

APPENDIX G: HORTICULTURE

**THE STUDY
ON
THE THIRD UMBRELLA COOPERATION
FOR
INTEGRATED AGRICULTURAL AND RURAL DEVELOPMENT
IN
THE REPUBLIC OF INDONESIA**

DRAFT FINAL REPORT

APPENDIX G : RESULTS OF FIELD SURVEY OF HORTICULTURE IN INDONESIA

Table of Contents

	Page
G.1 VEGETABLES.....	G - 1
G.1.1 Vegetable Production.....	G - 1
G.1.2 Kindsof Vegetable Grown.....	G - 3
G.1.3 Potentials for Production.....	G - 4
G.1.4 Farming System	G - 5
G.1.5 Marketing Channels for Vegetables.....	G - 8
G.1.6 Price of Vegetable.....	G - 8
G.1.7 Post-harvest Practice.....	G - 9
G.1.8 Problems and Constraints.....	G - 10
G.1.9 Suggestions for Improvement.....	G - 13
G.2 FRUITS	G - 14
G.3 EXPORT/IMPORT OF HORTICULTURAL PRODUCTS.....	G - 17
G.3.1 Vegetables.....	G - 17
G.3.2 Fruits	G - 18

List of Tables

	Page
Table G.1.1 Vegetable Production by Island, 1993	G - 3
Table G.1.2 Vegetable Production in Provinces Covered by the Study	G - 3
Table G.1.3 Comparison of Wholesale, Retail, and Supermarket Prices for Selected Vegetables in Bogor on November, 1993	G - 9
Table G.2.1 Fruit Production in Indonesia, 1993	G - 14
Table G.2.2 Fruit Production by Province, 1993	G - 16
Table G.3.1 Export/Import of Vegetable, 1991	G - 17
Table G.3.2 Export/Import of Fruits	G - 18

List of Figures

Fig. G.1.1 Vegetable Production (1969-1992)	G - 1
Fig. G.1.2 Average Monthly Rainfall in Majalengka for 1979-1988	G - 6
Fig. G.1.3 Traditional Farming System	G - 6
Fig. G.1.4 New Cropping System	G - 7
Fig. G.1.5 Marketing Channels for Vegetables	G - 8

Appendix G: Result of Field Survey of Horticulture in Indonesia

G.1 VEGETABLES

G.1.1 Vegetable Production

In accordance with the development objectives that have been stated in the State Main Feature (GBHN), and also in relation to the objectives of the agriculture development, several goals are attainable through development of horticulture: to protect self-supporting food production, agricultural diversification, increase farmers income, provide jobs in the agricultural sector, and also to increase agricultural export value.

In recent years, production of vegetables had increased sharply in Indonesia. This increase went through three stages of development as shown in Fig G.1.1.

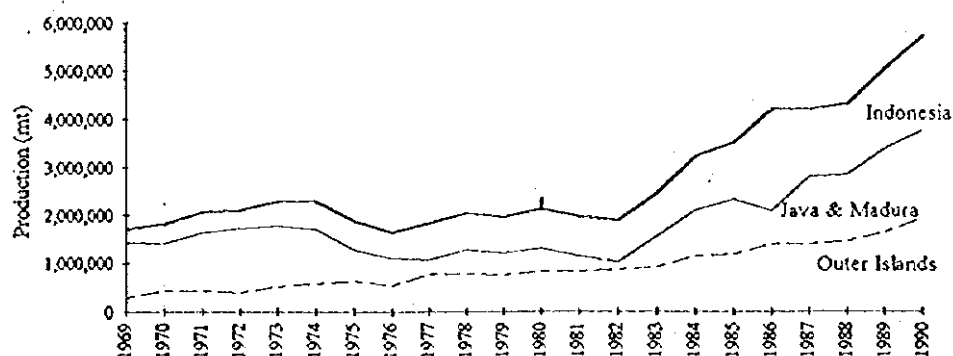


Fig. G.1.1 Vegetable Production (1969~1992)

As a first stage, temperate zone vegetables such as cabbage, potato, carrot shallot, etc. had been introduced by Holland and cultivated in high mountain areas since the beginning of this century. However, because of poor techniques and scarce seed supply, the production

was so limited and those vegetables were mainly sold as souvenir to visitors to resort areas.

In the second stage, along with the economical development and income increase in 1970s, refrigerators were popularized among rich families in urban area, demands for high class and quality vegetables were increased. Vegetable production began to develop sharply in this period.

Lately in 1980s, a number of supermarkets were built in the cities of Jakarta, Bandung and Surabaya. And cold chain systems were introduced in these supermarkets for marketing of vegetable well as for selling meat, fish and dairy products. High quality vegetables such as tomato, cucumber, cabbage, lettuce and shallot, which could not be handled before due to quickly perishable quality, appeared in larger quantities before urban consumers. Per capita demand for horticultural commodities increased with peoples' income and their production volume. The World Bank/IBRD analysis (1991) projected the average of increasing demands, period of 1988 to 2000 for vegetables is 3.6~4% per year, for fruits is 5.5~6.8% per year.

In summary, such rapid increase of vegetable production is due to following reasons.

- (1) Along with income increase of urban people, demands for high quality and nourishing vegetable have been increased.
- (2) A number of supermarket appeared in cities and these supermarkets have started to dominate the urban retail market and act as a main promoter of product innovation and quality improvement. At the same time, refrigerators become popular and vegetable are preserved well for daily consumption at home.
- (3) New kind and variety of vegetable have been introduced which stimulated consumer's demand.

Indonesia possess a wide range of agro-ecological zone which make it possible to grow a great variety of vegetables. Tables G.1.1 and G.1.2 show main area of vegetable production in the country.

Table G.1.1 Vegetable Production by Island, 1993

Area	ton	%
Sumatra	797,712	14.2%
Java	3,774,779	67.0%
Bali and Nusa Tenggara	378,678	6.7%
Kalimantan	190,292	3.4%
Sulawesi	480,905	8.5%
Maluku and IRJA	8,986	0.2%
Total for Indonesia	5,631,352	100.0%

Table G.1.2 Vegetable Production in Provinces Covered by the Study

Area	ton	%
South Sulawesi	374,676	6.65
West Java	1,740,996	30.9
West Nusa Tenggara	60,674	1.08
South Kalimantan	56,705	1.01

Source: DGFCH, Ministry of Agriculture

G.1.2 Kinds of Vegetable Grown

The following three cultural styles can be distinguished in Indonesia regarding vegetable production and cropping systems. In the following general classification, temperature reflected by altitude, and commercialization indicated by proximity to urban consumption centres are the main variables.

In the highlands (over 800 meters above sea level):

Intensive and commercialized farming systems are located in relatively homogeneous concentrated production areas in mountainous areas. Various kinds of temperate vegetables such as, radish, onion, garlic, cabbage, potato, leeks, carrot, asparagus and broccoli are grown. Recently, there seems to be a shift of cultivation in lowland areas plant o highland vegetables such as cabbage, potato, garlic, chinese cabbage etc. On the other hand; some lowland vegetables such as shallot, hot pepper, eggplant and

cucumber, are cultivated in highland areas, although from the quality point of view, highland vegetables are better than lowland ones.

In the medium altitude areas (200~800 meters above sea level):

Fully commercialized production systems, in the vicinity of provincial and district urban centres where significant volumes of horticultural crops are produced. Some crops, including potato, cabbage, chili and onions came originally from temperate zones. They are usually grown in the highlands, but have been adapted to the somewhat higher temperatures of medium altitudes. Other crops, such as peppers, tomato, various types of beans, cucumber and leafy vegetables, are more typically tropical horticultural commodities and some of them can be grown in the medium altitude areas.

In the lowlands (up to 200 meters above sea level):

Cultivation of lowland and heat resistant vegetables are traditional in these areas. Cultivation takes place especially in irrigated fields in the vicinity of urban area. Low land production includes mainly amaranth, eggplant, cucumber, yard-long bean, and kangkong.

In statistics, only 18 kinds of vegetable are accounted. Not included in the list are traditional vegetables such as young leaves of cassava and papaya which are grown in farmer's yard and a large quantity is consumed in rural areas. This causes relatively fewer quantity of vegetable consumption compared to that of other countries.

G.1.3 Potentials for Production

Almost all kinds of horticultural crops could be grown in Indonesia. Vegetable production has been increasing recently. Of all cultivated vegetables, cabbage was the highest in potential production, followed by potato, pepper, chinese cabbage, tomato, shallot and garlic.

(1) Domestic market

The prospect for development of domestic market for vegetables is large and in line with potential increase of population and income of the people. During the Fifth Five Year Development Plan, the domestic demand for vegetables increased 10.9% per year, with percapita annual consumption and national consumption increased 11.2% and 15.7% respectively. Another potential market is the demand for agribusiness as the materials for processed foods.

(2) Foreign market

Since all crops can be grown, Indonesia has great potential to produce vegetables for export to other countries. Main vegetable crops for export include potato, carrot and peas.

G.1.4 Farming System

Farming systems under rainfed conditions are primarily determined by the seasonal distribution of rainfall. As shown in Fig.G.1.2, the rainy season in this area extends from October to May with the rainfall peak in December - February.

Traditional farming systems before the introduction of commercial vegetable production are shown in Fig.G.1.3. It can be noticed that actual farming systems are characterized by infinite variations in crop combinations and sequences. The typical systems are: (1) a mixed cropping in upland fields, and (b) Rice-Soybean crop rotation followed in rainfed lowland fields. The first system intercrops maize and upland rice in the first crop season (October~January), followed by soybean in the second crop season (February~May), while cassava is grown along the edge of farm plots. The third system (c), practices rice double cropping in irrigated lowlands.

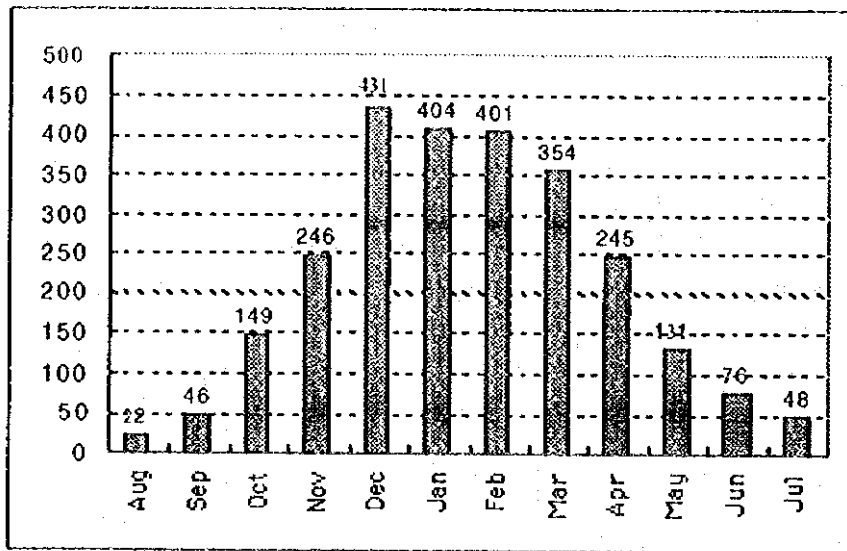


Fig.G.1.2 Average Monthly Rainfall in Majalengka for 1979 - 1988

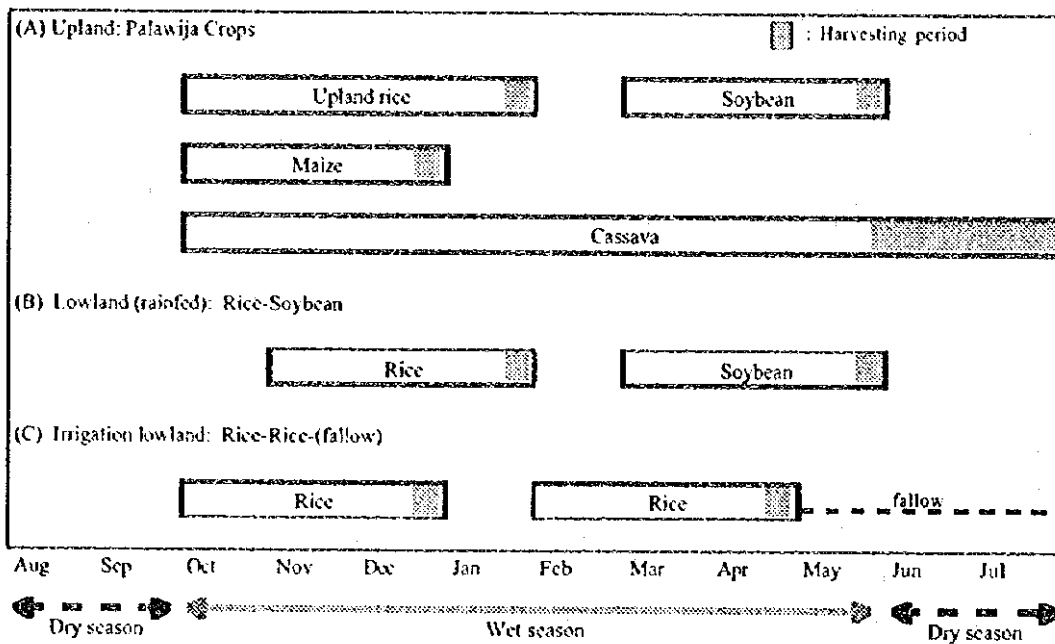


Fig.G.1.3 Traditional Farming Systems

New farming system have become increasingly popular after introduction of new kind of vegetables in the mid-1970s to high land areas of Java island.

The vegetable farming system developed in the highland of Indonesia has the following

characteristics based on the agroeco system of each area for maximum utilization of their cultivating lands.

(1) Highland

Number of vegetable crops; twice and thrice in a year and/or intercropping in the same field. Most kind of vegetable are grown.

(2) Rainfed

Rice production is main in rainy season. This is folowed by palawija such as soybean and maize and further by vegetables such as cucumber, eggplant, long yard bean utilizing the residue water.

(3) Irrigated

Basically two crops of rice and if possible followed by one crop of vegtaleb follows. At low land, traditional or heat resistant vegetables are cultivated.

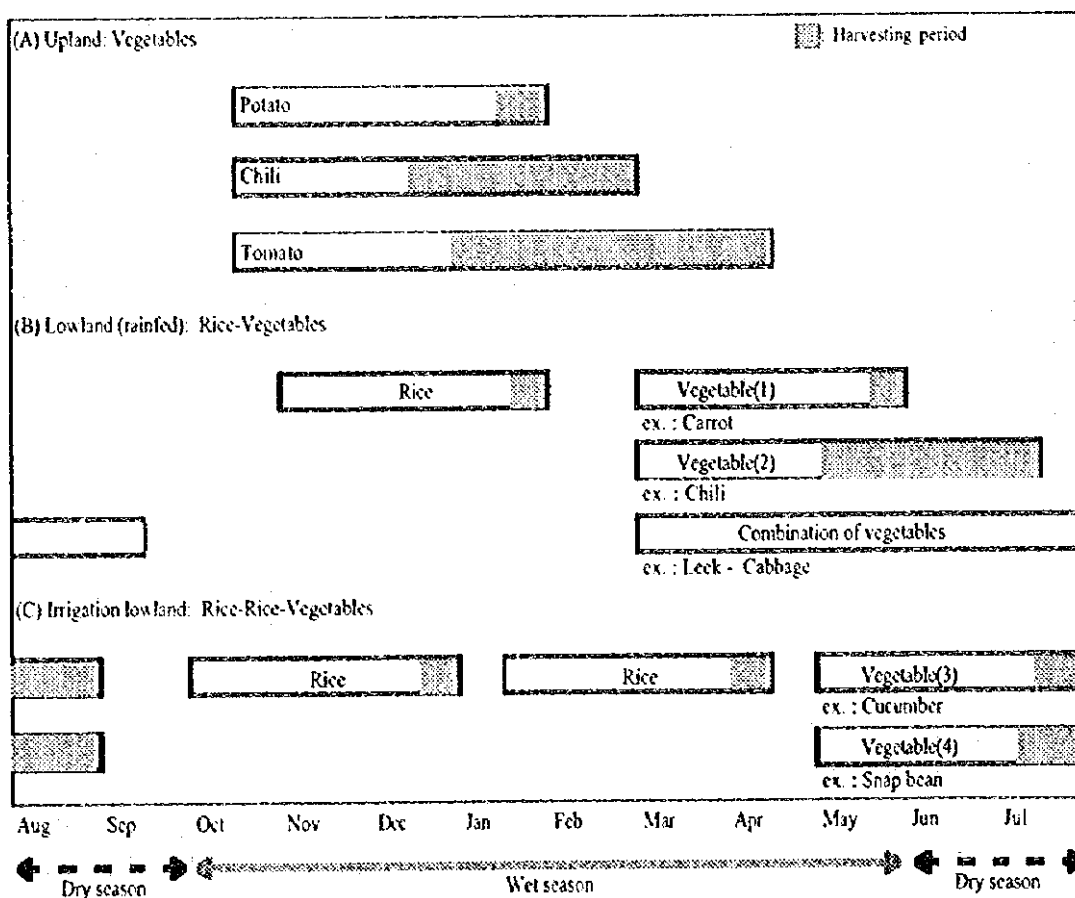


Fig.G.1.4 New Cropping Systems

G.1.5 Marketing Channels for Vegetables

Marketing channels for vegetables are drawn in Fig G.1.5 at the local level up to local consumers in town, or to the point of shipment to the metropolis. This Chart is taken from a description regarding marketing channels for vegetables at the local level in "Marketing Innovation for Vegetables" by the CGPRT.

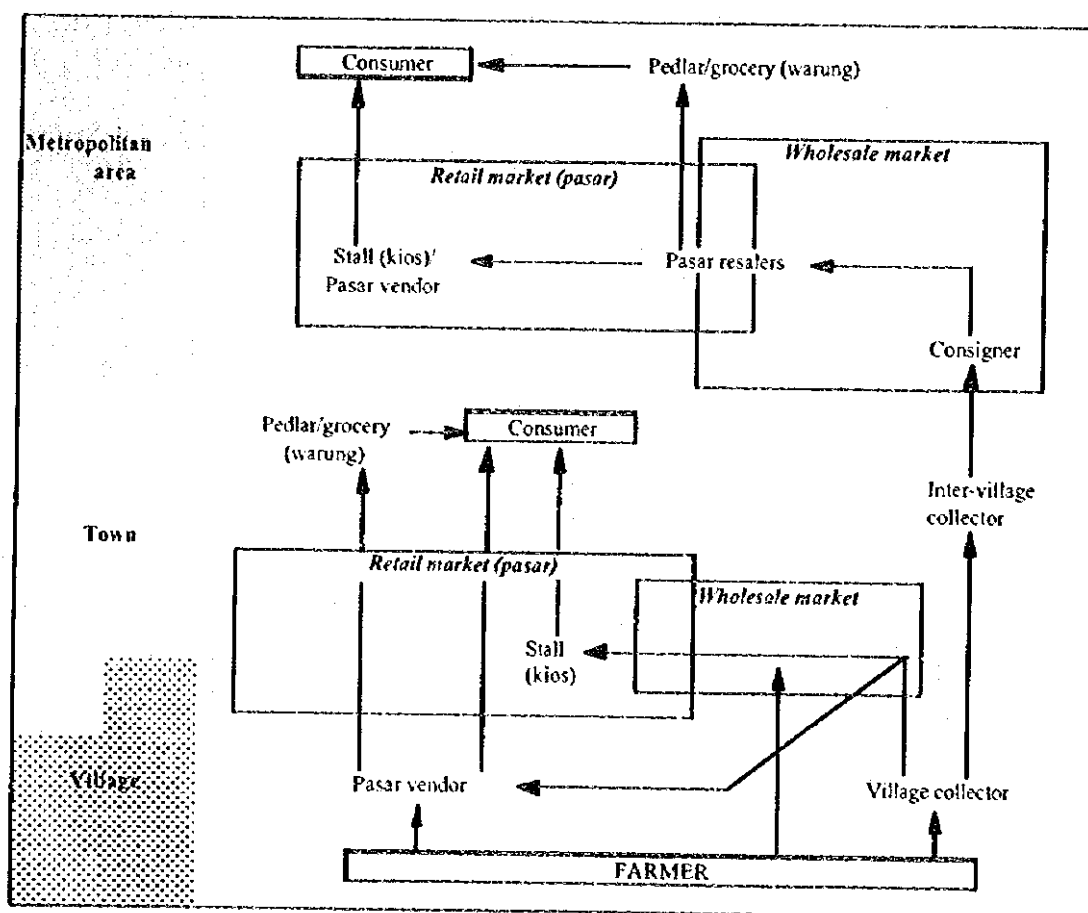


Fig.G.1.5 Marketing Channels for Vegetables

G.1.6 Price of Vegetables

It is very difficult to get accurate price system in the complex vegetable marketing structure. Since this study was made in limited time and area, it was impossible to carry out an authentic survey on the price of vegetables. However, among informations

collected, it was found that there is an excellent study on pricing system of vegetable from farmers to consumers.

The following price report (Table G.1.3) is an extraction from "An overview of the Fresh Vegetable Subsection in Indonesia" by Agribusiness Development Project (ADP working paper No.12). This price report contains the price of selling and buying by wholesaler in producing areas and consuming areas including supermarkets.

