CHAPTER 7

KALIMANTAN UPLAND RURAL INFRASTRUCTURE DEVELOPMENT FOR POVERTY ALLEVIATION

CHAPTER 7 KALIMANTAN UPLAND RURAL INFRASTRUCTURE DEVELOPMENT FOR POVERTY ALLEVIATION

7.1 INTRODUCTION

This project profile is a set of project ideas to be recommended for the on-going rural infrastructure project for poverty alleviation. These project ideas are extracted from the recommended programs presented in Volume 2: the Main Text of the Final Report.

7.2 BACKGROUND AND RATIONALE

Concerted efforts at alleviating poverty in Indonesia have been implemented since the beginning of the Sixth Five-Year Development Plan Period (1994-1998) with the following government programs:

- Backward Village Development Fund (Program Inpres Desa Tertinggal or IDT), granting village development funds, by Bappenas and Ministry of Home Affairs
- Infrastructure Development Program of Backward Villages (Pembangunan Prasarana Pendukung Desa Tertinggal or P3DT) by Bappenas and Ministry of Home Affairs
- Isolated Community Program (Program Masyarakat Terasing), by the Ministry of Social Affairs
- Small Credit Program by the National Family Planning Coordinating Board

OECF, World Bank and other donor agencies have assisted the Infrastructure Development Program of Backward Villages, while the other poverty projects have not been assisted by international and foreign donor agencies. This project has been administered by the Bappenas Project Management Unit in association with local governments. However, Bappenas' screening criteria and local governments' proposals do not tend to meet the actual local needs, because these two institutions have been accustomed to projects planned by the top-down approach of line-agencies.

The project ideas which we recommend in this chapter are those more suited to local situations and needs, rather than the projects which have been implemented in Java and Sumatra.

7.3 IDEAS OF PROJECT COMPONENTS FOR INLAND KALIMANTAN

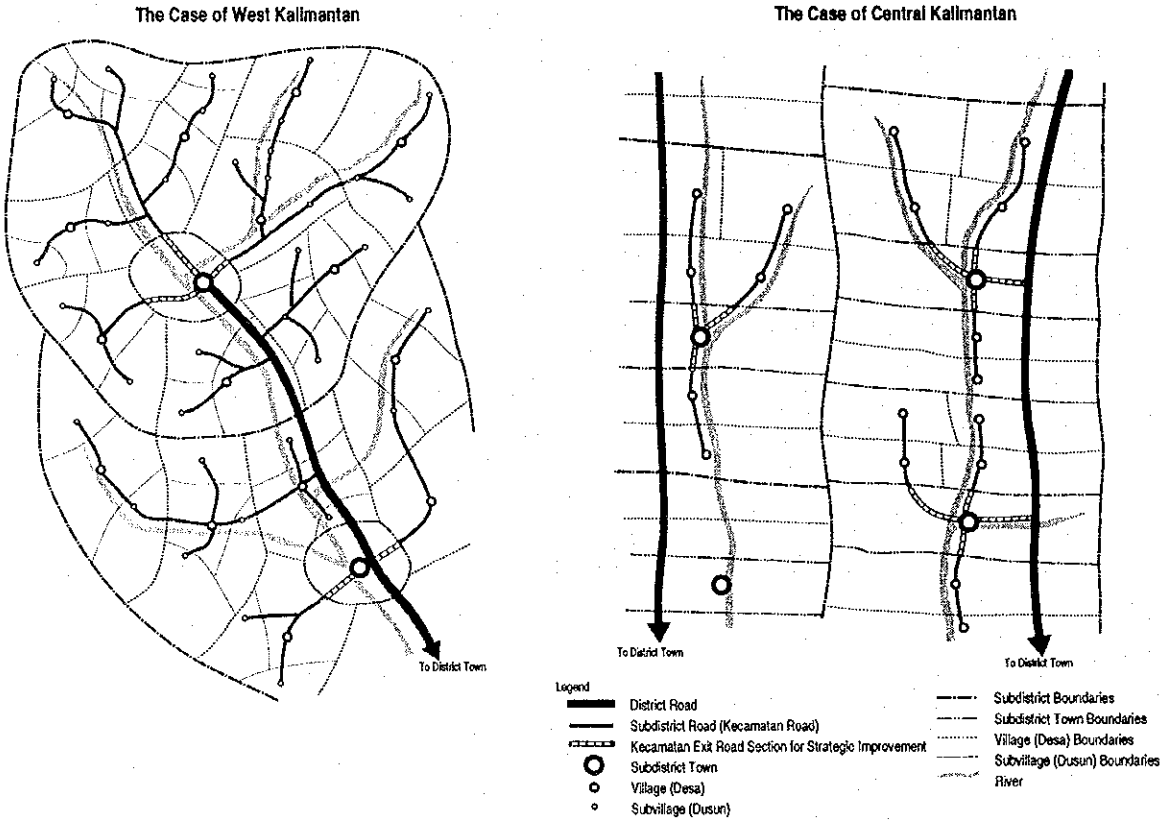
The following four projects are recommended to meet the needs of transportation, irrigation, clean water and telecommunications.

7.3.1 Kecamatan Exit Road Improvement Project

The District Roads (Kabupaten Roads) connecting district capital towns to subdistrict capital towns have been gradually constructed and improved, and government resources will be devoted to such road development constantly.

However, the roads from subdistrict capital towns to villages and subvillages tend to be neglected in the efforts at rural road development. In particular, the road sections exiting from subdistrict capital towns to villages and subvillages have been paid less attention, although those road sections are usually the most frequently used by rural road users and thus severely damaged. These special road sections are called "Kecamatan Exit Roads". On the other hand, the village roads which are roads within village territories, tend to be improved by collective efforts by villagers based on village development funds (Inpres Desa). Figure 7.1 shows typcical patterns of rural roads and Kecamatan Exit Roads in West and Central Kalimantan.

Figure 7.1 Rural Road Patterns and Kecamatan Road Sections in West and Central Kalimantan



The improvement of the road sections exiting from subdistrict capital towns could induce more villagers' collective efforts to improve their own village roads because once they improve their own village roads they could use motorcycles or four-wheel vehicles to directly reach subdistrict towns, district towns, and provincial towns.

In this sense, it is strategically important to improve the road sections exiting from subdistrict towns toward villages or sub-villages. The results of the needs assessment of the Kecamatan Exit Road Improvement Project are shown in Table 7.1. It is estimated that 306 km of roads need to be improved and 34 bridges need to be constructed in West Kalimantan, and that 170 km of roads need to be improved and 34 bridges need to be constructed in Central Kalimantan. Figure 7.2 and Table 7.2 shows the subdistricts which have potential needs of improving Kecamatan Exit Roads. The target beneficiaries of the Kecamatan Exit Road Improvement Project would be 600,000 people in West Kalimantan and 190, 000 people in Central Kalimantan.

Table 7.1 Needs of the Kecamatan Exit Road Improvement Project in West and Central Kalimantan

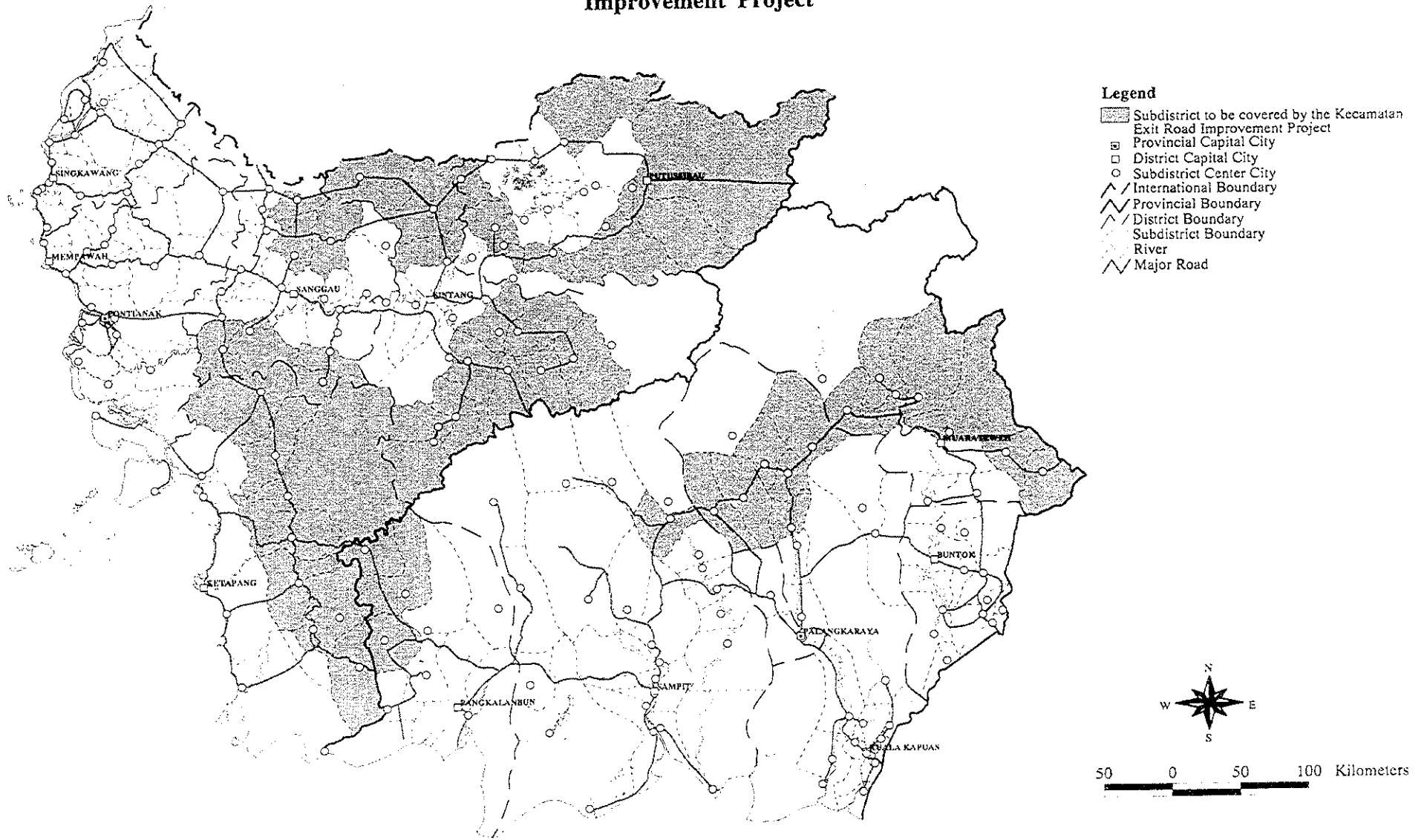
WEST KALIMANTAN	
3 Kecamatan Exit Roads to be Improved per 1 Kecamatan (Subdistrict) 3 km Road Improvement and 1 Bridge Construction per 1 Kecamatan Exit Road	
Number of Kecamatan to be Covered by Kecamatan Exit Road Improvement Project	34 Kecamatan (Subdistricts)
Total Length of Road to be Improved	306 km (=34x3x30)
Total Number of Bridges to be Constructed	34 Bridges
CENTRAL KALIMANTAN	
5 Kecamatan Exit Roads to be Improved per 1 Kecamatan (Subdistrict) 2 km Road Improvement and 2 Bridge Construction per 1 Kecamatan Exit Road	
Number of Kecamatan to be Covered by Kecamatan Exit Road Improvement Project	17 Kecamatan (Subdistricts)
Total Length of Road to be Improved	170 km (=17x5x20)
Total Number of Bridges to be Constructed	34 Bridges

