SCRDP - KALTENGBAR

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)
NATIONAL DEVELOPMENT PLANNING AGENCY (BAPPENAS)
THE GOVERNMENT OF REPUBLIC OF INDONESIA

PLANNING ATLAS

KALIMANTAN IN GIS

March 1999

PACIFIC CONSULTANTS INTERNATIONAL
INTERNATIONAL DEVELOPMENT CENTER OF JAPAN

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Abbreviation and Glossary

Adat	Customary law
ADB	Asian Development Bank
AIDA	Australia Indonesia Development Area
Alang-alang	Imperata cylindrica grassland
AFTA	ASEAN Free Trade Area
APBD	Anggaran Pendapatan dan Belanja Daerah, Provincial or district Budget
APBN	Anggaran Pendapatan dan Belanja Negara, National Budget
APPKD	Anggaran Penerimaan dan Pengeluaran Kas desa, Village Budget
ASEAN	Association of South East AsiaNations
Bangda	Direktorat Jenderal Pembangunan Daerah, Directorate General for Region Development, Ministry of Home Affairs
Bangdes	Direktorat Jenderal Pembangunan Desa, Directorate General for Village Development, Ministry of Home Affairs
Bappenas	Badan Perencanaan Pembangunan Nasional (National Development Planning Agency, Indonesia)
Bappeda	Badan Perencanaan Pembangunan Daerah (Regional Development Planning Agency)
BIMP-EAGA	Brunei Darussalam-Indonesia-Malaysia-Philippines East ASEAN Growth Area
BKKBN	Badan Koordinasi Keluarga Berencana Nasional (National Family Planning Coordinating Board)
BKPM	Badan Koordinasi Penanaman Modal (Capital Investment Coordinating Board)
BPN	Badan Pertanahan Nasional (National Board of Land Affairs)
BPS	Biro Pusat Statistik (Central Bureau of Statistics, Indonesia)
BRI	Bank Rakyat Indonesia (Indonesian People's Bank)
Bulog	Badan Urusan Logistik (State Logistics Board with special responsibility for food procurement)
Bupati	Administrative head of a district (kabupaten)
Camat	Administrative head of a subdistrict (kecamatan)
Cipta Karya	Directorate General of Human Settlements, Ministry of Public Works
CPO	Crude Palm Oil
Crude Birth Rate	The annual number of births per 1,000 persons
Damar	Resin
Das	Daerah Susur Sungai (Catchment Area)
Desa	Administrative village
Dinas	Office of Provincial Government
DPR	Dewan Perwakilan Rakyat (House of People's Representatives)
DPRD	Dewan Perwakilan Rakyat Daerah (Regional House of People's Representatives)
Dusun	Subvillage, hamlet (part of desa)
EPI	Expanded Program of Immunization
GBHN	Garis-garis Besar Haluan Negara (Broad Guidelines for State Policy)
GDP	Gross Domestic Product
GNP	Gross National Product
GRDP	Gross Regional Domestic Product
GTZ	Gesallschaft fur Technische Zusammernarbeit (German Agency for Technical Cooperation)
HPH	Hak Pengusahaan Hutan (Timber Concession)
HTI	Hutan Tanaman Industri (Industrial Tree Plantation)
IDT	Inpres Desa Tertinggal (Backward Village Program)
IMF	International Monetary Fund
Inpres	Instruksi Presiden (Presidential Instruction, a program of special grants from the central government)
Inpres program	Central government subsides to regional government (province, kabupaten and villages) for various kinds of infrastructure development and for the construction of primary schools and health centers
IPK	Izin Pemanfaatan Kayu (Wood Utilization Permit)
JICA	Japan International Cooperation Agency
Kabupaten	District or regency, administrative unit below the province
KADIN	Kamar Dagan dan Industri Indonesia (Chamber of Commerce and Industry)
Kampung	Hamlet, traditional settlement unit in parts of Kalimantan
Kantor dinas	Department under provincial governor's office
Kanwil	Kantor Wilayah (Regional Office, a line regional agency of a ministry)
Kebun karet rakyat	Rubber grove established by farmers, or so-called jungle rubber grove
Kecamatan	Subdistrict, administrative unit below the district (kabupaten)
Kelurahan	Urban village
Kepala desa	Village head
KUD	Koperasi Unit Desa (Village Unit Cooperative)
Kukesra	Kredit Usaha Keluarga Sejahtera (small-business credit component for Family Prosperity Development Program)
Ladang	Dry field
LKMD	Lembaga Ketahanan Masyarakat Desa (Village Community Development Institution)
LMD	Lembaga Musyawarah Desa (Village Council)
LNG	Liquid Natural Gas
NES	Nucleus Estate and Smallholder's integration scheme
NGO	Non Government Organization
Pancasila	Five philosophical principals that constitute the official national ideology
Pasar	Market place

PBB	Pajak Bumi dan Bangunan (land and building tax which has replaced the old lan tax, Ipeda)
PCM	Project Cycle Management, an objectis-oriented planning method adopted by JICA, a similar method to ZOPP
PIR	Perkebunan Inti Rakyat (nucleus-smallholders plantation scheme)
PJP II	Pembangunan Jangka Panjang II (Second Long-Term Development, 1994-2019)
PKK	Pembinaan Kesejahteraan Keluarga (Family Welfare Education Movement)
Posyandu/Pelayanan	Pos Terpadu (Integrated Health Service Delivery Post), a once a month health care center which provides maternal and child health, as well as family planning services
PMD	Pembangunan Masyarakat Desa (former Bangdes), Directorate for Community Development, Ministry of Home Affairs
Prokasih	Program Kali Bersih (Clean river program for urban rivers)
PT	Perseroan Terbatas (limited liability company)
PTP	Perseroan Terbatas Perkebunan (limited liability estate company)
Puskesmas	Pusat Kesehatan Masyarakat (subdistrict Health Center)
P5D	Pedoman Penyusunan Perencanaan dan Pengendalian Pembangunan Daerah, 1982 regulation on bottom-up planning
Rakorbang	Rapat Koordinasi Pembangunan (development planning coordination meeting)
Repelita	Rencana Pembangunan Lima Tahun (National Five-year Development Plan)
Repelitada	Rencana Pembangunan Lima Tahun Daerah (Regional Five-year Development Plan)
RePPProT	Regional Physical Planning Project for Transmigration
SALCRA	Sarawak Land Consolidation and Rehabilitation Authority
Sawah	Irrigated rice field
Sakernas	Survei angkatan Kerja Nasional (National Labor force Survey)
SCRDP-Kaltengbar	JICA Study Project, Development Study on Comprehensive Regional Development Plan for the Western Part of Kalimantan covering West Kalimantan (Kalbar) and Central Kalimantan (Kalteng)
SIJORI growth triangle	Singapore-Johor-Riau growth triangle
SME	Small and Medium Enterprise
SSE	Small Scale Enterprise
Susenas	Survei Sosial Ekonomi Nasional (National Socioeconomic Survey)
Swidden agriculture	Indigenous people's cyclic agriculture, shifting cultivation or slash and burn agriculture
Takesra	Tabungan Keluarga Sejahtera (saving mobilization component of Family Prosperity Development Program)
TGHK	Tata Guna Hutan Kesepakatan (Consensus Forest Landuse)
TPTI	Tebang Pilih dan Tanam Indonesia (Indonesian Selective Logging and Planting System)
UNDP	United Nations Development Program
USAID	United States Agency for International Development
ZOPP	Ziel-Orientierte Projekt-Plaunung (Objective-Oriented Project Planning), ZOPP planning technique, the GTZ's official project planning system

1 CONTENTS OF THE PLANNING ATLAS

1.1 INTRODUCTION

Based on a number of map data collected through the Development Study on Comprehensive Regional Development Plan for the Western Part of Kalimantan (SCRDP-Kaltengbar), the JICA Study Team has built a geographic database to support the planning works. This geographic database has been compiled from two GIS databases prepared for the National Masterplan for Forest Planning Project (NMFP), Ministry of Forestry and the Infrastructure Development Project (P3DT), BAPPENAS.

