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The Study on the Integrated Regional Development Plan for the Southern Part of Sumatra

Final Report

Vol. 3
Sectors and Communities

March 1993

Japan International Cooperation Agency

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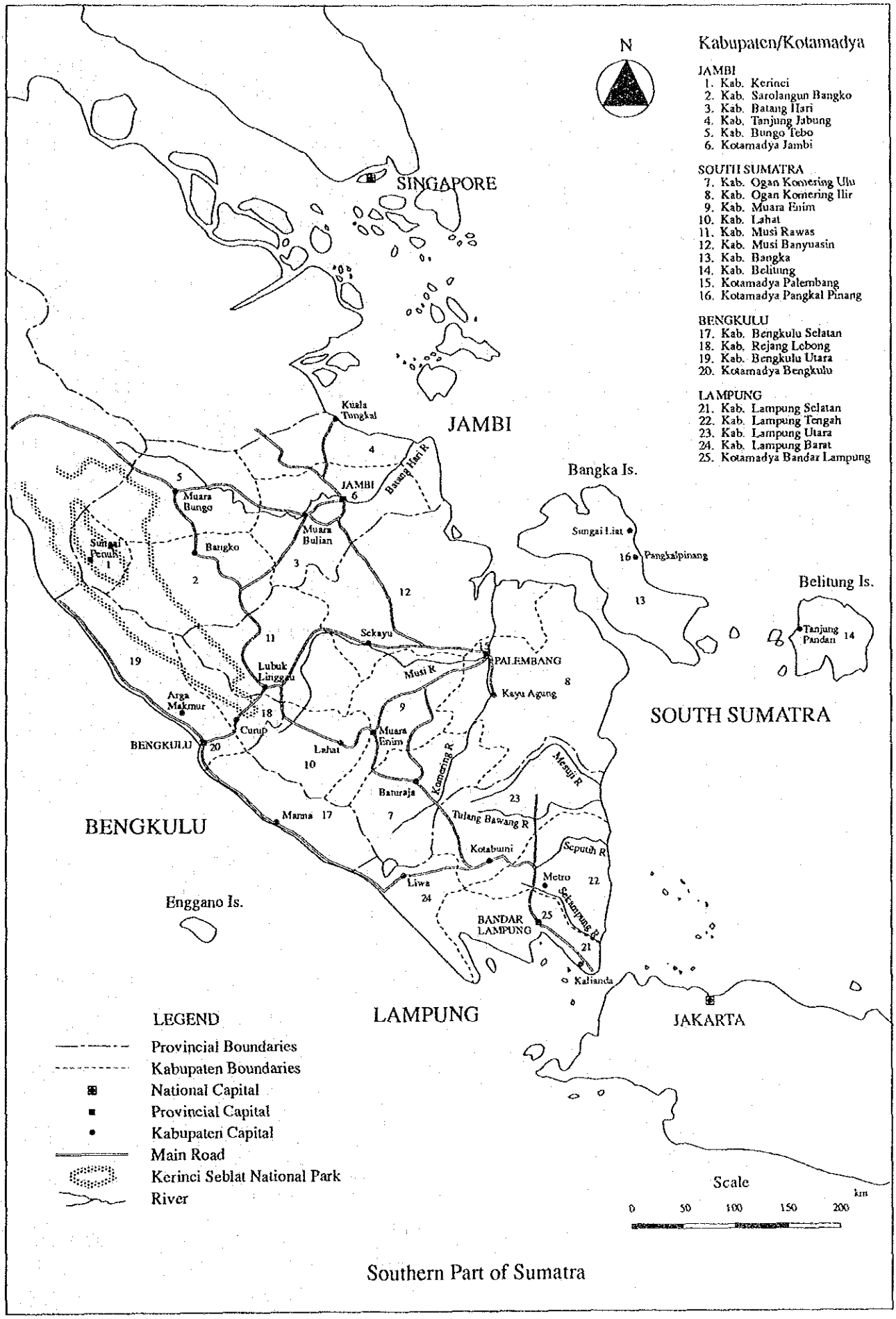

Southern Part of Sumatra

Glossary/Abbreviations

Adat	Social custom; the cultural traditions and social organisation of a particular ethnic group
Adat Law	Social custom as applied to public resolution of disputes, using agreed, non-official judicial mechanisms
ADB	Asian Development Bank
AFRD	Agency for Forestry Research and Development
Alim Ulama	Islamic religious teachers
APBN	Anggaran Pendapatan dan Belanja Negara (Planned/Actual National Budget)
APBD	Anggaran Pendapatan dan Belanja Daerah (Planned/Actual Regional Budget)
AWB	Asian Wetland Bureau
BAKOSURTANAL	Badan Koordinasi Survel dan Pemetaan Nasional (National Co-ordinating Body for Surveys and Mapping)
Bandaria	Community (sub-desa) groups of the Peminggir people in Lampung
Bandes	Bantuan Desa (National funds allocated to village development)
Bangda	Direktorat Jenderal Pembangunan Daerah (Directorate General Regional Development, Ministry of Home Affairs)
BAPEDAL	Badan Pengendalian Dampak Lingkungan (Environmental Impact Control Agency)
Bappeda	Badan Perencanaan Pembangunan Daerah (Regional Development Planning Board)
Bappenas	Badan Perencannan Pembangunan Nasional (National Development Planning Board)
BDL	Bandar Lampung
Bilateral	Kinship is traced through both the mother's and the father's line
Biotrop	Institute for Studies and Research in Tropical Biology (set up by SEAMEO-Southeast Asian Ministers of Education Oraganizations)
BKLH	Provincial Office for Population and Environment
BKPM	Badan Koordinasi Penanaman Modal (National Investment Coordinating Board)
BKPMD	Badan Koordinasi Penanaman Modal Daerah (Regional Investment Coordinating Board)

BPK	Balai Penelitian Kehutanan (Forest Research Institute)
BPN	National Land Board
BPS	Biro Pusat Statistik (Central Bureau of Statistics)
Bugis, Buginese	A seafaring ethnic group from South Sulawesi
Bupati	Regent, head of a Kabupaten (Regency)
Buway	Clan group of the Pubian people in Lampung
Camat	Head of a Kecamatan (Subdistrict)
Cerdik Pandai	Educated leaders in Minangkabau society
Cipta Karya	Directorate General of Human Settlements, Ministry of Public Works
CITES	Convention on International Trade in Endangered Species
Clan	A group of people claiming common descent from an ancestor (often mythical), with members being traced either through the mother's or the father's line
Damar	Resin from forest tree species
Departemen Sosial	Social Welfare Department
Depati	Head of a Marga (also called Pasirah)
Desa	Village, usually in rural areas (see also Kelurahan)
Dewan Marga	Council of advisors to the Pasirah under the Marga system
DGFU	Director General of Forest Utilization
Dikeresayoko	Serawai term for system of assistance to kin who suffer misfortune such as illness
Dinas	Sectoral departments of the local government
Dinas Kehutanan	Provincial Forestry Service
DIP	Daftar Isian Proyek (Project Budget)
Dusun	Hamlet; subdivision within a village
EIA	Environmental Impact Analysis
FAO	The Food and Agriculture Organization of the United Nations
GBHN	Garis-garis Besan Haluan Negara (Guidelines of State Policy)
GOI	Government of Indonesia
Gotong-royong	Forms of community co-operative working together
Hak Milik	The right to own land

Hak Pakai	The right to utilise land
Hak Ulayat	The right of members of an adapt community to utilise land which is claimed by the adat community
Harta Tubang	The inherited property (usually rice-lands, fishponds and house) passed down through the female line under Semendo adat
HPH	Hak Penggunaan Hutan (Forest Utilisation Concessions, for example logging companies)
HTI	Hutan Tanaman Industry (Industrial Timber Estate)
IDEP	Integrated Development Program
IMR	Infant Mortality Rate
IMU	IDEP Management Unit
Inhutani	A state-owned company in forestry
Inpres	Instruksi Presiden or funds allocated by national government in grant form for expenditure in the Regions
ITTO	International Tropical Timber Organization
Jala	Fishing net, a symbol of Semendo clan unity
Jenang	Malay middleman in trade with the Kubu (Suku Anak Dalam)
JICA	Japan International Cooperation Agency
Kabupaten	Regency or District; Second level of Regional Government (Level 2)
Kanwil	Regional Vertical Office
Kanwil Kehutanan	Regional Forestry Office
Kebun	Tree crop gardens or plantations
Kecamatan	Sub-district; third level of Regional Government (Level 3)
Kelurahan	Village, usually located in urban area (See also Desa)
Kepala Desa	Head of a Village (Desa)
KLH	Menteri Negara Kependudukan dan Lingkungan Hidup (Ministry of Population and Environment)
Kolonisatie	Transmigration program from Java to Outer Islands in Dutch Colonial Period
Komering	An ethnic group based in the South of South Sumatra
Kotamadya	Municipality; Second Level of Regional Government (Level 2)
KSDA	Regional Office for Conservation of Natural Resources, Ministry of Forestry

Kubu	A traditionally forest dwelling group located in South Sumatra and Jambi. They prefer to be called Suku Anak Dalam
KUD	Koperasi Unit Desa (Village Co-operative Unit)
Ladang	Dry-land cultivated field
Lebak Lebung	Swampy or seasonally inundated land
Lembaga Pemangku Adat	Consultative institution to advise on adat
Lineage	Descendants in one line (mother's or father's line) from a specified ancestor through a set number of generations
LKMD	Lembaga Ketahanan Masyarakat Desa (Village Self-Reliance Organisation)
LMD	Lembaga Musyawarah Desa (Village Consultative Council)
LPSM	Lembaga Pembinaan Swadaya Masyarakat (Indonesian Non-Government Organisation)
LSCI	Local Steering Committee for IDEP
LSM	Lembaga Swadaya Masyarakat (Indonesian Non-Government Organisation)
Lurah	Head of a Kelurahan
Madrasah	Islamic religious School
Marga	Lowest unit of local government in the Region until 1979, originally meant a kin-related, genealogical group
Matrilineal	Kin relationships are traced through the female line
Melangun	Kubu word meaning to shift the place of residence after a disaster such as illness or death
Meraje	Uncle who advises the eldest girl in Semendo adat
MOF	Ministry of Forestry
MUBA	Musi Banyuasin
MURA	Musi Rawas
Musyawarah	Process of consultative decision-making
Neolocal	Married couple establish an independent household
NES	Nucleus Estate Small Holder (see PIR)
NFI	National Forest Inventory
Ngeresayo	Serawai term for co-operative house building between kin group

Ninik-mamak	Group of male adat leaders in Minangkabau tradition; usually elders of lineage groups
NSCI	National Steering Committee for IDEP
NTFP	Non-Timber Forest Products
OECF	Overseas Economic Cooperation Fund
OKI	Ogan Komering Ilir
OKU	Ogan Komering Ulu
Pasang Surut	Tidal, also tidal swamp cultivation of rice
Pasemah	An ethnic group centred in the upland areas of Lahat
Pasirah	Head of a Marga
Patrilineal	Kin relationships are traced through the male line
PBB	Pajak Bumi Dan Bangunan (Tax on Land and Buildings)
Pedanda	Balinese Hindu priest
Pemangkat Pasirah	Marga officials assisting the Pasirah
Pemerintah Daerah	Local Government or Regional Government
Peminggir	An ethnic group from Lampung
Penggawo	Leader of a hamlet under the Marga system
Perum Perhutani	A state-owned company responsible for the forests on Java
PH	Direktorat Jenderal Pengusahaan Hutan (Directorate General of Forest Utilization)
PHPA	Direktorat Jenderal Perlindungan Hutan dan Pelestarian Alam (Directorate General of Forest Protection and Nature Conservation)
PIR	Perkebunan Inti Rakyat (Smallholder nucleus estates)
PKK	Pendidikan Kesejahteraan Keluarga, a women's organisation operating at village level and focussing on family welfare
PODES	Potensi Desa (Village Potential), a data source for village level information provided by the Village Head
Pola Dasar	Basic Policy
Posyandu	Village health aid posts staffed by volunteers
PPLH/PSL	Environmental Study Centre (university-based)
Pubian	An ethnic group from Lampung
Puskesmas	Community health centre at Kecamatan level

Rejang	An ethnic group originating in Kabupaten Rejang Lebong, Bengkulu
Repelita	Rencana Pembangunan Lima Tahun (Five-Year Development Plan)
Repelitada	Rencana Pembangunan Lima Tahun Daerah (Five-Year Regional Development Plan)
RePPProT	Regional Physical Planning Programme for Transmigration
RRL	Direktorat Jenderal Reboisasi dan Rehabilitasi Lahan (Directorate General of Reforestation and Land Rehabilitation)
RSTRP	Rencana Struktur Tata Ruang Propinsi (Provincial Spatial Structural Plan)
Sakernas	Survei Angkatan Kerja Nasional (National Labour Force Survey)
Sekwilda	Sekretaris Wilayah Daerah (Secretary to Governor or Bupati)
Semendo	An ethnic group originating in Kabupaten Muara Enim, South Sumatra, and spreading into Lampung and Bengkulu
Serawai	An ethnic group located mainly in Kabupaten Bengkulu Selatan
Suku Anak Dalam	Children of the Interior (Inside the Forest). This is the name the Kubu people prefer to be called.
SUPAS	Intercensal Survey
Tambak	Fishpond
Tanah Bengkok	Rice lands, the income of which is used by incumbent village officials during their term of office
Tanah Negara Bebas	A category of State land
TGHK	Tata Guna Hutan Kesepakatan (Forest Land-Use by Concensus)
Tk I, Tk II	Level of government (Level I: Province, Level II: Kabupaten/ Kotamadya)
TPI	Tebang Pilih Indonesia (Indonesian Selective Cutting System)
TPTI	Tebang Pilih Tanam Indonesia (Indonesian Selective Cutting and Planting System)
Trans Bandep	Transmigrasi Bantuan Departemen (Transmigration to increase the population of sparsely populated, existing villages)
Translok	Transmigrasi Lokal, or transmigration within provinces
Tunggu Tubang	The eldest girl who inherits the family wealth in Semendo adapt
Ulama	See Alim Ulama
UNDP	United Nations Development Programme
UNSRI	Universitas Sriwijaya (University of Sriwijaya, Palembang)

Uxorilocal	Husband resides with the wife and her kin on marriage
Virilocal	A married couple resides with the husband's kin group
WALHI	Indonesian Environmental National Forum
Walikota	Head of a Kotamadya
Warung	Small shop or stall
WB	World Bank
Wedana	Head of a Javanese Kewedanaan (District) administrative unit (no longer in existence)
WWF	World Wide Fund for Nature

THE STUDY ON THE INTEGRATED REGIONAL DEVELOMENT PLAN
FOR THE SOUTHERN PART OF SUMATRA
(LTA-129)

FINAL REPORT

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Part 1 Sectoral Development Plan

1. AGRICULTURE

1.1 CURRENT CONDITIONS

1.1.1 Regional Characteristics

Some salient characteristics of agriculture in the Southern Sumatra Region as a whole can be seen in comparison with Northern Sumatra (Aceh, North Sumatra, West Sumatra and Riau) and Java. Agricultural production in Southern Sumatra, as in Northern Sumatra, is characterized by the relative dominance of the extensive type of land use, which reflects the absence of the high population pressure on land found in Java. First of all, estate crops, especially tree crops, have been extremely important in the agricultural development of Southern Sumatra as well as in Northern Sumatra. The aggregate area planted to nine major tree crops (rubber, coconut, coffee, oil palm, cocoa, tea, clove, cinnamon and pepper) in the Southern Sumatra Region totals some 2.4 million ha in 1990 (Table 1.1.1). The area under these tree crops is 2.5 times the aggregate wetland area of a little less than 1 million ha in the Region. The ratio is 2.3 in Northern Sumatra with its area under nine tree crops totalling 2.9 million ha. In contrast, the ratio comes to 0.5 in Java with its total wetland area of 3.4 million ha, indicating the precedence of annual food crops over tree crops in agricultural land use.

Table 1.1.1 Planted Area and Production of Selected Estate Crops in Southern Sumatra Region (1985-1990)

	1985	1986	1987	1988	1989	1990	Annual Growth 1985-90
Planted Area (ha)							
Rubber	1,020,295	1,072,896	1,061,334	1,083,144	1,129,616	1,151,655	2.5%
Coffee	433,093	418,514	439,296	470,897	484,308	492,386	2.6%
Coconut	302,506	321,476	342,198	355,333	370,240	376,710	4.5%
Oil palm	44,707	44,211	64,740	84,379	102,006	135,880	24.9%
Pepper	66,204	66,695	89,044	89,063	97,811	99,995	8.6%
Clove	120,368	111,008	103,515	98,143	89,138	83,815	-7.0%
Cinnamon	41,711	41,279	45,224	46,009	47,191	49,015	3.3%
Cocoa	1,727	1,945	5,421	15,884	23,950	35,164	82.7%
Tea	3,089	3,451	3,269	3,418	3,617	4,034	5.5%
Sugarcane	45,475	36,697	41,882	41,067	52,903	49,645	1.8%
Total	2,079,175	2,118,172	2,195,923	2,287,337	2,400,780	2,478,298	3.6%
Production (ton)							
Rubber	317,066	329,553	358,908	392,306	398,309	401,277	4.8%
Coffee	162,948	174,599	185,675	216,038	222,142	227,012	6.9%
Coconut	153,122	172,949	236,415	237,316	257,989	261,708	11.3%
Palm oil	59,601	54,058	69,054	93,167	120,562	223,881	30.3%
Pepper	36,311	39,796	43,324	54,886	51,897	52,705	7.7%
Clove	4,033	2,532	3,680	7,114	3,985	4,220	0.9%
Cinnamon	6,313	4,822	12,115	11,923	13,595	7,950	4.7%
Cocoa	38	45	474	240	964	1,221	100.2%
Tea	5,576	6,146	4,505	6,623	6,671	5,696	0.4%
Sugarcane	125,116	172,291	185,461	161,871	273,541	306,841	19.7%

Sources: For 1985 - 88, Direktorat Jenderal Perkebunan (DJP), Statistik Perkebunan Indonesia, Tahun 1984-1989 and Tahun 1988 - 1990, Jakarta.
For 1989 - 90, data of Estate Crop Services in four provinces.

Tree crops dominate the agricultural landscape of the Southern Sumatra Region, and the bulk of their total planted area belongs to the smallholder sector. The development of large-scale estates is a recent phenomenon in the Region, accelerating since the late 1980s. According to the data provided by the Estate Crop Services of four provinces, some 283,000 ha belonged to large-scale estates in 1990 (Table 1.1.2), but most of the trees are not mature enough to produce. The planted area of estates accounts for about 14% of the total area under

nine tree crops. The same percentage amounts to 32% in the Northern Sumatra Region, where the development of estates has a much longer history, especially in North Sumatra Province.

Table 1.1.2 Planted Area and Production of Large Estates in Southern Sumatra Region (1990)

(Unit: ha)

	Jambi	South Sumatra	Bengkulu	Lampung	Total Region
Rubber	36,512	25,297	19,946	23,242	104,996
Coffee	0	0	535	0	535
Coconut	2,859	4,474	6	13,520	20,859
Oil palm	36,976	57,760	21,059	11,003	126,798
Cocoa	4,677	0	11,697	9,539	25,913
Tea	2,619	993	439	0	4,051
Sugarcane	0	12,265	0	45,445	57,710
Total	83,644	100,789	53,682	102,748	340,863

Note: Figures for Jambi, South Sumatra and Bengkulu include the areas of the nucleus estate and smallholder type of development known as NES or PIR.
Sources: Estate Crop Services of four provinces

Table 1.1.3 compares the Southern and the Northern Sumatra Regions in terms of the relative distribution of the harvested areas of major food crops (wetland and upland paddy, and five major palawija crops), with Java as reference. In contrast to the predominance of wetland paddy in Northern Sumatra, Southern Sumatra has a lower percentage of wetland paddy, a higher percentage of upland paddy, and a higher aggregate percentage of five secondary food crops (palawija crops) somewhat similar to Java. It must be noted that the last characteristic is due to the influence of Lampung rather than the common characteristic in Southern Sumatra.

Table 1.1.3 Percentage Distribution of Harvested Area by Major Food Crop (1990)

(Unit: %)

	Rice			Major Secondary Food Crops						Total
	Wet-land	Up-land	Sub-total	Maize	Cassava	Sweet Potato	Soy-bean	Ground-nut	Sub-total	
Southern Sumatra	48	15	63	15	11	1	9	2	37	100
Jambi	64	17	81	3	10	1	4	2	19	100
South Sumatra	67	19	86	3	5	1	3	2	14	100
Bengkulu	53	16	69	12	5	3	7	4	31	100
Lampung	31	12	43	27	15	0	14	1	57	100
Northern Sumatra	69	6	75	7	3	1	11	3	25	100
Aceh	55	1	56	5	1	1	32	5	44	100
North Sumatra	72	7	79	10	3	2	3	2	21	100
West Sumatra	85	3	87	3	2	1	4	2	13	100
Riau	57	25	82	7	4	1	4	2	18	100
Java	54	4	58	21	9	1	8	4	42	100
Indonesia	55	7	61	18	8	1	8	4	39	100

Source: BPS, Production of Cereals in Indonesia 1990.

The relatively extensive nature of food crop production is seen in the secular trend of paddy production in Southern Sumatra. As shown in Table 1.1.4, production of wetland paddy in Southern Sumatra increased at an annual growth rate of 6.2% over the period from the late 1970s (1976-80 average) to the late 1980s (1986-90 average). This is significantly higher than in Northern Sumatra and in Indonesia as a whole. The growth, however, derived more from the sizable expansion in harvested area than from the improved yield per hectare.

This is in contrast with the national trend, in which the yield improvement contributed more to the increase of production. In Northern Sumatra, the area expansion and the yield improvement are roughly in balance in the contribution to increased production. Reflecting the importance of extensification relative to intensification in wetland paddy production in Southern Sumatra, the 1986-90 average yield of wetland paddy in the Region is 20% lower than the national average and 10% lower than the average of Northern Sumatra.

Table 1.1.4 Trend of Paddy (GKG) Production (1976/80 Average to 1986/90 Average)

		5-year Average			Annual Growth Rate (%)		
		1976 - 80 (A)	1981 - 85 (B)	1986 - 90 (C)	(A) - (B)	(B) - (C)	(A) - (C)
Area Harvested (ha)							
Wetland	Southern Sumatra	549,479	670,571	787,400	4.06	3.26	3.66
	Northern Sumatra	986,119	1,121,857	1,287,428	2.61	2.79	2.70
	Indonesia	7,525,870	8,270,675	9,059,588	1.91	1.84	1.87
Upland	Southern Sumatra	273,395	281,102	262,888	0.56	-1.33	-0.39
	Northern Sumatra	180,500	164,250	143,858	-1.87	-2.62	-2.24
	Indonesia	1,167,355	1,169,052	1,141,267	0.03	-0.48	-0.23
Total	Southern Sumatra	822,873	951,673	1,050,287	2.95	1.99	2.47
	Northern Sumatra	1,166,620	1,286,106	1,431,286	1.97	2.16	2.07
	Indonesia	8,693,225	9,439,727	10,200,856	1.66	1.56	1.61
Production (ton)							
Wetland	Southern Sumatra	1,529,008	2,214,267	2,785,372	7.69	4.70	6.18
	Northern Sumatra	3,032,041	4,055,640	5,091,080	5.99	4.65	5.32
	Indonesia	24,089,022	33,820,688	40,053,653	7.02	3.44	5.22
Upland	Southern Sumatra	389,324	452,976	501,474	3.07	2.06	2.56
	Northern Sumatra	263,681	285,489	283,679	1.60	-0.13	0.73
	Indonesia	1,559,403	1,945,382	2,234,167	4.52	2.81	3.66
Total	Southern Sumatra	1,942,748	2,667,244	3,286,846	6.54	4.27	5.40
	Northern Sumatra	3,295,722	4,341,128	5,374,759	5.66	4.36	5.01
	Indonesia	25,670,841	35,766,074	42,287,820	6.86	3.41	5.12
Yield (ton/ha)							
Wetland	Southern Sumatra	2.78	3.30	3.54	3.47	1.42	2.44
	Northern Sumatra	3.07	3.61	3.95	3.27	1.82	2.54
	Indonesia	3.20	4.09	4.42	5.04	1.57	3.29
Upland	Southern Sumatra	1.42	1.61	1.90	2.47	3.42	2.94
	Northern Sumatra	1.46	1.74	1.98	3.53	2.60	3.07
	Indonesia	1.34	1.66	1.96	4.49	3.30	3.89

Source: BPS, Production of Cereals in Indonesia, annual issues.

Table 1.1.5 compares the distribution of different types of wetland in Southern and Northern Sumatra with Java. Southern Sumatra has about 933,000 ha of wetland in 1990, of which 30% is equipped with some forms of irrigation. Out of this irrigated area totalling 280,000 ha, 57% is under technical or semi-technical irrigation systems. Corresponding percentages in Northern Sumatra are 48% and 35%. The percentage of the irrigated area is lower, but the percentage of large- and medium-scale irrigation systems is larger in Southern Sumatra than in Northern Sumatra. In the same year, 74% of 3.4 million ha of wetland is irrigated in Java, and out of this irrigated wetland, 73% is under technical and semi-technical systems. The development of paddy-related infrastructure in Sumatra as a whole is below the level reached in Java. When the harvested area of wetland paddy is compared with the available wetland area as a rough approximation of paddy-cropping intensity, the rate comes to 89% in Southern Sumatra which is substantially lower than 106% in Northern Sumatra and 148% in Java.

