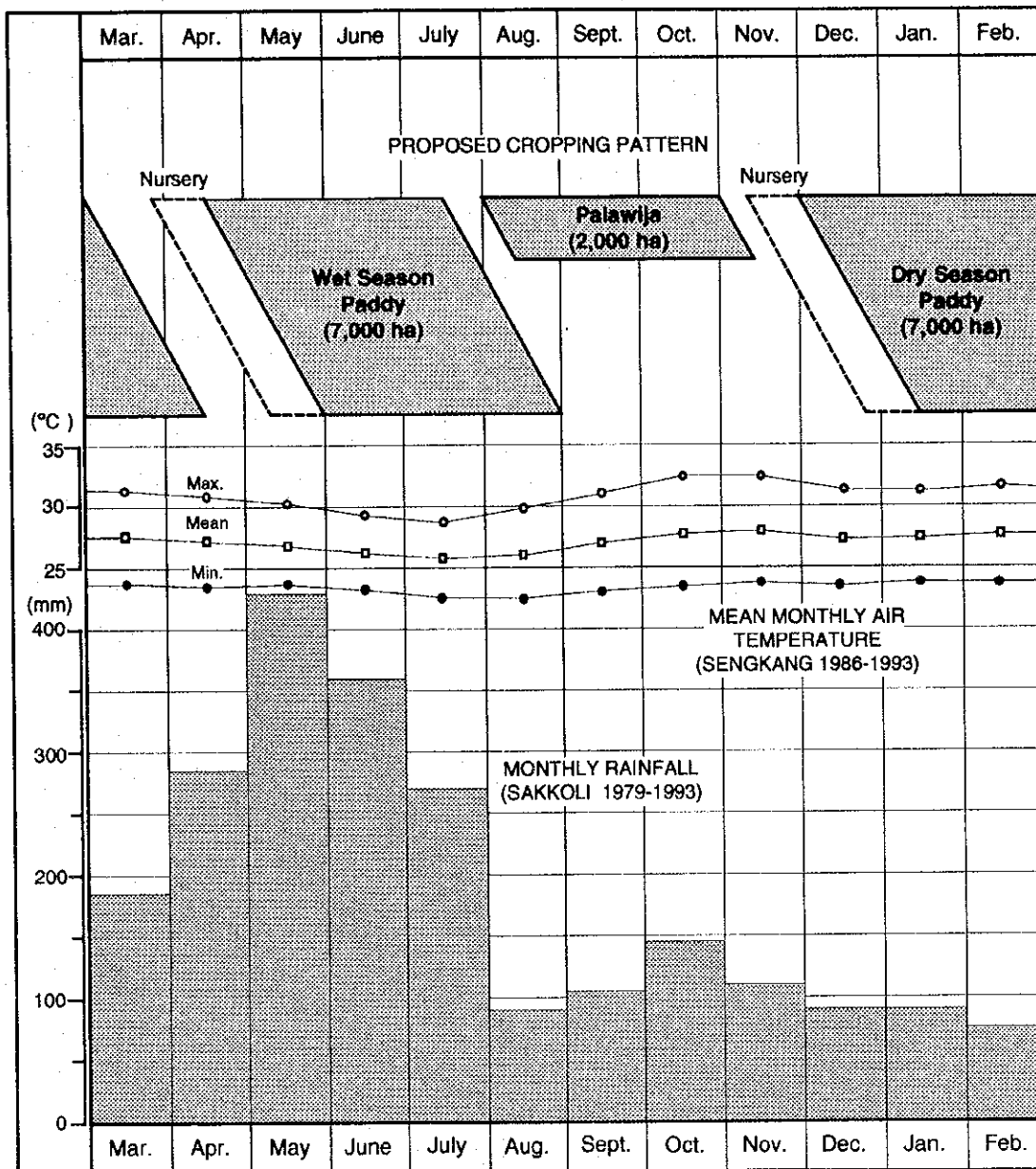