Here we would like to appreciate the kindness of the two projects, which made their geographic database available to us.

1.2 DATA ITEMS OF THE PLANNING ATLAS

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2 EXPLANATION OF MAPS

The following is a brief explanation of the maps complied in the Planning Atlas (Kalimantan in GIS). The map codes hereafter correspond to those found on the maps.

2.1 EXISTING CONDITIONS

A-1 to 3 Administration Boundaries

The administrative unit of subdistrict is a basic unit for official socioeconomic statistics. The minimum unit for analyses is the subdistrict level in this study. There are 7 Districts (6 Kabupaten, 1 Kotamadya) and 108 Subdistricts (Kecamatan) in West Kalimantan, 6 Districts (5 Kabupaten, 1 Kotamadya) and 190 Subdistricts in Central Kalimantan. A total of 13 Districts and 298 Subdistricts are shown in these maps with their corresponding name listed. The polygonal boundary shapes closely resemble the actual administration boundaries but do not accurately portray the measured units. Official statistic by subdistrict in 1990 is shown in Table 2.

A-4 Village Administration Boundaries

There are approximately 1,400 villages (desa) in West Kalimantan and 1,100 villages (desa) in Central Kalimantan. In West Kalimantan, some village administration boundaries were recently formed by the government by merging several small spontaneously established communities (kampungs) into one administrative village. The polygonal village boundaries closely resemble the actual existing conditions although the measured areas are not very accurate. In Central Kalimantan, the administration boundaries are rectangular along the rivers. These rectangles show that lands far from rivers are not used.

In 1989, the total estimated population in the village areas was approximated at 3 million in West Kalimantan and 1.4 million in Central Kalimantan. The population per village in West Kalimantan is four or five times larger than that of Central Kalimantan.

A-5 Population Density by Subdistrict in 1990

This map presents population density as an indicator of development intensity and urbanization in both West and Central Kalimantan.

A-6 Elevation

Much of the study area consists of lowland and middle lowland areas. Mountainous areas are located at provincial boundaries with few mountains higher than 2,000 meters.

A-7 Drainage Patterns, Catchment Areas and Rainfall Stations

Development of Kalimantan Island has been proceeding based on river transportation. Size of river i.e. size of catchment basin is service area of city and size of service town in the lower part of a river. Size of service center represents the size of development pressure to the upper part of a river and development intensity of each river basin. Due to the growth of the road transportation system in recent years, the relationship between drainage patterns and service towns is changing but gradually.

On this map, Kapuas River System and Kakab River System (consisting of Kahayan, Kapuas and Barito rivers) have the cities of Pontianak and Banjarmasin at the mouth of each catchment area. The following table shows the main rivers and catchment areas. Rainfall stations are also located on the map.

Table 1 Main Rivers and Catchment Areas

Main River	Area (km²)	
Sambas	11,981	
<Kapuas River system>		
Kapuas	69,331	
Ketungau-Kapuas	15,861	
Melawi-Kapuas	22,931	
Total of Kapuas River System		*108,123*
Pawan	14,473	
Pesaguan	9,297	
Kotawaringin	19,390	
Seruyan	20,425	
Mentaya	15,847	
Katingan	18,531	
Subangan	6,797	
<Kakab River system>		
Kahayan	17,531	
Kapuas	14,468	
Barito	45,343	
Total of Kakab River system		*77,342*

A-8 Land System Units

This original paper map is one of three map series at 1:250,000 scale made by the RePPProT in 1984 to 1989. The NMFP project digitized the RePPProT maps. Main soils formed in West and Central Kalimantan are shown in the following table:

Table 2 Main Soils Order and Group

Order	Suborder	Group
Histosol	Hemist	Tropohemist
Entisol	Aquent	Hydraquent
		Fluvaquent
		Tropaquent
	Psamment	Tropopsamment
	Fluvent	Tropofluvent
Inceptisol	Aquept	Tropaquept
	Tropept	Dystropept
Ultisol	Udult	Tropudult
		Paleudults
Spondosol	Aquod	Placaquod
Spondosol	Aquod	Placaquod
Oxisols	Orthox	Haplorthox

The land system concept is based on ecological principles and presumes closely interdependent links among rock types, hydroclimatology, landforms, soils and organisms. The same land system is recognized wherever the same combination of such ecological or environmental factors occurs, and has the same potential and limitation. Table 5 shows land type descriptions of each land system unit. For further information, refer to following reports:

- "Review of Phase 1 Results, West Kalimantan, RePPProT, Volume Two, Annexes 1-5", 1987
- "Review of Phase 1B Results, Central Kalimantan, RePPProT", June 1985.

A-9 Land Cover in 1989

This map consists of the latest data acquired for the whole western part of Kalimantan Island. This original paper map is one of three map series at 1:250,000 scale made by the RePPProT in 1984 to 1989 mainly based on the interpretation of aerial-photographs and satellite images.

Swidden agricultural lands are well distributed along the tributaries in the middle parts of the rivers while other agricultural lands are developing well along coastal areas such as in the northwestern part of West Kalimantan.

A-10 Transmigration Sites

Kalimantan Island has accepted transmigration from the beginning of the transmigration project. The total population including local people by the project as of 1996 is approximately 3.7 million in West Kalimantan Province and approximately 2.4 million in Central Kalimantan Province. This map presents distribution of transmigration project sites.

A-11 Road Networks and Road Types

This map presents the locations and routes of existing roads as well as planned roads. Most paved roads in Kalimantan Island have been constructed in recent years and the density of such roads is not high.

2.2 EXISTING PLANS

B-1 Timber Concession Areas (HPH)

Timber concessions are permitted by the Ministry of Forestry for large-scale commercial timber exploitation. The duration of timber concessions is 20 years. This map shows the timber concession areas which are effective in 1998.

B-2 Consensus Forest Landuse Plan (TGHK)

In 1982 the Directorate General Forestry, Department of Agriculture (now the Ministry of Forestry) reached a consensus with other agencies concerning forest landuse in each province. The forest functions are defined in the Consensus Forest Landuse Plan (TGHK) according to score ranked slope, soil erodibility and rainfall erosivity. For a further description of the classifications and forest classes, refer to the Agricultural Ministerial Decree No.680-684/Kepts/Um/8/1981.

B-3 Industrial Tree Plantation Concession Areas (HTI)

Industrial tree plantation concessions are permitted by the Ministry of Forestry. These concession areas were once forest concession areas (HPH). Whoever receives the HPH is obligated to plant trees for forest plantation development.

B-4 Oil Palm Plantation Concession Areas

Oil palm plantation development requires a series of permission from the provincial government, National Land Agency, the Ministry of Agriculture, and the Ministry of Forestry. The oil palm plantations are expected to be one of the major industries to support the regional economy of the study area as the timber industry declines in the future. This map presents the distribution of oil palm plantation concession areas covering approximately 300,000 ha in West Kalimantan and approximately 170,000 ha in Central Kalimantan. This map shows the following three types of permission information concerning oil palm plantation development: 1) developed or developing areas, 2) undeveloped but permitted concession, 3) concession being considered by the provincial government.

2.3 PRIMARY DATA ANALYSIS

C-1 Land Potential

This map presents 10 types of land potential. The land potential categories are made by grouping Land System Units from the viewpoint of crop suitability and natural protection. Main characteristics of the 10 zones of land potential are given below and summarized in Table 6.

1) Zone 1: Arable Land Suited to All Kind of Crops

Main soils in the area are Tropofluvent and Tropaquept and distribute in the large river floodplains. They are particularly common where

rivers carrying large sediment loads are liable over bank flooding. The textures are usually fine to medium and the drainage condition ranges from well to imperfectly drain. The area is more fertile alluvial soil and suited for crop cultivation such as upland crop, paddy and tree crops. Natural vegetation is a lowland dipterocarp forest.

2) Zone 2: Arable Land Suited to Crops except Wetland Paddy

Ultisol; Tropudult and Paleudults, are the most widespread soil order in the area and occurs on undulating and rolling terraces. The characteristics are strongly acid, leached and weathered. The area is suited for upland paddy and tree crops.

