Bengkulu

In Bengkulu, the urban population growth was remarkable in Kotamadya Bengkulu during 1980s, with the rural population decreasing as shown in Table 9.1.8. The urban population ratio in Kotamadya Bengkulu grew from 50.3% to 86.0% (Table 9.1.9). Other Kabupatens also show high growth rates of the urban population. Bengkulu Utara had a rapid increase of rural population, 152,402 people or 6.37% of growth rate. According to NUDS estimate, urban population of Kotamadya Bengkulu is projected to reach to 89,186 in 2000 from 32,478 in 1980 (Table 9.1.3), with the assuming average annual growth rate of 5.05%. In 1990 the urban population has already become 146,395 surprisingly.

Table 9.1.8 Urban and Rural Population in Bengkulu

| Bengkulu | Kota (urban) population | | | Desa (rural) population | | |
|---|---|---|---|---|---|---|
| Kab/Kodya | 1980 | 1990 | growth% | 1980 | 1990 | growth% |
| Bengkulu Selatan | 10,220 | 20,792 | 7.36 | 226,544 | 277,410 | 2.05 |
| Rejang Lebong | 29,724 | 61,056 | 7.46 | 258,517 | 306,909 | 1.73 |
| Bengkulu Utara | - | 11,949 | - | 178,250 | 330,652 | 6.37 |
| Kodya Bengkulu | 32,548 | 146,395 | 16.23 | 32,185 | 23,788 | -2.98 |
| total | 72,492 | 240,192 | 12.73 | 695,496 | 938,759 | 3.04 |

Source: BPS, Penduduk Indonesia 1990

Table 9.1.9 Total Population and Urban Population Ratio in Bengkulu

| Bengkulu | total population | | | urban pop./total pop | |
|---|---|---|---|---|---|
| Kab/Kodya | 1980 | 1990 | growth% | 1980 (%) | 1990 (%) |
| Bengkulu Selatan | 236,764 | 298,202 | 2.33 | 4.3 | 7.0 |
| Rejang Lebong | 288,241 | 367,965 | 2.47 | 10.3 | 16.6 |
| Bengkulu Utara | 178,250 | 342,601 | 6.75 | - | 3.5 |
| Kodya Bengkulu | 64,733 | 170,183 | 10.15 | 50.3 | 86.0 |
| total | 767,988 | 1,178,951 | 4.38 | 9.4 | 20.4 |

Source: BPS, Penduduk Indonesia 1990

Lampung

Lampung had the most modest growth of total and urban population in the 1980s as set out in Tables 9.1.10 and 9.1.11. This is mainly because that the official transmigration finished in 1979 and since then the population increase is caused by spontaneous transmigration and natural increase. However, Kotamadya Bandar Lampung showed the highest population growth rate in the province, 8.40% for total and 4.89% for urban population. It is also notable that in Lampung Utara, the rural population grew by 6.60% and only Lampung Tengah had a bigger urban population ratio to total population in 1990 than in 1980. The rapid population growth of Lampung Utara was caused by the spontaneous transmigration from other Kabupatens in the province.

Table 9.1.10 Urban and Rural Population in Lampung

| Lampung | Kota (urban) population | | | Desa (rural) population | | |
|---|---|---|---|---|---|---|
| Kab/Kodya | 1980 | 1990 | growth% | 1980 | 1990 | growth% |
| Lampung Selatan | 158,622 | 102,461 | -4.28 | 1,608,161 | 1,722,404 | 0.69 |
| Lampung Tengah | 87,200 | 126,447 | 3.79 | 1,603,720 | 1,772,951 | 1.01 |
| Lampung Utara | 46,883 | 60,492 | 2.58 | 835,485 | 1,582,936 | 6.60 |
| Bandar Lampung | 284,167 | 457,927 | 4.89 | - | 178,491 | - |
| total | 576,872 | 747,327 | 2.62 | 4,047,366 | 5,256,782 | 2.65 |

Source: BPS, Penduduk Indonesia 1990

The data of urban population by NUDS report are different from census, showing 357,691 urban population in Bandar Lampung in 1980. The projection of its urban population in 2000 is 831,549 with the growth rate 4.22% from 1980 to 2000 (Table 9.1.3). The real growth rate 4.89% from 1980 to 1990 is slightly higher than the projection.

Table 9.1.11 Total Population and Urban Population Ratio in Lampung

| Lampung | total population | | | urban pop./total pop | |
|---|---|---|---|---|---|
| Kab/Kodya | 1980 | 1990 | growth% | 1980 (%) | 1990 (%) |
| Lampung Selatan | 1,766,783 | 1,824,865 | 0.32 | 9.0 | 5.6 |
| Lampung Tengah | 1,690,920 | 1,899,398 | 1.17 | 5.2 | 6.6 |
| Lampung Utara | 882,368 | 1,643,428 | 6.42 | 5.3 | 3.7 |
| Bandar Lampung | 284,167 | 636,418 | 8.40 | 100.0 | 72.0 |
| total | 4,624,238 | 6,004,109 | 2.65 | 12.5 | 12.4 |

Source: BPS, Penduduk Indonesia 1990

(2) Spatial Planning

In each level of the Government (nation, province, kabupaten/ kotamadya), spatial plans have begun to be prepared: National Strategic Spatial Development Planning (SNPPTR: Strategi Nasional Pengembangan Pola Tata Ruang), Provincial Spatial Structure Plan (RSTRP: Rencana Struktur Tata Ruang Propinsi), and Level II Spatial Plan (RUTR(K): Rencana Umum Tata Ruang Kabupaten/ kotamadya). Also the urban spatial plan (RTR: Rencana Tata Ruang Kota Kecamatan) is prepared for a capital of Kecamatan and for the whole area of KOTIP which is a group of urban Kecamatan.

BAPPENAS and sectoral agencies have coordinate in compiling national spatial plan, BAPPEDA and sectoral agencies for provincial and kabupaten/kotamadya plans. Those spatial development plans are fifteen year planning from Repelita V up to 2005. They go together with the Guidelines of State Policy (Garis-garis Besan Haluan Negara: GBHN), Pola Dasar and Repelita of each level as below, which are sectoral policies.

Table 9.1.12 Spatial Planning and Sectoral Planning

| | Sectoral Plans | Spatial Plans |
|---|---|---|
| Nation | GBHN (25 year plan)<br>Repelita (5 year plan) | SNPPTR (15 year plan) |
| Province | Pola Dasar TkI (25 year)<br>Repelita TkI | RSTRP |
| Kab/Kodya | Pola Dasar TkII<br>Repelita TkII | RUTRK |

Source: Cipta Karya, Ministry of Public Works

National Strategic Spatial Development Plan is a set of policy guidelines and consists of 1) policy guideline on conservation land, 2) policy guideline on settlement system (urban and rural settlement system), 3) policy guideline on transportation system, 4) policy guideline on infrastructure system, and 5) policy guideline on strategic area development. Decree of conservation land and decree of strategic area development for industrial use were issued on July 25, 1990. Others are being prepared.

Provincial Spatial Structure Plan (RSTRP) has also five main components: plan for conservation areas, urban system, transportation system, infrastructure system, identification of strategic and priority areas. They have been prepared in each province of the Southern Part of Sumatra.

(3) Urban Development Situation and Projects

Current situation of provincial and kabupaten capitals and major connecting roads are shown in Figure 9.1.1. Roads under construction are in dotted lines. Urban infrastructure is generally poor in all provinces, and especially living conditions in congested areas and slums in big cities are very poor. Water supply, sanitation facilities, solid waste disposal, drainage system are insufficient. Flooding is also a serious problem in several towns. Water service ratios through house connections and public taps in four cities are set out in Table 9.1.13. The national target of water supply ratio for Repelita V is 80% for urban areas and 60% for rural areas. All of the four cities are far behind the target.

Table 9.1.13 Water Service Ratio in Kotamadya

| | service % | year |
|---|---|---|
| Kotamadya Jambi | 33 | '91 |
| Palembang | 42 | '91 |
| Kotamadya Bengkulu | 12 | '91 |
| Bandar Lampung | 20 | '90/91 |

Source: PDAM Mei, 1991 by Perusahaan Daerah Air Minum of Jambi, Cipta Karya in Palembang, Bengkulu City Water Supply and Sanitation project, Identifikasi, Inventarisasi Dan Persiapan Pelaksanaan Sarana Penyediaan Air Bersih Propinsi Lampung.

Recently it has been re-emphasized that urban development is critical for national development. The functions of cities can be an engine of economic growth, sources of employment and locations of settlements as well as sources of tax revenue. For the effective development, multi-sectoral and decentralized approach has been recognized necessary. IUIDP (Integrated Urban Infrastructure Development Program) is an operational approach of those policies, which emphasizes integrated urban infrastructure development under decentralization policy. The purpose of the program is to increase or improve urban infrastructure and services as well as to strengthen local governments' capacity of planning, implementation and operation, financial responsibility and institutional development.

With IUIDP approach, local governments prepare medium term (five year) investment programs (IPJM: Investasi Program Jangka Menengah), which is based on a spatial plan (master plan). Its components are 1) water supply, 2) drainage, 3) sanitation, 4) solid waste management, 5) Kampung improvement program (KIP), 6) market Infrastructural improvement program (MIIP), 7) urban road. Funding sources are the central Government, local Government (level I and II), foreign and/or domestic loans. Currently "West Java and Sumatra Secondary Cities Urban Development Project (SCUDP)", which is one type of program approaches of IUIDP, has been undertaken by Asian Development Bank (ADB) funding. The main criteria of selecting Kabupatens/Kotamadya and cities are whether they are priority cities (defined by NUDS report in 1985 and revised by Capta Karya in 1989), and willingness of local governments to commit institutionally and financially. Table 9.1.14 lists SCUDP projects by cities in the southern Sumatra region. Recently the government has started preparation of SCUDP II for southern part of Sumatra. The proposed cities are listed in Table 9.1.15. Figure 9.1.2 indicates the locations of major pastand on-going projects and plans in urban development.

KIP (Kampung Improvement Program) is to serve the more defficient and densily populated areas, where mainly people with low income live. The objectives of KIP are to improve infrastructure and services in kampung for alleviating poverty, and to promote integration of kampung into the cities. Infrastructure provided includes access road, drainage, water supply, community toilet facilities (MCKs) and solid waste management. MIIP (Market Infrastructure Improvement Program) is aiming at improving the environment of the residential area surrounding market areas. The components are repair and reconstruction of circulation network, repair and rehabilitation of drainage facilities, repair and extension of MCK areas,

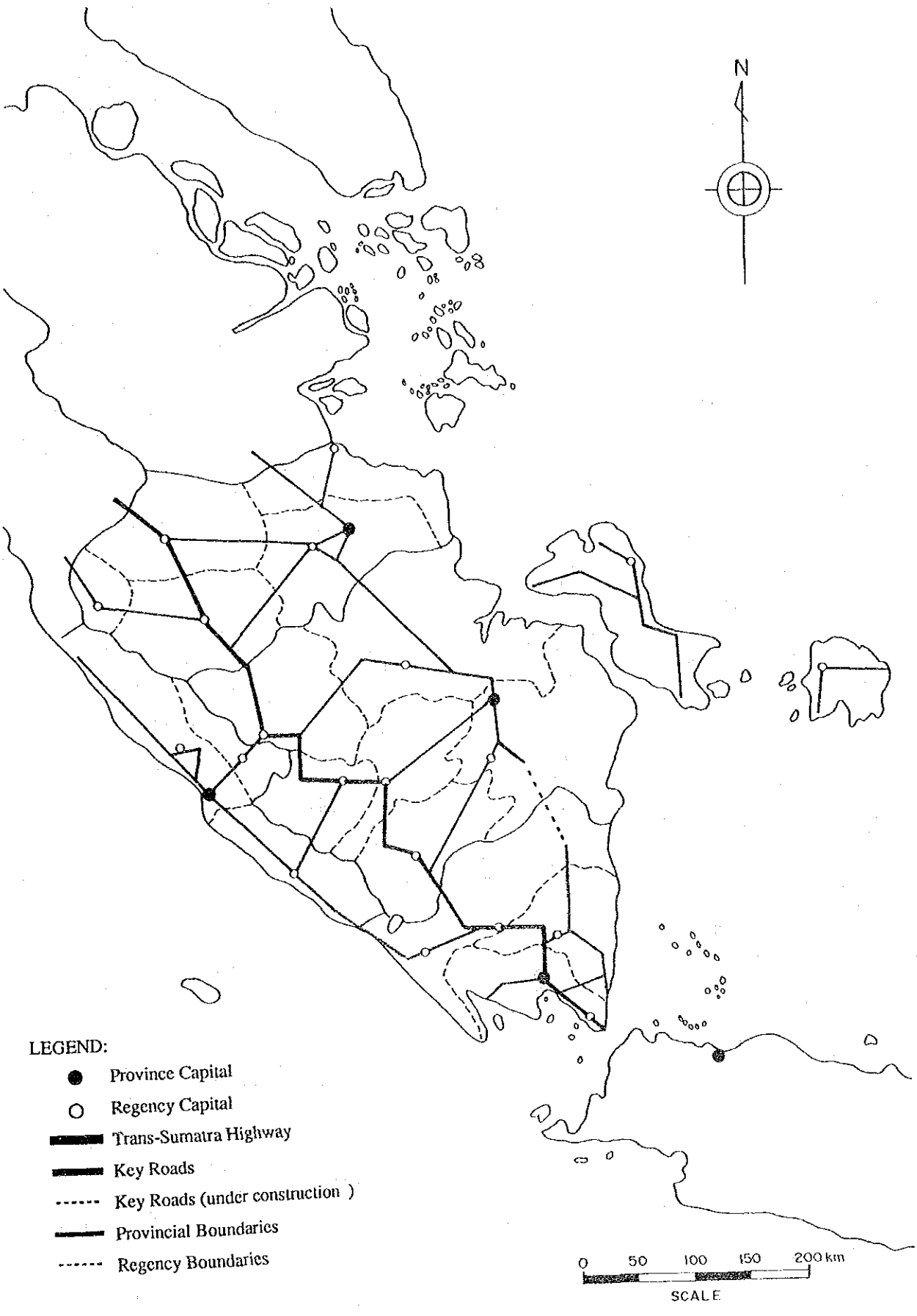



Figure 9.1.1 Road Links Between Capital Cities

provision of public standpipes and solid waste collection facilities. GLD (Guided Land Development) is a program to provide basic infrastructure for housing especially in urban fringe areas where denseness takes place within a long term framework, while the development of the housing itself is expected to be undertaken by the community or private sector.