Table 1.1.5 Distribution of Wetland in Southern Sumatra (1986 - 90)

(Unit: ha)

	Composition of Wetland (ha)									Harvested Area of Wetland Paddy	Paddy Cropping Intensity (%)
	Irrigated Wetland				Rainfed Irrigation	Tidal	Others	Total Wetland	Ratio of Irrigated Area (%)		
	Tech.	Semi-Tech.	Non-Tech.	Sub-total							
Southern Sumatra											
1986	93,094	40,388	107,857	241,339	111,975	138,514	257,517	749,345	32.2	758,628	101.2
1987	93,205	41,588	47,643	182,436	178,265	201,382	337,609	899,692	20.3	784,562	87.2
1988	96,607	48,435	129,811	274,853	175,293	176,383	334,352	960,881	28.6	796,724	82.9
1989	95,021	46,981	130,551	272,553	154,386	141,022	389,886	957,847	28.5	794,310	82.9
1990	105,340	54,657	119,645	279,642	145,001	166,042	341,931	932,616	30.0	828,427	88.8
Northern Sumatra											
1986	43,506	149,969	373,821	567,296	421,090	75,229	181,415	1,245,030	45.6	1,220,586	98.0
1987	50,707	152,541	293,452	496,700	452,171	76,780	268,379	1,294,030	38.4	1,235,348	95.5
1988	50,316	144,038	391,419	585,773	443,719	51,953	186,294	1,267,739	46.2	1,299,740	102.5
1989	64,374	148,664	384,756	597,794	453,351	55,333	193,025	1,299,503	46.0	1,329,660	102.3
1990	61,627	154,935	403,706	620,268	426,654	57,451	177,470	1,281,843	48.4	1,364,817	106.5
Java											
1986	1,353,926	472,313	653,031	2,479,270	933,104	3,054	29,052	3,444,480	72.0	4,997,268	145.1
1987	1,363,196	466,758	357,900	2,187,854	898,057	4,513	357,213	3,447,637	63.5	4,873,741	141.4
1988	1,369,737	454,985	698,432	2,523,154	893,607	1,200	25,437	3,443,398	73.3	4,859,848	141.1
1989	1,382,927	461,036	690,541	2,534,504	888,412	546	22,090	3,445,552	73.6	5,098,892	148.0
1990	1,389,098	458,556	688,011	2,535,665	863,471	3,565	17,826	3,420,527	74.1	5,063,461	148.0

Sources: BPS, Land Area by Utilization in Outer Java, and Land Area by Utilization in Java, annual issues.

The lower average yield of wetland paddy and the lower paddy cropping intensity in the Region indicate partly that the existing wetland is not sufficiently equipped to pursue the intensification drive of paddy production which has been the important national trend, or more specifically the trend in Java, during the past decades. They are also related to the fact that the traditionally dominant form of farming systems in the Region has been a varying combination of the more or less subsistence-oriented production of food crops and the market-oriented production of tree crops. As shown in Table 1.1.6, calculations of the provincial sample data of the Agricultural Census of 1983 indicate that the average farms in the Region comprised a wetland area (sawah) from 0.4 to 0.6 ha and an area planted to tree crops (kebun) from 0.5 to 0.8 ha, with an additional upland area from 0.5 to 0.6 ha used for arable crops either more or less continuously (tegal) or shiftingly (ladang and huma).

Table 1.1.6 Average Land Holding by Province (1983)

(Unit: ha)

Province	Wetland			Upland				Total
	Irrigated Wetland	Other Wetland	Subtotal Wetland	Tegal, Huma, Ladang	Kebun	Other Upland	Subtotal Upland	Operated Land
Jambi	0.12	0.42	0.54	0.63	0.76	0.03	1.43	1.96
South Sumatra	0.10	0.47	0.57	0.53	0.58	0.03	1.14	1.71
Bengkulu	0.24	0.19	0.43	0.52	0.55	0.03	1.10	1.53
Lampung	0.13	0.11	0.24	0.63	0.26	0.01	0.91	1.15

Sources: BPS, Sensus Pertanian: Hasil Sensus Sampel, Seri B.06, for four provinces.

Table 1.1.7 shows annual per capita consumption of major starchy food crops in 1990 for the provinces in Sumatra and Java. The figures in the table are adjusted from the weekly figures of the household food consumption survey published by the Central Bureau of Statistics (BPS). Per capita consumption of rice and other selected starchy foods varies from

province to province, partly reflecting the characteristics of local food crop production shown in Table 1.1.3. Among the four provinces of Southern Sumatra, Jambi and Bengkulu have higher per capita rice consumption of 135kg and 146kg respectively. South Sumatra and Lampung both have the significantly lower consumption of 116kg, but with higher consumption of cassava and/or maize than the former two provinces. It must be pointed out that the BPS survey does not include food consumption outside home, and accordingly, that the figures are likely to be lower than the actual consumption.

Table 1.1.7 Per Capita Consumption of Selected Starchy Food Crops in Sumatra and Java(1990)
(Unit: kg/year)

		Rice	Maize1)	Cassava2)	Sweet Potato
Southern Sumatra	Jambi	135.25	1.67	11.49	2.91
	South Sumatra	116.22	0.97	22.97	4.89
	Bengkulu	146.33	1.22	16.39	6.14
	Lampung	116.43	6.80	83.16	2.50
Northern Sumatra	Aceh	131.98	0.31	8.10	3.33
	North Sumatra	126.36	0.42	21.94	7.59
	West Sumatra	143.62	0.45	5.30	2.44
	Riau	119.34	0.52	11.83	3.69
Java	Jakarta	91.57	0.26	3.02	2.29
	West Java	123.40	3.00	12.68	4.52
	Central Java	92.35	12.80	23.32	6.24
	Yogyakarta	81.54	6.25	44.18	2.08
	East Java	85.33	19.41	25.85	2.86
Indonesia		107.43	9.26	21.78	5.10

Source: BPS, Pengeluaran Untuk Konsumsi Penduduk Indonesia per Provinsi 1990, Table 3.
Notes: 1) Dry maize equivalent.
2) Fresh cassava equivalent.

Table 1.1.8 shows the estimated total and per capita supply of rice for consumption in four provinces of Southern Sumatra in 1990. The supply is calculated from the production figures in dry paddy (GKG) published by BPS, by applying the same set of conversion rates employed by the Ministry of Agriculture. The estimated per capita supply of milled rice is highest in Jambi at 155kg, and in the range from 129 - 132kg in the remaining three provinces. The per capita supply of Southern Sumatra as a whole is 132kg, which is about 20% lower than that of Northern Sumatra.

With regard to rice which is the most important staple in Indonesia, the four provinces in Southern Sumatra are reported to have achieved their respective self-sufficiency in the mid-1980s, and have largely managed since then to maintain it. This is undoubtedly a remarkable achievement. It must be noted however that the rice self-sufficiency of the Region as of 1990 is supported by a fairly large contribution of upland paddy (540,000 tons), which accounts for 15% of the total regional production. In Northern Sumatra and in Indonesia as a whole, the corresponding figure is about 5%. It may be said that the four provinces of Southern Sumatra are yet far from becoming stable producers of sizable rice surpluses to contribute to the maintenance of the national rice self-sufficiency.

Table 1.1.9 compares production trends of major secondary food crops (palawija) in Sumatra and Java. Except for soybean, Southern Sumatra shows the highest growth per annum, especially after mid-1980s. The bulk of this growth originates in Lampung Province, which accounts for well over 80% for maize and soybean and over 70% for cassava in the total regional production. In the other three provinces, major secondary food crops appear to be produced largely for local consumption, with its marketing rarely targeted to the outside markets.

Table 1.1.8 Estimated Supply of Rice in Southern Sumatra Region (1990)

Province / Kabupaten	Production of Wetland Paddy 1) (ton)	Total Production of Paddy 2) (ton)	Total Rice Supply for Consump. 3) (ton)	Population in 1990	Per Capita Rice Supply (kg/year)
Jambi					
Kerinci	76,353	97,312	56,134	280,017	200.47
Bungo Tebo	36,764	67,423	38,893	361,242	107.66
Sarolangun Bangko	17,149	57,696	33,282	350,832	94.87
Batang Hari 5)	55,916	66,307	38,249	666,085	57.42
Tanjung Jabung	289,061	257,623	148,609	362,392	410.08
Total Province	475,243	546,361	315,167	2,020,568	155.98
South Sumatra					
Ogan Komering Ulu	261,045	303,744	175,214	963,794	181.80
Ogan Komering Ilir	300,205	323,355	186,526	771,463	241.78
Muara Enim	68,115	107,585	62,060	586,075	105.89
Lahat	130,366	144,017	83,076	599,347	138.61
Musi Rawas	85,911	129,369	74,626	512,077	145.73
Musi Banyuasin 5)	356,418	381,232	219,912	2,023,645	108.67
Bangka 6)	881	13,319	7,683	627,109	12.25
Belitung	222	506	292	192,972	1.51
Total Province	1,203,163	1,403,127	809,389	6,276,482	128.96
Bengkulu					
Bengkulu Selatan	101,012	107,314	61,904	298,214	207.58
Rejang Lebong	68,055	73,705	42,516	367,980	115.54
Bengkulu Utara 7)	65,015	88,282	50,925	512,928	99.28
Total Province	234,082	269,301	155,345	1,179,122	131.75
Lampung					
Lampung Selatan 8)	434,493	440,654	254,190	2,460,868	103.29
Lampung Tengah	478,476	592,918	342,023	1,901,630	179.86
Lampung Utara	197,277	309,340	178,442	1,655,075	107.81
Total Province	1,110,246	1,342,912	774,655	6,017,573	128.73
Southern Sumatra	3,022,734	3,561,701	2,054,556	15,493,745	132.61
Northern Sumatra	5,582,982	5,852,477	3,375,983	20,947,427	161.16

Notes:
1) Wetland paddy production figures are taken from the statistics prepared by the Central Bureau of Statistics (BPS). For Bengkulu and Jambi, kabupaten figures prepared by the Provincial Offices of Statistics do not correspond with the BPS figures, although the provincial totals are the same.
2) Kabupaten figures are taken from the statistics prepared by the respective Provincial Offices of Statistics. Provincial totals tally with those preparedby the BPS.
3) BPS figures of paddy (GKG) production is converted to rice supply as follows.
Total Rice Supply= ((Production of GKG - Seed - Feed) x Milling rate - Handling loss)
x BPS correction rate
(Seed = 1.0 % of production ; Feed= 2.0% ; Milling rate= 65% ; Handling loss= 2.5% ;
BPS correction rate= 90.12%)
4) Population figures are the preliminary estimates of the 1990 census.
5) Includes Kotmadya Palembang.
6) Includes Kotmadya Pangkal Pinang.
7) Includes Kotmadya Bengkulu.
8) Includes Kotmadya Bandar Lampung.

Sources: BPS, Production of Cereals in Indonesia 1990.
Provincial Dalam Angka 1990 for Jambi, South Sumatra, Bengkulu and Lampung.
BPS, Penduduk Indonesia: Hasil Sensus Penduduk 1990, Jan. 1991.

With regard to horticultural crops (vegetables and fruits), the regional production appears to be rather limited, largely geared to the local consumption within the Region. According to the available statistics on the harvested areas and the production of the 18 selected vegetables, the total production of the Region as a whole in 1990 is substantially smaller than the total provincial production of West Java alone in all but one crop. Considering the perishability of horticultural crops and the present marketing constraints and/or costs (chiefly transportation) in the Region, the situation is not hard to understand.

Table 1.1.9 Production Trends of Major Palawija Crops (1976/90 to 1986/90)

(Unit: ton)

		5-year Average			Annual Growth Rate (%)		
		1976 - 80 (A)	1981 - 85 (B)	1986 - 90 (C)	(A) - (B)	(B) - (C)	(A) - (C)
Maize	Southern Sumatra	66,410	167,654	479,606	20.35	23.39	21.86
	Northern Sumatra	66,586	105,321	230,814	9.60	16.99	13.24
	Indonesia	3,468,094	4,489,738	6,134,991	5.30	6.44	5.87
Cassava	Southern Sumatra	1,060,001	1,238,675	2,150,739	3.16	11.67	7.33
	Northern Sumatra	413,541	438,818	606,315	1.19	6.68	3.90
	Indonesia	13,011,701	13,323,131	15,212,054	0.47	2.69	1.57
Sweet Potato	Southern Sumatra	75,531	87,492	135,888	2.98	9.21	6.05
	Northern Sumatra	239,053	199,531	214,394	-3.55	1.45	-1.08
	Indonesia	2,239,511	2,060,056	2,071,977	-1.66	0.12	-0.77
Soybean	Southern Sumatra	31,348	41,945	141,830	6.00	27.59	16.29
	Northern Sumatra	18,154	43,045	161,492	18.85	30.27	24.43
	Indonesia	598,757	680,082	1,289,282	2.58	13.65	7.97
Groundnut	Southern Sumatra	11,031	23,367	34,422	16.20	8.06	12.05
	Northern Sumatra	24,455	32,771	54,697	6.03	10.79	8.38
	Indonesia	418,004	486,900	606,027	3.10	4.47	3.78

Source: BPS, Production of Cereals in Indonesia, annual issues.

Table 1.1.10 shows the production trends of the livestock subsector in Sumatra and Java. The annual growth of meat in the Southern Sumatra Region is significantly lower than the national trend. Moreover, the Region has the characteristics of a very strong growth in livestock meat and a weak growth in poultry meat in sharp contrast to Java. Northern Sumatra shows more or less balanced growth in both. The production of eggs in Southern Sumatra shows even a slight decline in contrast to the robust growth in Northern Sumatra. This trend corresponds with the observations that major cities in Southern Sumatra are increasingly supplied with eggs produced by large layer farms in North Sumatra.

Table 1.1.10 Production of Meat and Eggs (1983/86 - 1986/89)

		4-year Average (1000 tons)		Annual Growth(%)
		1983 - 86 (A)	1986 - 89 (B)	(A) - (B)
Total Meat	Southern Sumatra	63.21	73.64	3.89
	Northern Sumatra	117.11	136.34	3.87
	Java	425.04	474.64	2.80
	Indonesia	778.59	920.63	4.28
Livestock Meat	Southern Sumatra	29.33	37.36	6.24
	Northern Sumatra	68.90	81.56	4.31
	Java	283.34	287.10	0.33
	Indonesia	479.98	527.56	2.39
Poultry Meat	Southern Sumatra	33.89	36.28	1.72
	Northern Sumatra	48.21	54.78	3.24
	Java	141.70	187.54	7.26
	Indonesia	298.61	393.07	7.11
Total Eggs	Southern Sumatra	31.57	31.36	-0.16
	Northern Sumatra	59.29	74.91	6.02
	Java	194.73	236.04	4.93
	Indonesia	370.45	447.01	4.81

Source: Direktorat Jenderal Perternakan, Statistical Book on Livestock, annual issues.

The level of per capita consumption of livestock/poultry products (meat, eggs and milk) is yet generally low in Indonesia. The national per capita consumption of 5.49kg in

meat, 2.12kg in eggs and 3.92kg in milk in 1989 is well below the LIPI standard requirements of 7.6kg, 3.5kg and 4.6kg respectively. The levels of per capita consumption of meat in the four provinces are lower than the national average, but of eggs significantly higher. Relative to the provincial production in 1989, South Sumatra has a deficit of 12% in meat and 25% in eggs, and Jambi has a deficit of 2% in meat and 60% in eggs. Lampung has a meat deficit of 5% but is self-sufficient in eggs, while Bengkulu is nearly self-sufficient in meat and has some surplus of eggs. The livestock/poultry production in the Region is apparently not very responsive to the local demands, especially with regard to poultry products.

Table 1.1.11 Selected Indicators of the Livestock Subsector in Southern Sumatra (1989)

		Jambi	South Sumatra	Bengkulu	Lampung	Total
Per Capita Production (kg/year)	Meat	3.32	3.88	3.34	4.20	3.89
	Egg	1.47	1.99	4.61	3.36	2.65
	Milk	0.01	0.05	0.24	2.46	0.99
Per Capita Consumption (kg/year)	Meat	3.40	4.42	3.35	4.43	-
	Egg	3.47	2.61	3.24	3.36	-
	Milk	1.97	3.05	3.48	2.50	-
Ratio to Pelita V Targets in 1993 (%)	Meat (6.79 kg/year)	50.1	65.1	49.3	65.3	-
	Egg (2.52 kg/year)	137.7	103.6	128.6	133.3	-
	Milk (4.54 kg/year)	43.4	67.2	76.7	55.1	-
Ratio to the National Targets 1) (%)	Meat (7.6 kg/year)	44.7	58.2	44.1	58.3	-
	Egg (3.5 kg/year)	99.1	74.6	92.6	96.0	-
	Milk (4.6 kg/year)	42.8	66.3	75.7	54.3	-
No. of Livestock & Poultry (1,000 heads)	Cattle/Buffaloes	143.1	466.0	183.9	260.4	1,053.4
	Goats/Sheep	126.0	560.6	179.6	332.9	1,199.1
	Poultry	3,877.2	9,164.0	5,077.3	9,704.9	27,823.4
No. per 1,000 Rural Population (heads)	Cattle/Buffaloes	90.4	105.0	195.9	49.5	86.2
	Goats/Sheep	79.6	126.3	191.3	63.3	98.1
	Poultry	2,448.7	2,064.4	5,407.9	1,845.7	2,277.0
No. per 1,000 Population (heads)	Cattle/Buffaloes	71.0	74.2	156.0	43.4	68.1
	Goats/Sheep	62.5	89.3	152.3	55.4	77.5
	Poultry	1,923.1	1,459.9	4,306.0	1,615.9	1,797.6
No. per Wetland (heads/ha)	Cattle/Buffaloes	5.9	1.1	2.2	1.2	1.1

Note: 1) Norms established by LIPI
Sources: Annual reports by Provincial Livestock Services

1.1.2 Jambi

(1) Food Crops

As shown in Table 1.1.12, the production of wetland paddy (GKG) increased at an annual growth rate of 2.5% over the period from the late 1970s (1976-80 average) to the late 1980s (1986-90 average). The increase was lowest among the four provinces of Southern Sumatra. The pace of yield improvement has been slow and the average yield of 3.2 tons per hectare in the late 1980s was also lowest among the four provinces. This is partly related to the fact that approximately 80% of the available wetland is non-irrigated, mostly utilizing tidal and non-tidal swamplands. The irrigated wetland is mainly found in Kabupaten Kerinci where double-cropping is common, and in limited areas of Kabupatens Sarolangun Bangko and Tanjung Jabung. The lower growth of wetland paddy during the 1980s was partly offset by the high growth of 15.5% in upland paddy. This is in contrast with the other three provinces where the production of upland paddy started to decline, or its growth rate began tapering off during the 1980s. All palawija crops show substantial increase in output, especially during the

period from the early 1980s to the late 1980s. Their increase was largely due to the expansion in harvested area, and the yield improvement was slow.

The slowest growth and the lowest yield notwithstanding, Jambi is estimated to have the highest per capita rice production of 156kg among the four provinces in 1990 (Table 1.1.8). Relative to the provincial per capita consumption shown in Table 1.1.7, Jambi has an apparent surplus of about 13%.

Table 1.1.12 Production of Paddy and Major Palawija Crops in Jambi (1976/80 to 1986/90)

			5-year Average			Annual Growth Rate (%)		
			1976 - 80 (A)	1981 - 85 (B)	1986 - 90 (C)	(A) - (B)	(B) - (C)	(A) - (C)
Area Harvested (ha)	Rice	Wetland	125,853	140,901	136,814	2.28	-0.59	0.84
		Upland	19,608	20,178	36,229	0.58	12.42	6.33
		Total	145,460	161,079	173,043	2.06	1.44	1.75
	Maize		1,638	2,066	5,309	4.76	20.78	12.48
	Cassava		3,097	3,684	16,402	3.53	34.80	18.14
	Sweet Potato		1,328	1,203	3,397	-1.96	23.08	9.85
	Soybean		370	1,760	7,267	36.59	32.79	34.68
	Groundnut		950	1,025	3,150	1.51	25.18	12.73
Production (ton)	Rice	Wetland	338,423	408,009	434,609	3.81	1.27	2.53
		Upland	22,856	30,663	63,191	6.05	15.56	10.70
		Total	361,279	438,672	497,800	3.96	2.56	3.26
	Maize		1,986	2,652	8,084	5.95	24.97	15.07
	Cassava		28,101	34,827	165,853	4.39	36.64	19.43
	Sweet Potato		9,170	9,603	28,800	0.93	24.57	12.13
	Soybean		343	1,527	6,666	34.78	34.29	34.53
	Groundnut		871	1,082	3,239	4.42	24.53	14.03
Yield (ton/ha)	Rice	Wetland	2.69	2.90	3.18	1.51	1.89	1.70
		Upland	1.16	1.51	1.73	5.52	2.76	4.13
		Average	2.48	2.72	2.88	1.90	1.10	1.50
	Maize		1.21	1.28	1.51	1.09	3.39	2.23
	Cassava		9.00	9.56	10.34	1.21	1.58	1.40
	Sweet Potato		6.90	7.90	8.41	2.74	1.25	1.99
	Soybean		0.91	0.84	0.93	-1.42	1.95	0.25
	Groundnut		0.92	1.06	1.03	2.91	-0.64	1.12

Source: BPS, Production of Cereals in Indonesia, annual issues.

(2) Estate Crops

Table 1.1.13 shows the area and production of nine selected estate crops grown in the province during the period of 1985 - 1990. Rubber and coconut account for the bulk of the total planted area of about 730,000 ha. As in the other three provinces of Southern Sumatra, most of the area under these estate crops belong to smallholders. Traditionally, tree crops like coconut, coffee, clove and cinnamon are almost entirely grown by smallholders in Sumatra. According to the information provided by the Provincial Estate Crop Service, of the total area under rubber of some 470,000 ha in 1990, the smallholders account for well over 90%. The highlands of Kabupaten Kerinci is one of the major producing areas of cinnamon in Indonesia. With the recent establishment of Kerinci Sublat National Park, possible hazards of uncontrolled cinnamon growing in the highlands has become a major environmental issue.

In 1984, the estate sector of Jambi was limited to only 2,283 ha of tea in Kerinci highlands and 1,322 ha of rubber elsewhere. By 1990, the planted area of estates recorded a tremendous increase to some 84,000 ha, inclusive of the NES/PIR (nucleus estate and smallholder) type of development. The World Bank financed NES/PIR projects of the state-owned estate companies (PTP IV and PTP VI) at Bajubang (rubber) and Rimbo Bujang (rubber and hybrid coconut). In addition, PTP IV and PTP VI implemented PIR/TRANS projects at Bunut, S. Mekanding and Tanjung Lebar in association with transmigration programs, and two PIRSUS projects at Durian Luncuk (rubber) and Sei Bahar (oil palm).

Table 1.1.13 Area and Production of Selected Estate Crops in Jambi (1985-1990)

	1985	1986	1987	1988	1989	1990	Annual Growth 85-90 (%)
Planted Area (ha)							
Rubber	413,750	437,545	440,591	450,434	465,812	470,896	2.6
Coconut	107,474	108,688	112,214	114,000	118,658	118,403	2.0
Oil palm	4,000	5,788	16,583	20,923	24,852	45,513	62.6
Cinnamon	38,325	37,850	42,416	42,417	43,466	45,367	3.4
Coffee	28,974	28,390	30,441	31,155	31,760	31,344	1.6
Cocoa	340	400	2,009	2,678	6,350	6,136	78.4
Clove	8,062	7,900	7,807	7,816	8,631	5,339	-7.9
Tea	2,283	2,283	2,283	2,564	2,562	2,619	2.8
Sugarcane	927	930	430	738	630	1,236	5.9
Total	604,135	629,774	654,774	672,725	702,721	726,853	3.8
Production (ton)							
Rubber	105,973	112,878	146,475	160,609	173,106	170,878	10.0
Coconut	65,380	66,268	102,702	102,217	104,398	101,221	9.1
Palm oil	0	0	777	23,574	45,319	106,864	-
Cinnamon	6,143	4,700	11,750	11,578	13,280	7,614	4.4
Coffee	4,692	5,347	7,772	23,574	5,943	6,401	6.4
Cocoa	6	10	26	69	235	229	-
Clove	82	80	69	73	24	42	-12.5
Tea	4,300	5,608	4,500	5,355	5,355	4,576	1.3
Sugarcane	525	500	208	513	256	381	-6.2

Sources: For 1985 - 88, Direktorat Jenderal Perkebunan (DJP), Statistik Perkebunan Indonesia, Tahun 1984-1989 and Tahun 1988 - 1990, Jakarta.
For 1989 - 90, data of the Provincial Estate Crop Service.