Table 7.2 Target Population of Kecamatan Exit Road Improvement Project

WEST KALIMANTAN		
Name of District (Kabupaten)	Name of Subdistrict (Kecamatan)	Population in 1995 (Persons)
SANGGAU	Toba	10,372
	Meliau	38,327
	Nanga Mahap	19,568
	Nanga Taman	21,834
	Jangkang	24,377
	Bonti	16,780
	Noyan	8,599
KETAPANG	Manis Mata	15,171
	Jelai Hulu	12,476
	Tumbang Titi	37,110
	Nanga Tayap	24,540
	Sandai	26,915
	Sungai Laur	10,686
	Simpang Hulu	25,291
SINTANG	Sokan	11,954
	Tanah Pinoh	19,750
	Sayan	12,152
	Ella Hilir	12,952
	Menukung	13,800
	Serawai	18,116
	Kayan Hulu	18,072
	Nanga Pinoh	37,507
	Kayan Hilir	19,693
	Ketungau Hilir	15,867
	Ketungau Tengah	20,565
	Ketungau Hulu	14,980
KAPUAS HULU	Bunut Hulu	14,738
	Manday	12,690
	Putussibau	25,821
	Hulu Gurung	9,676
	Seberuang	8,111
	Semitau	11,838
	Empanang	5,342
	Embaloh Hulu	5,243
Sub-Total	34	600,913
CENTRAL KALIMANTAN		
Name of District (Kabupaten)	Name of Subdistrict (Kecamatan)	Population in 1995 (Persons)
KOTAWARINGIN BARAT	Balai Riam	4,507
	Lamandau	7,995
	Delang	6,688
	Katingan Tengah	15,177
KAPUAS	Kapuas Hulu	13,169
	Tewah	12,109
	Kurun	12,413
	Sepang	7,612
	Rungan	17,453
	Munuhing	7,719
BARITO UTARA	Gunung Purei	2,727
	Teweh Timur	6,358
	Lahei	18,576
	Laung Tahup	18,345
	Murung	17,808
	Permata Intan	12,626
	Tanah Siang	10,498
Sub-Total	17	191,780
Total	51	792,693

Source: Population Inter-Census 1995

Figure 7.2 Subdistricts to be Covered by the Kecamatan Exit Road Improvement Project



7.3.2 Small-Scale Village Irrigation Project

Both West Kalimantan and Central Kalimantan have increased paddy production in the last 25 years. However, the both provinces have not produced enough rice to meet the demand of the provincial population. In 1995, the rice self-sufficiency rates were 88% and 89% in West Kalimantan and Central Kalimantan respectively. Hit by the economic crisis and long drought, food crop production, especially rice production, has been given a high priority in the present policy.

From the perspective of food crop production, dryland paddy production has an adequate potential, but efforts to increase yields will be limited. Therefore, it is important not to reduce existing dryland paddy areas so that these areas are conserved even though some may already be in palm oil plantation areas, and to concentrate on wetland paddy production in upland farming areas for increasing rice production.

For attacking the problems of wetland paddy in upland areas, the following strategies are recommended:

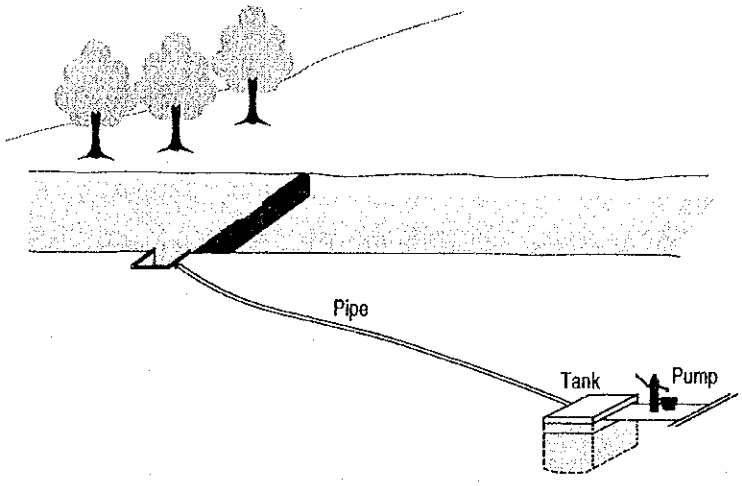
- Provide small and medium scale irrigation facilities at the village level for expanding irrigated wetland paddy fields in the district of Sanggau, Sintang and Kapuas Hulu. Especially, continue the on-going "Village Irrigation Scheme", but at the same time, utilize smaller-scale irrigation potential as small as 5 to 25 ha per one irrigation site.
- Provide the farmers (with irrigated fields in upland areas) with extension works more suitable to the local farmers conditions, so that the farmers become used to the usage of chemical fertilizers and pesticides.
- Make more credit available to wetland paddy farmers in upland areas so that they can use more chemical inputs.

OECF's assistance projects to village irrigation tend to support the projects with more than 30 ha of irrigatable lands probably following the criteria of investment efficiency. When it comes to the local needs to avoid damages of paddy cultivation due to long drought, it is necessary to pay attention to smaller scale of development potential of irrigation in upland areas. At the same time, it is necessary to emphasize the utilization of the methods and material of constructing irrigation facilities so that such ways enable local people to imitate the ways used by the assisted projects and to maintain irrigation facilities by themselves.

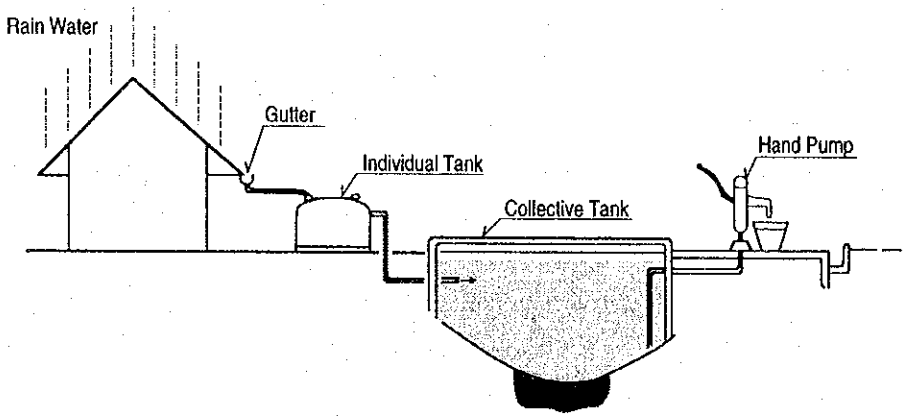
7.3.3 Village Clean Water Supply Project

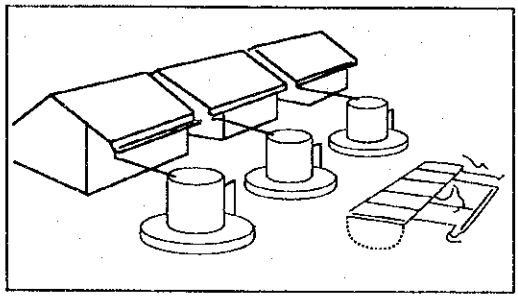
The project which we propose here is the same as the conventional project providing simple clean water supply facilities, such as piping water from clean water sources and water tanks for storing rain water, which are supported by ADB loans. See Figure 7.3. However, the areas to which are to be applied are different from the past cases. We strongly recommend that this type

Figure 7.3 Simple Clean Water Supply System in Rural Areas

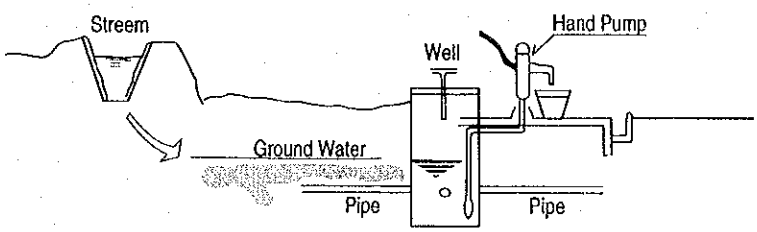


(1) Raw Water from River at Under-developed Small Village





(2) Raw Water from Rain at Under-developed Small Village



(3) Raw Water from Ground Water at Under-developed Small Village

of village clean water supply project should be implemented in the areas which suffer negative impacts of oil palm plantation and other types of development on their existing water sources.

7.3.4 Village Telephone Project

The present telephone systems in West and Central Kalimantan have limited coverage, especially in inland Kalimantan. West Kalimantan has 21 telephone stations. All the district capitals are connected by telephone stations. In addition, 11 major subdistrict towns are covered by telephone stations. Central Kalimantan has 15 telephone stations. All the district capitals are connected by telephone stations. In addition, 8 major towns are covered by telephone stations.

However, the extension of the telephone services is very much limited to urban areas. It can be said that no telephone services are provided to rural areas. Where there are frequent bus services to urban areas, it is possible to get market information of rubber, rattan and other commodities. In remote areas of inland Kalimantan, there are great needs of telephone services. At the same time, such telephone services in remote areas could help to collect forest fire information from remote forest areas.

Nowadays, various types of wireless telephone equipment are available at moderate prices. There are possibilities to provide such telephone equipment to satisfy the basic local needs of information and communication.