Table G.1.3 Comparison of Wholesale, Retail, and Supermarket Prices for Selected Vegetables in Bogor in November, 1993

Commodity (Grade)	Wholesale (a)		Retail Market (b)				Supermarket (d)	Difference	
	Buying	Selling	#1	#2	#3	Average (c)		(d)-(c)	(c)-(a)
Potato	465	565	700	850	775	775	1,350	565	210
Cabbage	240	340	400	350	500	417	1,269	852	77
Tomato	300	500	700	825	700	742	1,870	1,128	242
Carrot	150	200	500	550	500	517	1,333	816	317
Beans(Buncis)	425	500	625	675	675	658	1,350	692	158
Chilies	1,250	1,350	15550	2250	2150	1983	2,500	517	633
Shallot	1,300	1450	1750	2750	2200	2233	2,430	197	783

Note: All respondents were interviewed between 9:00 - 11:00 AM.

a = Ramayana Wholesale market

b = Retail Markets of #1 Pasar Bogor, #2 Gunung Batu, #3 Pasar Anyar

c = Average of (b)

d = Hero's Supermarket

Source: ADP Working Paper No.12

G.1.7 Post-harvest Practice

In Indonesia, most farmers sell their vegetables immediately after harvest. Grading/sorting is usually not done by farmers, instead by wholesale traders. Farmers who are in immediate need of cash sell their crops without adding the cost of post-harvest processing. Tebasan (standing crop) take place often on or near the farm so no extra cost are incurred (e.g. weighing, transportation, cleaning, peeling, grading, packing, loading etc.)

Generally for the transaction of vegetables, there is no fixed grading system existed.

At harvest time the field trader estimates quality and quantity and bargains towards an acceptable price. If agreement is reached, harvest starts early in the morning, and the

product is sorted, graded and packed. The trader collects the crop, weighing the sacks with his own portable scale.

Post-harvest loss of vegetable will vary with the kind of vegetable, the conditions of storage, packing and handling. A comprehensive study on losses should be conducted to find out postharvest technologies required for eliminating above losses.

G.1.8 Problems and Constraints

(1) Technical Aspects

1) Quality Seed

One of the constraints in the development of vegetables is the lack of quality seed to support production of high-quality vegetables to meet market demand. For example: tomato for processing industry, potato for french fries, cucumber for pickles, baby corn, asparagus, and okra. Therefore, the development of varieties that fulfill market demand is strongly recommended.

Small farmers still have difficulties in obtaining high quality seed and so they are forced to use lower quality seeds which result in lower yields.

2) Cultural Practice

Unsuitable cultural practices, with soil fertility, soil type and environmental conditions have adverse effect on vegetable production. Improper use of fertilizers (types, dosages, timing and method of application will add unnecessary costs and optimal yields can not be obtained. Nutrient deficiency will cause poor growth of vegetables. On the other hand, high dosages of fertilizers will affect the nutritional balance that cause an unavailability of certain compounds resulting in lower yields.

The cultivation areas of some vegetable crops is limited by agroclimate, and most of the production pattern is adapted to existing seasons. Consequently, over production occurred at one time, and under production at another time. Such production patterns

and fluctuations in market supply cause serious price fluctuations. To solve this, a technology package regarding cropping system must be developed.

3) Pest and Diseases

The yield loss caused by pests and diseases on vegetables has significant economic implications. However, improper pest and disease control which depends entirely upon chemical pesticides may cause negative effects including environmental pollution and the destruction of natural and other beneficial organisms, in addition to increased production cost..

4) Post-harvest Technology

Marketing is the process of moving the product from producer to consumer. The movement of the product includes physical and economic activities. Most vegetable products are voluminous and perishable, so several post-harvest treatments are needed to prevent deterioration of the product.

Fresh vegetables cannot be stored for long periods. Post-harvest handling of fresh vegetables includes storing and transportation, which very much depend on vegetable the quality. Methods of processing and proper preservation are needed to standardize quality since consumers, especially for export, demand higher quality.

Post-harvest research to reduce yield loss during handling, to improve quality and extend the period of storage and freshness, and processing to increase the value of vegetables are very important.

5) Technology Transfer

Farmers need intensive and continuous guidance. In general, the agricultural extension service workers have been trained in rice and secondary food crops technologies, with very few trained personnel in horticultural techniques. Therefore to promote technology transfer, specialized training for extension people working in the vegetable-growing areas is needed.

(2) Socio-economic Aspect

In general, most vegetable farmers are small-scale growers. The types of vegetable crop grown by the farmers is determined by expected financial return, their capability in crop management and the availability of production facilities.

Farmers can not adopt proper cultural practices, due to poor education, lack of guidance and capital to buy fertilizers, pesticides, etc. Sharp price fluctuations, lack of market information, and long distances between production centers and consumers markets are the main constraints for socio-economic development..

1) Market Information

The producers are always in weak position, because they are far from the consumers and sources of information. The marketing system does not give feedback to the farmers such as technology input, quality standardization, variety innovation, and so on. For these reasons, the establishment of market service system is required as follows:

- trade statistics;
- market prices;
- grades and standards;
- packaging and labeling requirements;
- phytosanitary and other import regulations;
- competitor profiles;
- market contacts;
- information on new technologies; and
- input supplier contacts.

2) Capital

The only available credit for farmers at present is commercial credit at 20~40% interest. To develop horticultural production, easily accessible credit facilities are required for farmers that would allow their competitive production. This would also support the processing industry and help increase farmers' income.

3) High Cost of Transportation

Most of the transportation is done by trucks that have no refrigerating facilities, essential for crops such as cabbage, welsh onion, chinese cabbage, etc. The cost of transportation accounts 10~30% of the market price.

G.1.9 Suggestions for Improvement

As mentioned before the development of vegetables in Indonesia faces several constraints:

1) limited technical support; 2) price fluctuations in supply due to irregular cropping system and limited market information and guidance; 3) low farm business efficiency due to the limited available technology and reduced bargaining capacity and 4) unavailability of technology for preserving the freshness of vegetables accelerates loss during transportation and storage;

In order to overcome the above-mentioned constraints, the following suggestions for improvement of vegetable production and marketing are proposed:

- (1) To maintain the availability of production components such as production technologies, quality seed, fertilizer and pesticide so that the cropping pattern can be better arranged.
- (2) To provide services to improve marketing quality so that farmers can obtain the proper price.
- (3) To promote joint ventures between the private sectors in the agribusiness to develop rural economy.
- (4) To strengthen vegetable exports.
- (5) To create a conducive business atmosphere to strengthen with the following vegetable development priority:
 - i) Vegetables that will reduce imports: shallot, garlic, potato and pepper.
 - ii) Vegetables for export such as: potato, pepper, cabbage and tomato.

- iii) Vegetables that have export potential: i.e. asparagus, mushroom, sweet pepper, string bean and bamboo shoot.

G.2 FRUITS

The production of fruit in Indonesia in 1993 is listed with their acreage is given in Table G.2.1

Table G.2.1 Production of Fruits in Indonesia 1993

	Area Planted (ha)	Yield (ton/ha)	Production (ton)
Avocado	19,185	49.00	93,999
Mango	126,184	36.48	460,357
Rambootan	66,423	41.82	277,790
Lauzons	8,349	71.40	59,610
Durian	31,383	54.45	170,871
Sapodilla	19,447	35.85	69,709
Papaya	10,751	392.89	422,399
Banana	70,721	373.84	2,643,812
Pineapple	19,985	229.72	459,105
Zalaka edulis	14,626	238.43	348,728
Grapefruit	11,408	28.78	32,829
Valencia orange	2,008	116.31	23,355
Siam orange	16,814	83.01	139,570
Orange	6,680	96.69	64,587
Orange total	36,910	70.53	260,341
Water rose apple	6,764	158.06	106,915
Malay rose apple	1,663	83.67	13,914
Guava	26,305	74.98	197,243
Jumbu total	34,712	91.63	318,072
Others	1,460	305.16	44,554
Total	460,156	122.34	5,629,347

Source: DGFCH, Ministry of Agriculture

According to SUSENAS, 1993 and as shown below, fruits share 7.0% and 3.0% of food and total expenditure respectively in an average indonesia consumer's budget.

	Rp	%	
Cereals	5,083	(7.6)	Production of fruit by province is listed in Table G.2.2.
Meat	2,232	(3.3)	
Vegetable	2,477	(3.7)	
Fruit	2,040	(3.0)	
Prepared food	5,207	(7.8)	Development of fruit production, processing and marketing are key points of success in agribusiness.
Food Total	29,306	(43.8)	
Total Expenditure	66,888	(100.0)	

- Roughly 110,000 tons of Pineapple were required. Most demand arose from

export-oriented canning and juice concentrate factories.

- Considerable demand for Mango and Jumbu (Guava et. al.) originated from domestically oriented Juice concentrate factories. This demand can be estimated to amount to 20,000~40,000 tons of Mango and 10,000~20,000 tons of Guava.
- About 30,000~50,000 tons of special Banana varieties (Pisang Siam, Pisang Kapas/Kapok) are required for the home industry and small scale Banana processing into Pisang Sale (smoked Banana) and Pisang Kripik (Banana chips).
- The specific fruit with high processing demand is Sirsak. The total demand for the juice and syrup industry can be estimated to amount to 15,000~ 25,000 tons/year.
- Papaya is often used as a base for tomato and chili sauces. Approx. 5%~10% of the papaya production can be estimated to be absorbed by sauce manufacturers.
- Smaller processing demand existed for seasonal Rambootan canning (approx. 5,000 tons/year), Durian pastes (Dodol) (1,000 tons/year) and Manisan Salak (sweet sour pickled Salak; approx. 1,000 tons/year).
- Approx. 1,500 to 2,000 tons of Strawberry were needed for jam production.

Table G.2.2

Fruit Production by Province 1993

	Province	Planted Area (ha)	Yield (qu/ha)	Production (ton)
1	DLACEH	8,634	82.66	71,365
2	SUM.UTARA	16,788	169.15	283,961
3	SUM.BARAT	5,309	121.27	64,380
4	RIAU	15,008	76.07	114,160
5	JAMBI	5,746	42	24,136
6	SUM.SELATAN	7,808	129.11	100,807
7	BENGKULU	2,449	62.21	15,236
8	LAMPUNG	9,643	128.25	123,667
	SUMATERA	71,385	111.75	797,712
9	DKIJAKARTA	4,682	82.42	38,587
10	JAWA BARAT	85,897	202.68	1,740,996
11	JAWA TENGAH	66,474	128.7	855,540
12	DLYOGYA	11,842	114.86	136,014
13	JAWA TIMUR	114,854	87.38	1,003.64
	JAWA	283,749	133.03	3,774,779
14	BALI	20,256	78.72	159,457
15	NT.BARAT	6,691	90.68	60,674
16	NT.TIMUR	12,259	120.77	148,058
17	TIMOR TIMUR	877	96.74	8,484
	BALI & NT	40,083	93.97	376,673
18	KL.BARAT	12,036	70.19	84,480
19	KAL.TENGAH	6,055	34.65	20,980
20	KAL.SELATAN	6,230	91.02	56,705
21	KAL.TIMUR	5,012	56.12	28,127
	KALIMANTAN	29,333	64.87	190,292
22	SUL.UTARA	4,251	56.39	23,973
23	SUL.TENGAH	2,717	151.96	41,287
24	SUL.SELATAN	23,333	160.58	374,676
25	SUL.TENGGAH	3,135	130.68	40,969
	SULAWESI	33,436	143.83	480,905
26	MALUKU	1,609	39.97	6,431
27	IRIAN JAYA	561	45.54	2,555
	MALUKU & IRJA	2,170	41.41	8,986
	LUAR JAWA	176,407	105.13	1,854,568
	INDONESIA	460,156	122.34	5,629,347

Source : DGFCII, Ministry of Agriculture

G.3 EXPORT/IMPORT OF HORTICULTURAL PRODUCTS

G.3.1 Vegetables

According to Central Bureau of Statistics, the following fresh and processed vegetables were exported/imported during 1991.

Table G.3.1 Export/Import of Vegetables, 1991

Fresh Vegetables	Export		Import	
	Tons	US\$	Tons	US\$
1. Potatoes	98,176	13,932,077	69	102,645
2. Cabbage	28,175	3,811,467	157	403,344
3. Shallot	10,375	2,753,992	13,638	4,860,768
4. Sweet Corn	554	164,719	-	115
5. Carrot	1,775	214,479	54	67,525
6. Cauliflower	274	72,442	20	25,101
7. Tomato	1,810	436,807	41	52,122
8. Others	5,869	2,636,105	35,221	21,414,847
	147,012	24,022,088	49,203	26,926,467

Processed Vegetable	Export		Import	
	Tons	US\$	Tons	Export
1. Mushroom (fresh)	6,310	14,016,992	405	175,034
2. Mushroom (chilled)	68	125,828	2	1,436
3. Cucumber (salted)	45	18,348	14	14,364
4. Tomato (processed)	-	-	27	30,618
5. Ketchups	95	91,328	261	165,203
6. Others	1,362	1,281,387	3,231	2,093,919
	7,880	15,533,883	3,940	2,480,574

Source: Central Bureau of Statistics

- The Indonesian Garlic production is insufficient to cover the local demand. In 1991, more than 18,000 tons of Garlic (13% of the domestic production) were imported.
- In 1991, nearly 14,000 tons of Shallots (2.5% of Indonesian domestic production) were imported.
- Vegetable exports to other South-East Asian countries, in particular to Singapore and Malaysia, have become a significant source of foreign exchange earnings for Indonesia. In 1991, vegetables with a value of nearly US\$40 million were exported. Main export commodities in 1991 were Potatoes (98,000 tons; nearly 20% of the

Indonesian production) and Cabbage (28,000 tons, 3% of the Indonesian production).

- Specialized vegetable growers have started to produce commodities like Broccoli or Paprika, which are not only marketed locally but also exported to Singapore and Saudi Arabia.
- In 1991, fresh and processed vegetable exportation was nearly US\$40 million and the value of imported vegetables is US\$30 million.

G.3.2 Fruit

Following figures are reported for export/import of fruits in 1991.

Table G.3.2 Export/Import of Fruits

Fresh Fruit	Export		Import	
	tons	US\$	tons	US\$
1. Mango	772	613,474	20	29
2. Mangosteen	452	530,614	0	0
3. Duke	238	192,471	0	0
4. Durian	45	18,514	2,318	4,953
5. Others	2,743	2,000,446	19,700	15,625,788
	4,250	3,355,519	22,038	15,630,770

Processed Fruit	Export		Import	
	tons	US\$	tons	US\$
1. Pineapple Syrup	63,931	45,468,802	16	29,607
2. Fruit and Vegetable mix juice	2,156	1,314,405	118	88,802
3. Citrus juice	604	436,340	601	266,904
4. Camp juice	172	125,310	134	103,575
5. Other juice	175	69,017	351	439,259
6. Others	35	31,435	1,880	2,311,970
	67,073	47,445,309	3,100	2,311,970

Source: Central Bureau of Statistics

- Some Papaya (Australia), Mango (Singapore, Taiwan and Saudi Arabia) and Durian (Singapore) were sporadically exported.
- A large quantity of oranges from Pakistan and China are increasingly imported.
- Out of season, Durian imported from Thailand is available in Jakarta. Due to very high prices (up to Rp24,000 /kg), its market share can assumed to be small.

- Orange from Pakistan and China, apple from America, grape from Australia are the main items of fruit importation.
- These imported orange, apple and grape are on sale even at rural small shops in whole Indonesia.

Indonesia has a favorite climate for production of fruits. However, high quality of fruit can not be produced to meet market requirement for both domestic and export. As a result of the above, a considerable quantity of fruit is imported and sold all over the country. The salient features of Indonesian fruit production can be summarised as below:

- 1) Fruit production of the country is mostly based on tropical fruit planted around farmers house and commercial plantation as observed in Philippines are very rare in Indonesia.
- 2) This production style poses following problems:
 - Marketing of fruits is seasonably short time and price drops sharply at the peak of the season.
 - Kind and variety of fruit are mostly traditional ones and very few improved varieties are available.
 - No quality control system exists and many spots and flaws caused by disease and insects are observed in marketed fruits.
 - Due to poor post-harvest technique and marketing infrastructure for transportation and storage, etc. it is difficult to maintain freshness and to prevent deterioration in fruit quality.
 - Indonesia has many islands and various growing season. However, due to poor system of transportation between islands and regions, products could not be transported from one place to another safely and quickly.
- 3) For the above reason, presently a large quantity of fruits is imported and it costs much foreign exchange, and also discouraging domestic farmers to produce and market the fruits. This is a vicious cycle in the national economy.

APPENDIX H:
POSTHARVEST AND MARKETING

**THE STUDY
ON
THE THIRD UMBRELLA COOPERATION
FOR
INTEGRATED AGRICULTURAL AND RURAL DEVELOPMENT
IN
THE REPUBLIC OF INDONESIA

DRAFT FINAL REPORT**

APPENDIX II : RESULTS OF FIELD SURVEY OF POSTHARVEST AND MARKETING

Table of Contents

	Page
H.1 Generation of Postharvest Losses.....	H - 1
H.2 Study on Postharvest Losses of Rice	H - 2
H.3 Postharvest Practices in Areas Covered by the Study.....	H - 3
H.4 Constraints in Improvement.....	H - 6
H.5 Activation of Rural Economy	H - 8
H.6 Improved Postharvest Practice and Agribusiness	H - 10

APPENDIX H: RESULT OF FIELD SURVEY OF POSTHARVEST AND MARKETING

H.1 Generation of Postharvest Losses

Rice cultivation in this country had been practiced rather in primitive manner until the introduction of high yielding varieties (HYVs) from IRRI. Harvesting of paddy also had been carried out in the traditional way by using ani-ani (harvesting knife). Because ripened rice has easy-shattering characteristics, they were harvested carefully panicle by panicle. Cutting of panicles were done many times because of the difference of ripening degree of the panicles in a same stalk. At this time, labour days for rice growing from sowing to harvesting was about 80~130 days/ha. and the harvesting quantity was 1.0~1.5 tons paddy/ha.

In the middle of 1960s, conventional harvesting work changed drastically with the debut of high yielding variety. Growing period of new varieties is shorter than traditional ones and therefore in the irrigated field double crops and triple crops of rice are possible in a year. Quantity of each harvest also increased to more than double. Labour input per a unit of field increased sharply to 200~250 days/ha. The postharvests practices also have changed from conventional variety to new high yielding variety as follows:

(1) Harvesting

HYVs are short stalk, quite uniform in ripening period. Therefore, sickles were used instead of ani-ani. Unfamiliar work caused rough performance of harvesting. Shattering of paddy kernels from panicles was resulted and it caused a considerable loss.

(2) Threshing

No special tool was prepared. And the work was mainly done by beating method also by trampling and striking with sticks. A lot of grain scattering occurred and it caused a large loss. Recently, power threshers are used and its number is increasing. However, most of them are used on a commission basis. Labour hours are reduced but a large loss is still observed.

(3) Drying

While conventional varieties were always harvested under fine autumn days. There was no worry about damages by rains. However, harvesting of second crop of HYVs (harvested in rainy season) coincides with the monsoon rainy season. Paddy under

drying process gets wet and at times a large quantity of undried paddy is spoiled by respiration heat.

(4) Milling

Conventionally, the milling work was done by village women with their mortar and pestle. It required a long time for milling. Engelberg type hullers (formerly used for crushing coffee beans) were also used in order to save the time taken for milling. However, this method of milling caused much broken rice, uneven milling and a large quantitative and qualitative loss.

Afterwards, rice milling machines from Japan and Taiwan were introduced and rapidly popularized. Further even more cheaper machines were manufactured in Indonesia. And in several years, most of the traditional rice mills were replaced by the new machines and it has greatly contributed to prevent the generation of losses.

Rice production in Indonesia was steadily developed since latter half of 1960s along with introduction HYVs, improvement of irrigation facility, also extension of agricultural technology to farmers. However, burden for cultivating new varieties increased largely especially for postharvest practices which are quite different from conventional ones. Large losses in quantity and quality have been generated.

H.2 Study on Postharvest Losses of Rice

The study on postharvest losses of rice have been carried out as the important item of 1st Umbrella Corporation to Indonesia by Japanese Government. This study was conducted from September 1981 to May 1982 at eight provinces of Aceh, South Sumatra, Lampung, West Java, Central Java, East Java, South Sulawesi and South Kalimantan by the study team dispatched by JICA.

This study team carried out detailed study on actual conditions of postharvest practices of rice, assessment of quantity of loss generated, proposed means of improvement and submitted a report. According to the report, the quantity of losses generated by the postharvest practices in both wet and dry seasons in four provinces of Aceh, West Java, South Sulawesi and South Kalimantan are estimated as shown in Table H.2.1:

Ministry of Agriculture and Central Bureau of Statistics jointly continue the study on the

loss year by year. There were a large fluctuations by the area and season, but in the opinions of all concerned, the total quantity of loss including quantity and quality should be in the range of 8~12%.

Losses in Postharvest Works of Rice

(Unit : %)

Province Stage	Aceh			West Java			South Sulawesi			South Kalimantan		
	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.	Max.	Min.	Ave.
Reaping	1.3	0.1	0.5	6.4	0.6	1.8	3.2	0.2	1.2	4.9	0.8	1.6
Threshing	2.0	0.0	0.4	4.7	0.1	0.5	7.4	1.5	3.5	4.2	0.0	1.0
Cleaning	2.3	0.0	0.3	-	-	-	-	-	-	0.5	0.0	0.1
Drying	0.1	0.0	0.0	-	-	-	-	-	-	1.0	0.0	0.0
Storage	2.1	0.2	0.3	4.2	0.8	0.6	0.9	0.3	0.4	5.9	0.4	0.5
Transportation	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rice Milling	4.5	0.0	0.8	4.5	0.0	0.7	4.5	0.0	3.5	4.5	0.0	1.9

Source: Study Report on Postharvest Losses in the Republic of Indonesia, JICA, 1982

Notes :

1. The amount of losses in the provinces have been obtained from the subject districts and estimated by areal pattern.
2. The amount of losses are the actual results of the survey, and all weight measurement of rice are based on 14% of moisture content and 3% of foreign materials.
3. Transportation means the carrying stage from the rice field to farm household.
4. 0.0% means a figure less than 0.025%.
5. The total number of farms surveyed are 96.