Table 9.1.14 The Contents of SCUDP by City

| | Water Supply | Drain-age | Sanita-tion | Solid Waste | Urban Road | KIP a/ | MIIP b/ | GLD c/ |
|---|---|---|---|---|---|---|---|---|
| Kodya Jambi | X | X | X | X | X | X | X | - |
| Sungai Penuh | X | X | X | X | X | X | X | - |
| Kodya Palembang (Kec. Ilirbarat) | - | X | - | - | - | X | X | - |
| Kodya Pangkal Pinang | X | X | X | X | X | X | X | - |
| Kodya Bengkulu | X | X | X | X | X | X | X | - |
| Kodya Bandar Lampung (Kec. Tanjung Karang) | X | X | - | - | - | X | X | X |
| Bandar Lampung: UDP d/ | X | X | X | X | X | X | - | - |
| Sungai Penuh | X | X | X | X | X | X | X | - |
| Prabumulih, Tj. Enim, Muara Enim | X | X | X | X | X | X | X | X |
| Baturaja, Muara Dua | X | X | X | X | X | X | X | - |
| Sekayu, Pangkalam Balai, Betung | - | X | X | X | X | X | X | - |
| Curup | | | unknown | | | | | |
| Metro, Bandar Jaya | X | X | X | X | X | X | X | - |

a/ Kampung Improvement Program, b/ Market Infrastructure Improvement Program, c/ Guided Land Development, d/ Urban Development Projects (different from SCUDP)
Note: ( ) means that the projects are planned only in kecamatan Ilirbarat for Palembang and only in kecamatan Tanjung Karang for Bandar Lampung.
Sources: SCUDP Quarterly Status Report Jan. to March 1991, Appraisal of the Bandar Lampung Urban Development Project 1990

Table 9.1.15 The Proposed Cities for SCUDP II

| Kabupaten | City |
|---|---|
| Batang Hari | Muara Bulian |
| Bungo Tebo | Muara Bungo |
| Tanjung Jabung | Kuala Tungkal, Muara Sabak |
| Sarolangun Bangko | Sarolangun, Bangko |
| Lahat | Pagar Alam, Tebing Tinggi, Lahat |
| Bangka | Sungailiat, Toboali, Muntok |
| Belitung | Manggar, Tanjung Pandan, Kelapa Kampit |
| Bengkulu Selatan | Bintuhan, Manna |
| Bengkulu Utara | Arga Makmur |
| Lampung Selatan | Kota Agung, Talang Padang, Pringsewn, Sidomulyo, Kalianda, Natar, Padang Cermin |
| Lampung Utara | Menggala, Kota Bumi, Bukit Kemuning, Blambangan Umpu |
| Lampung Barat | Krui, Liwa |

Sources: SCUDP II, Papers for Inception Report, May 1992.

These plans are medium-term (3 to 5 years) investment plans, except that of Palembang (2 years) and Bandar Lampung (2 years). For Kotamadya Jambi, the original target of water supply ratio was 60% at the end of the plan but it has been reduced due to financial constraint. The national target of Repelita V for water supply in urban areas is 80%,

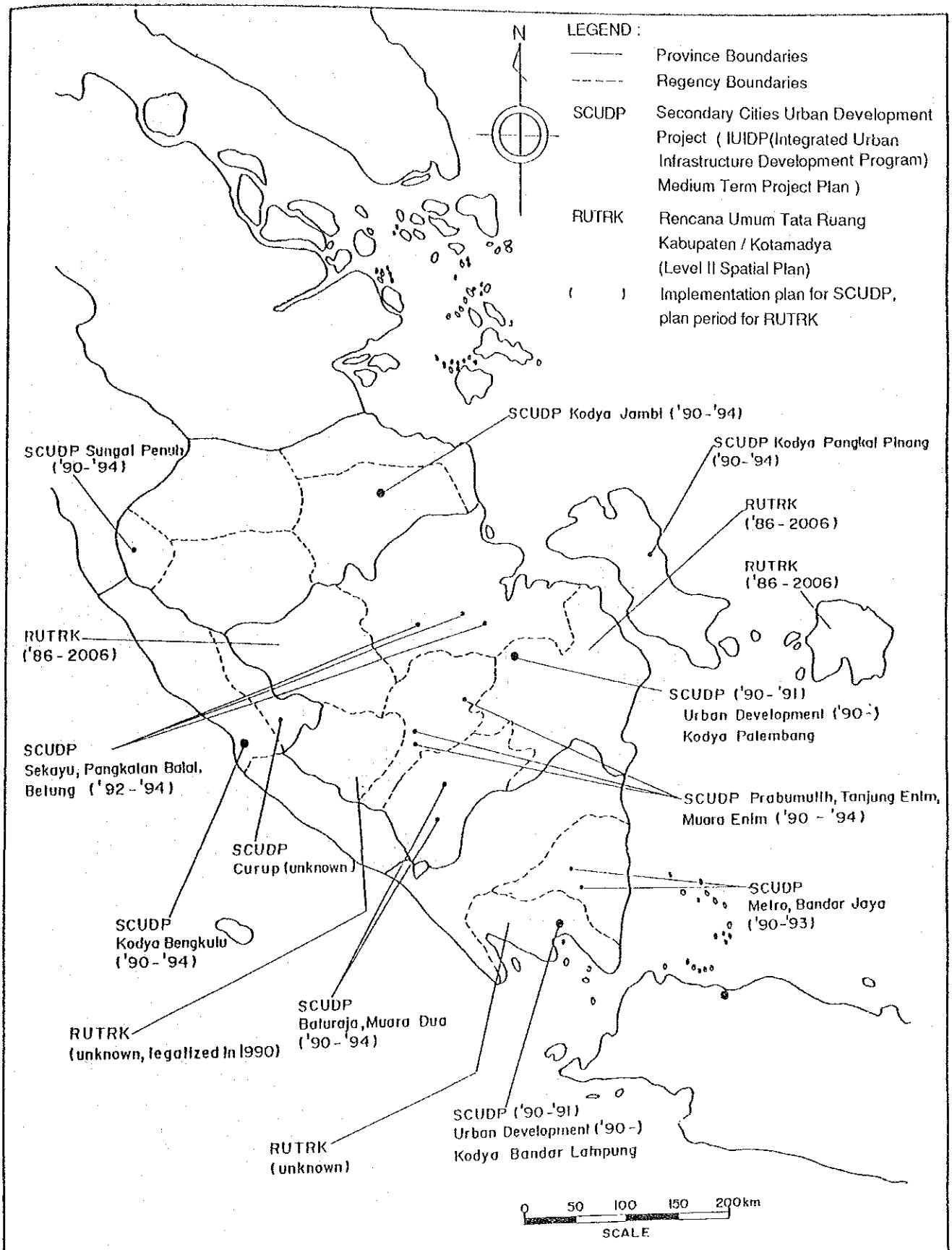



Figure 9.1.2 Major Past/On-Going Projects and Plans of Urban Development and Spatial Plans

therefore it needs to continue water supply plan intensively. Jambi's another serious problem is flood, therefore a city-wide drainage system should be prepared. For Kotamadya Bengkulu, water supply plan should be continued, since its water supply ratio will be 60% at the end of the plan.

Palembang is a metropolitan city having more than 1 million urban population. It needs to upgrade infrastructure and services but they are far behind the metropolitan standard. Water supply ratio is 42% in 1991. Suffering from flooding is great. Drainage is covered in SCUDP, however, owing to lack of funds, drainage work to be implemented is limited and the rest will be included in the main drainage program. Fourth urban development project by the World Bank, which formed the basis for IUIDP, was another program which included Palembang. KIP was implemented in late 1980s in this program.

For Bandar Lampung, besides the projects by SCUDP for kecamatan Tanjung Karang for 1990-92, Bandar Lampung Urban Development Project have been planned and started implementation by ADB from 1991 for five year period. This is also an integrated urban infrastructure development program including water supply, solid waste management, human waste disposal, KIP, flood protection, drainage and roads. Its urban population will reach 568,000 in mid-1990s and is expected to grow steadily in the future considering its strategic location and potential for economy. It needs a city-wide infrastructure for water supply, human waste and solid waste management. Currently piped water supply ratio is only 13% of population, solid waste collection ratio is about 53%, and there is no piped sewerage system: 88% of households having private toilets, 5% using shared toilets, 7% resorting to fields or ditches. After the projects, piped water supply service ratio will be 41% by 1995, with remaining 59% depending on groundwater. The service coverage of solid waste collection and disposal will be 60% for domestic refuse and 100% for non-domestic refuse by 1995. For human waste and waste water management, the projects aim at reducing discharge of human waste and other wastewater flowing into drains and streams. Flood protection is included in the program, since about 10% of urban population suffer from recurrent flooding.

Those urban infrastructure plans are mostly medium term plan. They are supposed to be based on each kabupaten / kotamadya spatial plan, though many of those spatial plans are currently being prepared or will be prepared. Therefore urban infrastructure plans may need to be reconsidered for longer term perspective and linked to overall development plans in a systematic way. At the same time development plans including improvement of infrastructure and services should be adopted to smaller cities and rural areas, too.

(4) Rural Situation

In the southern part of Sumatra, nearly 80% of the population lived in rural areas in 1990, doing mainly agriculture. Not small portion of those people are considered poor. Table 9.1.16 shows the number and ratio of poor desas and types of desas in a kabupaten and kotamadya. The definition of poverty here is set by BANGDES (Directorate General of Rural Development), Ministry of Home Affairs. They calculate village income by converting all consumptions to rice consumption per capita. The village with the converted rice consumption less than 360 kg per person a year is considered poor. Desa types are also defined by BANGDES. There are eight types according to dominant economic activity in a desa: DNL (Desa Nelayan: fishery ), DPS (Desa Persawahan: paddy field), DPL (Desa Perladangan: upland unirrigated cultivation), DPB (Desa Perkebunan: tree crops), DPT (Desa Peternakan: animal husbandry), DIK (Desa Industri Kecil/Kerajinan: small scale industry and handicrafts), DIB (Desa Industri Sedang dan Besar: large and medium scale industry), and DJP (Desa Jasa dan Perdagangan: trade and service).

In the whole region there is no animal husbandry dominant desa. Paddy field village, upland village and tree crop village are dominant, although there are variations by province and kabupaten. For Jambi, most villages are tree crop villages. Regarding the relation with poverty, it seems that tree crop desas and upland desas have the highest incidence of poverty, although there are exceptions. Most desas of South Sumatra are also tree crop

desas. Higher poor desa ratios of Kabupaten Muara Enim and MUBA seem to be related to tree crops, while the poorest Kabupaten OKU's dominant desas are upland desas. Bengkulu has most desas with tree crops, too. The poverty of Bengkulu Utara seems to have relation with upland agriculture. In Lampung most desas are upland desas. In one of the poorest, Kabupaten Lampung Utara, the number of upland and tree crop desas are almost the same, while in another poorer Kabupaten Lampung Tengah, upland desas seems to be related to poverty. Table 9.1.16 shows nearly 20% of people are considered poor on the average in the Southern Part of Sumatra. South Sumatra has the biggest ratio of poor desas. Trade and services are dominant in urban areas and their poor ratio seems lower.

Poverty is caused by the mixture of factors of social system, such as shortage of resources, mono-sectoral economic structure, low skill, low productivity, low level of education, overpopulation, lack of physical infrastructure which supports socio-economic activities, under-priced products from rural areas against relatively over-priced products from urban areas, lack of access to market and credit, and so on. They often reinforce each other and have cumulative effects. Some examples of consequences of poverty are:

1) Farmers have no or little savings so they need to sell their products immediately to get cash, even when prices are low.
2) Lack of cash means that farmers cannot afford investing in their economic activities to increase production and/or productivity.
3) Lack of cash often leads farmers to get loans. They usually cannot access to banks or institutional loans, therefore they borrow from informal creditors with much higher interest owing to no collateral, resulting in a spiral of debts. Some of them are forced to sell their land.
4) Insufficient agricultural income leads farmers to look for additional income sources, causing migration from rural to urban areas.
5) Poverty prevents people from having education, resulting in inability as a productive worker. This keeps them poor, thus becoming chain effects.