In response to the liberalization policy of the Indonesian Government, there was a surge of private-sector investments in estate development toward the late 1980s. In Jambi, a number of land licences/concessions totalling some 290,300 ha were approved for the private sector investments by the end of 1990, including 168,000 ha earmarked for the PIR/TRANS type of development by 10 private estates. Some 25,000 ha, or about 8%, was developed by the end of 1990. The existing and prospective estates are largely located in Kabupaten Batang Hari and the western half of Kabupaten Tanjung Jabung, in the extensive plains behind the levees of the Batang Hari River and its main tributaries and the Sungai Tungkal River. The rough planting targets by the private estates, inclusive of PIR/TRANS types, are shown below (When a concession lists more than two crops without areal specification, its target area is allocated equally to each crop). When fully developed, these estates will make a substantial contribution to the regional economic growth, and PIR/TRANS estates in particular to the improvement of rural income and employment in transmigration communities.

Crops	Target Areas
Oil palm	192,350 ha
(of which , PIR/TRANS	167,660 ha)
Rubber	75,793
Cocoa	20,000
Coconut	2,000
Pepper	145
Total	290,288 ha

(3) Livestock and Poultry

Table 1.1.14 summarizes selected aspects of the livestock/poultry sector of Jambi during the latter half of the 1980s. The population of cattle and buffaloes in Jambi is smallest among the four provinces, but the increase has been most rapid. Their number per hectare of wetland was highest among the four provinces in 1989 (See Table 1.1.11). The production of poultry meat has increased very rapidly, but that of eggs has remained stagnant, possibly due to the intensified competition with large-scale suppliers from North Sumatra Province. The per capita production of meat, eggs and milk is all lower than the consumption in 1989, relying on the supply from outside the province. Per capita consumption of eggs in 1989 has reached the

national requirement established by LIPI in 1988, but that of meat and milk is less than a half of the requirement (See Table 1.1.11).

Table 1.1.14 Trends of Livestock Population and Production in Jambi (1983/86 - 1986/89)

		4-year Average		Annual Growth(%)
		1983 - 86 (A)	1986 - 89 (B)	(A) - (B)
Population (1000 heads)	Cattle	39.1	65.0	13.58
	Buffaloes	60.3	55.5	-2.04
	Goats/Sheep	86.5	111.4	6.54
	Pigs	14.0	10.3	-7.37
	Local Chickens	1,685.0	2,169.9	6.53
	Broilers/Layers	782.0	1,012.6	6.67
Livestock Meat 1) (1000 tons)		3.5	4.2	4.68
Poultry Meat 2) (1000 tons)		5.4	9.1	14.13
Eggs 3) (1000 tons)		4.3	4.2	-0.54

Notes: 1) Includes horse meat.
2) Includes duck meat.
3) Includes duck eggs.

Source: Direktorat Jenderal Peternakan, Statistical Book on Livestock, annual issues.

1.1.3 South Sumatra

(1) Food Crops

As shown in Table 1.1.15, production of wetland paddy from the late 1970s (1976-80 average) to the late 1980s (1986-90 average) increased by 5.6% per annum, which is somewhat lower than the regional average (6.2%). The province recorded a significant improvement in yield from the late 1970s to the early 1980s, but the momentum seems to have been lost afterward. In contrast, the expansion of the harvested area has kept a steady pace of about 3.5% per annum for the last 15 years. The average yield of wetland paddy during the latter half of the 1980s remained a low 3.3 tons per hectare, primarily because the area of irrigated wetland is yet limited in the province. Of the total wetland area of about 430,000 ha, only a little over 16% is equipped with some types of irrigation, and a mere 5% with technical and semi-technical irrigation systems in 1990.

The centers of irrigated wetland are in Belitang in Kabupaten Ogan Komering Ulu and Tugumulyo in Kabupaten Musi Rawas, where large-scale technical irrigation systems were first developed during the colonial period, and to a much lesser extent the mountainous area of Kabupaten Lahat where there are numerous small irrigation systems. The bulk of wetland areas of the province consists of tidal swamp wetland (pasang surut), which are found mainly in Kabupaten Musi Banyuasin, and non-tidal swamp wetland (lebak) utilized during the dry season, which is mainly found in Ogan Komering Ilir and Musi Banyuasin. The two types of swamp wetland totalled 253,000 ha in 1990.

The production of upland paddy shows a declining trend due to the drop in harvested area, but still accounts for 13% of the total paddy output during the late 1980s. In South Sumatra, a slash-and-burn type of paddy cultivation called sunur is practiced in dried-up swamp areas near the end of the exceptionally prolonged dry season just prior to the onset of the rainy season. The dry spell occurs once every five years or so in South Sumatra. The year of 1991 was such a year, and 20,000 - 30,000 ha was reportedly utilized for sunur paddy. Because the sunur harvest is counted as upland paddy, the apparent decline of upland paddy production may not be a definite trend.

The estimated per capita production in South Sumatra was about 129kg in 1990 (Table 1.1.8). Relative to the per capita consumption figure in Table 1.1.7, the province has a surplus of about 10%. Although the average yield of wetland paddy is relatively low in

Kabupatens Musi Banyuasin and Ogan Komering Ilir, where pasang surut and lebak types of wetland are predominant, per capita production in the two kabupatens is high probably due to the larger operating size of wetland (See Table 1.1.8).

Table 1.1.15 Production of Paddy and Major Palawija Crops in South Sumatra (1976/80 to 1986/90)

			5-year Average			Annual Growth Rate (%)		
			1976 - 80 (A)	1981 - 85 (B)	1986 - 90 (C)	(A) - (B)	(B) - (C)	(A) - (C)
Area Harvested (ha)	Rice	Wetland	240,651	284,691	338,827	3.42	3.54	3.48
		Upland	117,030	104,349	96,223	-2.27	-1.61	-1.94
		Total	357,681	389,039	435,050	1.69	2.26	1.98
	Maize		6,236	11,386	20,235	12.80	12.19	12.49
	Cassava		19,285	20,624	29,663	1.35	7.54	4.40
	Sweet Potato		4,841	4,902	5,469	0.25	2.21	1.23
	Soybean		3,743	5,999	14,847	9.90	19.87	14.77
	Groundnut		5,382	9,703	12,788	12.51	5.68	9.04
Production (ton)	Rice	Wetland	647,217	886,048	1,120,173	6.48	4.80	5.64
		Upland	165,827	170,331	172,876	0.54	0.30	0.42
		Total	813,043	1,056,379	1,293,049	5.38	4.13	4.75
	Maize		5,208	14,790	34,974	23.21	18.78	20.98
	Cassava		184,707	222,213	369,842	3.77	10.73	7.19
	Sweet Potato		37,185	38,398	42,960	0.64	2.27	1.45
	Soybean		3,319	5,222	15,879	9.49	24.91	16.95
	Groundnut		4,282	10,002	14,181	18.49	7.23	12.72
Yield (ton/ha)	Rice	Wetland	2.69	3.11	3.31	2.94	1.24	2.09
		Upland	1.42	1.63	1.79	2.76	1.96	2.36
		Average	2.27	2.71	2.97	3.59	1.84	2.71
	Maize		0.84	1.25	1.72	8.30	6.63	7.46
	Cassava		9.58	10.75	12.44	2.34	2.96	2.65
	Sweet Potato		7.64	7.82	7.95	0.48	0.32	0.40
	Soybean		0.91	0.84	1.07	-1.63	4.96	1.61
	Groundnut		0.78	1.02	1.12	5.39	1.89	3.62

Source: BPS, Production of Cereals in Indonesia, annual issues.

(2) Estate Crops

The planted areas of ten estate crops in South Sumatra add up to more than 1 million ha, of which rubber and coffee combined account for a little over 80% (Table 1.1.16). As is the case with the other provinces in the Region, smallholders are predominant in terms of the area under estate crops. According to the information provided by the Provincial Estate Crop Service, 91% of the total area under six tree crops (rubber, coffee, coconut, oil palm, cocoa and tea) belongs to the smallholders in 1990. The smallholder coffee area expanded rapidly during the coffee boom in the 1970s, chiefly along the foothills and valleys of the Bukit Barisan in Kabupatens Lahat, Muara Enim and Ogan Komering Ulu. Rubber is extensively grown in the plains of the Musi River basin. Pepper is also grown mainly by smallholders, with marked concentration in Bangka Island.

The estate sector was small in 1984, with a combined area of 37,000 ha mostly under rubber, sugarcane and oil palm. Subsequently, the planted area nearly trebled to some 101,000 ha by the end of 1990. 57 % of the area is planted with oil palm, followed by rubber (25%), sugarcane (12%), hybrid coconut (4%) and tea (1%). The areas under tree crops continued to expand during the late 1980s, quite rapidly in the case of oil palm and coconut, but the area of sugarcane has remained largely unchanged since 1984. During the 1980s, the World Bank financed NES or PIR projects at Tebenan (rubber and oil palm) and Betung (oil palm). In addition, the state-owned estates implemented PIR projects in association with transmigration programs, one in Lahat (rubber) and another at Muara Enim (oil palm).

Chiefly during the late 1980s, land licenses/concessions granted to private investors increased rapidly in the province. According to the data provided by the Provincial Estate Crop Service, the cumulative total of such concessions amounted to 412,600 ha in 1990, of which only 10% was developed by the end of 1990. Over 50% of the total concession areas

Table 1.1.16 Area and Production of Selected Estate Crops in South Sumatra (1985-1990)

	1985	1986	1987	1988	1989	1990	Annual Growth 85-90 (%)
Planted Area (ha)							
Rubber	518,628	525,631	511,717	526,708	567,144	582,483	2.3
Coffee	232,589	237,029	235,277	236,496	243,250	248,917	1.4
Coconut	53,941	54,866	51,025	53,886	57,298	58,523	1.6
Oil palm	29,171	26,420	30,685	41,886	51,767	57,760	14.6
Pepper	25,130	26,738	47,886	47,451	53,062	54,189	16.6
Clove	14,013	13,321	9,397	13,641	9,879	8,575	-9.4
Cinnamon	1,211	1,168	1,168	1,058	1,259	1,131	-1.4
Cocoa	82	70	126	318	481	1,014	65.4
Tea	793	797	977	845	933	933	3.3
Sugarcane	12,191	9,172	12,315	12,246	13,000	12,565	0.6
Total	887,749	895,212	900,573	934,535	998,074	1,026,089	2.9
Production (ton)							
Rubber	171,985	171,688	167,060	186,880	181,694	186,635	1.6
Coffee	61,771	68,013	75,633	81,710	89,710	89,910	7.8
Coconut	16,546	16,027	17,650	18,751	20,201	21,450	5.3
Palm oil	18,825	19,397	25,239	42,543	42,559	76,346	32.3
Pepper	18,993	20,350	22,957	29,230	25,121	26,200	6.6
Clove	199	145	133	158	153	298	8.4
Cinnamon	112	49	37	103	104	105	-1.3
Cocoa	1	3	0	4	25	26	91.9
Tea	1,270	538	0	1,263	1,310	1,113	-2.6
Sugarcane	7,217	32,862	36,204	45,930	45,950	45,975	44.8

Sources: For 1985 - 88, Direktorat Jenderal Perkebunan (DJP), Statistik Perkebunan Indonesia, Tahun 1984-1989 and Tahun 1988 - 1990, Jakarta.
For 1989 - 90, data of the Provincial Estate Crop Service.

are located in Kabupatens Musi Banyuasin and Ogan Komering Ilir. When combined with the concessions of about 49,000 ha which belong to the state-owned estate companies, the total area allocated to the estate sector comes to 461,000 ha in 1990. The application for concessions continued after 1990, although the tightening of bank credit by higher interest rates apparently dampened the number of applications. According to the information of the Provincial BAPPEDA, the area of the estate sector could be increased to 1 million ha. The breakdown of private sector concessions by crop as of 1990 are shown below (when a concession lists more than two crops without areal specification, the area is allocated equally to each crop).

Crops	Approved Area
Oil palm	235,793 ha
Rubber	136,353
Cocoa	21,818
Coconut	8,170
Others	10,835
Total	412,970 ha

(3) Livestock and Poultry

Table 1.1.17 summarizes selected aspects of the livestock/poultry sector of South Sumatra during the latter half of the 1980s. The population of cattle in the province is largest among the four provinces, and recorded a robust growth of nearly 6% in recent years. The production of livestock meat has increased substantially, while those of poultry meat and eggs grew more slowly. The supply of eggs to the province's urban markets has become increasingly competitive with large-scale suppliers from North Sumatra Province. The per capita production of meat, eggs and milk is all lower than the consumption in 1989, relying on the supply from outside the province (See Table 1.1.11). Relative to the national requirement established by LIPI, per capita consumption of meat, eggs and milk is lower by 25% to 40%.

Table 1.1.17 Trends of Livestock Population and Production in South Sumatra (1983/86 - 1986/89)

		4-year Average		Annual Growth(%)
		1983 - 86 (A)	1986 - 89 (B)	(A) - (B)
Population (1000 heads)	Cattle	247.5	311.3	5.90
	Buffaloes	126.6	137.2	2.05
	Goats/Sheep	391.8	554.1	9.05
	Pigs	84.5	107.7	6.25
	Local Chickens	5,188.8	5,951.4	3.49
	Broilers/Layers	767.0	1,113.0	9.76
Livestock Meat 1) (1000 tons)		13.9	18.7	7.74
Poultry Meat 2) (1000 tons)		9.5	11.6	4.92
Eggs 3) (1000 tons)		8.5	10.9	6.45

Notes: 1) Includes horse meat.
2) Includes duck meat.
3) Includes duck eggs.

Source: Direktorat Jenderal Peternakan, Statistical Book on Livestock, annual issues.

1.1.4 Bengkulu

(1) Food Crops

The production of wetland paddy during the period from the late 1970s (1976-80 average) to the late 1980s (1986-90 average) annually increased by 7.1%, which is the second highest among the four provinces (Table 1.1.18). The pattern of growth shows a radical change over the period. From the late 1970s to the early 1980s, the growth of production by more than 10% per annum was achieved almost totally by a substantial gain in yield. In contrast, the slowed growth of production at 3.8% per annum from the early 1980s to the late 1980s was mostly achieved by an expansion in harvested area, with the yield improvement dropping to a mere 0.6% per annum.

Table 1.1.18 Production of Paddy and Major Palawija Crops in Bengkulu (1976/80 to 1986/90)

		5-year Average			Annual Growth Rate (%)		
		1976 - 80 (A)	1981 - 85 (B)	1986 - 90 (C)	(A) - (B)	(B) - (C)	(A) - (C)
Area Harvested (ha)	Rice Wetland	50,892	55,471	66,621	1.74	3.73	2.73
	Upland	19,894	23,729	21,166	3.59	-2.26	0.62
	Total	70,787	79,200	87,786	2.27	2.08	2.18
	Maize	3,040	4,994	10,898	10.44	16.89	13.62
	Cassava	1,496	3,091	5,473	15.62	12.11	13.85
	Sweet Potato	1,227	2,902	3,945	18.79	6.33	12.39
	Soybean	720	1,886	4,438	21.23	18.66	19.94
	Groundnut	1,096	3,169	4,610	23.66	7.78	15.45
Production (ton)	Rice Wetland	113,005	186,353	225,203	10.52	3.86	7.14
	Upland	27,827	37,962	36,461	6.41	-0.80	2.74
	Total	165,249	224,315	261,664	6.30	3.13	4.70
	Maize	3,435	7,204	19,383	15.96	21.89	18.89
	Cassava	12,179	29,781	62,722	19.58	16.06	17.81
	Sweet Potato	8,415	22,669	36,921	21.92	10.25	15.94
	Soybean	549	1,589	4,414	23.67	22.66	23.17
	Groundnut	949	3,654	5,165	30.94	7.17	18.46
Yield (ton/ha)	Rice Wetland	2.23	3.34	3.38	8.42	0.26	4.26
	Upland	1.41	1.59	1.72	2.48	1.59	2.03
	Average	2.34	2.82	2.99	3.81	1.17	2.48
	Maize	1.14	1.39	1.79	4.07	5.27	4.67
	Cassava	8.10	9.42	11.42	3.06	3.93	3.50
	Sweet Potato	6.88	7.74	9.40	2.38	3.96	3.17
	Soybean	0.74	0.85	0.98	2.74	3.07	2.90
	Groundnut	0.86	1.15	1.13	5.95	-0.37	2.74

Source: BPS, Production of Cereals in Indonesia, annual issues.

The existing wetland is relatively evenly distributed with about 21,000 ha each in Kabupatens Rejang Lebong and Bengkulu Utara and 29,000 ha in Bengkulu Selatan, but the percentage of irrigated wetland is very high in Rejang Lebong (90%) relative to around 50% in the other two Kabupatens. The production of upland paddy began to decline in the late 1980s, but still accounts for nearly 14% of the total paddy output in the late 1980s. Relative to the per capita consumption figure, the highest among the four provinces (Table 1.1.7), the pere capita production in Bengkulu implies a 10% deficit in rice n 1990 (Table 1.1.8). Five palawija crops all show very high growth rates than paddy in the province. Their increase is chiefly due to the rapid expansion in harvested area ranging from 13% to nearly 20% per annum.

(2) Estate Crops

As shown in Table 1.1.19, coffee and rubber account for the bulk of the planted area under ten selected estate crops in the province, and most of the area planted with these crops belong to smallholders. According to the information provided by the Provincial Estate Crop Service, the area under six tree crops (rubber, coffee, coconut, oil palm, cocoa and tea) totals about 203,000 ha in 1990, 73% of which belongs to the smallholder sector.

The estate sector was practically non-existent in 1984, but its planted area increased to some 54,000 ha by February of 1991, including the NES/PIR type of development. 39 % of this estate area is planted with oil palm, followed by rubber (37%) and cocoa (22%) and others (Arabica coffee, ramy, tea, ginger, etc.). During the late 1980s, the World Bank financed PIR projects (nucleus estate and smallholder development) at Seluma (rubber) and Talopino (oil palm), with co-finance from CDC. In addition, a state-owned estate company implemented a PIRSUS project in association with transmigration at Ketahun (rubber).

Table 1.1.19 Area and Production of Selected Estate Crops in Bengkulu (1985-1990)

	1985	1986	1987	1988	1989	1990	Annual Growth 85-90 (%)
Planted Area (ha)							
Coffee	62,243	63,760	62,940	87,730	89,194	90,975	7.9
Rubber	42,262	43,435	42,009	58,003	53,770	55,736	5.7
Clove	27,009	28,050	27,662	23,627	21,752	22,250	-3.8
Oil palm	736	1,203	6,611	10,560	14,078	21,023	95.5
Coconut	19,263	19,627	18,345	18,410	19,086	20,506	1.3
Cocoa	352	506	707	9,367	8,206	14,391	110.0
Cinnamon	1,800	1,814	1,149	2,031	1,965	2,000	2.1
Pepper	1,743	1,750	1,487	1,559	1,702	1,948	2.2
Tea	0	0	0	0	112	472	-
Sugarcane	1,050	440	440	0	0	0	-100.0
Total	156,458	160,585	161,350	211,287	209,865	229,301	7.9
Production (ton)							
Coffee	27,368	30,115	30,413	37,837	41,919	45,000	10.5
Rubber	13,731	14,418	12,372	10,798	13,012	13,706	0.0
Clove	1,202	1,197	1,071	855	727	812	-7.5
Palm oil	0	0	0	459	399	885	-
Coconut	11,868	11,101	8,222	7,531	9,423	10,217	-3.0
Cocoa	1	2	3	33	34	16	74.1
Cinnamon	48	39	117	44	31	50	0.8
Pepper	259	222	217	274	290	304	3.3
Tea	0	0	0	0	0	0	-
Sugarcane	425	206	206	0	0	0	-100.0

Sources: For 1985 - 88, Direktorat Jenderal Perkebunan (DJP), Statistik Perkebunan Indonesia, Tahun 1984-1989 and Tahun 1988 - 1990, Jakarta.
For 1989 - 90, Dinas Perkbunan, Propinci Bengkulu, Statistik Perkebunan, 1989 and 1990.

During the period from 1981 to the end of February 1991, land licenses/ concessions totalling 284,300 ha[1] have been approved for private sector investments in estate development, and approximately 47% each located in Bengkulu Utara and Bengkulu Selatan. About 11% has been planted with some estate crops by the end of February 1991. According to the Provincial Estate Crop Service, a gross area of some 400,000 ha (inclusive of the licenses/concessions above) has been identified as allocable for estate or estate crop development. The identified areas are located along the coastal road from Bintuan in the southeast to the border with West Sumatra in the northwest, skirting the existing communities and wetland areas. When fully developed, a more or less continuous belt of estates somewhat similar to the eastern coast of North Sumatra Province is expected to emerge in the province. The breakdown of private sector concessions as of February 1991 are shown below (when a concession lists more than two crops without areal specification, the total area is allocated equally to each crop).

Crops	Approved Area
Oil palm	124,402 ha
Cocoa	94,078
Rubber	34,750
Arabica coffee	7,843
Tea	2,000
Ramy	1,000
Ginger	1,900
Others	18,352
Total	284,325 ha

(3) Livestock and Poultry

Table 1.1.20 summarizes selected aspects of the livestock/poultry sector of Bengkulu during the latter half of the 1980s. The populations of livestock and poultry generally showed robust growth. The production of poultry meat and eggs has been growing substantially in contrast to livestock meat. The high growth for poultry meat is probably related to the recent establishment of a commercial broiler farm. The number of large ruminants in 1989 is largest per 1,000 of rural population among the four provinces (see Table 1.1.11). Relative to per capita consumption, the province is nearly self-sufficient in meat and has a surplus of eggs. Per capita consumption of eggs in 1989 has nearly cleared the national requirement established by LIPI, while that of meat remains less than a half of the standard requirement.

Table 1.1.20 Trends of Livestock Population and Production in Bengkulu (1983/86 - 1986/89)

		4-year Average		Annual Growth(%)
		1983 - 86 (A)	1986 - 89 (B)	(A) - (B)
Population (1000 heads)	Cattle	61.8	85.4	8.44
	Buffaloes	74.4	84.7	3.29
	Goats/Sheep	119.1	171.4	9.52
	Pigs	0.4	0.6	13.62
	Local Chickens	2,459.7	3,574.7	9.80
	Broilers/Layers	188.4	267.2	9.14
Livestock Meat 1) (1000 tons)		2.5	2.7	1.72
Poultry Meat 2) (1000 tons)		4.1	5.7	8.27
Eggs 3) (1000 tons)		3.3	4.7	9.29

Notes: 1) Includes horse meat.
2) Includes duck meat.
3) Includes duck eggs.

Source: Direktorat Jenderal Peternakan, Statistical Book on Livestock, annual issues.

1. The total area of concessions increased to 321,981 ha by March, 1992.

1.1.5 Lampung

(1) Food Crops

Agriculture in Lampung has some characteristics which are significantly different from the other provinces of Southern Sumatra. Three important differences need be mentioned. Firstly, most of the land available for agriculture has been already opened up, partly by the successive waves of government-sponsored and spontaneous transmigration from Java and Bali dating back to the colonial period, and partly by the development of large-scale agricultural enterprises. Secondly, as a corollary to the relatively tight relationship between land and farming population/enterprises, the agricultural use of upland, which would have been dominated by tree crops elsewhere in Southern Sumatra, also includes annual and seasonal cropping of substantial scale by both small-scale farmers and commercial farms. Thirdly, the proximity of Java, especially of expanding Metropolitan Jakarta, has no doubt provided relatively good access to wider markets, not only in the sense of demand for the province's agricultural produce and processed products, but also in the sense of manpower and capital supply.

The production of wetland paddy in Lampung during the period from the late 1970s (1976-80 average) to the late 1980s (1986-90 average) increased by nearly 9% per annum (Table 1.1.21), which is the highest among the four provinces in Southern Sumatra. Most of the increase was achieved by the expansion in harvested area of 6.4% per annum, while the yield improvement was a moderate 2.3%. The province has the highest average yield of wetland paddy at 4.1 tons per hectare during the late 1980s. This is probably related to the higher percentage of irrigation in the total wetland area, and moreover, the higher percentage of technical and semi-technical irrigation in the total irrigated wetland in Lampung. The growth of upland paddy started to taper off during the late 1980s due to a reduction in harvested area, but still accounts for 18% of the total paddy output. Relative to the per capita consumption figure in Table 1.1.7, the province has a rice surplus of about 10% in 1990 (See Table 1.1.8).

