SECTOR F

SOCIAL ENVIRONMENT

1. SOCIAL ENVIRONMENT OVERVIEW

1.1 Education, Health and Poverty

The social conditions of South Sumatra are examined by comparing with other provinces using statistic figures here.

In order to clarify a part of social conditions of South Sumatra Province, the numbers of primary schools, junior high schools, hospitals and health centers in proportion to the population are calculated with other Provinces in Indonesia. The ranks are almost the 20th in 26 Provinces. Comparing with other Provinces in Sumatra Island, South Sumatra Province is not necessarily ranked high in terms of accessibility of services on education and health. For the purpose of reference, Provinces ranked as No. 1 are Kalimantan Tengah with 1.44 in the number of primary schools (also No. 3 in junior high schools), Malukuu with 0.23 in the junior high schools, D.K.I Jakarta with 1.20 in hospitals and Irian Jaya with 9.47 in health centers.

Table F1.1.1 Accessibility of Services on Education and Health

Province	Number of Primary Schools per 1,000 persons (1999/2000)	Rank	Number of Junior High Schools per 1,000 persons (1999/2000)	Rank	Number of Hospitals per 100,000 persons (1999)	Rank	Number of Health Centers per 100,000 persons (1999)	Rank
Dista Aceh	0.80	17	0.13	16	0.62	14	5.44	9
Sumatera Utara	0.83	16	0.15	7	1.00	4	3.43	20
Sumtera Barat	1.00	11	0.11	21	0.92	8	4.78	14
Riau	0.76	18	0.11	20	0.57	19	3.02	21
Jambi	0.96	13	0.13	14	0.58	18	5.12	11
Sumatera Selatan	0.75	20	0.12	18	0.41	22	3.51	19
Bengkulu	1.01	9	0.14	9	0.50	20	7.97	3
Lampung	0.69	23	0.13	13	0.27	26	2.93	23
D.K.I Jakarta	0.38	26	0.13	15	1.20	1	3.91	17

Source: BPS-Statistics Indonesia, *"Statistical Year Book of Indonesia 2000"*

Another part of social conditions of South Sumatra Province is the population below poverty line. According to Statistical Year Book of Indonesia, the poverty lines is referred to as the daily minimum requirement of 2,100 kcal per capita and the non-food minimum requirement, such as for living, clothing, schooling, transportation, household necessities, and other basic individual needs. The value of expenditure (in Rupiahs) needed for fulfilling the basic minimum requirement including food and non food is

called poverty line. The poverty line was Rp. 42,032 for urban areas and Rp. 31,336 for rural areas in 1996 while it was Rp.92,409 and Rp. 74,272 in 1999. It increased sharply due to the economic crisis and the change in the standard of poverty in 1998.

The rank of South Sumatra declined from the 12th among 26 Provinces in 1996 to the 14th in 1999 with the number of population below poverty line increasing as much as 57.5%. Only South Sumatra and Jambi ranked down in Sumatra Island. But it should be noted that in these three years, all Provinces increase the number of population under poverty line even some of them ascended the rank.

Table F1.1.2 Population below Poverty Line

Province	Number of Population below Poverty Line ('000, 1996)	Percentage of Population below Poverty Line (1996)	Rank	Number of Population below Poverty Line ('000, 1999)	Percentage of Population below Poverty Line (1999)	Rank
Dista Aceh	491.8	12.72%	8	602.1	14.75%	6
Sumatera Utara	1,475.7	13.22%	9	1,972.7	16.74%	8
Sumtera Barat	426.2	9.84%	5	601.5	13.24%	3
Riau	496.7	12.62%	7	589.7	14.00%	4
Jambi	354.5	14.84%	11	677.0	26.64%	17
Sumatera Selatan	1,151.4	15.89%	12	1,813.7	23.53%	14
Bengkulu	236.9	16.69%	13	302.3	19.79%	12
Lampung	1,712.2	25.59%	21	2,037.1	29.11%	20
D.K.I Jakarta	215.8	2.35%	1	379.6	3.99%	1

Source: BPS-Statistics Indonesia, *"Statistical Year Book of Indonesia 2000"*

1.2 Cultural Property

Humans have been inhabited in South Sumatra since prehistoric times. Megalithic cultural heritages can be found in Lahat District, OKU District, and Muaraenim District. The sites are mostly located in open space. Such heritages consist of stone statues of humans and animals, menhir, dolmen, coffin stones, mortar stones and so on. Their sizes are small to giant. It is thought that they were created in 2500 - 1000 BC. The existing of the megalithic things has been evoking legends and myths among people in South Sumatra.

In addition, Limas house can also be counted as a cultural property, which can be seen Palembang and other places. It is a combination of Hinduism, Buddhism, Islamic architecture and old traditional house of South Sumatra. The Chinese pattern was adopted in carving because the influence of Sriwijaya culture (7th - 13th century AD) was strongly dominant.

1.3 Indigenous People

The native people in South Sumatra consist of various ethnic groups with local languages and dialects. Bahasa Indonesia or Indonesian national language is used in

their daily lives. Ethnic groups or tribes include Palembang, Ogan, Komering, Semendo, Pasemah, Gumay, Lintang, Musirawas, Meranjat, Kayuagung, Ranau, Kisam, Bangka, Belitung, and so on. These ethnic groups mix each other and even with migrating ethnic groups or foreigners by inter-ethnic marriage.

Each ethnic group has its own culture, which is generally shown up in the occasion of marriage ceremony and other special events. However, they influence each other by social relationship including marriage and some common cultural elements are found in different groups. This is caused by "diffusion acculturation and adaptation process" according to Provincial Tourist Service. It means that unity and uniform of culture in the tribe has realized by its members. In addition, their way of life is mostly influenced by such modernization as televisions, automobiles and so on.

1.4 Transmigration

Planned resettlement started in 1905 by Dutch colonial government for the purpose of solving poverty and unemployment in Java. The scheme has been continuing under the name of "transmigration" after the independence in 1945. Such Government-sponsored transmigration families are provided with free transportation to the settlement, 2 ha of land for cultivation, planting materials and foodstuffs for the first 12 months. At the same time, considerable number of families also moved as spontaneous transmigrants without any assistance from the government except land. South Sumatra has been one of the most important destinations since its low population density. The majority of transmigrants from Java are cultivating rice, rubber or coffee in rural centers.

The economic success of transmigration settlements varies widely from place to place due to quality of soil and availability of water supply. Because the construction of irrigation infrastructure is very expensive, most of the settlements established since mid-1970s apply rain-fed cultivation. Scarcity of suitable land for settlements because of rising population density forces cultivation of soils with extremely marginal quality for new transmingrants. Sometimes settlements have been established on large estuaries to lift river water utilizing rise and fall of tide, where so many problems occur with acidic swamp soil and poor drainage facilities.

The nucleus estate and small holder system (PIR) has been introduced to solve the problems of low quality soil. Transmigrants families cultivate tree crops such as oil palm on a small holder basis, with guidance from a nearby estate, which processes and sells the crops. The average income is Rp. 1,500,000/month per family. This is a successful case of transmigration.

Transmigaration has provided a better life for a large number of landless and near-landless families though some transmigrants have failed to gain economic success and have returned to Java. From 2001, the name of the transmigration ministry changed to Ministry of Transmigration and Population. Presently, there are limited number of national transmigration projects due to the limitation of government budget and a certain achievement of objectives. South Sumatra Province is still receiving transmigrants from problematic places including Aceh and East Timor on the province-to-province basis.

Table F1.4.1 Number of Transmigration Families Placed in South Sumatra

Year	Government-sponsored		PIR		Spontaneous		Result Total
	Target	Result	Target	Result	Target	Result	
2000	460	460	–	–	75	305	765
1999	585	585	–	–	–	–	585
1998	582	582	–	–	200	200	782
1997	847	847	1,085	1,085	2,825	2,825	4,757
1996	1,783	1,716	2,061	2,061	1,599	1,599	5,376

Source: BPS-Statistics South Sumatra, *"Sumatera Selatan Dalam Angka 2000"*

2. IDENTIFICATION OF ISSUES ON SOCIAL ENVIRONMENT

2.1 Introduction

Issues on social environment are identified with various tools in the Study. Results from one tool are cross-checked with those from others. Such tools used in the Study include:

(1) Review on reports of past studies and other documents,

(2) Field survey,

(3) Questionnaire Survey,

(4) Public Consultation Meetings (PCMs) including Pre-PCMs, and

(5) Interviews with residents and key persons.

Results of the (1) and (2) are the base of the following surveys. Results of (3) are shown in Section 2.2. Detailed results of PCMs including Pre-PCMs are presented in Chapter 4. Tool (5) is used to examine issues presented (3) and (4) in detail. Major issues identified from the viewpoint of social environment are described in the Sections 2.3 to 2.6.

2.2 Results of Questionnaire Survey

A questionnaire survey was held in the course of the Pre-PCM Meetings in order to collect basic information on water management as well as to get rough illustration of the Study area. The questionnaire contains questions on water use in general, water quality and agriculture. The questionnaire was translated into Indonesian language and distributed to the participants. At the end of the meetings, the questionnaire sheets were collected as follows.

Table F2.2.1 Questionnaire Survey on Water

	Lower Area	Middle Area	Upper Area
Date	September 16, 2002	September 20, 2002	September 18, 2002
Related Districts/Municipality	Palembang, Banyuasin, Musibanyuasin (MUBA), Ogan Komering Ilir (OKI)	Muaraenim, Perabumulih, Ogan Komering Ulu (OKU)	Musirawas (MURA), Lubuklinggau, Lahat, Pagaralam
Respondents	- Representatives of social groups - Local government officials of related services		
Distribution	31	22	39
Collection	27	20	28
Collection Rate	87.1%	90.1%	71.8%

2.2.1 Water Use in General

(1) River Utilization

Q. What do you use rivers for? (Check all that apply)

	Lower		Middle		Upper		Total	
Fishery	18	66.7%	13	65.0%	16	57.1%	47	62.7%
Transportation (people)	19	70.4%	5	25.0%	6	21.4%	30	40.0%
Agriculture	17	63.0%	10	50.0%	21	75.0%	48	64.0%
Forestry	7	25.9%	1	5.0%	6	21.4%	14	18.7%
Drinking water	21	77.8%	14	70.0%	16	57.1%	51	68.0%
Drainage/sewerage	17	63.0%	3	15.0%	18	64.3%	38	50.7%
Industry	7	25.9%	5	25.0%	4	14.3%	16	21.3%
Mining	8	29.6%	5	25.0%	4	14.3%	17	22.7%
Washing clothes	20	74.1%	11	55.0%	16	57.1%	47	62.7%
Play land	6	22.2%	3	15.0%	9	32.1%	18	24.0%
Fishpond	13	48.1%	6	30.0%	18	64.3%	37	49.3%
Cargo	7	25.9%	0	0.0%	2	7.1%	9	12.0%
Tourism	10	37.0%	6	30.0%	12	42.9%	28	37.3%
Plantation	6	22.2%	2	10.0%	6	21.4%	14	18.7%
Toilet	15	55.6%	8	40.0%	11	39.3%	34	45.3%

Q. How often do you use river water?

	Lower		Middle		Upper		Total	
Every day	23	85.2%	12	60.0%	11	39.3%	46	61.3%
3-4 days in a week	0	0.0%	1	5.0%	2	7.1%	3	4.0%
1-2 days in a week	0	0.0%	1	5.0%	4	14.3%	5	6.7%
A few days in a month	2	7.4%	2	10.0%	8	28.6%	12	16.0%
Seasonally	0	0.0%	0	0.0%	0	0.0%	0	0.0%
A few times in a year	0	0.0%	1	5.0%	0	0.0%	2	2.7%
Other/no answer	2	7.4%	3	15.0%	3	10.7%	7	9.3%

Analysis. Although rivers are used for many purposes, they are very important for the people's daily lives as they are used for the water source of drinking and washing clothes almost everyday by the majority of the people (68.0% and 62.7% in total respectively). In addition, more than 45% says they use rivers for toilet. Usage of rivers other than drinking and washing are different in areas. Transportation of people and fishery are the first and the second highest in the lower area while f transportation of people is not the first although fishery is the second in the middle area. In the upper area, agriculture and fishery pond are the first and the second.

(2) Problems on River Water Use

Q. Are there any problems for the use of river water? (Check all that apply)

	Lower		Middle		Upper		Total	
Sedimentation	21	77.8%	14	70.0%	12	42.9%	47	62.7%
Contamination	18	66.7%	9	45.0%	12	42.9%	39	52.0%
Smell	11	40.7%	8	40.0%	10	35.7%	29	38.7%
Garbage	16	59.3%	8	40.0%	15	53.6%	39	52.0%
Scouring	15	55.6%	11	55.0%	14	50.0%	40	53.3%
Low water level	11	40.7%	11	55.0%	12	42.9%	34	45.3%

Q. How frequently do the problems occur?

	Lower		Middle		Upper		Total	
Always	17	63.0%	9	45.0%	18	64.3%	44	58.7%
A few times in a month	2	7.4%	1	5.0%	3	10.7%	6	8.0%
A few times in a year	7	25.9%	7	35.0%	3	10.7%	17	22.7%
Seasonally	1	3.7%	3	15.0%	1	3.6%	5	6.7%
Once in a few years	0	0.0%	0	0.0%	1	3.6%	1	1.3%
Other/no answer	0	0.0%	0	0.0%	2	7.1%	2	2.6%

Analysis. There are various problems on river water. Above all, sedimentation is the highest also in the lower and the middle area. Its percentage increases from upper to lower. Thus, it should be considered as "inter-local" problem. Inter-local solutions are necessary for this type of problems. On the other hand, smell is relatively low percentage and almost same among areas. This can be a "local" problem. Low water level is a kind of local problems but it is the second highest in the middle. It can be called a "local-serious" problem due to local specific causes. Contamination is a mix of inter-local and local-serious features as the percentage increase from upper to lower and it is the second highest in the lower area.