In an indirect way, poverty induces farmers to behave to minimize risk. They cannot afford taking a risk by producing more. They have to adapt to instable market prices therefore they are inclined to choose smaller production which is just enough for their own food consumption if it means smaller risk. This restricts commercialization of agriculture, which is a key for enhancing rural economy. Poverty is thus caused by many structural elements and consequently influences farming systems, resulting in inability of farmers to increase their production and productivity. Rural development program should take into consideration these chain effects of poverty and we should take measures which are relevant and appropriate to the rural situation.

BANGDES classifies three types of desas according to the degree of development and social cultural character. They are Desa Swadaya (traditional village), Swakarya (transitional village), and Swasembada (developed village). These classification are based on seven indicators: 1) understanding political idea and ideology, 2) income level, 3) dependency ratio by age, 4) participatory level of people, 5) education level, 6) health status, and 7) security situation. The number of desas by this classification is in Table 9.1.17. These seven indicators are weighted and income level is among the least weighted one, therefore the classification does not necessarily coincide with the incidence of poor village.

Table 9.1.17 Number of Desas by Classification (1990)

| Province | Swadaya | Swakarya | Swasembada | Total |
|---|---|---|---|---|
| Jambi | 9 (1.0%) | 294 (28%) | 755 (71.0%) | 1058 (100%) |
| S. Sumatra | 5 (0.2%) | 897 (35.7%) | 1613 (64.1%) | 2515 (100%) |
| Bengkulu | 42 (3.9%) | 358 (33.1%) | 683 (63.1%) | 1083 (100%) |
| Lampung | 50 (3.1%) | 388 (24.0%) | 1181 (72.9%) | 1619 (100%) |
| total | 106 (1.7%) | 1937 (30.9%) | 4232 (67.4%) | 6275 (100%) |

Source: Type Dan Klasifikasi Desa by BANGDES of each province

Table 9.1.16 Desa Situation

| | DNL (%) fishery | | DPS (%) paddy | | DPL (%) upland | | DPB (%) tree crops | | DIK (%) smallscale ind | | DIB (%) L&M industry | | DIP (%) trade&service | | total no. of desas | No. of poor desas | ratio of poor desas |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jambi | | | | | | | | | | | | | | | | | |
| Kerinci | | | 162 | (64.3%) | 39 | (15.5%) | 43 | (17.1%) | | | | | 8 | (3.2%) | 252 | 23 | 9.1% |
| S. Bangko | | | 56 | (21.8%) | 85 | (33.1%) | 110 | (42.8%) | | | | | 6 | (2.3%) | 257 | 52 | 20.2% |
| Bungo Tebo | | | 37 | (19.1%) | 132 | (68.0%) | 19 | (9.8%) | | | | | 6 | (3.1%) | 194 | 29 | 14.9% |
| Batang Hari | | | | | | | 195 | (100%) | | | | | | | 195 | 76 | 39.0% |
| Tanjung Jabung | 3 | (2.9%) | 58 | (55.2%) | 4 | (3.8%) | 39 | (37.1%) | | | | | 1 | (1.0%) | 105 | 13 | 12.4% |
| Kodya Jambi | | | 2 | (3.6%) | 1 | (1.8%) | 1 | (1.8%) | | | | | 51 | (92.7%) | 55 | 0 | 0.0% |
| subtotal | 3 | (0.3%) | 315 | (29.8%) | 261 | (24.7%) | 407 | (38.5%) | | | | | 72 | (6.8%) | 1058 | 193 | 18.2% |
| South Sumatra | | | | | | | | | | | | | | | | | |
| Palembang | 3 | (4.2%) | | | | | | | | | | | 69 | (95.8%) | 72 | 8 | 11.1% |
| Pangkal Pinang | | | | | | | | | | | | | 57 | (100%) | 57 | 2 | 3.5% |
| OKU | | | 161 | (34.5%) | 189 | (40.5%) | 94 | (20.1%) | 1 | (0.2%) | 2 | (0.4%) | 20 | (4.3%) | 467 | 336 | 71.9% |
| OKI | 5 | (1.4%) | 226 | (64.8%) | | (0.0%) | 66 | (18.9%) | 7 | (2.0%) | 1 | (0.3%) | 44 | (12.6%) | 349 | 7 | 2.0% |
| Musi Rawas | | | 38 | (16.0%) | 24 | (10.1%) | 150 | (63.0%) | | | | | 26 | (10.9%) | 238 | 8 | 3.4% |
| Muara Enim | | (0.0%) | 58 | (22.4%) | 20 | (7.7%) | 170 | (65.6%) | | | | | 11 | (4.2%) | 259 | 87 | 33.6% |
| Musi Banyu Asin | 6 | (2.0%) | 101 | (33.7%) | 51 | (17.0%) | 134 | (44.7%) | 1 | (0.3%) | | | 7 | (2.3%) | 300 | 173 | 57.7% |
| Bangka | 4 | (2.9%) | | | | | 124 | (88.6%) | | (0.0%) | | | 12 | (8.6%) | 140 | 0 | 0.0% |
| Belitung | 11 | (20.4%) | | | 4 | (7.4%) | 17 | (31.5%) | | | | | 22 | (40.7%) | 54 | 0 | 0.0% |
| Lahat | | | 125 | (21.6%) | 337 | (58.3%) | 82 | (14.2%) | 1 | (0.2%) | 1 | (0.2%) | 32 | (5.5%) | 578 | 45 | 7.8% |
| subtotal | 29 | (1.2%) | 709 | (28.2%) | 625 | (24.9%) | 837 | (33.3%) | 10 | (0.4%) | 4 | (0.2%) | 300 | (11.9%) | 2514 | 666 | 26.5% |
| Bengkulu | | | | | | | | | | | | | | | | | |
| Kodya Bengkulu | 2 | (3.6%) | 4 | (7.3%) | 3 | (5.5%) | | | | | | | 46 | (83.6%) | 55 | 0 | 0.0% |
| Bengkulu Utara | 7 | (2.0%) | 77 | (22.2%) | 173 | (49.9%) | 72 | (20.7%) | | | | | 18 | (5.2%) | 347 | 48 | 13.8% |
| Rejang Lebong * | | | 78 | (26.0%) | 58 | (19.3%) | 134 | (44.7%) | | | | | 30 | (10.0%) | 299 | 4 | 1.3% |
| Bengkulu Selatan | 5 | (1.3%) | 150 | (39.4%) | 12 | (3.1%) | 186 | (48.8%) | | | | | 28 | (7.3%) | 381 | 14 | 3.7% |
| subtotal | 14 | (1.3%) | 309 | (28.5%) | 246 | (22.7%) | 392 | (36.2%) | | | | | 122 | (11.3%) | 1082 | 66 | 6.1% |
| Lampung | | | | | | | | | | | | | | | | | |
| Bandar Lampung | | | 1 | (1.2%) | 6 | (7.1%) | 1 | (1.2%) | | | | | 76 | (90.5%) | 84 | 2 | 2.4% |
| Lampung Utara ** | 3 | (0.6%) | 90 | (17.2%) | 212 | (40.5%) | 207 | (39.5%) | | | | | 12 | (2.3%) | 521 | 106 | 20.3% |
| Lampung Tengah | | | 187 | (41.8%) | 244 | (54.6%) | 12 | (2.7%) | | | | | 4 | (0.9%) | 447 | 89 | 19.9% |
| Lampung Selatan*** | | | 254 | (45.1%) | 171 | (30.4%) | 125 | (22.2%) | 1 | (0.2%) | | | 12 | (2.1%) | 562 | 67 | 11.9% |
| subtotal | 3 | (0.2%) | 532 | (32.9%) | 633 | (39.1%) | 345 | (21.3%) | 1 | (0.1%) | | | 104 | (6.4%) | 1614 | 264 | 16.4% |
| total | 49 | (0.8%) | 1865 | (29.7%) | 1765 | (28.1%) | 1981 | (31.6%) | 11 | (0.2%) | 4 | (0.1%) | 598 | (9.5%) | 6268 | 1189 | 19.0% |

* unknown for 1 desa on income. ** unknown for 2 desas on income of which 1 desa is unknown on type. *** unknown for 3 desas on income.
Sources: Type Dan Klasifikasi Desa 1990 by BANGDES of each province

As for social service conditions, all Kecamatan have a junior secondary school and a health center (Puskesmas). All Desas (village) have an elementary school (sekolah dasar: SD) and a health service post (Posyandu) including family planning, immunization, and so on. Desas have village community council called LKMD (Lembaga Ketahanan Masyarakat Desa). LKMD started by the Presidential Decree in 1980 and is supposed to be a bottom-up function to reflect the people's needs in development programs/projects.

(5) Existing Rural Development Projects

Integrated Area Development Program (PKT)

As a rural development program in the 1980s, Provincial Development Program (PDP) has been introduced in the nation. In Bengkulu Province, PDP was implemented from 1979 to 1989 by the funding from USAID. In Repelita V, Pengembangan Kawasan Terpadu (PKT), integrated area development program, has been replacing PDP. The contents of both programs are the same, however the project unit is different. In PKT the unit is Kecamatan, while PDP is provincial wide. Implementation of PKT projects started in September 1990. PKT project sites are shown in Table 9.1.18 and on Figure 9.1.3.

Table 9.1.18 PKT Locations in '90/'91. [Plans for '91/'92 are in parentheses]

| Province | Kabupaten/ Kotamadya | Kecamatan |
|---|---|---|
| Jambi | Bungo Tebo | Rantau Pandan, (Tanah Tumbuh) |
| | Batang Hari | Kumpeh, Sekernan |
| | Sarolangan Bangko | Tabir Ulu, (Jangkat, Muara Siau) |
| | (Kerinci) | (Gunung Kerinci, Air Hangat, Sungai Penuh, Sitinjau Laut, Danau Kerinci, Gunung Raya) |
| S. Sumatra | Musi Rawas | Rawas Ilir, (Rawas Ulu) |
| | OKI | Tanjung Lubuk |
| | (Muara Enim) | (Penukal Abab) |
| | (Lahat) | (Kikim) |
| | (Musi Banyu Asin) | (Sungai Lilin) |
| | (Bangka) | (Mentok) |
| | (Kodya Pangkal Pinang) | (Pangkal Balam) |
| | (Belitung) | (Membalong) |
| Bengkulu | Bengkulu Utara | Enggano, Taba Penanjung, Muko-Muko Selatan, (Ketahun, Muko-Muko Utara) |
| | Bengkulu Selatan | Pino |
| | (Rejang Lebong) | (Rejang Lebong Selatan, Rejang Lebong Utara, Curup) |
| Lampung | Lampung Selatan | Tanjung Bintang, (Palas, Padang Cermin) |
| | Lampung Tengah | Seputih Banyak, Seputih Raman, Rumbia, (Padang Ratu, Jabung) |
| | Lampung Utara | Pesisir Tengah, (Pesisir Selatan, Pesisir Utara) |

Source: BANGDES

The targets of PKT are desas with special problems: poor, isolated, border, coastal, critical, densely populated, and scarcely populated villages. They have a low income in general and are not reached effectively by other development programs. PKT is an integrated program to tackle these problems in a small area, kecamatan or smaller, crossing various sectors. The objectives are 1) to increase the welfare of low-income community, and 2) to stimulate development of socio-economic activities in the community by diversifying community's economic activities and by stimulating community self-help. PKT stresses all social strata's participation in planning and implementation of development program.

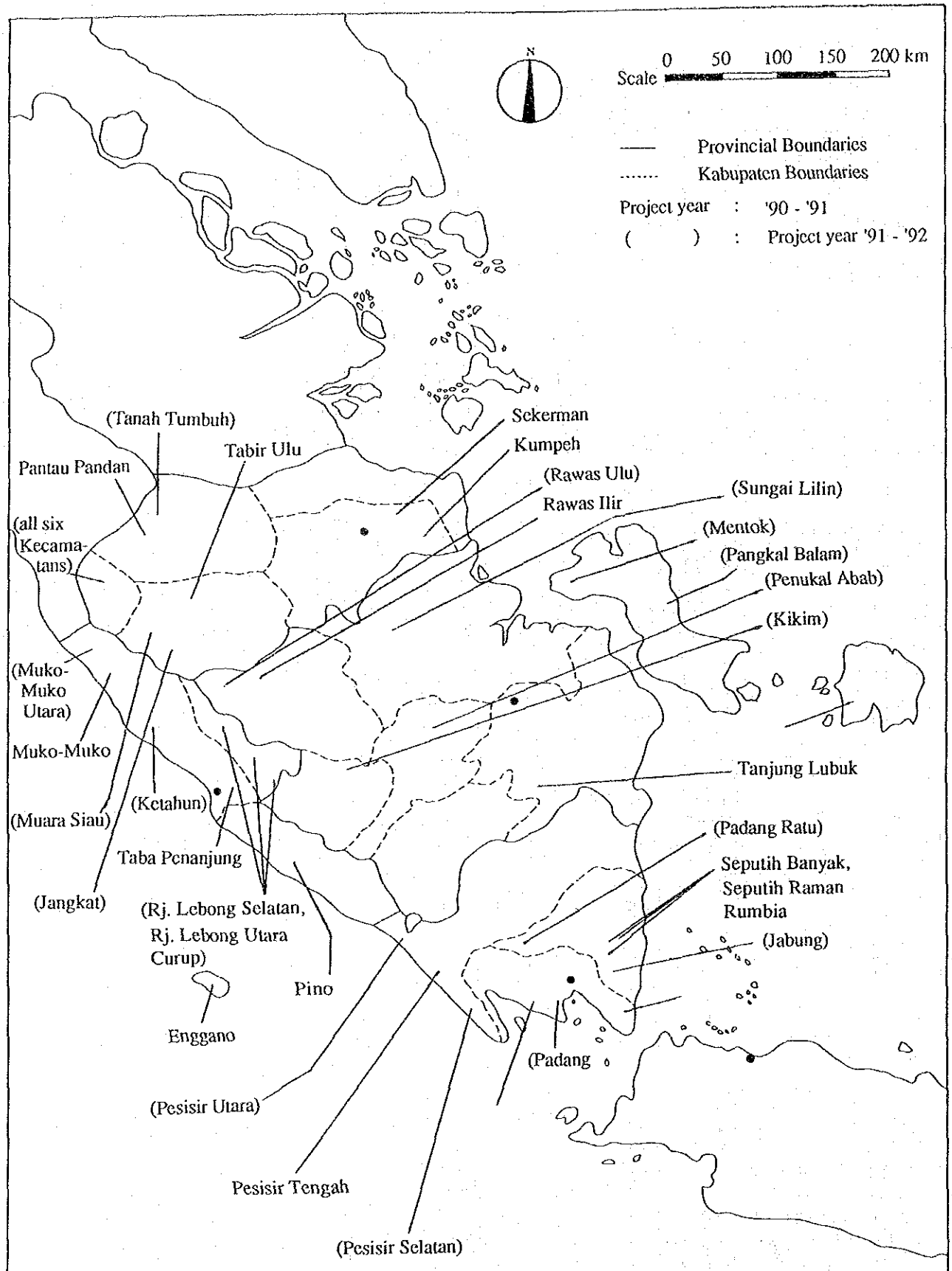



Figure 9.1.3 PKT (Pengembangan Kawasan Terpadu: Integrated Area Development Program) Project Sites (Kecamatan Names)