However, at the same time, it is necessary to overcome technical difficulties of to how to give a certain amount of credits of telephone uses to rural communities as grant aid for social development, and how to collect charges of telephone uses beyond the local basic needs.

Table 7.3 Existing Telephone Potential of PT. Telkom in 1997

West Kalimantan

District	Location of Local Office	Number of Capacity (lines)	Number of Subscribers ①	Population of District ②	①/② *100
Sambas	Singkawang	8,212	5,635		
	Bengkayang	532	376		
	Pemangkat	2,772	1,653		
	Sambas	3,582	1,113		
	Tebas	910	732		
	Sungaiduri	500	273		
Sub Total		16,508	9,782	880,200	1.11
Kabupaten	Mempawah	904	836		
Pontianak	Ngabang	528	471		
	Sungai Pinyuh	1,016	939		
Sub Total		2,448	2,246	908,200	0.25
Sanggau	Sanggau	2,184	1,866		
	Balai Karangan	482	373		
	Sekadau	642	484		
Sub Total		3,308	2,723	512,200	0.53
Ketapang	Ketapang	2,834	2,543		
	Kendawangan	532	434		
Sub Total		3,366	2,977	383,100	0.78
Sintang	Sintang	3,092	2,296		
	Nangah Pinoh	1,094	909		
Sub Total		4,186	3,205	477,900	0.67
Kapuas Hulu	Putussibau	912	809		
Sub Total		912	809	181,900	0.44
Kotamadya	Pontianak	29,508	24,533		
Pontianak	Pontianak	3,522	2,853		
	Pontianak	6,480	3,655		
	Pontianak	12,602	0		
Sub Total		52,112	31,041	469,000	6.62
Total		82,840	52,783	3,812,500	1.38

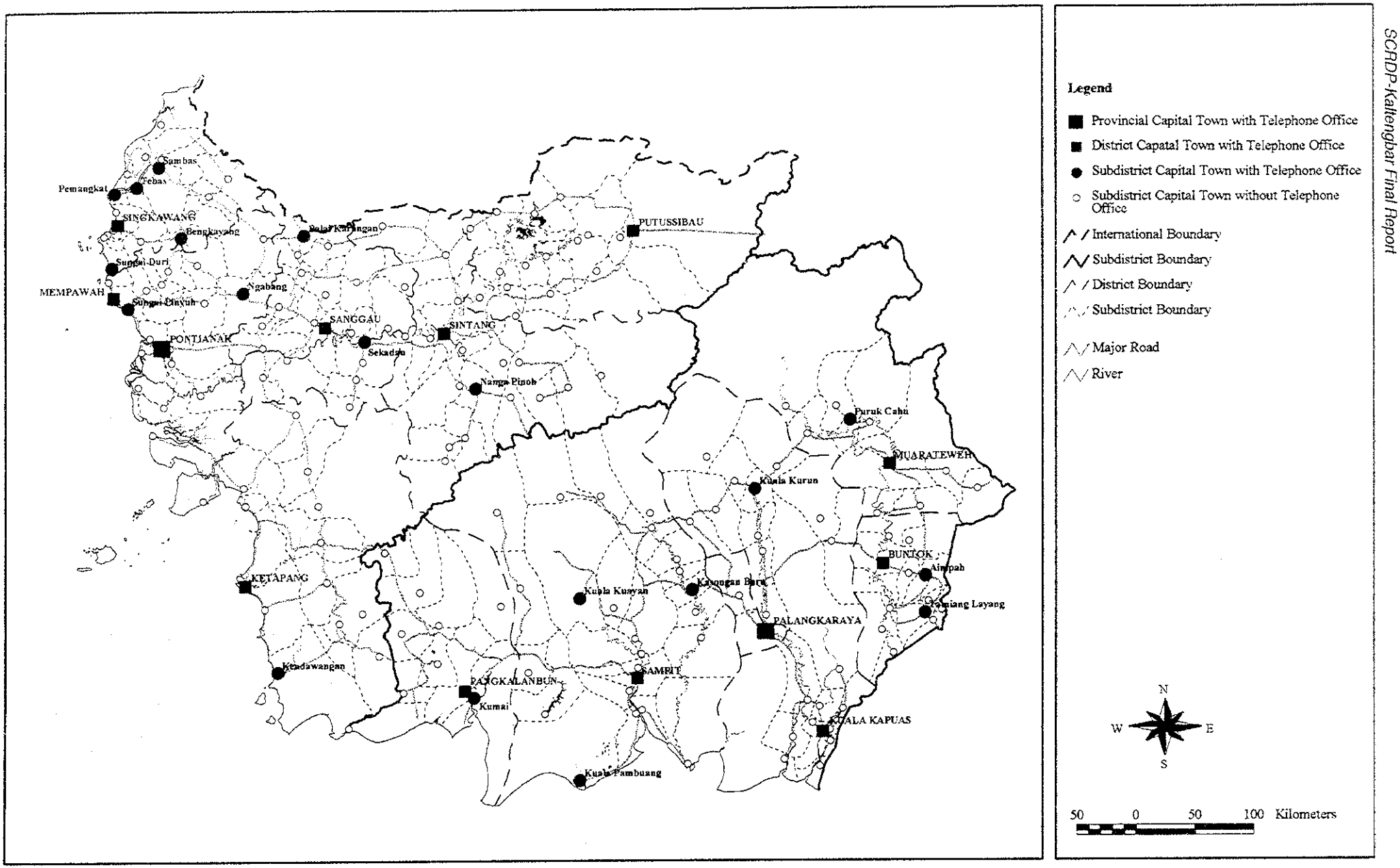
Source : PT. Telkom, Pontianak

Central Kalimantan

District	Location of Local Office	Number of Capacity (lines)	Number of Subscribers ①	Population of District ②	①/② *100
Kotawaringin	Sampit	6,592	4,323		
Timur	Kuala Pembuang	1,024	904		
	Kasongan	520	371		
	Kuala Kuayan	296	272		
Sub Total		8,432	5,870	232,800	2.52
Kotawaringin	Pangkalanbun	4,534	3,834		
Barat	Kumai	776	740		
Sub Total		5,310	4,574	479,600	0.95
Barito	Muarateweh	2,008	1,869		
Utara	Purukcahu	812	389		
Sub Total		2,820	2,258	527,300	0.43
Barito	Buntok	1,432	1,374		
Selatan	Tamiang Layang	448	282		
	Ampah	432	346		
Sub Total		2,312	2,002	169,200	1.18
Kapuas	Kuala Kapuas	3,719	2,758		
	Kuala Kurun	400	302		
Sub Total		4,119	3,060	164,800	1.86
Kotamadya	Palangkaraya	15,081	9,733		
Palangkaraya	Palangkaraya	508	407		
Sub Total		15,589	10,140	161,500	6.28
Total		38,582	27,904	1,735,200	1.61

Source : PT. Telkom, Palangkaraya

Figure 7.4 Distribution of Telephone Offices



CHAPTER 8

KALIMANTAN UPLAND COMMUNITY RESCUE AND DEVELOPMENT PROJECT

CHAPTER 8 KALIMANTAN UPLAND COMMUNITY RESCUE AND DEVELOPMENT PROJECT

8.1 INTRODUCTION

This project is designed for local NGOs' implementation by foreign assistance. Project ideas are taken from the recommended programs presented in Volume 2: the Main Text of the Final Report. This project should be implemented as a pilot project by local NGOs in order to refine the development models and implementation organizations, aiming at diffusing such development models to government agencies and other NGOs.

8.2 BACKGROUND AND RATIONALE

In the economic crisis, Indonesia's citizens, especially ordinary citizens, have suffered various difficulties ranging from inflation of basic needs items including food, unemployment, to shortage of incomes to continue children's school education. Many government efforts supported by international and bilateral development agencies have been concentrated on meeting immediate needs, such as rice, cooking oil and scholarship.

Such assistance might be able to help people's immediate difficulties in the short-term. However, in many cases of inland Kalimantan, real problems of rural livelihoods and basic public services, such as school education and health are with the government's ignorance of local situations and needs. In the economic crisis, the government has tried to put its resources to rural areas. By taking advantages of these situations, it is necessary to tackle the real problems of attaining real and sustainable development of rural livelihoods and communities, by establishing new development models more suited to local situations and needs.

8.3 DEVELOPMENT GOALS

- To rescue and revitalize rural livelihoods of inland Kalimantan, and
- To rehabilitate and strengthen the basic public systems to provide school education and primary health services at the community level

8.4 PROJECT OBJECTIVES

- To establish new methods to rescue and revitalize rural livelihood models
  - Swidden-based clone rubber replanting model by community participation
  - Small-scale irrigation development model by community participation
  - Cooperative-based or farmers-group-based development of smallholder oil palm plantations
- To establish new methods to rehabilitate and strengthen the basic public services delivery systems
  - To revitalize rural primary school operation through development efforts at school libraries
  - To make linkages between district hospitals and health centers/village health volunteers through the training of health center personnel at district hospitals,

8.5 PROJECT LOCATION

The location of the project should be in one or two inland districts of West Kalimantan. West Kalimantan is selected as a pilot project area by local NGOs because it has a relatively long history of local NGOs' activities. In fact, many local NGOs have developed and are experienced in various activities.

8.6 IMPLEMENTING ORGANIZATION

The implementing organization is composed of the following four NGOs:

- One coordinating NGO with a strong coordinating capability
- Three implementing NGOs
  - one NGO with strong rubber agroforestry experiences
  - one NGO with strong health and education experiences
  - one NGO with strong community orientation

Activities of each implementing NGO, especially at the stage of establishing development models, is administered separately from other NGOs' activities. At the integration stage, the expertise and experiences of three implementing NGOs are combined for practicing a regional approach.

Many NGOs have developed certain strong areas of activities. Some are good at health, some are strong in agriculture, and others are good at strengthening solidarity in the community. Once they have acquired certain expertise, they tend to stick to the solutions based on the expertise. In order to avoid such tendency of sectoral approaches, it is necessary to integrate several NGOs with different expertise and experiences in regional development.

8.7 CONTENTS OF THE PROJECT

At the stage of establishing development models (the first one to two years)

Each NGO has two-three sites for model development. Each NGO works at different sites without close coordination.

At the stage of integrating several development efforts at one site, using a regional approach (from the second or third year to fifth year)

After the establishment of development models, each NGO starts to learn the other NGOs' development models and to study the applicability of their activity sites by exchanging knowledge and experiences among the implementing NGOs. Considering the local needs and situations, they apply other development models to their own sites.