2.2.2 Water Quality

(1) River Water

Q. Is the river water colored?

	Lower		Middle		Upper		Total	
No, in dry season	9	33.3%	9	45.0%	16	57.1%	34	45.3%
No, in wet season	3	11.1%	1	5.0%	3	10.7%	7	9.3%

Q. Does the river water smell?

	Lower		Middle		Upper		Total	
No, in dry season	6	22.2%	11	55.0%	10	35.7%	27	36.0%
No, in wet season	8	29.6%	2	10.0%	5	17.9%	15	20.0%

Q. Does the river water have turbidity?

	Lower		Middle		Upper		Total	
No, in dry season	5	18.5%	3	15.0%	14	50.0%	22	29.3%
No, in wet season	3	11.1%	0	0.0%	3	10.7%	6	8.0%

Analysis. Percentage of "no" in river water quality problems decreases in the wet season except smell in the lower area. Change in water quality between dry and wet season is large in the upper and middle area.

(2) Drinking Water

Q. What is the source of drinking water? (Check all that apply)

	Lower		Middle		Upper		Total	
Dry season								
River	11	40.7%	8	40.0%	9	32.1%	28	37.3%
Well	13	48.1%	5	25.0%	21	75.0%	39	52.0%
Irrigation channel	1	3.7%	0	0.0%	0	0.0%	1	1.3%
Wet season								
River	9	33.3%	5	25.0%	7	25.0%	21	28.0%
Well	15	55.6%	7	35.0%	21	75.0%	43	57.3%
Irrigation channel	1	3.7%	0	0.0%	0	0.0%	1	1.3%

Q. Have you got any diseases due to the drinking water?

	Lower		Middle		Upper		Total	
Yes	9	33.3%	4	20.0%	3	10.7%	16	21.3%

Q. Does the water taste salty?

	Lower		Middle		Upper		Total	
Yes, in dry season	9	33.3%	2	10.0%	0	0.0%	11	14.7%
Yes, in wet season	1	3.7%	0	0.0%	1	3.6%	2	2.7%

Q. Is the drinking water supplied enough in dry seasons?

	Lower		Middle		Upper		Total	
Yes	5	18.5%	13	65.0%	15	10.7%	33	44.0%

Analysis. The majority in total uses well for drinking water but not a few people use rivers as more than 40% in the lower and middle area and more than 30% in the upper area in the dry season. Number of river decreases in wet season because the water quality deteriorates in wet season. Control of river water quality should be an important matter for people's health. As a matter of fact, more than 20% have got disease due to the drinking water. Further, only 44% can get enough water for drinking in dry season. Supplying enough water in dry season is another important matter, especially in the lower and upper area.

(3) Water for Miscellaneous Use

Q. What is the source of the water for washing? (Check all that apply)

	Lower		Middle		Upper		Total	
Dry season								
River	13	48.1%	10	50.0%	12	42.9%	35	46.7%
Well	12	44.4%	6	30.0%	17	60.7%	35	46.7%
Irrigation channel	0	0.0%	0	0.0%	0	0.0%	0	0.0%
Wet season								
River	10	37.0%	6	30.0%	8	28.6%	24	32.0%
Well	11	40.7%	8	40.0%	21	75.0%	40	53.3%
Irrigation channel	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Analysis. Percentage of river matches well in dry season. River decreases in wet season because the water quality deteriorates in wet season.

(4) Water for Agriculture

Q. What is the source of water for agriculture? (Check all that apply)

	Lower		Middle		Upper		Total	
Dry season								
River	15	55.6%	8	40.0%	16	57.1%	39	52.0%
Well	3	11.1%	1	5.0%	1	3.6%	5	6.7%
Irrigation channel	2	7.4%	4	20.0%	19	67.9%	25	33.3%
Wet season								
River	13	48.1%	7	35.0%	17	60.7%	37	49.3%
Well	1	3.7%	3	15.0%	1	3.6%	5	6.7%
Irrigation channel	5	18.5%	4	20.0%	17	60.7%	26	34.7%

Analysis. Only one third use irrigation channel for agriculture while a half use rivers. Percentage distribution differs in areas. The lower area shows very low percentage. Three areas have different patters of the water use due to the change from wet season to dry season. The upper area increases irrigation channel. The middle area increases river and decreases well. The lower increases river and decreases irrigation.

(5) Water for Aquaculture

Q. What is the source of water for aquaculture? (Check all that apply)

	Lower		Middle		Upper		Total	
Dry season								
River	15	55.6%	6	30.0%	16	57.1%	37	49.3%
Well	2	7.4%	1	5.0%	1	3.6%	4	5.3%
Irrigation channel	0	0.0%	2	10.0%	11	39.3%	13	17.3%
Wet season								
River	13	48.1%	5	25.0%	17	60.7%	35	46.7%
Well	1	3.7%	1	5.0%	0	0.0%	2	2.7%
Irrigation channel	4	14.8%	4	20.0%	11	39.3%	19	25.3%

Q. Are there any diseases in the fish?

	Lower		Middle		Upper		Total	
Yes	5	18.5%	1	5.0%	9	32.1%	15	20.0%

Analysis. More than a quarter use irrigation channel for aquaculture in wet season. Especially in the upper area, nearly 40% use irrigation channel all the seasons. No distinct difference in seasonal patters of the water use can be seen in the three areas.

(6) Water for Industry/Service

Q. What is the source of water for industry/service? (Check all that apply)

	Lower		Middle		Upper		Total	
River	5	18.5%	8	40.0%	10	35.7%	23	30.7%
Well	1	3.7%	4	20.0%	1	3.6%	6	8.0%
Irrigation channel	1	3.7%	0	0.0%	1	3.6%	2	2.7%

Analysis. River is the most important water source for industry and service. In the middle area, well is also an important source.

2.2.3 Agriculture

Q. What are your main products? (Check all that apply)

	Lower		Middle		Upper		Total	
Husked paddy/rice	10	37.0%	8	40.0%	19	67.9%	37	49.3%
Vegetables	8	29.6%	8	40.0%	16	57.1%	32	42.7%
Spices	4	14.8%	3	15.0%	8	28.6%	15	20.0%
Coffee	1	3.7%	5	25.0%	15	53.6%	21	28.0%
Oil palm	2	7.4%	5	25.0%	3	10.7%	10	13.3%
Coco palm	2	7.4%	6	30.0%	1	3.6%	9	12.0%
Rubber	6	22.2%	6	30.0%	5	17.9%	17	22.7%
Timber	3	11.1%	2	10.0%	6	21.4%	11	14.7%
Wood for pulp	3	11.1%	3	15.0%	1	3.6%	7	9.3%
Fruit	4	14.8%	4	20.0%	9	32.1%	17	22.7%
Fishery	6	22.2%	6	30.0%	14	50.0%	26	34.7%

Analysis. In the upper area, percentage of rice, vegetable and coffee is very high while coco palm is very low comparing with other areas. The middle area shows less difference among products. Lower area has smaller numbers in almost all the products. Fishery posts quite a large number especially in the upper area.

Q. Do you have any problems with your products? (Check all that apply)

	Lower		Middle		Upper		Total	
Soil erosion	7	25.9%	9	45.0%	14	50.0%	30	40.0%
Water shortage	6	22.2%	5	25.0%	7	25.0%	18	24.0%
Water flood	8	29.6%	6	30.0%	11	39.3%	25	33.3%
Loss of soil fertility	6	22.2%	8	40.0%	11	39.3%	25	33.3%
Conflict with governmental conservation plan	4	14.8%	2	10.0%	8	28.6%	14	18.7%

Analysis. The largest problem against the production is soil erosion that 40% raise as a problem. The upper area shows higher percentage for all the choices. A distinctive difference is that it shows nearly 30% for conflicts with government conservation plans.

2.3 Issues on Spatial Planning

2.3.1 Spatial Plan and Its Implementation

What is a spatial plan? According to Law No.24/1992 (Spatial Planning), a spatial plan is a form and pattern of spatial utilization with or without future activities for

improvements. Spatial plan is different from land use plan in the sense that not only it covers rivers and inland water areas but also its dynamic planning features of designing, utilizing and controlling space. The planning objectives include the following environmental considerations:

- Spatial panning should be environmentally sound.
- Protected and unprotected areas should be established.
- Spatial utilizations are integrated, balanced, effective, efficient, protective, and preventive against negative impacts.

Every one has the right to know and to participate in designing a spatial plan and is obliged to obey the established spatial plan while he/she has the right to have sufficient compensation of the results from the implementation of the plan. Due process is required for making the spatial plan.

Spatial plans are made by the nation, Provinces and Districts/Municipalities. National spatial plan contains decision of protected, unprotected, and definite areas and their norms. It is an umbrella for Provincial and District/Municipality spatial plans and also the guideline for the spatial planning by Provinces and Districts/Municipalities. Provincial spatial plans contain the management of protected, rural and urban areas, the development of settlement, transportation, forestry, agriculture, mining, industry and tourism area, the development of regional infrastructure, and policy making on land-use, water-use, atmosphere-use and natural resource-use. It is the guideline for the spatial planning by Districts/Municipalities. District/Municipality spatial plans contain the management of protected, rural and urban area, the management of settlement, transportation, telecommunication, energy, water resource and environment, and policy making on land-use, water-use, atmosphere-use and natural resource-use.

Spatial plans and spatial planning have basically two problems in their making process and implementation. Firstly, in spite of the requirement of due process by the law, people's participation in the process of making spatial plans is not satisfactorily realized yet so far. In addition, public relations of the spatial plans are not necessarily satisfactory either. Insufficiency of participation coupled with lack of enough public information results in people's indifference to the spatial plans. People's indifference in turn causes idleness of government officials to implement the plans. As a result, a spatial plan is just made for a colorful panel displayed at the lobby of the government office.

Secondly, after the decentralization, Districts/Municipalities have own power to develop regional areas including forest and water resources, and have to find their own financial sources for their development. Sometimes planning policies conflict between Provinces and Districts/Municipalities especially on the issues of environmental conservation. As a result, spatial plans cease to function concerning their most important role.

2.3.2 Provincial Policy on Buildings Located at the Land Adjacent to or in Rivers

There is no specified Provincial regulation on buildings located at the land adjacent to rivers or in the rivers at present. Therefore, the Provincial Government controls such buildings in accordance with Law No. 11/1974 (Water Resource), Government Regulation No. 35/1991 (River) and Ministerial Regulation (former Ministry of Public Works) No. 63/PRT/1993 (Borders, Channels, and Ex-channels of River).

Law No. 11/1974 (Water Resource) is an umbrella law for regulations concerning water resources including rivers. Government Regulation No. 35/1991 (River) decrees protection, development, utilization and control over rivers including lakes and reservoirs. Rivers and river structures should be developed, exploited, maintained and utilized for the prosperity and safety of the people by the government, or state-owned companies, or formal/social bodies, or individuals. It prohibits, among others, to construct, change or destruct buildings inside or across the river. Misconducts of prohibited deeds are convicted of crimes.

Ministerial Regulation No. 63/PRT/1993 (Borders, Channels, and Ex-channels of River) defines river borders and decrees details of their utilization. River border with dyke is at least 3 m (in urban areas) or 5 m (outside urban areas). River border without dyke is 10-30 m (in urban areas) or 50-100 m (outside urban areas). River borders may be used for: cultivation of permitted crops; commercial; mining; quarrying; posting of billboards, power, phone, and pipe lines; foundation of roads, bridges and railways; water navigation; water intake and drainage facilities; and social activities. On the other hand, river borders may not be used for: dumping of garbage, solid and suspended wastes, developing permanent buildings, houses, and commercial facilities.

In spited of regulations mentioned above, so many houses are built in the river borders in urban areas. Such illegal houses have been built by the people who came from rural areas and have no land titles in authorized areas. Illegal buildings are not removed by the related authorities unless some development plans are implemented in the relevant area. As a matter of fact, it would be extremely difficult to enforce the regulations by removing such illegal buildings without preparing alternate lands nor a program of returning the inhabitants to their original villages. Such mitigation programs may not be implemented due to lack of budget and personnel.

2.4 Conservation of Forest Area

Forest ecosystems provide environmental services including watershed and coastal protection. On the other hand, people especially living in rural areas depend on forests for their livelihoods, while woods is the main household energy source for heating and cooking of many of the poorest communities. As it is pointed out by the World Bank's Report, *Biodiversity Conservation in Forest Ecosystems,* conservation and sustainable use of forest ecosystem and forest biodiversity are critical components to alleviate poverty and support sustainable development. Encroachment and illegal logging are the most emergent threat to the forest ecosystem not only in South Sumatra but also the global communities. In this subsection, firstly, these two typical forest crimes are

examined in detail. Then, the World Bank's approach in Kerinci Selabat National Park is introduced. Finally, we introduce actions to forest crimes adopted in the Forest Law Enforcement and Governance East Asia Ministerial Conference held in Bali, Indonesia.

2.4.1 Encroachment

Encroachment is an invasion to forest areas by people farming the land without concession. Encroachment is a serious problem because:

- People clear the land by slash and burn of forests. It changes the ecosystem of the forest area. It also increase land erosion and decreases water-holding capacity of land. Erosion gets much more severe since they often clear slopes.
- People often plant food crops such as paddy after clear the land, and it also causes land erosion.
- People often give up farming and leave the land not maintained and clear new lands when the fertility of land deteriorates (shifting cultivation).
- People also give up farming and leave the land not maintained when the price of crops goes down and they lose interest in cropping.
- People invade natural conservation forests or protected forests. It causes biodiversity problems in the former case while it causes problems on water source, flood protection, erosion control, etc. in the latter case.

The primary reason why people encroach is land scarcity in accordance with population growth as well as lack of awareness of the people. It is sometimes another reason that the border of forest conservation area is unclear. This problem cannot be solved simply by law enforcement since the many factors are inter-related. Integrated Conservation and Development Project (IDCP) is one of approaches to solve the complicated problem. IDCP is discussed below.