Programs to be implemented are 1) the increase of productivity in economic activities, such as edible plant, estate, animal husbandry, fishery, forestry, and small scale industry, 2) training for community groups to develop capability and skill: farmers, informal leaders, local administration, 3) strengthening of formal and non-formal institutions, formal: LKMD, cooperatives, etc; non-formal: P3A (Water User Association), etc. 4) development of credit and marketing activities, 5) improvement of infrastructure and facilities, such as irrigation network, road, transportation, bridges, water supply, health, and rural electrification facilities, 6) improvement of the quality of natural resources and environment. Project period is 1-2 years so that people feel the fruits of a plan quickly. PKT thus includes most of components of rural development program shown in Table 9.2.8 below. The implementation of PKT projects started in September of 1990, therefore it is too early to evaluate the program.

Inpres Desa

Inpres Desa (development assistance from the president to each village) is another development program, which tries to stimulate self-help of desas. Every desa gets Inpres Desa, Rp. 3.5 million in 1991, Rp. 1 million increase from the previous year. Plans for using Inpres are prepared by village heads with village community coucil (LKMD). Projects funded by Impres desa are:

(i) construction of production facilities, such as village dam, reservoir, irrigation canal, and water pipe.
(ii) construction of transportation facilities such as rural roads, motor boats for inter-village transportation, rural villages, and ditch.
(iii) marketing facilities such as market, kiosk, village barns.
(iv) social facilities such as village hall, clean water supply, waste disposal, and solar energy power.
(v) others for development/improvement of village community income.

BANGDES also has integrated rural development training program. It is to strengthen self-help of community to plan rural development by community themselves.

Integrated Rural Settlement Infrastructure Development (DPP)

For a desa with a potential for productive activity such as agriculture, industry, and tourism, a program called DPP (Desa Pusat Pertumbuhan: Integrated Rural Settlment Infrastructure Development) has been planned and implemented by Cipta Karya (Directorate General of Human Settlements), Ministry of Public Works, since 1983. The criteria for desas chosen as a center are that they are free from disaster, have access to hinterland and (small) cities, have potential for agriculture, industry, tourism, and are classified as Desa Swakarya. It has to have relatively more complete facilities and infrastructure than surrounding desas and it is likely to have central functions. It also should be surrounded by desas whose activity can complement the center. Desas in high priority kabupaten for development are given higher priority. BAPPEDA of kabupaten level decides the location.

The objectives of this program are to support surrounding desas and to evoke the prevalence of development through the introduction of rural center. A desa as a center and surrounding four to six desas are one unit, with the area 200 to 800 ha wide and the population of 3,000 to 10,000. The components of this program are 1) spatial planning for the center, 2) motivation training for local people for the operation and management, and 3) building infrastructure: local road, water supply (public water and water tank), sanitation facilities (public bath and latrine), rural facilities: market for local products for farmers' needs, which is held regularly but not every day, terminal for rural road network, warehouse, shops, meeting hall, etc. Those compoments have been chosen by local people. Since only those desas with potential for productive activities are chosen, this program does not focus on productive sector very much.

The program is coordinated by Cipta Karya which is responsible for spatial planning and technical matters, and other ministries such as Ministry of Health according to the components. The project term is 5 years: 1 year for planning, 1 year for implementation, and 3 years for guidance and counseling. So far about 700 centers have been planned and/or implemented in the whole country. Three units in Jambi, 5 in South Sumatra, 3 in Bengkulu, and 5 in Lampung started for 1991.

## 9.2 STRATEGY FOR URBAN SYSTEM AND DEVELOPMENT

### (1) Urban System

One of the functions of a city is to stimulate economic activity, through agglomeration of industry, services, information, infrastructure, and so forth, and the increase of economic activities then makes the city bigger and more efficient. A certain degree of concentration has multiplier and spread effects. But too much concentration leads to a point at which negative effects cannot be overlooked. To facilitate economic growth and distribute benefits more equally and to prevent excessive rural-urban migration, especially to a primate city, it is important to establish a system of urban and rural centers which is spatially well-balanced and functionally integrated, according to an area's economy and role. We have to consider not only large cities but also medium-size and small cities, and rural centers in the same system. The word "center" is used to show places with a greater centrality. We use the word because in rural areas they are not necessarily cities (urban areas) by definition.

In a developing country, unlike in a developed one, intermediate and lower level cities are often lacking. Figure 9.2.1 shows urban population by kecamatan in the southern part of Sumatra. Urban population is an indicator to show a center system in a region. Center system also includes number of facilities, infrastructure and services, and their extent of service areas. We deal with infrastructure and services in the next section. Figure 9.2.1 indicates large discrepancies between primary cities (notably Palembang and other provincial capitals to a lesser extent) and local cities that are generally small. It should be noted that several cities of almost identical size (about 50,000) exist in the interior of South Sumatra, suggesting a lack of a functioning urban center system among them. According to the Region's overall development concept, this inland zone, which is rather populous with high potential of agricultural production, should become a center of long-term development. We define their function in an urban system to help guide those particular cities' direction to fulfill their own roles more effectively. The urban system also includes number of facilities, infrastructure and services, and their extent of service areas. We deal with infrastructure and services in the next section. National Urban Development Strategy (NUDS) categorizes strategic urban areas as shown in Table 9.2.1.

As shown in Table 9.2.1, it is better to group centers into categories according to their functions, size, social services, and so on, in order to establish a center system. NUDS report groups strategic urban areas into four categories mainly according to economic functions: National Development Center (NDC), Interregional Development Center (IDC), Regional Development Center (RDC), and Local Service Center (LSC). NUDS has established this by identifying four basic functions of strategic urban areas in Indonesia, that is, hinterland services, interregional communications, goods processing (manufacturing), and residential subcenters. As proxies for the functions, it uses the total non-oil tonnage outflow from each kabupaten for the first function, volumes of interregional trade for the second function, and total kotamadya or kabupaten employment in large and medium scale manufacturing for the third function. Using the criteria shown in Table 9.2.1, the NUDS report grouped strategic urban areas in southern part of Sumatra, based on 1980 data, into the four categories as shown in Table 9.2.2.

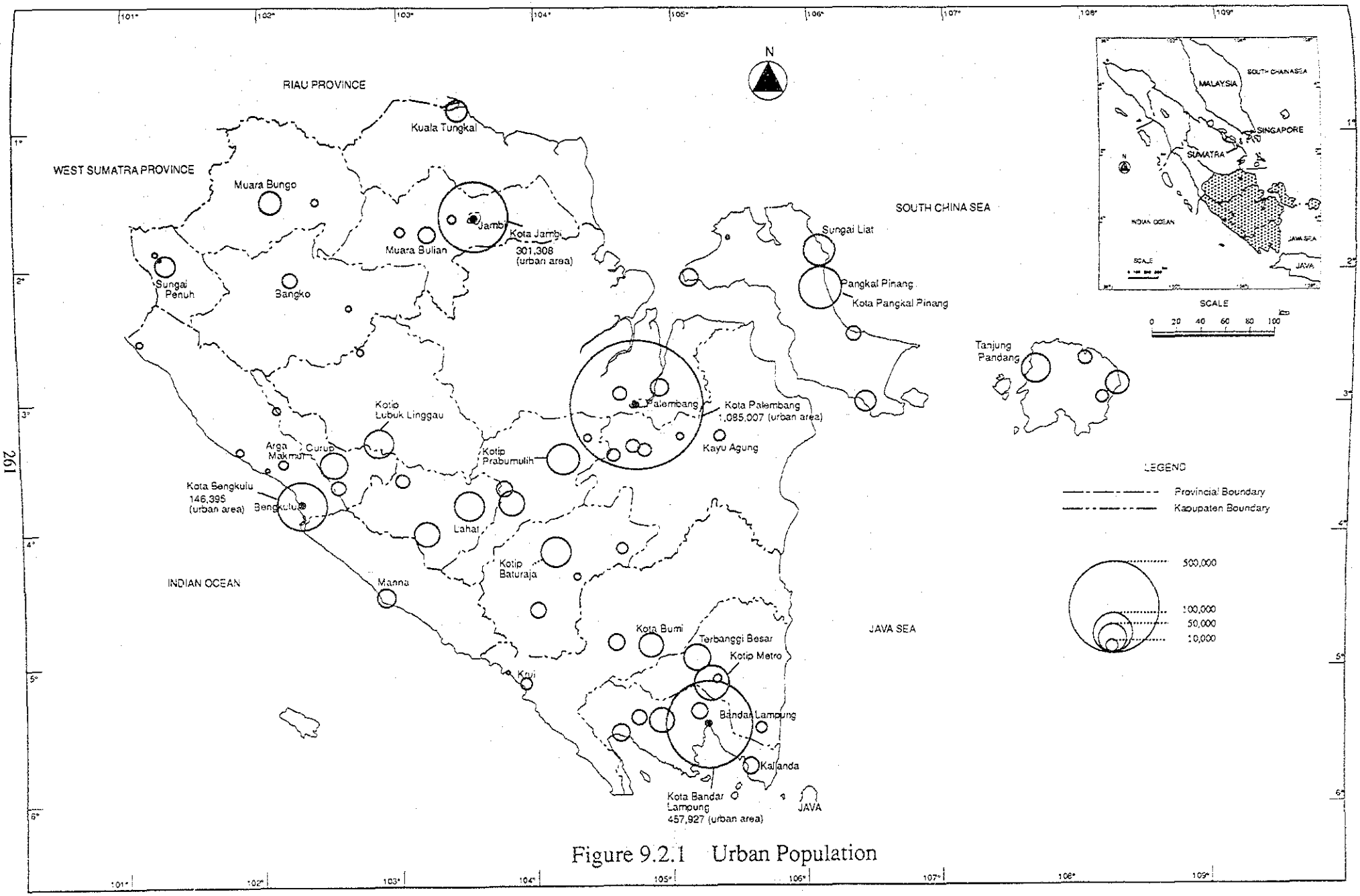



Figure 9.2.1 Urban Population

Table 9.2.1 Category of Strategic Urban Areas and Its Criteria by NUDS

| | |
|---|---|
| NDC a/ | 1) with a forecasted annual non-oil goods outflow of 2 million tonnes or more in 2000.<br>2) with the potential for diversified manufacturing development over the period.<br>--> with a 1980 large and medium manufacturing employment level of at least 3,000 people, and at least 10 industrial subsectors for an urban area outside Java.<br>-mature NDC: 3 cities in Java with already significant congestion<br>-emerging NDC: remaining NDCs<br>-NDC subcenters: all cities located within a reasonable daily commuting range of NDC |
| IDC b/ | -Level I IDC: with a forecasted annual non-oil goods outflow of 0.5 milljon tonnes or more in 2000 outside Java, or with average daily motor vehicle traffic in 1982 more than 2500 outside Java<br>-Level II IDC: with a forecasted annual non-oil goods outflow of 0.1 million tonnes or more in 2000 outside Java |
| RDC c/ | hinterland support centers in provincial subregions, and not selected as NDC or IDC. 1 city is selected in each kabupaten which does not have NDC or IDC.<br>-Level I IDC: the same criteria as IDC<br>-Level II IDC: the same criteria as IDC |
| LSC d/ | all of the remaining NUDS strategic urban areas |

a/ National Development Center, b/ Interregional Development Center, c/ Regional Development Center, d/ Local Service Center
Source: NUDS Final Report 1985

From its own strategic view point, the Team proposes a slightly different system as shown in Table 9.2.3. First of all, we consider IDC (Interregional Development Center) as a center for strategic inter-provincial linkage. As for each city, Bakauheni of Lampung Province, Baturaja and Lubuk Linggau of South Sumatra, and Kuala Tungkal of Jambi province are strategically important cities. Table 9.2.3 shows center system considering our strategy for 20 year perspective. According to the strategic importance, we give higher priority to those cities to make development plans. In our strategy, the most important cities, four provincial capitals and Kuala Tungkal, Lubuk Linggau, Baturaja, and Bakauheni have functions and problems as shown in Table 9.2.4.