The soils are predominantly well drained, yellowish to red, fine to moderately fine texture with normally a clear increase in clay content with depth. They are deep, except on the steepest slopes. Surface organic horizons are thin. The soils are invariably leached of soluble bases beneath the topsoil and reserves of major nutrients are low. The type of clay forms a poor capacity to retain nutrients. Aluminum saturation is high which probably impedes the root growth of non-tolerant crops.

3) Zone 3: Arable Land Suited to Tree Crops

The area consists of Dystropepts and Tropodults and landform is rolling plain (9-25%). Texture of the soils varies from medium to fine. Soil drainage is very poor to excessive on terrace surface, good to imperfect on slopes and poor or very poor in the valleys. The soils are very strongly acid and have very low base status and have a very low CEC and therefore only a weak ability to retain added nutrient.

4) Zone 4: Arable Land Suited to Tree Crops, Moderately Suited to Oil Palm

Ultisol, Tropudult and Paleudults are main soils in the area. They form a high proportion of the red-yellow podsolic soils often quoted in literature as being typical of the rolling lowland plains (16-25%). The main soil characters are almost same as those of Zone 2 and 3. The land is suitable for rubber and coconuts but only moderately suited to oil palm.

5) Zone 5: Arable Land Suited to Wetland Paddy

The area consists of Fluvaquent and Tropaquept. Landforms of the area comprise the levees, alluvial plain and back swamp margins of the lower reaches of the major rivers. The levee soils may thin surface layers or intercalation of silt or fine sand. The area is saturated with water for long period and is associated with flat and poorly drained alluvial plains where the texture tend to be fine. Their inherent fertility is varied and largely dependent on the mineralogy and organic matter content of the alluvial deposits they are formed in. The area is suitable for wetland paddy cultivation.

6) Zone 6: Peat Soils (Unarable Land)

Soils in the area are mainly Tropohemist and Tropaquent, which are peat and alluvium soils. Main physical characteristics are strongly poor drainage and consist of fine texture. Generally, the soils are known to be very strongly acid and lacking both major and minor nutrients essential for satisfactory growth of all but specialized crops. Usually deep peat area is not encroached by cultivators, in places shallower peat has been used, but has commonly been abandoned to regrowth. Timber extraction from peat swamp forest is widespread, and locally intensive, in both Production Forest and Convertible Forest.

7) Zone 7: Acid Sulfates Soils (Unarable Land)

Main soils are Hydraquents, which occur in tidal swamps and associate commonly with the Sulfaqients. These are poorly drained silty and clayey soils containing pyrites, which can produce strongly acid soil conditions with toxic levels of iron and aluminium sulphates, if drained. In this land, however, the clays locally overlie at shallow depth former marine or estuarine clays, rich in oxidisable sulphur. If exposed to air, by drainage for example, such soils produce sulphate ions and subsequently a very acid soil, which is toxic to almost all crops normally grown in these areas. Soils are saline due to daily tidal inundation. They are very poorly drained, soft and fine-textured. Salt concentrations are excessively high for all but highly specialized plants. They occur at the mouths of major rivers and place at the coast. Original vegetation is mangrove and nipa. The forests may be felled without license because they are classed as Convertible Forest. However, the forests play a very important role to maintain ecosystems; protection to coastlines and river banks from erosion and provides breeding grounds for a variety of fish and crustacean In addition to the roles, considerable benefits can be gained by retaining this forest. The natural products that can be selectively harvested are many, such as sugar and leaf roofing materials from nipah palm, charcoal and tannin from mangrove, and rot-resistant poles and planks from nibong palm.

8) Zone 8: Sandy Soils (Unarable Land)

The area consists of Dystropepts and Tropodults, which are the most dominant soils in the study area. Topographical conditions are long gently undulating dip slopes and relatively short, steep, and scrap slope. These soils are extremely infertile and highly susceptible to erosion once the natural vegetation is removed. Very fine-crowned heath forest and highland disterocarp are occurred in the area. Seasonal water logging may occur on the gentler slope.

9) Zone 9: Steep Slopes (Unarable Land)

Soils of the area are Dystropepts and Tropodults as same as Arable area suited to tree crop. However, slope is steep; more than 40%. The soils are less infertile, but very low value for agriculture, and medium and coarse texture in which podsolisation is less extreme. These soils develop over the medium and fine grained quartzitic sandstones. Their chemical fertility is very poor and erosion risk, following forest clearing, is very high. The steepest slopes and ridge summits invariably have shallow, stony soils, locally with rock outcrops. Footslopes may have deeper soils over colluvial deposits.

10) Zone 10: Coastal Sands (Unarable Land)

Soils in the area are Tropaquents and Tropasamments and they are distinctive soils normally found on young and old beaches. Therefore, the area consists of low beach ridges and intervening swales, predominantly parallel to the shore. They are nowhere well developed because the fertility is characteristically very low.

C-2 Estimated Present Landuse in 1998

Identification of the present landuse in 1998 in the study area was worked out by the study team for planning purposes. This map was prepared by using the maps of existing conditions and existing plans shown in the previous pages. The landuse shown in this map therefore indicates the estimated most likely landuse in 1998. The following maps were used for preparation of this map.

(1) A-9 Land Cover in 1989
(2) A-10 Transmigration Sites
(3) B-2 Consensus Forest Landuse Plan (TGHK)
(4) B-4 Oil Palm Plantation Concession Areas

C-3 Land Suitability and Existing Oil Palm Plantation Concession Areas

This map shows land suited to oil palm plantation development and oil palm plantation concession areas in the study area. Some of the oil palm plantation concession areas are located on the land which is not suited to any kind of agricultural development. Most of these unsuitable concessions have not been developed and it is suggested that these concessions should be rescinded because development on such unsuitable land will not only be economically unfeasible but also environmentally dangerous.

C-4 Land Potential and Existing Industrial Tree Plantation Concession Areas

This map shows the land suited for oil palm plantation development and industrial tree plantation concession areas in the study area. Basically, land suitable for oil palm plantation development and industrial tree plantation development is the same. Some of the industrial tree plantation concession areas are located on the land which is not suited to any kind of agricultural development. Industrial tree plantation development requires land clearing before tree plantation. Forest clearing especially in the swamp forest area leads severe environmental impact on land and water ecosystems and dries up peat swamp areas. This will also increase the risk of forest fires. Evaluations of technical and economic feasibility and environmental impacts should be made before development is implemented. It is suggested that tree plantation development in such areas should be avoided in principle. Consideration should be also given to the fact that industrial tree plantations will be direct competition with oil palm plantation in future.

C-5 Agricultural Landuse and Concession Areas for Large Scale Plantation Development

This map shows the existing agriculture landuse and large scale plantation concession areas. The existing agricultural landuse indicated on this map is based on the data acquired from the map of land cover 1989. The large scale plantation concession areas are oil palm plantations and industrial tree plantations, which are shown in the previous maps. These plantation areas need to use the designated land in the concession areas exclusively for the plantations. Many of plantation concession areas are located in present swidden agriculture areas, where traditional farming is practiced by the indigenous peoples. This is especially true of the case in the midstream area of Kapuas river in West Kalimantan. How to enable the existing traditional farmers to coexist and cooperate with plantation development will be the most significant issue for sustainable economic and social development of the region.

In Central Kalimantan, land competition between plantation development and existing swidden agriculture is less constraint for the development than West Kalimantan at present.

C-6 Agricultural Land and Transmigration Sites

This map overlays the existing agricultural landuse with transmigration sites. Most transmigration sites in the midstream catchment areas of the Kapuas River overlap existing swidden agricultural landuse. Therefore, it can be concluded that there is some competition between transmigration site and existing agricultural landuse.

In West Kalimantan, most of the land that has agricultural landuse potential has already been used in one way or another; therefore, there is little land to absorb more transmigrants for supplying labor to future oil palm plantation development. However, in Central Kalimantan, transmigration sites do not encroach upon existing agricultural areas.