2.4.2 Illegal Logging

Illegal logging is the log cutting for the purpose of making wood products without receiving concession from governments. Only bared land is left after illegal logging because the loggers have no interest in the land that they clear. It causes much worse situations than encroachment where farmers will try to plant tree crops or something. Causes of illegal logging can be divided into two aspects: supply side and demand side. So, countermeasures should also be considered for two aspects.

Suppliers of illegal logging or illegal loggers usually do not aware of the results from their logging. In addition, illegal logging is an easy way of making money for the people who have no good means for living in rural areas. If loggers are members of a village society, programs of increase in society's welfare can be a countermeasure. Establishment of a social forest is a good example. On the other hand, the village societies have to strengthen their effort to control and monitor conditions of forests because illegal logging may be the cause of many social and environmental problems for the entire village including land erosion, sedimentation, ecosystem change, and so on.

Governments should support such efforts as a matter of course. Further, environmental education is an important key for reducing illegal logging in the long run.

Causes in demand side are a little bit complicated. In the past three decades, timber and wood product have been a good exporting industry for the country. As a result, the production capacity of the logging industry in Indonesia reaches approximately 70 million m^3 while the production capacity which keeps forest resource sustainable is only 20 million m^3 a year. So, "it means that 50 million m^3 of products are illegal" according to *the Sumatera Ekspres*. Nevertheless, demand pressure on illegal logging is increasing because of the closure of concession due to a national policy to rehabilitate tropical forest and increase in timber price with adjustment of market price to international level. Registered wood or wood logged with concession is more expensive than unregistered one and hard to get. Even you find one, its supply often does not continue. With considering those factors, countermeasures should be as follows:

- Restructure the logging industry for decreasing the production capacity to balance supply and demand of the forest resource
- Connect reforest program with logging industry
- Develop forest continuity management
- Develop technology to utilize wood more efficiently (presently only 20-30% of the usable wood is used) and usage of waste of wood
- Promote cooperation among authorities for effective control of forest conservation including court, prosecutor, police, telecommunication and custom, as well as encourage local people to participate

2.4.3 Integrated Conservation and Development Project of Kerinci Seblat National Park

Integrated Conservation and Development Project (IDCP) is a project scheme attempting to reconcile local and regional development needs with the conservation of protected areas and to promote biodiversity conservation. The IDCP of Kerinci Selabat National Park (KSNP) stated in 1996 with the finance by the World Bank.

KSNP is the first national park in Indonesia and the second biggest. KSNP is located in the Middle of Sumatra Island and covers 1.4 million ha of forest area, which is upper catchments of the Musi River and the Batanghari River. The park area contains the highest mountain in Sumatra Island (Mt. Kerinci, 3,805m) and the highest caldera lake in Southeast Asia. Some of the last viable populations of endangered mammals including the Sumatran rhinoceros, tiger, clouded leopard, Malay tapir inhabit in the park.

Because of rapid economic development coupled with increase in human population, the ecosystem of KSNP had been facing threats such as encroachment and illegal logging. Lack of awareness on conservation by the communities has expanded the problems. In addition, lack of coordination, poor communication, and economic competition between

related Provinces made it difficult for the communities to participate in conservation actions and solve problems.

Examining conditions mentioned above, it was considered that guarding the park only with strong law enforcement would not succeed in conserving biodiversity. Thus, ICDP was introduced instead of a conventional park management approach. The objectives of ICDP are as follows:

- To stabilize the park boundary and protect biodiversity within the park,
- To maintain biodiversity and promote sustainable forest management within production forests around the park, and
- To enhance the livelihoods of poor households who live around the park.

The ICDP consists of four components:

- *Component A (Park Management)*: To increase the effectiveness of management activities in the Park. It includes the development of a management plan and zoning, species inventorying, biological and socio-economic monitoring, and efforts to stabilize the park boundary and also support conservation awareness.
- *Component B (Area/Village Development, by WWF)*: To develop community resource management in selected villages, documented in a Village Conservation Agreement (VCA). The activities run by Local Community Organizer (live in the village) and coordinated by Village Conservation Facilitator (VCF). It includes arising conservation awareness among villagers.
- *Component C (Integrating Biodiversity in Forest Concession Management)*:

  (1) To map and identify areas of high biodiversity significance in the concession areas, and train concessionaires and local staff in managing and monitoring the sites.

  (2) To carry out independent concession audit.

- *Component D (Monitoring and Evaluation)*: To support surveys, remote sensing activities, and to monitor encroachment, poaching and other impacts on the Park.

According to the World Bank report (*Biodiversity Conservation in Forest Ecosystems, World Bank Assistance 1992-2002, July 2002*), the ICDP provided maps of development planning to local government agencies; supports biodiversity surveys and audits in adjacent forest concessions and provides small development grants to communities which enter conservation agreements with the park.

2.4.4 Declaration of East Asia Ministerial Conference on Forest Law Enforcement and Governance

On September 11 to 13, 2001, the Forest Law Enforcement and Governance (FLEG) East Asia Ministerial Conference was held in Bali, Indonesia. The Conference gathered

nearly 150 participants from 20 countries, representing government, international organizations, NGOs, and the private sector. It was co-hosted by the World Bank and the Government of Indonesia. The Conference resulted in the adoption of Ministerial Declaration, which commits participating countries to intensify national efforts and strengthen bilateral, regional and multilateral collaboration to address violations of forest law and forest crime, and create a regional task force on forest law enforcement and government to advance the Declaration's objectives.

Concerning national and sub-national level, the Declaration and its annex state variety of actions from those for legislation to public awareness in order to implement the Declaration.

In order to confirm the actions to be implemented, we propose that the related authorities make an implementation plan including concrete and realistic schedules with public participation. Progress of implementation be periodically publicized.

2.5 Water Allocation between Irrigation and Fishpond

2.5.1 Outline of the Survey

Survey on Water Allocation between Irrigation and Fishpond was carried out on November 2-5, 2002 with the aims at assessing (potential) conflicts in water use between rice fields and fishponds in Kelingi-Tugumulyo irrigation scheme which has initially been raised during the Pre-PCM in Lubuklinggau. It is conducted through structured interview with respondents from two categories, namely rice farmers and fishpond owners. The total of 31 rice farmers (WUA members) have been selected based on location of WUA in the secondary system, of which 10 farmers from upstream WUA, 10 farmers from midstream WUA, and 11 farmers from downstream WUA.

It has been recognized in the Government Regulation No. 77/2001 (Irrigation) that irrigation water-use has been given priority to agricultural activities, especially rice fields. However, because this regulation has not been widely socialized, most farmers at the grass root level are not aware about the regulation. In addition, available water in the irrigation canals has given opportunity for various water usage, including fast-flow fishpond business.

Fast-flow fishponds shall not reduce water recharge at the irrigation canals if the water returned back to the canals after being used for fish cultivation. In fact, water recharge is decreased such that some areas at the downstream experience water shortage. Fishponds are blamed for this due to the fact that only part of the water diverted to the fishponds was returned back to the canals. But, whether or not water diversion for fishpond is a wrong conduct is remain unclear since there is no regulation (e.g. Perda) regarding water allocation between fishpond and rice field which can be applied to non-members of WUA. Sometimes a large fishpond owner is a non-member of WUA. If he/she is a member of WUA, WUA regulation can be applied to him/her on water allocation.

2.5.2 Fast-Flow Fishponds

In Kelingi-Tugumulyo irrigation scheme, fishponds are developed along the primary and secondary canals. Fishpond business in this area has been established for more than 10 year. The number of fishpond increases every year since market demand for fresh fish tends to increase in recent years.

Size of pond varies from 30 m^2 to 65 m^2 per unit. Each business operates 3 to 23 units of fishponds. The total area of fishpond varies from 120 m^2 to 1,000 m^2 .

Within one production cycle (2 month), each business can produce 8 to 60 ton of fresh fish, depending on the total area of fishpond. In one year, there are 4 production cycles such that the total production becomes 32 to 240 ton of fish. The common fish produced are *Mas* (gold fish) and *Nila*. Summary of fast-flow fishponds is presented in **Table F2.5.1**.

Table F2.5.1 General Description of Fast-flow Fishpond

Descriptions	Unit	Dimension
Average area of one unit fishpond	m^2	30 - 65
Number of unit	unit	3 - 23
Total area of fishponds	m^2	120 – 1.000
Total production per cycle	Ton in 2 month	8 - 60
Number of cycle per year	Cycle	4
Total production per year	Ton	32 - 240

Simple financial analysis indicates that income from fishpond business is much higher than that from rice field. Within a year the business owner operating 120 m^2 can earn up to 11 million Rupiah, while those operating up to 1,000 m^2 fishpond can earn 100 million Rupiah.

2.5.3 Rice Field

The average area of rice field for farmer of upstream WUA, mid stream WUA, and downstream WUA are 1.175 ha, 0.86 ha, 0.62 ha respectively. The cropping pattern for rice field of the upstream WUA is paddy-paddy, for the mid stream WUA is paddy-fish-paddy, and for the downstream WUA is paddy-paddy/second crop-second crop (see **Table F2.5.2**). Based on income from farming, midstream farmers seemed more successful than upstream and downstream farmers. Higher income of midstream farmers might be contributed by fish cultivation.

Table F2.5.2 General Description of Rice Field

Description	Upstream	Midstream	Downstream	Overall
Average area (ha)	1.175	0.86	0.62	0.88
Cropping pattern	Paddy-paddy	Paddy-fish-paddy	Paddy-paddy/second crop-second crop	
Farm income (Rp)	841,000	1,223,800	1,060,990	1,008,320
Water source	Irrigation	Irrigation	Irrigation	Irrigation
How to get water	Intake, divert	Intake	Intake	Intake
Water availability: -Wet season -Dry season	 -Sufficient -Shortage	 -Sufficient -Shortage	 -Sufficient -Shortage	 -Sufficient -Shortage

In general, farmers respond that during wet season planting water for paddy field is considered sufficient, whereas during dry season planting water for paddy field is considered insufficient. This shortage of water has led farmers in the downstream to cultivate second crops in the second and third season.

2.5.4 Water Use for Fishponds

Fishponds need water flow for fast fish production. Sources of water for the ponds are primary and secondary canals of the Kelingi-Tugumulyo irrigation system which are diverted to the ponds. Few diversions are facilitated with control gates, while some are not. Has the water been used for the fishponds, most of the water is returned back to the canals, only little is drained out to the river or surrounding lowlands.

Development of fishponds, according to respondents (fishpond owners), had been given recommendation from the district government (Office of Water Resource). The recommendation did not indicate explicitly the right to use irrigation water. However by paying some money (up to Rp 3 million per year) for 5-year period to the 'actor' at the government office, the owner felt that he was given right to use the water.

The fishpond owners recognize that irrigation water be used mainly for food crop production. They admit that while operating the business they receive complains from the farmers. The reasons for them are damage of the canal being diverted and water shortage for paddy field.

2.5.5 Farmers' Respond on Water Use for Fishponds

The following table presents farmers' responds on the questions of water use for fishponds. Responding to the question on how fishponds get water, all farmers said that fishponds get water by diverting canal with/without gate. When using gate, water intake can be controlled, otherwise cannot. In contrary to fishpond owners, farmers said that most of the water being used for fishpond is then drained-out to the river or surrounding lowlands. With this situation, more farmers demand that fishponds should not be allowed to use irrigation water. It is suggested that fishpond owners should develop

other canal, take water from other sources or they might use water drained from rice field. Only few farmers allow fishponds to use irrigation water in wet season during high water supply.

Table F2.5.3 Farmers' Responds on Water Use for Fishponds

Questions	Responds
How do fishponds get the water?	Diverting canal with/without gate
What is done to the water after being used for fishponds?	Little returned to the canal, some drained-out to the river or surrounding lowlands
What do you think about using irrigation water for fishpond?	-Not allowed (58.1%) -Allowed by WUA regulation (12.9%) -Decrease water allocation for paddy field (12.9%) -Disadvantage to farmers (16.1%)
How should fishponds get the water?	-Develop other canal (58.1%) -Take from other water sources (9.7%) -Use water drained from rice fields (6.4%) -Use canal water only in wet season (9.7%) -Allocation from canal based on schedule (6.4%) -Other (9.7%)
If fishponds could get water from the canal, what regulation should be applied to them?	-Structures must meet technical specification (22.6%) -No dam, return water to the canal (35.5%) -Pay ISF (19.4%) -Submit schedule, farmers are given priority (22.6%)
What should be their rights?	-Take water for fish cultivation (100%)
What should be their responsibilities?	-Obey WUA's regulation (100%)
What do you request to the government with regard to water allocation between rice field and fishponds?	-Facilitate bipartite meeting (25.8%) -Apply sanction (32.3%) -Develop regulation (38.7%) -Dismiss fishponds (3.2%)

2.5.6 Impacts of Water Use for Fishponds on Rice Field

The following table presents responds of farmers on the impacts of water use for fishponds on the availability of water for rice field, its productivity, and possible existence of c in water use.

Table F2.5.4 Farmers' Responds on the Impacts of Water Use for Fishponds on Rice Field

Impacts	Upstream	Midstream	Downstream	Overall
Water availability before and after fishponds:				
-Different	100.0	100.0	100.0	100.0
-Not different	0.0	0.0	0.0	0.0
Significancy of different water availability:				
-Significant	100.0	100.0	100.0	100.0
-Less significant	0.0	0.0	0.0	0.0
-Not significant	0.0	0.0	0.0	0.0
Significancy of effect of different water availability on rice productivity:				
-Significant	100.0	100.0	100.0	100.0
-Less significant	0.0	0.0	0.0	0.0
-Not significant	0.0	0.0	0.0	0.0
Existence of conflict:				
-Exist	50.0	40.0	54.5	48.4
-Not exist	50.0	60.0	45.5	51.6

With regard to the existence of fishponds, farmers respond that water availability before and after the development of fishponds is significantly different. The effect of fishpond development on water availability has significantly caused the decrease in rice productivity. This negative impact has ended in water use conflicts between rice field and fishpond.