Table 9.2.2 Urban System in the Region by NUDS

| | Jambi | S. Sumatra | Bengkulu | Lampung |
|---|---|---|---|---|
| National Dev. Center | | Palembang (E-C) | | B. Lampung (E-C)<br>Pringsewu (E-SC) |
| Interregional Dev. Center | Jambi (II) | Pangkal Pinang (II)<br>Tanjung Pandan (II) | Bengkulu (II) | |
| Regional Dev. Center | Sungai Penuh (II)<br>Mura Bungo (II) | Baturaja (I)<br>Kayu Agung (II)<br>Prabumulih (II)<br>Lahat (I)<br>Lubuk Linggau (II) | Manna (II)<br>Curup (II) | Metro (I)<br>Kota Bumi (I) |
| Local Service Center | Rantau Panjang<br>Bangko<br>Muara Tembesi<br>Muara Bulian<br>KualaTungkal<br>Muara Sabak | Muara Dua<br>Tanjung Enim<br>Muara Enim<br>Talang Ubi<br>Pagar Alam<br>Sekayu, Belinyu<br>Sungai Liat<br>Toboali, Manggar | Bintuhan<br>Muara Aman<br>Lais<br>Muko Muko | Kota Agung<br>Talang Padang<br>Kalianda<br>Labuan Meringgai<br>Bandar Jaya<br>Blambangan<br>Menggala<br>Liwa |

Notes: E-C denotes emerging NDC, E-SC denotes subcenter of Emerging NDC, I denotes level I IDC or RDC, II denotes level II IDC or RDC.
Sources: NUDS Final Report 1: Sumatra 1985

Table 9.2.3 Urban System in the Region by the Team

| | Jambi | S. Sumatra | Bengkulu | Lampung |
|---|---|---|---|---|
| National Dev. Center | | Palembang | | B. Lampung |
| Interregional Dev. Center | Jambi (I)<br>Kuala Tungkal(II) | Lubuk Linggau (II)<br>Baturaja (II) | Bengkulu (II) | Bakauheni (I) |
| Regional Dev. Center | Bangko (II)<br>Mura Bungo (II)<br>Sungai Penuh (II) | Lahat (I)<br>Kayu Agung (I)<br>Prabumulih (II)<br>Pangkal Pinang (I)<br>Sungai Liat (II)<br>Tj. Pandan (II) | Curup (II)<br>Manna (II) | Metro (II)<br>Menggala (I)<br>Kota Bumi (I)<br>Bandar Jaya (II) |
| Local Service Center | Muala Bulian<br>Rantau Panjang<br>Sarolangun<br>Muara Tembesi<br>Muara Sabak | Muara Dua<br>Muara Enim<br>Sekayu<br>Tanjung Enim<br>Pagar Alam<br>Talang Ubi<br>Belinyu, Manggar<br>Toboali | Arga Makumur<br>Bintuhan<br>Muara Aman<br>Lais<br>Muko Muko<br>Ipuh | Pringsewu<br>Kota Agung<br>Talang Padang<br>Labuan Meringgai<br>Kalianda<br>Blambangan<br>Liwa<br>Krui |

Table 9.2.4 Functions and Problems of the Strategically Important Cities

| city | functions | role for and/or relation with IDEP | problems |
|---|---|---|---|
| Palembang | -economic and communi-cation hub of the Region<br>-primary all-round industrial center | -proposed site of IDEP to lead the Region's and nation's economy | -poor infrastructure & services, esp.water supply, drainage, sanitation,<br>-lack of city dev. plan |
| Bandar Lampung | -connecting point between Sumatra and Java<br>-primary agro-industrial center | -proposed site of IDEP with a role of agro-industrial center<br>-support base for agricultural produc-tion in Lampung Utara | -poor infrastructure & services, esp. water supply, sanitation, drainage, electricity<br>-lack of city dev. plan |
| Jambi | -secondary agro-industrial center | -support center for agricultural base (Tj. Jabung) in financial, marketing & management requirement | -insufficient water supply, flood control<br>-insufficient transportation infrastructure |
| Bengkulu | -tertiary agro-industrial center<br>-outlet on the western side | -support center for Bengkulu Selatan | -lack of agglomeration of city functions as IDC<br>-insufficient infrastructure, esp. water supply |
| Kuala Tungkal | -access point to Northern Sumatra and growth triangle | -proposed site of IDEP with a role of linking the functions of Kab. Tj. Jabung with growth triangle | -insufficient infrastructure, & services in general |
| Lubuk Linggau | -hub for agro-zone 2<br>-connecting point to Bengkulu and Jambi | -proposed site of IDEP with a role of trade& commerce center for products of agro-zone 2 | -insufficient agglomeration of city functions as IDC<br>-insufficient infrastructure |
| Baturaja | -connecting point between agro-industrial zone and agro-zone 2<br>-part of Sumatra Gateway Triangle | -role to link and support four IDEP sites: Palembang, Musi Rawas/ Lahat, LampungUtara and Bandar Lampung/Lampung Selatan | -insufficient infrastructure & services<br>-insufficient agglomeration of city functions as IDC |
| Bakauheni | -access point to Java | -proposed site of IDEP with a role of carrying materials, products and passengers to and from Java as a port city | -linsufficient infrastructure & services<br>-insufficient agglomeration of city functions as IDC |

(2) Integrated Urban Development

Urban development plan should include a spatial plan, economic and social infrastructure plans, social and economic service plans, and policies to be based for those planning. Economic infrastructure includes such components as road, transportation, energy, and telecommunication, and social infrastructure includes water supply, sewerage, solid waste disposals, and so on. Social service includes education and health, and economic service includes marketing, information and so forth. Currently there is a spatial plan for many cities in Sumatra which, however, tends to be just documents and not utilized fully for an infrastructure development plan. There is also an urban social infrastructure plan which is covered in Integrated Urban Infrastructure Development Program (IUIDP). For development of other components mentioned above, sectoral agencies deal with them. Now the idea of "Integrated Urban Development Program (IUDP)" is considered, integrating all necessary components. This is conceptualized in Figure 9.3.1. The left side shows the current planning which should be integrated. During the implementation of those plans which needs strong commitment of concerned agencies, not only infrastructure but the information, know-how and knowledge are accumulated, which will be the basis for a new urban development plan. These are shown in the center of the figure: new type IUIDP which integrates both social and economic infrastructure, non-IUIDP which includes social and economic services, and software which represents know-how, knowledge, etc. After their implementation, the result will become a new basis for the next development plan. Thus urban development project is not a single complete project but should be accumulated for next development. This integrated and revolving-type program is IUDP. The role of concerned governmental agencies, private sector, and people should be clearly for IUDP, since the idea of IUDP is comprehensive and requires the strong commitment of those related agencies.

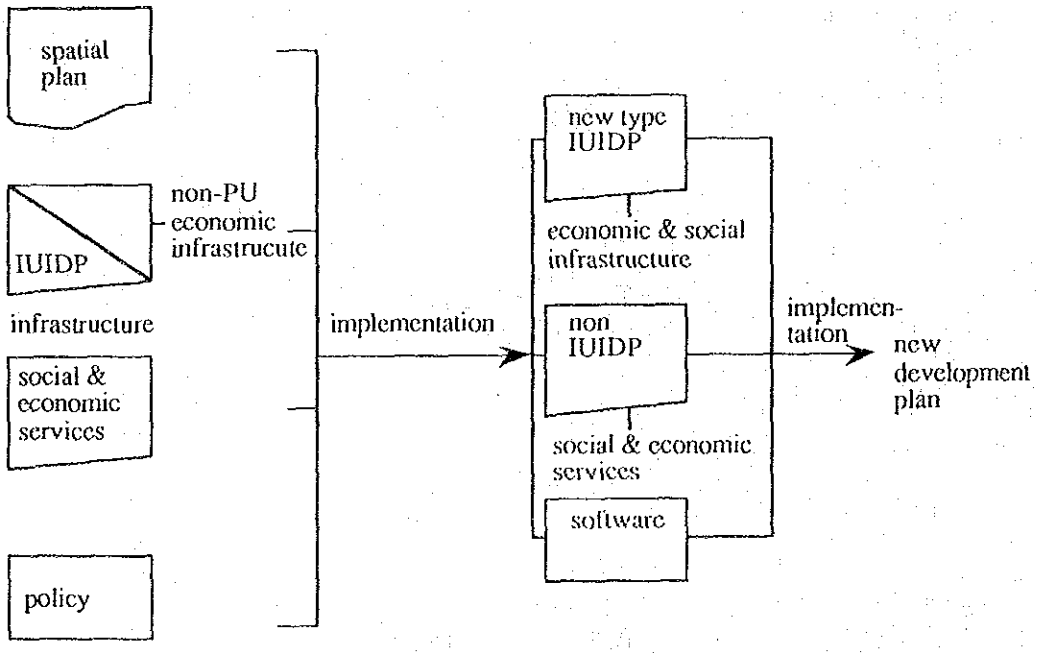



Figure 9.3.1 The Concept of IUDP

## 9.3 CONCEPT OF URBAN INFRASTRUCTURE AND SERVICES

Individual cities have different roles to play in development strategy both at national and at regional levels, as we saw in the previous section. Strategic cities should be given higher priority for development program. However, regardless of strategic difference, cities should have roles to provide urban infrastructure and services such as water supply,

sanitation, solid waste disposal, drainage, road and transportation, electricity, market facilities, education and health facilities, and so on, according to the size and administrative status, while there is difference of needs by each city. NUDS ranks cities in order of population size: metropolitan cities with the population more than 800,000, large cities with 800,000 to 500,000 population, medium cities with 500,000 to 100,000 population, small cities with 100,000 to 50,000, and very small cities with less than 50,000. Though the need for urban infrastructure and services varies not only by size but also by population density, we can establish standards of the infrastructure and services by city size. Urban infrastructure and services in smaller cities generally do not require high standards of bigger cities, because urban incomes are lower and demands for urban service are residential not commercial. If population denstiy is low, the cities do not need large scale programs for infrastructure. As cities develop, basic needs standards are satisfied and household incomes increase, demands for higher standards will emerge. The standards and/or indicators of urban infrastucture are set out by the Team as follows.

Small cities (50,000 - 100,000 pop.) and very small cities (less than 50,000 pop.)

The general strategy for small and very small cities is to utilize households for most services. They should be complemented by public investments and assistance in a small scale. Except designated RDC, basic needs standards should be enough, since demand for services is dominantly residential and lower because of lower income than bigger cities. Once city populations reach 50,000 and population density approaches 150 persons/ha in at least 10 ha in the city, public piped system becomes necessary for water supply. If groundwater is not safe and insufficient, municipal piped water supply system is required regardless of city size. For human waste management household sector relies on on-plot disposal facilities, receiving assistance from environmental health programs. For solid waste management local community should be responsible from collection to disposal (landfill or incineration), with training and education given. For very small cities, individual households and neighborhoods are responsible. Regarding urban road system, the policy for very small cities is to provide a basic system of through routes and local access roads. Similar policies apply to small cities, but widening of through roads may become necessary. For transportation, local and district bus stations are provided.

Medium-sized cities (100,000 - 500,000 pop.)

In this type of cities demands for urban services shifts from dominantly residential to a combination of residential and non-residential such as small and medium scale industries and commercial use. The general strategy for this type is to incrementally improve standards to meet higher demands so as to stimulate economic growth from infrastructure. The need of city-wide infrastructure would emerge during the expansion of cities. For human waste management household sector should be supplemented with neighborhood or household-based public program such as MCK (community bathing and toilet facilities). For solid waste management local governments have responsibility for planning, financing, implementing, and operating existing solid waste management. For bigger cities with population more than 250,000, linking community style management with city-wide solid waste management program are desirable. With regards to urban road, investment for widening through roads is necessary as in small cities. If widening is impracticable, construction of bypass routes is necessary. Many of the cities come to require traffic management schemes to mitigate traffic congestion and provision of additional public transport services. District and regional bus stations are provided.

Large cities (500,000 - 800,000 pop.)

At this stage demand for urban infrastructure and service shifts from mixture of non-residential and residential to non-residential but urban income and service standard is still lower than metropolitan cities. City-wide human waste management systems, like vacuum/cartage system become necessary. Also a city-wide solid waste management system should be introduced. As for road and transportation, large cities need more complex traffic

management systems. An urban road system of through, arterial, collector and access roads is necessary to provide sufficient capacity for vehicle circulation. National bus stations are provided.

Metropolitan cities (more than 800,000 pop.)

Newly emerging metropolitan cities require upgrading of their infrastructure to metropolitan status and also needs to provide newly growing areas with infrastructure and services. City-wide infrastructure development should be emphasized. Human waste management requires higher cost sanitation technology such as modular or complete sewerage system. Regarding road system, metropolitan cities need similar policies as large cities. They require more urgent actions to plan, implement and operate improvement and expansion program of urban road system, and public transport system.