Table 1.1.21 Production of Paddy and Major Palawija Crops in Lampung (1976/80 to 1986/90)

			5-year Average			Annual Growth Rate (%)		
			1976 - 80 (A)	1981 - 85 (B)	1986 - 90 (C)	(A) - (B)	(B) - (C)	(A) - (C)
Area Harvested (ha)	Rice	Wetland	132,083	189,508	245,138	7.49	5.28	6.38
		Upland	116,863	132,846	109,270	2.60	-3.83	-0.67
		Total	248,946	322,355	354,408	5.30	1.91	3.60
	Maize		44,493	86,073	196,751	14.11	17.98	16.03
	Cassava		75,562	87,194	122,343	2.91	7.01	4.94
	Sweet Potato		2,510	1,987	2,797	-4.57	7.08	1.09
	Soybean		32,913	43,018	116,348	5.50	22.02	13.46
	Groundnut		6,425	9,453	11,775	8.03	4.49	6.25
Production (ton)	Rice	Wetland	430,363	733,857	1,005,388	11.26	6.50	8.86
		Upland	172,814	214,020	228,945	4.37	1.36	2.85
		Total	603,177	947,877	1,234,333	9.46	5.42	7.42
	Maize		55,780	143,008	417,164	20.72	23.88	22.29
	Cassava		835,014	951,854	1,552,323	2.65	10.28	6.40
	Sweet Potato		20,760	16,823	27,206	-4.12	10.09	2.74
	Soybean		27,137	33,607	114,871	4.37	27.87	15.52
	Groundnut		4,929	8,630	11,837	11.86	6.52	9.16
Yield (ton/ha)	Rice	Wetland	3.26	3.86	4.10	3.46	1.20	2.32
		Upland	1.47	1.61	2.09	1.77	5.36	3.55
		Average	2.42	2.93	3.48	3.91	3.48	3.69
	Maize		1.24	1.59	2.12	5.21	5.84	5.53
	Cassava		11.06	10.91	12.63	-0.27	2.98	1.34
	Sweet Potato		8.26	8.46	9.74	0.48	2.85	1.66
	Soybean		0.82	0.76	0.99	-1.59	5.38	1.83
	Groundnut		0.77	0.90	1.01	3.32	2.18	2.75

Source: BPS, Production of Cereals in Indonesia, annual issues.

The production of palawija crops, excluding sweet potato, show robust growth from the late 1970s and the late 1980s. During the late 1980s, Lampung accounts for 87% for maize, 81% for soybean and 72% for cassava of the respective regional total production. The importance of secondary food crops in the province is partly related to the higher consumption of maize and cassava shown in Table 1.1.7. But a greater part of the increased production was oriented to markets other than local food consumption, such as soybean for Jakarta and West Java, and cassava for local starch factories and for the export of feed pellets to Europe.

(2) Estate Crops

Table 1.1.22 shows the area and production of ten selected estate crops grown in the province during the period of 1985 - 1990. Coconut and coffee accounts for nearly 60% of the planted area, while rubber is relatively small compared with the other three provinces. As in the other provinces, most of the area under tree crops belong to smallholders. According to the information provided by the General Directorate of Estate Crops, the total area under six tree crops (rubber, coffee, coconut, oil palm, cocoa and tea) is about 368,000 ha in 1990, 86% of which belongs to the smallholders.

Table 1.1.22 Area and Production of Selected Estate Crops in Lampung (1985-1990)

	1985	1986	1987	1988	1989	1990	Annual Growth 85-90 (%)
Planted Area (ha)							
Coconut	121,828	138,295	160,614	169,037	175,198	179,278	8.0
Coffee	109,287	109,660	110,638	115,516	120,104	121,150	2.1
Clove	71,284	61,737	58,649	53,059	48,876	47,651	-7.7
Pepper	39,331	38,207	39,671	40,053	43,047	43,858	2.2
Rubber	45,655	45,960	46,086	47,999	42,890	42,540	-1.4
Cocoa	953	969	2,579	3,521	8,913	13,623	70.2
Oil palm	10,800	10,800	10,861	11,010	11,309	11,584	1.4
Cinnamon	375	447	491	503	501	517	6.6
Tea	13	0	9	9	10	10	-5.1
Sugarcane	31,307	26,155	28,697	28,083	39,102	49,645	9.7
Total	430,833	432,230	458,295	468,790	489,950	509,855	3.4
Production (ton)							
Coconut	59,328	79,553	107,841	108,817	123,967	128,820	16.8
Coffee	69,117	71,124	71,857	72,917	84,570	85,701	4.4
Clove	2,550	1,110	2,407	6,028	3,081	3,068	3.8
Pepper	17,059	19,224	20,150	25,382	26,486	26,201	9.0
Rubber	25,377	30,569	33,001	34,019	30,497	30,058	3.4
Cocoa	30	30	445	134	670	950	99.6
Palm oil	40,776	34,661	43,038	26,591	32,285	39,786	-0.5
Cinnamon	10	34	211	198	180	181	78.5
Tea	6	0	5	5	6	7	3.1
Sugarcane	116,949	138,723	148,843	115,428	227,335	260,485	17.4

Sources: For 1985 - 88, Direktorat Jenderal Perkebunan (DJP), Statistik Perkebunan Indonesia, Tahun 1984-1989 and Tahun 1988 - 1990, Jakarta.
For 1989 - 90, Dinas Perkbunan, Propinci Lampung, Informasi Data Statistik Perkebunan Lampung, July 1991.

Among the four provinces, Lampung had the largest estate area of 43,000 ha under six tree crops in 1984, but the subsequent growth was slower, reaching some 58,000 ha in 1990. In the other three provinces, the rapid expansion of the estate area during the latter half of the 1980s was mainly led by oil palm. In contrast, the planted area of oil palm in Lampung apparently decreased from 17,600 ha in 1984 to 11,000 ha in 1990. In addition to the tree crops, the province has sizable sugarcane estates, both state-owned and private, and in contrast to the sugarcane estates in South Sumatra, their planted area more than trebled from 15,000 ha to 45,455 ha from 1984 to 1990. As of 1990, the total planted area of the estate sector amounts to 103,235 ha, of which 44 % is planted to sugarcane, followed by rubber(22%), coconut (13%), oil palm (11%), cocoa (9%) and others.

Land licenses/concessions authorized for the private sector investments totalled 115,400 ha, and the applications under processing 258,750 ha, at the end of 1990. Most of the

investments, including those under processing, have been for sugarcane and tree crops like hybrid coconut, cocoa and oil palm. But what distinguishes Lampung from the other three provinces is the existence of large commercial farms growing non-tree crops, such as pineapple, cassava and maize in addition to sugarcane. The breakdown of the private sector concessions by crop, inclusive of those under processing, are shown below (when a concession lists more than two crops without areal specification, the area is allocated equally to each crop).

Crops	Concession Area
Sugarcane	193,484 ha
Oil palm	60,597
Coconut	53,681
Cocoa	31,146
Pineapple	15,900
Cassava	6,700
Rubber	5,775
Others	6,894
Total	374,177 ha

(3) Livestock and Poultry

Table 1.1.23 summarizes selected aspects of the livestock/poultry sector of Lampung during the latter half of the 1980s. The populations of livestock and poultry and the production thereof show widely-varied trends. The production of livestock meat recorded substantial growth, but that of poultry meat and eggs apparently declined. As shown in Table 1.1.11 of the previous section, the number of cattle and buffaloes is smallest per 1,000 of rural population among the four provinces. However, per capita production of meat in 1989 is highest among the four provinces. Relative to consumption, the province is nearly self-sufficient in meat and eggs. Per capita consumption of eggs in 1989 has nearly cleared the national requirement established by LIPI, although that of meat and milk remains a little more than a half of the requirement (see Table 1.1.11).

Table 1.1.23 Trends of Livestock Population and Production in Lampung (1983/86 - 1986/89)

		4-year Average		Annual Growth(%)
		1983 - 86 (A)	1986 - 89 (B)	(A) - (B)
Population (1000 heads)	Cattle	134.1	172.8	6.53
	Buffaloes	35.3	36.1	0.56
	Goats/Sheep	213.7	327.2	11.25
	Pigs	25.7	34.3	7.46
	Local Chickens	12,966.6	7,771.3	-12.01
	Broilers/Layers	1,015.3	1,362.1	7.62
Livestock Meat 1) (1000 tons)		9.5	11.9	5.66
Poultry Meat 2) (1000 tons)		14.8	9.9	-9.56
Eggs 3) (1000 tons)		15.5	11.6	-7.03

Notes: 1) Includes horse meat.
2) Includes duck meat.
3) Includes duck eggs.

Source: Direktorat Jenderal Peternakan, Statistical Book on Livestock, annual issues.

Since 1990, three private investments in cattle fattening have been making progress in Lampung. One of them, a joint venture with an Australian company, has begun its fattening operation with the target capacity of 30,000 heads, with a PIR type arrangement with local farmers concerning the production of green feeds. Another fattening farm with a target capacity of 6,000 heads is being implemented by a pineapple estate, with a view to utilize pineapple wastes as feeds. The last project with a target capacity of 3,000 heads is reportedly planning to organize local farmers who will sell young steers for fattening.

1.2 DEVELOPMENT CONCEPT

1.2.1 Development Potentials

(1) Potentials of Existing Agricultural Land

Figure 1.2.1 roughly shows the current agricultural land use in the Southern Sumatra Region. As discussed already in the previous section, the existing agricultural land use is generally extensive, and offers substantial room for expanding agricultural production. Table 1.2.1 shows the existing wetland areas in four provinces. The potentials of increasing paddy production from the existing wetland somewhat differ between Bengkulu and Lampung, on the one hand, and Jambi and South Sumatra, on the other. In the former two provinces, the irrigated wetland accounts for 60 - 65% of the total wetland in 1990. In Bengkulu, nearly 50% of the irrigated wetland is of small-scale, non-technical irrigation systems, while technical and semi-technical irrigation systems account for 76% in Lampung. The improvement (rehabilitation and extension) of existing command areas and/or the better operation and management of the irrigation systems will make it possible to raise the cropping intensity and the average crop yields in the existing wetland. (See Appendix to this Chapter for kecamatan-wise figures, although using different sources.)

Table 1.2.1 Distribution of Wetland by Province (1986 - 90)

(Unit: ha)

	Composition of Wetland (ha)								Ratio of Irrigated Area (%)	Harvested Area of Wetland Paddy (ha)	Paddy Cropping Intensity (%)
	Irrigated Wetland				Rainfed Wetland	Tidal Swamp Wetland	Others	Total Wetland			
	Tech.	Semi-Tech.	Non-Tech.	Sub-total							
Jambi											
1986	650	6,009	16,837	23,496	12,773	12,843	49,956	99,068	23.7	140,047	141.4
1987	650	7,476	9,358	17,484	58,907	76,149	57,301	209,841	8.3	134,831	64.3
1988	650	8,887	34,518	44,055	63,095	74,811	65,146	247,107	17.8	139,536	56.5
1989	650	10,619	29,577	40,846	31,224	67,197	73,548	212,815	19.2	136,241	64.0
1990	203	11,020	16,957	28,180	29,313	75,203	74,791	207,487	13.6	145,214	70.0
South Sumatra											
1986	14,239	5,076	35,034	54,349	35,374	114,569	157,458	361,750	15.0	334,579	92.5
1987	13,465	5,072	16,148	34,685	61,396	115,574	193,888	405,543	8.6	331,848	81.8
1988	12,550	5,892	40,221	58,663	47,679	90,596	214,391	411,329	14.3	343,626	83.5
1989	12,675	6,194	40,284	59,153	48,052	71,059	279,621	457,885	12.9	341,750	74.6
1990	13,727	6,824	48,897	69,448	46,217	83,948	230,253	429,866	16.2	353,218	82.2
Bengkulu											
1986	10,493	10,039	23,930	44,462	10,836	4,919	22,405	82,622	53.8	65,752	79.6
1987	6,527	12,395	9,827	28,749	11,338	4,627	35,631	80,345	35.8	68,216	84.9
1988	7,631	16,783	19,304	43,718	11,552	4,146	24,772	84,188	51.9	67,934	80.7
1989	7,527	13,015	23,758	44,300	13,308	522	13,359	71,489	62.0	68,055	95.2
1990	11,187	13,710	21,826	46,723	11,322	3,001	10,887	71,933	65.0	65,933	91.7
Lampung											
1986	67,712	19,264	32,056	119,032	52,992	6,183	27,698	205,905	57.8	218,250	106.0
1987	72,563	16,645	12,310	101,518	46,624	5,032	50,789	203,963	49.8	249,667	122.4
1988	75,776	16,873	35,768	128,417	52,967	6,830	30,043	218,257	58.8	245,628	112.5
1989	74,169	17,153	36,932	128,254	61,802	2,244	23,358	215,658	59.5	248,264	115.1
1990	80,223	23,103	31,965	135,291	58,149	3,890	26,000	223,330	60.6	264,062	118.2
Southern Sumatra											
1986	93,094	40,388	107,857	241,339	111,975	138,514	257,517	749,345	32.2	758,628	101.2
1987	93,205	41,588	47,643	182,436	178,265	201,382	337,609	899,692	20.3	784,562	87.2
1988	96,607	48,435	129,811	274,853	175,293	176,383	334,352	960,881	28.6	796,724	82.9
1989	95,021	46,981	130,551	272,553	154,386	141,022	389,886	957,847	28.5	794,310	82.9
1990	105,340	54,657	119,645	279,642	145,001	166,042	341,931	932,616	30.0	828,427	88.8

Sources: BPS, Land Area by Utilization in Outer Java, annual issues.

In both Jambi and South Sumatra, the percentage of irrigated wetland, especially of technical and semi-technical irrigation systems, is yet extremely limited. In terms of area, the wetland developed in tidal swamps (pasang surut) and the wetland developed in inland swamps (lebak or payo) which is included in the category of "Others" in the table account for three-fourths of the total wetland in South Sumatra, and two-thirds in Jambi. The two types of swamp wetland have different cropping seasons, namely, pasang surut mainly during the rainy

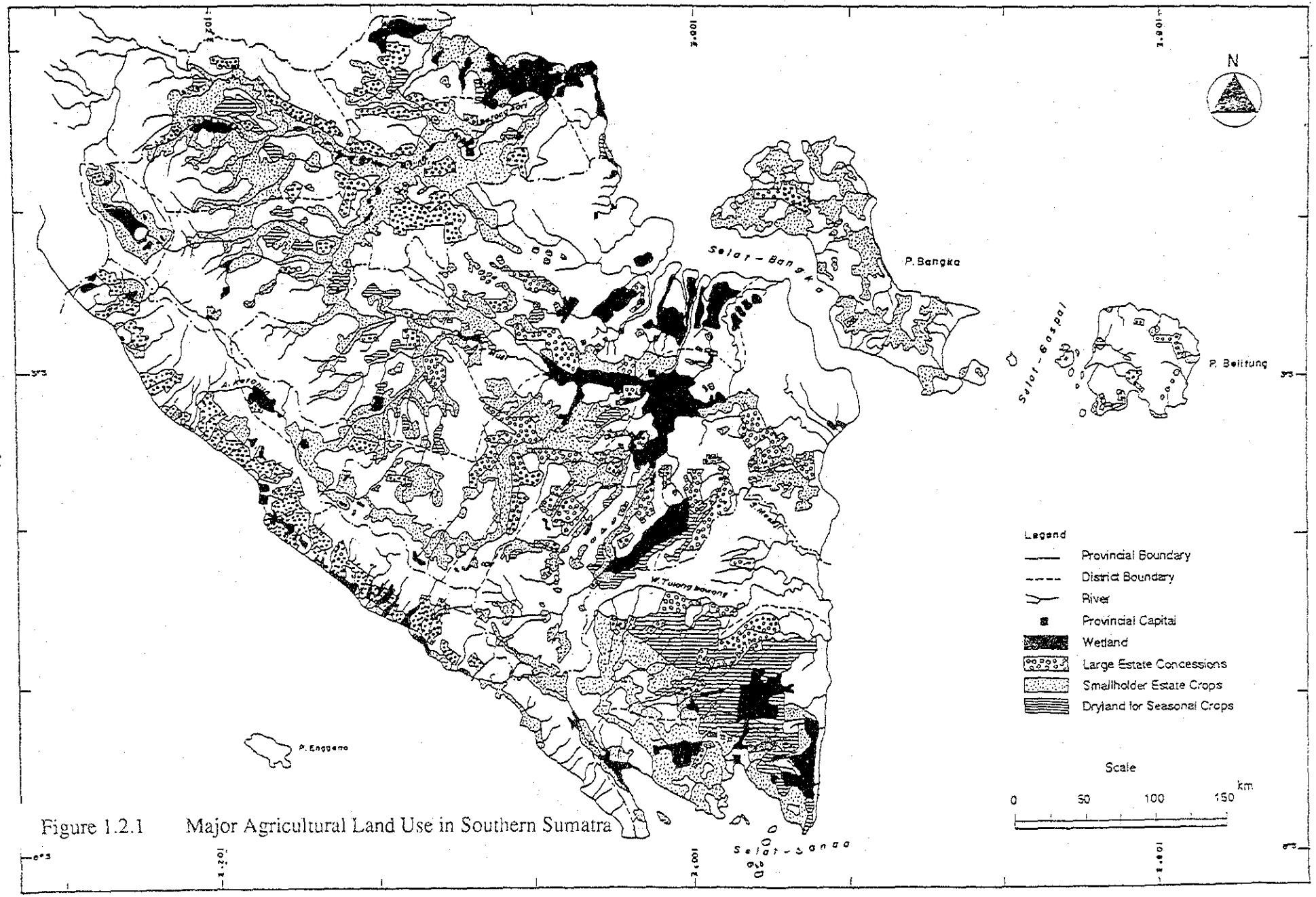


Figure 1.2.1 Major Agricultural Land Use in Southern Sumatra

season and lebak during the dry season, and function to stabilize the rice supply situation in the Region. Even with some drainage and water control improvement and the introduction of better planting materials, the possibility of increasing the paddy cropping intensity and the average yields appears rather limited in these two types of wetland. The farming systems approach will be necessary to establish improved cropping patterns with appropriate on-farm land development.

Table 1.2.2 summarizes the utilization of upland in Southern Sumatra as compiled by the Agricultural Survey on Land Area Utilization. (See Appendix for kecamatam-wise figures.) Four categories of upland farming by smallholders are recognized in the Survey. Tree crops like coffee and pepper, fruits and various arable crops are grown in pakarangan (translated as "house compound" in the Survey). Tegal is relatively fertile upland where arable crops like palawija and vegetables are intensively cultivated every year. Kebun is the area under tree crops. However, it is not possible to distinguish the area under tree crops from the area planted with arable crops, because tegal and kebun are aggregated in the Survey. In ladang and huma (together translated as "shifting cultivation"), arable crops like upland paddy and palawija are cultivated but temporarily. These types of upland are not infrequently interplanted with seedlings of tree crops like rubber and coffee, and eventually turn into kebun.

Table 1.2.2 Utlization of Upland by Province (1990)

(Unit: ha)

Province / Kabupaten	Used Smallholder Upland				Large Estates	Fish & Shrimp Culture Ponds	Total Used Upland	Total Upland 3)
	House Compound	Permanently Used 1)	Temporarily Used 2)	Subtotal				
Jambi	166,373	357,948	122,801	647,122	1,069,066	10,363	1,726,551	2,703,724
Kerinci	3,550	51,695	25,494	80,739	29,301	194	110,234	214,624
Bungo Tebo	91,639	137,838	28,415	257,892	124,006	450	382,348	717,368
Sarolangun Bangko	29,261	56,032	49,224	134,517	595,751	850	731,118	805,993
Batanghari	32,811	107,727	74,718	215,256	625,052	1,044	841,352	1,020,617
Tanjung Jabung	9,663	93,932	5,872	109,467	123,807	4,712	237,986	457,137
South Sumatra	292,503	377,870	201,590	871,963	935,560	10,206	1,817,729	5,541,119
Ogan Komering Ulu	44,725	104,346	29,688	178,759	122,229	625	301,613	633,171
Ogan Komering Ilir	29,728	34,447	21,320	85,495	84,024	957	170,476	1,990,932
Muara Enim	24,239	43,117	36,099	103,455	108,753	925	213,133	594,518
Lahat	25,657	23,710	29,254	78,621	155,494	3,460	237,575	413,922
Musi Rawas	16,822	23,185	26,902	66,909	132,858	449	200,216	356,588
Musi Banyuasin	73,453	78,882	33,796	186,131	177,945	468	364,544	565,030
Bangka	67,396	56,446	23,820	147,662	126,955	3,304	277,921	756,126
Belitung	10,483	13,737	711	24,931	27,302	18	52,251	230,832
Bengkulu	40,138	98,938	66,421	205,497	210,885	5,231	421,613	935,802
Bengkulu Selatan	15,590	16,854	12,280	44,724	59,830	1,997	106,551	344,028
Rejang Lebong	6,223	49,112	5,086	60,421	34,405	1,032	95,858	150,495
Bengkulu Utara	18,325	32,972	49,055	100,352	116,650	2,202	219,204	441,279
Lampung	223,586	514,052	204,321	941,959	475,451	14,260	1,431,670	2,039,099
Lampung Selatan	52,711	100,464	53,928	207,103	151,864	3,468	362,435	419,152
Lampung Tengah	99,606	242,758	17,993	360,357	120,473	4,171	485,001	556,102
Lampung Barat	7,716	40,028	18,862	66,606	39,047	4,909	110,562	209,547
Lampung Utara	63,553	130,802	113,538	307,893	164,067	1,712	473,672	854,298
Southern Sumatra	722,600	1,348,808	595,133	2,666,541	2,690,962	40,060	5,397,563	11,219,744

Notes: 1) Consists of tegal and kebun.
2) Consists of ladang and huma.
3) Includes grassland, unused swamps, fallow land and wooded land excluding national forests as well as used upland.

Sources: Kantor Statistik, Propinsi Jambi, Luas Lahan Menurut Penggunaannya di Propinsi Jambi 1990.
Kantor Statistik, Provinsi Sumatera Selatan, Luas Lahan Menurut Penggunaannya di Sumatera Selatan 1990.
Kantor Statistik, Propinsi Bengkulu, Luas Penggunaan Tanah dan Alat-Alat Pertanian di Propinsi Bengkulu 1990.
Kantor Statistik, Propinsi Lampung, Luas Lahan Menurut Penggunaannya di Propinsi Lampung 1990.

As shown in Table 1.2.2, the smallholder upland areas under use roughly command a combined area of 2.7 million ha. The major part of the smallholder upland areas are dominated by a variety of tree crops. From figures in Tables 1.1.1 and 1.1.2, approximately 2.1 million ha under ten estate crops belongs to smallholder sector. Major smallholder tree crops such as coffee, rubber and coconut are commonly characterized by low inputs (including labor) and low productivity. Technically speaking, there is a large room for increasing their production with provision of new, more productive planting materials, better plant protection and fertilizer application. According to the Survey, large estates command another area of about 2.7 million ha in 1990, which is at variance with the known concessions, both authorized and under processing, which total about 1.6 million ha. Whatever are the reasons for the discrepancy, most of the estate areas are not yet planted. In the coming decade, the development of the concessions would give a decisive boost to the agricultural development in the Region.

The exact area of tegal cannot be known, but it is unlikely to be large, because it requires favorable conditions like fertile soils. It is usually found in valleys and volcanic plateaus in the hilly to mountainous areas where horticulture is practiced and along the river terraces and levees with alluvial soils. Ladang and huma have a total area of some 600,000 ha, chiefly found in transmigration areas. Both Lampung and South Sumatra have about 200,000 ha each, but Lampung apparently practices a much efficient use of ladang, judging from its large areas and production of maize, cassava and soybean. In view of the expected growth of domestic markets for palawija and horticultural crops as foodstuffs, feeds and raw materials for processed food, upland areas of higher potentials can be developed for more efficient commercialized production.

(2) Potentials for Extensification

The rough magnitude of agricultural development potentials in the Southern Sumatra Region can be gleaned from the report of the Regional Physical Planning Programme for Transmigration (RePPProT) in 1988. The RePPProT distinguished 78 different land systems in the entire Sumatra by noting their physiographic characteristics, and evaluated their agricultural suitability on the basis of such criteria as hydrology and climate (groundwater quality, risks of inundation, rainfall and temperature, wind), soils and nutrients (physical and chemical characteristics to the extent of the available information), and topography (altitude, slope, fragmentation due to the landscape). Keeping in mind that the land suitability evaluation conducted in the RePPProT is of preliminary nature, the results of the evaluation on Southern Sumatra relative to the selected types of agricultural use are shown in Table 1.2.3.

The total area indicated for a particular type of agricultural use is the sum of the areas of those land systems which are judged to contain a high proportion of land suitable for that agricultural use. Thus, the area signifies the gross area of suitable land. Many of the land systems (excluding those considered as unsuitable for any agricultural use for various reasons) are judged suitable for more than one type of agricultural use, and thus the total area suitable for one type of agricultural activity substantially overlaps with the areas judged suitable for the other types.

With respect to the suitable land for wetland arable crops (chiefly paddy), "without extra inputs" means the suitability for rainfed wetland development. The land system which has the largest share (about 70%) in the total suitable area is the physiographic type named "coalescent estuarine/riverine plains" in the RePPProT, or tidal swamps in short, and the remaining 30% comprises six land systems of varying riverine plains or terraces. The area suitable "with extra inputs" means that wetland could be developed with irrigation development and/or some such corrective measures. Almost all (97%) of this total area is taken up by the land system of the physiographic type named "undulating to rolling tuffaceous sedimentary plains," which is extensively found in the eastern peneplains of the Region from Jambi through South Sumatra to Lampung. The same land system is also suitable for most of tree crops traditionally grown in the plains of the Region.