II.3 Postharvest practices in Areas Covered By the Study

Actual conditions of rice postharvest practices in areas covered by the study were as follows. The details of rice postharvest practices in study areas are collected by experts as follows. As experts visited study areas at out of harvesting season, the informations were collected by hearing from farmers.

(1) South Sulawesi

	Kab. Sidrap		Kab. Pinrang		Kab. Luwu	
Harvesting	sickle	97%	sickle	97%	sickle	100%
	reaper	3%	combine	3%		
Threshing	beating	5%	beating	30%	beating	85%
	trampling	10%	power thresher	70%	pedal thresher	10%
	power thresher	85%				
Cleaning	wind	15%	wind	100%	wind	15%
	winnower	70%			sieve	85%
	sieve	15%				
Drying	solar	90%	solar	100%	solar	100%
	dryer	10%				
Trans- portation	house	20%	man power	1%	house	5%
	bicycle	70%	house	5%	bicycle	15%
	wheel	10%	bicycle	50%	trailer	15%
			wheel	2%	track	65%
			autobicycle	39%		
			trailer	3%		
Straw	burning	65%	burning	75%	burning	95%
	To soil	35%	To soil	30%	To soil	5%

Regional features of postharvest practice

1. Custom threshing system is popular in Kab. Sidrap.
2. Most farmers have winnower to clean paddy in Kab. Sidrap.
3. Bicycle is an important transport means to the collection point in Sulawesi.

(2) West Java

	Kab. Bandung		Kab. Cianjur	
Harvesting	sickle	100%	sickle	95%
			ani-ani	5%
Threshing	beating	85%	beating	90%
	power thresher	15%	power thresher	10%
Cleaning	wind	85%	wind	90%
Drying	solar	100%	solar	95%
			dryer	5%
Transportation	man power	20%	man power	15%
	house	10%	house	5%
	bicycle	25%	bicycle	30%
	wheel	45%	wheel	50%
Straw	burning	80%	burning	90%
	mulching	15%	mulching	10%
	mushroom bed	5%		

Regional features of postharvest practice

1. Custom threshing systems are developing largely at suburbs of Jakarta and Bandung.

2. A part of straw is utilized for mulching of vegetable and mushroom bed.
3. Very few traditional varieties are cultivated in mountain area and harvested by ani-ani.

(3) West Nusa Tenggara

	Sumbawa		Lombok	
Harvesting	sickle	100%	sickle	100%
Threshing	beating	92%	beating	95%
	pedal thresher	3%	power thresher	5%
	power thresher	5%		
Cleaning	wind	95%	wind	95%
	sieve	5%	sieve	5%
Drying	solar	100%	solar	100%
Transportation	man power	100%	man power	100%
Straw	burning	100%	burning	20%
			mulching for soybean	80%

Regional features of postharvest practice

1. Threshing by power-thresher is beginning stage.
2. Paddy are mostly carried by man-power to the collection point and trader's trucks come to pick up.
3. Straws are used for mulching of soybean.
4. A derepan system is common in harvesting works and workers can get 1/6~1/7 quantity of paddy harvested in Sumbawa and 1/10 in Lombok.

(4) South Kalimantan

	Kab. Banjar		Kab. Tapin		Kab. Barito Kuala	
Harvesting	ani-ani	70%	ani-ani	10%	ani-ani	80%
	sickle	30%	sickle	90%	sickle	20%
Threshing	beating	30%	beating	10%	beating	30%
	trampling	60%	trampling	25%	trampling	70%
	pedal thresher	10%	pedal thresher	75%		
Cleaning	wind	5%	wind	10%	wind	75%
	winnower	95%	winnower	90%	winnower	25%
Drying	solar	100%	solar	100%	solar	100%
Transportation	man power	5%	man power	5%	man power	10%
	m/p + bicycle	25%	m/p + bicycle	75%	m/p + bicycle	20%
	m/p + boat	70%	m/p + boat	20%	m/p + boat	70%
Straw	leave in field		leave in field		leave in field	

Regional features of postharvest practice

1. Ani-anis are still used for harvesting paddy of traditional varieties.
2. Boats are common means of transport in these areas.
3. Winnower is popular in Kab. Banjar and Tapin.
4. Threshing is mainly done by trampling in Kab. Banjar and Rarito Kuala.
5. Harvesting works are conducted by workers who are paid 3,500 Rp/day and 10 workers are required for harvesting one hectare of paddy field.

II.4 Constraints in Improvement

The generation of losses during rice postharvest practices is still unsolved and show high rate. Since Indonesia produces about 50 million tons of paddy in 1995/96, the loss is estimated between 4 to 6 million tons of paddy. If half of the loss is prevented, 2 to 3 million tons of paddy will be saved.

In order to cope with the problem of such large losses, various counter-measures were enforced. The government strongly promoted the diffusion of mechanization and cooperative action programs on postharvest works. And then a number of tractors, threshers and small rice milling machines have been introduced.

As an example of mechanization of postharvest processing of rice, the circumstance in which threshers were introduced and diffused in rural areas of Indonesia is as follows:

(1) Threshers

Threshers began to be introduced in Indonesia in 1981, when JICA study mission proposed the use of such thresher in Aceh province for improvement of works. It was proved to be effective. The diffused type then was 5~6 feet length of threshing 6 cylinder (65~85 hp), throw-in type threshers with capacity of 2~3 ton/hr. The price was 5~8 million Rupiah per one unit. Owners or operators of the thresher are mostly thresher lenders or contractors for threshing works who are called custom threshers. It is very rare for farmers to purchase, maintain and operate threshers themselves.

1) Needs of Power Thresher

Due to introduction of HYV's, farmers in this country can now plant double crop, triple crop or soybeans, vegetable, etc. after rice. Time between crops is shorter and busier

and manual or animal threshing can hardly do the works in time. There is a pressing need for farmers to finish threshing work as early as possible.

2) Conventional Mode of Harvesting Works

Most of the Indonesian landowners do not work in field themselves. They let the works to poor farmers (mostly landless). Harvesting works have been carried out by them under sharing system (derepan). In case, they join such work, he will get $1/6 \sim 1/10$ of the crop in kind depending on the amount of work carried out by him. Generally, such amount of share he gets in kind corresponds to about 60% of his annual expenditure and is about equal to the annual rice consumption of his family. The rest 40% of his total income shall be earned by doing other works.

3) Loss Generated during Threshing

The loss generated by threshing is the largest among all postharvest works. This loss may be reduced by doing the work carefully. Custom harvesters are getting 12~15% of all crops in kind for their work of reaping and threshing, including cleaning. To the custom harvesters, their income will be larger if they harvest more, which made the work rough and resulted in a larger loss.

4) Employment Opportunities for Poor Farmers

After introduction of power threshers, poor farmers are having less income and less opportunity for employment in harvesting works. Especially in the vicinity of urban area, such custom harvesters are increasing sharply. This trend is observed in main rice producing area. This created serious problems among poor and landless farmers and unemployment in the rural area is increasing in Indonesia. Thrers are necessary for rationalization of farm management. Extensive use of threshers have contributed to the double crop, triple crop of rice and cultivation of soybeans and vegetable after rice crop. However, on the other side, it did not help much to the prevention of loss. Also, the increased number of threshers have resulted in losing the employment opportunities among poor farmers.

II.5 Activation of Rural Economy

In the government's 6th five year plan, activation of rural economy shall be achieved by promoting an integrated farming system and agribusiness. In this connection, the above two points are explained roughly as follows:

(1) Integrated Farming System

In the government plan, a conquest over rural poverty was emphasized as a basic policy of agricultural development and the increase of farmers' income was placed as direct target. In order to achieve these targets, the government stressed the promotion of integrated and comprehensive management of agricultural operations.

In the past government plans, several approaches for agricultural development were adopted: Diversification, Intensification, Extensification, Rehabilitation have been stressed and these targets are now being achieved gradually. The agricultural development in the plan included agricultural commodities such as food crops, horticulture, tree crops, livestock and fishery, as horizontal diversification. However, it was found that they did not always result in the increase of farmers' income. This has borne a necessity to strengthen the management of farming by introducing integrated farming system.

Adding to the above horizontal development, the integrated agriculture shall enforce various activities; improvement in infrastructure of agricultural production, activation of farmers organization, promotion of mechanization, diffusion of technologies, improvement in postharvest processing, storage, marketing, etc. which are added vertically as an ordinate to the horizontal abscissas of increased food production. By this, mutual integration of various factors will be achieved and their synergistic effect shall contribute directly to add value to farm product, and eventually to the increase of farmers' income.

(2) Agribusiness

Recently in Indonesia, agribusiness becomes a topic of talks in all quarters. They are now largest keyword in the administration and development of Agriculture. A new department called AAB (Agency of Agribusiness) has been established in the Ministry of Agriculture. In the Ministry of Cooperative and Small Enterprises Development and Ministry of Industry, officers are seriously discussing the founding of the

agribusiness.

The following is a quotation from the thesis regarding "Agribusiness Oriented Agricultural Development" by Dr. Dudung Abdul Adjid, Director General of Agribusiness Agency, Ministry of Agriculture of the Republic Indonesia.

Agribusiness is a system of a very wide range of components related to the dynamic process of farming in the rural community which covers activities on inputs supply, services, farming, processing and marketing. In others words, agribusiness is a system that consists of various sub-systems, such as: (a) input delivery, (b) farming, (c) postharvest and processing/ agroindustry, (d) supporting services, R & D, education training extension, finance, transportation, etc, (e) marketing, and (f) infrastructure.

In Indonesian situation, where each farmer holds a very small farm entity, an agribusiness system will consequently covers a large number of farmers who have to operate their respective farm individually but in an harmonious orchestrated coordinated management, so they can act as consolidated large scale agribusiness and agroindustry as well. So an agribusiness system in Indonesia will be a joint ventures of various business agencies, such as, input supplies, machinery services, farmers, agroindustry, etc.

Other aspect that need to be considered related to the specific situation, is that each farmer cannot afford to maximize their limited resources (land and human), if they do not diversify their farming practice. Through the diversification of farm enterprises, they can avoid the adverse risk of monoculture and be able to get more profit and productivity as well.

Following those reasons mentioned above, the strategy for the development of agribusiness systems, is to promote integrated and sustainable agribusiness entities, organized and managed to collaborative effort involving the farmer and business entrepreneurs. For the implementation of that strategy, we need to develop a conducive economic and social condition in the rural areas.

Based upon the concept and issues of agribusiness development, the Department of Agriculture is now being strengthened through the establishment of new supportive unit, the Agribusiness Agency. The main task of the Agency is to assist the Minister

of Agriculture in formulating and implementing policies for the development of agriculture in the changing global environment through the implementation at agribusiness approach and orientation. Besides that, some technical task has to be implemented in order to serve the agricultural community and society as whole in performing economic activities concerning agriculture and agribusiness development; technical services on market information and development; investment and environmental impact; institutional and partnership venture; and standardization and accreditation; are being institutionalized.

H.6 Improved Postharvest Practice and Agribusiness

(1) Value-adding Process

Most farmers in Indonesia have only been "persons who produce" and how to handle their crop in the market has mostly been in the hands of middlemen. In other words, they did not insist their share of the price of agricultural produce. In order to increase their share, it is necessary to add value to their produce by employing a new concept of market-oriented postharvest practices. Farmers are expected to transform themselves to "persons who produce and market".

In realization of above farmers' transformation, it is necessary to stimulate the farmers to participate in the market-oriented works.

As a motivation, an incentive must be given to farmers so that they can get their reasonable share of the price by adding value with some additional works on their crops as mentioned below:

Paddy :	Cleaning, drying, bagging, collecting, transportation
Soybean • Ground nut :	Hand picking of damaged kernel, bagging, collecting, transportation
Vegetable, fruits :	Washing, cleaning, sorting & grading, bagging, collecting, transportation

In short, it is important for farmers to know by experience that they can get more share by value adding practices for their crops before selling. This may be a prime mover to develop their sustainable agricultural management. And it will eventually result in the increase of their income.

(2) Utilization of Rice Straw

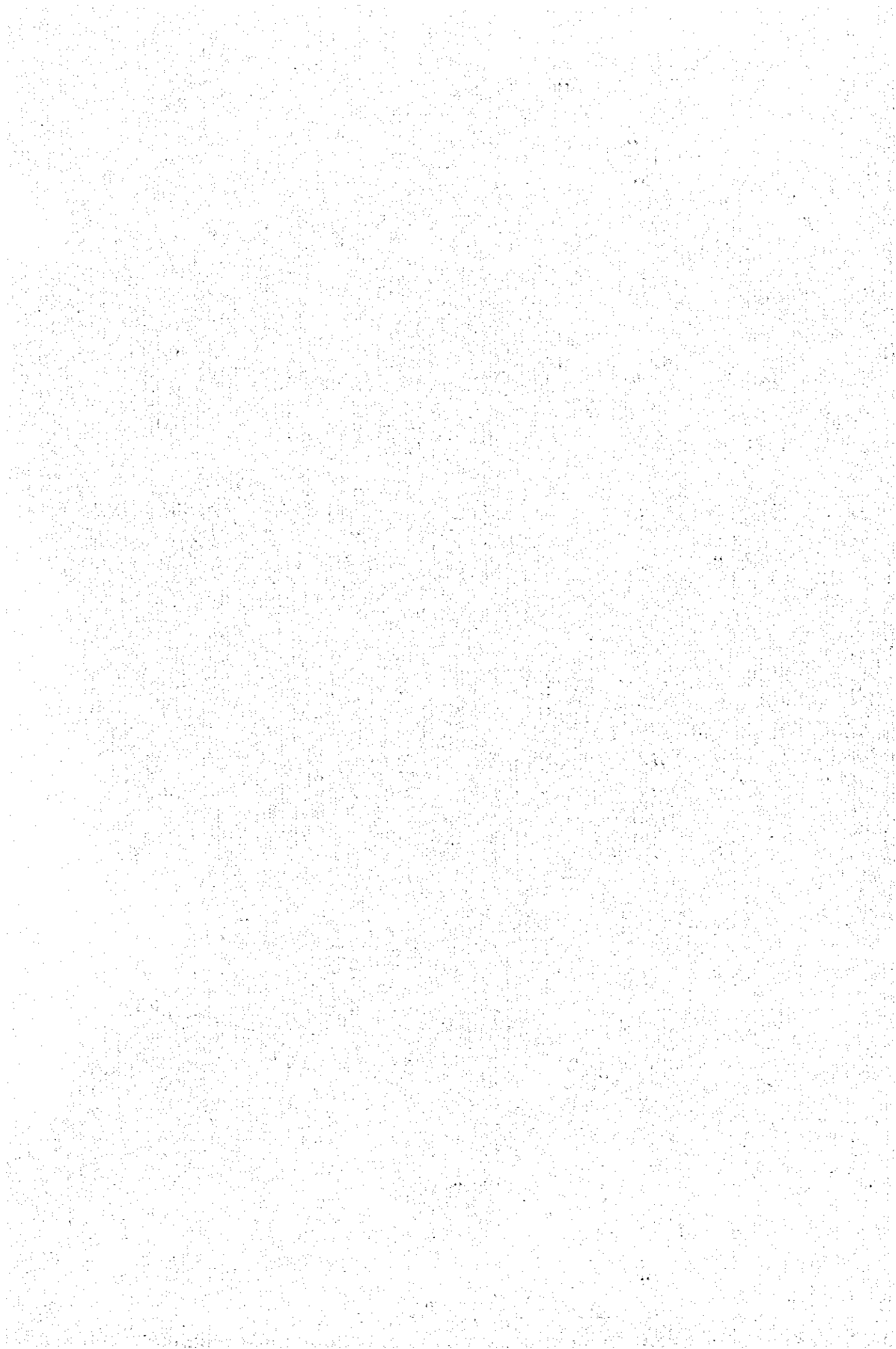
In Indonesia, about 50 million ton of rice straw is available as a by product of rice production. Most of them is abandoned in the field. It is learned recently that burning of rice straw was banned due to some environmental reasons.

Rice straw can be utilized in many useful ways as mentioned below:

- 1) Compost as organic fertilizer
- 2) Mulching for vegetable growing
- 3) Mushroom bed
- 4) Handycraft such as rope and mat
- 5) Paper material

Usage of straw in such ways can contribute to the integrated and sustainable farm management and eventually increase farmers' income. It is recommended that farmers in Indonesia should use the straws in most advantageous way, suitable for each local conditions.

APPENDIX I: EXTENSION



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INTEGRATED AGRICULTURE AND RURAL DEVELOPMENT
IN
THE REPUBLIC OF INDONESIA**

DRAFT FINAL REPORT

APPENDIX I: EXTENSION

Table of Contents

	page
I.1 SIGNIFICANCE OF SURVEY ON AGRICULTURAL EXTENSION	1 - 1
I.2 PRESENT SITUATION	
I.2.1 Present Situation of Agricultural Extension Office (BPP) and Extension Activity	1 - 1
I.2.2 Other Organizations Concerned	1 - 1
I.3 PROBLEMS CONSIDERED THROUGH THE SURVEY FROM THE VIEWPOINT OF AGRICULTURAL EXTENSION	1 - 1
I.3.1 Facility for extension activity	1 - 1
I.3.2 Subject on the extension activity	1 - 1
I.4 REVIEW OF THE PRESENT EXTENSION ACTIVITY	1 - 1
I.4.1 Extension Activity Plan	1 - 1
I.4.2 Training and Visit Activity	1 - 1
I.4.3 Setting up and Management of Demonstration Field	1 - 1
I.4.4 Organizing Farmers Functional Group	1 - 1
I.4.5 Subject on Training	1 - 1

I.5	WORKING OUT COUNTERMEASURES IN REGARD TO PROJECT FORMULATION	
I.5.1	Agricultural Extension Activity	
I.5.2	Training System and Training Plan	

List of Tables

Table I.1.3	Present Condition of Agricultural Extension Activities	I - 12
-------------	--	--------

List of Figures

Fig. I.4.1	The Role of Extension Officer (PPL) - Draft _	I - 13
------------	---	--------

Appendix: EXTENSION

I.1 SIGNIFICANCE OF SURVEY ON AGRICULTURAL EXTENSION

One of the particular differences of the Third Umbrella Project, compared with the 1st and 2nd ones, is that objective crop was not clearly decided. It will be selected reasonably according to the local situations, since the final purpose is set as "Improvement of Living standards of Farmers".

Then it is required to show some kind of direction to achieve the ultimate purpose. This is rather difficult and also takes much time to accomplish. But this is the reason why the extension activity is imposed for this survey.

Another task of the extension activity is to make a plan for improvement of the management of training center to be built at Mataram, NTB.

The purpose of this project is to improve not only the farmers' technology and productivity but also the standard of farmers' living conditions which should be considered more precisely. This idea should be pursued not only for NTB but for every area in this country as an essential problem. Hence, the countermeasures for the concerned subject should be considered through our survey.

I.2 PRESENT SITUATION

I.2.1 Agricultural Extension Office (BPP) and Extension Activity

Number of Agricultural Extension Offices (BPP) and Subject Matter Specialists (PPS) and Extension Officers (PPL) in NTB are shown in Table I.2.1 and Table I.2.2

Table I.2.1 Number of BPP in NTB				
Crop	Horticulture	Livestock	Fishery	Total
18	13	12	9	52

Remarks: Out of 52 BPP, 12 are slightly damaged, 3 are severely damaged.

Table 1.2.2 Number of PPS and PPL in NTB

Province	Year	Crop		Horticulture		Livestock		Fishery		Total	
		PPS	PPL	PPL	PPS	PPL	PPS	PPL	PPS	PPL	PPS
NTB	1990	68	848	-	-	-	-	-	-	68	848
	1994	25	399	17	272	20	179	17	118	79	968

Remarks:

- In 1990. As the extension activity had been carried out in general by national level administration , PPL was in charge of all kinds of technology development.
- In 1994. the extension activity has been put under the provincial / district level administration and separated according to each specialty. Also, BPP in charge of Horticulture (mainly estate crop), Livestock and Fishery were decentralized and moved to respective place.
- Numbers of Villages (Desa) in NTB are 570, countries (Kecamatan) are 60.

1.2.2 Other Organizations Concerned

(1) Agricultural High School (SPP)

Agricultural High School(SPP) in Mataram/Lombok Island is the only school established under Agency of Agricultural Education and Training (AAET or BPLP).

AAET plans to establish a new training center in SSP under the 3rd umbrella cooperation. The percentage of farmers' successor to total graduates is very low, namely less than 10%.

(2) Faculty of Agriculture, Mataram University

In order to clarify the relation between the university and extension activity from educational view, the survey was conducted in the faculty of agriculture.

This faculty has following divisions:

Division of ; Agronomy, Soil science, Breeding of plants, Post-harvest, Plant Protection, Agribusiness.