2.5.7 Role of WUA in Irrigation Management

Table F2.5.5 below presents responds of farmers regarding current role of water user association (WUA) in water management. Most farmers agree that WUA has played important role in irrigation management, except gate operation. This role is no longer taken by WUA officials since the establishment of fishponds. Fishpond owners, who are considered "powerful" by farmers, take over gate operation for the benefits of fishponds. Therefore, WUAs is considered less functional eventhough WUAs have performed most of their roles in water management (except gate operation). Despite the fact that there has been regulation in WUA that applies to fishponds, the actions taken by WUA is considered insufficient to solve water use conflicts between fishpond and rice field. Therefore, farmers are unsatisfied with the current actions made by WUAs.

Table F2.5.5 Farmers' Responds on the Role of WUA in Water Management

Item	Responds
WUA's role (%):	
-Cropping pattern planning	100.0
-Water allocation planning	100.0
-Gate operation	0.0
-Canal and structure maintenance	100.0
-ISF collection	100.0
-Financial management	100.0
Evaluation on WUA's function (%):	
-Fully functional	0.0
-Less functional	100.0
-Not functional	0.0
WUA's regulation regarding fishponds (%):	
-Exist	100.0
-Not exist	0.0
WUA's solution on water allocation (%):	
-No and unsuccessful solution	61.3
-Bipartite meeting	6.5
-Proposing gate operation for fishponds	12.9
-Regulation enforcement	3.2
-Initiating agreement	16.1
Satisfaction on WUA's solution (%):	
-Satisfied	6.5
-Not-satisfied	38.7
-No response	54.8

2.6 Development and Conservation in Swamp Area

2.6.1 Roles of Swamp Area

Swamp areas provide many ecological and hydrological functions to human beings. Among them, the most important ones are the roles of water supply, water purification and flood control. Swamp areas play a significant role for the river basin water management as a link of the total ecosystem. They also play many other important socio-economic roles including provision of habitat for fisheries and forestry resources and are critical for the conservation of biological diversity.

Rapid and unsustainable development of swamp areas disturbs natural hydrological cycles. Such disturbance in turn brings about flooding, drought and pollution in more frequent and severer manner in many cases. Deterioration and loss of swamp area s and their biodiversity cause huge economic and social costs to human beings. Therefore, appropriate protection and water allocation to swamp area is critical to enable these ecosystems to survive and continue to play important roles.

2.6.2 Development Projects of Swamp Area

Swamp lands are poorly drained water-logged areas which are inundated regularly for prolonged periods. Reclamation of swamp lands brings about many changes in the

environment, some of which may be irreversible. Therefore, a gradual and cautious development of the water management infrastructure is required. Base on this requirement, development of tidal swamplands is divided into three stages called stage-wise development

First stage development

The first stage of swamp development is based on the following objectives:

(1) Develop new areas in the outer islands to promote equity in development.

(2) Expand agricultural production areas to support national food self-sufficiency.

(3) Create job opportunities for transmigrant settlers.

(4) Stimulate regional development through the establishment of new production centers.

(5) Strengthen national security through economic development of border areas.

The first stage swamp development employs a low-cost, low-technology approach, providing minimum infrastructures, e.g. uncontrolled (open) drainage system, partial land clearing, flood protection, construction of simple houses and unsurfaced rural roads. Due to soil conditions and salinity intrusion, limited control structures may be provided. Besides, only basic supporting services in agricultural extension, health care, and education are provided to the transmigrants. As a matter of fact, no consideration had been made for the conservation of swamp areas since nobody became aware of importance of the function in basin management.

The cropping pattern introduced is based on wetland (rainfed) rice cultivation in the rainy season, followed by a dry land food crops (palawija) in the dry season. Each household is allocated a land area of 2.25 ha, consisting of a 0.25 ha house lot, a 1.0 ha first holding to be cultivated for food crops, and a 1.0 ha second holding to be cultivated for cash crops. It was assumed that the families will produce sufficient food in the initial years on the first holding, and they would gradually generate income by developing the second holding for cash crops.

Second stage development

The objective of the second stage is to promote intensive cultivation of the 2.25 ha with farming systems and cropping patterns tuned to the potentials of the land. This stage includes upgrading and improvement of water management system (hydraulic infrastructure and its operation and maintenance), as well as providing additional services, e.g. marketing, transportation and communications, and sanitation.

The measures to be taken during the second stage are:

(1) Improvement of water management infrastructure and its operation and maintenance (O&M).

(2) Crop diversification through introduction of cash crops.

(3) Establishment and empowerment of farmers' organizations, water users' associations, village co-operatives, improvement of education, sanitation, and health care facilities.

(4) Improvement of agricultural services, e.g. extension, seed production, plant pest and disease control, storage, processing and marketing facilities.

(5) Improvement of accessibility and communication through construction of roads, jetties, bridges, and navigation facilities.

On the other hand, consideration on ecological role of the swamp areas is still unsatisfactory. Little attention is paid for the mitigation against the negative impacts on ecology

Future stage development

Future stage of swampland development should consider further improvement of accessibility and communications, investigation and development of water supply and irrigation in addition to the existing drainage system (e.g. low-lift pumping), and provision of a basin-wide water management plan aimed mainly at preventing an increase of salinity intrusion.

Projects with Foreign Assistance

Foreign financial assistance is offered from the World Bank, ADB, JBIC, IFAD, and EU. The World Bank loan includes:

(1) Karang Agung I: Master plan and feasibility study of 20,000 ha, detailed design of 9,000 ha. Its components are construction, monitoring and evaluation of agricultural development.

(2) Karang Agung II: Feasibility study of 30,000 ha, detailed design of 9,000 ha. Its components are construction, monitoring and evaluation of agricultural development.

(3) Special maintenance and efficient O&M

ADB loan is offered for the Telan Saleh Integrated Irrigation Sector Project with 60,000 ha and JBIC loan for the Pulau Rimau and Air Sugihan South Sumatra Swamp Improvement Project (SSSIP).

2.6.3 Requirements for the Sustainability of Development Projects

The sustainability of the development projects requires the following conditions:

- Government commitment to integrate lowland development as a center for driving force,
- Inter-agency coordination in lowland management. The responsibility is integrated among related agencies, and
- Community involvement in project planning and implementation.

If these requirements were not fulfilled, the outcomes would be successful only partially due to obstacles such as unrealistic targets, poor site selections and top-down approaches. In order to avoid such failures, development of swamp areas should be reviewed from multi-disciplinary viewpoints including environmental conservation.

2.6.4 Guidelines for Integrating Wetland Conservation and Wise Use into River Basin Management

The 7th Meeting of the Conference of the Contract Parties to the Convention on Wetlands (Ramsar, Iran, 1971) was held in 1999 at San José, Costa Rica, where the contracting parties adopted Guidelines for Integrating Wetland Conservation and Wise Use into River Basin Management (Resolution VII.18). This guideline aims to integrate wetlands river basin management and is considered to be very useful for the Study with comprehensive management. The Annex of the Guidelines presents detailed actions.

2.7 Komering Irrigation Project and Its Social Impacts

2.7.1 Outline of Komering Irrigation Project

The Komering Irrigation Project area is located at the middle part of Komering River basin and in the boundary zone between South Sumatra Province and Lampung Province. This project aims to provide farmlands with adequate irrigation and darainage facilities for the year-round irrigation water supply. The project plan consists of three stages as follows:

Table F2.7.1 Outline of Komering Irrigation Project

Stage	Irrigated Area	Main Constructions	Note
Stage 1	20,968 ha	Perjaya Headworks, Main Canal, Secondary Canal, Ranau Regulation Dam Distribution System in Belitang Area	Finished in 1995
Stage 2 Phase 1	25,589 ha	Secondary Canal, Distribution System, Land Development	Finished in 2001
Phase 2	16,501 ha		-
Stage 3	57,600 ha	Secondary Canal, Distribution System, Dams	-

Source: Komering Irrigation Project Office

The implementation of the project started in 1991 and has already finished up to the Sage 2 Phase 1 with JBIC loan programs. The total irrigation area amounts to 46,557 ha, or 38.6% of the total planned area.

The water source of the project is the Komering River at the Perjaya Headworks site. The River originates in the Saka River and the Selabung River, which in turn originates from Lake Ranau.

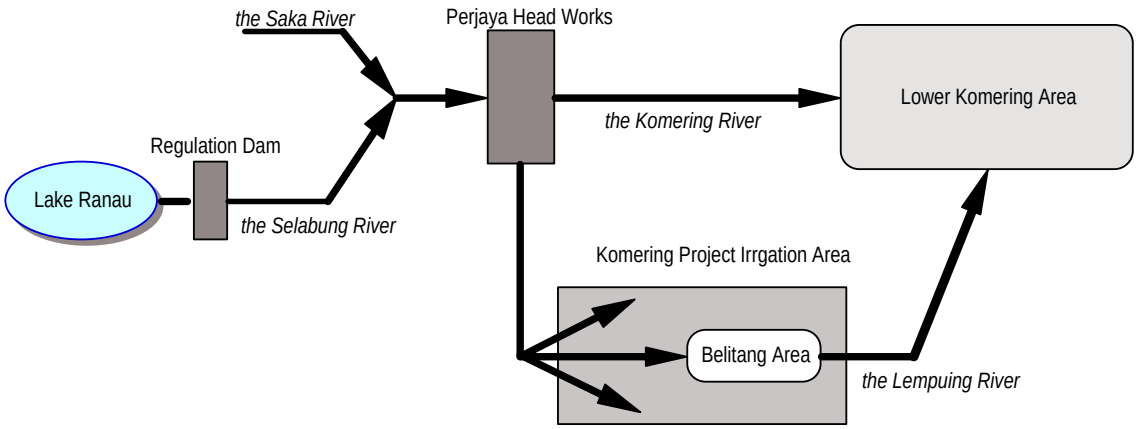

Figure F2.7.1 Irrigation Scheme of Komering Project

2.7.2 Survey on Water Level of the Lake Ranau and the Regulation Dam

(1) Increase in Water Level of Lake Ranau

The Ranau Regulation Dam was constructed for supplying necessary water to the Komering Irrigation Project area because it was considered that the water is not supplied enough to the project area without the dam of the Lake Ranau.

Presently, the Ranau Regulation Dam is being operated with the "Tentative HWL" of 541.7 m (Effective Depth: 1.2 m) instead with "Planned HWL" of 542.5 m (Effective Depth: 2 m) in order to avoid submersion of areas in the lakefront, which are especially lower than the others.

It is planned that irrigation area will be expanded by 16,501 ha in the Stage 2 Phase 2 of the project. The plan includes the construction of dykes to protect the lower places when the regulation dam is fully operated with the "Planned HWL" of 542.5 m (Effective Depth: 2 m). The total length of the dykes reaches 200 to 500 m in the implementation plan.

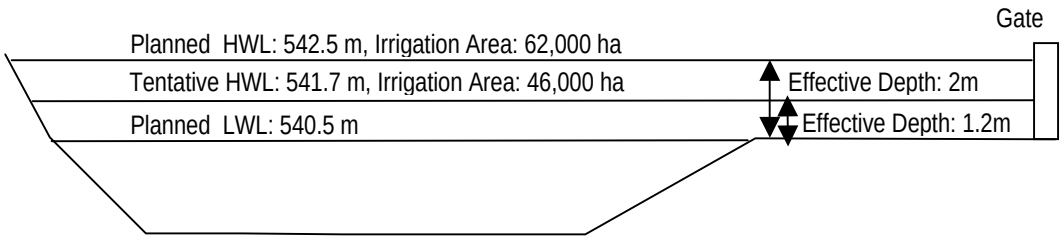

Figure F2.7.2 Water Level of the Lake Ranau

(2) Survey Design

The survey was designed as follows:

Objectives	1. To identify present social and environmental impacts of water level in Lake Ranau and possible impacts if water level be increased. 2. To collect information on perception, opinion and proposed actions from the potentially infected people
Methods	1. Questionnaire survey with semi-structured interviews and indepth interviews. 2. Group discussion for triangulation of information and for formulation of proposed action 3. Documentation of photos
Duration	February 4-9, 2003.
Expected Outputs	1. Historical aspects of the incidence of floods. 2. Social and environmental impacts of water level increase. 3. Perception on the impacts. 4 Opinion regarding impact mitigation
Expected Respondents	1. Households living in the near side of Lake Ranau whose activities rely on or whose living conditions are affected by the lake 2. Formal and informal leaders from the area

(2) Respondents and Interview Points

A total of 31 respondents are enumerated in this survey, of which 11 respondents are from Village Kota Batu, 10 respondents from Village Bandar Agung, and the 11 respondents are from Village Pilla. The average age of respondents is 45.9 year, ranging from 30 year to 65 year. All of the respondents are Moslem and most of them (80.6 percent) are Ranau people, who have been living in these villages for most of their ages. About one-third of the respondents are high school graduates. The main occupation of the respondents is farming. Most of them cultivate paddy and some are coffee planters.