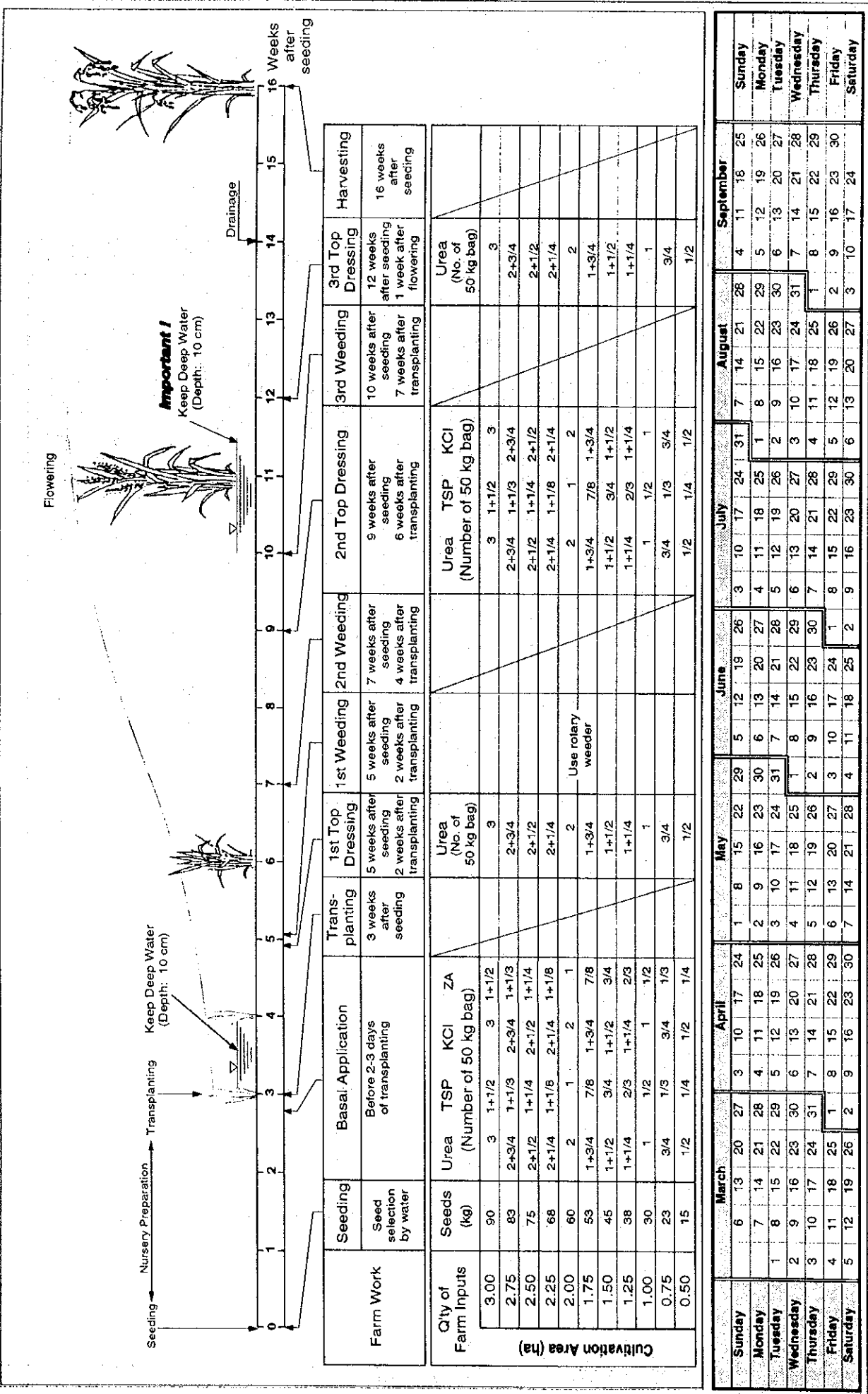