C-7 Desirable Conservation Areas and Existing Forest Conservation Areas

This map is an overlay of the land to be conserved from information of C-1 (Land Potential Map) with forest conservation areas designated by the Ministry of Forestry. Many of the forests, which should be conserved in accordance with our analysis of land potential, are excluded from the government's forest conservation areas. In Central Kalimantan especially, there are very few forest conservation areas. On the other hand, in West Kalimantan, conservation areas are well designated although the conservation areas around the Lake Sentarum should be expanded to protect the whole catchment area of the lake.

2.4 SECONDARY DATA ANALYSIS

D-1 Future Landuse Plan in 2018

This map shows most-likely or desirable landuse in 2018. Each landuse zone is based on the maps previously mentioned and is determined by the conditions described below:

Conservation Areas

The conservation areas we recommend include existing conservation areas and undeveloped land in the desirable conservation areas based on our analysis of land potential. It consists basically of forest lands of steep slopes, sandy soils, peat soils and water bodies.

Many areas of Reserved Forest for Future Use, what will be able to use for commercial forestry and agricultural landuse, are presently logged-over forests on relatively good soils. These areas have not developed because of no access method available now. Therefore, these areas should be reserved for future utilization of land or forest resources.

Development Areas

Existing landuse will be continued in wetland paddy, land for estate crops and transmigration sites. Swidden agricultural land will remain excluding land for development of oil palm plantations and industrial tree plantation concession areas (ITI).

The landuse for oil palm plantations has excluded all concession areas on unsuitable from the overall oil palm plantation concession areas. The landuse areas for oil palm plantations and incorporates existing swidden agricultural lands, which will co-exist with the oil palm plantations. This means that net oil palm planting area in each concession area is less than 50%. In West Kalimantan the net planted area is 1 million hectares, and in Central Kalimantan it is 800 thousand hectares.

We have the same meaning in industrial tree plantation areas (HTI), and we designate the future landuse for HTI by excluding the area to be conserved from overall industrial tree plantation concession areas.

D-2 Upland Ecological Development Corridor and Land Potential

In this study, the formation of an Upland Development Corridor is proposed as a priority development area, and especially the upland area of two districts in the western part of Central Kalimantan is identified the area of high potential for future development. It is important to give adequate consideration to environmental and social aspects in the formation of upland development corridor. In this sense, we named the upland areas as the Upland Ecological Development Corridor. For promoting actual development, it is necessary to make a detailed development plan.

This map also shows the land potential of the Upland Ecological Development Corridor and Oil Palm Plantation Concession Areas. In these areas, development coordinating among rural development, environmental consideration and urban development must be proceeded.

2.5 OTHER REFERENCES

E-1 Land Potential in Kalimantan

This map shows the land potential of the whole Kalimantan Island. The land potential categories are the same as those in C-1 (Land Potential). In both South Kalimantan and East Kalimantan, the Upland Development Corridor just like in Central Kalimantan and West Kalimantan is not identified. Instead, because good land potential areas for oil palm plantation development are scattered along rivers.

E-2 Existing Provincial Landuse Plan in 1995

This map shows the landuse plan prepared by West Kalimantan Provincial Government. Each provincial government has to prepare a landuse plan based on its natural, social, economic and geographic conditions. However, the existing provincial landuse plans do not tend to be based on land potential, partly due to the influence of forestry sector interests.

It is strongly recommended that the provincial governments should re-start restructuring the existing landuse plan based on the information given by this Planning Atlas in GIS for institutionalizing the visions for achieving desirable landuse and sustainable development of the region.