The faculty has 3 duties of education, research and extension. A course of lectures on " Extension and Communication" has started since 1981 to focus on fostering human resources needed for agricultural development. Curriculum of Human Resources consists of 60% of national level and 40% of local level. Also 40% of curriculum is theory .The faculty provides training to the farmers for 2 weeks, twice a year. Usually 4 professors are involved in the training, and participants list include farmers, extension officers, instructors, etc.

- (3) The Institute of Agricultural Research and Education (*Instalasi Penelitian dan Penkajian Teknologi Pertanian*, IPPTP)

BIP was reorganized to IPPTP in 1995 and became a division of the Research Bureau(AAET). Formerly, there were Agricultural Information Centers (BIP) under Agency of Agricultural Education, Training and Extension (AAETE, which was reorganized to AAET).

PPS had been working according to their specialty at the former BIP in preparing materials needed for extension service and taking in charge of training to the extension officer. When thinking over the functions of present PPS in IPPTP, it is not clear whether they guide the extension officer more close to the farmers than ever or not.

1.3 PROBLEMS CONSIDERED THROUGH THE SURVEY FROM THE VIEWPOINT OF AGRICULTURAL EXTENSION

1.3.1 Facility for Agricultural Extension

As shown in Table 1.3.1, conditions of the facilities and of PPL are not enough. Some conditions are directly concerned with the extension activity. The vehicles used for extension activity are in poor condition especially in NTB compared with South Sulawesi.

PPL in transmigration areas have no such vehicles. Therefore they are forced to visit farmers on foot. The other facilities are also limited, even not provided with their desks. PPL has been eagerly wanting to have these facilities, mainly motorcycles, microscopes apparatus for PH measurement, and other materials needed for farmers' training. All are rather simple materials except motorcycle. Therefore it is urgently required to provide such simple materials for extension / training activities.

1.3.2 Subject on the Extension Activity

- (1) System of the extension activity

Systems of the extension activity have been changed. Services of extension

officers were transferred from national level to provincial / district level. Also PPL has been separated according to each specialties, such as crop, horticulture, livestock, and fishery.

It is desirable that PPL should deepen their speciality through brushing up their technology to cope with the farmers' demand.

(2) Collect information and its application

Almost all PPL complain on the shortage of facilities but do not care about the shortage of information. On the contrary, as Table I.3.1 shows, many PPL think that information is enough. They don't have much attention for the necessity of information and satisfied with present conditions. It is necessary to make them realize the importance of collecting and using the collected information. Information should be collected not only from libraries, experiment stations or government organizations concerned but also from farmers through participation in their daily activities.

It is recommended that PPL should collect and modify information so that understandable to farmers by taking account of the local situation with assistance from PPS.

(3) Functions of PPS

According to reliable information, 17 BIP out of 27 have already been changed to IPPTP. Definition and role of PPS would be different between PPS working at research bureau and at kinds of *Dinas*. The other PPS are working at provincial and also district levels. Both of them have a duty to guide PPL, visit BPP and take charge of the training. But differences between them was not clarified during the survey. It is desirable to make clear the role of PPS in order to promote the agricultural extension activity, those are: strengthen the intermediary work between government/experiment station and PPL, provide practical information to the extension officer, plan and conduct systematic training to PPL.

I.4 REVIEW OF PRESENT EXTENSION ACTIVITY

I.4.1 Extension Activity Plan

Farmers' intention should be taken into account for making the plan for extension activity. Also, it is required to make out actual extension activity plan independently by PPL themselves in order to achieve effective extension activity.

As asked for making out extension activity plan and reporting, so far no clear answer was received from any extension offices. There are some forms of extension activity plan and forms of report. One of the form of annual plan at BPP Genung Sari, Lombok Island, is as follows:

Format of Annual Plan (Sample)

No.	General Problem	Special Problem	Main Point	Object Situation	Target Achievement	Ground for Guidance	Frequency	Person in Charge	Budget	Extension
1										
2										
3										

However, nobody filled in this form. It is required that PPL should make an entry of this form by their own will through the experience of daily activity in order to promote them.

Dinas Pertanian Tanaman Pangan in NTB published those standard forms for PPL, such as Standard Operating Procedure (SOP) and *Instrumen Kendali* (IK) system for the extension activity. There are 33 such kinds of forms which may be usable for extension activity.

Almost all of the forms are used for reporting (*Laporan*). Other forms are for plan of extension service which is only for monthly and seasonal ones. The seasonal form for extension service is shown below;

Format of Seasonal Extension Service (Sample)

No.	Month	Kind of Activity	Objective group	Target	Time	Necessary Budget
1						
2						
3						
4						

It is desirable to make out the extension activity plan independently which will reflect the farmers' needs and local situations.

I.4.2 Training and Visit Activity

Training and Visit system has been mainly applied for the extension activity and carried out systematically in Indonesia.

Every PPL had been taking in charge of 16 groups (*Kelompok*), 4 days a week to visit those groups (i.e., 2 groups per day), then PPL can go round all groups in 2 weeks. Consequently, PPL can go round 2 times for each group in a month.

Problems are, whether the farmer would come together at the key farmer's *Kelompok* by expecting something from PPL or not.

It was clear that few farmers come together. But every PPL replied that about 20 farmers or so of each group would come together as shown in table I.4.1.

In this system 20 common farmers should be organized under progressive farmer (*Tani Maju*) in each group. The above mentioned PPL is supposed to be according to this general regulation of the system.

I.4.3 Setting up and Management of Demonstration Field.

PPL is obliged to set up demonstration fields in dry and rainy season. Each field has an area of 0.65 ha, and necessary expenses are supported by *Dinas*. Each BPP in the study area generally get Rp.84,000/ season for these expenses. But this amount is not enough for buying necessary materials for demonstration farms.

Needless to say, setting up of demonstration field/plot is a common extension method and quite necessary. But following points should be considered when setting up demonstration field :

- Demonstration field/plot should be set up in consideration of local situation and the farmers' needs

- Get consensus with the farmers how to do.
- Manage independently and work together with PPL and farmers.
- Check and discuss not only at final stage but at each and every important stages.
- Make use of this demonstration field/plot as a base for extension activities in future.

The role of PPL is not only to transfer improved technology to the farmers but also to reflect the farmers' needs to the government, through the PPS or to the experiment station in order to solve those technological difficulties.

These relations concerned the role of extension officer are illustrated in Fig. 1.4.1.

1.4.4 Organizing Farmers' Functional Group

One of the farmers' group (*Kelompok Tani*) is widely organized all over this country. This group is an area unit and used for a serviceable base of activity for the extension officer. This group played an important role for the extension activity, though it implies a kind of areal unit.

There are many functional groups such as Irrigation water controlling group, Cooperative tractor using group, etc. Some of functional group is more recommendable from the viewpoint of agricultural extension, such as to introduce agricultural material, to sell production cooperatively or organize group for studying improved technology with each other among the volunteer.

In order to contribute to the development of farming and also farmers' living standard, these functional group should be strengthened.

Additionally, one of the large scaled farmers group - agricultural cooperatives (KUD) also should be fostered to be a representative of the farmers.

Final objective of "Improvement of standard of living" in 3rd Umbrella project shall be achieved with consciousness and effort of all farmers' household, mainly housewives.

From this aspect, it is also essential to organize women's' functional group to improve from the viewpoint of both physical and mental living standards.

Organizing farmers' successors is also important. Some of these women and farm youths group have been working for this purpose.

Therefore, it is not only important to organize these new groups but reconsider to foster the already existing group with innovated idea through the extension officer.

1.4.5 Subject on Training

The target of the Third Umbrella Cooperation implies not only to promote farm productivity but also to make the farmers motivated toward home life improvement in line with the technical guidance through the extension officer.

Motivation of farmers is rather difficult to achieve and requires much time, though, it is needed to find a clue to achieve the final target.

PPL is the officer who contact with farmers directly. He should pay a high regard to the farmers by considering their social background. Also method of extension should be educational.

So extension activity contains not only guidance to the farmers through providing improved technology but also to encourage and motivate through method of extension/education.

Objectives of their activities include farm manager, woman and young farmer just as the same significance of forming group.

Consequently, one of the possible ways to motivate and make them consciousness is to enforce a kind of systematized training.

So far in NTB, PPL had opportunities to attend some training. Most of the training are lecture type, and its term is short and fragmented.

If we can collect only several trainees and train them continuously from the beginning of cultivation or feeding to the end of harvest we can expect large effect. It means the trainees(PPL) will get actual technology which is directly serviceable to the farmers through their training. Furthermore it is expected the trainees would become positive for their activity to the farmers as the result of getting conviction.

PPL have been eagerly wanting to take such practical training. As shown in Table 4.5.1., almost 100% PPL want practical training than theoretical one. Because PPL visits farmers' field so many times, they face with problems in farming. The farmer expects and asks PPL for practical technology to in order to solve the problems on the spot.

Since, the progressive farmers are much skillful on farming, then it is wise to make use of them as an instructor of such kind of training.

These ideas should be considered in the training for the extension officers.

I.5 WORKING OUT COUNTERMEASURES IN REGARD TO PROJECT FORMULATION

I.5.1 Agricultural Extension Activity

Regarding to the establishment of the Training Center in Mataram, which has already started under the 3rd Umbrella Project, a short term expert from JICA has surveyed and submitted a report. Besides, a JICA expert who is working under AAET reported about this matter.

Original comments on extension and training activity based on the results of our survey are as follows:

- (1) Extension activity plan should be made out independently to reflect the real situation of farmers by make use of the forms provided by BPP from Dinas.
- (2) Collect necessary information and make use of it effectively.
- (3) Each extension officer should have special/proper technology according to the advancement level of farmers. This is a desirable inclination, but first of all, the present system should be fixed as early as possible.
- (4) Definition, role and status of PPS should be made clear.

- (5) Horizontal relationship should be established between extension office and other organizations concerned such as KUD and local government which have usable information, to make training plan.
- (6) In order to improve the activity of Training and Visit System, PPL should propose the farmers appropriate technology so that they feel interest to work, setting up demonstration field/plot according to the reasonable procedures which is mentioned in the previous chapter.

Besides, it should be stressed that the purpose of the extension activity is not only to improve the production but also to get more income through farming.

- (7) One of the way to display the result of extension activity is to set up demonstration plot/model farmer/ model area, then try to work there in priority. After getting good result, extend this method and result to the other areas one by one gradually. It is desirable to introduce such kind of extension method in future.

1.5.2 Training System and Training Plan

- (1) Establishment of training system

The details of training should reflect the needs or background situation of the trainees.

The curriculum and the method of training will be decided after consulting with the representatives of the committee consisting both officers concerned and farmers/extension workers. PPS should play an important role in establishing the training system.

- (2) Enforcement of practical training

As mentioned above almost 100% of PPL has been wanted to have practical training. Now, it is pointed out that PPL should be trained mainly at Training Center (BLPP) to get practical technology. They have to be trained by a instructor. Does the instructor posses much required skills for this practical training in the field?

If PPL will become skillful on practice, the instructor in BLPP should be trained before everything. So that technique of "On Campus Trial", "Field Laboratory" "Method of Problem Solving" have been carried out at BLPP. "Learning by Doing" is essential for the development of fruitful training to the extension officer.

Through such training, visiting a advanced farmer or agricultural experiment station is much useful, "seeing is believing". After finished observation, it is needed to have discussions how to solve problems among the trainees. After the execution of these training, it is hoped to publish a manual from the experiences learned through these training

As the extension activity plays an basic role to develop agriculture, it is hoped that BLPP should get more information on this matter. Also AAET has excellent idea on sociological and educational background. We'd like to expect more outstanding plan of training based on this background.

Looking back our survey, a kind of following subject will be effective for cooperation as far as the agricultural extension activity is concerned.

- Intensification of model activity for the extension officer.
- Setting up model training system and its enforcement.

Table I.3.1 Present Condition of Agricultural Extension Activities

Province	Location	Career (year)	PPL	Allowance for going to BPP (Rp.)	Distance from BPP (km)	Trans- portation (Motor Cycle)	Area in Charge (ha)		No. farmers collected in Training System	Information		Desirable Type of Training	Remarks
							Paddy	Upland		Enough	no enough	Lecture	Practice
South Sulawesi	Sidrap	1 17	13	-	13	7	433	-	21	0		0	
		2 12	12	-	16	7	1,083	-	5-15	0		0	
		3 18	14	-	5	7	1,500	-	15-20	0		0	
		4 15	14	few	7	8	1,200	-	20-40	0		0	
		5 12	14	-	?	8	900	-	30-45	0		0	
	Pinrang	6 19	19	-	15	5	1,400	-	5-15	0		0	
		7 21	19	-	15	5	417	53	8-10	0		0	
		8 20	9	1,000/day	6	5	1,915	-	15	0		0	
		9 21	7	-	7	4	1,534	-	10-12	0		0	
		10 12	7	-	10	3	800	-	20	0		0	
West Nusa Tenggara	Lape Lopok	11	4	39,000/month live in the area	12	1	840	430	20	0		0	
		12	(1)		-	-	Household 270-500		20	?		0	Transmigration area, living in same area
	Pelampung	13	(1)	live in the area	-	-			20	?		0	same as above
		14	6	(1)	live in the area	-			20-25	?		0	same as above, from house to office by bus (17km)
	BPP Sumbawa Besar	15	avg. 12/5 person		20	1				0		0	BPP Crop
	BPP Alas	16	11-15	5	15	3	3,389 rainfed 148			0		0	BPP Crop
	BPP Berfais	17	23			1	598 irrigated 700M.H.			0		0	
	BPP Gerung	18	4+3			3			20, 13-16 gr.	0		0	(BPP livestock) others: 1 Veterinarian, 2 Pathologist & 3 inseminator
	BPP Gcunung Sari	19	crop 6			crop 2	1,251	11,134	10-15, 4- 14gr.	0		0	No. 18, 19 & other BPP locate at the same place. *fishery 4, horticulture 7

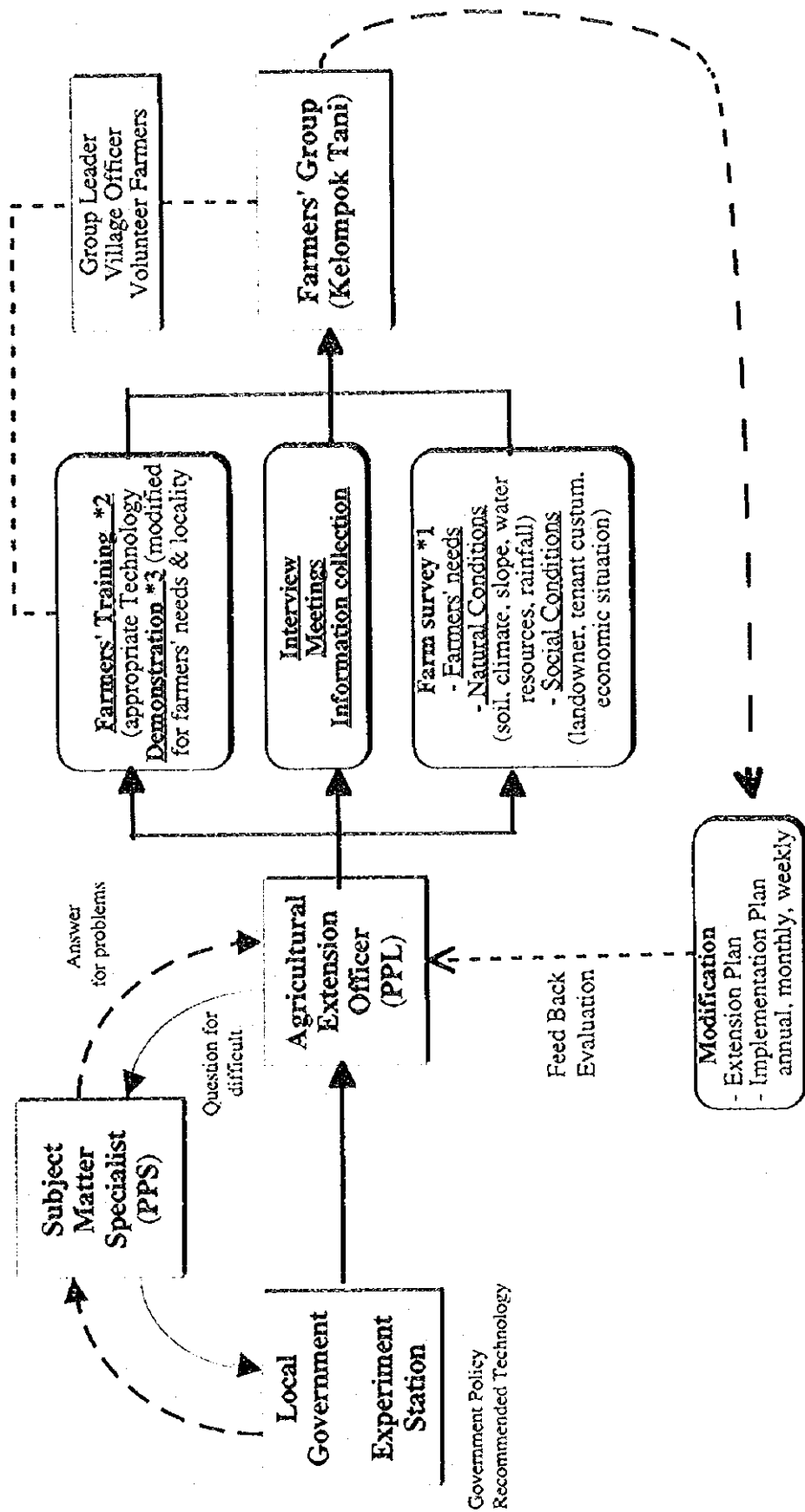


Fig. I.4.1 The Role of Agricultural Extension Officer (PPL) - Draft -

APPENDIX J: ENVIRONMENT

**THE STUDY
ON
THE THIRD UMBRELLA COOPERATION
FOR
INTEGRATED AGRICULTURAL AND RURAL DEVELOPMENT
IN
THE REPUBLIC OF INDONESIA
DRAFT FINAL REPORT**

APPENDIX J : Environment

Table of Contents

	page
J.1 The current status of environment in Indonesia.....	J - 1
J.1.1 Natural Environment.....	J - 1
J.1.2 Social Environment.....	J - 8
J.2 The current status of environment in South Kalimantan.....	J - 8
J.2.1 Forest Classification.....	J - 8
J.2.2 Protected Species	J - 8
J.2.3 The Environmental Constraints Concerning Agricultural Development in Swamp Area	J - 9
J.3 Others.....	J - 11
J.3.1 Soil Erosion	J - 11
J.3.2 Water contamination due to Livestock Industry.....	J - 11

List of Table

	page
Table J.1.1 National Parks and Forest Parks in Indonesia	J - 12
Table J.1.2 Protected species in Indonesia	J - 13
Table J.1.3 List of CITES Species	J - 18
Table J.1.4 The List of Activities Requiring AMDAL	J - 25
Table J.2.1 Protected species in South Kalimantan	J - 26

List of Table

	page
Fig. J.1.1 The Flow Chart of AMDAL Procedure	J - 29

Appendix J : Environment

J.1 THE CURRENT STATUS OF ENVIRONMENT IN INDONESIA

J.1.1 Natural Environment

(1) The policies regarding environmental conservation

The policies regarding environmental conservation in Indonesia aim at developing its economy and culture in a harmony with natural environment for sustainable development. Such development should be considered to conserve every natural environment and ecosystems for both present and future generations.

The main objectives of the policies regarding environmental conservation are as follows:

- 1) To conserve every important ecosystem and wildlife by establishing nature conservation areas in forest, wetland, coastal area etc..
- 2) To manage natural conservation area rationally and wisely without damaging the nature in the conservation area.
- 3) To provide maximum social benefits by managing natural resources and living environment.
- 4) To maintain natural resources and environment at high level with appropriate techniques.
- 5) To enhance people's consciousness towards natural conservation through extension of forestry and educational programs.
- 6) To conserve wildlife species by encouraging conservation of appropriate habitat.

(2) The current status of natural conservation in Indonesia

Directorate General of Forest Protection and Nature Conservation (PHIPA) in the Ministry of Forestry is the responsible agency regarding natural conservation in Indonesia including forest conservation, national park administration, conservation of valuable flora and fauna and conservation of marine ecosystem.

1) Protected areas

Overall, the total gazetted protected area is about 19 million ha, which covers 9.7% of Indonesia's surface area, in which there are 33 National parks, 239 terrestrial

reserves and 24 marine reserves.

By the year 2000, the government also intends to increase the conservation areas upto more than 30 million ha, which would cover 10% of the country's total area.

National parks and forest parks are listed in Table J.I.I.

2) Forest classification

The forest area of Indonesia is about 142,000,000 ha which is equivalent to 74% of the gross area. The forest area is classified into 4 categories by their functions and objectives, namely "Protected forest", "Conservation forest", "Production forest" and "Conversion forest".

"Protected forest" is established in the forest areas having high conservation functions such as maintenance of water resources. Most of them are located in watershed with high elevation, steep slope and high rainfall. Forestry is prohibited in this area.

"Conservation forest" is the forest area which includes habitat for valuable wildlife and high potential for tourist attractions such as national parks. In this area also forestry is prohibited.

"Production forest" is mainly for wood production. It is classified into two types according to a index determined by slope and annual rainfall, which are "limited production forest" and "production forest". Forestry operation in this forest is basically the selective logging-natural regeneration. However, artificial reforestation is adopted on bare land, grass land and forest with low productivity. The criteria for permission of logging in forests with limited production is rather strict comparing with that of "production forest" because of the high productivity and the important conservation function of land conservation.