Table 1.2.3 Land Suitability Evaluation by RePPProT

(Unit: ha)

Land Suitability	Jambi	South Sumatra	Bengkulu	Lampung	Total
1. Suitable for wetland arable crops					
Without extra inputs	602,200	2,020,600	68,400	238,300	2,929,500
Of which, tidal swamps	309,200	1,579,600	8,100	147,100	2,044,000
With extra inputs	1,296,800	3,184,900	65,500	1,403,800	5,951,000
Total	2,208,200	6,785,100	142,000	1,789,200	10,924,500
2. Suitable for highland arable crops	217,700	76,800	62,400	53,000	409,900
3. Suitable for dryland arable crops	721,100	2,635,700	128,200	314,700	3,799,700
4. Suitable for rubber	2,298,900	6,290,500	264,800	2,176,600	11,030,800
5. Suitable for oil palm	2,302,300	6,316,900	280,900	2,210,300	11,110,400
6. Suitable for robusta coffee and cocoa	1,720,100	4,299,900	236,100	1,950,100	8,206,200
7. Suitable for coconut	1,932,200	4,640,700	233,000	2,056,400	8,862,300
8. Suitable for pasture/livestock	1,924,800	4,554,200	247,600	1,998,600	8,725,200
9. Recommended Development Areas (RDAs)					
Wetland arable	26,100	456,800	0	0	482,900
Dryland arable	0	20,100	0	0	20,100
Tree crops	335,100	162,700	0	0	497,800
Mixed (dryland+tree crops)	218,400	101,600	0	46,200	366,200
Total	579,600	741,200	0	46,200	1,367,000

Source: Departemen Transmigrasi, Regional Physical Planning Programme for Transmigration (RePPProT), Aug. 1988.

By eliminating the existing land use and the areas already allocated for some kind of development, the RePPProT identifies 36 Recommended Development Areas (RDAs) in the Southern Sumatra Region for the future transmigration sites. As shown in Table 1.2.3, these RDAs add up to a gross area of 1.36 million ha, from which a net area of some 620,000 ha is preliminarily estimated to be usable for the four different models of agricultural activities. Because of the requirements of the state-sponsored transmigration program, the identification is said to have aimed at "an area of roughly 15,000-25,000 ha containing a high proportion of land suitable for one or more of the possible development activities," while excluding those gross suitable land areas of less than 10,000 ha. Accordingly, the RDAs proposed for further study in the Southern Sumatra Region are chiefly located in Jambi and South Sumatra, while there is none in Bengkulu and very limited in Lampung. It can be assumed that the total land area suitable and available for one or more of agricultural activities in the four provinces is much larger than the net area of 620,000 ha indicated in the table.

1.2.2 Development Constraints

(1) Natural Constraints

Although the general availability of suitable land for agricultural development is considered more than sufficient in Southern Sumatra, due attention must be paid to climatic and soil constraints for selecting appropriate locations and appropriate types of agricultural development. The climate of Southern Sumatra is generally classified as hot tropical rainy climate with two noticeable seasons of wet and dry under the Koppen system. The climatic conditions in the Region are summarized by the RePPProT Study as shown on Table 1.2.4. The levels of annual rainfalls are on the whole sufficient in Southern Sumatra, but the relatively longer dry season in the southern part of the Region would constrain the choice of crops or the cropping intensity without irrigation facilities. On the other hand, the heavy rains during the wet season are likely to cause soil erosion in hilly, undulating and rolling areas with less vegetation cover. Agricultural development in the valleys, plateaus and foothills of the Barisan Range and some part of the rolling peneplains require some measures to avoid acceleration of soil erosion, such as terracing, contour tillage, and permanent crop cover rather than seasonal cropping.

Table 1.2.4 Selected Climatic Conditions in Southern Sumatra

Physiographic Region	Related Province	Rainfall (mm)	Temperature (°C)		No.of Dry Months
			Max.	Min.	
Western Coastal Foothills	Bengkulu, Lampung	3,000-4,000	26-33	18-23	1-3
Southern Barisan Mountains	All Provinces	2,500-3,500	23-28	13-21	2-4
Jambi-Palembang Plains	Jambi, South	1,500-3,000	28-36	21-24	4-6
	Sumatra, Lampung	1,500-3,000	28-36	21-24	4-6
Barumun-Mesuji Swamplands	Jambi, South	1,500-2,500	30-33	22-25	4-8
	Sumatra, Lampung	1,500-2,500	30-33	22-25	4-8
Eastern Islands	South Sumatra	2,000-3,000	29-32	22-24	4-8

Source: The Regional Physical Planning Programme for Transmigration (RePPProT), 1988.

Soils in Southern Sumatra are generally low in fertility, dominated by red-yellow podosols and swamp soils. Major soil constraints are acidity associated with red-yellow podosols found extensively in the peneplains, and peat soils in swamps, especially acid sulfate soils in coastal swamps. These soils would require substantial corrective measures and appropriate selection of suitable crops, and some even better be left untouched by agricultural development.

(2) Infrastructural Constraints

As mentioned already, only 30% of the existing wetland is currently serviced by some forms of irrigation in Southern Sumatra. Technical and semi-technical irrigations systems cover less than 17%. The Region achieved rice self-sufficiency in the mid 1980s, but large investments in irrigation facilities will be required to maintain self-sufficiency through the coming decades when the population is expected to increase substantially.

Inadequate rural infrastructure, such as roads, electricity and telecommunication, is a serious constraint to the development of market-oriented agriculture in the Region. The shortage and substandard conditions of rural roads and its inadequate linkage with urban centers constrain input delivery and agricultural produce marketing, and thereby hinder the adoption of new high-yielding technologies among small farmers. Especially in relation to the estate sector, which is expected to grow rapidly in the Region, it will be necessary to articulate the export-oriented regional network of trunk roads to major ports. Moreover, inadequacy of rural infrastructure is a major constraint to promote private sector investments in agriculture and agroindustries.

(3) Manpower and Institutional Constraints

Probably the most important constraints in Southern Sumatra would be in the sphere of human resources and institutional supports. The existing institutional supports such as research and extension and rural credit are inadequate, both in quantity and quality, to help small farmers to take advantage of growing opportunities of commercialization or income generation. More effective research and extension will be especially necessary to disseminate better farming practices, including farmers-level post-harvest technology, of arable crops other than wetland paddy and livestock and poultry. It will be equally important to strengthen institutional supports which will develop and disseminate sustainable farming systems in environmentally less-endowed areas. Because rural poverty often coincides with areas of marginal land resources, the promotion of environmentally sustainable farming systems will also play a crucial role in reducing rural poverty.

Another important institutional constraint is inadequate supply and market systems connecting rural producers and urban consumers. Apace with economic growth and urbanization, the domestic demands for higher value and better quality agricultural commodities are expected to expand. But the existing marketing systems are not capable of dealing

perishable commodities like high-value vegetables and fruits, and of bulk handling of raw materials for food processing industries.

1.2.3 Development Concept

(1) Overall Perspective

Within the overall framework of long-term development envisaged for the Southern Sumatra Region, the agricultural sector must increase and diversify its production on four levels of reference. Firstly, the sector will have to feed the growing regional population with rising per capita income. The growth of population is expected to be much higher than the national trend, and even assuming the declining income elasticity of demand, the total Regional demand for rice would increase substantially. The rapid growth of the regional income and urbanized population will function to bulk the demand for more and better food, such as higher value vegetables and fruits, livestock and poultry products and processed food items.

Secondly, the closer integration with other regions of the country through improved transportation and communication networks will widen the markets for the agricultural commodities, which the Region now produce and will be able to produce. This process will open up development possibilities of regional agricultural specialization and agro-industries. Many food crops (paddy, palawija, vegetables and fruits), tree crops for sizable domestic consumption (especially, coconut and coffee) and livestock will have potentials to be developed as commodities and/or as materials for processed food items for markets outside the Region.

Thirdly, the Region's agricultural sector will directly and indirectly contribute to the growth of non-oil/gas exports, by increasing and diversifying the range of commodities and processed products for export. On this level of reference, the international competitiveness through quality improvement and effective market-targetting and merchandizing will play a crucial role. Agricultural enterprises, such as large estates of rubber, oil palm, cocoa and coconut, and emerging commercial farms of horticulture, arable crops and livestock and poultry, will play the dominant role, as exporters of the commodities and as suppliers of raw materials to down-stream industries. The major issue will be how to ensure the participation by the vast number of smallholders in the process of export expansion and diversification.

Lastly, the future agricultural development should involve the successful management of resources in order to conserve the quality of environment. The first order of requirement is to keep agricultural activities out of the designated forest reserves, protection forests and other forest vegetation in crucial watersheds. This issue will be elaborated later in the chapter on land use, forestry and environment. In terms of agricultural sustainability, tree crop and wetland areas can be considered relatively free from conservation needs. The greatest conservation needs are basically in upland areas where arable crops are grown with varying intensity, especially in hilly and rolling terrains where the erosion of top soils could be very severe. Therefore, it is crucial to develop and disseminate suitable conservation farming systems in upland arable crop cultivation. In this regard, Indonesia has the traditional farming system of tumpang sari involving intercropping and crop rotation, and also can utilize the findings of a number of field trials of alley cropping in various parts of the country including Lampung.

(2) Wetland Development

In view of Indonesia's continuing policy emphasis on the maintenance of the national self-sufficiency, the first priority is the increased production of paddy, especially in wetland which promises more stable production with a much higher yield potential than upland. The national policy on rice self-sufficiency has two implications for the Southern Sumatra Region. One is that the Region will have to maintain its self-sufficiency which it achieved in the mid-1980s, and the other is that the Region will produce a stable and substantial surplus to contribute to the national requirement.

Table 1.2.5 shows the projected demands for rice and three palawija crops in Southern Sumatra. Over the period from 1990 to 2010, the Southern Sumatra Region will have to expand its rice production by 62%, or an increase of some 1,260,000 tons, in order to maintain its self-sufficiency. The increase would require an addition of some 300,000 ha in terms of irrigated wetland, assuming the cropping intensity of 170% and the average paddy yield of 4.5 tons per ha. As will be discussed later in the chapter on water resource development, the Southern Sumatra Region has more than enough potentials for developing technical irrigation systems of this magnitude. In other words, the Region will be able not only to feed rice to its growing population but also to produce a substantial surplus toward the maintenance of national self-sufficiency.

In addition to the construction of new technical irrigation systems and upgrading of existing systems, incremental development of other types of wetland will be necessary primarily to ensure local food security in rural areas. As mentioned in the previous section on extensification potentials, the Region's largest unutilized potential for wetland development is found in the eastern coastal swampland. There are a number of problems and controversies associated with the large-scale tidal swamp reclamation. But the public sector commitment seems to be strong in the provincial levels of government, and the proposed construction of the Eastern Trans-Sumatra Highway will give better access to the hitherto isolated coastal plains. The experiences gained in the past development can be prudently put to good use in planning agricultural development in swampy areas in the long term perspective. Tidal (pasang surut) and non-tidal (lebak) swamp wetland appear to have very limited room for productivity improvement, and the development and dissemination of mixed cropping or land use, including tree crops and small-scale livestock keeping will be more needed in swampy terrains than the single crop approach.

(3) Market-induced Diversification

In the Southern Sumatra Region, the market-induced diversification chiefly means (i) the cultivation of horticultural crops (vegetables and fruits) in some pockets in the mountainous areas and in the surrounding areas of major cities like Palembang and Bandar Lampung, (ii) the cultivation of one or more of palawija crops to supply to agroindustries within and/or outside the Region, and (iii) the increased supply of livestock products.

Firstly, the horticultural production for urban markets has been gaining force for some time in the Region. For instance, in the traditional coffee growing areas in Lampung Barat, Lahat in South Sumatra, Kerinci in Jambi and Rejang Lebong in Bengkulu, mid-latitude vegetables like cabbage and potato have been expanding, sometimes replacing coffee, or intercropped between the rows of coffee trees. Along the river terraces and levees free from annual flooding, fruits like banana and pineapple as well as lowland vegetables are grown in the areas near Palembang. The process of converting part of tree crop land (kebun) to permanently cultivated land (tegal) or the increasing importance of intensive cropping on limited fertile upland is likely to accelerate in the future in response to the growing demand of higher income households in urban centers.

Secondly, the cultivation of some palawija crops for agroindustries and outside markets has been most developed in Lampung, such as cassava for tapioca factories and feed mills, soybean traded to the Jakarta market and hybrid corn for feed mills. In many areas of Lampung, old smallholder rubber trees are being cut down to plant cassava or other arable crops. The growth of agroindustries, especially food processing industries, will generate immediate income to small farmers by creating new demands for the crops already grown and producible. As shown in Table 1.2.5, the regional demands for maize, cassava and soybean are expected to grow at annual rates of around 3% during 1991 - 2010. The production increase of these crops is chiefly generated by demands for feedstuffs and processed food. Considering the Region's comparative advantage of producing palawija crops in large scale, the production targets could well be set higher than the projected demands.

Table1.2.5 Projected Demand for Rice, Maize, Cassava and Soybean in Southern Sumatra

	1990 1)	1995	2000	2005	2010	Annual Growth %
Rice						
Total regional Demand (ton)	2,032,835	2,468,605	2,726,544	3,042,591	3,290,351	2.4
Jambi	292,813	361,354	405,160	458,069	499,903	2.7
South Sumatra	791,036	954,273	1,063,217	1,193,553	1,293,614	2.5
Bengkulu	183,072	229,398	256,241	288,497	313,920	2.7
Lampung	765,913	923,580	1,001,926	1,102,472	1,182,915	2.2
Income Elasticity		0.15	0.10	0.05	0.01	
Price Change (%)		-9.64%	10.67%	-10.66%	0.00%	
Price Elasticity		-0.075	-0.075	-0.075	-0.075	
Regional Per Capita Consumption (kg)	131.3	137.9	134.5	134.7	131.8	
Maize						
Total Regional Demand (ton)	281,883	350,219	403,118	453,572	505,191	3.1
Jambi	36,834	46,423	54,225	62,070	69,988	3.4
South Sumatra	114,430	139,967	160,934	181,536	202,584	3.1
Bengkulu	21,618	27,492	31,840	36,194	40,897	3.4
Lampung	109,001	136,337	156,120	173,772	191,721	3.0
Income Elasticity		0.388	0.388	0.388	0.388	
Price Change (%)		-8.36%	0.40%	0.00%	0.00%	
Price Elasticity		-0.261	-0.261	-0.261	-0.261	
Regional Per Capita Consumption (kg)	17.69	19.57	19.89	20.08	20.24	
Cassava						
Total Regional Demand (ton)	951,136	1,099,128	1,278,831	1,470,921	1,634,330	2.9
Jambi	124,285	145,633	172,035	201,042	225,971	3.2
South Sumatra	386,112	441,656	514,435	593,475	660,147	2.9
Bengkulu	72,945	86,381	101,316	117,651	132,255	3.2
Lampung	367,793	425,459	491,046	558,752	615,957	2.8
Income Elasticity		0.261	0.261	0.261	0.261	
Price Change (%)		7.15%	6.99%	0.00%	0.00%	
Price Elasticity		-0.390	-0.390	-0.390	-0.390	
Regional Per Capita Consumption (kg)	59.69	61.41	63.10	65.11	65.48	
Soybean						
Total Regional Demand (ton)	135,444	191,671	226,067	222,613	248,260	3.2
Jambi	17,699	25,408	30,409	30,483	34,429	3.6
South Sumatra	54,983	76,548	90,223	88,725	99,180	3.2
Bengkulu	10,388	15,044	17,854	17,742	20,102	3.5
Lampung	52,375	74,671	87,581	85,662	94,551	3.2
Income Elasticity		0.458	0.458	0.458	0.458	
Price Change (%)		-20.59%	-21.08%	0.00%	0.00%	
Price Elasticity		-0.779	-0.779	-0.779	-0.779	
Regional Per Capita Consumption (kg)	8.50	10.71	11.15	9.85	9.95	

Notes: 1) The base year for maize, cassava and soybean is 1991.
2) Growth rates of regional income and population are based on the economic framework developed by this study.
3) Income elasticity and price elasticity are taken from the baseline BAPPERTA model developed by BAPPENAS and the Ministry of Agriculture. Rice prices are based on the 1992 World Bank forecasts up to 2005, and assumed to remain unchanged afterward. Prices of maize, cassava and soybean are estimates by the BAPPERTA model. Per capita consumption of rice is calculated from the SUSENAS in 1990, but those of maize, cassava and soybean are estimates by the BAPPERTA model.

Thirdly, given the availability of large upland areas, especially of grassland, the Region has a comparative advantage in extensive livestock farming, by private investments or by small farmers using communal grazing grounds. The livestock subsector traditionally occupies a minor position in Indonesian agriculture, contributing only about 10% of the agricultural GDP. The situation is basically the same in Souther Sumatra. However, the demand for livestock products is expected to show robust growth in the coming decade. As shown in Table 1.2.6, the demands for some livestock products are expected to grow at annual rates of around 4% in Southern Sumatra. As evidenced in the fact that three feedlots of imported or local calves have either started operation or been under development in Lampung to supply the Jakarta market, the demand for beef is sure to increase outside the Region apace with the expected takeoff. Together with the increased production of feedstuffs, the poultry

production which has so far been lagging could also grow rapidly by aiming urban markets outside the Region.

In order to support a momentum of growth in the on-going transitional diversification, it will be necessary, on the supply side, to improve the multiplication and distribution systems of seeds and seedlings, more intensive extension services and rural credit through farmers' organizations. In addition to inducing better plant protection and fertilizer application for arable crops and better animal health and nutrition for livestock, it will be necessary to develop and disseminate the conservation farming systems in hilly and rolling terrains. On the demand side, it will be necessary to establish a more functional wholesale and retail market system which will channel the increasing bulk of agricultural produce and also give proper market signals to producing farmers and traders.

Table 1.2.6 Projected Demand for Beef, Poultry Meat and Eggs in Southern Sumatra

	1991	1995	2000	2005	2010	Annual Growth %
Beef						
Total Regional Demand (ton)	27,408	37,523	42,765	49,598	55,611	3.8
Jambi	3,581	4,980	5,751	6,810	7,745	4.1
South Sumatra	11,126	14,745	16,673	19,414	21,861	3.6
Bengkulu	2,102	2,935	3,346	3,933	4,507	4.1
Lampung	10,598	14,863	16,995	19,442	21,498	3.8
Income Elasticity		0.795	0.795	0.795	0.795	
Price Change (%)		-8.97%	5.86%	0.00%	0.00%	
Price Elasticity		-0.515	-0.515	-0.515	-0.515	
Regional Per Capita Consumption (kg)	1.72	2.10	2.11	2.20	2.23	
Poultry Meat						
Total Regional Demand (ton)	40,952	59,161	65,897	74,997	84,142	3.9
Jambi	5,351	7,852	8,862	10,301	11,725	4.2
South Sumatra	16,624	23,248	25,662	29,293	33,015	3.7
Bengkulu	3,141	4,627	5,154	5,943	6,819	4.2
Lampung	15,836	23,434	26,220	29,460	32,583	3.9
Income Elasticity		0.839	0.839	0.839	0.839	
Price Change (%)		-16.06%	0.94%	0.00%	0.00%	
Price Elasticity		-0.647	-0.647	-0.647	-0.647	
Regional Per Capita Consumption (kg)	2.57	3.31	3.25	3.32	3.37	
Eggs						
Total Regional Demand (ton)	36,650	48,318	58,669	66,414	74,471	3.8
Jambi	4,789	6,414	7,890	9,119	10,373	4.2
South Sumatra	14,878	18,956	22,896	25,990	29,269	3.6
Bengkulu	2,811	3,778	4,592	5,265	6,035	4.1
Lampung	14,172	19,171	23,291	26,039	28,794	3.8
Income Elasticity		0.800	0.800	0.800	0.800	
Price Change (%)		0.00%	0.00%	0.00%	0.00%	
Price Elasticity		0	0	0	0	
Regional Per Capita Consumption (kg)	2.30	2.70	2.89	2.94	2.98	

Notes: 1) Growth rates of regional income and population are based on the economic framework developed by this study.
2) Income elasticity and price elasticity are taken from the baseline BAPPERTA model developed by BAPPENAS and the Ministry of Agriculture. Price forecasts are based on estimates by the BAPPERTA model up to 2000, and assumed to be unchanged afterward. Per capita consumption figures are based on the estimates by the model.

(4) Estate Crop Development

As mentioned already, the traditionally dominant mode of agricultural land use in the Southern Sumatra Region is smallholder tree crops of rubber, coffee and coconut, and to a lesser extent clove, pepper and cinnamon. A number of programs have so far been implemented to improve the productivity and quality of smallholder tree crops and thereby to increase their income: notably, (i) the Project Management Units (PMU or UPP) and partial PMUs chiefly for rubber and coconut (hybrid and local varieties), sometimes with external financing, (ii) Nucleus Estate and Smallholder Development (NES/PIR), sometimes in

association with transmigration programs, (iii) the government sponsored credit scheme for rehabilitation and expansion of smallholder export crops (PRPTE) and other more or less similar programs financed with the central and provincial government budgets. The continued implementation of smallholder tree crop development programs mentioned above will be undoubtedly vital to the balanced development in the Region.

Table 1.2.7 Projected Areas under Selected Estate Crops (Large Estates)

(Unit: ha)

	1990		2000		2010		Annual Growth '90 - 2000	Annual Growth 2000 - '10	Annual Growth '90 - 2010
Jambi									
Oil Palm	36,976	(44.2)	198,887	(56.3)	287,192	(51.9)	18.3	3.7	10.8
Rubber	36,512	(43.7)	97,703	(27.7)	140,751	(25.4)	10.3	3.7	7.0
Cocoa	4,677	(5.6)	23,565	(6.7)	44,267	(8.0)	17.6	6.5	11.9
Coconut	2,859	(3.4)	24,465	(6.9)	36,792	(6.6)	23.9	4.2	13.6
Sugarcane	0	(0.0)	0	(0.0)	28,453	(5.1)			
Others	2,619	(3.1)	8,731	(2.5)	15,896	(2.9)	12.8	6.2	9.4
Total	83,644	(100.0)	353,351	(100.0)	553,351	(100.0)	15.5	4.6	9.9
South Sumatra									
Oil Palm	57,760	(57.3)	198,203	(56.1)	286,509	(51.8)	13.1	3.8	8.3
Rubber	25,297	(25.1)	106,735	(30.2)	149,782	(27.1)	15.5	3.4	9.3
Cocoa	0	(0.0)	15,273	(4.3)	35,974	(6.5)		8.9	
Coconut	4,474	(4.4)	7,061	(2.0)	19,388	(3.5)	4.7	10.6	7.6
Sugarcane	12,265	(12.2)	17,680	(5.0)	46,133	(8.3)	3.7	10.1	6.8
Others	993	(1.0)	8,562	(2.4)	15,727	(2.8)	24.0	6.3	14.8
Total	100,789	(100.0)	353,514	(100.0)	553,514	(100.0)	13.4	4.6	8.9
Bengkulu									
Oil Palm	21,059	(39.0)	98,223	(42.6)	119,640	(42.6)	16.6	2.0	9.1
Rubber	19,946	(36.9)	39,714	(17.2)	48,306	(17.2)	7.1	2.0	4.5
Cocoa	11,697	(21.6)	64,499	(27.9)	78,356	(27.9)	18.6	2.0	10.0
Coconut	6	(0.0)	2,942	(1.3)	3,651	(1.3)	85.8	2.2	37.8
Sugarcane	0	(0.0)	1,400	(0.6)	1,685	(0.6)		1.9	
Others	1,336	(2.5)	24,058	(10.4)	29,208	(10.4)	33.5	2.0	16.7
Total	54,044	(100.0)	230,835	(100.0)	280,846	(100.0)	15.6	2.0	8.6
Lampung									
Oil Palm	11,003	(10.7)	53,207	(17.5)	53,207	(17.5)	17.1	0.0	8.2
Rubber	23,242	(22.5)	23,242	(7.6)	23,242	(7.6)	0.0	0.0	0.0
Cocoa	9,539	(9.2)	25,252	(8.3)	25,252	(8.3)	10.2	0.0	5.0
Coconut	13,520	(13.1)	42,102	(13.8)	42,102	(13.8)	12.0	0.0	5.8
Sugarcane	45,445	(44.0)	157,662	(51.8)	157,662	(51.8)	13.2	0.0	6.4
Others	487	(0.5)	3,160	(1.0)	3,160	(1.0)	20.6	0.0	9.8
Total	103,235	(100.0)	304,624	(100.0)	304,624	(100.0)	11.4	0.0	5.6
Region									
Oil Palm	126,798	(37.1)	548,520	(44.2)	746,548	(44.2)	15.8	3.1	9.3
Rubber	104,996	(30.7)	267,394	(21.5)	362,080	(21.5)	9.8	3.1	6.4
Cocoa	25,913	(7.6)	128,589	(10.4)	183,849	(10.4)	17.4	3.6	10.3
Coconut	20,859	(6.1)	76,570	(6.2)	101,933	(6.2)	13.9	2.9	8.3
Sugarcane	57,710	(16.9)	176,742	(14.2)	233,933	(14.2)	11.8	2.8	7.2
Others	5,435	(1.6)	44,510	(3.6)	63,991	(3.6)	23.4	3.7	13.1
Total	341,712	(100.0)	1,242,324	(100.0)	1,692,335	(100.0)	13.8	3.1	8.3

Table 1.2.7 roughly estimates the future planted areas of the estate sector for selected crops on the basis of the areas of state-owned estates and private concessions known as of 1990. In the case of a concession listing more than two crops, the area is equally allocated to each crop. As of 1990, the concessions in the Region totalled 1,630,000 ha, of which 330,000 ha was planted with some estate crops. It is assumed that 70%, or about 900,000 ha, of the remaining area will be actually planted with some estate crops, and that the planting of these areas will be more or less finished by the year 2000. After 2000, there is no expansion in Lampung, but Jambi, South Sumatra, and Bengkulu will continue to increase its respective planted areas, albeit at much slower pace. As shown in the table, the total productive areas of the estate sector will expand to a combined area of 1,700,000 ha in the year 2010.