Regarding drainage, large cities in flat plains, cities with heavy rainfall and/or located in coastal plains have severe problems therefore drainage system needs to be improved. For providing electricity, Indonesian target is to achieve service coverage of 100% of households by 2000 for all cities except very small cities. National targets of education facilities is that all-size cities will have senior high school by 2000. Large cities and metropolitan cities should have universities and other tertiary level schools. For health facilities, all-size cities should have puskesmas (health center), auxiliary puskesmas and mobile puskesmas as the national target.

Table 9.3.1 shows a center system in terms of urban infrastructure and services, their scope of influence, and population to be served. Since we need to examine integration of urban and rural function, rural centers are included at the lowest level. We will elaborate on rural centers later.

## 9.4 CONCEPT OF RURAL DEVELOPMENT PROGRAM

Rural development is closely linked with and critical for regional planning in the Region, since most people live in rural areas in southern Sumatra. We need to take integrated policies for rural development: promotion of both agricultural and non-agricultural activities to generate income and employment, building of rural infrastructure, development of rural centers, provision of social services, establishment and/or utilization of local organization to motivate local people's participation in various activities for development. Table 9.4.1 shows the possible components of rural development program.

Also when we set a rural development program, we should consider the different socio-economic situation of desas and the needs of people. The approach for development should be appropriate for each condition and people's needs. In Indonesia, there are some rural development programs with different targets for different rural situation. For desas with such problems as poverty and isolation, BANGDES has launched PKT (Pengembangan Kawasan Terpadu: Integrated Area Development Program) since 1990 as mentioned in Section 9.1.

While we largely follow the existing rural development programs/projects in the Region, we should put more importance on urban and rural linkage or integration of their functions, and people's participation in development activities. Regarding urban and rural linkage, although we need to strengthen non-agricultural activities for desas, agriculture remains essential for both urban and rural development. It should produce the raw materials which are basis for industrial activities, and feed urban population, while rural people are important market for industrial products. The integration of urban and rural functions would be achieved through a mutually reinforcing system of centers of each level. DPP (Integrated Rural Settlement Infrastructure Development) is a good starting point in this respect. We need to reinforce or create rural centers in the framework of the Region and the nation.

Table 9.3.1 Center System for Infrastructure and Services in the Region

| | Indicator of Administrative Status | Radius of Influence km | Service Area in Sq. km | Population in Area | Population in Center | Social Services | Urban Infrastructure | Other Infrastructure |
|---|---|---|---|---|---|---|---|---|
| Metropolitan | provincial capital | \| 180 | \| 100,000 | \| 8,000,000 | \| 800,000 | university principal hospital | city-wide infrastructure system: higher-cost sewerage system etc. | national roads, international airport, terminal railway station, national bus station |
| Large City | provincial capital | 180 \| 100 | 100,000 \| 30,000 | 8,000,000 \| 5,000,000 | 800,000 \| 500,000 | university principal hospital | piped water supply, city-wide sewerage system of lower cost, city-wide human waste management, drainage, solid waste disposal system, general electric supply, | " |
| Medium City | provincial capital kabupaten capital | 100 \| 57 | 30,000 \| 10,000 | 5,000,000 \| 500,000 | 500,000 \| 100,000 | (Kabupaten) high school, regional hospital | piped water supply system, pit-latrine or household-based public human waste program (MCK), local governments are responsible for solid waste management, public lighting, drainage | national and regional roads, national airport, major railway station, reginal bus station |
| Small City | kabupaten capital kecamatan capital | 57 \| 18 | 10,000 \| 1,000 | 500,000 \| 250,000 | 100,000 \| 50,000 | (Kecamatan) junior high school high school Puskesmas (health center) | piped water supply system, on-plot disposal facilities, pit latrine, public lighting, drainage if necessary | regional and district roads, district bus station |
| Very Small City | kecamatan capital and other small cities | 18 \| 13 | 1,000 \| 500 | 250,000 \| 100,000 | 50,000 \| 10,000 | " | stand pipes and wells on-plot disposal facilities, local community solid waste management, generators | district and local roads, district and local bus station |
| Rural Center | I \| II (Desa) | 13 \| 8 | 500 \| 200 | 100,000 \| 10,000 | 10,000 \| 1,000 | junior high school (Desa) elementary school Posyandu (health service post) | (Desa) wells, surface water, boreholes, individual generator | rural road network bus stop for rural road network (Desa) rural road |

Source: Prepared by the Team drawing on ESCAP, Guidelines for rural centre planning, and PADCO, Inc., Analysis of Urban Services Standards, Technologies and Costs

Table 9.4.1 Concept of Rural Development Program Components

| | |
|---|---|
| **Productive Sector** | |
| Agriculture | diversification of products, multiple cropping, quality improvement: technology, supply of pesticides, training |
| Non-agriculture | promotion of small-scale industry, trade and services, fishery, forestry, cattle breeding, mining |
| **Non-productive Sector** | |
| Infrastructure | |
| desa/rural center | irrigation, drainage, access and feeder roads, storage and processing facilities, waterway, small bridges, local road network |
| district/region centers | main road, bridges, radio and tele-communications, public transport, market centers |
| Public utilities | water supply, drainage, human waste disposal, garbage disposal, power and energy supply |
| Basic services | education, health service, food if necessary |
| Housing | housing improvement |
| Other social and economic services | cultural, religious, recreational and sports facilities, shops, markets, provision of credit |
| Training | training for health, participating development activities (planning, implementaion, O & M) |
| Local organization | formal: cooperatives for extension services, training (to minimize costs of supplying inputs and farm implements, to promote the marketing of rural production, to increase access to productive resources), LKMD, PKK, etc.<br>informal: P3A (water user association), traditional social institutions |

The functions of rural centers are 1) to improve the economic and social services in rural areas, 2) to develop an interlinked market system with other centers, and 3) to spread the effects of industrial development in upper centers (cities) to rural areas through strengthening linkages between urban and rural centers. A rural center is producer-oriented (mainly agriculture) and should meet the basic needs of agricultural producers. Its service coverage should be small enough so that farmers can reach there to get necessary facilities and go back home within the same day by an available transport. Rural centers not only deal with the provision of services, but also play a role of productive functions by strengthening the economic structure in rural areas. An interlinked system of centers should promote the commercialization of agriculture and facilitate an efficient exchange of goods and services.

To achieve rural development effectively and to interlink the function of urban and rural centers, integrated rural development program needs to consider the scope of its impact. When we plan a rural center, we should investigate the location of rural center in accordance with the framework of a kabupaten spatial plan. While linking a center with other centers outside the kabupaten, a more strengthened linkage of local demand and local production can cause self-sustaining investment flows in the kabupaten through the increase of production/productivity and diversification. We should investigate coordinated measures which stimulate and sustain circular flows, chain effects, or investment flows and linkage effects in the kabupaten.

With regard to people's participation, it is important for local people to participate in development activities to achieve the effective and sustainable development. In a long run it can increase the efficiency of a project if people feel they need it and participate in the process

of the project, mobilizing their own resources. Development activities should meet the needs of people and motivate them. People are not only the objects but also the subjects of a project. Ideally people should participate in all stages, from planning, implementation, and operation and management. If they participate in the planning stage, the project can reflect their needs and induce people's incentives and responsibility. People can feel that the project is their project, not a project coming from top or outside which ignores their real needs. They are expected to manage their projects after the completion of the project. While people's incentive is important, people's ability is also important in determining program's success. People may need some training and education to participate effectively. Another important matter is who in the community participates. We should consider how more disadvantaged people can participate, otherwise they tend to be excluded from the development activities. We should clearly target people, such as poorer people and women, and identify their problems and needs.

Participation implies the importance of a certain degree of decentralization. Local governments are expected to know about local people and their situations better than upper level offices. They can get people's confidence and work with them. If they have ability and the responsibility for a project, they can monitor it effectively and make a necessary change. Development projects can be carried out in a more flexible manner.

In our rural development program, we set the overall objectives of rural development as follows: to increase welfare of rural people, to enhance economic activities through strengthening linkages between urban and rural centers, and to strengthen capability of local institutions and community participation. Rural development program in a kabupaten proceeds as shown in Figure 9.4.1.

Framework planning consists of situation survey, target group analysis and formulation of rural development concept and framework. The contents of situation survey are natural conditions, resource potential, physical infrastructure, socio-economic situation, socio-cultural background. In this survey, problem situations and impediments to development can be investigated. Target people analysis consists of survey of rural population on income, ways of living, degree of basic needs fulfillment, education level and so on. Target people are participate in identifying problems and needs. They also should be given information on the program. For rural center planning, situation survey includes existing settlement patterns, existing and future possible communication, and economic networks and other linkage patterns. In determination of the present centrality of the settlement, indexing by collecting data on the nature, number of present services and facilities can be used. Then select settlements which (will) play a role of center and rank them. In this stage we consider the future potential, population distribution, and radius of influence of each center. Based on all these, we can decide the concept of development in the kabupaten and rural development framework. This includes the decision of the priority area for development program. This program can be incorporated into the Region's development plan and investigate how to integrate urban and rural areas in the kabupaten.

In the program planning stage, we roughly pick up individual projects and measures based on the data collected and development framework. The projects and measures should work for the overall objectives, taking reducing obstacles to development into consideration. Measures should be what target population contribute with their labor and resources in the long run. Therefore this stage also requires participation of target population, practically LKMD, NGOs and other local people, too. After building projects and measures idea, we incorporate them into a coherent comprehensive program formulation, so that the effects of integrated program are greater than the sum of individual projects' effects. Rural center planning is incorporated to program formulation here. When formulating a program, ability of local institutions should be considered for sustainable development. We need to include training for them if necessary. We estimate financial requirements in this stage. Local capacity for funding follow-up costs should be taken into account.

Operational planning involves personnel, material and financial requirements for implementation of projects, and institutional and organizational assignments of responsibilities for implementation. Target people should participate in this stage, too.

In implementation stage, management is important for effective cordination and monitoring. Capability of local government and local organization should be improved through training. Effective development activities require flexibility. It is good to have a feed-back system between planning and implementation, because we cannot exactly foresee the effects of the program, progress of projects and local groups capability, and possibility of unexpected matters. Other things to be emphasized again are importance of improving local ability - government, formal and non-formal organizations, and people - for effective and sustainable development activities, and taking measures which local resources can afford in the long run.

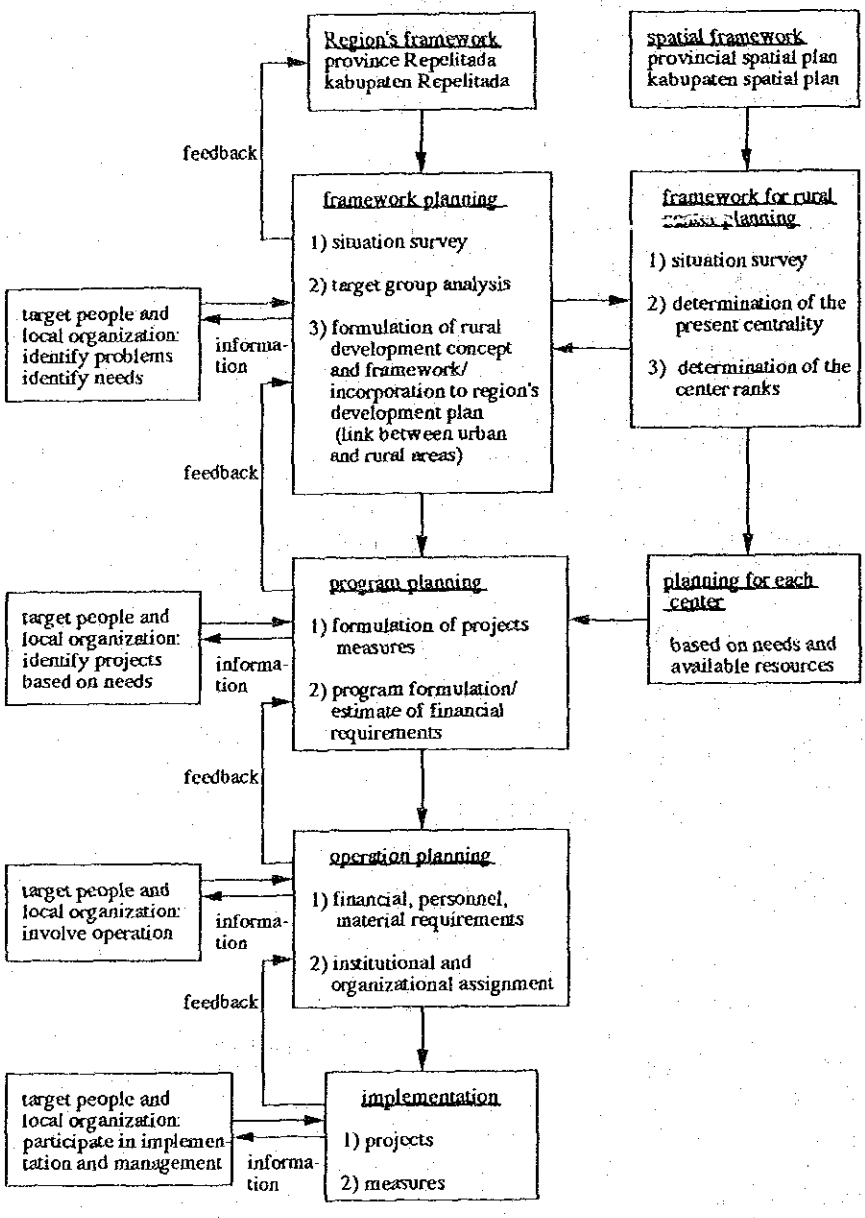



Figure 9.4.1 Rural Development Program Chart

# 10. LAND USE / FORESTRY / ENVIRONMENT

## 10.1 CURRENT CONDITIONS

### 10.1.1 General Current Condition of the Regional Forestry

Forestry and forest industry sector forms an important part of the regional economy, in terms of direct employment, indirect employment attributable to forestry and regional income. At present, the wood industry is central to forestry development in the Region, and regional consumption of processed wood products registered considerable growth between early 1960's and 1988.