Table 3 Official Statistics by Subdistrict

			Area (km2)	Population in 1990 (Person)	Population Density (Person/km2)
6101000	**District (Kabupaten): Sambas**		12,295.96	761,375	62
	Capital: Singkawang (6101000)				
	Subdistrict (Kecamatan)	Center Town			
6101010	Sungai Raya	Sungai Duri	516.20	45,499	88
6101020	Tujuh Belas	Sedau	457.39	59,328	130
6101030	Samalantan	Samalantan	899.50	36,874	41
6101040	Bengkayang	Bengkayang	604.50	29,962	50
6101050	Ledo	Ledo	1,037.80	14,537	14
6101060	Sanggau Ledo	Sanggau Ledo	857.30	23,066	27
6101070	Seluas	Piantus	1,481.00	13,320	9
6101080	Sejangkung	Sejangkung	855.00	22,108	26
6101090	Sambas	Sambas	1,147.60	74,664	65
6101100	Tebas	Tebas	478.80	78,189	163
6101110	Selakau	Selakau	292.50	33,557	115
6101120	Pemangkat	Pemangkat	283.90	82,822	292
6101130	Jawai	Sentebang	287.50	55,532	193
6101140	Teluk Keramat	Sekura	1,358.10	89,074	66
6101150	Paloh	Liku	1,692.30	19,015	11
6101710	Pasiran	Pasiran	15.00	42,893	2,860
6101720	Roban	Roban	31.57	40,935	1,297
6102000	**District (Kabupaten): Pontianak**		18,171.20	778,546	43
	Capital: Mempawah (6102180)				
	Subdistrict (Kecamatan)	Center Town			
6102010	Batu Ampar	Batu Ampar	2,002.70	32,743	16
6102020	Kubu	Kubu	1,211.60	29,300	24
6102030	Teluk Pakedai	Teluk Pakedai	291.90	20,566	70
6102040	Sungai Kakap	Sungai Kakap	564.20	72,179	128
6102050	Sungai Raya	Sungai Raya	929.30	112,219	121
6102060	Terentang	Terentang	786.40	7,888	10
6102070	Sungai Ambawang	Sungai Ambawang	1,199.10	67,078	56
6102080	Siantan	Jungkat	324.30	45,647	141
6102090	Sungai Pinyuh	Sungai Pinyuh	184.70	43,522	236
6102100	Mandor	Mandor	455.10	21,338	47
6102110	Sengah Temila	Pahauman	2,848.60	59,115	21
6102120	Ngabang	Ngabang	1,996.90	56,930	29
6102130	Air Besar	Serimbu	2,329.20	27,323	12
6102140	Menyuke	Darit	1,240.30	41,882	34
6102150	Mempawah Hulu	Karangan	716.10	37,348	52
6102160	Menjalin	Menjalin	322.90	14,185	44
6102170	Toho	Toho	356.90	23,257	65
6102180	Mempawah Hilir	Mempawah	254.40	47,468	187
6102190	Sungai Kunyit	Sungai Kunyit	156.60	18,558	119
6103000	**District (Kabupaten): Sanggau**		18,502.00	428,295	23
	Capital: Sanggau (6103060)				
	Subdistrict (Kecamatan)	Center Town			
6103010	Toba	Teraju	1,227.20	9,599	8
6103020	Meliau	Meliau	1,495.70	34,917	23
6103030	Nanga Mahap	Nanga Mahap	568.60	18,353	32
6103040	Nanga Taman	Nanga Taman	944.90	20,658	22
6103050	Sekadau Hulu	Rawak	869.70	20,495	24
6103060	Sanggau Kapuas	Sanggau	1,382.00	53,330	39
6103070	Mukok	Kedukul	501.00	14,749	29
6103080	Sekadau Hilir	Sekadau	853.10	35,343	41
6103090	Belitang Hilir	Sungai Ayak	764.30	17,054	22
6103100	Belitang Hulu	Balai Sepuak	1,443.70	20,286	14
6103110	Jangkang	Balai Sebut	1,589.20	19,658	12
6103120	Bonti	Bonti	1,221.80	15,462	13
6103130	Parindu	Pusat Damai	593.90	21,145	36
6103140	Tayan Hilir	Tayan	1,050.50	23,486	22
6103150	Balai	Batang Tarang	395.60	20,554	52
6103160	Tayan Hulu	Sosok	719.20	20,821	29
6103170	Kembayan	Kembayan	610.80	17,963	29
6103180	Beduwai	Beduai	435.00	8,612	20
6103190	Noyan	Noyan	487.90	7,948	16
6103200	Sekayan	Balai Karangan	1,347.90	27,862	21
6104000	**District (Kabupaten): Ketapang**		30,642.60	251,953.00	8
	Capital: Ketapang (6104070)				
	Subdistrict (Kecamatan)	Center Town			
6104010	Kendawangan	Kendawangan	5,859.10	19,498	3
6104020	Manis Mata	Manis Mata	2,912.20	14,327	5
6104030	Marau	Marau	2,179.80	14,940	7
6104040	Jelai Hulu	Jelai Hulu	1,358.50	12,110	9
6104050	Tumbang Titi	Tumbang Titi	1,645.80	17,747	11
6104060	Matan Hilir Selata	Pesaguan	2,162.10	44,567	21
6104070	Matan Hilir Utara	Ketapang	1,403.00	57,303	41
6104080	Nanga Tayap	Tayap	1,728.10	18,205	11
6104090	Sandai	Sandai	6,466.20	23,840	4
6104100	Sungai Laur	Aur Kuning	1,650.70	10,121	6
6104110	Simpang Hulu	Balai Bekuak	4,222.60	23,943	6
6104120	Sukadana	Sukadana	949.20	13,601	14
6104130	Simpang Hilir	Teluk Melano	2,172.80	42,025	19
6104140	Pulau Maya-Karimat	Tanjung Satai	1,098.90	14,150	13
6105000	**District (Kabupaten): Sintang**		32,279.00	377,399	12
	Capital: Sintang (6105150)				
	Subdistrict (Kecamatan)	Center Town			
6105010	Sokan	Nanga Sokan	1,577.20	11,054	7
6105020	Tanah Pinoh	Kota Baru	1,568.30	18,782	12
6105030	Sayan	Nanga Sayan	1,166.40	10,697	9
6105040	Ella Hilir	Nanga Ella	1,139.80	11,845	10
6105050	Menukung	Menukung	1,062.10	13,102	12
6105060	Serawai	Nanga Serawai	2,127.50	16,935	8
6105070	Ambalau	Nanga Ambalau	6,386.40	11,622	2
6105080	Kayan Hulu	Nanga Tebidah	937.50	17,303	18
6105090	Nanga Pinoh	Nanga Pinoh	2,438.20	33,295	14
6105100	Belimbing	Pemuar	1,692.00	15,881	9
6105110	Sepauk	Nanga Sepauk	1,825.70	35,648	20
6105120	Tempunak	Tempunak	1,027.00	20,091	20
6105130	Dedai	Nanga Dedai	694.10	20,761	30
6105140	Kayan Hilir	Nanga Mau	1,136.70	19,127	17
6105150	Sintang	Sintang	1,635.00	74,342	45
6105160	Ketungau Hilir	Nanga Ketungau	1,544.50	14,933	10
6105170	Ketungau Tengah	Merakai	2,182.40	18,879	9
6105180	Ketungau Hulu	Senaning	2,138.20	13,102	6
6106000	**District (Kabupaten): Kapuas Hulu**		29,842.00	159,423	5
	Capital: Putussibau (6106050)				
	Subdistrict (Kecamatan)	Center Town			
6106010	Silat Hilir	Nanga Silat	1,177.10	12,732	11
6106020	Silat Hulu	Nanga Dangkan	1,061.80	7,603	7
6106030	Bunut Hulu	Nanga Suruk	1,899.40	13,188	7
6106040	Manday	Bika	2,253.00	11,746	5
6106050	Putussibau	Putussibau	9,474.30	23,361	2
6106060	Embaloh Hilir	Nanga Embaloh	1,869.10	8,498	5
6106070	Bunut Hilir	Nanga Bunut	1,668.10	13,111	8
6106080	Embau	Jongkong	953.70	13,677	14
6106090	Hulu Gurung	Nanga Tepuai	432.90	8,569	20
6106100	Selimbau	Selimbau	1,199.80	11,314	9
6106110	Seberuang	Sejiram	573.80	7,644	13
6106120	Semitau	Semitau	982.70	10,884	11
6106130	Empanang	Nanga Kantuk	805.80	5,135	6
6106140	Badau	Badau	700.00	3,294	5
6106150	Batang Lupar	Lanjak	1,332.90	3,875	3
6106160	Embaloh Hulu	Benua Martinus	3,457.60	4,792	1
6171000	**District (Kotamadya): Pontianak**		107.50	396,658	3,690
	Provincial Capital: Pontianak (6171010-6171040)				
	Subdistrict (Kecamatan)	Center Town			
6171010	Pontianak Selatan	Pontianak Selatan	28.70	102,045	3,556
6171020	Pontianak Timur	Pontianak Timur	9.05	42,464	4,692
6171030	Pontianak Barat	Pontianak Barat	32.55	172,818	5,309
6171040	Pontianak Utara	Pontianak Utara	37.20	79,331	2,133
6100000	**Kalimantan Barat**		141,840.26	3,153,649	22

			Area (km2)	Population in 1990 (Person)	Population Density (Person/km2)
6201000	**District (Kabupaten): Kotawaringin Barat**		21,000.00	165,579	8
	Capital: Pangkalanbun (01050)				
	Subdistrict (Kecamatan)	Center Town			
6201010	Jelai	Kuala Jelai	1,600.00	6,544	4
6201020	Sukamara	Sukamara	1,028.00	8,477	8
6201030	Balai Riam	Balai Riam	1,199.00	4,138	3
6201040	Kotawaringin Lama	Kotawaringin	1,218.00	7,937	7
6201050	Arut Selatan	Pangkalanbun	2,400.00	51,079	21
6201060	Kumai	Kumai	4,456.00	53,554	12
6201070	Arut Utara	Pangkut	2,685.00	3,472	1
6201080	Bulik	Nanga Bulik	2,456.00	16,776	7
6201090	Lamandau	Tapin Bini	2,588.00	7,465	3
6201100	Delang	Kudangan	1,370.00	6,137	4
6202000	**District (Kabupaten): Kotawaringin Timur**		50,688.00	377,560	7
	Capital: Sampit (02000)				
	Subdistrict (Kecamatan)	Center Town			
6202010	Seruyan Hilir	Kuala Pambuang	6,087.00	19,601	3
6202020	Mentaya Hilir Selatan	Samuda	928.00	28,439	31
6202030	Pulau Hanaut	Bapinang	619.00	19,601	32
6202040	Mentaya Hilir Utara	Bagendang	723.00	7,480	10
6202050	Danau Sembuluh	Telaga Pulang	2,424.00	5,526	2
6202060	Hanau	Pambuang Hulu	1,135.00	9,256	8
6202070	Mentaya Baru-Ketapang	Ketapang	722.00	59,139	82
6202080	Baamang	Baamang	774.00	31,952	41
6202090	Kota Besi	Kota Besi	2,177.00	15,082	7
6202100	Cempaga	Cempaga	2,424.00	20,222	8
6202110	Parenggean	Parenggean	1,774.00	11,918	7
6202120	Mentaya Hulu	Kuala Kuayan	6,343.00	37,031	6
6202130	Seruyan Tengah	Rantau Pulut	2,012.00	10,682	5
6202140	Seruyan Hulu	Tumbang Manjul	4,746.00	7,758	2
6202150	Katingan Hulu	Tumbang Sanamang	2,604.00	8,217	3
6202160	Marikit	Tubang Hiran	2,178.00	4,486	2
6202170	Sanaman Mantikei	Tumbang Kaman	3,030.00	4,486	1
6202180	Katingan Tengah	Tumbang Samba	1,089.00	13,562	12
6202190	Pulau Malan	Buntut Bali	805.00	7,000	9
6202200	Tewang Sangalang Garin	Pendahara	568.00	8,207	14
6202210	Katingan Hilir	Kasongan Baru	663.00	11,229	17
6202220	Tasik Payawan	Petak Bahandang	804.00	5,138	6
6202230	Kamipang	Baun Bango	2,793.00	6,070	2
6202240	Katingan Kuala	Pagatan	3,266.00	25,478	8
6203000	**District (Kabupaten): Kapuas**		34,800.00	441,062	13
	Capital: Kuala Kapuas (03000)				
	Subdistrict (Kecamatan)	Center Town			
6203010	Kahayan Kuala	Bahaur	4,956.00	22,489	5
6203020	Kapuas Kuala	Lupak	427.00	35,842	84
6203030	Selat	Selat	394.00	72,081	183
6203040	Kapuas Timur	Anjir Serapat	202.00	23,960	119
6203050	Basarang	Basarang	206.00	15,043	73
6203060	Kapuas Hilir	Barimba	91.00	13,061	144
6203070	Pulau Petak	Sei Tatas	135.00	22,197	164
6203080	Kapuas Murung	Palingkau	491.00	17,476	36
6203090	Kapuas Barat	Mandomai	480.00	16,472	34
6203100	Pandih Batu	Pangkoh	949.00	54,038	57
6203110	Kahayan Hilir	Pulang Pisau	1,683.00	23,485	14
6203120	Kahayan Tengah	Bukit Rawi	783.00	5,491	7
6203130	Banawa Tingang	Bawan	626.00	6,339	10
6203140	Mantangai	Mantangai	6,128.00	19,914	3
6203150	Timpah	Timpah	2,016.00	5,954	3
6203160	Kapuas Tengah	Pujon	1,833.00	12,952	7
6203170	Kapuas Hulu	Sei Hanyo	2,596.00	12,293	5
6203180	Tewah	Tewah	1,136.00	10,828	10
6203190	Kurun	Kuala Kurun	842.00	10,294	12
6203200	Sepang	Sepang Simin	740.00	6,801	9
6203210	Rungan	Tumbang Jutuh	1,816.00	16,050	9
6203220	Murunhing	Tumbang Talaken	1,714.00	6,848	4
6203230	Kahayan Hulu Utara	Tumbang Miri	4,556.00	11,154	2