Table 1.2.8 shows the estimated production of five selected crops by the estate sector. New development of large estates chiefly by the private sector investments will foster a dynamic momentum to change the distribution of agricultural growth in the Region. For instance, the coastal undulating and rolling belt of Bengkulu will be soon dotted with estates in a manner somewhat similar to the east coast of North Sumatra Province. In the eastern peneplains in Jambi and South Sumatra, and also in the northern part of Lampung, the hitherto unutilized areas will be planted to rubber, oil palm, cocoa, hybrid coconut and the like. The creation of direct and indirect employment will be substantial, given the possibility of developing downstream industries and associated growth of various service industries.

Table 1.2.8 Projected Production of Selected Estate Crops (Large Estates)

(Unit: ton)

	1990	1995	2000	2005	2010	Annual Growth %
Jambi						
Oil Palm	59,941	344,300	446,898	642,953	894,489	14.5
Rubber	16,236	42,794	63,750	94,234	134,755	11.2
Cocoa	2,885	14,023	16,676	25,708	35,942	13.4
Coconut	1,731	17,164	22,433	34,562	51,092	18.4
Sugarcane	0	0	0	99,112	237,832	-
South Sumatra						
Oil Palm	73,477	269,439	394,525	603,443	892,360	13.3
Rubber	20,613	79,818	94,273	117,943	143,402	10.2
Cocoa	0	4,735	6,527	15,093	29,209	-
Coconut	1,800	2,646	5,278	13,474	26,924	14.5
Sugarcane	49,478	55,887	102,662	222,286	385,608	10.8
Bengkulu						
Oil Palm	13,811	84,899	140,379	207,233	305,925	16.8
Rubber	8,870	16,020	25,913	31,389	38,022	7.5
Cocoa	2,631	18,182	27,562	37,992	52,370	16.1
Coconut	2	1,612	2,199	2,997	4,085	45.0
Sugarcane	0	6,775	8,129	9,753	11,702	-
Lampung						
Oil Palm	21,583	105,042	131,512	147,628	165,718	10.7
Rubber	15,769	8,593	18,732	20,416	22,251	1.7
Cocoa	2,145	6,350	10,791	14,875	20,504	11.9
Coconut	5,439	19,381	31,469	42,893	58,465	12.6
Sugarcane	205,654	711,887	969,662	1,130,425	1,317,841	9.7
Region						
Oil Palm	168,812	803,679	1,113,314	1,601,257	2,258,492	13.8
Rubber	61,487	147,226	202,667	263,982	338,430	8.9
Cocoa	7,660	43,289	61,555	93,668	138,025	15.6
Coconut	8,973	40,802	61,380	93,926	140,565	14.7
Sugarcane	255,131	774,548	1,080,452	1,461,576	1,952,984	10.7

(5) Major Areas of Growth

Figure 1.2.2 roughly shows major areas of growth, by noting large irrigation development and swamp reclamation, centers of horticultural development and the areas of large estates. The existing land under smallholder tree crops in the peneplains will be converted to upland arable crops in some places with higher potentials. Otherwise, it will remain under tree crops. The evolution of agriculture in four provinces is expected to proceed in the following manners. Firstly, the relative proportion of the intensive agricultural land use will increase in accordance with the growth of regional population in general, and apace with the growth of urban centers and industries which utilize agricultural produce in particular. Secondly, the unutilized or underutilized areas with reasonably high development potentials will be opened up by the government sector according to its national policy commitments and by the private sector ready to invest in agribusiness opportunities available in the Region. The evolution of these processes will be aided by the development of arterial and feeder transportation networks. In spatial terms, this involves the expansion of agriculture from the

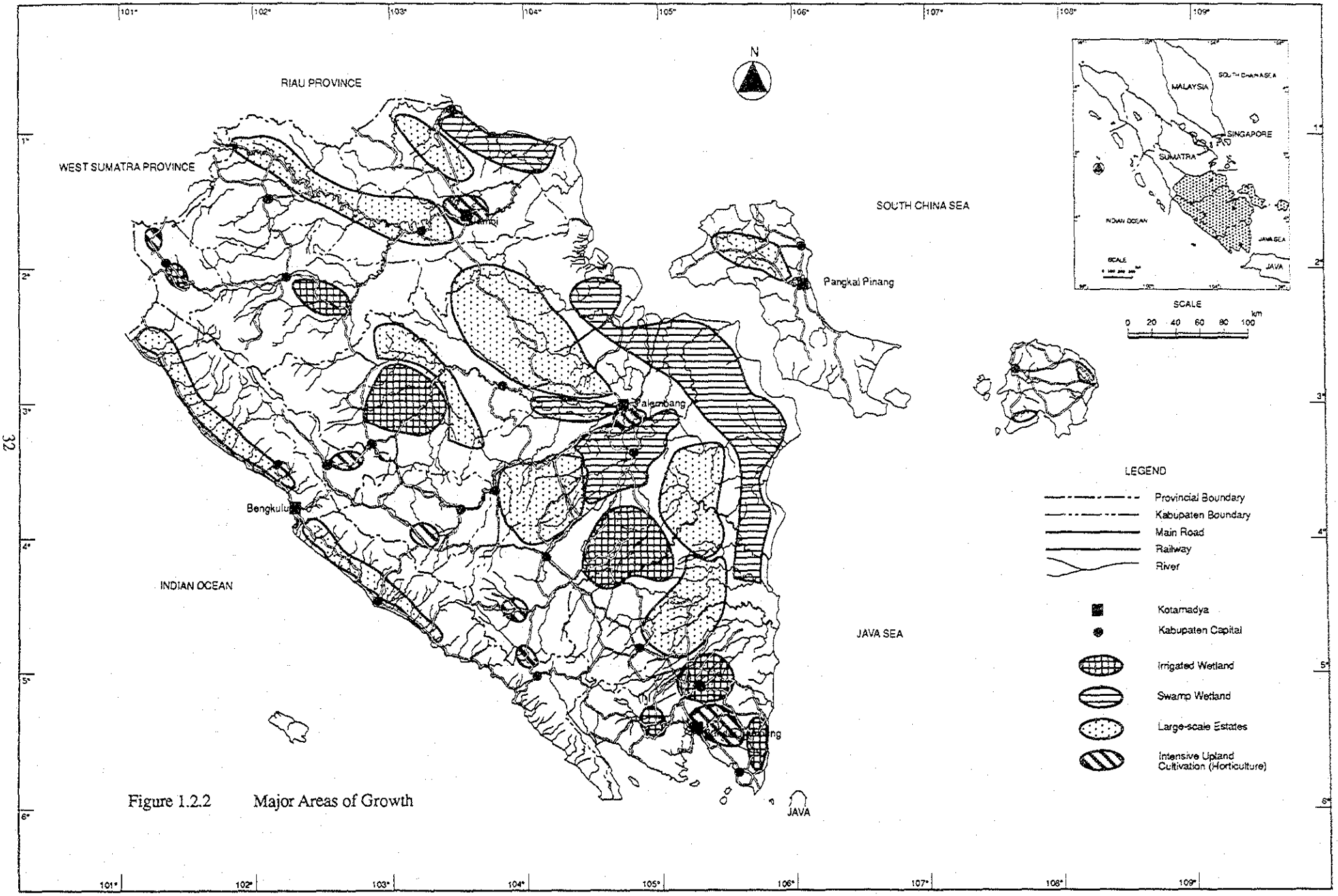


Figure 1.2.2 Major Areas of Growth

narrow meandering alluvial belts along the rivers to low-lying coastal plains and rolling or undulating plains between the rivers.

1.3 DEVELOPMENT ISSUES AND STRATEGY

Food Crops

The strategy of agricultural development is based on the trilogy of intensification, extensification and diversification, with added dimension of conservation. By noting the importance of rice self-sufficiency both on the regional and national level, and the possibility of increasing markets for other food crops, the future development efforts will be geared to the following directions.

1) Intensification of paddy cropping and yield improvement on better-managed irrigated wetland through advanced INSUS programs
2) Construction and improvement of technical irrigation systems
3) Rehabilitation, improvement and/or on-farm land development of small irrigation systems and rainfed wetland
4) Consolidation and extension of tidal swamp reclamation
5) Development of mixed land use and cropping in tidal and inland swamplands
6) Intensification of horticulture in high altitude areas and in the surrounding areas of major cities
7) Sustainable upland farming systems especially in hilly and marginal areas

The above directions of development will naturally require the continued improvement of the effectiveness of various agricultural support services. Except for the irrigated wetland where more or less standardized technical packages are already available, the intensification and diversification efforts in the other types of wetland and upland farming will require more location-specific technology packages.

One of the most serious constraints seems to be the limited availability of suitable planting materials, other than local varieties, which can be used in two dominant types of tidal and inland swamp wetland in the Region. Basically the same constraint exists for emerging upland farming of horticultural and palawija crops. Accordingly, it will be necessary to identify representative types of land use, and initiate the development of farming systems suitable to local conditions. Actually, Indonesia already has years of experiences in cropping systems research, some of which were carried out in Lampung. Because the four provinces have the similar physiographic land systems in the areas where the future agricultural development is likely to take place, it will be necessary to coordinate their efforts in cropping systems trials and share the results for wider dissemination.

With the growing diversification of the regional and national demands for food crops and food items, it will become necessary to strengthen the marketing systems of the agricultural produce. There is a need to feed back what are in demand, and when in demand, in the urban markets to the farmers, especially with regard to palawija and horticultural crops. Some informative studies have already been undertaken in Lampung on selected crops, but additional information will be necessary in order to reflect the findings to the extension services and applied research on cropping systems. In addition, it will become necessary before long to institute a more functional wholesale and retail system of marketing in the Region, accompanied by appropriate development of market-related infrastructure in major cities.

Livestock and Poultry

Relative to the growing markets for livestock/poultry products both within and outside Southern Sumatra, it is considered necessary to expand basic veterinary and artificial insemination services of the four provinces and to disseminate improved animal nutrition among the small farmers. In addition to such strengthening of institutional supports, the following possibilities can be either promoted or programed for implementation.

1) Development of poultry farms around major cities
2) Establishment of a livestock breeding center, or centers
3) Development of commercial farms of beef cattle
4) Facilitation of the PIR type cattle farming and fattening
5) Development of cold storage facilties in major urban centers

Estate Crops

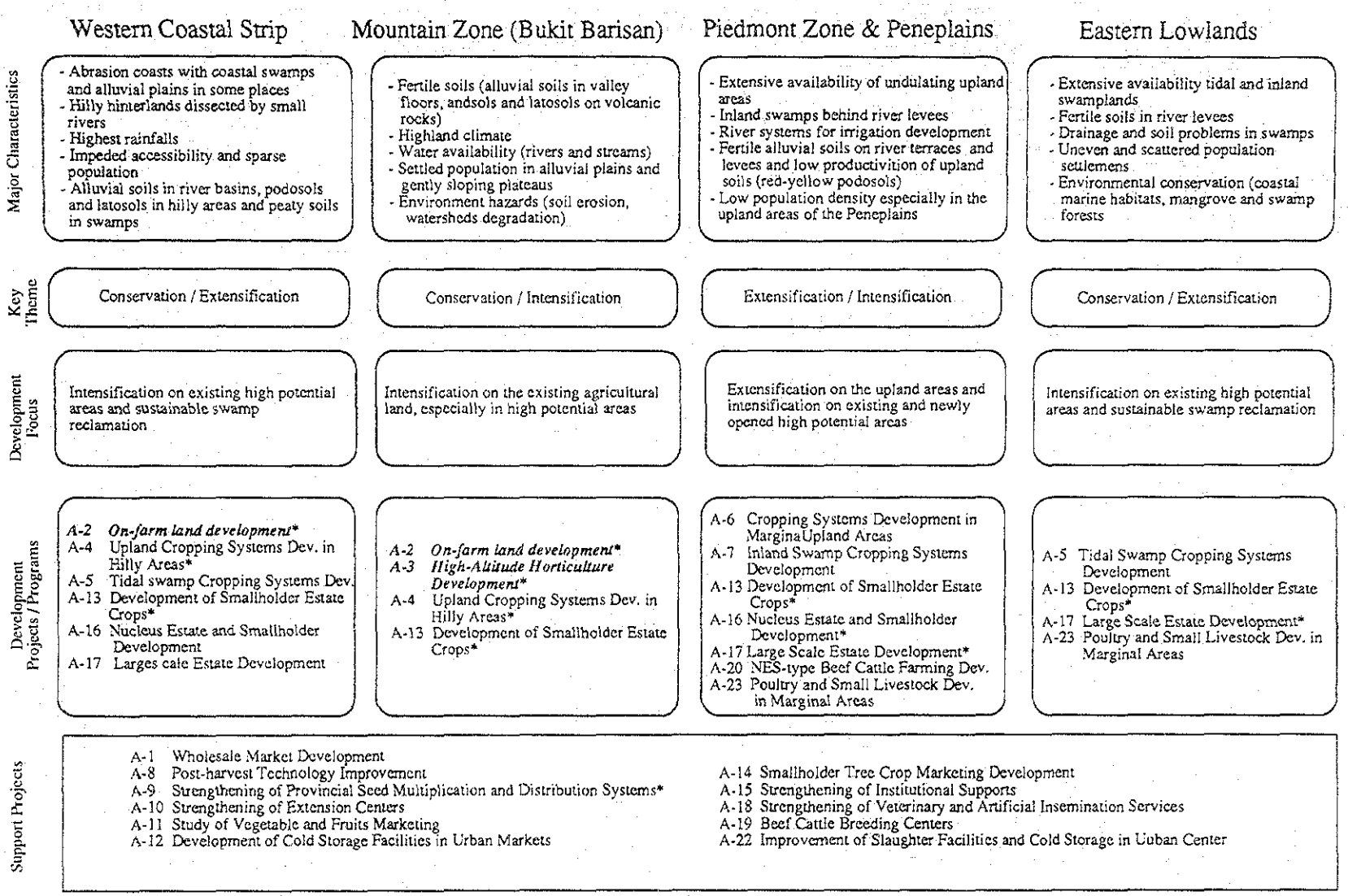
In order to improve the productivity and quality of smallholder tree crop production, it is essential to strengthen national and provincial programs of institutional supports such as better extension and provision of improved planting materials. In addition, the following measures will be needed to boost the growth of estate crops in the Region.

1) Planting of smallholder tree crops in new communities (both state-sponsored and spontaneous transmigrants) in areas where wetland development is limited
2) Consolidation of the existing smallholder tree crops through rehabilitation and replanting
3) Improvement of post-harvest technology and marketing in the existing PMUs and PRPTEs through farmers' organizations
4) Facilitation of further private investments in estate development
5) Promotion of NES/PIR programs in the development of private estates

1.4 FORMULATION OF PROJECTS

A list of 23 projects or programs is prepared on the bases of the foregoing considerations. Figure 1.4.1 schematically shows the background and the framework of project selection.

Figure 1.4.1 Framework of Project Selection in Agricultural Sector



* high priority projects Projects in *Italics* are preliminarily evaluated.

APPENDIX

Table A-1 Distribution of Wetland in Jambi (1990)

(Unit: Ha)

Kabupaten/Kecamatan	Irrigated Wetland					Rainfed Wetland	Tidal Swamp Wetland	Non-tidal Swamp Wetland	Other Wetland	Total Wetland	% of Irrigated Wetland
	Technical	Semi-technical	Simple PU	Simple Non-PU	Subtotal						
Kerinci	0	6799	0	4613	11412	1884	0	0	2823	16119	70.8
1 Gunung Raya	0	0		661	661	139	0		367	1167	56.6
2 Danau Kerinci	0	480		867	1347	811	0		308	2466	54.6
3 Sungai Penuh	0	550		607	1157	472	0		758	2387	48.5
4 Sitinjau Laut	0	1545		322	1867	127	0		190	2184	85.5
5 Air Hangat	0	1782		1352	3134	123	0		105	3362	93.2
6 Gunung Kerinci	0	2442		804	3246	212	0		1095	4553	71.3
Bungo Tebo	0	713	0	4346	5059	8244	0	0	27409	40712	12.4
1 Tanah Tumbuh	0	426		2178	2604	2030	0		944	5578	46.7
2 Rimbo Bujang	0	0		0	0	0	0		3163	3163	0.0
3 Jujuhan	0	0		60	60	375	0		90	525	11.4
4 Rantau Pandan	0	0		865	865	0	0		720	1585	54.6
5 Muara Bungo	0	287		979	1266	2247	0		1875	5388	23.5
6 Tebo Ilir	0	0		0	0	1695	0		1495	3190	0.0
7 Tebo Tengah	0	0		0	0	1051	0		1684	2735	0.0
8 Tebo Ulu	0	0		264	264	846	0		17438	18548	1.4
Sarolangun Bangko	0	2750	0	6245	8995	5756	0	0	6688	21439	42.0
1 Jangkat	0	0		1634	1634	3150	0		1250	6034	27.1
2 Batang Asai	0	0		500	500	0	0		638	1138	43.9
3 Muara Limun	0	130	0	400	530	355	0		0	885	59.9
4 Sarolangun	0	0		1009	1009	935	0		536	2480	40.7
5 Pauh	0	0		0	0	253	0		1046	1299	0.0
6 Bangko	0	45		95	140	110	0		638	888	15.8
7 Muara Siau	0	0		231	231	0	0		503	734	31.5
8 Sungai Manau	0	725		1206	1931	431	0		819	3181	60.7
9 Tabir	0	1850		1170	3020	522	0		1258	4800	62.9
Batanghari	203	365	0	527	1095	3058	0	0	21776	25929	4.2
1 Mersam	0	0		0	0	0	0		4647	4647	0.0
2 Muara Tembesi	0	18		127	145	0	0		6091	6236	2.3
3 Muara Bulian	0	0		250	250	0	0		0	250	100.0
4 Jambi Luar Kota	203	347		0	550	758	0		5638	6946	7.9
5 Sekernan	0	0		150	150	0	0		3200	3350	4.5
6 Kumpeh	0	0		0	0	2300	0		2200	4500	0.0
Tanjung Jabung	0	266	0	902	1168	9932	75203	0	18320	104623	1.1
1 Tungkal Ulu	0	141		592	733	56	894		2045	3728	19.7
2 Tungkal Ilir	0	0		0	0	56	13484		648	14188	0.0
3 Muara Sabak	0	125		310	435	9820	30475		1200	41930	1.0
4 Nipah Panjang	0	0		0	0	0	30350		14427	44777	0.0
Kodya Jambi	0	0	0	150	150	450	0	0	1928	2528	5.9
1 Kota Baru	0	0		0	0	0	0		0	0	
2 Jambi Selatan	0	0		150	150	0	0		80	230	65.2
3 Pasar Jambi	0	0		0	0	0	0		0	0	
4 Telanaipura	0	0		0	0	450	0		0	450	0.0
5 Danau Teluk	0	0		0	0	0	0		698	698	0.0
6 Pelayangan	0	0		0	0	0	0		820	820	0.0
7 Jambi Timur	0	0		0	0	0	0		330	330	0.0
Total Jambi	203	10893	0	16783	27879	29324	75203	0	78944	211350	13.2

Source: Kantor Statistik, Propinsi Jambi, Statistik Pertanian Tanaman Pangan, Tahun 1990.

Table A-2 Distribution of Wetland in South Sumatra (1990) (Unit: Ha)

Kabupaten/Kecamatan	Irrigated Wetland					Rainfed Wetland	Tidal Swamp Wetland	Non-tidal Swamp Wetland	Other Wetland	Total Wetland	% of Irrigated Wetland
	Technical	Semi-technical	Simple PU	Simple Non-PU	Subtotal						
Ogan Komering Ulu	9196	2467	0	10801	22464	25223	0	11583	14866	74136	30.3
1 Buay Madang	4139	0		0	4139	13178	0	1721	9545	28583	14.5
2 Pulau Beringin	0	0		1634	1634	0	0	0	44	1678	97.4
3 Peninjauan	0	0		0	0	88	0	0	0	88	0.0
4 Martapura	0	0		0	0	3365	0	600	400	4365	0.0
5 Baturaja Barat	0	0		0	0	36	0	0	0	36	0.0
6 Pengandonan	0	0		935	935	440	0	0	60	1435	65.2
7 Banding Agung	0	685		1596	2281	246	0	0	0	2527	90.3
8 Muaradua Kisam	0	0		2500	2500	1000	0	0	2900	6400	39.1
9 Baturaja Timur	0	0		0	0	77	0	0	0	77	0.0
10 Sosoh Buay Rayap	0	0		0	0	1	0	0	0	1	0.0
11 Belitang	3871	862		0	4733	3342	0	0	0	8075	58.6
12 Simpang	0	0		375	375	295	0	0	420	1090	34.4
13 Cempaka	586	545		3211	4342	2805	0	9262	1347	17756	24.5
14 Muara Dua	600	375		550	1525	350	0	0	150	2025	75.3
Ogan Komering Ilir	0	0	0	3326	3326	8902	12970	74053	7876	107127	3.1
1 Muara Kuang	0	0		0	0	0	0	3464	2170	5634	0.0
2 Tanjung Raja	0	0		0	0	0	0	12625	0	12625	0.0
3 Tanjung Datu	0	0		0	0	0	0	1037	0	1037	0.0
4 Indoralaya	0	0		0	0	0	0	8362	0	8362	0.0
5 Pemulutan	0	0		3206	3206	0	0	15700	1440	20346	15.8
6 Tanjung Lubuk	0	0		0	0	126	0	9310	799	10235	0.0
7 Pedamaran	0	0		0	0	150	0	2035	0	2185	0.0
8 Mesuji	0	0		0	0	1313	0	0	2032	3345	0.0
9 Kayu Agung	0	0		120	120	7313	0	4621	0	12054	1.0
10 Sirah Pulau Padang	0	0		0	0	0	0	13375	1435	14810	0.0
11 Pampangan	0	0		0	0	0	12948	3524	0	16472	0.0
12 Tulung Salapan	0	0		0	0	0	22	0	0	22	0.0
Muara Enim	0	428	0	3675	4103	2310	0	13897	3721	24031	17.1
1 Semendo	0	200		3600	3800	50	0	0	150	4000	95.0
2 Tanjung Agung	0	168		0	168	138	0	0	0	306	54.9
3 Muara Enim	0	0		0	0	1381	0	0	1094	2475	0.0
4 Gunung Megang	0	0		0	0	581	0	350	1151	2082	0.0
5 Talang Ubi	0	0		75	75	60	0	3540	786	4461	1.7
6 Prabumulih Barat	0	0		0	0	0	0	0	0	0	
7 Prabumulih Timur	0	60		0	60	0	0	0	90	150	40.0
8 Rambang Dangku	0	0		0	0	100	0	500	425	1025	0.0
9 Rambang Lubai	0	0		0	0	0	0	0	0	0	
10 Gelumbang	0	0		0	0	0	0	9507	25	9532	0.0
Lahat	0	1707	0	19207	20914	1045	0	0	9079	31038	67.4
1 Tebing Tinggi	0	0		1267	1267	55	0	0	388	1710	74.1
2 Pulau Pinang	0	0		780	780	20	0	0	542	1342	58.1
3 Tanjung Sakti	0	0		1418	1418	0	0	0	167	1585	89.5
4 Kota Agung	0	0		2795	2795	15	0	0	384	3194	87.5
5 Merapi	0	0		600	600	325	0	0	181	1106	54.2
6 Jarai	0	0		1895	1895	0	0	0	62	1957	96.8
7 Lahat	0	207		576	783	14	0	0	744	1541	50.8
8 Ulu Musi	0	0		3710	3710	0	0	0	1938	5648	65.7
9 Pendopo	0	50		1535	1585	0	0	0	1129	2714	58.4
10 Kikim	0	0		1821	1821	16	0	0	1843	3680	49.5
11 Pagar Alam	0	0		2310	2310	0	0	0	1501	3811	60.6
12 Muara Pinang	0	1450		500	1950	600	0	0	200	2750	70.9
Musi Rawas	4081	1142	0	1385	6608	10869	0	3677	3913	25067	26.4
1 Muara Rupit	0	0		30	30	1955	0	264	148	2397	1.3
2 BKL Ulu	450	260		812	1522	3036	0	0	42	4600	33.1
3 Jaya Loka	0	0		40	40	68	0	0	14	122	32.8
4 Rawas Ilir	0	0		0	0	297	0	2447	2734	5478	0.0
5 Lubuk Linggau Timur	0	0		47	47	377	0	0	20	444	10.6
6 Muara Beliti	1663	140		25	1828	376	0	121	0	2325	78.6
7 Rawas Ulu	40	100		63	203	1035	0	4	63	1305	15.6

8 Muara Kelingi	0	0		0	0	1606	0	0	816	2422	0.0
9 Tugumulyo	1843	592		185	2620	446	0	686	0	3752	69.8
10 Muara Lakitan	0	50		0	50	1673	0	155	0	1878	2.7
11 Lubuk Linggau Barat	85	0		183	268	0	0	0	76	344	77.9
Musi Banyuasin	0	0	0	1063	1063	1275	114781	28700	54464	200283	0.5
1 Banyuasin I	0	0		531	531	1125	18960	4951	27568	53135	1.0
2 Banyuasin II	0	0		0	0	0	58922	0	309	59231	0.0
3 Banyuasin III	0	0		0	0	0	26779	7150	18447	52376	0.0
4 Sekayu	0	0		0	0	150	0	11155	456	11761	0.0
5 Babat Toman	0	0		500	500	0	0	5444	2705	8649	5.8
6 Sungai Lilin	0	0		32	32	0	558	0	4979	5569	0.6
7 Bayung Lincir	0	0		0	0	0	0	0	0	0	
8 Talang Kelapa	0	0		0	0		9562	0	0	9562	0.0
Bangka	0	244	0	665	909	108	0	18	1664	2699	33.7
1 Mentok	0	0		0	0	0	0	0	0	0	
2 Jebus	0	0		0	0	0	0	0	100	100	0.0
3 Kelapa	0	0		0	0	0	0	0	0	0	
4 Belinyu	0	0		0	0	0	0	0	0	0	
5 Sungai Liat	0	0		7	7	0	0	0	0	7	100.0
6 Merawang	0	0		0	0	0	0	0	0	0	
7 Mendo Barat	0	0		221	221	0	0	0	0	221	100.0
8 Pangkalan Baru	0	0		0	0	0	0	0	25	25	0.0
9 Sungai Selan	0	0		0	0	0	0	0	0	0	
10 Payung	0	0		0	0	0	0	6	918	924	0.0
11 Koba	0	0		25	25	0	0	0	0	25	100.0
12 Toboali	0	244		412	656	108	0	12	621	1397	47.0
13 Lepar Pongok	0	0		0	0	0	0	0	0	0	
Belitung	0	31	0	67	98	47	0	0	150	295	33.2
1 Kelapa Kampit	0	0		5	5	0	0	0	25	30	16.7
2 Tanjung Pandan	0	31		0	31	0	0	0	0	31	100.0
3 Manggar	0	0		0	0	2	0	0	37	39	0.0
4 Gantung	0	0		17	17	45	0	0	88	150	11.3
5 Membalong	0	0		45	45	0	0	0	0	45	100.0
6 Dengdang	0	0		0	0	0	0	0	0	0	
Palembang	0	0	0	0	0	0	0	5953	1546	7499	0.0
1 Seberang Ulu I	0	0		0	0	0	0	2565	192	2757	0.0
2 Seberang Ulu II	0	0		0	0	0	0	601	15	616	0.0
3 Ilir Barat I	0	0		0	0	0	0	137	181	318	0.0
4 Ilir Barat II	0	0		0	0	0	0	1845	881	2726	0.0
5 Ilir Timur I	0	0		0	0	0	0	0	0	0	
6 Ilir Timur II	0	0		0	0	0	0	805	277	1082	0.0
Total South Sumatra	13277	6019	0	40189	59485	49779	127751	137881	97279	472175	12.6

Source: Kantor Statistik, Provinsi Sumatera Selatan, Luas Lahan Menurut Penggunaannya de Sumatera Selatan 1990.