At the same time, each NGO starts to diffuse their own development models to adjacent villages and other areas. They design and implement seminars to diffuse their development models to those who might be interested in such models. They open their model sites for study tours, and encourage other people to conduct study tours to their model sites.

CHAPTER 9

KALIMANTAN SMALL AND MEDIUM ENTERPRISES PROMOTION PROJECT

CHAPTER 9 SMALL AND MEDIUM ENTERPRISES PROMOTION PROJECT IN KALIMANTAN

9.1 INTRODUCTION

This project is one of the projects constituting "the Kalimantan Small and Medium Enterprise Promotion Program", whose outline is given in Chapter 8 of Volume 2: the Main Text of the Final Report. This project is expected to play a role of a pilot project for implementing the recommended program.

9.2 BACKGROUND AND RATIONALE

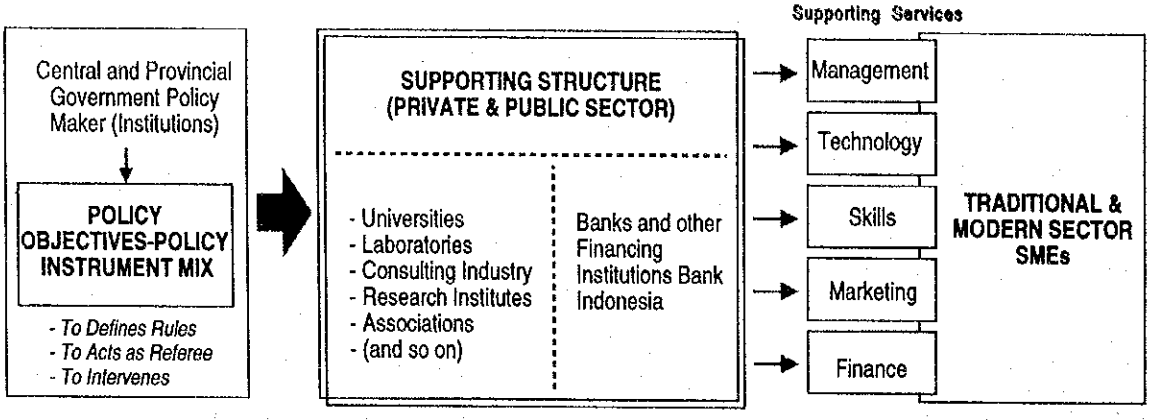
The regional economies of the Kalimantan provinces are characterized by a fragile structure where few resource-based modern manufacturing units (heavily concentrated in the fields of wood and plantation based processing) are concentrated in the primary sector. The large-scale plantation subsector in combination with the modern resource-based processing manufacturing subsector, though presently of outstanding importance in terms of production and foreign exchange earnings, is not large enough to generate employment opportunities in order to keep pace with the in creasing rural and urban incomes. To the contrary, the wood processing industry, in particular the plywood manufacturing industry, is in absolute decline due to timber resource depletion.

The small and medium sized enterprise subsector, though of less importance in terms of contribution to output growth, is essential in terms of widespread employment and therefore stable income generation in both, rural and urban areas. This subsector is, however, of outstanding importance in terms of short to long-term social stability, as well as for achieving a relative balance between income developments in rural and urban areas. In addition, SME subsector development may be a useful catalysis for a healthy linkage development between the primary sector (in particular plantation-based smallholder production) and downstream industries.

The potential resources of the vast SME subsector remain, however, so far untapped, due do a lack of suitable policy approaches at the provincial level, the quasi non-existence of a viable support structure, and the lack of adequate coverage by existing promotional schemes, especially, in the field of SME financing (for both, working capital and investment financing). The Government of Indonesia is obliged under the terms of the Memorandum of Understanding

with the IMF to initiate, formulate and implement a national level action program for the promotion of SMEs. This measure, which is not only intended as a sort of short-term "social safety net" measure, aims at harvesting the long-term potentials for employment and income generation in the SME subsector. There is also discussion to extend such action programs at the provincial level, though no final decision has been made yet on this matter by Bappenas.

Figure 9.1 Major Structure Elements of the SME System



9.3 DEVELOPMENT GOALS OF THE SME SUBSECTOR

In line with the development goals of the study area as a whole and the needs of the SME subsector, the following operational development goals of the SME subsector action plan are defined:

Development Goal 1

Sustainable SME subsector development with emphasis on employment creation and equity in rural and urban areas, which is based on "the Kalimantan System", and which is geared toward increasing the long-term competitive ability of the SMEs.

Development Goal 2

Toward that end, the strengthening of the relevant financial and non-financial sector SME support services structure at various provincial levels is an absolute prerequisite.

9.4 PROJECT COMPONENTS

As mentioned earlier, existing SME support projects provided by the international donor community use a variety of strategies and approaches to support SME development, the main difference being in the entry point (for example improving access to financing only) and depth and scope of support activities.

The SME subsector action plan should rather use a holistic strategy and approach using the provincial boundaries as a delineator for the project's potential group of beneficiaries. It has to be investigated, whether the action program for the two provinces could be linked with the on-going national level action plan under preparation (see above), and whether the two provinces could be included into the proposed provincial level action plans as holistic provincial pilot action plans for outer island SME development.

Given such a holistic approach, the major subsector plan components would typically comprise:

Component 1

Policy and Overall Enabling Environment Subsector Plan Component

Component 2

Support Services Structure Components Comprising Two Major Sub-Components :

- Financial Support Mechanisms, and
- Non-financial Sector Support Mechanism.

Component 3

Provision of Direct Technical Assistance to Promising SMEs

9.5 PROJECT OBJECTIVES

- Study on policy and regulatory frameworks,
- Provision of technical assistance to selected promising SMEs,
- Implementation of pilot projects for selected commodity processing,
  - Investment and working-capital financing
  - Machinery and equipment assistance
  - Assistance in raw material sourcing
  - Assistance in marketing and market information,
  - Assistance in modernization
- Evaluation of pilot projects and improvement of pilot project implementation

- Refinement of assistance systems to SMEs

9.6 PROJECT SCOPE

9.6.1 Phase 1 of the Subsector Action Plan Implementation

The subsector action plan covers, in principle, in line with the above identified major action plan components, the following main activity blocks :

- Provision of technical assistance (training; on-the-job training; management assistance, assistance in technology sourcing, and so on) to selected promising SMEs,
- Implementation of pilot projects for selected commodity processing,
- Investment and working-capital financing,
- Machinery and equipment assistance,
- Assistance in raw material sourcing,
- Assistance in marketing and market information, and
- Assistance in modernization, where and when needed.

The action program would be geared to generate the following typical outputs : (the listing does not suggest any phasing, sequencing or prioritization) :

Relevant to Component 1 :

Output 1. A basket of identified constraints, obstacles and restrictions within the policy objective instrument mix and the general regulatory frameworks, which impedes the sustainable development of the SME subsector

Output 2. Based on the above, a basket of policy and other regulatory relevant recommendations, which would remove such obstacles, including a rough sequencing of policy and regulatory environment adjustments and an assessment of their likely impact, and

Output 3. A cross-country policy and incentive system analysis with a view to identify in a number of selected countries the "prevailing best-practice" system approaches, therefore "lessons to be learned" for the approach to be adopted in the long-term under the project.

Relevant to Component 2 :

Output 1. Evaluation of the overall relevance of the existing SME support approaches and structures in the target provinces, including an in-depth assessment of the relevance of the existing structures to meet SME short- to long-term development needs, and general and specific impeding factors on both, the supply and demand sides

Output 2. Based on the above, identification and adoption of a basic structure for the delivery system. The system should be designed in a way that is geared toward meeting short-, medium and long-term development needs and long-term sustainability of the system itself, and should be based on self-help principles. The system should be, to the extent possible and suitable, integrated and/or interconnected with existing suitable SME promotion schemes, and

Output 3. Test the adequacy and overall suitability of the delivery system through the implementation of a pilot project.

Relevant to Component 3 :

Output 1. Identify short-term action priority target group SMEs and commodities (a guiding principle may be to keep as many promising SMEs alive as possible [using short term stabilization measures]), including an in-depth assessment of their assistance needs

Output 2. Arrange liaison and twinning arrangements with existing suitable and functioning support mechanisms (realization of synergies)

Output 3. Provide direct and systematic technical assistance to the priority target group SMEs

Output 4. Establish a reliable data base on the SME subsector comprising key structural and performance data, and

Output 5. Lay the groundwork in terms of future promotional activities, project and program organization, and data organization for Phase 2 of the action program.

9.6.2 Phase 2 of the Subsector Action Plan Implementation

The basic assumption for this phase is, that the economic crisis will have been overcome, and that the economy is back on a growth track, though this is likely to be at a lower growth performance level than before.

The development issue in this phase is the full promotion of the SME subsector's development potential.

The action program should comprise the following principal outputs :

Output 1. The results of the pilot phase have been evaluated, and the basic structure of the delivery system has been fine tuned where needed (optimization of delivery mechanism structure and procedures)

Output 2. The self-help system in accordance with the items above has been established and completed

Output 3. The coverage ratio of target group SMEs and commodity groups covered and/or to be addressed during this phase has been enlarged

Output 4. The assistance provided has been geared away from "survival" toward market-oriented and cost efficient structures, and emphasis is placed on community development, and

Output 5. In line with needs, technology (process and product) and management development, and technical skill training are intensified.

9.6.3 Phase 3 of the Subsector Action Plan Implementation

The basic assumption for this phase is that the SME subsector's economic activities are firmly embedded in a self-help and delivery mechanism structure. In other words, a suitable "enabling environment (delivery mechanism plus policy incentives)" is in place. The phase may be called the "continuous fine-tuning phase".

The action program during this phase should comprise the following principal outputs :

Output 1. Sustainability of the delivery system, that has full independent functioning after project completion is secured

Output 2. Support services have been geared toward the strengthening of the SMEs adoption capability (innovation capability in terms of process and product), and

Output 3. Overall results of the project under cost-benefit and cost-effectiveness criteria have been achieved.

CHAPTER 10

DEVELOPMENT OF RESEARCH STATION AND FIELD CENTERS IN THE UPSTREAM KAPUAS FOR THE KALIMANTAN SYSTEM BASIC AND APPLIED RESEARCH INSTITUTE

CHAPTER 10 THE DEVELOPMENT OF RESEARCH STATION AND FIELD CENTERS IN THE UPSTREAM KAPUAS FOR THE KALIMANTAN SYSTEM BASIC AND APPLIED RESEARCH INSTITUTE

10.1 INTRODUCTION

This project is one of the projects constituting "the Development Program of the Kalimantan System Basic and Applied Research Institute", whose outline is given in Chapter 8 of Volume 2: the Main Text of the Final Report.