			Area (km2)	Population in 1990 (Person)	Population Density (Person/km2)
6204000	**District (Kabupaten): Barito Selatan**		12,664.00	152,269.00	12
	Capital: Buntok (04040)				
	Subdistrict (Kecamatan)	Center Town			
6204010	Jenamas	Rantau Katang	708.00	6,725	9
6204020	Dusun Hilir	Mangkatif	2,065.00	12,043	6
6204030	Karau Kuala	Bangkuang	1,099.00	12,928	12
6204040	Dusun Selatan	Buntok	1,829.00	32,236	18
6204050	Dusun Utara	Pedang	1,196.00	12,970	11
6204060	Gunung Bintang Awai	Tabak Kanilan	1,933.00	12,300	6
6204070	Dusun Tengah	Aimpah	1,007.00	27,429	27
6204080	Pematang Karau	Bambulung	579.00	8,028	14
6204090	Awang	Hayapin	203.00	4,347	21
6204100	Patangkep Tutui	Bentot	255.00	4,663	18
6204110	Dusui Timur	Tamiang Layang	1,532.00	14,752	10
6204120	Benua Lima	Pasar Panas	258.00	3,848	15
6205000	**District (Kabupaten): Barito Utara**		32,000.06	142,861	4
	Capital: Muarateweh (05050)				
	Subdistrict (Kecamatan)	Center Town			
6205010	Montalat	Tumpung Laung	553.00	8,539	15
6205020	Gunung Timang	Kandui	890.00	6,991	8
6205030	Gunung Purei	Lampeong	1,468.00	2,510	2
6205040	Teweh Timur	Banangin	768.00	2,510	3
6205050	Teweh Tengah	Muara Teweh	1,708.00	37,677	22
6205060	Lahei	Muara Lahei	2,913.06	17,744	6
6205070	Laung Tahup	Muara Laung	3,111.00	17,791	6
6205080	Murung	Puruk Cahu	730.00	16,613	23
6205090	Permata Intan	Tumbang Lahung	1,227.00	11,605	9
6205100	Tanah Siang	Saripoi	1,549.00	10,485	7
6205110	Sumber Barito	Tumbang Kinyi	17,083.00	10,396	1
6271000	**District (Kotamadya): Palangkaraya**		2,400.00	112,511	47
	Capital: Palangkaraya (71010-71020)				
	Subdistrict (Kecamatan)	Center Town			
6271010	Pahandut	Pahandut	1,071.00	104,665	98
6271020	Bukit Batu	Tangkiling	1,329.00	7,846	6
6200000	**Kalimantan Tenga**		153,552.06	1,391,842	9

Table 4 Land Type Description of Land System Units

Land System Units		Land Type
BKN	Bakunan	Minor valley floors
BLI	Beliti	Swampy floodplains mainly within terraces
BPD	Bukit Pandan	Mountains
BRH	Barah	Peat-covered sandy terraces
BRW	Beriwit	Mountainous cuestas and circular basins
BTA	Batu Ajan	Dissected volcano
BTK	Barong Tongkok	Moderately dissected lava flows
BWN	Bawin	Rolling plain and sandy terrace remnants
GBT	Gambut	Peat domes or basins
HJA	Honja	Hillocky plain
JLH	Juloh	Steep hills and sub-parallel ridges
KHY	Kahayan	Alluvial floodplains between swamps
KJP	Kajapah	Tidal mudflats under mangrove or nipah forest
KLR	Klaru	Permanently waterlogged plains
KPR	Kapor	Undulating karst plains
KRU	Keremui	High sandstone plateaus
LHI	Lohai	Steep narrow ridges
LNG	Luang	Mountains
LPN	Liangpran	Eroded, mountainous stratovolcanoes
LWW	Lawanguwang	Undulating plains with several wide valleys
MDW	Mendawai	Peat swamp margins
MGH	Mangkaho	Wide valleys with low hummocks
MPT	Maput	Steep hills
MTL	Mantalat	Hills with moderately steep dip slopes and steep scarp slopes
OKI	Okki	Steep karstic blocks and ridges
PDH	Pendreh	Mountains
PKU	Pakau	Undulating sandy terraces
PLN	Pakalunai	Moderately steep hills
PMG	Paminggir	Backswamps
PTG	Putting	Coastal beach ridges
RGK	Rangankau	Undulating rolling non-sedimentary plains
SBG	Sebangan	Meander belt of riverine alluvium and floodplain
SGT	Segintung	Waterlogged sandy terraces
SHD	Suhaid	Peat-covered terraces of the upper Kapuas basin
SMD	Sungai Medang	Rolling volcanic plains
SMI	Sungai Mimpi	High undulating rivering terrace
SPG	Sungai Pinang	Terrace remnants
SRM	Serimbang	Peat-filled valleys within terraces
TBA	Tambera	Steep volcanic plugs
TDR	Tandur	Dissected dip slopes of cuestas
TWB	Tewai Baru	Hillocky plains with cuesta-shaped ridges
TWH	Teweh	Hillocky plains
TWI	Telawi	Mountainous ridges

Table 5 Land Potential Classification based on Land Systen Units

Land Potential		Land System Units	
Zone	Crop Suitability	West Kalimantan	Central Kalimantan
1	Arable Land Suited to All Kind Of Crops	BKN, SBG	BKN, SBG
2	Arable Land Suited to Crops Except Wetland Paddy	BTK, RGK, SMI	RGK
3	Arable Land Suited to Tree Crops	BWN, SMD, TWH	BWN, TWH
4	Arable Land Suited to Tree Crops, Moderately Suited to Oil Palm	HJA, LWW, TWB	HJA, LWW, MGH, TWB
5	Arable Land Suited to Wetland Paddy	BLI, KHY	BLI, KHY
6	Peat Soil	BRH, GBT, KLR, MDW, PKU, SGT, SHD, SRM	BRH, GBT, KLR, MDW, PKU, PMG, SGT, SRM
7	Acid Sulfate Soils	KJP	KJP
8	Sandy Soils	BRW, KRU, LHI, MPT, MTL, PDH, TDR	BRW, KPP, LHI, MPT, MTL, PDH, SPG, TDR
9	Steep Slope	BPD, BTA, JLH, LPN, PLN, TBA, TWI	BPD, BTA, JLH, LNG, OKI, PLN, TBA, TWI
10	Coastal Sands	PTG	PTG