Table A-3 Distribution of Wetland in Bengkulu (1990) (Unit: Ha)

Kabupaten/Kecamatan	Irrigated Wetland					Rainfed Wetland	Tidal Swamp Wetland	Non-tidal Swamp Wetland	Other Wetland	Total Wetland	% of Irrigated Wetland
	Technical	Semi-technical	Simple PU	Simple Non-PU	Subtotal						
Bengkulu Selatan	1068	2793	2974	8162	14997	7328	2824	0	4191	29340	51.1
1 Kaur Selatan	0	99	25	236	360	1355	0		0	1715	21.0
2 Kaur Tengah	0	147	0	1402	1549	400	0		20	1969	78.7
3 Kaur Utara	0	27	612	855	1494	716	0		0	2210	67.6
4 Manna	0	2230	1375	2896	6501	997	0		140	7638	85.1
5 Pino	0	0	63	1494	1557	639	0		254	2450	63.6
6 Talo	0	0	440	956	1396	2289	2662		1999	8346	16.7
7 Seluma	1068	290	459	323	2140	932	162		1778	5012	42.7
Rejang Lebong	5732	6628	2891	2559	17810	825	0	0	858	19493	91.4
1 Kepahyang	489	2183	745	235	3652	27	0		0	3679	99.3
2 Padangulak Tanding	625	390	345	0	1360	274	0		0	1634	83.2
3 Curup	1086	2213	665	0	3964	0	0		0	3964	100.0
4 Lebong Selatan	2489	779	534	1840	5642	218	0		398	6258	90.2
5 Lebong Utara	1043	1063	602	484	3192	306	0		460	3958	80.6
Bengkulu Utara	4065	4044	2749	2004	12862	2701	0	0	4611	20174	63.8
1 Enggano	0	0	42	0	42	9	0		211	262	16.0
2 Talang Empat	0	163	146	263	572	767	0		261	1600	35.8
3 Taba Penanjung	0	269	99	210	578	220	0		75	873	66.2
4 Pondok Kelapa	0	39	186	28	253	622	0		1985	2860	8.8
5 Kerkap	1306	1086	600	106	3098	68	0		306	3472	89.2
6 Lais	388	93	525	610	1616	189	0		0	1805	89.5
7 Ketahun	0	0	430	747	1177	209	0		898	2284	51.5
8 Muko-Muko Utara	1000	1780	240	40	3060	156	0		732	3948	77.5
9 Muko-Muko Selatan	0	0	95	0	95	461	0		0	556	17.1
10 Argamakmur	1371	614	386	0	2371	0	0		143	2514	94.3
Kodya Bengkulu	222	245	742	175	1384	311	175	0	112	1982	69.8
1 Gading Cempaka	65	70	0	0	135	60	0		0	195	69.2
2 Teluk Segara	157	0	92	0	249	76	0		112	437	57.0
3 Selebar	0	175	0	125	300	125	175		0	600	50.0
4 Muara Bengkulu	0	0	650	50	700	50	0		0	750	93.3
Total Bengkulu	11087	13710	9356	12900	47053	11165	2999	0	9772	70989	66.3

Source: Kantor Statistik, Propinsi Bengkulu, Luas Penggunaan Tanah dan Alat-Alat Pertanian di Propinsi Bengkulu 1990.

Table A-4 Distribution of Wetland in Lampung (1990)

(Unit: Ha)

Kabupaten/Kecamatan	Irrigated Wetland					Rainfed Wetland	Tidal Swamp Wetland	Non-tidal Swamp Wetland	Other Wetland	Total Wetland	% of Irrigated Wetland
	Technical	Semi-technical	Simple PU	Simple Non-PU	Subtotal						
Lampung Selatan	4435	9210	4355	8786	26786	37240	538	5350	575	70489	38.0
1 Cukuh Balak	0	0	0	448	448	506	0	0	0	954	47.0
2 Padang Cermin	0	64	0	1221	1285	788	0	0	0	2073	62.0
3 Kedondong	0	0	1964	2061	4025	77	0	200	0	4302	93.6
4 Pardasuka	0	0	982	0	982	1239	0	0	0	2221	44.2
5 Kota Agung	0	2305	0	851	3156	60	0	0	0	3216	98.1
6 Wonosobo	0	2200	90	0	2290	1139	20	25	575	4049	56.6
7 Talang Padang	40	2162	0	0	2202	338	0	0	0	2540	86.7
8 Pulau Panggung	0	635	0	758	1393	0	0	0	0	1393	100.0
9 Pagelaran	1532	0	0	806	2338	792	0	0	0	3130	74.7
10 Pringsewu	889	0	0	121	1010	1753	0	0	0	2763	36.6
11 Sukoharjo	0	0	0	0	0	1327	0	0	0	1327	0.0
12 Gading Rejo	655	596	0	165	1416	1136	0	0	0	2552	55.5
13 Gedong Tataan	503	790	158	188	1639	1013	0	0	0	2652	61.8
14 Natar	55	35	97	54	241	4426	0	0	0	4667	5.2
15 Kalianda	0	0	0	925	925	868	0	44	0	1837	50.4
16 Ketibung	0	15	0	0	15	1366	0	0	0	1381	1.1
17 Penengahan	0		250	1188	1438	3623	0	389	0	5450	26.4
18 Palas	761	231	400	0	1392	7446	0	1036	0	9874	14.1
19 Tanjung Bintang	0	177	0	0	177	4580	0	231	0	4988	3.5
20 Sidomulyo			414	0	414	4763	518	3425	0	9120	4.5
Lampung Tengah	64114	13216	4187	4788	86305	9585	1695	9922	2419	109926	78.5
1 Kalirejo	0	0	1250	339	1589	633	0	0	0	2222	71.5
2 Bangun Rejo	0	432	30	280	742	518	0	0	0	1260	58.9
3 Padang Batu	4450	2585	1955	850	9840	695	0	0	0	10535	93.4
4 Gunung Sugih	2405	51	118	128	2702	701	0	164	0	3567	75.7
5 Trimurjo	4256	0	0	0	4256	0	0	0	0	4256	100.0
6 Metro Raya	1848	0	0	0	1848	0	0	0	0	1848	100.0
7 Batanghari	3891	81	0	240	4212	0	0	55	0	4267	98.7
8 Sekampong	3117	0	0	751	3868	0	0	0	0	3868	100.0
9 Jabung	0	9100	150	1125	10375	2451	1600	5400	1100	20926	49.6
10 Labuhan Maringgai	195	0	0	0	195	471	0	3582	1114	5362	3.6
11 Way Jepara	5832	0	449	0	6281	0	0	0	0	6281	100.0
12 Sukadana	2556	225	96	443	3320	250	0	0	0	3570	93.0
13 Pekalongan	2597	0	0	0	2597	0	0	0	0	2597	100.0
14 Punggur	5227	0	0	0	5227	0	0	0	0	5227	100.0
15 Terbanggi Besar	9146	0	0	30	9176	225	0	0	0	9401	97.6
16 Seputih Raman	5940	0	0	0	5940	65	0	0	0	6005	98.9
17 Raman Utara	2070	0	0	266	2336	0	0	330	0	2666	87.6
18 Purbolinggo	4351	0	0	0	4351	0	0	0	0	4351	100.0
19 Rumbia	0	0	139	0	139	607	0	391	0	1137	12.2
20 Seputih Banyak	0	485	0	336	821	184	95	0	0	1100	74.6
21 Seputih Mataram	4708	217	0	0	4925	488	0	0	0	5413	91.0
22 Seputih Surabaya	0	0	0	0	0	2095	0	0	205	2300	0.0
23 Bantul	1525	40	0	0	1565	0	0	0	0	1565	100.0
24 Metro Kibang	0	0	0	0	0	202	0	0	0	202	0.0
Lampung Barat	0	350	1676	5398	7424	4658	0	375	430	12887	57.6
1 Pesisir Selatan	0	0	0	752	752	3460	0	375	430	5017	15.0
2 Pesisir Tengah	0	350	830	292	1472	0	0	0	0	1472	100.0
3 Pesisir Utara	0	0	0	387	387	763	0	0	0	1150	33.7
4 Balik Bukit	0	0	431	890	1321	25	0	0	0	1346	98.1
5 Sumber Jaya	0	0	415	1615	2030	387	0	0	0	2417	84.0
16 Belalau	0	0	0	1462	1462	23	0	0	0	1485	98.5
Lampung Utara	11674	327	970	1806	14777	6001	1657	1747	5152	29334	50.4
6 Bukit Kemuning	0	0	0	262	262	94	0	0	372	728	36.0
7 Kotabumi	0	260	10	70	340	160	0	25	0	525	64.8
8 Sungkai Selatan	250	0	123	0	373	0	0	0	0	373	100.0
9 Kasui	43	0	0	83	126	114	0	0	0	240	52.5
10 Blambangan Umpu	0	0	0	204	204	258	0	104	0	566	36.0
11 Pakuon Ratu	0	0	0	0	0	170	0	130	2441	2741	0.0

12 Tulang Bawang Udik	3386	0	0	0	3386	67	0	167	1008	4628	73.2
13 Tulang Bawang Tengah	279	0	0	0	279	247	0	0	0	526	53.0
14 Menggala	0	0	0	420	420	549	1491	710	0	3170	13.2
15 Mesuji Lampung	0	0	0	0	0	687	166	0	249	1102	0.0
17 Tanjung Raja	0	0	362	123	485	0	0	0	0	485	100.0
18 Abung Timur	4590	0	0	0	4590	0	0	257	0	4847	94.7
19 Abung Barat	0	0	175	105	280	120	0	37	0	437	64.1
20 Abung Selatan	635	67	88	145	935	191	0	0	246	1372	68.1
21 Sungkai Utara	0	0	0	110	110	85	0	0	0	195	56.4
22 Banjit	2073	0	212	284	2569	0	0	0	836	3405	75.4
23 Baradatu	418	0	0	0	418	0	0	317	0	735	56.9
24 Bahuga	0	0	0	0	0	3259	0	0	0	3259	0.0
Kodya Bandar Lampung	0	0	80	19	99	710	0	0	30	839	11.8
1 Teluk Betung Selatan	0	0	0	0	0	0	0	0	0	0	
2 Teluk Betung Utara	0	0	0	0	0	0	0	0	0	0	
3 Tanjung Karang Timur	0	0	0	4	4	24	0	0	0	28	14.3
4 Tanjung Karang Barat	0	0	0	0	0	12	0	0	0	12	0.0
5 Tanjung Karang Pusat	0	0	0	0	0	0	0	0	0	0	
6 Teluk Betung Barat	0	0	0	15	15	47	0	0	20	82	18.3
7 Panjang	0	0	0	0	0	0	0	0	0	0	
8 Sukarame	0	0	0	0	0	267	0	0	0	267	0.0
9 Kedaton	0	0	80	0	80	360	0	0	10	450	17.8
Total Lampung	80223	23103	11268	20797	135391	58194	3890	17394	8606	223475	60.6

Source: Kantor Statistik, Propinsi Lampung, Luas Lahan Menurut Penggunaannya di Propinsi Lampung 1990.

Table A-5 Distribution of Upland in Jambi (1990)

(Unit: Ha)

	Used Upland (A)						Unused Upland (B)					Total	% of Used
Kabupaten/Kecamatan	House Garden	Tegal & Kebun	Ladang & Huma	Estates	Tambak/ Kolam	Subtotal A	Grass-land	Swamps	Fallow Land	Wooded Land	Subtotal B	Upland A+B=C	Upland A/C
Kerinci	3550	51695	25493	29301	194	110234	325	4571	19831	79663	104390	214624	51.4
1 Gunung Raya	275	3460	1750	15623	38	21146	100	706	5997	23417	30220	51366	41.2
2 Danau Kerinci	400	6065	520	7943	30	14958	0	0	0	22327	22327	37285	40.1
3 Sungai Penuh	1043	1842	3717	900	15	7517	0	671	6025	5000	11696	19213	39.1
4 Sitinjau Laut	529	1247	90	535	19	2420	0	306	601	17699	18606	21026	11.5
5 Air Hangat	551	7000	1305	0	60	8916	225	225	3570	5420	9440	18356	48.6
6 Gunung Kerinci	752	32081	18112	4300	32	55277	0	2663	3638	5800	12101	67378	82.0
Bungo Tebo	91639	137838	28415	124006	450	382348	14003	19774	95606	205637	335020	717368	53.3
1 Tanah Tumbuh	19520	12265	6369	35755	46	73955	3200	644	35419	45565	84828	158783	46.6
2 Rimbo Bujang	4260	10208	3554	23670	23	41715	17	26	14410	0	14453	56168	74.3
3 Jujuhan	1209	14072	4620	8844	5	28750	0	3710	1376	14217	19303	48053	59.8
4 Rantau Pandan	95	900	1589	14500	22	17106	210	0	1960	13258	15428	32534	52.6
5 Muara Bungo	60532	58380	135	9731	336	129114	161	135	26903	32284	59483	188597	68.5
6 Tebo Ilir	1193	12814	9146	0	5	23158	613	1670	11439	0	13722	36880	62.8
7 Tebo Tengah	435	5104	608	11011	1	17159	0	446	45	45957	46448	63607	27.0
8 Tebo Ulu	4395	24095	2394	20495	12	51391	9802	13143	4054	54356	81355	132746	38.7
Sarolangun Bangko	29261	56032	49224	595751	850	731118	5395	3313	37878	28289	74875	805993	90.7
1 Jangkat	386	10519	575	3075	0	14555	625	450	1358	0	2433	16988	85.7
2 Batang Asai	600	1430	1566	5353	0	8949	270	0	9634	9371	19275	28224	31.7
3 Muara Limun	402	62	40	0	0	504	0	0	0	0	0	504	100.0
4 Sarolangun	1991	5725	5886	43331	551	57484	3120	1376	7461	0	11957	69441	82.8
5 Pauh	4045	2384	6949	0	0	13378	0	0	0	0	0	13378	100.0
6 Bangko	5024	9476	12446	477144	20	504110	25	0	125	1244	1394	505504	99.7
7 Muara Siau	2142	1993	2897	25000	6	32038	15	7	14000	2150	16172	48210	66.5
8 Sungai Manau	1287	5120	1200	16903	123	24633	0	20	950	0	970	25603	96.2
9 Tabir	13384	19323	17665	24945	150	75467	1340	1460	4350	15524	22674	98141	76.9
Batanghari	24036	16377	11154	195461	4053	251081	5070	15515	75871	143970	240426	491507	51.1
1 Mersam	340	30	550	6337	30	7287	830	400	9226	30115	40571	47858	15.2
2 Muara Tembesi	997	3523	0	33553	1717	39790	497	0	1172	0	1669	41459	96.0
3 Muara Bulian	3677	4935	2850	0	25	11487	0	0	46000	80164	126164	137651	8.3
4 Jambi Luar Kota	4500	7289	6734	123071	2261	143855	2785	12750	18523	27491	61549	205404	70.0
5 Sekernan	725	500	260	26500	10	27995	900	2240	750	1500	5390	33385	83.9
6 Kumpeh	13797	100	760	6000	10	20667	58	125	200	4700	5083	25750	80.3
Tanjung Jabung	9663	93932	5872	123807	4712	237986	1573	2459	17527	197592	219151	457137	52.1
1 Tungkal Ulu	1598	23730	2562	90000	21	117911	0	222	498	2075	2795	120706	97.7
2 Tungkal Ilir	1454	46580	25	4125	294	52478	12	680	1429	15663	17784	70262	74.7
3 Muara Sabak	3890	23046	3285	24421	4357	58999	1556	1557	15600	179854	198567	257566	22.9
4 Nipah Panjang	2721	576	0	5261	40	8598	5	0	0	0	5	8603	99.9
Kodya Jambi	8224	2074	2642	740	104	13784	0	139	2172	1000	3311	17095	80.6
1 Kota Baru	1560	940	2294	700	75	5569	0	57	757	975	1789	7358	75.7
2 Jambi Selatan	3342	33	0	30	3	3408	0	2	429	0	431	3839	88.8
3 Pasar Jambi	395	0	0	0	0	395	0	7	0	0	7	402	98.3
4 Telanaipura	1100	550	135	0	20	1805	0	35	724	25	784	2589	69.7
5 Danau Teluk	164	274	136	0	1	575	0	19	116	0	135	710	81.0
6 Pelayangan	120	166	77	10	1	374	0	0	132	0	132	506	73.9
7 Jambi Timur	1543	111	0	0	4	1658	0	19	14	0	33	1691	98.0
Total Jambi	166373	357948	122801	1069066	10363	1726551	26366	45771	248885	656151	977173	2703724	63.9

Source: Kantor Statistik, Propinsi Jambi, Statistik Pertanian Tanaman Pangan 1990.

Table A-6 Distribution of Upland in South Sumatra (1990)

(Unit: Ha)

Kabupaten/Kecamatan	Used Upland (A)						Unused Upland (B)					Total Upland	% of Used Upland
	House Garden	Tegal & Kebun	Ladang & Huma	Estates	Tambak/ Kolam	Subtotal A	Grass-land	Swamps	Fallow Land	Wooded Land	Subtotal B	A+B=C	A/C
Ogan Komering Ulu	44725	104346	29688	122229	625	301613	5963	17119	160515	147961	331558	633171	47.6
1 Buay Madang	3388	1547	2616	1419	38	9008	0	2616	7552	7324	17492	26500	34.0
2 Pulau Beringin	1461	3264	1274	9732	98	15829	420	0	14974	11453	26847	42676	37.1
3 Peninjauan	1301	15205	1507	38126	0	56139	1608	1031	40301	73200	116140	172279	32.6
4 Martapura	1013	638	432	1846	0	3929	542	319	6758	775	8394	12323	31.9
5 Baturaja Barat	1835	1175	942	3961	0	7913	0	5	4076	998	5079	12992	60.9
6 Pengandonan	148	35310	799	1782	0	38039	0	0	2040	0	2040	40079	94.9
7 Banding Agung	1203	197	177	4652	3	6232	0	0	16	51	67	6299	98.9
8 Muaradua Kisam	20000	12100	4944	15000	200	52244	0	2000	18000	0	20000	72244	72.3
9 Baturaja Timur	253	815	728	387	0	2183	343	1	178	451	973	3156	69.2
10 Sosoh Buay Rayap	303	658	307	455	1	1724	0	0	4147	0	4147	5871	29.4
11 Belitang	7560	0	6754	0	125	14439	0	97	4105	850	5052	19491	74.1
12 Simpang	3325	27932	6500	2500	0	40257	3050	1050	6822	9731	20653	60910	66.1
13 Cempaka	1450	5369	2424	5369	0	14612	0	7500	10896	1903	20299	34911	41.9
14 Muara Dua	1485	136	284	37000	160	39065	0	2500	40650	41225	84375	123440	31.6
Ogan Komering Ilir	29728	34447	21320	84024	957	170476	61124	1451595	92062	215675	1820456	1990932	8.6
1 Muara Kuang	1540	323	0	21537	0	23400	0	15520	0	13304	28824	52224	44.8
2 Tanjung Raja	2819	949	150	489	0	4407	300	180	200	860	1540	5947	74.1
3 Tanjung Batu	1964	2120	1754	642	0	6480	12830	13389	3012	16779	46010	52490	12.3
4 Indoralaya	3363	1515	175	462	84	5599	8873	10418	0	14902	34193	39792	14.1
5 Pemulutan	780	1240	60	60	150	2290	0	1800	450	300	2550	4840	47.3
6 Tanjung Lubuk	632	1114	565	4603	3	6917	1200	7945	0	3726	12871	19788	35.0
7 Pedamaran	240	579	1134	4120	351	6424	237	74692	23681	9095	107705	114129	5.6
8 Mesuji	7730	13466	12905	1522	58	35681	2765	262688	11369	19418	296240	331921	10.7
9 Kayu Agung	6875	7957	471	1698	26	17027	1814	45476	36800	26700	110790	127817	13.3
10 Sirah Pulau Padang	1050	1703	40	150	1	2944	1375	10709	950	1650	14684	17628	16.7
11 Pampangan	1690	2640	3560	27373	284	35547	18110	432808	5600	14116	470634	506181	7.0
12 Tulung Selapan	1045	841	506	21368	0	23760	13620	575970	10000	94825	694415	718175	3.3
Muara Enim	24239	43117	36099	108753	925	213133	4748	6955	219048	150634	381385	594518	35.8
1 Semendo	410	0	0	7700	200	8310	25	0	250	63000	63275	71585	11.6
2 Tanjung Agung	105	20000	683	0	50	20838	0	0	0	100	100	20938	99.5
3 Muara Enim	1080	1262	977	10017	500	13836	500	1320	4705	1003	7528	21364	64.8
4 Gunung Megang	6080	8000	11776	14214	105	40175	310	125	54634	32265	87334	127509	31.5
5 Talang Ubi	450	9726	2934	1339	40	14489	42	2516	75641	2360	80559	95048	15.2
6 Prabumulih Barat	904	90	147	1922	0	3063	0	75	39	0	114	3177	96.4
7 Prabumulih Timur	1128	87	495	533	3	2246	0	1	0	0	1	2247	100.0
8 Rambang Dangku	756	3240	1775	13676	25	19472	0	0	10894	29658	40552	60024	32.4
9 Rambang Lubai	13011	0	13200	24378	2	50591	0	965	2785	22248	25998	76589	66.1
10 Gelumbang	315	712	4112	34974	0	40113	3871	1953	70100	0	75924	116037	34.6
Lahat	25657	23710	29254	155494	3460	237575	27321	3595	98135	47296	176347	413922	57.4
1 Tebing Tinggi	1250	1250	7600	10016	85	20201	4500	0	20000	1900	26400	46601	43.3
2 Pulau Pinang	982	1650	974	3315	481	7402	750	600	18100	2500	21950	29352	25.2
3 Tanjung Sakti	750	475	550	12125	200	14100	0	0	650	2238	2888	16988	83.0
4 Kota Agung	275	500	700	6683	235	8393	462	0	4000	4250	8712	17105	49.1
5 Merapi	1200	2450	2900	4412	458	11420	900	700	27100	3500	32200	43620	26.2
6 Jarai	177	474	175	14640	175	15641	875	0	973	9740	11588	27229	57.4
7 Ulu Musi	3500	552	2700	36120	225	43097	7284	0	1862	550	9696	52793	81.6
8 Lahat	486	3500	4000	5253	558	13797	2950	295	8500	14455	26200	39997	34.5
9 Pendopo	200	6509	335	0	40	7084	0	0	4500	3413	7913	14997	47.2
10 Kikim	9760	4000	8000	12730	428	34918	9000	2000	12000	3500	26500	61418	56.9
11 Pagar Alam	2277	100	720	32200	225	35522	450	0	200	1000	1650	37172	95.6
12 Muara Pinang	4800	2250	600	18000	350	26000	150	0	250	250	650	26650	97.6
Musi Rawas	16822	23185	26902	132858	449	200216	3671	31358	49836	71507	156372	356588	56.1
1 Muara Rupit	479	204	1776	31550	17	34026	61	200	3252	6231	9744	43770	77.7
2 BKL Ulu	2528	9126	2832	7285	87	21858	1840	15000	10000	15000	41840	63698	34.3
3 Jaya Loka	956	1754	1664	4772	10	9156	150	432	23745	425	24752	33908	27.0
4 Rawas Ilir	1951	3196	5016	16098	0	26261	16	13483	2228	17256	32983	59244	44.3
5 Lubuk Linggau Timur	1523	235	285	1590	5	3638	0	0	0	100	100	3738	97.3
6 Muara Beliti	1386	1001	2733	7169	154	12443	0	212	1000	0	1212	13655	91.1
7 Rawas Ulu	1300	389	1943	18011	17	21660	0	10	4000	5500	9510	31170	69.5
8 Muara Kelingi	2929	2746	5149	27273	81	38178	1600	1200	1900	24027	28727	66905	57.1
9 Tugumulio	1959	678	1455	5224	58	9374	0	406	0	2914	3320	12694	73.8
10 Muara Lakitan	1676	3536	3309	11480	8	20009	4	415	2443	54	2916	22925	87.3
11 Lubuk Linggau Barat	135	320	740	2406	12	3613	0	0	1268	0	1268	4881	74.0
Musi Banyuasin	64690	77422	33764	177945	293	354114	688	137812	25131	34586	198217	552331	64.1
1 Banyuasin I	14708	15576	491	2803	106	33684	100	677	1856	73	2706	36390	92.6
2 Banyuasin II	13570	4690	0	6372	73	24705	0	18573	785	3881	23239	47944	51.5
3 Banyuasin III	8912	10668	3050	74117	72	96819	90	106300	3665	11750	121805	218624	44.3
4 Sekayu	3246	6823	4500	45265	0	59834	0	1759	1772	2351	5882	65716	91.0
5 Babat Toman	2263	10014	4315	29066	7	45665	35	2705	420	0	3160	48825	93.5