Figure A.6.10 Alternative Cropping Patterns for Future with Project Condition



**Figure A.6.11 Proposed Cropping Pattern**

**Figure A.6.12 Sample for Cropping Calendar**  
**RICE CULTIVATION - WET SEASON IN 1994 - IR 66**



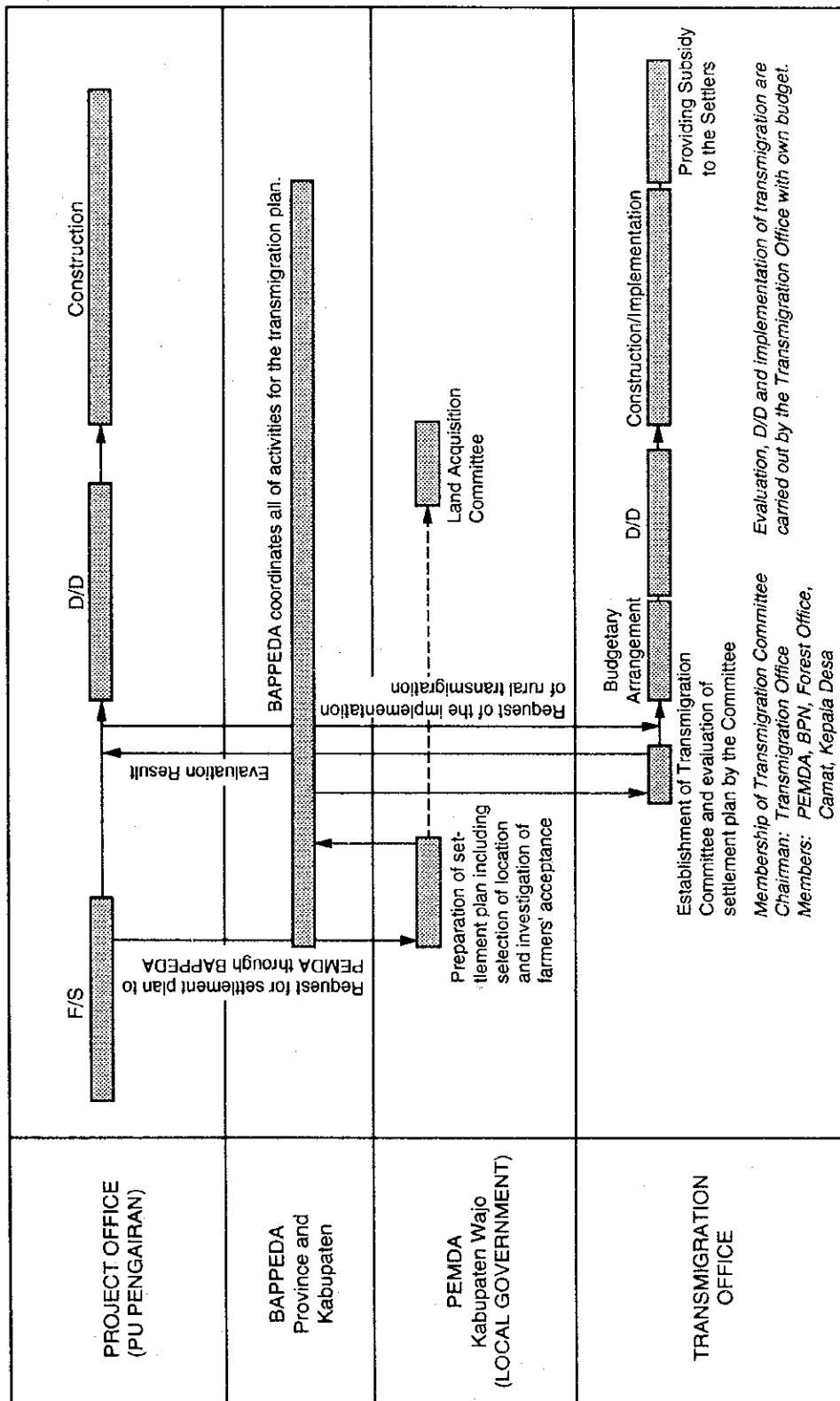


Figure A.6.13 Implementing Procedure of Rural Transmigration Plan

**ANNEX 7**

**CONSTRUCTION PLAN AND COST ESTIMATE**

## ANNEX 7 CONSTRUCTION PLAN AND COST ESTIMATE

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## **ANNEX 7 CONSTRUCTION PLAN AND COST ESTIMATE**

### **1. BASIC CONSIDERATIONS FOR CONSTRUCTION**

The Project implementation schedule is formulated on the following considerations :

The civil works to be executed by the Project are broadly classified into the main civil works and the tertiary development works. The civil works consist of the main project facilities such as Gilirang intake weir, Paselloreng dam, main and secondary canals, major drainage canals, construction roads. The tertiary development works include all the facilities below the tertiary outlets such as tertiary irrigation canals, tertiary drain, farm ditches and their related structures.