In addition to the demand pressure for forest products, growth in population from 11 million in 1980 to 15 million in 1990, has created other forms of pressures on forest land for expansion of agriculture, settlements, estate crops, etc. (Table 10.1.1). Within a period of a decade the Region's forest area as a percentage of total land area decreased from about 50 percent to 40 percent. This represents a compounded annual decrease of about 1 percent (Table 10.1.2).

Table 10.1.1. Population and Population Density in 1980 and 1990 by Province of the Region

| Province | 1980 | | 1990 | |
|---|---|---|---|---|
| | Population | People per km2 | Population | People per km2 |
| Jambi | 1,444,000 | 27 | 2,018,000 | 38 |
| South Sumatra | 4,628,000 | 42 | 6,276,000 | 57 |
| Bengkulu | 768,000 | 39 | 1,179,000 | 60 |
| Lampung | 4,625,000 | 131 | 6,018,000 | 170 |
| Region | 11,465,000 | 53 | 15,491,000 | 71 |

Source: Penduduk Sensus, BPS, 1990

Table 10.1.2 Area and Percent of Forest in the Region (Area in 100 ha=km$^2$)

| | Vegetation Map 1972 | | Directorate Forestry Planning 1973 | | Directorate Forestry Inventory 1979 | |
|---|---|---|---|---|---|---|
| Province | Total | Forest | Total | Forest | Total | Forest |
| Jambi | 42,879 | 11,858 | 44,924 | 30,850 | 48,945 | 27,542 |
| South Sumatra | 107,448 | 73,160 | 103,688 | 42,240 | 86,381 | 30,661 |
| Bengkulu | 19,784 | 3,245 | 21,168 | 15,385 | 19,859 | 11,931 |
| Lampung | 31,377 | 14,671 | 33,307 | 10,875 | 32,387 | 8,578 |
| Region | 201,488 | 102,934 | 203,087 | 99,350 | 187,572 | 78,713 |
| Forest % | | 51.09 | | 48.92 | | 41.96 |
| | National Land use Board 1979 | | RePPProT by existing TGHK ** 1982 | | Biotrop * Vegetation Maps 1984 | |
| Province | Total | Forest | Total | Forest | Total | Forest |
| Jambi | 50,685 | 25,075 | 48,687 | 27,658 | 51,895 | 26,279 |
| South Sumatra | 107,454 | 43,933 | 102,543 | 35,621 | 94,129 | 33,986 |
| Bengkulu | 19,789 | 11,388 | 20,893 | 11,266 | 19,403 | 12,144 |
| Lampung | 32,864 | 7,645 | 33,447 | 6,478 | 32,713 | 7,035 |
| Region | 210,792 | 88,041 | 205,570 | 81,023 | 198,140 | 79,444 |
| Forest % | | 41.77 | | 39.41 | | 40.09 |

* : Main island only **: Forest land-use by Concensus

Source : Forest Resources and Land Use in Indonesia, MOF/FAO, 1989

There are extensive areas of degraded lands and forests affecting the condition of watersheds. Higher priority is assigned to critical watersheds which are being rehabilitated through reforestation (within forest areas) and regreening (outside forest areas) programmes. Up to now about 0.5 million hectares of critical land have been rehabilitated in the Region; the area of such lands yet to be rehabilitated in the Region is at least 1.9 million hectares (Table 10.1.3).

Table 10.1.3 Estimate of Rehabilitated and Remaining Critical Areas up to 1992

(ha)

| Province | Rehabilitated Area | | | Remaining Critical land | | |
|---|---|---|---|---|---|---|
| | Reforested | Regreening | Total | Outside Forest | In Forest | Total |
| Jambi | 6,511 | 27,635 | 34,146 | 2,123 | 39,149 | 41,272 |
| S. Sumatra | 92,406 | 111,008 | 203,414 | 143,905 | 452,662 | 5916,567 |
| Bengkulu | 32,268 | 39,854 | 72,122 | 306,318 | 211,633 | 517,951 |
| Lampung | 114,007 | 96,795 | 210,802 | 198,552 | 546,391 | 744,943 |
| Region | 245,192 | 275,292 | 520,484 | 650,898 | 1,249,835 | 1,900,733 |

Source: Directorate General of Reforestation and Land Rehabilitation; and Forest Resources and Land Use in Indonesia, MOF/FAO, 1989.

Some 0.8 million people practice shifting cultivation inside the forest of the Region, covering an area of about 2 million hectares. About 14 percent of the area under shifting cultivation is in production forest. Shifting cultivation, which in the past had existed harmoniously with the natural forest, is becoming unsustainable. As the population of shifting cultivators increases, the farming cycle and the fallow periods are reduced. Infrastructure developments including logging roads often facilitate expansion of shifting cultivation (Tables 10.1.4 and 10.1.5).

Table 10.1.4 Area under Shifting Cultivation and Number of Shifting Cultivators by Province

| Province | Area of Shifting Cultivation (ha) | Percentage of Forest Area Affected by Shifting Cultivation | Number of Shifting Cultivators 1/ |
|---|---|---|---|
| Jambi | 200,500 | 7 | 58,950 |
| South Sumatra | 1,456,700 | 41 | 194,450 |
| Bengkulu | 214,500 | 19 | 294,050 |
| Lampung | 488,900 | 75 | 257,315 |
| Region | 2,360,600 | 29 | 804,765 |

1/ Original data given in numbers of households. The set of figures provided herein are based upon an average household size of five.

Sources: Regional Physical Planning Programme for Transmigration (RePPProT), Land Resources Department (UK) and Departemen Transmigrasi (RI), volume two of various sets, 1985-1989; Data Pokok Peladang Berpindah, Departemen Kehutanan, Jakarta 1983; Studi Kelayakan Pengendalian Perladangan, Departemen Kehutanan, various volumes for individual provinces, 1982-1985; Statistik Indonesia 1987, Biro Pusat Statistik, Jakarta 1988.

Table 10.1.5 Area under Shifting Cultivation by Forest Type

(ha)

| Province | Nature reserves and Protection forest | | Limited and regular production forest | | Conversion (and unclassified) forest | |
|---|---|---|---|---|---|---|
| Jambi | 26,700 | 13 % | 36,000 | 18 % | 137,800 | 69 % |
| South Sumatra | 171,200 | 12 % | 207,900 | 14 % | 1,077,600 | 74 % |
| Bengkulu | 10,600 | 5 % | 11,100 | 5 % | 192,800 | 90 % |
| Lampung | 64,000 | 13 % | 70,900 | 15 % | 354,000 | 72 % |
| Region | 272,500 | 12 % | 325,900 | 14 % | 1,762,200 | 74 % |

Source: Regional Physical Planning Programme for Transmigration (RePPProT),Land Resources Department (UK) and Departemen Transmigrasi (RI), volume two, 1985-1989.

Industrial timber plantations can to some extent compensate for the loss of productive natural forest. Even though plantation forestry in Indonesia was initiated over 100 years ago, large-scale plantation programme is a recent phenomenon, not only in the Region but in Indonesia (Table 10.1.6).

Table 10.1.6 New Area of Timber Estate (Industrial Forest) Plantations

(ha)

| Province | 1986 | 1988 | 1989 | 1990 | 1991 | 1992 | Total |
|---|---|---|---|---|---|---|---|
| Jambi | 1,126 | 0 | 474 | 1,530 | 1,529 | 15,300 | 19,959 |
| S. Sumatra | 377 | 0 | 1,748 | 24,592 | 56,967 | 72,800 | 156,484 |
| Bengkulu | 0 | 0 | 0 | 0 | 0 | 3,000 | 3,000 |
| Lampung | 2,017 | 3,821 | 4,066 | 3,127 | 6,524 | 16,100 | 35,655 |
| Region | 3,520 | 3,821 | 6,288 | 29,249 | 65,020 | 107,200 | 215,098 |

Source: Directorate General of Reforestation and Land Rehabilitation.

Domestic market for forest products is concentrated in Java, with 61 percent of the population, whereas over 98 percent of the forests are located in the Outer Islands including the four provinces with about 7% of the total forest. In the densely populated areas even of the Region, wood needs are partly met from non-forest sources, such as plantations of rubber and coconut and home gardens.

Non-timber forest products, such as rattan, resin, sago, kayu putih oil, tengkawang, and sandalwood oil have considerable potential. These, however, have not received adequate attention so far. The Region's forestry is at present dominated by log production from natural forests and their processing to produce sawnwood and plywood. Log production and their processing are almost entirely carried out by the private sector, operating under concession arrangements with the Ministry of Forestry.

The natural forests of Indonesia are categorized into conservation, protection, limited production, regular (fixed) production and conversion forests. Limited and regular production forests together accounts for some 53 percent of the total forest area in the Region (Table 10.1.7 and Figure 10.1.1). The production forests are managed primarily under a system of selective cutting and planting (TPTI), by concessionaires. As of the end of 1989 there were 62 forest concessions covering an area of over 5 million hectares (Tables 10.1.8 and 10.1.9). Performance evaluation of forest concession management have pointed out several deficiencies, and an acute and urgent need for real improvements in the management of forest concessions. Several measures have already been adopted in this regard by Ministry of Forestry.

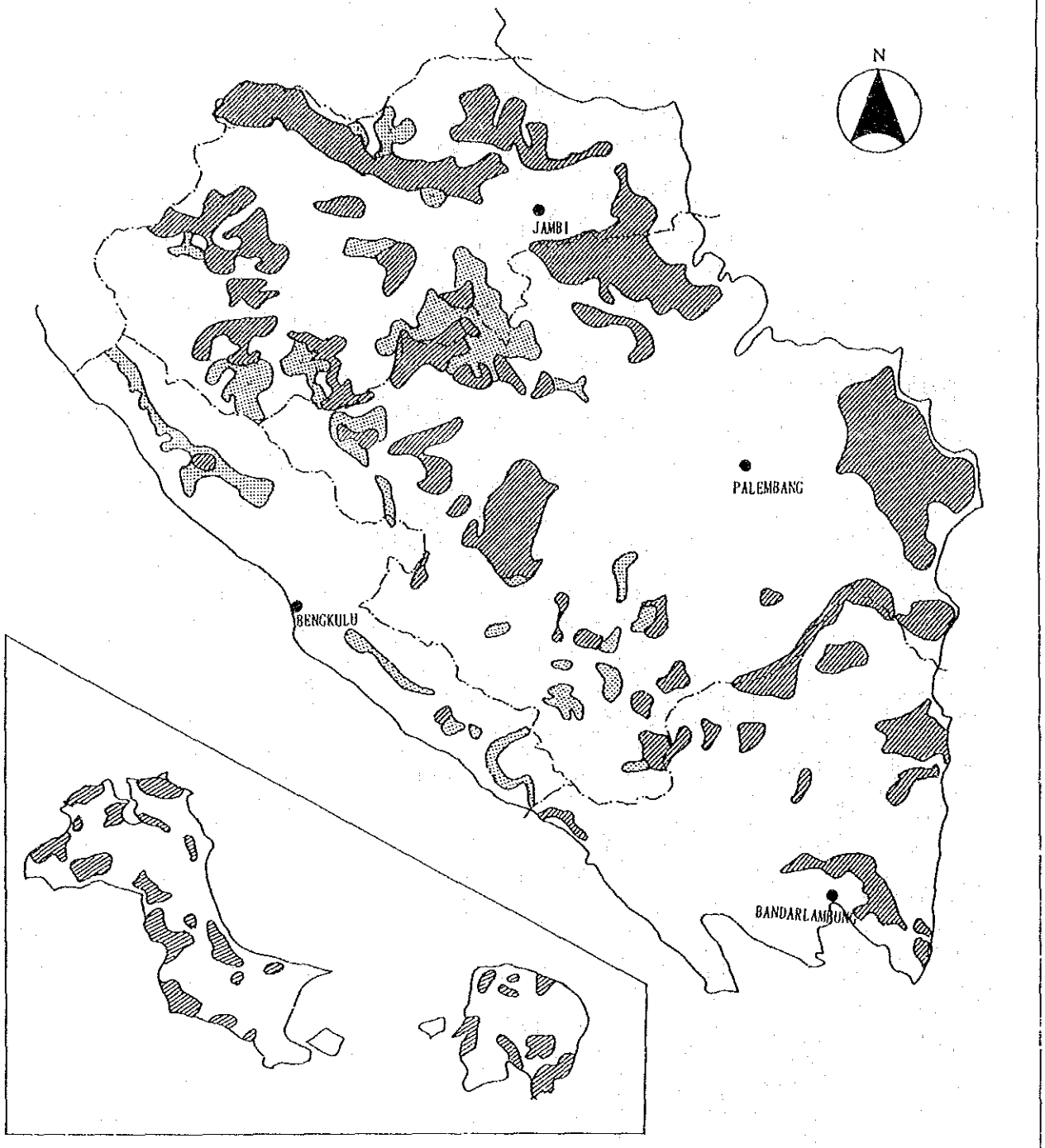
Current situation in respect of several other aspects calls for attention. They are: wastage in logging and processing; low level of forest fees and charges; inadequate human resource in terms of number and skills, and imbalance in their distribution; insufficient facilities for forestry training; and limitations of forestry research.