Table 6 Description of Land Potential

	Zone	Crop Suitability	Land Characteristics	Type of Forest	Existing Landuse	Problems	Target & Role	Proposed Landuse	Counter Measure to Achieve	West Kalimantan		Central Kalimantan		Study Area	
										Area (Km2)	Share (%)	Area (Km2)	Share (%)	Area (Km2)	Share (%)
ARABLE LAND	1	Arable Land Suited to All Kind of Crops	Fertile Alluvial Soils	Lowland Dipterocarp Forest	Annual Crop (Wetland Paddy, Vegetable, etc.)	Low Intensification	Increasing Productivity, Food Supply for the Region	Intensive Agricultural Area (Annual Crop, Rice, Vegetables)	Technical Extension, Irrigation Facility	1,705	1	3,349	2	5,054	2
	2	Arable Land Suited to Crops Except Wetland Paddy	Flat, Acid, Well Drained, Rather Fertile Soils	Lowland Dipterocarp Forest	Perennial Crops (Oil Palm, Rubber, HTI, etc.), Forest Concession Area	Disordered Landuse Plan	Landuse Plan for High Land Productivity, Substitute for the Forest Sector in Regional Economy	Intensive Industrial Crops Production Area (Oil Palm, Estate Crop)	Adjustment of Landuse Plan, Technical Extension	5,244	4	6,125	4	11,369	4
	3	Arable Land Suited to Tree Crops	Rolling (9-25%), Strongly Acid Soils	Lowland Dipterocarp Forest	Perennial Crops (Oil Palm, Rubber, HTI, etc.), Forest Concession Area	Disordered Landuse Plan	Harmony between Production and Protection	Coexistence of Extensive and Intensive Agriculture Area (Estate Crop)	Technical Extension, Distribution of Nursery Stock	16,114	11	23,336	15	39,450	13
	4	Arable Land Suitd to Tree Crops, Moderately Suited to Oil Palm	Rolling, Strongly Acid Soils, Steep Slope (16-40%)	Lowland Dipterocarp Forest	Perennial Crops (Oil Palm, Rubber, HTI, etc.), Forest Concession Area	Disordered Landuse Plan	Buffer Zone, Harmony between Production and Protection	Extensive Agricultural Area (Agroforestry)	Technical Extension, Distribution of Nursery Stock	40,016	27	17,511	11	57,527	19
	5	Arable Land Suited to Wetland Paddy	Fertile Alluvial Soils, Poor Drainage	Freshwater Swamp Forest	Wetland Paddy, Horticulture (Coconut, etc.)	Low Productivity	Production of Basic Food, Supply Vegetables to City	Intensive Agricultural Area (Wetland Paddy, Raised Bed Cultivation)	Technical Extension, Expanding Raised Bed Cultivation	6,312	4	8,802	6	15,114	5
UNARABLE LAND	6	Unarable Land	Peat Soil	Peat Swamp Forest	Forest Concession Area, Wetland Paddy, Grass	Over Logging (Illegal Logging)	Protection of the Peat Swamp, Conservation of the Biodiversity, Increasing Productivity	Protection and Limited Production Forest	Natural Regeneration, Research on Forest Products Except Timber	22,616	15	45,536	30	68,152	23
	7	Unarable Land	Acid Sulfate Soils	Mangrove Forest	Protection Area (Mangrove Forest, Shrimp Pond)	Illegal Logging	Conservation of the Fishery Resource	Protection Forest (Mangrove)	Reforestation, Research on Forest Products	2,126	1	1,657	1	3,783	1
	8	Unarable Land	Infertile Sandy Soils	Highland Dipterocarp Forest, Heath Forest	Forest Concession Area, Agroforestry	Over Logging (Illegal Logging)	Protection of the Land, Conservation of Biodiversity, Increasing Productivity	Protection Forest (Highland Dipterocarp)	Natural Regeneration, Reseach on Forest Products Except Timber	11,402	8	18,769	12	30,171	10
	9	Unarable Land	Very Steep Slopes (40%<)	Mountain Forest	Forest Concession Area, National Park	Over Logging (Illegal Logging)	Watershed Management, Conservation of Biodiversity	Protection and Limited Production Forest (Mountainous Forest, National Park)	Forest Management	39,208	27	22,908	15	62,116	21
	10	Unarable Land	Coastal Sands	No Vegetation	Coast	-	-	Coastal Beach	-	228	0	813	1	1,041	0
									Sub-Total	144,743	99	147,993	96	292,736	97
									River	1,549	1	6,114	4	7,663	3
									Total	146,292	100	154,107	100	300,399	100

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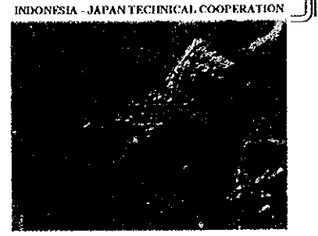
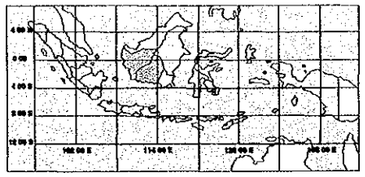


THE DEVELOPMENT STUDY ON
COMPREHENSIVE REGIONAL DEVELOPMENT PLAN FOR
THE WESTERN PART OF KALIMANTAN
SCRDP - KALTENGBAR

MAP LOCATION



SAMBAS
SINGKAWANG
MEMPAWAH
PONTIANAK
PONTIANAK
SANGGAU
SANGGAU
KAPUAS HULU
PUTUSSIBAU
SINTANG
SINTANG
KALIMANTAN BARAT
BARITO UTARA
KUALA KAPUAS
KALIMANTAN TENGAH
KAPUAS
KETAPANG
KETAPANG
KOTAWARINGIN TIMUR
PALANGKARAYA
PALANGKARAYA
KOTAWARINGIN BARAT
SAMPIT
PANGKALAN BUN
BARITO SELATAN
BUNTOK
KUALA KAPUAS

GIS Data Source: National Masterplan for Forest Plantation Project (NMFP), Ministry of Forestry

DISTRICT ADMINISTRATION BOUNDARIES

- Provincial Capital
- District Capital

- International Boundary
- Provincial Boundary
- District Boundary
- Subdistrict Boundary

- River
- Main Road

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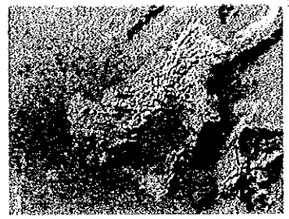
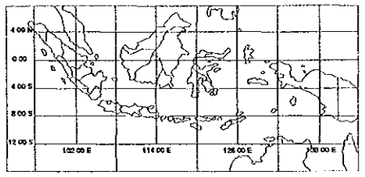
INDONESIA - JAPAN TECHNICAL COOPERATION



THE DEVELOPMENT STUDY ON
COMPREHENSIVE REGIONAL DEVELOPMENT PLAN FOR
THE WESTERN PART OF KALIMANTAN
SCRDP KALTENGBAR

MAP LOCATION



DISTRICT ADMINISTRATION BOUNDARIES

- Provincial Capital
- District Capital
- International Boundary
- Provincial Boundary
- District Boundary
- Subdistrict Boundary
- River
- Main Road

SAMBAS
SINGKAWANG
MEMPAWAH
PONTIANAK
PONTIANAK
SANGGAU
SANGGAU
KALIMANTAN BARAT
SINTANG
SINTANG
PUTUSSIBAU
KAPUAS HULU
BARITO UTARA
MUARATEWEH
KALIMANTAN TENGAH
KAPUAS
BUNTOK
BARITO SELATAN
KETAPANG
KETAPANG
KOTAWARINGIN TIMUR
PALANGKARAYA
PALANGKARAYA
KOTAWARINGIN BARAT
SAMPIT
PANGKALANBUN
PULA KAPUAS

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GIS Data Source: National Masterplan for Forest Plantation Project (NMFP), Ministry of Forestry