The main civil works would be undertaken by a qualified civil work contractor / contractors with assistance of foreign technical services, which should be selected through competitive bidding, and the tertiary canals drains and roads, by the local contractors. The quaternary canal networks in the tertiary system would be constructed by farmers themselves under the guidance of the local government.

As the civil works of the Project include a large volume of earth works, the mechanized construction will principally be introduced in the main civil works. In order to increase the employment opportunity in and around the Project area, however, the manpower construction will be adopted as much as possible. The large scale civil work such as weir, dam, main and secondary canals, major drainage canals and construction roads will be carried out mainly by heavy construction machinery. The tertiary development works will be carried out by manpower with minor construction equipment.

Taking into account the large scale of the civil works, the Project would be implemented in three stages; 1) detailed design of the main project facilities 2) construction of the main project facilities and 3) the detailed design and construction of tertiary development works. The tertiary development works would be initiated simultaneously with the main works, so that upon completion of the main works, immediate benefits can be envisaged.

### **2. IMPLEMENTATION SCHEDULE**

The Project implementation schedule is as shown in Figure A.7.1. It includes the Project preparatory works and the construction works. The Project preparatory works will last 24 months including the time necessary for additional photo mapping works, the detailed design works, mobilization, and construction of offices and quarters. The construction works will last 43 months for the main civil works and tertiary development works.

The Project mobilization which includes financing, legalization, establishment of the Project organization would have to be completed by the middle of 1996. In order to facilitate the early commencement of the construction works, the tendering should be promoted on October 1997.



### 3. CONSTRUCTION PLAN

#### 3.1 Basic Assumptions

##### 3.1.1 Workable Days

25 days per month are applied to the workable days of normal works such as concrete works, foundation treatment works, construction works of irrigation facilities etc. On the other hand, as the impervious materials of dam embankment are affected by heavy rainfall, the workable days for these materials in wet season are reduced from 25 days of normal works. The following time length to suspended the work are set for respective ranges of daily rainfall.

Daily rainfall depth (mm)	Time to be suspended (day)
0 - 10	0
10 - 30	0.5
30 - 50	1.0
more than 50	2.0

The workable days are estimated to be 250 days per annum.

##### 3.1.2 Basic Method of Earth Works

Following equipment are basically introduced for earth works of the Project:

Earth Works	Earth Materials	Proposed Equipment
Excavation	Sand, Common Soil, Gravel, Weathered Rock	Bulldozer, Back-hoe Shovel, Ripper Dozer, Back-hoe shovel blasting & bulldozer
Loading	Any kind of excavated materials	Tractor shovel, Back-hoe shovel
Spreading	Any kind of excavated materials	Bulldozer
Compacting	Impervious materials, Coarse materials, Common soil	Tamping roller, Vibration-roller, Tire-roller, Compactor, Tamper

### 3.2 Construction Plan and Method

#### 3.2.1 Preparatory Works

The preparatory works such as additional aerial photo mapping, detailed design, construction of office and quarters, and land acquisition will be started on April of 1996.

Aerial photo maps on a scale 1/5,000 with a contour interval of 0.5 m would have to be prepared for in and around the Project area of 5,000 ha. This map will be used for the design and construction of the tertiary development.

The detailed design of Gilirang intake weir, Paselloreng dam, irrigation system and drainage system will be started on April 1996. The design will be completed by the end of March 1998.

The Project office and quarters will be completed prior to the major construction works. This will be started from November 1996 and completed by the end of September 1997. The land acquisition for the Project facilities will be completed at least one year prior to the construction works.