10.2 BACKGROUND: THE KALIMANTAN SYSTEM BASIC AND APPLIED RESEARCH INSTITUTE

Kalimantan has salient features which are comparatively different from Sumatra and Sulawesi. In Kalimantan, the natural and socio-economic conditions have influenced each other to formulate a unique system of nature and socio-economy.

Development has been expanding at an increasingly rapid rate while being influenced by road and plantation development in the last decade. However, much of the Kalimantan System is not yet known, including gene resources, eco-systems of forests and lakes and local knowledge on forest resources and land management.

Kalimantan's regional development has to rely on the natural and social power of the Kalimantan System. In this sense, the accumulation of knowledge on the Kalimantan System itself is essential for the application of such knowledge and the utilization of natural resources for regional development.

The JICA study "The Development Study on Comprehensive Regional Development Plan for the Western part of Kalimantan" has recommended eight major strategies for sustainable regional development of Kalimantan. One of the major strategies is to develop a basic and applied research institute for the Kalimantan System. This strategy is closely related to other strategies on (1) making regional policy changes to attain the sustainability of the Kalimantan System and (2) restructuring of the existing spatial framework to adjust to the era of plantation development.

The natural resources and ecosystem of the Kalimantan System have not yet been sufficiently studied. Applied research has not been practically conducted for developing the knowledge and skills to utilize existing resources for economic development. Forest resources in primary and secondary forests, and aquatic resources in rivers, lakes and swamp areas are particularly important for applied research. Not only biological resources, such as gene resources, but also human resources of local knowledge should be included in applied research.

We recommend to develop a research institute by networking with the existing research centers and activities. The research institute can be called "The Kalimantan System Basic and Applied Research Institute". The goals of the development of the Kalimantan System Research Institute are as follows:

1) To accumulate knowledge on the Kalimantan System through basic and applied research
2) To develop practical technology and techniques based on knowledge of the Kalimantan System
3) To monitor the natural and social resources of Kalimantan for development and environmental management

The institute consists of one headquarters which has managing and intensive research functions, one branch office in Kalimantan, some research stations and field centers at designated research areas. Proposed locations of these facilities are shown in Figure 10.1

The roles and functions of the Institute are:

1) To conduct basic and applied research in natural science, social science and technology development for the preservation and utilization of natural resources
2) To conduct research concerning the local knowledge on utilization of forest and other natural resources (ethno-biology and ethno-zoology)
3) To monitor natural resources (forest resources, inland water fisheries resources and coastal water fisheries resources)
4) To fund basic and applied research on the Kalimantan System, not only for governmental organizations but also for NGOs and the private Sector.
5) To develop training material on the Kalimantan System for policy-makers, school teachers, and other personnel whose activities are closely related to the extension of the Kalimantan System.

10.3 STARTING WITH THE UPSTREAM KAPUAS: OBJECTIVES OF THE PROJECT

This project is designed to be the first project to initiate the whole program of "the Development Program of the Kalimantan System Basic and Applied Research Institute". The first project for the Upstream Kapuas serves for initiating the construction of a network of the Kalimantan System research institute.

The Upper Kapuas of West Kalimantan has two major areas of environmental research and conservation. One is the Sentarum Lake areas[1], which have a unique wetland environment and rich fresh water aquatic species, and the other is Gunung Bentuang and Karimun National Park[2], which consists of highland tropical forests that are undieturbed by human activities in some areas and still keep high biodiversity. In these two areas, various research groups and environmental conservation groups have been active with the support of international agencies and NGOs.

Since the basic principle for realizing the program is to develop the research institute by networking the existing research institutes and activities, rather than to construct a totally new institute, the Upstream Kapuas area is the most suitable area to initiate supporting activities to the on-going activities in Kalimantan.

Based on the understanding of the significance of the Kalimantan System and on-going activities for investigating and conserving the Kalimantan System, the project tries to find and support the needs of assistance, especially physical facilities and equipment.

By implementing this project in the Upstream Kapuas, the project aims at the following:

1) To initiate the development of "The Kalimantan System Basic and Applied Research Institute",
2) To provide a preferable working environment for research and technology development activities being carried out by various public and private organizations in the Upper Kapuas area ,
3) To define the role, functions and detailed activities of "The Kalimantan System Basic and Applied Research Institute",
4) To set the necessary arrangement of institutional formation to carry out the tasks to be assigned to the Institute

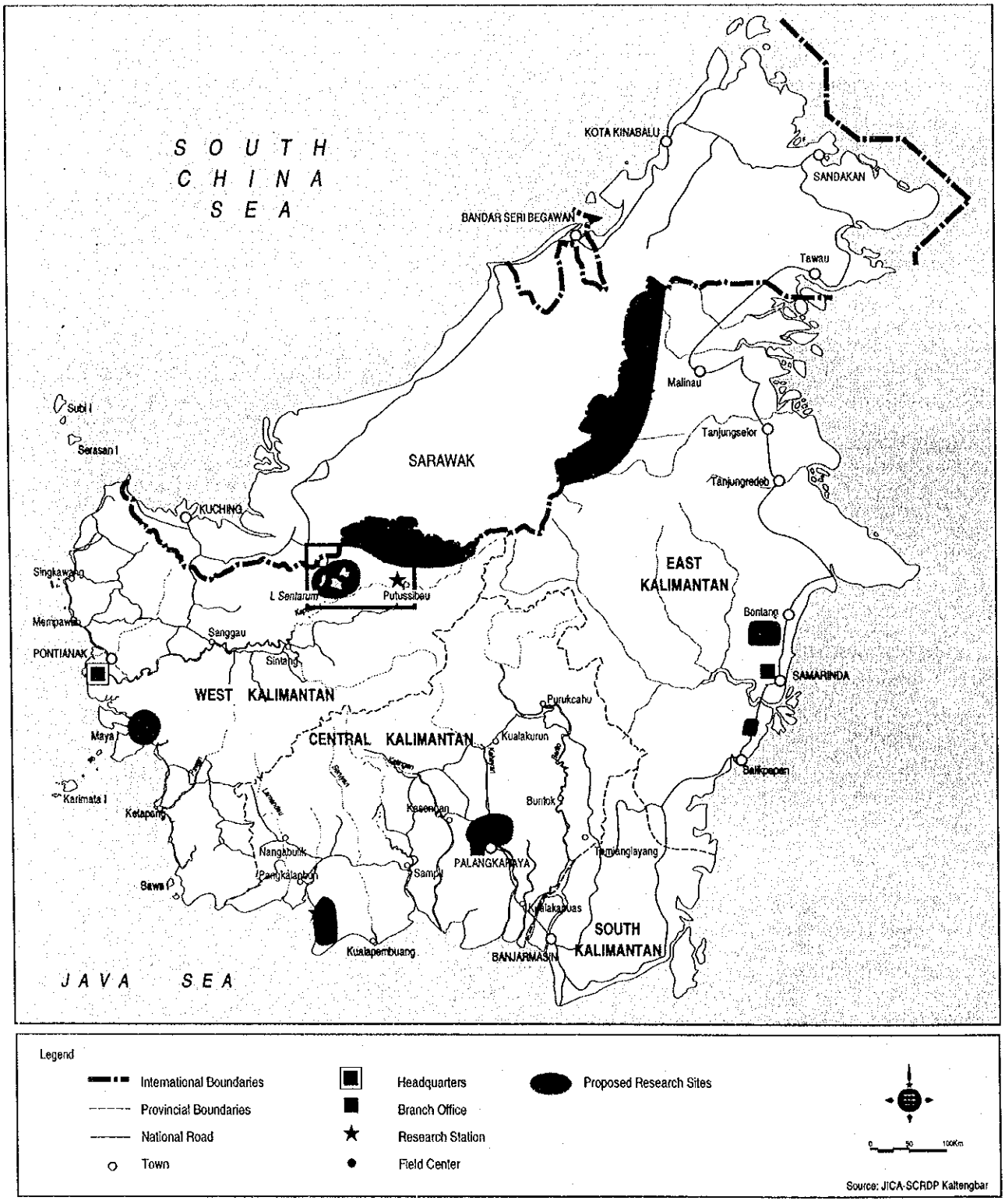
10.4 PROJECT LOCATION

Kapuas Hulu District, West Kalimantan (see Figure 10.1)

[1] Conservation study of the Sentrum Lake Area by "Wetland International" (NGO) under the assistance of ODA (UK)

[2] Study and project implementation of conservation of the Gunung Bentuang / Karimun National Park by WWF

Figure 10.1 Project Area and the Kalimantan System Basic and Applied Research Institute's Network



10.5 IMPLEMENTING AGENCY

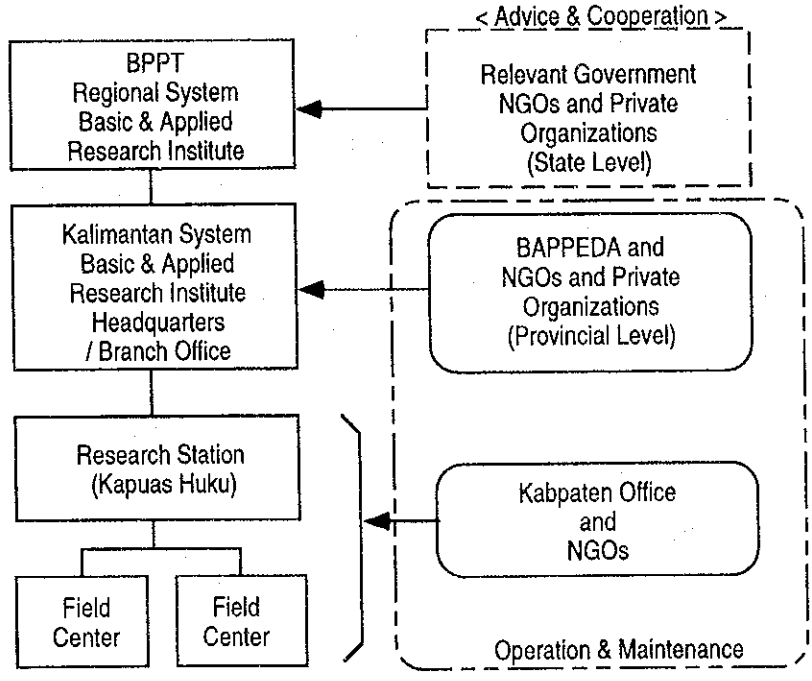
As for the executing agency, the Agency for the Assessment and Application of Technology (BPPT) or National Academy of Science (LIPI) is recommended.