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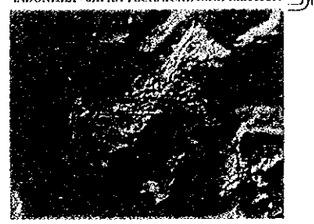
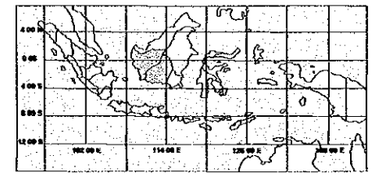


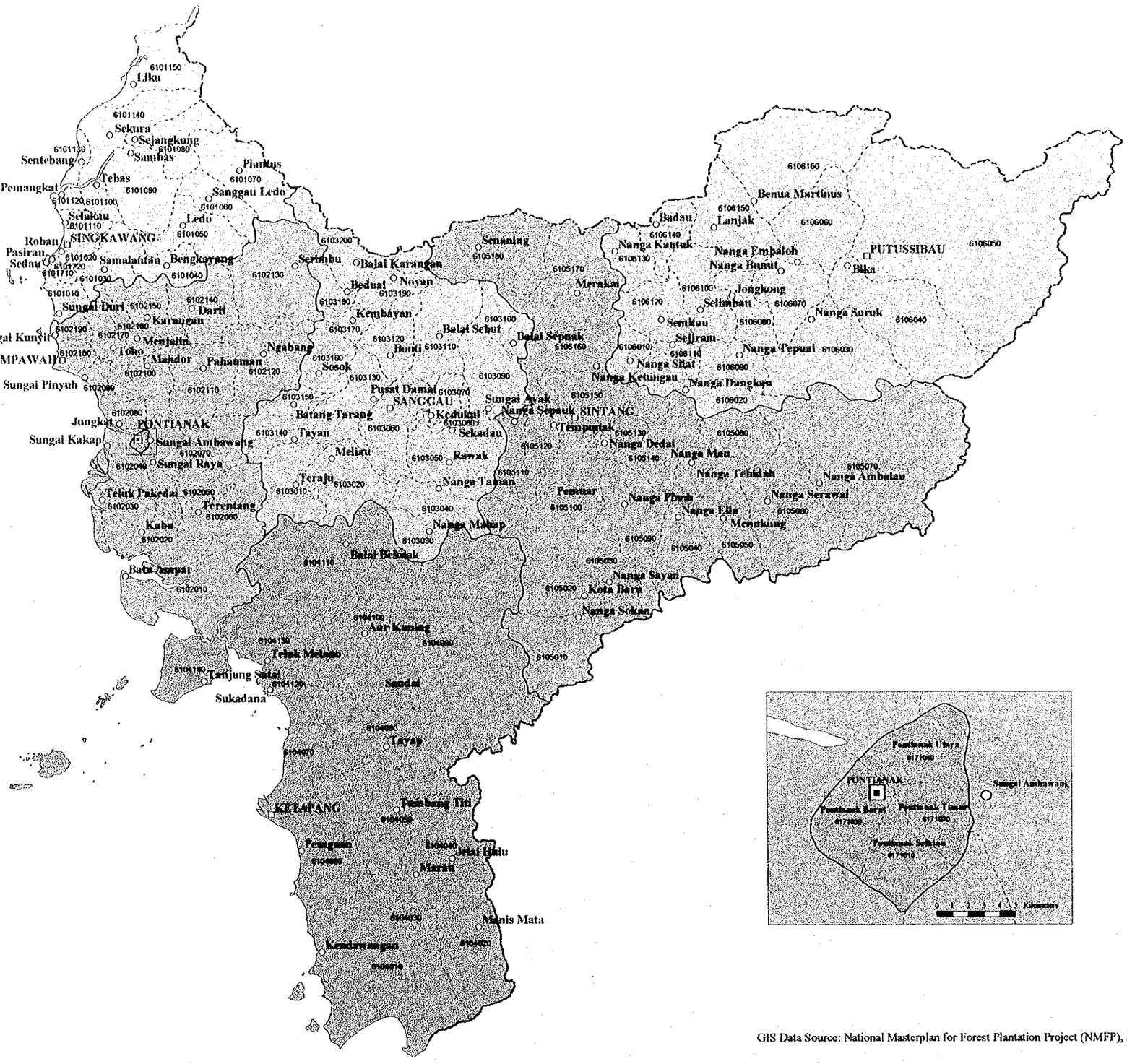
THE DEVELOPMENT STUDY ON
COMPREHENSIVE REGIONAL DEVELOPMENT PLAN FOR
THE WESTERN PART OF KALIMANTAN
SCRDP - KALTENGBAR

MAP LOCATION



SUBDISTRICT ADMINISTRATION BOUNDARIES IN WEST KALIMANTAN

- Provincial Capital
- District Capital
- Subdistrict Center
- International Boundary
- Provincial Boundary
- District Boundary
- Subdistrict Boundary
- River
- Main Road



GIS Data Source: National Masterplan for Forest Plantation Project (NMFP), Ministry of Forestry

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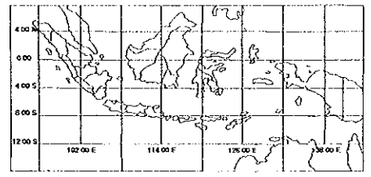
INDONESIA - JAPAN TECHNICAL COOPERATION

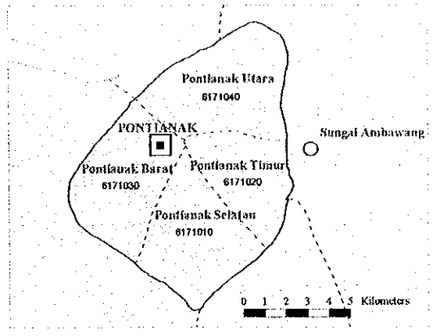
THE DEVELOPMENT STUDY ON
COMPREHENSIVE REGIONAL DEVELOPMENT PLAN FOR
THE WESTERN PART OF KALIMANTAN
SCRDP KALTENGBAR

MAP LOCATION



SUBDISTRICT ADMINISTRATION BOUNDARIES IN WEST KALIMANTAN

- Provincial Capital
- District Capital
- Subdistrict Center
- International Boundary
- Provincial Boundary
- District Boundary
- Subdistrict Boundary
- River
- Main Road



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GIS Data Source: National Masterplan for Forest Plantation Project (NMFP), Ministry of Forestry

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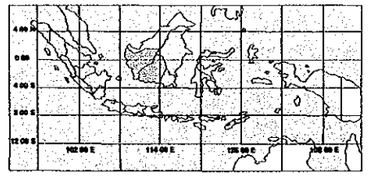
INDONESIA - JAPAN TECHNICAL COOPERATION JICA

THE DEVELOPMENT STUDY ON
COMPREHENSIVE REGIONAL DEVELOPMENT PLAN FOR
THE WESTERN PART OF KALIMANTAN
SCRDP - KALTENGBAR

MAP LOCATION



SUBDISTRICT ADMINISTRATION BOUNDARIES IN CENTRAL KALIMANTAN

- Provincial Capital
- District Capital
- Subdistrict Center
- International Boundary
- Provincial Boundary
- District Boundary
- Subdistrict Boundary
- River
- Main Road

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PCJ

GIS Data Source: National Masterplan for Forest Plantation Project (NMFP), Ministry of Forestry

A - 3

INDONESIA - JAPAN TECHNICAL COOPERATION JICA

THE DEVELOPMENT STUDY ON
COMPREHENSIVE REGIONAL DEVELOPMENT PLAN FOR
THE WESTERN PART OF KALIMANTAN
SCRDP KALTENGBAR

MAP LOCATION

SUBDISTRICT ADMINISTRATION BOUNDARIES
IN CENTRAL KALIMANTAN

- [•] Provincial Capital
- [ ] District Capital
- ○ Subdistrict Center
- International Boundary
- Provincial Boundary
- District Boundary
- Subdistrict Boundary
- River
- Main Road

GIS Data Source: National Masterplan for Forest Plantation Project (NMFP), Ministry of Forestry

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