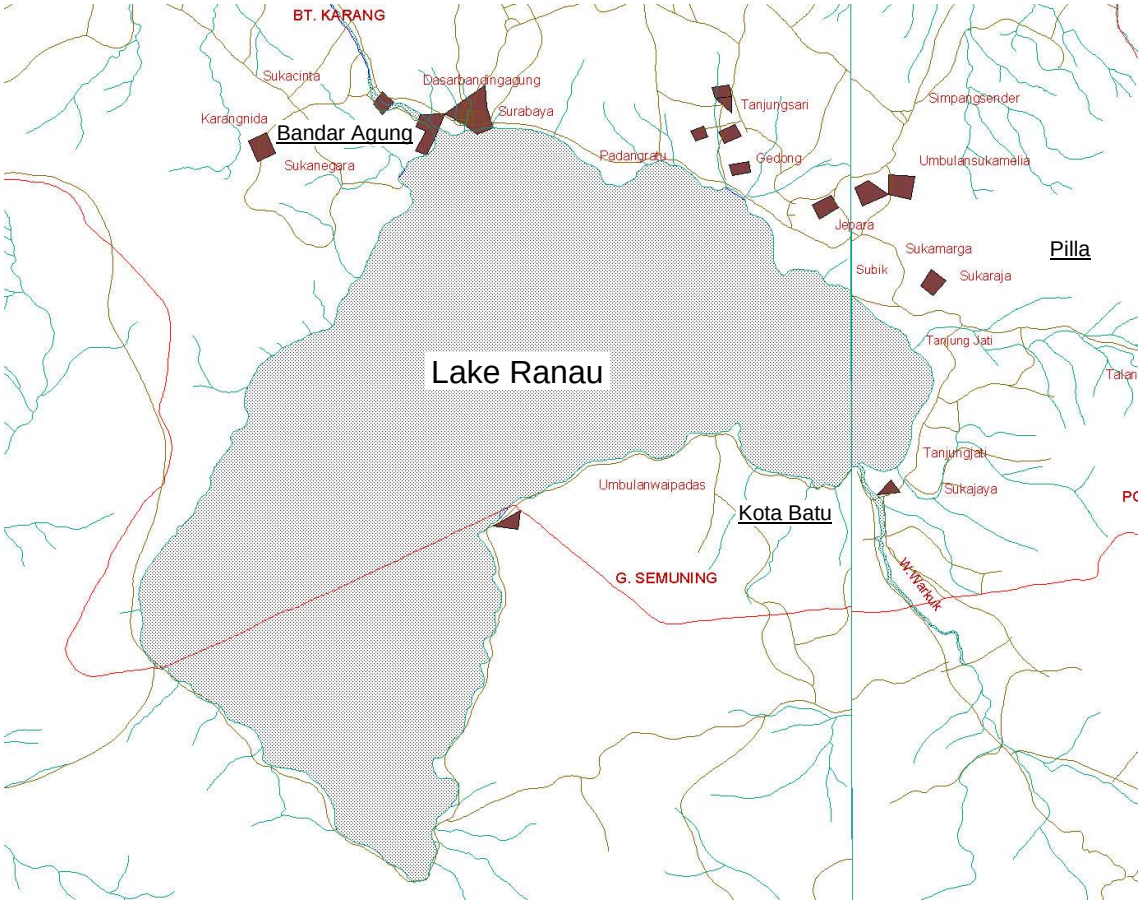

Figure F2.7.3 Survey Points (Underlined Villages)

(3) History of Flood

Most of the respondents (93.5 percent) have ever experienced flood during their lives at current address. More than a half experienced flood twice or more. The first flood experience varied from 1995 to 1998, except in 1997. Before 1995 (the construction of the Ranau Regulation Dam), they had never experienced any flood incidence, while in 1997 nobody experienced flood due to the lengthened dry season. Of all respondents, 10 respondents experienced last flood in 2002.

The impacts of flood as reported by the respondents were the inundation of paddy fields and houses. Respondents whose paddy field inundated, reported that water level on paddy field was 0.3 to 0.5 meter. Whilst, houses were inundated up to 1 meter above the floor.

Table F2.7.2 Summary of Flood Incidences

No	Description	Number of samples	Percentage
1.	Ever experience flood		
	Never	2	6.5
	Ever	29	93.5
2.	Flood frequency (29 respondents)		
	Experience once	16	55.2
	Experience twice or more	13	44.8
3.	First flood experience (29 respondents)		
	In 1995	4	13.8
	In 1996	23	79.3
	In 1997	0	0.0
	In 1998	2	6.9
	In 1999	0	0.0
	In 2000	0	0.0
	In 2001	0	0.0
	In 2002	0	0.0
4.	Last flood incidence (14 respondents)		
	In 1999	0	0.0
	In 2000	4	28.6
	In 2001	0	0.0
	In 2002	10	71.4
5.	Impacts of flood		
	No impact/no flood	2	6.5
	Paddy field inundated (0.3 - 0.5 m)	23	74.2
	House flooded (0.3 - 0.5 m)	3	9.7
	House inundated (0.5 - 1.0 m)	3	9.7
6.	How people adapt to flooding		
	No effort	13	41.9
	Using boat for paddy harvesting	9	29.0
	Using bamboo to cross over the flood	1	3.2
	Leave the paddy field flooded	8	25.8
7.	Causes of flood		
	No response/no flood	2	6.5
	Activities by the Komering Irrigation Project	29	93.5
8.	Other causes of flood		
	No response/no flood	2	6.5
	No other causes	28	90.3
	Rainy season	1	3.2

(4) Expected Impacts of Increase in Water Level

All the respondents reported that their paddy fields would be inundated if the water level increased above the current level. More than 60 percent of respondents mentioned that their houses would be inundated, while those who lived in Village Pilla which located at the higher part reported that their house and the roads in their village are safe from the flood.

Most of the respondents estimated that water level above the village would be below 0.3 m, the duration of road inundation would be 3 weeks or less, and the location of village road inundation would be mostly at Pantai Lama and Pantai Baru (Village Kota Batu) and lake front at Village Bandar Agung. Most of the house inundation is estimated to happen in Village Kota Batu since housing in this village mostly located at the lower part of the village, whereas in Village Bandar Agung the lake front area is used for the economic activities (market, jetty). In Village Pilla, lower area is used mostly for paddy field, whereas housing is located at the higher part of the village. Water level above the floor is estimated to be about 0.3 - 0.5 meter. Paddy field inundation is estimated to happen mostly in Village Kota Batu (22.5 ha) which belongs to about 50 families. Whereas, inundation of paddy fields in Village Pilla and Village Bandar Agung is estimated to be much lower.

(5) Perception and Opinion of Respondents on Flood Incidence

Perceiving the flood caused by the increase of water level in the lake, most of the respondents put improper gate operation at the Ranau Regulation Dam as the main cause. In order to prevent from flooding, they propose that gates be kept open to maintain water level on the lake at the safe level.

When flood happens, most of the respondents say no action they can make. However, all of them indicate that government and the Komering Irrigation Project be responsible to overcome the impacts of flooding by providing compensation for the impacted people. They also indicate that both government and the Komering Irrigation Project are responsible to prevent from flooding.

(6) Recommendation from the Results of the Survey

- Dykes which are being planned should be constructed as soon as possible to protect lower places.
- The instruction or manual of gate operation should be reviewed for the appropriate function of the dam at the time of flood incidence.
- The Komering Irrigation project office should conduct a survey on the damage caused by the past floods which took place after the construction of the Regulation Dam in order to examine the relationship between the dam construction and the floods.

2.7.3 Water Balance Study on Komering Irrigation Project

The water balance study was carried out in 1994 by the Komering Irrigation Project Office in order to confirm the project scale, taking the situation changes in the lower Komering basin as well as in river runoff into consideration because the riparian people living in the downstream reach of the Randau diversion point at Sekabumi Village suffer from water shortage, especially for their domestic water.

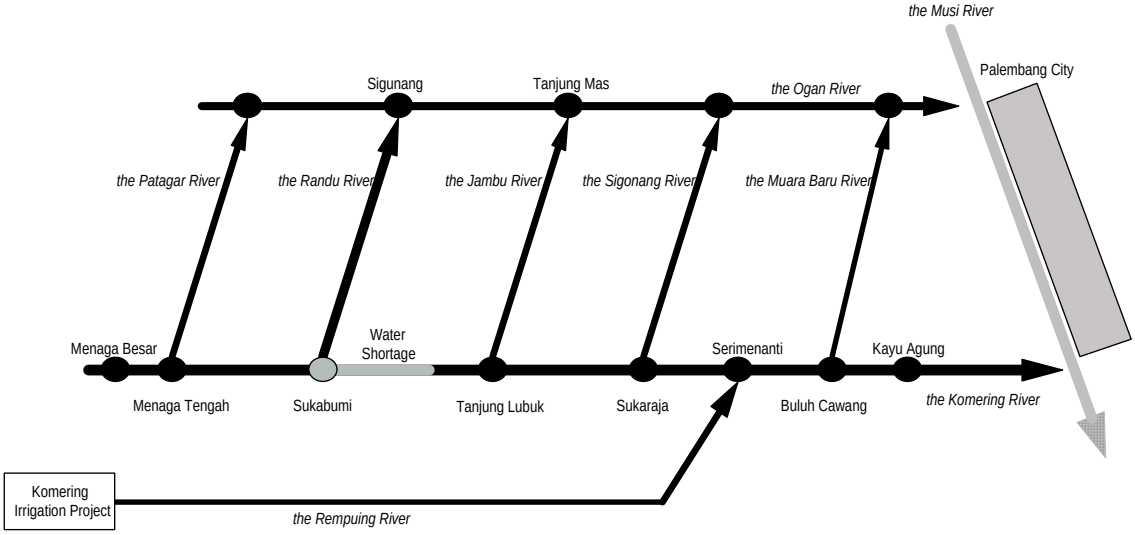

Figure F2.7.4 Water Shortage at the Lower Komering River Basin

The existing (as of 1994) and potential downstream water demands for irrigation, domestic water, fish culture, natural environmental and son was estimated with assumptions by the Project Office. The estimated water demand is 19 m^3/sec for existing demand and 35 m^3/sec for future potential demands.

The minimum water release at the Headworks was determined at 35 m^3/sec for the downstream area as the river maintenance flow. When the runoff discharge becomes less than 35 m^3/sec from the upstream reach of the Headworks, the Project stops water intake from the Komering River. The gate of the Ranau Regulation Dam is operated in accordance with water demands at the Perjaya Headworks.

Table F2.7.3 Low Water Allocation Plan

Allocation	Discharge (35 m^3/sec)
1. Irrigation	19.6
2. Domestic Water	3.5
3. Fish Culture	3.0
4. Environmental Improvement	8.4
5. Other Miscellaneous	0.5
Total	35.0

Source: Komering Irrigation Project Office, *Water Balance Study on Komering Irrigation Project, September 1994*

2.7.4 Survey on Water Flow Shortage in the Middle Area of the Komering River and Its Social Impacts

(1) Survey Design

The survey was designed as follows:

Objectives	1. To investigate the incidence of river water flow shortage in several villages in the lower Komering River basin. 2. To confirm the issue raised in Pre-PCMs
Methods	1. Questionnaire survey with structured interviews and indepth interviews. 2. Documentation of photographs and village potencies.
Duration	October 19-21, 2002.
Expected Outputs	1. History of water level changes. 2. Incidence of river water flow shortage in the last year (records of frequency, duration, affected people, etc). 3. Impacts of river water flow shortage. 4. Solution made and proposed.

(2) Survey Points and Interviewees

The survey was carried out at four villages that sandwich the Randau diversion point along the Komering River, namely, Menaga Besar, Campang Tiga Ulu, Gunung Batu and and Tanjung Lubuk. Then numbers of interviewees are 5, 4, 4, and 3 respectively.

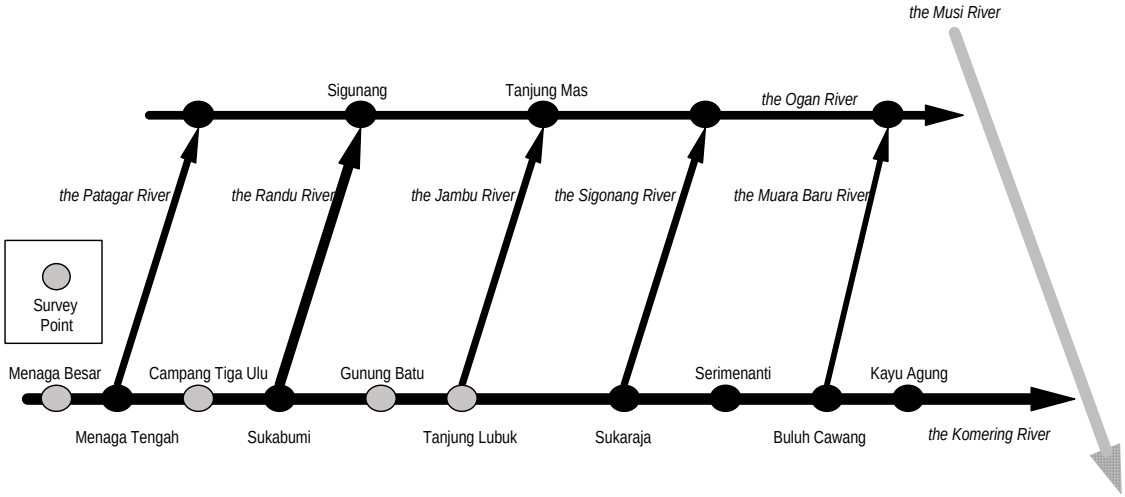

Figure F2.7.5 Survey Points

(3) Water Shortage Situations

The survey was conducted in the end of dry season. Water shortage is being brought about not only in the lower reaches but also in the upper reaches of the Randau diversion point. The river depth is very shallow or no water can be seen in the river channel. In Gunung Batu, the riverbed is dredged in order to make a river water flow. See the Photos below.

Photo F2.7.1 Menaga Besar

Photo F2.7.2 Campang Tiga Ulu

Photo F2.7.3 Gunung Batu

Photo F2.7.4 Tanjung Lubuk

(4) Daily Water Use

Most of the residents depend on rivers for the water source of their daily lives including drinking, washing, bathing and toilet. The percentage of "Rivers" dramatically reduced in dry season especially for drinking, which is contrasted sharply to the results of the questionnaire survey of the whole river basin. See **2.2.2 Water Quality (2) Drinking Water**.

Table F2.7.4 Daily Water Use

Source	Wet season (%)				Dry season (%)			
	Drink	Wash	Bath	Toilet	Drink	Wash	Bath	Toilet
Rivers	75.00	81.25	93.75	87.5	18.95	68.75	56.25	75.00
Canals	–	–	–	–	–	–	–	–
Dams	–	–	–	–	–	–	–	–
Wells	93.75	100.00	100.00	50.00	100.00	93.75	87.50	50.00
Rain water	–	–	–	–	–	–	–	–
Connected pipes	18.75	–	–	–	18.75	–	–	–
Public taps	–	–	–	–	–	–	–	–

(5) History of the Komering River Flow Shortage

During the 70s, flood-drought yearly cycle of the Komering River can be summarized as follows:

(a) January-February at peak of rainy season: flood, village roads were inundated for about 2 months.