LIPI is a scientific research institution covering a variety of academic fields. However, it is weak in the orientation of conservation and applied technology. On the other hand, BPPT is responsible for formulating general policies, coordinating the execution of programs, and conducting activities in the assessment and application of technology, as well as providing technological services to both the government and private sector. In response to the current national economic crisis, BPPT realizes the importance of developing appropriate technology suitable for the natural and socio-economic conditions of each region of Indonesia.

However, at the provincial level, the provincial government should be responsible for the actual operations and maintenance of the Institute's activities.

A suggested organization of implementation agencies is in for the Kalimantan System Basic and Applied Research Institute is shown in Figure 10.2.

Figure 10.2 Organization of The Kalimantan System Basic and Applied Research Institute



10.6 CONTENTS OF THE PROJECT:

(1) Phasing and Time Frame

The project is divided into the following three phases:

Phase - 1: Study of Existing and Future Needs and Basic Design of Facilities

On-going environmental research and conservation activities in the Upstream Kapuas will be studied to identify needs in order to support existing and proposed activities by various organizations. In addition to the existing organizations, potential organizations to be involved in the Institute will be studied.

Based on the findings and discussion among the related organizations, appropriate institutional arrangements for the actual operation and maintenance of the facilities will be established.

Basic needs for field centers and a research station will be identified. A basic design for the facilities to meet the requirement and financial evaluation shall be carried out.

Phase - 2: Detailed Design and Construction of Facilities

Detailed design will be carried out based on the study in the previous phase. Construction of facilities for field centers and a research station will be carried out.

Phase - 3: Operation and Study for Institutional Building

The actual operation of the facilities which includeinventory, data collection and monitoring will take place in order to effectively develop the full scale organization and operation of the facilities of the "Kalimantan System Basic and Applied Research Institute".

Based on the provided facilities, a study for institutional building for effective operation of research and conservation activities will be studied.

The time framework of the project is set in the following:

Phase - 1 : 8 months
Phase - 2: 12 months (Design and Construction)
Phase - 3: 24 months (Operation, Monitoring and Further Planning)

(2) Facilities to be Constructed

1) Field Centers

One(1) field center located inside or on the fringe of the protection area of Sentrum Lake, and one (1) field center located inside of the Gunung Bentuang / Karimun National Park (See Figure 10.3) will be provided with the following basic facilities:

- simple accommodation (simple beds and mosquito nets)
- shower rooms and toilets
- cooking space with a sink and water supply system(primitive)
- dining and meeting space

Total building area : 220 sq. m (for one field office)

An image of the field center is shown in the Figure 10.4.

2) Research Station

One (1) research station to be located in Putussibau will consist of the following two buildings.

- One 12 room guest house (500 sq.m)
  (with capacity of 3-4 beds per room)
- One administration building (600 sq. m) to include the following:
  - Administration office 100 sq. m
  - Meeting Room 100 sq. m
  - Information Center 200 sq. m
  - Utility area and open space 200 sq. m

(3) Estimated Project Cost

Phase - 1: Institutional study and Basic design of facilities US$ 500,000

Phase - 2: Detailed Design and Construction of Facilities US$ 850,000

Phase - 3: Facilities operation, monitoring, inventories and data collection for the development of full scale organization and facilities development of "The Kalimantan System Basic and Applied Research Institute".

US$ 2,500 / month x 24 month = US$ 60,000

Figure 10.3 Location Map of a Research Station and Field Centers

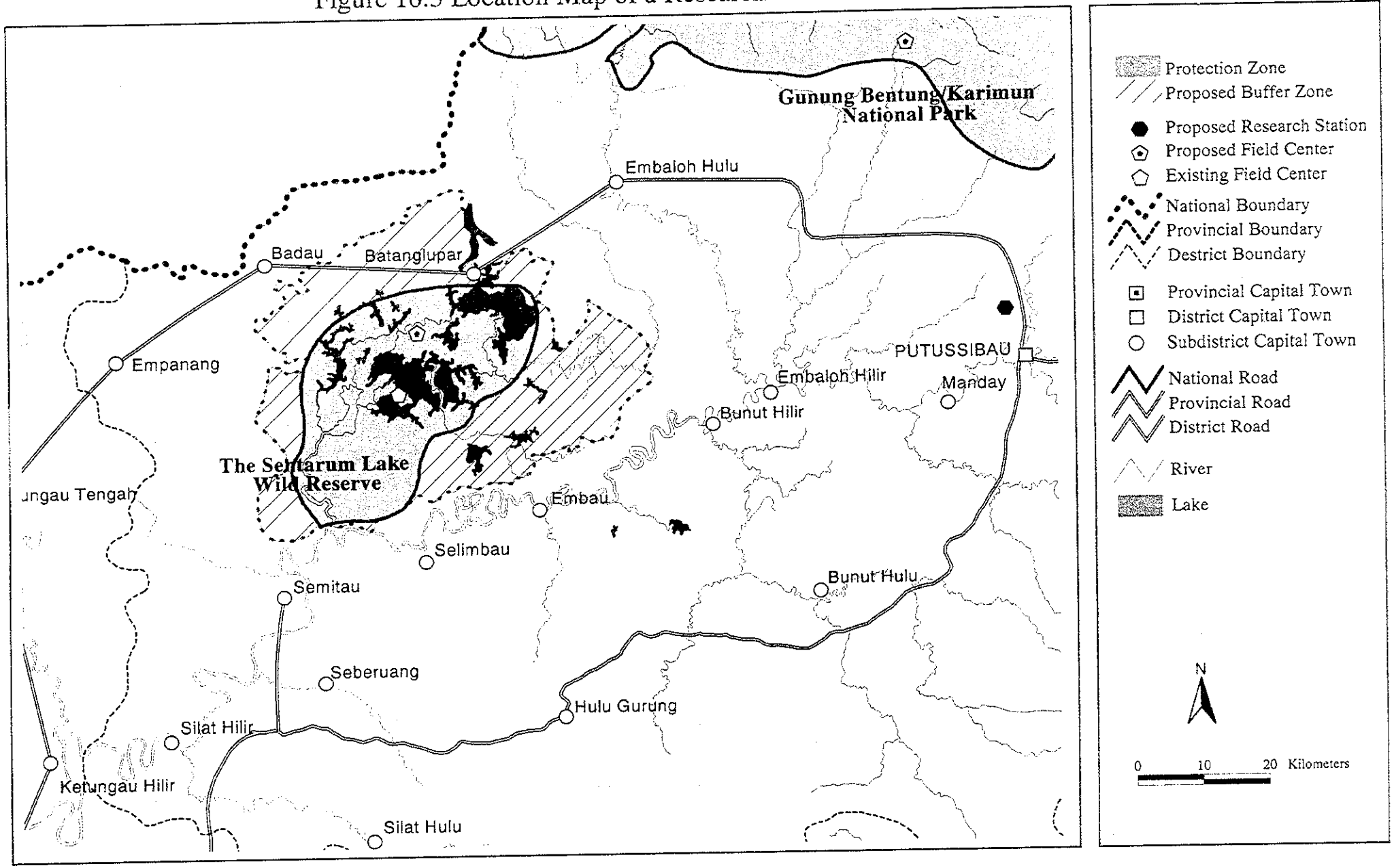
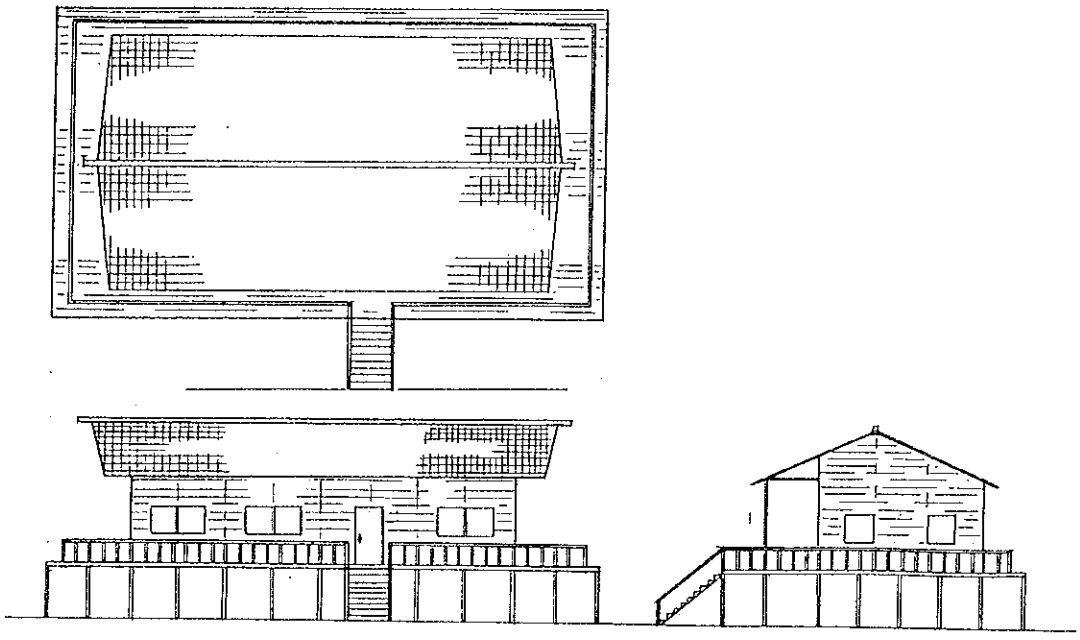
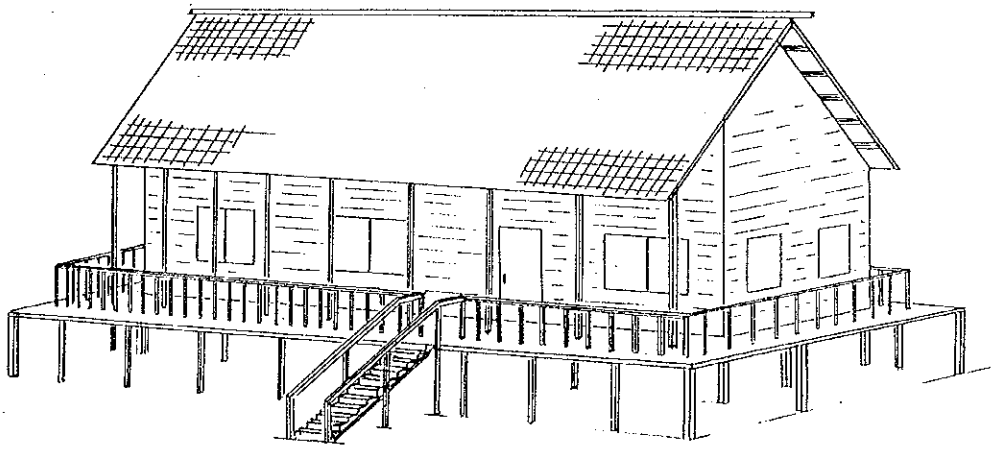


Figure 10.4 Image of the Field Center





CHAPTER 11

PLANNING STUDY ON COMMUNITY-BASED ENVIRONMENTAL MANAGEMENT OF PEOPLE'S GOLD MINING

CHAPTER 11 PLANNING STUDY ON COMMUNITY-BASED ENVIRONMENTAL MANAGEMENT OF PEOPLE'S GOLD MINING

11.1 INTRODUCTION

This chapter discusses a recommended priority project (planning study project), one of several projects comprising the "Kalimantan Pollution Monitoring Program", the outline of which is given in Chapter 8, Volume 2: the Main Text of the Final Report. (This chapter may serve as the Terms of Reference of the study project.)