"Conversion forest" is the forest which could be changed into other purposes such as agriculture, housing and etc..

People transmigrated by the government policies are mainly sent to this type of forest. The land that has already converted for agriculture or housing use is going to be re-classified into other classification when forest classification is revised.

Area under each type of forest classified by their functions in Indonesia is summarized as follows:

Forest type	Area (million ha)	Ratio to total surface area (%)
Protected forest	29.6	15.5
Conservation forest	19.2	10.2
Production forest	33.4	17.5
Limited production forest	29.6	15.5
Conversion forest	30.0	15.7
Total	141.8	74.4

Source: Information of Ministry of Forestry

3) Flora and Fauna

There are about 325,000 species in Indonesia distributed in large and small 17,000 islands extended from east to west covering almost 5,100 km, and from north and south covering about 1,900 km. Thereby, Indonesia is called as one of the richest countries in terms of its bio-diversity.

The government designates 66 species of mammal, 81 species of bird, 30 species of reptile, 20 species of insect, 1 species of anthozoa, 14 species of bivalvia as protected species.(refer to Table J.1.2.)

4) International treaty concerning natural conservation in Indonesia

a. Ramsar treaty (Convention on Wetland of International Importance especially as Waterfowl Habitat)

Ramsar treaty was adopted at Ramsar in Iran in 1971 to conserve wetland which is habitat for living waterfowl, flora and fauna. Indonesia has been a signatory to the Ramsar convention since 1991 through the Presidential decree No. 48 of 1991.

Following two sites are designated as Ramsar sites

- Berbak National Park(162,700ha)-Southern Sumatra
- Danau Sentarum Wildlife Reserve(125,000ha) -West Kalimantan

And Indonesia has been proposing following sites for nomination and subsequent ratification as Ramsar sites:

- Pulau Rambu Bird Sanctuary(56ha)-Jakarta Bay-
- Wasur National Park(413,810h)-Irian Jaya

b. Washington Treaty(Convention on International Trade in Endangered Species of Wild Fauna and Flora-CITES)

The objective of CITES is to control international trade of wildlife by collaboration between the export country and import country, and to conserve the endangered species by control hunting and gathering. CITES was adopted at Washington in USA in 1973. Indonesia was signatory to it in 1978.

CITES has designated 34 species mammal, 12 species bird, 12 species reptile, 1 species fish, 1 species mollusc and other marine invertebrates, 2 species plant as endangered species.(refer to Table J.1.3)

c. Biodiversity treaty

Biodiversity treaty was adopted at Rio de Janeiro in Brazil in 1992 for the conservation of bio-diversity, sustainable utilization of structural elements of bio-diversity and fair and proper distribution of profits gained in the utilization of genetic resources. Indonesia joined to this treaty at the same time.

(3) Outline of environmental administration

1) Administrative organization regarding environment

The establishment of National Environment Committee in 1972 was the first administrative action concerning environment. And then, in 1978, the Ministry of Environmental Management, which treats with environmental administration at Ministry level was established . The Act No.4 1982 on basic provision for environmental management which is most basic law concerning the environment was enacted in 1982. Corresponding to this enactment, the Ministry of Environmental management was reorganized into the Ministry of Population and Environment (KLH).

The basic government regulation concerning the Environmental Impact Assessment process, PP29/1986, was promulgated in 1986. The Environmental Impact Management Agency (BAPPEDAL) was established as the responsible agency for environment administration in 1990. It has been contributing actively to environment administration in the field of environmental impact assessment, water pollution, air pollution and etc.. National Development Planning Agency(BAPPENUS) is also responsible for making developing plan and has close relationship with study and evaluation of development plan concerning environment.

The Investment Coordination Agency (BKPM) has large roles in introducing environmental consideration into procedures concerning foreign and domestic investments.

2) Environmental standard

a. Standard of water quality

There are two types of standard for discharged water in Indonesia. One is "The Government Ordinance of Republic No.20 1990 on control of water pollution", which rules standard of water quality classification. The other is that "The Decision of State Minister of Environment and Population No. KEP-03/MENKLH/II/1991 on the control of discharged water from existing factories".

b. Standard of air quality

The standard concerning prevention of pollution is ruled by the law of ministry of Population and Environment KEP-02/MENKLH/1988

3) AMDAL

"AMDAL" is Indonesian environmental impact assessment system. The basic government regulation concerning the AMDAL process was promulgated in 1986. Initially, the coordination regarding AMDAL procedures was conducted by Ministry of Population and Environment, when the Environmental Impact Management Agency (BAPPEDAL) was transferred into BAPPEDAL in 1990.

AMDAL procedures are conducted by the Ministries related with the development supervised by BAPPEDAL.

BAPPEDAL declared general guidelines for the AMDAL procedures in 1987.

And the related Ministries has made its own technical guidelines and internal procedures based on BAPPEDAL guidelines. Proponents prepare AMDAL documents according to the concerning technical guidelines. The technical guidelines of principal Ministries are shown as belows:

AGENCY NAME	APPROVAL NUMBER	PROJECT TYPE
Agriculture	353/Kpts RC.220/6/89	Food Crops Animal Husbandry Fisheries Trade Plantation Trade
Public Works	46/PRT/1990	Groundwater Irrigation Surfacewater Irrigation Swamp Irrigation Roads and Bridges Solid Waste Disposal Sites Wastewater Urban Drainage Clean Water
Transmigration	43/MEN/1989	Transmigration Sector
Forestry	5/2/90 No.6	Forest Concession

Source: A guide to environmental assessment in indonesia (1992 bapedal)

Types of business or activity which are predicted to have significant impacts on the environment shall include:

- modification of landforms and the natural landscape;
- exploitation of renewable and non-renewable natural resources;
- processes and activities with the potential to cause waste, damage and a decline in natural resource utilization;
- processes and activities which may affect the social and cultural environment;
- processes and activities which may affect the preservation of natural resource conservation areas and/or the protection of cultural reserves;
- introduction of new species of plants, animals and micro-organisms;
- production and use of biotic and abiotic substances;
- applications of technology which are predicted to have considerable potential to affect the environment;
- activities having high risks and affecting national security

The list of activities requiring AMDAL is shown in Table J.1.4.

The AMDAL documents should be prepared and submitted by proponents are as follows:

- a. Terms of reference (KA)
- b. An environmental impact statement (AMDAL)

- Detailed and in-depth research study on the significant impacts of a proposed business or activity
- c. An environmental management plan (RKL)
A document presenting those efforts that will be made to manage the significant environmental impacts which may result from a proposed business or activity
 - d. An environmental monitoring plan (RPL)
A document presenting those efforts that will be made to monitor the environmental components which will be subjected to significant impacts arising from a proposed business or activity

Flowchart of AMDAL procedures from proponent to permission is shown in Fig J.1.1. Projects submitted by proponents are reviewed by the AMDAL Commission . The Commission decide whether ANDAL will be necessary or not for the projects. In the case the Commission decides ANDAL is necessary for the project, proponent should submit a KA.

The commission will decide whether KA is acceptable or not within 12 working days.

When KA is approved by the committee, proponents should submit ANDAL, RKL, RPL at same time. The commission also examines the contents of the documents, then approve the proposed business or activities within 45 working days after receipt of the documents.

AMDAL commissions are established at central level and provincial level respectively. Their duties are to establish the technical guidelines, review the documents, promulgate decision concerning AMDAL and etc.. At present time, there are 14 central AMDAL Commissions and 27 Provincial AMDAL Commissions. The commissions consist of permanent members such as representatives appointed by responsible Ministry or Agency, representatives appointed by the Investment Coordination Board, and experts from relevant fields and temporary members such as those appointed from non-government organizations and etc..

At present, among the Ministry of Public Works's projects, there are 29 irrigation projects, 6 swamp development projects, 10 river improvement projects which require preparation of KA .

J.1.2 Social Environment

The final goal of this cooperation aims at increasing the living standard of farmers. For achieving the goal, role of women and social environment in the existing social structure should be improved. The improvement should consider many matters such as releasing the farmers from heavy works, participation in rural activities, improvement of communication network among women in villages and etc. Therefore, considerations not only for the improvement of effectiveness in farming, but also to increase of living quality in surrounding environment of women is essential for this cooperation.

J.2 ENVIRONMENT IN SOUTH KALIMANTAN(SWAMP AREA)

J.2.1. Forest Classification

About 57% of the total area of South Kalimantan is occupied by forest. As most of swamp forests in South Kalimantan has already been extinguished, secondary forest is currently dominating. The " production forest" is designated to inland swamp area and " protected forest " is to small part of tidal swamp area .

The forest classification in South Kalimantan is summarized as follow:

Forest type	Area(ha)	Ratio to total state area (%)
Protected forest	110,365	3.0
Conservation forest	387,143	10.5
Production forest	1,309,716	35.4
Limited production forest	109,375.5	3.0
Conversion forest	184,257.5	5.0
total	2,100,857	56.9

Source: Ministry of Forestry 1994)

J.2.2 Protected Species

The protected species include 30 plant species, 19 mammal species, 19 bird species, 6

reptile species, 4 fish species.(refer to Table J.2.1.)

J.2.3 The Environmental Constraints Concerning Agricultural Development in Swamp Areas

(1) Biodiversity

Wetlands are breeding areas for many animals, especially fish and waterbirds.

They are also essential habitats for the survival of many endangered species such as the Sumatra Tiger, the Java Rhino and etc..

Up to 50% of the total area of wetlands in Indonesia is degraded or converted into other land uses.

The swamp area in Kalimantan is 12,764,000 ha which is 32% of total swamp area of Indonesia.

The loss of wetlands leads into a drastic decrease of fisheries and biodiversity, also prolongation of dry seasons and an increase of frequency and harshness of flooding.

More than 50% of Indonesians live nearby the coastal plains or along inland waterways, wetlands are also of tremendous economic value to them. More than 6,000 species of animal and plant are utilized for Indonesian daily life. And people obtain protein mainly from 7000 species of sea freshwater fish. Considering the fact that agriculture directly and indirectly depends on the diversity and the environmental functions of nature, conservation of bio-diversity is essential for sustainable development.

(2) Soil of lowland swamp

Two types of soil, namely the peat soil and alluvial soil are distributed in the swamp areas South Kalimantan. The peat soil is widely distributed in swamp areas of South-East Asia, which often become as a limiting factor for agriculture development.

1) Peat soil

Normally peat soil has high amount of water content, sometimes nearly 3/4 of total volume. Therefore, subsidence caused by a drainage, a process in agricultural management, is a serious problem. Such as the case in Kalimantan, subsidence brought by drainage has reached 50 cm after 6 years. Subsequent burning will also bring in more severe subsidence. By this reason, Indonesian government allows

exploitation only in places where a depth of peat layer is less than 2 meters.

Rice cultivation is considered to be ideal for the conservation of peat soils because rice cultivation does not require deep drainage and its submerged conditions prohibit decomposition of organic matter. However, cultivation test ever carried out in Indonesia showed a poor rice growth caused by unripening. Soils having a thick peat layer specially showed this sort of problem. From this finding, it is considered that soluble polyphenol may be a factor involved in this process. Polyphenol is known as a component that attribute to black water color commonly seen in wetland.

2) Acid sulfate soils

Acid sulfate soils frequently exist below peat soils. The formation of acid sulfate soil is closely related with that of peat soil. Anderson explained the formation of peat soil and acid sulfate soil which are distributed in Salawaku and Brunei as follows; As mangroves on alluvial coastal sediments progresses seawards, wetland forest replaces the interior of mangrove forest. Mangrove can invade when sediments accumulates till the high water line of neap tide. And the rate of accumulation normally decreases when sediment reaches the high water line of spring tide because of a decrease of submerging frequency. However, mangrove stands flanking a river basin channel forms levee, which keeps stable mangrove at the interior of wetland and accumulating organic matter. This leads into the formation of peat soil. Instead, the exterior of wetland where submergence is prolonged and repeated, it gives rise to reduced condition which promote the accumulation of sulfate. Microorganism such as *Desulfovibrio*, *Desulfotomaculum* reduces sulfur and forms pyrite. And when this pyrite is oxidized, acid sulfate soil will be formed. Acid sulfate soil exhibits strong acidity when a soil becomes dried by the drainage. It is not surprise that a soil exhibits a lower than pH 3. As one of the methods for improving acid sulfate soil, there was successful case which was actually carried out in West-Africa, Sierra Leone. They made ditches for promoting soils to be matured and oxidized, in addition to rinse of acids and Al by sea water brought by at the high tide. After a removal of most of pyrite existed in surface 30 cm layer, rainfall takes place the role of rinsing acids instead of sea water. Van Breemen calculated the cost for improving acid sulfate soils. He concluded 150 ton/ha of Ca were needed for a soil having 3 % of pyrite to be improved even after a half of acids was already removed. This shows improvement of this type of soil cost a lot.

In South-Kalimantan there are a lot of transmigrated farmers from Java under governmental transmigration plan. The low productivity of South-Kalimantan lands are thus attributable to the presence of low nutrient soils that accelerate from illegal logging by those farmers. During one third of a month, the farmers in this area are engaged in fishery. The decrease of water quality caused by acid soil affects not only the quality of water for daily life but also aquatic ecosystem, causing a decrease of fish species and fishery net. Generally, fish net is high in dry season, but in Kalimantan which decreases in dry season since acid sulfate soils exhibits lower pH as a soil becomes dry. Fish is an elementary source of protein and income for local people.

As seen above, areas which can be immediately exploited are not so large due to soil limiting factors such as poor nutrient and high acidity. In order to avoid irreversible deterioration, exploitation of wetland soils must be carried out according to well designed plan and an intensive soil survey.

J.3 OTHERS

J.3.1 Soil Erosion

West Java has a relatively steep topography. It is necessary to consider prevention of soil erosion by controlling the developments in such areas. And even in the execution of developments, measures to prevent soil erosion such as mulching with grass is essential.

J.3.2 Water Contamination due to Livestock Industry

Some livestock industry projects have been proposed for West Java. The main problem concerning the development of livestock industry is the destruction of vegetation because of overgrazing. Besides that careful considerations to prevent the water contamination caused by inadequate treatment of muck in slaughter house are also necessary.

Table J.1.1 National Parks and Forest Parks in Indonesia

NO	NAME	PROVINCE	AREA(ha)	NO	NAME	PROVINCE	AREA(ha)
(National Parks)							
1	Gn. Leuser	DI. Aceh/Sumut	792,675	18	Kutai	Kaltim	200,000
2	Kerinci Seblat	Jambi/Sumsel	1,484,650	19	Gunung Palung	Kalbar	90,000
3	Bukit Barisan Selatan	Lampung/Bengkulu	365,000	20	Bukit Baka - Bukit Raya	Kalbar/Kalteng	181,090
4	Siberut	Sumut	190,500	21	Gunung Rinjani	NTB	40,000
5	Bernak	Jambi	162,700	22	Kelimutu	NTT	75,000
6	Way Kambas	Lampung	130,000	23	Komodo	NTT	75,000
7	Ujung Kulon	Jawa Barat	78,619	24	Bunaken	Sulut	89,065
8	Halimam	Jawa Barat	40,000	25	Bogani - Nani Wartabone	Sulut	287,115
9	Gede Pangrango	Jawa Barat	15,000	26	Lore Lindu	Sulteng	231,000
10	Kep. Seribu	DKI	110,000	27	Rawa Aopa Wanumohai	Sultra	96,804
11	Kep. Karimun Jawa	Jawa Tengah	111,625	28	Laut Taka Bonerate	Sulsel	530,765
12	Meru Betiri	Jawa Timur	50,000	29	Manusela	Maluku	189,000
13	Baluran	Jawa Timur	25,000	30	Laut Teluk Cenderawasih	Irija	1,453,500
14	Alas Purwo	Jawa Timur	43,420	31	Wasur	Irija	308,000
15	Bromo Tengger Semeru	Jawa Timur	58,000	32	Bukit Tiga Puluh	Jambi/Riau	127,698
16	Bari Barat	Bali	77,727	33	Benteng Karimam	Kalbar	800,000
17	Tanjung Puting	Kalteng	355,000		TOTAL		4,164,850
(Forest Parks)							
1	Bukit Barisan	Sumut	51,600	5	R. Soeryo	Jawa Timur	25,000
2	DR. Mohammad Hatta	Subar	500	6	Ngurah Rai	Bali	1,373.5
3	Wan Abdul Rachman	Lampung	22,244	7	Sultan Adam	Kalsel	112,000
4	Ir. H. Juanda	Jawa Barat	590	8	Murhum	Sulteng	700,000
					TOTAL		74,934.0

Source : Information of Ministry of Forestry

Table J.1.2 Protected Species in Indonesia (1/5)

No.	SCIENTIFIC NAME	LOCAL NAME
	(MAMMALS)	
1	Jenis Tarsius(2 sp)	Binatang hantu,Singapuar
2	Pongo pygmaeus	Orang Utan Mawas
3	Hylobatidae(6 sp)	Owa,Kera tak berbuntut
4	Nasalis larvatus	Kahau,Bekantan
5	Dicerorhinus sumatrensis	Badak Dumatra
6	Rhinoceros sondaicus	Badak Jawa
7	Tapirus indicus	Tapir,Cipan,Tenuk
8	Capricornis sumatrensis	Kambing Sumatra
9	Manis javanica	Trenggiling,Peusing
10	Elephas indicus	Gajah
11	Bos javanicus	Banteng
12	Anoa depressicornis	Kerbau pendek
13	Babyrousa babyrussa	Babirusa
14	Jenis Cervus dan Rusa(3 sp)	Menjangan,Rusa,Sambar
15	Muntiacus muntjak	Kidang,Muncak
16	Jenis Tragulus(2 sp)	Kancil,Pelanduk,Napu
17	Panthera tigris sondaica	Harinau Jawa
18	Panthera pardus	Macan kumbang,Macan tutul
19	Cynoitnecus niger	Monyet hitam Sulawesi
20	Dendrolagus sp	Kanguru pohon
21	Cervus kuhli;Axis kuhli	Rusa Bawean
22	Panthera tigris sumatrae	Harimau Sumatra
23	Simias concolor	Simpei Mentawai
24	Lariscus insignis	Bajing tamah,Tupai tamah
25	Nesolagus netscheri	Kelinci Sumatra
26	Cynogale bennetti	Musang air
27	Dugong dugon	Duyung
28	Helarctos malayanus	Biruung madu
29	Ratufa bicolor	Jelarang
30	Cynocephalus variegatus	Kubung,Tando,Walangkekes
31	Petaurista elegans	Cukbo,Bajing terbang
32	Prochidna bruijini	Landk Irian,Landak semut
33	Felis bengalensis	Kucing hutan,Meong congkok
34	Felis marmorata	Kuwuk
35	Neofelis nebulosa	Harimau dahan
36	Nycticebus coucang	Malu-malu
37	Orcaella brevirostris	Lumba-lumba air twar,Pesut
38	Ziphiidae & Dolphinidae	Lumba-lumba air laut
39	Macaca tonkeana	Monyet jambul
40	Macaca maura dan Macaca brunescens	Monyet Sulawesi
41	Macaca pagensis	Bokoi,Beruk Mentawai
42	Presbytis potenziani	Joja,Lutung Mentawai
43	Presbytis thomasi	Rungka
44	Presbytis rubicunda	Lutung merah,Kelasi
45	Balaenoptera musculus	Paus biru
46	Balaenoptera Physalus	Paus bersirip
47	Megaptera novaeangliae	Paus bongkok
48	Phalanger spp.	Kuskus
49	Dendrolagus spp.	Kanguru pohon
50	Thylogale spp.	Kanguru tanah
51	Presbytis aygula	Surili

Table J.1.2 Protected Species in Indonesia (2/5)

No.	SCIENTIFIC NAME	LOCAL NAME
52	<i>Presbytis frontata</i>	Lutung dahi putih
53	<i>Tomys horsfieldi</i>	Bajing terbang ekor marah
54	<i>Lariscus hosei</i>	Bajing tanah bergaris
55	<i>Hystrix brachyura</i>	Langak
56	<i>Cuon alpinus</i>	Ajag
57	<i>Mydaus javanensis</i>	Sibung
58	<i>Arctonyx collaris</i>	Puluan
59	<i>Prionodon linsang</i>	Musang congkok
60	<i>Macrogalidea musschengroeki</i>	Musang Sulawedi
61	<i>Arctictis binturong</i>	Binturong
62	<i>Felis badia</i>	Kucing merah
63	<i>Felis temmincki</i>	Kucing mas
64	<i>Felis planiceps</i>	Kucing dampak
65	<i>Felis viverrinus</i>	Kucing bakau
66	<i>Cetacea</i> (semua jenis)	Paus
(AVES)		
1	<i>Sternidae</i>	Burung dara laut
2	<i>Esacus magnirostris</i>	wili-sili,Uar,Bebek laut
3	<i>Leptilos javanicus</i>	Marabu,bangau tongtong
4	<i>Ibis cinereus</i>	Bluwok,Walangkadak
5	<i>Ciconia episcopus</i>	Beruang Madu
6	<i>Pelecanidae</i> (4 sp)	Bangkul
7	Jenis <i>Egretta</i> dan <i>Bubulcus ibis</i> (5 sp)	Bintarung
8	<i>Threskiornis aethiopicus</i>	Landak
9	<i>Plegadis falcinellus</i>	Sigung
10	<i>Nysticorax caledonicus</i>	
11	<i>Elanus hypoleucus</i> , <i>Elanus caeruleus</i>	Alap-alap putih,Alap-alap tikus
12	Jenis <i>Goura</i> (3 sp)	Burung dara mahkota,Burung titi Mambruk
13	<i>Caloenas nicobarica</i>	Junai,Burungmas,Minata
14	<i>Alcedinidae</i> (46 sp)	Burung udang,Raja udang
15	<i>Bucerotidae</i> (15 sp)	Julang,enggang,Rangkong,Kangkareng,dsb.
16	<i>Trogonidae</i> (7 sp)	Kasumba,Suruku,Burung luntur
17	<i>Pittidae</i> (12 sp)	Burung paok,Burung cacing
18	<i>Paradisidae</i> (44 sp)	Burung cenderawasih
19	<i>Nectariniidae</i> (18 sp)	Burung madu,Jantingan,Klases
20	<i>Meliphagidae</i> (75 sp)	Burung sesap,Pengisap madu
21	<i>Leucopsar rothschildi</i>	Jalak Bali
22	<i>Macrocephalon maleo</i>	Burung maleo
23	<i>Megapodius reinwardt</i>	Burung gosong
24	<i>Probosciger aterrimus</i>	Kakatua raja,kakatua hitam
25	<i>Argusianus argus</i>	Kuau
26	<i>Cacatua galerita</i>	Kakatua putih besar jambul kuning
27	<i>Gracula religiosa robusta</i>	Bep Nias
28	<i>Casuarus casuaris</i>	Kasuari
29	<i>Accipitridae</i> (53 sp) <i>Falconidae</i> (8 sp) <i>Pandionidae</i> (1 sp)	Burung alap-alap,Elang
30	<i>Cairina scutulata</i>	Itik liar
31	<i>Aramidopsis platani</i>	Mandar Sulawesi
32	<i>Muscicapa rueckii</i>	Burung kipas biru
33	<i>Lorius domicella</i>	Nori merah kepala hitam