(b) March-April at the transition from rainy to dry season: water level decreased.

(c) May-October during the dry season: water level at the Komering River decreased to a minimum of 10 cm, but never been dried-out.

(d) October-December at the beginning of rainy season: water level at the Komering River returned to normal.

Between 70s and 90s, drought at the Komering River happened only during the dry season. However in certain places of the river body, the water level was still 0.4-0.5 meter except in 1997 when dry season lengthened and the Komering River dried-out.

Residents adapted to the water shortage by digging wells at the Komering River channel. The depth of the wells was 0.5-1.0 meter.

The cause of drought was riverbed siltation due to sedimentation at the river channel. The respondents think that this situation has been worsened since the operation of the Perjaya Headworks.

(6) Incidence of the Komering River Flow Shortage in 2001

In 2001, the incidence of drought happened in the period of June to December. But severe effects of drought were experienced by the residents in the period of July to September. During this 3-month period, the Komering River channel passing the villages surveyed was almost completely dried. In some places at the river body, water was only 5 cm high. In addition, wells developed near the houses were no longer sufficient to meet daily water need of the households.

The residents have to build wells at the (mid of) river channel. This severe effect was experienced by almost all of the people in these villages since most of daily water needs were fulfilled by the Komering River.

As mentioned above, the respondents think that the effects of water shortage after the operation of the Perjaya Headworks were considerably severer than before. In 2001, this situation is worsened by the lengthened dry season.

(7) Impacts of the Komering River Flow Shortage

Water shortage in the Komering River has caused negative impacts to almost all the people in the survey areas. The severe effects were experienced by the people living in the upper part of these villages,.especcially in Menanga Sari Sub-village (Dusun) where 20% of Menanga Besar Village inhabitants lived in this sub-village. Each well in these villages only produced 3 buckets of water every day. In addition, soil in the fields and house lots were dried-out and broken which led to unsatisfied harvest of food crops and fruit trees.

Negative impacts of water shortage as reported by the people can be summarized as follows:

(a) Paddy and fruit harvest were drastically decreased. In 2001, productivity of paddy (local variety, planted during the period of April to October) was only 0.15 ton husked paddy per hectare, compared to usual productivity of 4 ton per hectare. The average loss of production was 50 percent.

(b) Local people can no longer catch fish in the Komering River for their household consumption and for their additional income.

(c) Prevalence of diseases increased, especially diarrhea.

(d) Household expenditure increased, e.g. to build wells at the house lot.

The cost of water shortage can summarized below:

(a) The decrease in income from paddy exceeds 75%.

(b) The decrease in income from fish catch exceeds 90% (from the average of 10 kg of fish to only 0.5 kg of fish daily).

(c) The increase of family expenditure for health service (Rp. 10,000 for transportation cost for every visit, service is free).

(d) The increase of family expenditure for digging well.

No positive impacts were reported as the effects of water shortage in the Komering River.

Since the insidence of water shortage, some households got (clean) water from the wells developed in the house lots, some still took water from wells in the Komering river.

Photo F2.7.5 Well Dug at the Mid of the Dried River Bed (Campang Tiga Ulu)

(8) Solution Made by the Residents

Measures taken by the people to intervene the causes of water shortage up to now are nil.

Measures taken by the people to mitigate the negative impacts of water shortage are:

(a) To build wells at the house lots. Each 4-5 meter well costs Rp. 1 million, while100 meter wells cost Rp. 4 million.

(b) To dig wells at the river channel.

People who has a well at the house lots expressed little satisfaction with this solution, while those who built a well in the river channel felt unsatisfied.

(9) Solution Proposed by the Residents

Solution proposed to the government with regard to the causes of water shortage are nil.

Solution proposed to the government to mitigate the direct impacts of water shortage as of 2001 are:

(a) Development of public tap was proposed to the Bupati, but no response nor implementation was made so far. Financial value of this proposal as of 2001 was Rp. 40 million, but this year the value may double.

(b) Development of connected pipe was proposed to PDAM (drinking water company), but neither response nor implementation was made so far. No financial value stated in this proposal.

Overall activities needed to recover the effects of water shortage in this area (dredging of river channel, development of public taps, reboisation at the upper Komering areas, and development of other facilities e.g. health centers), according to the respondents, will cost billion of Rupiahs (no value specified).

With regard to irrigation development proposed in this area, people are ready to participate by surrendering their land for canal development at reasonable compensation.

2.7.5 Difference of Benefits between Local People and Transmigrants in Irrigation Projects and Social Impacts

(1) Survey Design

The survey was designed as follows:

Objectives	1. To assess social impacts of irrigation development on local people. 2. To investigate (potential) conflicts between transmigrants and local people with regard to the irrigation development.
Methods	1. Questionnaire survey with structured interviews and indepth interviews to local people.
Duration	October 24-26, 2002.
Expected Outputs	1. Positive and negative impacts of irrigation development on local people. 2. Social interaction between transmigrants and local people. 3. Conflicts between transmigrants and local people with regard to the irrigation development.

(2) Survey Points and Interviewees

The Belitang Area is selected for the target area of the Survey because this area is already established and people have enough knowledge about it. The survey was carried out for the same interviewees of the Water Shortage Survey, namely, five at Menaga Besar, four at Campang Tiga Ulu, four at Gunung Batu and three at Tanjung Lubuk.

(3) Impacts of the Irrigation Development on Local People

Positive Impacts

Positive impacts of the irrigation development as reported by respondents are as follows:

(a) *Public transportation services and facilities increase*. To reach Belitang from Palembang, public buses pass through Komering road such that local people gain benefits from public bus service. In addition, local people have also owned and managed public transportation in service to Belitang.

(b) *Trade activities increase*. This also involves local people who sell products in several local markets in Belitang.

(c) *Information accessibility increase*.

(d) *Direct benefits from sand and stone trading*.

Negative Impacts

Negative impacts of the Belitang irrigation development as reported by respondents are:

(a) *Household income decrease* due to the decrease in production of food crops, tree/fruit crops, and fish as a result of water shortage in the Komering River presumably caused by the development of Belitang irrigation schemes.

A note for the water shortage. If there happened no severe water shortage in the Komering River, the income difference in paddy would be 2.8 million Rp./family/year in Swamp area, 4.5 million Rp./family/year in Highland, and 6-10 million Rp./family/year for Transmigrants with irrigation, according to another survey conducted by Sriwidjaya University. It is reported that the average loss of production was 50 percent due to the severe water shortage. See **2.7.4 Survey on Water Flow Shortage in the Middle Area of the Komering River and Its Social Impacts**.

(b) *Psychologically, local people feel to be subordinate* to people in Belitang since development activities (especially agriculture) have been focused more to Belitang than to local villages.

(c) *Number of people in productive ages staying in local villages decreased* since many of them outmigrated for non-agricultural employment.

(d) *Water transportation disturbed/disappeared* due to limited water on river body.

Up to now, there have not been any efforts made by the government to mitigate these negative impacts, except dredging of river channel in Gunung Batu Village for 8 km long (FY 2002). Under theses sever conditions, local people were in search for non-agricultural employment for additional household income, e.g. *ojek* (motor-cycle transportation provider), trader (fabrics and clothes), etc.

(4) Social Interaction between Transmigrants and Local People

(Note: the term "transmigrant" may no longer be convenient to people living in Belitang since current cohorts were born in Belitang, eventhough their first generation came from Java through transmigration or colonialization in the Dutch term.)

Social interaction is a dynamic social relationship between individuals, groups, or between individuals and groups through social contacts and communication. Social interaction may exist in the following forms: cooperation, competition, and conflicts.

It is recognized by respondents that local people have interacted with people of Belitang for quite a long time. The forms of interactions as reported by respondents are trade relationships, out-migration of Belitang people to local villages and vice versa, marriages, information exchanges (mainly in agriculture), etc. These interactions can in general be classified as cooperation since they may give advantageous to both sides much more than disadvantageous. In Menanga Sari Sub-villabe of Menanga Besar Village, 20 percent of its inhabitants are people from Belitang (originally Javanese).

(5) Conflicts between Transmigrants and Local People

Conflicts are part of social interactions. Conflicts between transmigrants and local people have never been reported to exist, even though interactions between the two groups have been existed for quite long.

(6) Local People's Opinions and Expectations

Until now, only people living in irrigated areas gain direct benefits from the development of the Belitang irrigation schemes. On the other hand, most local people do not except those who have outmigrated to Belitang areas. Local people's perception regarding the Belitang irrigation development is reportedly positive since this development has increased the cropping intensity to 200-300 percent. With this development, the price of rice is considerably low and stabilized, and the supply is reportedly sufficient. However, as local people perceived that water shortage in the Komering River worsened since the development of the Belitang irrigation schemes, they felt somewhat unsatisfied with this condition.

Therefore, local people expect that in the near future government will:

(a) Support water allocation and distribution to local people as manifestation of water right; and

(b) Develop irrigation schemes in local villages for the welfare of local people through agricultural development.

3. PUBLIC CONSULTATION MEETINGS

3.1 Introduction

In addition to the issues and requirement identified by the Study Team through field reconnaissance, interview survey, review of existing reports, discussion with relevant government personnel, etc., the Study Team conducted public consultation meetings to confirm the issues and to obtain people's voice.

According to the "Guidelines for PCP" developed in North Sulawesi Water Resources Institutional Development Project (P3SU), November 1999, objectives of Public Consultation Meeting (PCM) can be counted as follows:

- To start a mechanism (bottom-up top-down) and its institutionalisation for local communities to participate in the development of their region
- To give a chance to beneficiaries to share ideas/opinions and influence decisions
- To provide beneficiaries with a voice in the planning and development process, develop ownership and for decision makers to earn trust and establish credibility
- To obtain local information on issues, concerns and possible solutions
- To create an opportunity to review potential social conflicts, impacts of proposals and increase project effectiveness in achieving objectives
- To promote inter-institutional and sectoral coordination and communication at community, decision makers and technical services level

The "Guidelines" ends up the counting of objectives with the lessons learned that projects where there has been active participation by beneficiaries have been more successful than projects without participations.

The "Guidelines" also shows the benefits of PCM as follows:

- The sense of ownership which public consultation established within communities will encourage them to operate and maintain facilities and systems with care and respect.
- The PCM process also promotes the development of democracy, accountability and transparency that are known to be important elements of sustainability.
- It also encourages the inclusion of environmental considerations.
- Through PCM, social concerns and conflicts are brought to light.
- The concerns and needs of women can also be heard through PCM.

Thus, PCM will reduce costs and ensure sustainability of projects. Projects that fail to consider all natural and social environmental aspects would enlarge the costs of environmental disturbances.

Concerning the Study, which is in the begging of planning stage in a project cycle, the significant objectives of PCM should be to obtain local information and triangulation on issues and concerns. As a result, the benefit is that the data and information obtained through field work by the Study Team members can be confirmed or cross-checked in the discussion with local people.

3.2 Public Consultation Meetings in the Process of the Study

PCMs were originally planned in the Inception Report for two times, namely, at the end of the first fieldwork and also at the end of the second field work. In the Steering Committee Meeting on the Inception Report, it was agreed that Pre-PCMs would be held in the course of the field reconnaissance at three places which represent a lower, middle and upper area of Musi River Basin respectively.

Major objectives of each PCM are as follows:

- Pre-PCM: Collection of opinions on water management, and collection of basic information for the identification of environmental issues in the Musi River Basin in the early stage of the Study.
- PCM (1): Clarification of issues on the results of identification concerning formulation of the Comprehensive Water Management Plan for Musi River Basin in the stage of compiling the Progress Report.
- PCM (2): Explanation of the Musi River Basin Water Management Plan to the local inhabitants, stakeholders, etc., and building a consensus on project implementation.

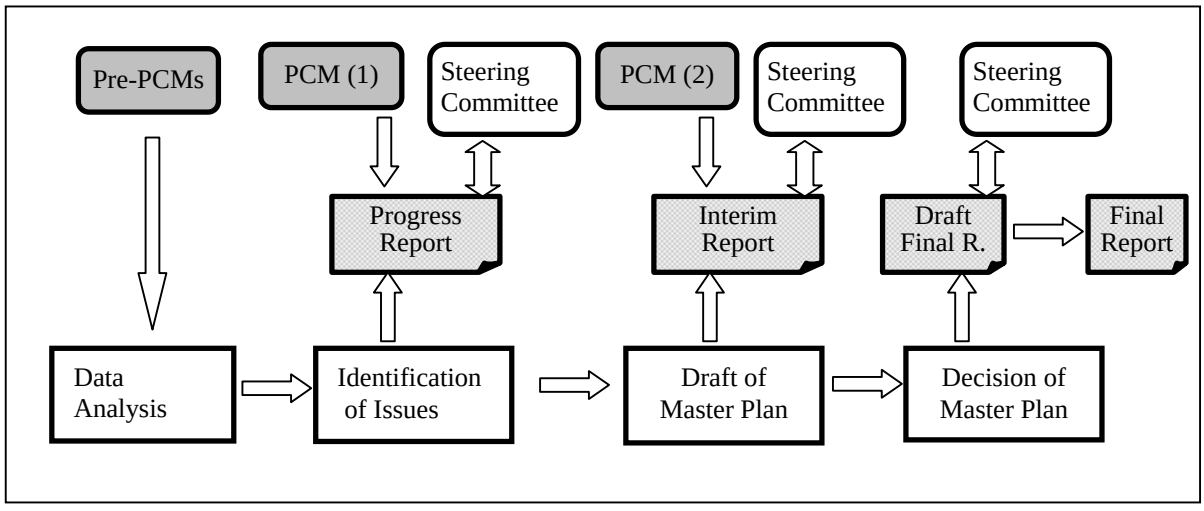

Figure F3.2.1 Public Consultation Meetings in the Process of the Study

3.3 Pre-PCMs

3.3.1 Outlines of Pre-PCMs

Pre-PCM was held for three times in September in the course of the field reconnaissance. Outline of each Pre-PCM is shown below:

Table F3.3.1 Outlines of Pre-PCMs

	Lower Area	Middle Area	Upper Area
Date	September 16, 2002	September 20, 2002	September 18, 2002
Place	Sekayu	Muaraenim	Lubuklinggau
Related Districts/Municipality	Palembang, Banyuasin, Musibanyuasin (MUBA), Ogan Komering Ilir (OKI)	Muaraenim, Perabumulih, Ogan Komering Ulu (OKU)	Musirawas (MURA), Lubuklinggau, Lahat, Pagaralam
Invited Persons	- Representatives of social groups - Local government officials of related services		
Number of Attendants	42 (See **Annex F3.3.1** for the List of Attendants)	33 (See **Annex F3.3.2** for the List of Attendants)	48 (See **Annex F3.3.3** for the List of Attendants)

The preparation for the Pre-PCMs including making the Invitation List and listing-up examples of main issues which are to be consulted was done by a discussion in a joint meeting of the Coordinating/Supervising Team and the Counterpart Team with the JICA Study Team. Invitation letters were sent through related Regions/Districts. Staffs of the Provincial Department of Water Resources visited related Regions/Districts for explaining significance and objectives of the Pre-PCM in advance.