11.2 BACKGROUND AND RATIONALE

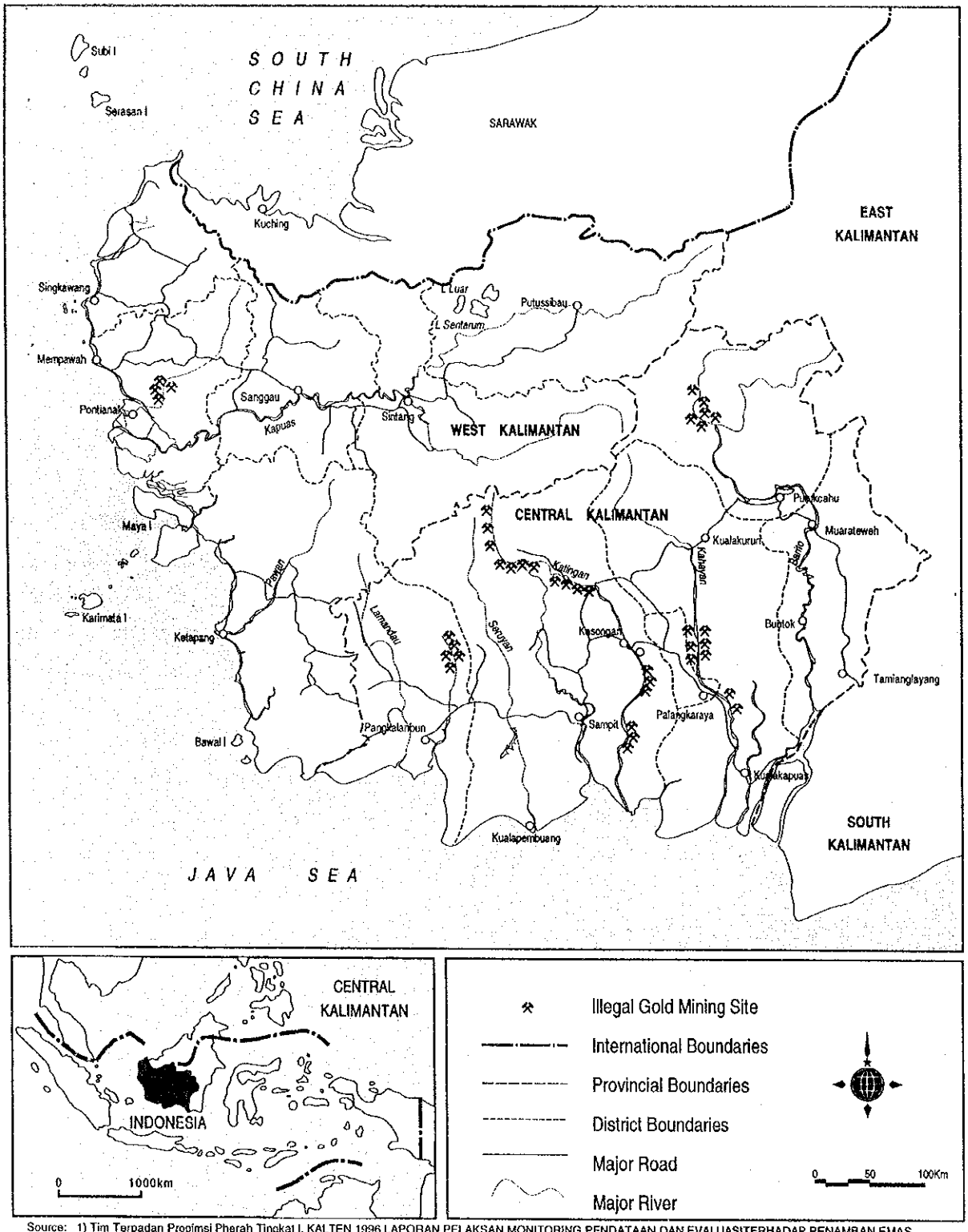
According to the report on "Environmental Concentration of Mercury Along the Kapuas River, West Kalimantan", August 1995, Environmental Management Center (EMC, PUSARPEDAL)/ Environmental Impact Management Agency (Bapedal), the survey on environmental concentration of mercury was carried out at 6 points for surface water, sediment and fish, and hair samples were taken from 7 persons in May, 1995. The report drew the following conclusion:

There is mercury contamination in the surface water, sediments, fish and hair samples. It is very important to regularly monitor this situation. The people living along the river may have serious health problems in the future because of the large amount of mercury used for illegal gold mining for many years.

The recent increase of small-scale gold mining activities in the study area reflected the increased nominal rupiah prices of gold because of falling rupiah prices against US dollar. Under such circumstances many small farmers rushed to such gold mining activities in rivers. However, even before the present monetary crisis, such gold mining is one of the important income sources of rural people in Kalimantan.

The people's gold mining activities are those of finding alluvial gold by using motorized pumps for flushing river water against river banks or pumping up riverbed soils. Gold miners utilize mercury for refining alluvial gold before selling it to local traders.

Figure 11.1 Illegal Gold Mining Sites in the Study Area



Source: 1) Tim Terpadan Propimsi Pherah Tingkat I, KALTEN 1996 LAPORAN PELAKSAN MONITORING PENDATAAN DAN EVALUASITERHADAP PENAMBAN EMAS TANPA IJIN (PETI), DI DAS KAPUAS
2) Tim Terpadan Propimsi Pherah Tingkat I, KALTEN 1996 LAPORAN PELAKSAN MONITORING PENDATAAN DAN EVALUASITERHADAP PENAMBAN EMAS TANPA IJIN (PETI), DI DAS KAHAYAN
3) Tim Terpadan Propimsi Pherah Tingkat I, KALTEN 1996 LAPORAN PELAKSAN MONITORING PENDATAAN DAN EVALUASITERHADAP PENAMBAN EMAS TANPA IJIN (PETI), DI DAS KSNTIGSN

As a result, there are two kinds of river water pollution. One is mercury pollution of soils and river water. At the same time, gold miners are at constant risk of skin absorption of mercury. The other is muddy water due to soil erosion created by such increased gold mining activities. Since the people's gold mining is more active when the volume of river water is smaller in the dry season, the problems of mercury contamination and muddy river water are more severe in the dry season.

At present, the people in gold mining communities are not so aware of actual health risks of utilizing mercury, resulting in the careless handling and storing of mercury. Environmental hazards to human health and aquatic life may arise if are not taken measures to encourage the gold miners' communities to pay more attention to mercury handling.

There are no cheap gold mining methods dispensing mercury which are economically feasible for the people's gold mining. The gold mining activities are one of the social safety net for the rural people who suffer from increased prices of merchandised goods. In this sense, prohibiting the people's gold mining will not lead to a solution of environmental and livelihood problems related to the people's gold mining.

On the other hand, muddy river water caused by the gold mining activities creates problems for drinking water in the gold mining communities.

The Clean River Program (PROKASIH: Program Kali Bersih) is a national water quality improvement program. As reported in its 1996-1997 Annual Report, small-scale gold mining by local people in several areas in West Kalimantan has been going on since 1987. At least, small-scale mining activities that generate toxic waste, such as organic mercury, have been observed in the Kapuas River in West Kalimantan, the Katingan River, the Kahayan River, and the Barito River in Central Kalimantan recently.

In West and Central Kalimantan, there are as yet no environmental or pollution monitoring systems established for effective environmental management. The laboratory testing of water and air still depends on the facilities in Java. In fact, West Kalimantan, at present, still does not have an office of PROKASIH and the staff gathers only when a survey is implemented.. PROKASIH used the laboratory belonging to the Department of Health in Pontianak for its water quality analysis. Water samples were taken from 5 survey points for river water and 15 for industrial factories, and survey items did not include heavy metals such as mercury.

In Repelita VI, public awareness and active community participation are considered to play an important role in the preservation of living environmental functions. Environmental education related to gold mining is very important, and this should be a prime concern of schools. There

is a very great need to educate local people about the dangers posed on health and the environment by poisons used to catch fish and mercury contamination from gold mining.

In this planning study and a pilot project, the following three issues need to be tackled:

- Monitoring of the mercury levels of people living in the area through hair samples, of locally caught fish and of river water
- Promotion of a community education program on hygiene and the risks related to mercury contamination, in cooperation with the Health Department and the Education Department
- Promotion of community-based initiatives for environmental management concerning people's gold mining

11.3 IMPLEMENTING AGENCIES

The major implementing agency for this project should be the Regional Environmental Impact Management Agency (Bapedalda) under the provincial government.

The following government agencies also should cooperate with implementation of this planning study.

- The Environmental Impact Management Agency (Bapedal), technically guiding local governments
- The Office of the State Minister of the Environment, formulating policies and coordinating related agencies
- The Ministry of Health, which is responsible for ensuring the health of the people by planning and coordinating public health awareness and sanitation programs, and
- The Ministry of Public Works, which has a duty to promote physical infrastructure development such as constructing potable water supply.