Table J.1.2 Protected Species in Indonesia (3/5)

No.	SCIENTIFIC NAME	LOCAL NAME
34	<i>Karius roratus</i>	Bayan
35	<i>Anhinga melanogaster</i>	Pecuk ular
36	<i>Sula leucogaster</i>	Gangsa batu
37	<i>Rhipidura javanica</i>	Burung kipas
38	<i>Pavo muticus</i>	Merak
39	<i>Caduarius bennetti</i>	Kasuari kecil
40	<i>Caduarius unappendiculatus</i>	Kasuari gelambir satu, Kasuari leher kuning
41	<i>Sula dactylatra</i>	Gangsa batu muka biru
42	<i>Sula abbotti</i>	Gangsa batu aboniti
43	<i>Sula sula</i>	Gangsa batu kaki merah
44	<i>Fregeta andrewsi</i>	Burung gunting, Bintayung
45	<i>Cacatua galerita</i> (semua sub jenis)	Kakatua putih besar jambul kuning
46	<i>Lorius domicellus</i>	Nori merah kepala hitam
47	<i>Mycteria cinerea</i>	Bangau putih susu, Bluwok
48	<i>Ptilonorhynchidae</i>	Burung namdur (Burung dewata)
49	<i>Pseudibis davisoni</i>	Ibis hitam punggung putih
50	<i>Lophura bulweri</i>	Beleang ekor putih
51	<i>Vanellus macropterus</i>	Trulek ekor putih
52	<i>Limnodromus semipalmatus</i>	Blekek Asia
53	<i>Tringa guttifer</i>	Trinil tutul
54	<i>Sterna zimmermanni</i>	Dara kaut berjambul
55	<i>Ducula whartoni</i>	Pergam raja
56	<i>Otus migicus beccarii</i>	Burung hantu biak
57	<i>Psittichas fulgidus</i>	Kasturi raja, Betet besar
58	<i>Egretta sacra</i>	Kuntul karang
59	<i>Ibis leucocephala</i>	Bluwok berwarna
60	<i>Polyplectron malacense</i>	Merak kerdil
61	<i>Grus spp.</i>	Jenjang
62	<i>Numenius spp.</i>	Gagajahan
63	<i>Himantopus himantopus</i>	Trulex lisi, Lilimo
64	<i>Megalaima corvina</i>	Haruku, ketuk-ketuk
65	<i>Megalaima javensis</i>	Tulung tumpuk, Bultok Jawa
66	<i>Megalaima armillaris</i>	Cangcarang
67	<i>Psaltia exilis</i>	Glatik kecil, Glatik gunung
68	<i>Alcipp pyrrhoptera</i>	Brencet wergan
69	<i>Crocias albonotatus</i>	Burung matahari
70	<i>Satchyris grammiceps</i>	Burung tepus dada putih
71	<i>Satchyris melanothorax</i>	Burung tepus pipi perak
72	<i>Garrulax rufifrons</i>	Burung kuda
73	<i>Rhipidura phoenicura</i>	Burung kipas ekor merah
74	<i>Rhipidura euryura</i>	Burung kipas perut putih, Kipas gunung
75	<i>Stururus melanopterus</i>	Jalak putih, Kaleng putih
76	<i>Aethopyga exina</i>	Jantingan gunung
77	<i>Lophozosterops javanica</i>	Burung kaca mata leher abu-abu
78	<i>Megapodiidae</i> (semua jenis)	Maleo, Burung gosong
79	<i>Tanygmatus sumatranus</i>	Nuri Sulawesi
80	<i>Trichoglossus ornatus</i>	Kasturi Sulawesi, Ornate
81	<i>Loriculus exilis</i>	Serindit Sulawesi
(REPTILE)		
1	<i>Varanus konodoensis</i>	Biawak komodo, Ora
2	<i>Hydrasaurus amboinensis</i>	Soa-soa, Biawak Ambon, Biawak pohon

Table J.1.2 Protected Species in Indonesia (4/5)

No.	SCIENTIFIC NAME	LOCAL NAME
3	<i>Crocodylus siamensis</i>	Buaya siam
4	<i>Crocodylus novaeguineae</i>	Busys air tawar Irian
5	<i>Tomistoma schlegelii</i>	Senyulong, Buaya sapit
6	<i>Varanus indicus</i>	Biawak maluku
7	<i>Varanus togianus</i>	Biawak togina
8	<i>Varanus gouldi</i>	Biawak coklat
9	<i>Varanus nebulosus</i>	Biawak abu-abu
10	<i>Tiliqua gigas</i>	Kadal Panama
11	<i>Gonycephalus dilophus</i>	Bunglon sisir
12	<i>Balagur baska</i>	Tuntong
13	<i>Orlitia borneensis</i>	Kura-kura gading
14	<i>Clabi-labi besar</i>	Labi-labi besar
15	<i>Kura-kura Irian</i>	Kura-kura Irian
16	<i>Dermochelys coriacea</i>	Penyu belimbing
17	<i>Python molurus</i>	Sanca bodo
18	<i>Crocodylus porosus</i>	Buaya myara
19	<i>Lepidochelys olivacea</i>	Penyu ridel
20	<i>Caretta caretta</i>	Penyu tempayan
21	<i>Elseya novaeguineae</i>	Kura Irian leher pendek
22	<i>Chelodina novaeguineae</i>	Kura Irian leher panjang
23	<i>Varanus prasinus</i>	Biawak hijau
24	<i>Varanus timorensis</i>	Biawak Timor
25	<i>Varanus borneensis</i>	Biawak kalimantan
26	<i>Chlamydosaurus kingii</i>	Soa payung
27	<i>Chondropython viridis</i>	Sanca hijau
28	<i>Python timorensis</i>	Sanxa Timor
29	<i>Eretmochelys imbricata</i>	Penyu sisik
30	<i>Natator depressa</i>	Penyu pipih
(INSECT)		
1	<i>Ornithoptera goliath</i>	Kupu sayap burung goliath
2	<i>Ornithoptera paradisea</i>	Kupu sayap burung surga
3	<i>Ornithoptera chimaera</i>	Kupu sayap burung peri
4	<i>Troides hypolitus</i>	Kupu raja
5	<i>Troides vandepolli</i>	Kupu raja
6	<i>Troides criton</i>	Kupu raja
7	<i>Troides riedeli</i>	Kupu raja
8	<i>Troides haliphron</i>	Kupu raja
9	<i>Troides plato</i>	Kupu raja
10	<i>Troides helena</i>	Kupu raja
11	<i>Troides meoris</i>	Kupu raja
12	<i>Troides rhamantus</i>	Kupu raja
13	<i>Troides miranda</i>	Kupu raja
14	<i>Troides andromache</i>	Kupu raja
15	<i>Troides amphrysus</i>	Kupu raja
16	<i>Trogonoteria brookiana</i>	Kupu trogon
17	<i>Cethosia myrina</i>	Kupu bidadari
18	<i>Ornithoptera rptschldi</i>	Kupu burung rotsil
19	<i>Ornithoptera tithous</i>	Kupu burung titon
20	<i>Ornithoptera priamus</i>	Kupu burung priamus

Table J.1.2 Protected Species in Indonesia (5/5)

No.	SCIENTIFIC NAME	LOCAL NAME
	(PISCES)	
1	<i>Scleropages fornosus</i>	Peyang Malaya, Tangkelasa
2	<i>Scleropages leichardti</i>	Peyang Irian, Hiu Sentani
3	<i>Pritis sp.</i>	Pari Sentani, Hiu Sentani
4	<i>Homaloptera gymnogaster</i>	Selusur Maninjau
5	<i>Puntius microps</i>	Wader goa
6	<i>Notopterus sp.</i>	Bilida Jawa, Lopis Jawa
	(ANTHOZOA)	
1	<i>Antiphatas spp.</i>	Akar bahar, Koral hitam
	(BIVALVIA)	
1	<i>Tridacna gigas</i>	Kima raksasa
2	<i>Tridacna derasa</i>	Kima selatan
3	<i>Hippopus porcellanus</i>	Kima Cina
4	<i>Tridacna crocea</i>	Kima kunia, Lubang
5	<i>Tridacna squamosa</i>	Kima sisik (Kima seruling)
6	<i>Tridacna maxima</i>	Kima kecil
7	<i>Hippopus hippopus</i>	Kima tapak kuda, Kima kuku beruang
8	<i>Charonis tritonis</i>	Triton terompet
9	<i>Birgus latro</i>	Ketam kelapa
10	<i>Tachipleus gigas</i>	Ketam tapak kuda
11	<i>Cassis cornuta</i>	Kepala kambing
12	<i>Trochus niloticus</i>	Troka, susur bundar
13	<i>Turbo marmoratus</i>	Batu laga, Siput hijau
14	<i>Nautilus pompilius</i>	Nautilus berongga

Source : Information of Ministry of Forestry

Table J.1.3 List of CITES Species (1/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
(MAMMALS)			
1	<i>Zaglossus bruijnii</i>	Spiny Anteater	
2	<i>Phalanger maculatus</i>	Eastern Cuscus	
3	<i>Phalanger orientalis</i>	Spotted Cuscus	
4	<i>Dendrolagus ursinus</i>	Dusky Tree Kangaroo	
5	<i>Dendrolagus innsius</i>	Grizzled Tree Kangaroo	
6	<i>Acerodon spp.</i>	Fruit Bat	
7	<i>Pteropus spp.</i>	Fruit Bat	
8	<i>Nasalis larvatus</i>	Proboscis Monkey	I
9	<i>Simias concolor</i>	Big-tailed Leaf Monkey	I
10	<i>Hylobates syndactylus</i>	Siamang	I
11	<i>Hylobates klossi</i>	Kloss Gibbon	I
12	<i>Hylobates muelleri</i>	Muller's Gibbon	I
13	<i>Hylobates moloch</i>	Moloch Gibbon	I
14	<i>Hylobates agilis</i>	Agile Gibbon	I
15	<i>Hylobates lar</i>	Lar Gibbon	I
16	<i>Pongo pygmaeus</i>	Orang Utan	I
17	<i>Manis javanicus</i>	Pangolin	
18	<i>Ratufa affinis</i>	Giant Squirrels	
19	<i>Ratufa bicolor</i>	Jelarang	
20	<i>Balaenoptera acutorostrata</i>	Minke Whale	I
21	<i>Balaenoptera borealis</i>	Sei Whale	I
22	<i>Balaenoptera edeni</i>	Bryde's Whale	I
23	<i>Balaenoptera musculus</i>	Blue Whale	I
24	<i>Balaenoptera physalus</i>	Fin Whale	I
25	<i>Megaptera novaeangliae</i>	Humpback Whale	I
26	<i>Canis lupus</i>	Asiatic Wild Dog	
27	<i>Helarctos malayanus</i>	Sun Bear	I
28	<i>Lutra lutra</i>	Common Otter	I
29	<i>Lutra sumatrana</i>	Hairy-nosed Otter	
30	<i>Lutra perspicillata</i>	Smooth Otter	
31	<i>Aonyx cinerea</i>	Oriental Small-clawed Otter	
32	<i>Cynogale bennettii</i>	Otter Civet	
33	<i>Herpessomys derbianus</i>	Banded Palm Civet	
34	<i>Paradoxurus hermaphroditus</i>	Common Palm Civet	III
35	<i>Prionodon linsang</i>	Banded Linsang	
36	<i>Felis bengalensis</i>	Leopard Cat	I
37	<i>Felis marmorata</i>	Marble Cat	I
38	<i>Felis planiceps</i>	Flat-headed Cat	I
39	<i>Felis badia</i>	Bornean Red Cat	I
40	<i>Felis temminckii</i>	Golden Cat	I
41	<i>Felis viverrina</i>	Mangrove Cat	I
42	<i>Neofelis nebulosa</i>	Clouded Leopard	I
43	<i>Panthera pardus</i>	Leopard Panther	I
44	<i>Panthera tigris</i>	Tiger	I
45	<i>Elephas maximus</i>	Asian Elephant	I
46	<i>Dugong dugon</i>	Dugong	I
47	<i>Babirusa babirusa</i>	Babirusa	I
48	<i>Tapirus indicus</i>	Tapir	I
49	<i>Axis kuhlii</i>	Bawean Deer	I
50	<i>Bubalus depressicornis</i>	Lowland Anoa	I
51	<i>Bubalus quarlesi</i>	Highland Anoa	I
52	<i>Capricornis sumatrensis</i>	Sumatran Serow	I
(AVES)			
1	<i>Fregata andrewsi</i>	Christmas Frigatebird	I
2	<i>Sula abbotti</i>	Abbott's Booby	I
3	<i>Mycteria cinerea</i>	Milky Stork	
4	<i>Pandion haliaetus</i>	Osprey	
5	<i>Aviceda jerdoni</i>	Jerdon's Baza	

Table J.1.3 List of CITES Species (2/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
6	<i>Aviceda suberistata</i>	Pacific Baza	
7	<i>Aviceda leuphotes</i>	Black Baza	
8	<i>Hemcopernis longicauda</i>	Long-tailed Buzzard	
9	<i>Pernis ptilorhynchus</i>	Oriental Honey-buzzard	
10	<i>Pernis celebensis</i>	Barred Honey-buzzard	
11	<i>Macheiramphus alcinus</i>	Bat Hawk	
12	<i>Elanoides caeruleus</i>	Black-winged Kite	
13	<i>Milvus migrans</i>	Black Kite	
14	<i>Haliastur sphenurus</i>	Whistling Kite	
15	<i>Haliastur indus</i>	Brahminy Kite	
16	<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	
17	<i>Ichthyophaga humilis</i>	Lesser Fish Eagle	
18	<i>Ichthyophaga ichthyaetus</i>	Grey-headed Fish Eagle	
19	<i>Circus gallicus</i>	Short-toed Eagle	
20	<i>Spilornis cheela</i>	Crested Serpent Eagle	
21	<i>Spilornis rufipennis</i>	Sulawesi Serpent Eagle	
22	<i>Circus assimilis</i>	Spotted Harrier	
23	<i>Circus melanoleucos</i>	Pied Harrier	
24	<i>Circus aeruginosus</i>	Western Marsh-harrier	
25	<i>Circus spilonotus</i>	Western Marsh-harrier	
26	<i>Circus approximans</i>	Swamp Harrier	
27	<i>Accipiter trivirgatus</i>	Crested Goshawk	
28	<i>Accipiter griecocephalus</i>	Sulawesi Goshawk	
29	<i>Accipiter badius</i>	Shikra Goshawk	
30	<i>Accipiter soloensis</i>	Chinese Goshawk	
31	<i>Accipiter trinitatus</i>	Spot-tailed Goshawk	
32	<i>Accipiter fasciatus</i>	Brown Goshawk	
33	<i>Accipiter novaehollandiae</i>	Grey Goshawk	
34	<i>Accipiter melanochlamys</i>	Black-mantled Goshawk	
35	<i>Accipiter henricus</i>	Moluccan Goshawk	
36	<i>Accipiter poliocephalus</i>	Grey-headed Goshawk	
37	<i>Accipiter gularis</i>	Japanese Sparrow-hawk	
38	<i>Accipiter virgatus</i>	Besra	
39	<i>Accipiter minos</i>	Small Sparrow-hawk	
40	<i>Accipiter cirrocephalus</i>	Collared sparrow-hawk	
41	<i>Accipiter erythronotus</i>	Rufous-necked Sparrow-hawk	
42	<i>Accipiter rhodogaster</i>	Vinous-breasted Sparrow-hawk	
43	<i>Accipiter meyerianus</i>	Meyer's Goshawk	
44	<i>Accipiter badius</i>	Chestnut Shoulder Goshawk	
45	<i>Accipiter doriae</i>	Doria's Hawk	
46	<i>Buteo badius</i>	Rufous-winged Buzzard	
47	<i>Buteo indicus</i>	Grey-faced Buzzard	
48	<i>Buteo buteo</i>	Common Buzzard	
49	<i>Harpyopsis novaeguineae</i>	New Guinea Eagle	
50	<i>Ictinaetus malayensis</i>	Black Eagle	
51	<i>Aquila gurneyi</i>	Gurney's Eagle	
52	<i>Aquila audax</i>	Wedge-tailed Eagle	
53	<i>Hieraetus fasciatus</i>	Bonelli's Eagle	
54	<i>Hieraetus pennatus</i>	Booted Eagle	
55	<i>Hieraetus morphnoides</i>	Little Eagle	
56	<i>Hieraetus kienerii</i>	Rufous-bellied Eagle	
57	<i>Speizaetus cirratus</i>	Changeable Hawk-eagle	
58	<i>Spizaetus bartelsi</i>	Javan Hawk-eagle	
59	<i>Spizaetus lancoatus</i>	Sulawesi Hawk-eagle	
60	<i>Spizaetus alboniger</i>	Blyth's Hawk-eagle	
61	<i>Spizaetus nanus</i>	Wallace's Hawk-eagle	
62	<i>Microhierax fringillatus</i>	Black-thighed Falconet	
63	<i>Falco berigora</i>	Brown Falcon	
64	<i>Falco berigora</i>	Eurasian Kestrel	
65	<i>Falco moluccensis</i>	Spotted Kestrel	

Table J.1.3 List of CITES Species (3/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
66	<i>Falco cenchroides</i>	Australian Kestrel	
67	<i>Falco subbuteo</i>	Eurasian Hobby	
68	<i>Falco severus</i>	Oriental Hobby	
69	<i>Falco longipennis</i>	Australian Hobby	
70	<i>Falco peregrinus</i>	Peregrine Falcon	I
71	<i>Cairina scutulata</i>	White-winged Duck	I
72	<i>Macrocephalon maleo</i>	Malco	I
73	<i>Polyplectron schlegelmacheri</i>	Bornean Peacock Pheadant	
74	<i>Argusianus argus</i>	Great Argus Pheasant	
75	<i>Pavo muticus</i>	Green Peafowl	
76	<i>Grus rubicunda</i>	Brolga	
77	<i>Tringa guttifer</i>	Nordmann's Greenshank	
78	<i>Caleonax nicobarica</i>	Nicobar Pigeon	I
79	<i>Goura cristata</i>	Western Crown Pigeon	
80	<i>Goura scheepmakeri</i>	Southern Crown Pigeon	
81	<i>Goura victoria</i>	Victoria Crown Pigeon	
82	<i>Chalcopsitta atra</i>	Black Lory	
83	<i>Chalcopsitta sintillata</i>	Yellow-streaked Lory	
84	<i>Chalcopsitta duivenbodei</i>	Brown Lory	
85	<i>Eos cyanogenia</i>	Biak Red Lory	
86	<i>Eod reticulata</i>	Blue-streaked Lory	
87	<i>Eos squamata</i>	Violet-necked Lory	
88	<i>Eos histrio</i>	Red-and-blue Lory	
89	<i>Eos bornea</i>	Moluccan Red Lory	
90	<i>Eos semilarvata</i>	Blue-eared Lory	
91	<i>Trichoglossus ornatus</i>	Ornate Lorikeet	
92	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet	
93	<i>Trichoglossus flavoviridis</i>	Yellow-and-green Lorikeet	
94	<i>Trichoglossus euteles</i>	Olive-headed Lorikeet	
95	<i>Psittaculirostris iris</i>	Iris Lorikeet	
96	<i>Psittaculirostris goldiei</i>	Goldie's Lorikeet	
97	<i>Pseudos fuscata</i>	Dusky Lory	
98	<i>Lorius lory</i>	Black-capped Lory	
99	<i>Lorius donicella</i>	Purple-naped Lory	
100	<i>Lorius garrulus</i>	Chattering Lory	
101	<i>Charmosyna toxopei</i>	Blue-fronted Lorikeet	
102	<i>Charmosyna placensis</i>	Red-flanked Lorikeet	
103	<i>Charmosyna rubronotata</i>	Red-fronted Lorikeet	
104	<i>Charmosyna multistriata</i>	Striated Lorikeet	
105	<i>Charmosyna wilhelminae</i>	Pygmy Lorikeet	
106	<i>Charmosyna pulchella</i>	Little Red Lorikeet	
107	<i>Charmosyna josephinae</i>	Josephine's Lorikeet	
108	<i>Charmosyna papou</i>	Papuan Lorikeet	
109	<i>Oreopsittacus arfaki</i>	Plum-faced Lorikeet	
110	<i>Neopsittacus muschenbroekii</i>	Yellow-billed Lorikeet	
111	<i>Neopsittacus pulicanda</i>	Orange-billed Lorikeet	
112	<i>Psittaculirostris desmarestii</i>	Large Fig-parrot	
113	<i>Psittaculirostris salvadorii</i>	Salvadori's Fig-parrot	
114	<i>Psittaculirostris edwardsii</i>	Edward's Fig-parrot	
115	<i>Opopsitta gulielmii</i>	Orange-breasted Fig-parrot	
116	<i>Opopsitta diophthalma</i>	Double-eyed Fig Parrot	
117	<i>Micropsitta bruijnii</i>	Red-breasted Pygmy Parrot	
118	<i>Micropsitta keiensis</i>	Yellow-capped Pygmy Parrot	
119	<i>Micropsitta geelvinkiana</i>	Geelvink Pygmy Parrot	
120	<i>Micropsitta pusio</i>	Buff-faced Pygmy Parrot	I
121	<i>Probosciger aterrimus</i>	Palm Cockatoo	
122	<i>Cacatua sulphurea</i>	Yellow-crested Cockatoo	
123	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	
124	<i>Cacatua moluccensis</i>	Salmon-crested Cockatoo	I
125	<i>Cacatua alba</i>	White Cockatoo	