3.3.2 Main Results of Pre-PCMs

The Pre-PCM consists of two parts, namely, group discussions of respective regions/districts and a general discussion of all the participants. Lots of issues were presented by the participants in group discussions. Such issues were presented and a Q&A session was held in a general discussion.

Results of the three Pre-PCMs can be summarized in the following manner.

(1) Issues presented by the participants are related each other even if those issues are belong to different sectors. For example, sedimentation not only affects floods conditions but also water usage. Therefore, problems should be solved comprehensively.

(2) Effects are often also causes of other problems. The number of problems will increase in the manner of chain reaction as time elapses. Thus, problems should be solved timely.

(3) There can be found some common issues in the three Pre-PCMs, namely, water shortage (for drinking and irrigation), sedimentation and water quality deterioration. So, local governments can cooperate each other for treating those issues efficiently.

(4) Capacity building problems concerning planning sections of local governments and WUAs were also presented. Capacity building matters should be considered significantly on formulating the Master Plan

Issues discussed in Pre-PCMs are shown in detail in **Tables F3.3.2 - 3.3.4**.

Table F3.3.2 Main Results of Pre-PCM in Lower Area

Group Discussions	
Sector	Discussed Issues
Planning	• Land use plans are difficult to be implemented and infrastructure development is too slow. (Palembang) • Spatial planning has not yet been established due to limited data on land use and land suitability from past and present studies. (Banyuasin)
Water Usage	• Drinking water supply covers only 40% of the total households due to poor distribution system. (Palembang) • Agricultural water shortage during dry season, and flood during wet season. (Palembang) • Due to the riverbank construction, the river width has contracted from 22 m to 14 m and water has accumulated into one river system. (Palembang) • Business chance of water tourism is limited due to limited tourism events on Musi river. (Palembang) • Ogan Keramasan irrigation infrastructure failed to provide water for paddy field. (OKI) • Drinking water supply is not enough and its quality has decreased due to contamination. Therefore, there are no good opportunities for tourism. (Banyuasin) • Water navigation is difficult especially in dry season due to sedimentation. (MUBA)
Flood Control	• Past floods caused damage of public facilities including river banks, retaining walls, roads and also diseases. (Palembang) • Drinking water pipes which run across river channels inhibit the river flow. (Palembang) • Sedimentation and erosion at Ogan river causes inundation during heavy rains. (OKI)

	• There are problems in river/canal banks and drainage. (Banyuasin) • Flooding and inundation occur due to the sedimentation in river channel. (MUBA)
Natural Environment	• Domestic and industrial waste accumulated in drainage canals turns water color black, smells and diminishes local fish. (Palembang) • Due to sedimentation in rivers, large vessels are inhibited to move, and rivers are no more used for transportation especially in small rivers. In addition, water flora and fauna have decreased. (Palembang) • Sedimentation at Komering River causes lack of water in dry season, flood in downstream area, water transportation disturbance, and increase in diarrhoea and fish mortality in aquaculture. (OKI) • Water contamination varies with the distance to source of contamination. (Banyuasin)
Social Environment	• Women's role for efficient water use is limited due to lack of awareness and education. (Palembang) • There are conflicts between transmigrants vs. natives, and local fishermen vs. incoming ones. (Banyuasin) • Drinking water supply is not enough due to lack of processing and distribution facilities. Capacity of water tanks in swamp area is limited for domestic use during dry season. (Banyuasin)
General Discussion	
• Similar problems have been identified in the four locations: flood and sedimentation. (Province) • Water transportation should be revitalized. (MUBA, Banyuasin) • Water contamination due to domestic waste should be reduced. (Palembang) • In the lower Komering areas, inundation period tends to be longer, but when entering dry season, water level decreases very rapidly which reduces water availability for lowland paddy field. (OKI)	

Table F3.3.3 Main Results of Pre-PCM in Middle Area

Group Discussions	
Sector	Discussed Issues
Planning	• Though the district boundary was changed, the land use master plan has not been changed yet. (Perabumulih) • Comprehensive land use plan has not been developed yet. (OKU) • Only general maps are available for the District. (Muaraenim) • Forest area plan has not been established in Semendo. (Muaraenim)
Water Usage	• Domestic water supply covers only 15%. (Perabumulih) • Distribution system is old so that it causes water loss. (Perabumulih) • Water source is 23 km far from the city. (Perabumulih) • Low capacity to meet the increasing demand of drinking water. (Perabumulih) • Water quality is low in rainy season. (Perabumulih)

	• Drinking water has inorganic contamination. (Perabumulih) • Rambang Kapak Tengah subsictrict (2,000 ha) has potentiality for irrigation development. (Perabumulih) • Wunut dam is no longer used for irrigation because 1) Paddy field is higher than the water level and 2) Paddy field has been converted to rubber plantation. (Perabumulih) • In dry season, domestic water is short and water transportation is disturbed while in wet season, the quality of domestic water bad and water supply to PDAM is disturbed. (OKU) • People suffer from water shortage in dry season and flood in wet season. (Muaraenim) • Sedimentation accumulates in river and water transportation is disturbed. (Muaraenim) • Water quality has been deteriorated since water treatment cost increased due to industrial waste disposal to the river. (Muaraenim) • Rivers have limited function for tourism. (Muaraenim)
Flood Control	• City drainage system has not been developed properly. (Perabumulih) • River bank is eroded. (OKU) • Sedimentation accumulates in lower reaches. (OKU) • River sedimentation and drainage clogging increase the risk of floods. (Muaraenim) • Inundations occur in lowland areas. (Muaraenim) • River bank erosion threatens settlements. (Muaraenim)
Natural Environment	• Oil exploitation waste has contaminated water in Kelekar river. (Perabumulih) • Poisonous substance is used for catching fish. (Perabumulih) • Pulp processing wastes at the upper part of the District have contaminated drinking water source for the District. (Perabumulih) • Deforestation in the upper area has exceeded 75 % of the total forest area. (OKU) • Forest areas are used for industrial and estate activities without proper coordination. (Muaraenim) • EIA document is not properly followed by large companies/industries. (Muaraenim) • Aquaculture businesses have not been properly managed. (Muaraenim)
Social Environment	• People's awareness of water use is low. (Perabumulih) • Drinking water is considered expensive. (Perabumulih) • Many houses are built on the sides of rivers. (OKU) • River is used not only for washing but also toilet. (OKU) • People dispose waste in the river. (OKU) • Water management regulation has not been developed.

	(Muaraenim) • Water management regulation institution has not been established. (Muaraenim) • There is a bared land which can be turned to paddy field with a irrigation system. (Muaraenim) • Water use associations (WUAs) do not optimally work for water management. (Muaraenim)
General Discussion	
• Oil pollution still exists mainly at Kelekar river after one year when this problems was discussed first. Pertamina considers Kelekar river as an artificial channel for waste disposal while local people consider as a natural river which is indispensable for their lives. (Perabumulih) • Perabumulih has a potentiality for development since it locates at the center between Palembang and Muaraenim. (Province) • The government of Perabumulih should consider that water supply be provided and managed by the private company. (Province) • The government of Perabumulih has already had a detailed design for drinking water facility development and it has been offered to KIMPRASWIL as well as to investors, but until now the following actions have never been made. (Perabumulih) • A considerable number of WUAs in Muaraenim do not control water distribution to paddy field so that water flow to paddy field is insufficient. In addition, it is still unclear who is doing what in WUA's organization. (Muaraenim)	

Table 3.3.4 Main Results of Pre-PCM in Upper Area

Group Discussions	
Sector	Discussed Issues
Planning	• Land use planning has difficulty in implementation due to low discipline in human resources, lack of data and information. (Pagaralam) • Forest deterioration is proceeding. (Pagaralam)
Water Usage	• Water recharge for paddy field is insufficient and quantity of drinking water is limited. (Pagaralam) • Water shortage in dry season and floods in wet season. (Pagaralam) • Business chance of tourism is limited. (Pagaralam) • Irrigation canals are diverted to fishponds for aquaculture so that water shortage for paddy field has happened. (Lubuklinggau) • Quality of drinking water from Kelingi river is low. (Lubuklinggau) • Drinking water distribution facilities are insufficient. (Lubuklinggau) • Water quality is bad in wet season. (Lahat) • Water use conflicts occur between irrigation and aquaculture. (Musirawas)
Flood Control	• Damage of public facilities (river banks, roads, bridges, retaining walls and 22 deaths). (Pagaralam) • Kasie I and Kasie II irrigation schemes are in high risk to be

	eroded. (Lubuklinggau) ● Lubuklinggau is in high risk to inundation since drainage system is insufficient. (Lubuklinggau) ● Many settlements are located at side of Mesat river. (Lubuklinggau) ● Water intakes are sunk when flooding and hung over the water during dry season. (Lahat)
Natural Environment	● Domestic waste is damped to rivers. (Pagaralam) ● Small rivers can be no longer used for water transportation due to sedimentation. (Pagaralam) ● Rubber plantations are encroaching at Petanang highland. (Lubuklinggau) ● Water source surrounding Bukit Sulap has been decreased. (Lubuklinggau). ● Stone mining on Bukit Sulap has caused a high risk for land sliding. (Lubuklinggau) ● Small rivers can be no longer used for water transportation. (Lubuklinggau) ● Forest land in the upper area is in critical conditions due to shifting cultivation, illegal logging, and extensive coffee plantation. (Lahat) ● In Kerinci Seblat National Park, land is encroached by illegal logging.* (Musirawas)
Social Environment	● Women's role for efficient water use is limited due to lack of education. (Pagaralam) ● People's perception has been changed from food crops to fish production with regard to the use of water in irrigation canals. WUAs are not optimally functioning. (Lubuklinggau) ● Coffee price fluctuates. (Lahat) ● People's awareness on conservation is low. (Lahat) ● Technical irrigation scheme has not been developed. (Lahat)

General Discussion
• Women play important role in daily activities. But they are not assisted or even trained informally or formally with proper knowledge or simple technology how to use water effectively and efficiently. (Pagaralam)
• Poor people cut trees because they are not only poor but they are offered to cut trees by other persons who pays money to them. (Province)
• As the dumping site is 10 km far from the city, people burn their domestic garbage at their back yard. (Lubuklinggau)
• Handling of plastic garbage becomes a problem (Pagaralam)
• Although Lahat has already dumping sites, their capacity is limited. (Lahat)
• Water use is actually a problem, but it is not as crucial as natural and social environment. Flood is mainly caused by environmental problems (ex. illegal logging) in upper areas. If this problem was solved, floods would be no longer a problem. (Lahat)
• Rivers are used for inland water ways since some remote areas only can be accessed through water transportation. Floods are seasonal as a result of illegal activities in the areas surrounding the national park. (Musirawas)
• People's awareness toward forest conservation is low because of lack of communication and limited extension to the people. (Musirawas)
• Problems of illegal logging should be overcome. Awareness toward river pollution is low, especillay in Kelingi river where waste water is disposed to the river. (Musirawas)

*) Illegal logging and encroach are two different things and may not be correlated one another. Illegal logging is intended to take log out of the forest, while encroachment is aimed to open forest land for plantation. The former is mainly for the prosperity of the rich/powerful outsides, while the latter is for local people.

3.4 PCM (1)

3.4.1 Outline of PCM (1)

PCM Working Group was formulated for the preparation for PCM (1) including setting up objectives, making the Invitation List and application of methods used in the group discussions such as "Logical Framework". It consists of three selected members from the Counterpart Team and the social environmental specialist from the JICA Study Team. Invitation letters were sent through related Districts/Municipalities. Staffs of the Provincial Department of Water Resources visited related Districts/Municipalities for explaining significance and objectives of PCM (1) in advance. PCM (1) was held with the following outline:

Table F3.4.1 Outline of PCM (1)

Date	Monday, November 25, 2002		
Place	Palembang (Operation room of Cipta Karya, South Sumatra Province)		
Related Districts/Municipalities	Upper Area	Middle Area	Lower Area
	Musirawas (MURA), Lubuklinggau, Lahat, Pagaralam	Muaraenim, Perabumulih, Ogan Komering Ulu (OKU)	Palembang, Banyuasin, Musibanyuasin (MUBA), Ogan Komering Ilir (OKI)
Objectives	- Confirmation of issues on water management which have been presented in the Pre-PCMs - Identification of stakeholders		
Invited Persons	- Expected clientele (for each main issue) - Local government officials of related services		
Number of Attendants	78 (See **Annexes F3.4.1-F3.4.3** for the Lists of Attendants)		

Sessions of PCM (1)

Sessions of PCM (1) consists of general session and group session. Details are as follows:

General Session (1)

- Prologue of PCM on Comprehensive Study of Water Management on Musi River Basin
- Results of Pre-PCM
- Discussion

Group Session (1): participants were divided into three groups based on their locality, namely, Lower, Middle and Upper Group.