11.4 OBJECTIVES

- To study the existing condition of the people's gold mining activities
- To prepare action plans for community-based environmental management of the people's gold mining

11.5 STUDY AREA

The study area covers the provinces of West and Central Kalimantan.

11.6 SCOPE OF WORK

The study is composed of the following three phases:

Phase 1: Data collection and analysis of a wide-range of the people's gold mining activities in various aspects

Phase 2: Implementation of pilot action plans for community-based environmental management of people's gold mining

Phase 3: Preparation of action plans for community-based environmental management of the people's gold mining

The tasks in each of these phases are as follows:

11.6.1 Phase 1: Data Collection and Analysis of People's Gold Mining Activities in Various Aspects

[Task 1] Data collection and analysis of the existing conditions of people's gold mining

[Task 2] Data collection and analysis of the social and economic conditions of the people engaged in gold mining

[Task 3] Data collection and analysis of environmental impacts of people's gold mining

[Task 4] Data collection and analysis of regulation systems of people's gold mining

This task is to be done at the following different levels:

- Central government level
- Provincial government level
- District government level
- Local community level

[Task 5] Identification of critical locations and aspects of environmental risks due to people's gold mining

11.6.2 Phase 2: Implementation of Pilot Action Plans for Community-Based Environmental Management of People's Gold Mining

[Task 6] Case studies by implementing pilot action plans for community-based environment of people's gold mining

[Task 7] Identification of issues concerning people's gold mining through pilot action plans

[Task 8] Identification of constraints for taking actions for community-based environmental management of people's gold mining through pilot action plans

[Task 9] Analysis of availability of resources (financial, human and others) for community-based environmental management of gold mining through pilot action plans

11.6.3 Phase 3: Preparation of Action Plans for Community-Based Environmental Management of the People's Gold Mining

[Task 10] Setting of goals and objectives of community-based environmental management of people's gold mining

[Task 11] Formulation of frameworks and basic strategies for community-based environmental management of people's gold mining

- Framework and basic strategies for the management of environmental aspects
- Framework and basic strategies for the management of social aspects
- Framework and basic strategies for the management of institutional aspects (community-based participation schemes)

[Task 12] Formulation of a long list of actions

- Necessary actions by communities
- Necessary actions by the government including establishment of regulations and assistance to the people's gold mining communities

[Task 13] Selection of priority actions

[Task 14] Preparation of priority actions' profiles

11.7 NECESSARY INPUTS

Expatriate Consultants	
Team Leader/ Environmental Specialist	12 person-months
Water Pollution Control Specialist	10
Rural Development Planner	7
Sanitary Engineer	7
Water Supply Engineer	7
Participatory Planning Specialist	7
Gold Mining Specialist	7
Evaluation Economist	4
Sub-Total of Expatriate Consultants	6
Local Consultants	
Sub-Team Leader	12 person-months
Water Pollution Control Specialist	10
Rural Development Planner	10
Participatory Planning Specialist	10
Gold Mining Specialist	10
Sociologist	7
Institutional Specialist	7
Cost Estimate Specialist	7
Social Survey Specialist	7
Evaluation Economist	4
Sub-Total of Local Consultants	84
Total of Consultants	**145 person-months**

11.8 SCHEDULE

It is tentatively proposed that the study takes 16 months. The three phases outlined above need the following time period:

Phases		
Phase 1	Data collection and analysis of a wide-range of the people's gold mining activities in various aspects	4 months
Phase 2	Implementation of pilot action plans for community-based environmental management of people's gold mining	8 months
Phase 3	Preparation of action plans for community-based environmental management of the people's gold mining	4 months

CHAPTER 12

INITIAL ENVIRONMENTAL EXAMINATION OF THE PRIORITY PROJECTS

CHAPTER 12 INITIAL ENVIRONMENTAL EXAMINATION OF THE PRIORITY PROJECTS

The initial environmental examination (IEE) is normally required to examine 23 environmental items that may be affected by project implementation not only in the project area, but also in any areas that may be directly or indirectly affected during the construction and operation periods of the projects.

The characteristics of the priority projects in terms of development objectives and environmental impact are summarized in Table 12.1.

The screening and scoping for these 23 environmental items of IEE on the priority projects in this study have been carried out. The results are shown in Table 12.2 and 12.3

Table 12.1 Characteristics of Priority Projects Concerning the Environment

	Chapter	Name of Priority Project	Characteristics of the Project
1	Chapter 2	Kalimantan Forest Fire Disaster Management Project	An project partly aiming at environmental protection
2	Chapter 3	Oil Palm Subsector Improvement Project	A project requiring an emphasis on environmental considerations on what extent and where oil palm plantations are developed
3	Chapter 4	The Tayan-Pangkalanbun Section of the Trans-Kalimantan Highway Project	A road development project requiring careful environmental considerations
4	Chapter 5	The Upland Ecological Development Corridor Project in Central Kalimantan	Environmental conservation is incorporated in the goals of project development .
5	Chapter 6	Pangkalanbun-Kumai Urban, Industrial and Port Development Project	An urban, industrial and port development project requiring careful environmental considerations.
6	Chapter 7	Kalimantan Upland Rural Infrastructure Development for Poverty Alleviation Project	A project with small-scale rural development components, with less environmental impact
7	Chapter 8	Kalimantan Upland Community Rescue and Development Project	A project with small-scale development components, with less environmental impact
8	Chapter 9	Kalimantan Small and Medium Enterprises Promotion	A project based on small-scale activities
9	Chapter 10	Development of a Research Station and Field Centers in the Upstream Kapuas for the Kalimantan System Basic and Applied Research Institute	A project for environmental conservation
10	Chapter 11	Community-Based Environmental Management for People's Gold Mining	A project for environmental management

Table 12.2 The Results of the Screening and Scoping (1)

Environmental Items		Project Name	Chapter 2: Kalimantan Forest Fire Disaster Management Project							Chapter 3: Oil Palm Subsector Improvement Project							Chapter4: The Tayan-Pangkalanbun Section of the Trans-Kalimantan Highway Project							Chapter 5: Upland Ecological Development Corridor Project in Central Kalimantan							Chapter6: Pangkalanbun-Kumai Urban, Industrial and Port Development Project						
		Activities which may cause impacts	Before Operation			After Operation				Before Operation		After Operation					Before Operation		After Operation					Before Operation		After Operation					Before Operation		After Operation				
			Incidence of Forest Fires	Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods	Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods	
Social	1	Resettlement								◎	◎	◎	◎				○							○							○						
	2	Economic Activity	○							◎	◎	◎	◎	○					○	○		○				○	○			○	○			○	○		
	3	Traffic & Public Facility								◎	◎		○	○						○						○					○						
	4	Split of Communities								○	○	○	○														○	○				○					
	5	Cultural Property								○	○	○	○				○			○				○			○				○	○				○	
	6	Water Rights/ Rights of Common								○	○	○	○		○				○			○						○			○	◎				○	
	7	Public Health Condition	◎								○	○	○		○														○								
	8	Waste										○	○		○														○								
	9	Hazards (Risk)	○												○		○												○				○	○			○
Natural Environment	10	Topography & Geology															○							◎	○							○					
	11	Soil Erosion									◎	◎					○	○	○					○	○							○					
	12	Groundwater	◎								◎	◎																						○			
	13	Hydrological Situation	◎								○	○																				○					
	14	Coastal Zone																														◎	○	○			
	15	Fauna & Flora	◎								◎	◎					○	○	○	○				○	○	○	◎	○			○	○	○	○	○	○		
	16	Meteorology																																			
	17	Landscape															○							○								○		○	○	○		
Pollution	18	Air Pollution	◎															○		○					○		○						○	○	○		
	19	Water Pollution	○								○																						○	○	○	○	
	20	Soil Contamination									○																								○		
	21	Noise & Vibration									○							○		○					○		○						○	○	○		
	22	Land Subsidence																																○	○		
	23	Offensive Odor																																○			

Note: ◎ : The environmental items to which special attention has to be paid, because they might cause serious impacts that may affect the project formulation, depending on the magnitude of the impacts and the possibility of the measures.
○ : The environmental items which may give a significant impact depending upon the scale of project and site conditions.
No mark: The environmental items which require no impact assessment since the anticipated impacts are not significant.

Table 12.3 The Results of the Screening and Scoping (2)

Environmental Items		Project Name	Chapter 7: Upland Rural Infrastructure Developement Project							Chapter 8: Kalimantan Upland Community Rescue and Developement Project							Chapter 9: Kalimantan SME Promotion Project							Chapter 10: Development of a Research Station and Field Centers inthe Upstream Kapuas for the Kalimantan System Basic and Applied Research Institute							Chapter 11: Community-Based Environmental Management for People's Gold Mining						
		Activities which may cause impacts	Before Operation		After Operation					Before Operation		After Operation					Before Operation		After Operation					Before Operation		After Operation					Before Operation		After Operation				
			Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods		Reclamation	Construction Works	Spatial Occupancy	Operation of Transport	Operation of Facilities	Accumulation of People/Goods	
Social	1	Resettlement	○	○	○			○	○																											
	2	Economic Activity	○	○															○	○							○									
	3	Traffic & Public Facility	○	○																																
	4	Split of Communities	○	○	○																															
	5	Cultural Property																								○										
	6	Water Rights/ Rights of Common	◎	◎			◎												○	○							○									
	7	Public Health Condition		◎			◎												○	○							○									
	8	Waste																	○								○									
	9	Hazards (Risk)	○	○	○		○												○	○													○			
Natural Environment	10	Topography & Geology	○	○																																
	11	Soil Erosion																																		
	12	Groundwater	○	○															○	○																
	13	Hydrological Situation	○	○																						○										
	14	Coastal Zone																																		
	15	Fauna & Flora	○	○	○		○																			○	○									
	16	Meteorology																																		
	17	Landscape																	○	○																
Pollution	18	Air Pollution	○	○															○	○																
	19	Water Pollution	○	○	○		○												○	○													○	○		
	20	Soil Contamination	○	○															○	○																
	21	Noise & Vibration	○	○			○												○	○																
	22	Land Subsidence																	○	○																
	23	Offensive Odor																	○	○																

Note: ◎ : The environmental items to which special attention has to be paid, because they might cause serious impacts that may affect the project formulation, depending on the magnitude of the impacts and the possibility of the measures.
○ : The environmental items which may give a significant impact depending upon the scale of project and site conditions.
No mark: The environmental items which require no impact assessment since the anticipated impacts are not significant.