Table J.1.3 List of CITES Species (4/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
126	<i>Cacatua goffini</i>	Tanimbar Corella	I
127	<i>Cacatua sanguinea</i>	Little Corella	
128	<i>Psittichas fulgidus</i>	Pedquet's Parrot	
129	<i>Eclectus roratus</i>	Eclectus Parrot	
130	<i>Geoffroyus geoffroyi</i>	Red-veeched Parrot	
131	<i>Geoffroyus simplex</i>	Blue-collared Parrot	
132	<i>Prioniturus flavicans</i>	Yellow-breasted Racquet-tail	
133	<i>Prioniturus platurus</i>	Golden-mantled Racquet-tail	
134	<i>Prioniturus mada</i>	Buru Racquet-tail	
135	<i>Tanygnathus lucionensis</i>	Blue-naped Parrot	
136	<i>Tanygnathus sumatranus</i>	Blue-backed Parrot	
137	<i>Tanygnathus gramineus</i>	Black-lored Parrot	
138	<i>Tanygnathus megalirynchos</i>	Great-billed Parrot	
139	<i>Psittacula longicauda</i>	Red-breasted Parakeet	
140	<i>Psittacula longicauda</i>	Long-tailed Parakeet	
141	<i>Aprosmictus jonquillaceus</i>	Olive-shouldered Parrot	
142	<i>Aprosmictus erythropterus</i>	Red-winged Parrot	
143	<i>Alisterus amboinensis</i>	Moluccan King Parrot	
144	<i>Alisterus chloropterus</i>	Papuan King Parrot	
145	<i>Psittacula brehmii</i>	Brehm's Tiger-Parrot	
146	<i>Psittacula picta</i>	Painted Tiger-parrot	
147	<i>Psittacula modesta</i>	Modest Tiger-parrot	
148	<i>Psittacula maderaszi</i>	Madarasz's Tiger Parrot	
149	<i>Psittinus cyanurus</i>	Blue-rumped Parrot	
150	<i>Loriculus galgulus</i>	Blue-crowned Hanging-parrot	
151	<i>Loriculus stigmatus</i>	Sulawesi Hanging-parrot	
152	<i>Loriculus amabilis</i>	Moluccan Hanging-parrot	
153	<i>Loriculus catamene</i>	Sangihe Hanging-parrot	
154	<i>Loriculus aurantiifrons</i>	Papuan Hanging-parrot	
155	<i>Loriculus exilis</i>	Red-billed Hanging-parrot	
156	<i>Loriculus flosculus</i>	Wallace's Hanging-parrot	
157	<i>Loriculus pusillus</i>	Yellow-throated Hanging-parrot	
158	<i>Tyto alba</i>	Barn Owl	
159	<i>Tyto rosenbergii</i>	Sulawesi Owl	
160	<i>Tyto inexpectata</i>	Minahassa Masked Owl	
161	<i>Tyto nigrobrunnea</i>	Taliabu Masked Owl	
162	<i>Tyto sororecula</i> Lesser	Masked Owl	
163	<i>Tyto novaehollandiae</i>	Australian Masked Owl	
164	<i>Tyto tenebrosa</i>	Greater sooty Owl	
165	<i>Tyto longimembris</i>	Eastern Grass-Owl	
166	<i>Pholidus badius</i>	Oriental Bay Owl	
167	<i>Otus sagittatus</i>	White-fronted Scopsowl	
168	<i>Otus rufescens</i>	Reddish Scopsowl	
169	<i>Otus spilocephalus</i>	Mountain Scopsowl	
170	<i>Otus mandanensis</i>	Sulawesi Scopsowl	
171	<i>Otus alfredi</i>	Flored Scopsowl	
172	<i>Otus angelinae</i>	Javan Scopsowl	
173	<i>Otus umbra</i>	Simeulue scopsowl	
174	<i>Otus enganensis</i>	Enggano Scopsowl	
175	<i>Otus sunia</i>	Oriental Scopsowl	
176	<i>Otus magicus</i>	Moluccan Scopsowl	
177	<i>Otus brookii</i>	Rajah's Scopsowl	
178	<i>Otus lempiji</i>	Collared Scopsowl	
179	<i>Otus mentawai</i>	Mentawai Scopsowl	
180	<i>Otus silvicola</i>	Wallace's Scopsowl	
181	<i>Bubo sumatranus</i>	Barred Eagle-owl	
182	<i>Ketupa ketupu</i>	Buffy Fish-owl	
183	<i>Glaucidium brodiei</i>	Collared Owlet	
184	<i>Glaucidium castanopterum</i>	Javan Owlet	
185	<i>Uroglaux dinorpha</i>	Papuan Hawk-owl	

Table J.1.3 List of CITES Species (5/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
186	<i>Ninox rufa</i>	Rufous Owl	
187	<i>Ninox connivens</i>	Barbing Owl	
188	<i>Ninox rudolfi</i>	Sumba Boobook	
189	<i>Ninox novaeseelandiae</i>	Southern Boobook	
190	<i>Ninox scutulata</i>	Brown Boobook	
191	<i>Ninox ochracea</i>	Ochre-bellied Boobook	
192	<i>Ninox squamipila</i>	Moluccan Boobook	
193	<i>Ninox theomacha</i>	Papuan Boobook	
194	<i>Ninox punctulata</i>	Spotted Boobook	
195	<i>Strix seloputo</i>	Spotted Wood-owl	
196	<i>Strix leptogrammica</i>	Brown Wood-owl	
197	<i>Berenicornis comatus</i>	White-crowned Hornbill	
198	<i>Anorthinus galeritus</i>	Bushy-crowned Hornbill	
199	<i>Penelopides exarhatus</i>	Sulawesi Hornbill	
200	<i>Rhyticeros corrugatus</i>	Wronlied Hornbill	
201	<i>Rhyticeros cassidix</i>	Knobbed Hornbill	
202	<i>Rhyticeros undulatus</i>	Wreathed Hornbill	
203	<i>Rhyticeros subruficollis</i>	Pian-ouched Hornbill	
204	<i>Rhyticeros plicatus</i>	Blyth's Hornbill	
205	<i>Rhyticeros everetti</i>	Sumba Hornbill	
206	<i>Anthracoceros malayanus</i>	Black Hornbill	
207	<i>Anthracoceros albirostris</i>	Asian Pied Hornbill	
208	<i>Buceros rhinoceros</i>	Rhinoderos Hornbill	
209	<i>Buceros bicornis</i>	Great Hornbill	I
210	<i>Rhinoplax vigil</i>	Helmeted Hornbill	I
211	<i>Pitta guajana</i>	Banded Pitta	
212	<i>Pitta nympha</i>	Fairy Pitta	
213	<i>Cyornis ruckii</i>	Ruck's Blue Flycatcher	
214	<i>Leucopsar rothschildi</i>	Bali Starling	I
215	<i>Loria loriae</i>	Loria's Bird-of-Paradise	
216	<i>Loboparadesia sericea</i>	Yellow-breasted Bird-of-Paradise	
217	<i>Cnemophilus macgregorii</i>	Crested Bird-of-paradise	
218	<i>Macgregoria pulchra</i>	Macgregor' Bird-of-Paradise	
219	<i>Lycocorax pyrrhopterus</i>	Paradise Crow	
220	<i>Mannocodia attra</i>	Glossy-mantled Manucod	
221	<i>Mannocodia jobiensis</i>	Jobi Manucode	
222	<i>Mannocodia chaybata</i>	Crinle-collared Manucode	
223	<i>Nannocodia kerandrenii</i>	Trumpet Manucode	
224	<i>Ptiloris magnificus</i>	Magnificent Riflebird	
225	<i>Semioptera wallacei</i>	Wallace'd Standardwing	
226	<i>Seleucidis melanolenca</i>	Twelve-wired Bird-of-Paradise	
227	<i>Paradigalla carunculata</i>	Long-tailed Paradigalla	
228	<i>Paradigalla brevicanda</i>	Short-tailed Paradigalla	
229	<i>Epimachus albertisi</i>	Buffed-tailed Sicklebird	
230	<i>Epimachus bruynii</i>	Pale-billed Sicklebird	
231	<i>Epimachus fastuosus</i>	Black Sicklebird	
232	<i>Epimachus meyeri</i>	Brown Sicklebird	
233	<i>Astrapia nigra</i>	Arafak Astrapia	
234	<i>Astrapia splendidissima</i>	Splendid Astrapia	
235	<i>Lophorina superba</i>	Superb Bird-of-Paradise	
236	<i>Parotia sefilata</i>	Western Parotia	
237	<i>Parotia carolae</i>	Carola's Parotia	
238	<i>Pteridophora alberti</i>	King of Saxony Bird-of-Paradise	
239	<i>Cincinnurus regius</i>	King Bird-of-Paradise	
240	<i>Cincinnurus magnificus</i>	Magnificent Bird-of-Paradise	
241	<i>Cincinnurus respublica</i>	Wilson's Bird-of-Paradise	
242	<i>Paradisaea apoda</i>	Grete Bird-of-Paradise	
243	<i>Paradisaea minor</i>	Lesser Bird-of-paradise	
244	<i>Paradisaea rubra</i>	Red Bird-of-Paradise	

Table J.1.3 List of CITES Species (6/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
(REPTILES)			
1	<i>Batagur baska</i>	River Terrapin	I
2	<i>Testudinidae spp.</i>	Freshwater Turtle	
3	<i>Chelonia mydas</i>	Green Sea Turtle	I
4	<i>Eretmochelys imbricata</i>	Hawksbill Turtle	I
5	<i>Xaretta caretta</i>	Loggerhead Sea Turtle	I
6	<i>Lepidochelys olivacea</i>	Olive Ridley Turtle	I
7	<i>Lepidochelys kempi</i>	Kemp's Ridley Turtle	I
8	<i>Sermochelys coreacea</i>	Leatherback Turtle	I
9	<i>Tomistoma schlegelii</i>	Malayan Gavial	I
10	<i>Crocodylus porosus</i>	Saltwater Crocodile	
11	<i>Crocodylus novaeguineae</i>	New Guinea Freshwater Crocodile	
12	<i>Crocodylus siamensis</i>	Siamese Freshwater Crocodile	I
13	<i>Varanus komodoensis</i>	Komodo Dragon	I
14	<i>Varanus bengalensis</i>	Grey Monitor	I
15	<i>Varanus salvator</i>	Monitor Lizard	
16	<i>Candoia aspera</i>	Pacific Island Boa	
17	<i>Candoia carinata</i>	Rougy-scaled Pacific Island Boa	
18	<i>Liasis albertisii</i>	D'Alber'd Python	
19	<i>Liasis mackloti</i>	Macklot'd Python	
20	<i>Liasis papuanus</i>	Papuan Python	
21	<i>Python amethistinus</i>	Amethystine Python	
22	<i>Python boeleni</i>	Boelen'd Python	
23	<i>Python boeleni</i>	Blood Python	
24	<i>Python curtus</i>	Asiatic Rock Python	I
25	<i>Python reticulatus</i>	Reticulated Python	
26	<i>Python timorensis</i>	Timor Python	
27	<i>Naja naja</i>	Cobra	
(AMPHIBIAN AND FISH)			
1	<i>Rana hexdaactyla</i>	Frog	
2	<i>Scleropages fonnosus</i>	Dragon Fish	I
(INSECTS-BUTTERFLIES)			
1	<i>Ornithoptera aescalus</i>	Aescalus Birdwing	
2	<i>Ornithoptera chimaera</i>	Chibaera Birdwing	
3	<i>Ornithoptera croesus</i>	Croesus Birdwing	
4	<i>Ornithoptera goliath</i>	Goliath Birdwing	
5	<i>Ornithoptera incredionalis</i>	Birdwing Butterfly	
6	<i>Ornithoptera paradisea</i>	Birdwing Butterfly	
7	<i>Ornithoptera priamus</i>	Green Birdwing	
8	<i>Ornithoptera rotschildi</i>	Rotschild'd Birdwing	
9	<i>Ornithoptera lithonus</i>	Birdwing Butterfly	
10	<i>Troides amphrysus</i>	Birdwing Butterfly	
11	<i>Troides andromache</i>	Birdwing Butterfly	
12	<i>Troides criton</i>	Birdwing Butterfly	
13	<i>Troides cuneifera</i>	Birdwing Butterfly	
14	<i>Troides dohertyi</i>	Talaud Black Birdwing	
15	<i>Troides haliphron</i>	Birdwing Butterfly	
16	<i>Troides helena</i>	Black and Gold Butterfly	
17	<i>Troides hypolitus</i>	Birdwing Butterfly	
18	<i>Troides miranda</i>	Miranda Birdwing	
19	<i>Troides oblongonacnatus</i>	Troides Birdwing	
20	<i>Troides plato</i>	Birdwing Butterfly	
21	<i>Troides pratorum</i>	Troides Birdwing	
22	<i>Troides radhamantus</i>	Birdwing Butterfly	
23	<i>Troides riedeli</i>	Birdwing Butterfly	
24	<i>Troides vandeputti</i>	Birdwing Butterfly	

Table J.1.3 List of CITES Species (7/7)

No.	SCIENTIFIC NAME	LOCAL NAME	APPENDIX
(MOLLUSC AND OTHER MARINE INVERTEBRATES)			
1	Tridacnidae spp.	Tridacna Clam	
2	Antiphataria spp.	Black Coral	I
27	Scleractinia spp.	Hard Coral Biota	
28	Milleporidae spp.	Karang Api	
	Stylasteridae spp.		
29	Coccolithales	Soft Coral	
30	Tubiporidae	'Terumbu Karang Suling'	
(FLORA)			
1	Cactaceae	Cactus(all species)	
2	Cycadaceae	Cycads(all species)	
3	Euphorbiaceae	Euphorbs(all species)	
4	Aloe spp.	Aloe	
5	Nepenthes spp.	Pitcher Plants	
6	Nepenthes khasiana	Pitcher Plant	I
7	Nepenthes rajah	Giant Pitcher Plant	I
8	Orchidaceae	Orchids(all species)	
9	Aquilaria spp.	'Gaharu'	

Source: Information of Ministry of Forestry

Remarks :

Species are listed under Appendix II unless indicated by " I " or " III ".

" APPENDIX " shows the degree of protection necessity of species.

The species in "APPENDIX I" is considered endangered one.

Table J.1.4 The List of Activities Requiring AMDAL

AGENCY NAME	TYPE OF ACTIVITY	SIZE
Public Works	Construction of dams of embankments	Height \geq 15m or impounded area \geq 100ha
	Immigration area development	Immigrated area \geq 2000ha
	Tidal swamp area development	Area \geq 5000ha
	Coastal protection in large cities	Population \geq 500,000
	River improvement works in large cities	Population \geq 500,000
	Canalization/flood control facilities in large cities	Length \geq 5km or width \geq 20m
	Canalization other than item 6 above (coastal areas, swamps, etc.)	Length \geq 25km or width \geq 50m
	Construction of toll roads and fly-overs	
	Highway construction	Length \geq 25km
	Arterial and collector road construction and upgrading outside of large cities or metropolitan areas	Length \geq 5km or area \geq 5ha
	Garbage disposal using incineration	\geq 800 ton/ha
	Garbage disposal using controlled landfill or sanitary landfill systems	\geq 800 ton/ha
	Garbage disposal using open dumping systems	\geq 80 ton/ha
	Drainage systems using canals in large cities and metropolitan areas	Primary canal length \geq 5km
Agriculture	Wastewater treatment	
	-Construction of wastewater treatment facilities in urban areas	Area \geq 50ha
	-Construction of sewerage systems	Service area \geq 2,500ha
	Systems for withdrawal of water from lakes, rivers, spring or other water resources	
	Public housing and settlement construction	Area \geq 200ha
	Urban renewal projects	Area \geq 5ha
	Construction of multi-stories and apartment buildings	Height \geq 60m
	Shrimp/fish culture	Area \geq 50ha
	Development of rice fields in forested areas	Area \geq 1000ha
	Plantations	Area \geq 10,000ha
Transmigration and Forest resettlement	Cash crop farms	Area \geq 5,000ha
	Proposed transmigration settlement construction	Area \geq 3,000ha
	safari park construction	Area \geq 250ha
	Zoo construction	Area \geq 100ha
Forestry	Forest concession	
	Sago palm forest concessions	
	Industrial forest concession	
	Establishment of parks, including : national parks, nature reserves, hunting preserves, marine parks, wildlife preserves, biosphere preserves	

Source : Decree of Minister of State for the Environment, No. KEP-11/MENCH/3/1994

Table J.2.1 Protected species of Flora in South Kalimantan (1/3)

No.	SCIENTIFIC NAME	LOCAL NAME
1	<i>Palaquium gutta</i>	Palam merah, suban getah merah
2	<i>Agathis labillardieri</i>	Damar kopal
3	<i>Dyera</i> spp.	Jelutung
4	<i>Styrax</i> spp.	Kemenyn
5	<i>Dryobalanop camphora</i>	Keruing minyak
6	<i>Anacardium occidentale</i>	Jambu Monyet
7	<i>Durio zibethinus</i>	Durian
8	<i>Aleuriyes moluccana</i>	Kemiri
9	<i>Arenga pinnata</i>	Enau
10	<i>Excocaria agallocha</i>	Mata buta, Garu
11	<i>Myristica argenta</i>	Hongi, saya
12	<i>Cinnamomum burmanii</i>	Kaku manis
13	<i>Cinnamomum cullilawan</i>	Kaku lawang
14	<i>Spernum</i> sp	Bayur
15	<i>Eusideroxylon zwageri</i>	Bulian, Ulin
16	<i>Eucalyptus</i> sp	Eucalyptus
17	<i>Scorodocarpus bornensis</i>	Kulim, Kaku bawang
18	<i>Manikkara kauki</i>	Sawo kecil
19	<i>Dalbergia latifolia</i>	Sawo keling
20	<i>Toona sureni</i>	Suren
21	<i>Duabanga moluccana</i>	Tuker benuang
22	<i>Fragera fragrans</i>	Tembesu
23	<i>Goelegyne pandurata</i>	Anggrek hitam
24	<i>Gramatophyllum speciosum</i>	Anggrek raksasa
25	<i>Paphiopedilum ambilis</i>	Anggrek kasut
26	<i>Paphiopedilum bullenianum</i>	-
27	<i>Paphiopedilum sprianum</i>	-
28	<i>Phalenopsis gigantea</i>	Anggrek bulan kasut
29	<i>Phalenopsis amabilis pleihari</i>	Anggrek bulan pleihari
30	<i>Phalenopsis violacea</i>	Anggrek kolip
(MAMAL)		
1	<i>Nasalis larvatus</i>	Bekantan
2	<i>Tarsius tarsier</i>	Singapuar
3	<i>Hylobates muelleri</i>	Owa-owa
4	<i>Manis javanicus</i>	Trenggiling
5	<i>Cervus unicolor</i>	Rusa sambar
6	<i>Muntiacus muntjak</i>	Kijang
7	<i>Tragulus javanicus</i>	Kancil
8	<i>Tragulus napu</i>	Pelanduk
9	<i>Lariscus insignis</i>	Bajing / Tupai Tanah
10	<i>Cynogale bennetti</i>	Musang Air
11	<i>Ratufa bicolor</i>	Jelarang
12	<i>Petaurista elegans</i>	Cukbo, Bajing Terbang
13	<i>Felis bengalensis</i>	Kucing Hutan
14	<i>Felis nebulosa</i>	Macan Dahan
15	<i>Helarctos malayanus</i>	Beruang Madu
16	<i>Presbytis rubiconae</i>	Bangkul
17	<i>Arctitis binturong</i>	Bintarung
18	<i>Hystrix brachyura</i>	Landak
19	<i>Mydaus javanensis</i>	Sigung