- To agree on main issues
- To confirm related issues
- To develop a Cause-Effect Tree

Group Session (2)

- To find solution to the issues
- To develop a Objective Tree

General Session (2)

- To present the results of group discussions
- Conclusion

3.4.2 Confirmation of Issues

Issues of each area (Upper, Middle, Lower) were confirmed in the group discussions with using the tool of Logical Framework. Participants developed a Cause-Effect Tree and an Objectives Tree in each group, based on the issues discussed in the Pre-PCMs. Relationship of the activities in Logical Framework and those of the Study is shown in the following table:

Table F3.4.2 Logical Framework and Related Process of the Study

Step of Logical Framework	Activities	Related Process of the Study
Step 1: Assess Sector Performance	Sector performance is assessed by using performance indicators that reflect the contribution of the sector to the larger economy and to the quality of life.	• Data/Information Collection • Field Reconnaissance • Environmental Survey • **Pre-PCM**
Step 2: Identify Sector Performance Problems or Opportunities	Problems or opportunities are identified as issues of concern.	
Step 3: Cause-Effect Analysis of Problems or Opportunities (Cause-Effect Tree)	A core problem or opportunity is selected to improve sector performance. It is analyzed to identify the causative factors as well as consequent effects.	• Analysis of Collected Data/Information • **PCM (1)**
Step 4: Objectives Tree	The cause-effect tree is converted into an objectives tree.	
Step 5: Alternative Analysis	Various courses of possible actions are derived from the objectives tree.	• Master Plan Formulation • **PCM (2)**
Step 6: Project Design Using the Logical Framework	The chosen course of action is translated in to a project design.	

Source: Asian Development Bank, 1998, *Using the Logical Framework for Sector Analysis and Project Design: A User's Guide*.

A simulation session was held two weeks before PCM (1) with utilizing the occasion of Technical Meeting. Some of the members joined the session and developed a Cause-Effect Tree. Following improvements were made examining the results:

- Categorize issues into Common, Upper, Middle and Lower specific in order that each group can first concentrate their issues,
- Enlarge the font size of the issues printed on cards in order to be seen clearly (issues are printed on cards beforehand for the purpose of saving time to write on the card),

- Use color paper for the background so that the issue cards with white color can be identified easily on the background, and
- Decide the color for each area, namely green for Upper Area, yellow for Middle and blue for Lower, and use such colors for participants' identification and background papers in order to avoid confusion among groups.

3.4.3 Identification of Stakeholders

Stakeholders are identified with several items including their needs, demands, absorptive capacity, gender issue, and potential adverse impacts of an expected countermeasure. A questionnaire was distributed to and fulfilled by the participants. Identification items are as follows:

Table F3.4.3 Stakeholder Identification

Identification Item	Description
Needs	Problems need to be solved. E.g., basic health/education facilities, safe drinking water, etc.
Demands	Goods or services to be used for solving problems. In addition, the stakeholders have willingness to pay or participate in activities to get them
Absorptive Capacity	Capability of stakeholders to both acquire the goods or services and to utilize them effectively. Indicators: • Motivation to change • Level of knowledge and skill • Social and political obstacle • Community organizations • Other community resources
Gender Issue	Important differences in roles between men and women concerning solving problems. Indicators: • Differences in the allocation of time and work • Differences in the control over the use and disposition of assets and money • Differences in roles to decide the allocation of time and resources • Other significant differences
Potential Adverse Impacts	Possible negative impacts of the countermeasure. E.g., involuntary resettlement, loss of livelihood, price change, environmental change, etc

Source: Asian Development Bank, 1994, *Handbook for Incorporation of Social Dimensions in Projects*

The number of effective responds is 33. Shares of the respondents are as follows:

Table F3.4.4 Results of Stakeholder Identification

Job	Number	Percentage
Government Staff	22	66.7%
NGO Staff	4	12.1%
Employee of District Owned Enterprise	4	12.1%
Entrepreneur	2	6.1%
Teacher	1	3.0%

Almost all the needs and demands are fall in issues identified Pre-PCMs. It seems very difficult for the people to point out adverse effects because no concrete projects are identified in this stage of the Study. Results of questions on absorptive capacity and gender issue are as follows:

Table F3.4.5 Absorptive Capacity

Toward the program/activities which are necessary to solve the major problem concerning water management.

a) Do local people have a good education to participate in the program/activities?	Sufficient 39.4%	Less Sufficient 54.5%	Insufficient 6.1%	—
b) How is local people's attitude toward the program/activities?	Very Much Agree 33.3%	Agree 63.6%	Less Agree 3.0%	Disagree 0.0%
c) How is local people's custom and tradition toward the program/activities?	Very Much Suitable 15.2%	Suitable 75.8%	Less Suitable 9.1%	Not Suitable 0.0%
d) How is the community institution toward the program/activities?	Very Much Supportive 27.3%	Supportive 69.7%	Less Supportive 3.0%	Not Supportive 0.0%
e) Do local people ready to offer the public resources toward the program/activities?	Willing 78.8%	Less Willing 212%	Not Willing 0.0%	—

No respondents select totally negative alternative except education (it is still very low). It means that respondents think their community has certain extent of absorptive capacity for the program/activities to solve the major problem.

Table F3.4.6 Gender Issue

Issue	Male Dominant	M > F	Equal	M < F	Female Dominant
a) Allocation of time for working outside	54.5%	27.3%	18.2%	0.0%	0.0%
b) Allocation of time for socialization	36.4%	36.4%	24.2%	3.0%	0.0%
c) Financial decision for household	12.1%	12.1%	30.3%	33.3%	12.1%
d) Important decision	48.5%	24.2%	27.3%	0.0%	0.0%

Respondents think male has a power in the decision of important matters in household. Please note that almost all the respondents are male. Concerning the financial matter, however, they think female has a power to some extent.

3.4.4 Main Results of PCM (1)

Discussions in the Group Session (2), where each group made a Cause-Effect Tree and an Objective Tree, can be summarized as follows:

Presentation of Middle Area Group

The core issues of the Middle Area are:

(1) Drought

(2) Shortage of drinking water

(3) River contamination

(4) Poor city drainage system

(5) Rice self-sufficiency has not been achieved

(6) River is currently used for bathing, washing, and toilet

Presentation of Upper Area Group:

The core issues of the Upper Area are:

(1) Water-use conflict between paddy field and fishpond. District regulation regarding water-use has been proposed, District Office of Water Resource is in the process of developing the criteria for water-use.

(2) Illegal logging.

Presentation of Lower Area Group

The core issues of the Lower Area are:

(1) Sedimentation

(2) Industrial waste

(3) Shortage and low quality of drinking water

(4) Flood in rainy season

See **Annexes F3.4.4-F3.4.9** for the Cause-Effect Tree and the Objective Tree made by each group.

In the process of discussion among groups, several programs have been identified to apply to the cross upper-middle-lower areas, which are:

(1) Reforestation

(2) Improvement of river as means for bathing, washing, and toilet

(3) Provision of drinking water in quantity as well as quality

(4) River contamination reduction and prevention

(5) Improvement of waste treatment

(6) Improvement of drainage

3.4.5 Postmortem of PCM (1)

Several points can be itemized for improving future public consultation meetings with the results of PCM (1).

(1) Preparation was not necessarily enough. Although the PCM Working Group started about one month before, which is not late, Indonesian members had to join 5-day training of another project one or two weeks before the PCM (1). As a result, communication between members and preparation were not carried out enough.

(2) The number of clientele participants was only 13, which is very low compared with the invitation, 52. Invitation to clientele was made through related District/Municipality Governments. Because they were very busy for their daily routine works, some of them cannot spare enough time to work for invitation of proper persons who were designated by the PCM Working Group.

(3) More simulation sessions are required for smooth application of Logical Framework. Working Group members understood the method well, but

experience of some facilitator is not necessarily enough. It caused some confusion in the process of the group session.

3.5 PCM (2)

3.5.1 Outline of PCM (2)

PCM Working Group was again formulated for the preparation for PCM (2) including setting up objectives, making the Invitation List and application of methods used in the group discussions such as "Alternative Analysis". The Working Group consists of three selected members from the Counterpart Team and the social environmental specialist from the JICA Study Team. The staff of Dinas PU Pengairang sent invitation letters directly to the participants with explaining significance and objectives of PCM (2) in advance. PCM (1) was held with the following set-up:

Table F3.5.1 Outline of PCM (2)

Date	Tuesday, February 25, 2003
Place	Palembang (Operation room of Cipta Karya, South Sumatra Province)
Objectives	• Collection of opinions on the proposed Musi River Basin Water Management Plan from the meeting participants • Promotion of active cooperation in the water management proposed in the Study
Attendants	98 (See **Annexes F3.5.1** for the Lists of Attendants)

Sessions of PCM (2)

Sessions of PCM (2) consists of general session and group session. Details are as follows:

General Session (1)

- Presentation of the results of PCM (1)
- Explanation of the Draft Master Plan (including Priority Projects and Implementation Plan)
- Discussion

Group Session (1): Discussions on Priority Projects by 4 groups formulated on the sector basis (Organization & Institution, Floods, Natural Environment, Water Use)

- Alternative Analysis of Priority Projects proposed by the JICA Study Team

Group Session (2): Continuation of Group Session (1)

General Session (2)

- Presentation of the results of group discussions

3.5.2 Alternative Analysis

Group Discussions were made with applying the method called "Alternative Analysis" in four groups, namely Organization & Institution, Floods, Environment, and Water Use, which were formulated by the background of participants. The discussion method was used with referring to Asian Development Bank, 1998, *Using the Logical Framework for Sector Analysis and Project Design: A User's Guide*. It includes the following:

- Possible constraints on the implementation of the Priority Projects,
- Positive and negative impacts of the Priority Projects,
- Prerequisite for the implementation of the Priority Projects,
- Possible alternative solutions, and
- Rank of solutions according to the participants priorities (examination of priority)

Please see **Table F3.4.2 Logical Framework and Related Process of the Study** for the relationship of the activities in Logical Framework and those of the Study in detail.

The following table shows the priority programs for each discussion group. In the session, participants were able to not only discuss those programs which were not proposed as priority ones but also make proposals by them selves.

Table F3.5.2 Priority Programs for Each Discussion Group

Discussion Group	M/P Component	Priority Program
Organization & Institution	1. Institutional Strengthening	1-1. Personnel Management with Incentive Mechanism 1-4. Official Web Site of Water Resources Management 1-7. Establishment of Water Resources Data and Information 1-9. Establishment of PTPA/PPTPA as soon as possible 1-12. Training on Operating Techniques for Government Employees of Balai PSDA 1-13. Training on Management and Planning for Related Government Employees
	2. Monitoring Network Establishment	2-1. Hydrological Monitoring System Establishment 2-2. Water Quality Monitoring system Establishment 2-4. Hydrological Database Establishment
Floods	3. Floodplain Management	3-1. Land Use and Zoning
	4. Urban Water Environment Improvement	4-1. Community Drainage Management 4-3. Trunk Drainage Channels Rehabilitation
Natural Environment	5. Watershed Rehabilitation and Restoration	5-1-1. Application of Agroforestry to Farmers Plantation 5-1-3. Strengthening of Agriculture/ Forestry Extension 5-1-4. Reforestation of Production Forest 5-1-6. Inner- and Inter-basin Coordination 5-2-1. Rehabilitation of Existing Protected Forests
Water Use	6. Water Use Management	6-2. Irrigation Development and Water Management 6-3. Swamp Area Development 6-4. Water Supply to Tidal Swamp Area 6-5. Aquaculture Water Management

Note: Program numbers were put tentatively at the time of PCM (2).

3.5.3 Results of PCM (2)

The followings are priority programs selected in the group discussions:

Organization & Institution

- Establishment of PTPA/PPTPA (1-9)
- Establishment of the system for compensation from downstream to upstream for conservation (group's proposal)
- Establishment of Water Resources Data and Information (1-7)

Floods

- Improvement of flood warning system (3-2, group's proposal)
- Reforestation of the upstream area (group's proposal)
- Drainage system restoration (group's proposal)

Natural Environment

- Enforcement of environmental regulations (5-1-5, group's proposal)
- Management of River Environment (5-2-3)
- Control of river water pollution (group's proposal)

Water Use

- Irrigation Development Program (6-2)
- Swamp Area Development Program (6-3)
- Water Supply to Tidal Swamp Area (6-4)
- Water management for transportation (group's proposal)
- Raw water (river) development (group's proposal)

Note: Program numbers were put tentatively at the time of PCM (2).

See **Annexes F3.4.2-F3.4.12** for Alternative Analyses made by each group.

3.5.4 Postmortem of PCM (2)

- The number of total attendants as well as non-governmental increased considerably from 78 and 13 respectively in PCM (1) to 98 and 29 in PCM (2) because the staff of Dinas PU Pengairang sent invitation letters directly to the participants with explaining significance and objectives of PCM (2).
- It is still open to question whether the participatory approach is effective for asking opinions on matters which are abstract or whose influences are indirect to participants such as "master plans" and "management" instead on matters which are concrete or whose influences are direct such as "construction projects" located adjacent to them. In PCM (2), participants were asked to discuss not the Master Plan itself but programs which are more concrete based on the priority proposed by the JICA Study Team in order to activate discussions. It still seems difficult for them to discuss those programs which are not recognized "related to them."
- On the other hand, it is effective for the second objective "promotion of active cooperation in the water management proposed in the Study" with increasing mutual understanding between stakeholders that people come from various areas to discuss the same issue together. It can be justified, however, only when the discussion topics of the group they belong coincide with their interests. In this

context, it may be preferable that the participants formulate programs by themselves as required by the Logical Framework and Project Cycle Management.