6 Sungai Lilin	7133	16125	18451	13950	10	55669	30	5904	9637	5035	20606	76275	73.0
7 Bayung Lincir	7280	12678	2907	4784	0	27649	405	1236	5520	9239	16400	44049	62.8
8 Talang Kelapa	7578	848	50	1588	25	10089	28	658	1476	2257	4419	14508	69.5
Bangka	67396	56446	23820	126955	3304	277921	27472	79822	198912	171999	478205	756126	36.8
1 Mentok	5400	5450	1390	2900	5	15145	2000	20250	2000	1500	25750	40895	37.0
2 Jebus	3945	2175	376	10463	0	16959	0	15992	7300	1000	24292	41251	41.1
3 Kelapa	1690	2400	2660	15120	0	21870	350	11725	13750	16750	42575	64445	33.9
4 Belinyu	13486	6326	976	10250	2	31040	0	201	17850	20220	38271	69311	44.8
5 Sungai Liat	6010	7945	50	0	17	14022	1498	0	34509	0	36007	50029	28.0
6 Merawang	3250	1600	0	6225	55	11130	875	325	1350	11555	14105	25235	44.1
7 Mendo Barat	810	6950	1627	7125	15	16527	5	5	45	198	253	16780	98.5
8 Pangkalan Baru	5125	3800	3618	1900	3200	17643	2900	35	700	1500	5135	22778	77.5
9 Sungai Selan	991	3809	395	15111	3	20309	9214	14091	10770	0	34075	54384	37.3
10 Payung	835	2612	869	26976	0	31292	6380	4840	1989	28594	41803	73095	42.8
11 Koba	21470	12215	421	4215	7	38328	475	185	8592	9873	19125	57453	66.7
12 Toboali	259	939	11228	21420	0	33846	200	9627	96871	74459	181157	215003	15.7
13 Lepar Pongok	4125	225	210	5250	0	9810	3575	2546	3186	6350	15657	25467	38.5
Belitung	10483	13737	711	27302	18	52251	7372	14048	19469	137692	178581	230832	22.6
1 Kelapa Kampit	384	1949	142	918	0	3393	0	595	325	6210	7130	10523	32.2
2 Tanjung Pandan	2730	9514	71	14702	10	27027	4920	0	5121	68232	78273	105300	25.7
3 Manggar	3405	1851	70	1739	7	7072	200	3120	625	15113	19058	26130	27.1
4 Gantung	496	102	56	2952	1	3607	0	585	660	6677	7922	11529	31.3
5 Membalong	2460	255	103	4637	0	7455	0	0	10801	5000	15801	23256	32.1
6 Dengdang	1008	66	269	2354	0	3697	2252	9748	1937	36460	50397	54094	6.8
Palembang	8763	1460	32	0	175	10430	0	315	1954	0	2269	12699	82.1
1 Seberang Ulu I	100	479	0	0	42	621	0	50	60	0	110	731	85.0
2 Seberang Ulu II	913	141	32	0	25	1111	0	0	0	0	0	1111	100.0
3 Ilir Barat I	830	50	0	0	0	880	0	0	252	0	252	1132	77.7
4 Ilir Barat II	2193	530	0	0	43	2766	0	15	1639	0	1654	4420	62.6
5 Ilir Timur I	1360	120	0	0	15	1495	0	5	3	0	8	1503	99.5
6 Ilir Timur II	3367	140	0	0	50	3557	0	245	0	0	245	3802	93.6
Total South Sumatra	292503	377870	201590	935560	10206	1817729	138359	1742619	865062	977350	3723390	5541119	32.8

Source: Kantor Statistik, Provinsi Sumatera Selatan, Luas Lahan Menurut Penggunaannya di Sumatera Selatan 1990.

Table A-7 Distribution of Upland in Bengkulu (1990) (Unit: Ha)

	Used Upland (A)						Unused Upland (B)					Total	% of Used
Kabupaten/Kecamatan	House Garden	Tegal & Kebun	Ladang & Huma	Estates	Tambak/ Kolam	Subtotal A	Grass-land	Swamps	Fallow Land	Wooded Land	Subtotal B	Upland A+B=C	Upland A/C
Bengkulu Selatan	15590	16854	12280	59830	1997	106551	9537	32343	81086	114511	237477	344028	31.0
1 Kaur Selatan						0					0		
2 Kaur Tengah						0					0		
3 Kaur Utara						0					0		
4 Manna						0					0		
5 Pino						0					0		
6 Talo						0					0		
7 Seluma											0		
Rejang Lebong	6223	49112	5086	34405	1032	95858	205	450	32319	21663	54637	150495	63.7
1 Kepahyang						0					0		
2 Padangulak Tanding						0					0		
3 Curup						0					0		
4 Lebong Selatan						0					0		
5 Lebong Utara						0					0		
Bengkulu Utara	16945	30958	47855	116610	2144	214512	2310	29790	110827	75543	218470	432982	49.5
1 Enggano						0					0		
2 Talang Empat						0					0		
3 Taba Penanjung						0					0		
4 Pondok Kelapa						0					0		
5 Kerkap						0					0		
6 Lais						0					0		
7 Ketahun						0					0		
8 Muko-Muko Utara						0					0		
9 Muko-Muko Selatan						0					0		
10 Argamakmur						0					0		
Kodya Bengkulu	1380	2014	1200	40	58	4692	978	1617	420	590	3605	8297	56.6
1 Gading Cempaka						0					0		
2 Teluk Segara						0					0		
3 Selebar						0					0		
4 Muara Bengkulu						0					0		
Total Bengkulu	40138	98938	66421	210885	5231	421613	13030	64200	224652	212307	514189	935802	45.1

Source: Kantor Statistik, Propinsi Bengkulu, Luas Penggunaan Tanah dan Alat-Alat Pertanian di Propinsi Bengkulu 1990.

Table A-8 Distribution of Upland in Lampung (1990)

(Unit: Ha)

Kabupaten/Kecamatan	Used Upland (A)						Unused Upland (B)					Total Upland	% of Used Upland
	House Garden	Tegal & Kebun	Ladang & Huma	Estates	Tambak/ Kolam	Subtotal A	Grass-land	Swamps	Fallow Land	Wooded Land	Subtotal B	A+B=C	A/C
Lampung Selatan	45239	96886	52909	150948	3446	349428	2168	1011	13885	39334	56398	405826	86.1
1 Cukuh Balak	1214	1142	2963	19000	102	24421	0	131	516	3293	3940	28361	86.1
2 Padang Cermin	1136	20465	800	2000	45	24446	986	0	928	1784	3698	28144	86.9
3 Kedondong	883	975	1330	12272	98	15558	50	122	25	1712	1909	17467	89.1
4 Pardasuka	1089	3274	1772	13280	23	19438	0	5	0	0	5	19443	100.0
5 Kota Agung	2285	1266	417	8253	22	12243	0	0	439	332	771	13014	94.1
6 Wonosobo	1911	238	1094	6817	42	10102	0	0	778	200	978	11080	91.2
7 Talang Padang	2034	2703	565	831	205	6338	0	0	0	0	0	6338	100.0
8 Pulau Panggung	3607	105	1453	11275	32	16472	0	0	0	4809	4809	21281	77.4
9 Pagelaran	3021	8965	1980	10188	178	24332	0	0	1215	3192	4407	28739	84.7
10 Pringsewu	1120	1418	0	0	29	2567	27	68	169	328	592	3159	81.3
11 Sukoharjo	2070	4581	3056	1584	31	11322	0	0	0	50	50	11372	99.6
12 Gading Rejo	1660	1425	120	0	0	3205	0	0	0	0	0	3205	100.0
13 Gedong Tataan	3498	3355	1472	5993	54	14372	75	0	803	2736	3614	17986	79.9
14 Natar	5384	14363	6220	11536	10	37513	0	328	0	3405	3733	41246	90.9
15 Kalianda	1008	947	643	14370	133	17101	0	0	1222	3877	5099	22200	77.0
16 Ketibung	506	3853	3687	15090	4	23140	0	0	0	6794	6794	29934	77.3
17 Penengahan	2125	11913	9980	0	1171	25189	0	0	3300	0	3300	28489	88.4
18 Palas	2823	7602	4357	0	1179	15961	1028	50	4340	4104	9522	25483	62.6
19 Tanjung Bintang	2980	3914	7878	12150	48	26970	0	250	150	2718	3118	30088	89.6
20 Sidomulyo	4885	4382	3122	6309	40	18738	2	57	0	0	59	18797	99.7
Lampung Tengah	99606	242758	17993	120473	4171	485001	200	19214	23852	27835	71101	556102	87.2
1 Kalirejo	1432	8626	0	1542	181	11781	0	0	0	495	495	12276	96.0
2 Bangun Rejo	559	7347	0	100	15	8021	0	0	0	140	140	8161	98.3
3 Padang Batu	4175	30621	0	11289	60	46145	0	50	475	13527	14052	60197	76.7
4 Gunung Sugih	8299	11090	0	13995	19	33403	0	53	2201	5390	7644	41047	81.4
5 Trimurjo	1220	134	0	0	0	1354	0	0	0	0	0	1354	100.0
6 Metro Raya	1645	369	0	0	3	2017	0	0	0	0	0	2017	100.0
7 Batanghari	1645	1411	0	0	10	3066	0	9	0	0	9	3075	99.7
8 Sekampong	2203	1804	0	0	0	4007	0	0	0	0	0	4007	100.0
9 Jabung	32400	24100	5481	7475	2434	71890	200	2581	1230	2550	6561	78451	91.6
10 Labuhan Maringgai	9256	15430	0	6113	1207	32006	0	7326	387	0	7713	39719	80.6
11 Way Jepara	4023	20717	0	0	26	24766	0	1224	0	0	1224	25990	95.3
12 Sukadana	5143	27230	0	9797	75	42245	0	50	125	0	175	42420	99.6
13 Pekalongan	1700	1620	0	110	4	3434	0	0	0	0	0	3434	100.0
14 Punggur	1764	2178	0	0	51	3993	0	0	5140	0	5140	9133	43.7
15 Terbanggi Besar	7611	17157	8987	45435	9	79199	0	148	14235	4097	18480	97679	81.1
16 Seputih Raman	1406	3029	0	0	13	4448	0	84	59	216	359	4807	92.5
17 Raman Utara	1200	4540	0	0	0	5740	0	0	0	0	0	5740	100.0
18 Purbolinggo	2149	2718	0	0	27	4894	0	0	0	0	0	4894	100.0
19 Rumbia	3045	21650	0	1576	6	26277	0	1100	0	0	1100	27377	96.0
20 Seputih Banyak	2178	14538	0	0	10	16726	0	427	0	0	427	17153	97.5
21 Seputih Mataram	2146	9203	3525	22512	5	37391	0	0	0	629	629	38020	98.3
22 Seputih Surabaya	3054	13012	0	0	14	16080	0	6162	0	791	6953	23033	69.8
23 Bantul	571	67	0	0	0	638	0	0	0	0	0	638	100.0
24 Metro Kibang	782	4167	0	529	2	5480	0	0	0	0	0	5480	100.0
Lampung Barat	7716	40028	18862	39047	4969	110562	119	503	67672	30691	98985	209547	52.8
1 Pesisir Selatan	1953	17723	4270	0	30	23976	0	477	12006	75	12558	36534	65.6
2 Pesisir Tengah	2381	244	158	3511	4552	10846	0	24	0	1420	1444	12290	88.3
3 Pesisir Utara	289	14835	2280	0	28	17432	0	0	35917	0	35917	53349	32.7
4 Balik Bukit	384	890	5886	17300	32	24492	0	2	1765	0	1767	26259	93.3
5 Sumber Jaya	2051	3158	4252	8035	216	17712	0	0	1753	0	1753	19465	91.0
16 Belalau	658	3178	2016	10201	51	16104	119	0	16231	29196	45546	61650	26.1
Lampung Utara	63553	130802	113538	164067	1712	473672	4802	83425	212587	79812	380626	854298	55.4
6 Bukit Kemuning	807	166	435	10709	48	12165	0	0	1706	85	1791	13956	87.2
7 Kotabumi	3725	7745	977	6331	18	18796	0	75	13462	561	14098	32894	57.1
8 Sungkai Selatan	1941	1725	1365	25184	5	30220	0	110	1200	1500	2810	33030	91.5
9 Kasui	2529	2201	2238	9560	3	16531	0	0	9658	0	9658	26189	63.1
10 Blambangan Umpu	7214	14835	12883	15231	20	50183	46	10	26495	2499	29050	79233	63.3
11 Pakuon Ratu	3915	2153	13929	1892	4	21893	0	9768	12704	0	22472	44365	49.3
12 Tulang Bawang Udik	2143	8436	138	11310	142	22169	0	570	905	6160	7635	29804	74.4
13 Tulang Bawang Tengah	5618	21447	24509	7333	978	59885	3637	4128	6142	3184	17091	76976	77.8
14 Menggala	9039	38765	1539	3732	132	53207	1100	65172	3780	59715	129767	182974	29.1
15 Mesuji Lampung	6425	2634	23426	1814	63	34362	0	3000	126417	0	129417	163779	21.0
17 Tanjung Raja	583	711	1632	13554	79	16559	5	4	704	1414	2127	18686	88.6
18 Abung Timur	2994	8874	1352	1437	0	14657	0	181	0	0	181	14838	98.8
19 Abung Barat	1380	710	2036	23750	24	27900	0	72	1568	1460	3100	31000	90.0
20 Abung Selatan	5385	10193	3188	11183	89	30038	14	270	1500	2180	3964	34002	88.3
21 Sungkai Utara	2940	2591	10340	6540	12	22423	0	0	0	0	0	22423	100.0
22 Banjit	1416	1344	1156	6201	67	10184	0	0	3754	1054	4808	14992	67.9

23 Baradatu	1857	3450	3155	7083	22	15567	0	0	2242	0	2242	17809	87.4
24 Bahuga	3642	2822	9240	1223	6	16933	0	65	350	0	415	17348	97.6
Kodya Bandar Lampung	7472	3578	1019	916	22	13007	0	4	315	0	319	13326	97.6
1 Teluk Betung Selatan	346	30	0	137	0	513	0	0	0	0	0	513	100.0
2 Teluk Betung Utara	541	0	0	0	0	541	0	0	25	0	25	566	95.6
3 Tanjung Karang Timur	435	239	98	0	1	773	0	2	35	0	37	810	95.4
4 Tanjung Karang Barat	1348	843	729	191	3	3114	0	0	29	0	29	3143	99.1
5 Tanjung Karang Pusat	594	0	0	0	0	594	0	0	0	0	0	594	100.0
6 Teluk Betung Barat	355	1476	81	578	2	2492	0	0	125	0	125	2617	95.2
7 Panjang	950	383	43	0	0	1376	0	0	28	0	28	1404	98.0
8 Sukarame	956	175	68	10	0	1209	0	0	48	0	48	1257	96.2
9 Kedaton	1947	432	0	0	16	2395	0	2	25	0	27	2422	98.9
Total Lampung	223586	514052	204321	475451	14260	1431670	7289	104157	318311	177672	607429	2039099	70.2

Source: Kantor Statistik, Propinsi Lampung, Luas Lahan Menurut Penggunaannya di Propinsi Lampung 1990.

2. FISHERIES

2.1 CURRENT CONDITIONS

(1) Regional Characteristics

The fisheries sector in the Region plays a substantial role in supplying fish as a major animal protein source to the population in the Region. Fish production grew at an annual rate of about 6% between 1981 and 1989. The total fish production in the Region accounts for about 31% of whole Sumatra or 8% of national total (the Region produced 267,491 tons of fish in 1990).

Total fish export in the Region in 1990 was 2,299 tons, which accounted for only 3% of whole Sumatra or less than 1% of national total. This low rate of contribution to export earnings can be explained by the situation that larger volume of fish are distributed to meet local demand especially in Jakarta, which seems to be more important market for the Region than export, due to the limited export commodities and the close location to Jakarta.

About 73% of total fish production in the Region is accounted for by the marine fishery. The major fishing area is the east coast of Sumatra where representing over 90% of the Region's marine fish. Although this accounts for less than a half of fish catch in the Malacca Strait, the potential fish stock has not been fully exploited even in the coastal water.

The marine fishery in the west coast is extremely underdeveloped due to the high wave, lack of appropriate fish landing place, and the limited scale of fishermen. The fish catch accounts for only 8% of the whole west coast, while the coast line of the Region occupies about one third in length.

Inland fishery plays a substantial role in supplying an important animal protein to rural people. Although it is conducted at or near the subsistence level, the Region represents about 68% (53,948 tons in 1990) of inland fishery production of whole Sumatra. With the promotion of flood control, however, fishes have been losing spawning ground and/or migratory channel and therefore the natural productivity seems to be decreasing as certified from the recent stagnant catch level.

Aquaculture in the Region does not reach the remarkable production as experienced in the northern part of Sumatra (only about 24% of whole Sumatra's production). Brackishwater shrimp culture (tambak) and mariculture has rapidly been developing in recent years with participation of private companies in the Region, particularly in Bangka island and the east coast of Lampung.

Except the coastal area of Jambi, the private fish landing base (so-called "toke") which are widely seen in North Sumatra and Riau, is very limited so that the roles of public fish landing centers (PPIs) are more important in the Region. At present, there are 2 national fishing ports, i.e., Sungailiat (Bangka) and Tg. Pandan (Belitung) and 30 PPIs. Most of PPIs suffer from sedimentation and the lack of ice during fishing season. Due to the limited number of toke in the Region such as Bangka and Belitung and Labuan Maringgai, the KUD-managed auction is activated.

As of June 1991, there are 65 private enterprises engaging in fishery activities (all export-oriented) in the Region, of which 50 are concentrated in Lampung and South Sumatra. Thirty one investments are related to shrimp culture (tambak), while there are 13 cold storage mostly for frozen shrimp (of which 10 are in South Sumatra).

(2) Development Potential and Constraints

1) Development Potential

a) Jambi

Since the fish catch from both marine and inland waters has been stagnating showing a tendency of resource depression, the fisheries sector of Jambi should focus on sound management of fishery resources as well as development of aquaculture.

b) South Sumatra

The fisheries development of this province would be greatly emphasized in order to maximally utilize the rich potential fish stock, especially in Bangka and Belitung. These areas would continue to play an important role as a major fish export base to Jakarta and foreign countries other than Palembang, while the inland areas of mainland Sumatra would continue to provide local people with freshwater fish on subsistence level.

c) Bengkulu

Bengkulu would have to be strongly emphasized with exploitation of rich marine fish resources which are mostly untouched, since this province would be advantageous to develop as the main fish supply base to the inner regions of South Sumatra and Jambi in future.

d) Lampung

Lampung is benefitted from high development potentials of both marine and freshwater fishes taking into the advantage of close location to Java. As a main fish supply base to Jakarta as well as to support the rapidly increasing provincial demand, the further development of fisheries would be important. The development emphasis would be given to marine fishery in the west coast, brackishwater aquaculture (tambak) in the east coast, freshwater aquaculture/inland fishery in the central plain, and mariculture in the southern bays.

2) Major Constraints

Following are major constraints for development of the fisheries sector in the Region.

a) Marketing Constraints

i) Weakness of KUD-based activities
ii) Simple processing pattern
iii) Lack of appropriate fish marketing facilities

b) Technical Constraints

i) Resource depression in near coast
ii) Limited hatchery production capacity
iii) Small-scale fishing capacity

c) Infrastructural Constraints

i) Lack of fish landing facilities
ii) Lack of maintenance dredging of fish landing sites
iii) Inadequate fishing village environment
iv) Inadequate water supply system to aquaculture ponds

2.2 DEVELOPMENT CONCEPT

The per capita fish consumption in the Region was estimated at about 16.2 kg (1990) which has been gradually increasing year by year and had almost reached the national

average (16.3 kg). However, it is still lower than the target (18 kg/capita/year) proposed by the National Nutritional Workshop as well as the target (19 kg) set out in Repelita V. It is also far below the Sumatra average (19.9 kg). The people's buying capacity will be enlarged gradually in accordance with the relatively high growth of GDP in the Region compared with the national average (6%) during 1990-2010. If the required volume of fish is supplied at present price structure of fish and meat/egg/milk to the regional market, therefore, it is expected that the fish consumption level would reach the above-mentioned target in the future (See Table 2.2.1 below).

Table 2.2.1 Per Capita Fish Consumption (1990)

Province	Jambi	South Sumatra	Bengkulu	Lampung	Southern Sumatra	Sumatra	Indonesia
Production (mt/yr)							
- Marine fishery	17,243	91,576	10,747	76,214	195,780	703,068	2,370,107
- Inland fishery	4,641	37,748	1,635	9,924	53,948	79,242	292,537
- Aquaculture	606	3,670	2,508	10,979	17,763	73,539	499,825
Total	22,490	132,994	14,890	97,117	267,491	855,849	3,162,469
Proportion in Region (%)	8.41	49.72	5.57	36.31	100.00		
Export	658	1,350	0	291	2,299	83,301	320,241
Import	0	0	0	565	565	6,602	73,285
Inter-provincial movement	7,000	(15,000)	3,000	(10,000)	(15,000)	(55,000)	0
Provincial consumption	28,832	116,644	17,890	87,391	250,757	724,150	2,915,513
Population ('000)	2,016	6,277	1,179	6,006	15,478	36,455	179,322
Per capita fish consumption	14.30	18.58	15.17	14.55	16.20	19.86	16.26

Note : Inter-provincial movement volume is based on the hearing at the field survey

For the time being, some fishes (about 10,000 tons) are brought from the northern part of Sumatra to the Region (mainly Jambi and Bengkulu). However, this volume may not be largely increased if the Region's own fish production is enough. On the other hand, it is estimated that the Region supplies about 25,000 tons of fish per annum to Java, mostly to Jakarta. This volume may include transhipment at Jakarta for export. The Region's direct export accounts for only about 2,299 tons (1990). The per capita fish consumption in Jakarta is also lower than the target, but the demand for fish has been steadily increasing not only in quantity but also in quality. In these contexts, the fish produced in the Region should play a substantial role principally in satisfying the increasing local demand both in the Region and Jakarta market including export demand. The direct export from the Region would also increase if the transportation network is improved.

Accordingly, it will be essential to increase fish production steadily, first to keep pace with the increasing population, and, second to be a major fish supply base to the densely populated area, Java. It can be expected from the afore-mentioned contexts that the Region's demand for fish will continue to increase along with an population increase and toward the national target of the per capita fish consumption (19 kg per annum) step by step by 2010, and the Region's share of fish supply to Java will drastically increase at an annual rate of 10%. Based on these assumptions, the total demands for fishes during the next 20 years are estimated as shown in Table 2.2.2 below.