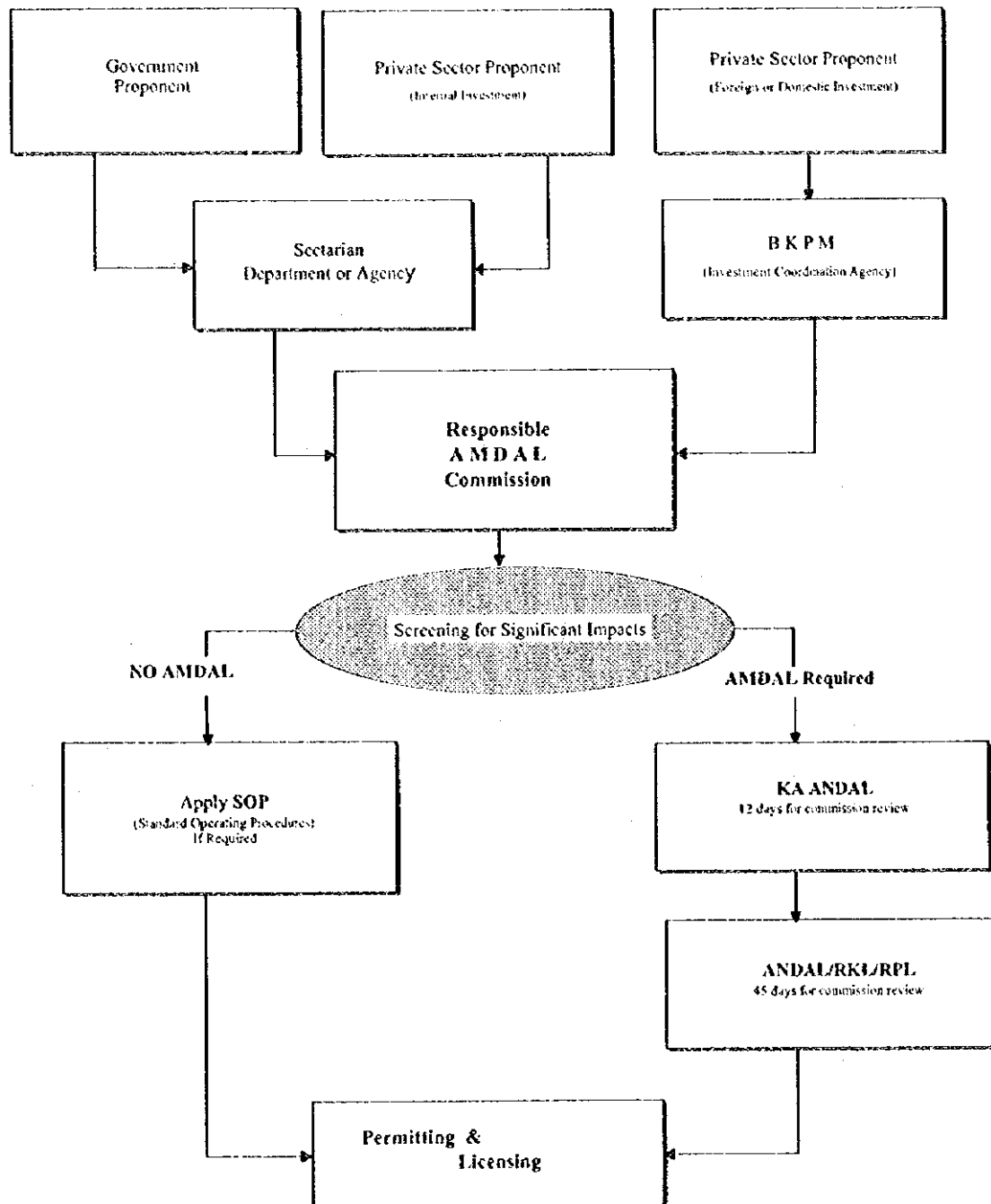
Table J.2.1 Protected species of Flora in South Kalimantan (2/3)

No.	SCIENTIFIC NAME	LOCAL NAME
	(AVES)	
1	<i>Leptotiles javanicus</i>	Merabu, Bangau Tong-tong
2	<i>Egretta alba</i>	Kuntul, Bangau-putih besar
3	<i>Egretta intermedia</i>	Kuntul, Bangau-putih
4	<i>Egretta eulophotes</i>	Kuntul cina
5	<i>Threskiornis malanocephalus</i>	Ibis putih, Pelatuk besi
6	<i>Pseudibis papillosa</i>	Ibis hitam
7	<i>Alcedo pulchella</i>	Raja Udang Pita
8	<i>Halcyon concretia</i>	Raja Udang Kalung Coklat
9	<i>Halcyon sancta</i>	Raja Udang
10	<i>Halcyon pileata</i>	Raja Udang Kuduk Hitam
11	<i>Alcedo atthis</i>	Raja Udang Sungai
12	<i>Alcedo meninting</i>	Raja Udang Meninting
13	<i>Alcedo euryzona</i>	Raja Udang Binti
14	<i>Ceyx rufidorsum</i>	Raja Udang Hutan
15	<i>Ceyx ecithacus</i>	Raja Udang Rimba
16	<i>Anthracoseros malabaricus</i>	Rankong kecil
17	<i>Buceros rhinoceros</i>	Rangkong
18	<i>Aceros coronatus</i>	Kangkareng
19	<i>Anthracoseros malayanus</i>	Enggang Tiringa
20	<i>Berenicornis comatus</i>	Enggang
21	<i>Anorrhitis guleritus</i>	Enggang Konde
22	<i>Aceros leucocephalus</i>	Burung tahun
23	<i>Aceros undulatus</i>	Julang
24	<i>Harpectes kasumba</i>	Kasumba, Burung Luntur
25	<i>Harpectes diardi</i>	Suruku, Burung Luntur
26	<i>Harpectes duayucolli</i>	Br. Trogang Jingga
27	<i>Ibis cenerius</i>	Br. Bangau Putih Susu
28	<i>Pitta garnatina</i>	Br. Pita
29	<i>Harpectes orthophaenus</i>	Br. Trogon Coklat Muda
30	<i>Harpectes oreskios</i>	Br. Trogon Kuning Tua
31	<i>Pitta caerulea</i>	Br. Pita, Paok cacing
32	<i>Pitta aravata</i>	Br. Pita Biru
33	<i>Pitta baudi</i>	Br. Pita Kepala Biru
34	<i>Pitta guajana</i>	Br. Pita Ekor Biru
35	<i>Pitta sordida</i>	Br. Pita Topi
36	<i>Antheroptes singalensis</i>	Br. Madu
37	<i>Antheroptes malacensis</i>	Br. Sesap Madu
38	<i>Antheroptes singalensis</i>	Br. Madu Pipi Merah
39	<i>Nectrania hypogrammicum</i>	Br. Madu Kuduk Ungu
40	<i>Nectrania chalapstetha</i>	Br. Madu Tenggorokan Pirang
41	<i>Aethya mytalis</i>	Br. Madu Merah
42	<i>Araethya longirostris</i>	Br. Madu Jangkung
43	<i>Araethya crassirostris</i>	Br. Madu Paruh Tebal
44	<i>Araethya robusta</i>	Br. Jantung Besar
45	<i>Araethya chrysogenys</i>	Br. Jantung Kecil
46	<i>Araethya effinis</i>	Br. Jantung Kelabu
47	<i>Argusianus argus</i>	Kuau
48	<i>Accipiter solensis</i>	Alap-alap Cina
49	<i>Accipiter trivirgatus</i>	Alap-alap Jambul, Siko

Table J.2.1 Protected species of Flora in South Kalimantan (3/3)

No.	SCIENTIFIC NAME	LOCAL NAME
50	<i>Accipiter virgatus</i>	Alap-alap Burung
51	<i>Macher hamphus alcinus</i>	Alap-alap Kelelawar
52	<i>Avicedo jerdoni</i>	Alap-alap Kadal Jambu
53	<i>Pernis ptilorhynchus</i>	Alap-alap Madu
54	<i>Butastur indicus</i>	Elang Muka Kelabu
55	<i>Butastur liventer</i>	Elang Sayap Coklat
56	<i>Spizeatus cirrhatus</i>	Elang Hitam, Elang Bontok, Kuliki
57	<i>Hieraetus kienrii</i>	Elang Kecil
58	<i>Spizeatus alboniger</i>	Elang Hitam Putih
59	<i>Ichthyophaga nana</i>	Elang Laut Kecil
60	<i>Spilornis cheela</i>	Elang Ular, Wulung
61	<i>Circus aeruginosus</i>	Elang Rawa
62	<i>Circus melanoleucus</i>	Elang Cina
63	<i>Elanus caeruleus</i>	Alap-alap Tikus
64	<i>Cairina scutulata</i>	Itik Liar
65	<i>Elanus caeruleus</i>	Alap-alap Putih
66	<i>Anhinga melanogaster</i>	Pecuk Ular
67	<i>Phipidura javanica</i>	Kipas Biru
68	<i>Fregata androwsi</i>	Br. Gunting, Bintayung
69	<i>Ptilorhynchidae</i>	Br. Nendur
70	<i>Psaendibis davisoni</i>	Ibis Hitam Punggung Putih
71	<i>Limoordromus semipalmatus</i>	Bleok Asia
72	<i>Tringa guttifer</i>	Trinil Tutul
73	<i>Sterna zimmermani</i>	Dara Laut Berjambul
74	<i>Ducula whartoni</i>	Pergam Raja
75	<i>Egretta sacra</i>	Kuntul Karang
76	<i>Ibis leucocephalus</i>	Bluwok Berwarna
77	<i>Numenius spp</i>	Gegajahan
78	<i>Rhipidura euryzona</i>	Br. Kipas Perut Putih, Kipas Gunung
79	<i>Rhipidura phoenicurus</i>	Br. Kipas Ekor Merah
(REPTILE)		
1	<i>Tomistoma schlegelii</i>	Senyolong, Buaya Sapit
2	<i>Phyton malurus</i>	Sanca Bodo
3	<i>Orlitia borneensis</i>	Kura-Kura
4	<i>Orlitia borneensis</i>	Kura-Kura Gading
5	<i>Crocodylus porosus</i>	Buaya Muara
6	<i>Varanus bornensis</i>	Biawak Kalimantan
(FICES)		
1	<i>Scleropages formosus</i>	Tangkalasa
2	<i>Antiphates spp</i>	Akar Bahar
3	<i>Targo marmoratus</i>	Batu Laga, Siput Hijau
4	<i>Biegus latro</i>	Ketum Kelapa

Source : STATISTIK KEHUTANAN PROVINSI KALIMANTAN TAHUN 1993/1994)



source : Highlight of PP51/1993 (BAP/AMDAL 1993)

Fig J.1.1 The Flowchart of AMDAL Procedure

APPENDIX K:
SYNERGISTIC EFFECT AND PRIORITIZATION

APPENDIX K: PRIORITIZATION

K.1 General

The Umbrella Cooperation aims to improve the living standard of farmers by means of integrated agricultural and rural development. It will create and incorporate, in theory, the existing, on-going and future projects in such a way that its intervention will optimize the effects of each individual project, and synergism will eventually appear.

One of the main purpose of this study is to propose a method for the Third Umbrella Cooperation Program by which all the identified projects with the umbrella cooperation will be prioritized according to their place in the context of the logical framework of the cooperation.

In the beginning of the study, the three matrices using point-scoring comparison were proposed as a means to prioritize, monitor and evaluate the effect of the Program as well as each individual project.

While conducting a field study, it has been realized that the point-scoring comparisons without proper standardization of different indices may mislead the understanding of the total situation, and may invite unnecessary disputes over the selection of candidate project, besides the fact that they consume much time and resources.

An alternative framework proposed in the main report is meant to attain structural simplicity and clarity with less involvement of resources . What is presented is a thought experiment that involves various idealization while correctly containing all the important features of the prioritization.

As all the basic ideas are given in the chapter four of the main report, this appendix confines itself to supply a general background and a trend of the recent development cooperation in the agricultural sector of Indonesia in which the third umbrella cooperation is going to be fitted in.

K.2 Development Cooperation

The Third Umbrella Cooperation, as one of the development cooperation programs has been conceived and will be implemented within a framework of the agriculture sector policy whose national development objectives are dictated by the REPELITA VI.

The complexities of the development cooperation could be understood by observing Table K.1. In the table, development cooperation which diversify into many types are classified under the groups of sector, sub-sector, type and donor. The table also gives an idea about the size of the fund involved. This complexity may tell that the individual projects have chances to be interrelated each other.

TABLE K.2.1 Development Cooperation, 1994

(Unit: US\$1000)

Sector/Subsector	Free Technical Cooperation	Investment Related Technical Cooperation	Investment Project Assistance	Program Budgetary Aid	Total *	95111an	Umbrella Related					
							Central		Regional		Others	
							Amount	No.	Amount	No.	Amount	No.
HUMAN RESOURCES DEV.												
Sector Policy & Planning	7,600	0	480	345	8,401	8,198	-	-	-	-	-	-
Tech. & Manage. Training	37,862	4,736	56,550	6	99,154	80,483	-	-	-	-	-	-
Total	45,462	4,736	57,030	351	107,555	88,681	-	-	-	-	-	-
AGRICULTURE **												
Sector Policy & Planning	9,626	0	0	0	9,626	15,202	7,475	6	0	0	6	1
Research & Dev.	6,782	0	14,761	0	21,543	724	4,261	7	14,761	1	0	0
Support Services	4,166	5,035	167,451	8,945	185,617	42,977	46,614	13	41,854	4	0	0
Food Crops	4,136	600	24,928	0	29,754	5,137	16,437	8	866	2	0	0
Industrial Crops	995	165	37,052	10	38,222	26,413	36,790	8	0	0	0	0
Livestock	4,339	26	1,569	15	5,949	2,462	1,994	13	0	0	2,869	3
Total	30,044	5,936	245,761	8,970	290,711	92,935	113,531	53	60,451	7	2,875	4
AREA DEVELOPMENT												
Integrated Rural Dev.	6,528	1,004	103,071	4,229	114,832	9,222	101,513	3	0	0	0	0
Ag. Community Dev.	19,428	1,009	16,734	8,267	45,528	16,558	13,256	14	0	0	2,307	2
Settlements	9				9	2,672	0	0	0	0	0	0
Rural Plan. & Dev.	3,514	7,860	311		11,715	13,105	7	1	2,910	1	0	0
Total	29,479	9,963	120,116	12,496	172,084	41,457	114,762	18	2,910	1	2,307	2
Total							228,293	71	63,791	8	5,182	6
Grand Total							296,866	85				

Notes: * Forestry & Fishery are excluded (26,267)
 ** Food Aid in Agri. Sector is excluded (186)

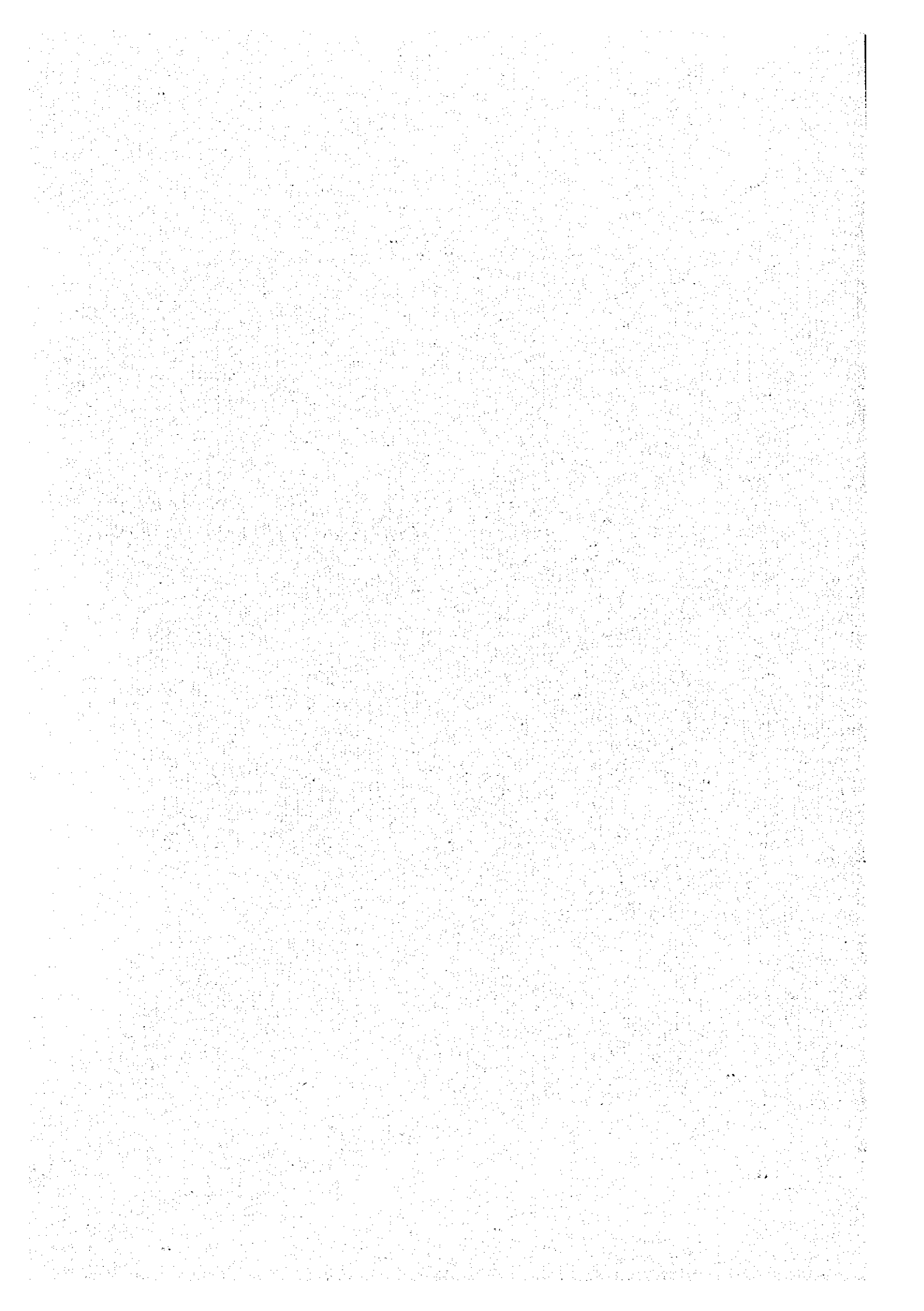
Source: UNDP

Source: UNDP

(Unit: US\$1000)

DONOR		AGRICULTURE		DONOR		AGRICULTURE		DONOR		AGRICULTURE	
MULTILATERAL				BILATERAL				UNGO			
UNSYSTEM											
FAO	451	7.29%		Australia	3,471	2.28%		CIFOR		10	1.09%
IAEA	135	2.18%		Austria	110	0.09%		Food Foundation		343	37.28%
IFAD	4,630	74.82%		Belgium	30	0.02%		DFRC-Canada		341	37.07%
UNDP	771	12.46%		Canada	1,209	0.83%		ORSCA		226	24.57%
UNV	16	0.26%		Finland	1,353	0.89%					
WFP	185	2.97%		France	2,979	1.96%					
TOTAL	6,188	1.95%		Germany	4,641	3.05%					
NON-UN				Italy	6	0.00%					
ASDI	145,625	92.35%		Japan	119,404	78.36%					
CEC	12,656	7.65%		Norway	11	0.01%					
				New Zealand	647	0.42%					
				Switzerland	110	0.07%					
				UK	7,064	4.64%					
				USA	11,252	7.38%					
TOTAL	157,681	49.72%		TOTAL	152,023	48.04%		TOTAL		920	0.29%
Grand Total								317,162		100.00%	

APPENDIX L: MONITORING AND EVALUATION



APPENDIX L: MONITORING OF THE OVERALL UMBRELLA COOPERATION

As one of the background surveys, a project monitoring system (SIMPRO) has been studied. It has recently been fitted into the existing reporting system of the MOA. The system is summarized in this Appendix L.

In any given recent fiscal year, the MOA has been implementing around 1,200 central projects throughout the country. The manager of each project is to give its account to the higher echelon monthly. There are four tiers in the system and not all the reports have reached the monitoring center at the ministry due to various reasons. 68 per cent of the reports reached in 1994/95; about 75 per cent in 1995/96. The progress is attributable partly to introduction of facsimile machine at the regional level.

The newly introduced SIMPRO consists of four modules which correspond to four levels of administration namely project, region, directorate general and ministry.

At the project level, a monthly report provides information on financial and physical progress of the project, and on problems encountered. The report also provides information of how the problems were being attended to. In this SIMPRO system the final assessment report of overall projects' situation reaches the Minister at the end of the next month.

The items of problems to be monitored in SIMPRO during execution of projects are classified into five categories which are further divided into sub-categories. The five categories, number of sub-groups and individual items are as follows:

- i. documents of the plan and the project (5-30*),
- ii. rules and directions of implementation (1-10),
- iii. preparation of the implementation (3-30),
- iv. implementation (8-62), and
- v. natural disaster (2-9).

* (number of sub-groups - individual items; total 141)

For further dissemination and campaign of the SIMPRO in the MOA, around 2,400 staff members are being assigned. The period is set at one year. The required fund, an amount of Rp. 4.14 bil. is to be provided by allocating a part of the remainder of the

OECD loan No.IP-404 dated 4 NOV., 1993, which were under the category of consulting services activities for agricultural development project. This proceedings reflects willingness on the part of the ministry to strengthen its monitoring capability.