Table 10.1.7 Area of Forest Land by Land Use Type (TGHK): 1988

(100 ha)

| Province | Protection Forest | Park and Conservation | Limited Product | Regular Product | Conversion |
|---|---|---|---|---|---|
| Jambi | 11,475 | 4,930 | 9,740 | - | 10,132 |
| South Sumatra | 7,747 | 7,965 | 3,330 | 21,240 | 11,865 |
| Bengkulu | 4,655 | 2,499 | 2,420 | 341 | 1,936 |
| Lampung | 3,150 | 3,560 | - | 5,730 | - |
| Region | 27,027 | 18,954 | 15,490 | 27,311 | 23,933 |

Source : Statistik Kehutanan Indonesia, 1989.




LEGEND :

Fixed production forest

Limited production forest

Provincial border

SCALE

0 25 50 75 100 km

SOURCE: Land Resources of Indonesia, A National Overview: Atlas, Min. of Transmigration, 1990

Figure 10.1.1 Location of Production Forst of the Region: 1982

Table 10.1.8 Total Number of Concessions by Province:1970, 1976, 1980-1989

| Province | 1970 | 1976 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jambi | 1 | 18 | 25 | 19 | 22 | 22 | 18 | 22 | 22 | 22 | 30 | 31 |
| South Sumatra | 2 | 9 | 20 | 18 | 19 | 21 | 21 | 16 | 17 | 20 | 22 | 23 |
| Bengkulu | - | 2 | 4 | 3 | 3 | 2 | 2 | 3 | 4 | 5 | 5 | 5 |
| Lampung | - | 2 | 4 | 3 | 2 | 3 | 3 | 1 | 3 | 3 | 3 | 3 |
| Region | 3 | 31 | 53 | 43 | 46 | 48 | 44 | 42 | 46 | 50 | 60 | 62 |

Source :Data Perkembangan HPH s/d December 1988 and Asosiasi Perusahaan Hutan Indonesia, June 1988 and Perkembangan Penyelesaian Permohonan dan Pencadangan Hak Pengusahaan Hutan Tahun 1989.

*: Data for 1989=1988 data plus the areas of 2 new concessions from January-December,1989.

Table 10.1.9 Area of Concessions by Province:1970, 1976, 1980-1989

(1000ha)

| Province | 1970 | 1976 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Jambi | 76 | 1,624 | 2,383 | 2,418 | 2,383 | 2,383 | 2,383 | 2,433 | 2,433 | 2,456 | 2,550 | 2,550 |
| South Sumatra | 205 | 856 | 1,657 | 1,690 | 1,822 | 1,983 | 1,998 | 2,057 | 2,057 | 1,991 | 2,051 | 2,105 |
| Bengkulu | - | 164 | 375 | 375 | 375 | 375 | 375 | 411 | 1,171 | 411 | 411 | 411 |
| Lampung | - | 158 | 208 | 208 | 210 | 179 | 179 | 177 | 184 | 184 | 177 | 177 |
| Region | 281 | 2,802 | 4,623 | 4,691 | 4,790 | 4,920 | 4,935 | 5,078 | 5,845 | 5,042 | 5,189 | 5,243 * |

Sources: Data Perkembangan HPH s/d December 1988 and Asosiasi Perusahaan Hutan Indonesia, June 1988.Perkembangan Penyelesaian Permohonan dan Pencadangan Hak Pengusahaan Hutan Tahun 1989.

*: Data for 1989=1988 data + the areas of 2 new concessions from January-December, 1989.

### 10.1.2 Current Conditions of Provincial Land Use and Environment

(1) Jambi

The province shares part of the mountainous Barisan range (tropical rain forest) with Bengkulu and West Sumatra, mangrove forest and peat swamp habitats (fresh water swamp forest) with Riau as well as South Sumatra, and ironwood forests with South Sumatra. There are thus no habitat types peculiar to Jambi. The population is distributed along the main river, the Batang Hari, and its upriver tributaries. The swampy areas near the coast and the steep mountains are sparsely populated.

Nearly 2.8 million hectares (see Table 10.1.10) are still forested, i.e. 57% of the province, although the forests on the lower swampier areas have been mostly scheduled as production forests. The main areas of large-scale logging thus appear to be in the interior of the province, while there exists considerable small-scale logging activity at the village level. The province has officially licensed several plywood and 12 sawmills, most of which are concentrated close to Jambi City. BAPPEDA produced a set of maps, "Data Pokok Untuk Pembangunan Daerah 1989/1990," which includes the latest land use map of the province (1:500,000, 1989).

(2) South Sumatra

The province encompasses a full range of forest types from mangrove, peat and freshwater forests, dry lowland dipterocarp and ironwood forests, hilly lowland forests, to various submontane and montane formations. However, only 35% (about 36,000 km$^2$, see Table 10.1.10) of the province remains forested because almost all forest covers in the plains and hills have been cleared for agricultural use. The newest land use map for the whole province is now available, being included in a series of maps, "Data Pokok Untuk Pembangunan Daerah 1990/1991" (1:625,000, 1991, BAPPEDA).

Table 10.1.10 Areas of Present Land Use and Vegetation Types

| Land use/ Veg. Type | Jambi | | South Sumatra | | Bengkulu | | Lampung | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | km$^2$ | % | km$^2$ | % | km$^2$ | % | km$^2$ | % | km$^2$ | % |
| Forest | 27,658 | 56.8 | 35,621 | 34.7 | 11,266 | 53.9 | 6,478 | 19.4 | 81,023 | 39.4 |
| Bush/scrub | 8,728 | 17.9 | 22,256 | 21.7 | 3,525 | 16.9 | 8,346 | 25.0 | 42,855 | 20.8 |
| Grassland | 770 | 1.6 | 10,632 | 10.4 | 989 | 4.7 | 2,125 | 6.3 | 14,516 | 7.1 |
| Shifting | 2,005 | 4.1 | 14,567 | 14.2 | 2,145 | 10.3 | 4,889 | 14.6 | 23,606 | 11.5 |
| Dryland Agr. | 827 | 1.7 | 4,698 | 4.6 | 331 | 1.6 | 3,731 | 11.1 | 9,587 | 4.7 |
| Wetland Agr. | 2,259 | 4.6 | 4,185 | 4.1 | 368 | 1.8 | 579 | 1.7 | 7,391 | 3.6 |
| Tree crops | 5,037 | 10.4 | 4,095 | 4.0 | 1,685 | 8.0 | 4,165 | 12.5 | 14,982 | 7.3 |
| Water | 563 | 1.2 | 1,084 | 1.1 | 0 | 0 | 67 | 0.2 | 1,714 | 0.8 |
| Unvegetated | 0 | 0 | 51 | 0 | 29 | 0.1 | 4 | 0 | 84 | 0 |
| Settlement | 811 | 1.7 | 4,353 | 4.2 | 152 | 0.7 | 2,934 | 8.8 | 8,250 | 4.0 |
| No data | 29 | <1 | 1,000 | 1.0 | 403 | 2.0 | 129 | 0.4 | 1,561 | 0.8 |
| Total | 48,687 | 100.0 | 102,543 | 100.0 | 20,893 | 100.0 | 33,447 | 100.0 | 205,570 | 100.0 |

Sources : Regional Physical Planning Programme for Transmigration Vol.1, Review of Phase I Results, Sumatra (RePPProT, Departemen Transmigrasi, 1988); and Forest Resources and Land Use in Indonesia (MOF/FAO, 1989)

A large area of swamp forest expands in the eastern part of the province, with a long coastal shore of mangrove (1,950 km$^2$ that is the second largest mangrove area in Sumatra, see Table 10.1.11). Over the area of primary dryland forest in the flat lowland, the range of total standing value is 134 ~ 200 m$^3$/ha. Commercially valuable timber species such as ironwoods (Eusideroxylon zwageri, which is the last rich stands) average 78 m$^3$/ha but may total as much as 110 m$^3$/ha.

Table 10.1.11 Areas of Mangrove Forest

| Province | Areas (km$^2$) |
|---|---|
| Jambi | 650 |
| South Sumatra | 1,950 |
| Bengkulu | 0 |
| Lampung | 170 |
| ..... | ..... |
| Riau | 2,760 |

Source : Forest Resources and Land Use in Indonesia (MOF/FAO, 1989)

Large-scale logging for plywood or sawn timber production is evident in the interior of the province as well as many of the outer, lower and middle slopes of the Barisan ranges. And the province has a concentration of 20 officially licensed sawmills, one pulp/paper mill and 4 plywood factories around Palembang.

Only scattered and minor areas of upland forest remain on the Bangka and Belitung Islands. This is restricted mainly to the highest and steep hills and mountains.

(3) Bengkulu

A total of over 11,000 km$^2$ (about 54% of the whole provincial area) is still forested as in Table 10.1.1. The latest land use map found available is contained in the map set made by BPN in 1989 (1:500,000). The main forest habitat types represented in the province

are wet lowland forest on volcanic rocks and alluvial soils, and montane forest on new volcanic rocks, both of which are largely classified as "Tropical Rain Forest." And nearly half of the forest area is montane above 900 m altitude. All the coastal plains are unclassified or convertible, which include the lowland forest. The little primary lowland forest remains to the east of the Ketaun River, while the residual lowland forest remains only in a reserve on the Bengkulu-Lampung Province border and in the remote north Bengkulu coast. In the extreme south, approximately 660 $km^2$ of the Bukit Barisan Selatan National Park extends from the mountains in a narrowing band over the coastal plain to the sea. Its habitat range is large and the flora and fauna diverse.

Besides, most of the forest in the province serves important protection functions in preventing erosion on the steep mountain slopes, and in protecting and maintaining good water supply upon which the population is dependent.

Over 36% of the forest area (4,110 $km^2$) is supposed to be still within operating timber concessions (see Table 10.1.9), and two sawmills are located near Mukomuko and Ketaun. About 19% of the forest as a whole is used for shifting cultivation (see Table 10.1.12).

(4) Lampung

This province has been extensively settled mainly by Javanese migrants, who have needed to clear a large area of forest for agricultural use such as shifting or slash-and-burn cultivation (a converted ratio from forest to shifting cultivation is 75%, see Table 10.1.12). The slash-and-burn cultivation has also expanded the forest loss due to a fire with an annual average of 9 $km^2$ (1983 - 1988). This makes Lampung one of the less forested provinces in Indonesia and the least forested in Sumatra (only less than 20% of its land area is still forested as shown in Table 10.1.10), which has been further accelerated by commercial timber cutting with official concessions. As of 1989, 1,770 $km^2$ of the granted concessions were under operation (see Table 10.1.9). There are sawmills at Blambangan, Kotabumi and Tanjungkarang (Bandar Lampung), which also has a plywood factory.

Table 10.1.12 Forest Area Affected by Shifting Cultivation and Number of Shifting Cultivators (combination of Tables 10.1.4 and 10.1.5)

| Province | Jambi | S.Sumatra | Bengkulu | Lampung | Region |
|---|---|---|---|---|---|
| Area ($km^2$) by slope class | | | | | |
| 0 ~ 8% | 129 | 2,532 | 296 | 436 | 3,393 |
| 9 ~ 40% | 1,307 | 10,433 | 701 | 3,002 | 5,443 |
| 40 ~ % | 569 | 1,602 | 1,148 | 1,451 | 4,770 |
| Total | 2,005 | 14,567 | 2,145 | 4,889 | 23,606 |
| % to whole forested area | 7 | 41 | 19 | 75 | 29 |
| No.of Shifting Cultivators | 58,950 | 194,450 | 294,050 | 257,315 | 804,765 |
| Affected reserve and protection forest ($km^2$) | 267 | 1,712 | 106 | 640 | 2,725 |

Source : Situation and Outlook of the Forestry Sector in Indonesia Vol.4 : Social, Environmental and Institutional Aspects (MOF/FAO,1990)

Note: Although "shifting cultivation" is characterized by a rotation of fields rather than of crops, often accompanied by slashing and burning, the data used on areas and number of shifting cultivators suffer from lack of consistent definitions.

The western part of the province is liable to flooding and landslides because such agricultural development occurs even in the recently settled parts of the undulating and rolling plains for food crop production due to land shortage in southeastern Lampung.

Much of the low lying area along the east coast is covered by extensive peat free freshwater swamps, which makes the province distinctive within Sumatra. The east coast is also a fringe of mangrove habitat of 170 $km^2$ in total (see Table 10.1.11) while the province has nesting or staging sites for wildlife, turtle, resident shorebird and migratory wander as well as coral reef habitat in the islands south of Bandar Lampung. A land use map titled "Penggunaan Tanah and Status Tanah" (1:250,000) has been found the most up-dated for the province, being produced by the provincial government in 1989.

### 10.1.3 Forestry Measures Already Taken by the Government

Considering the important role of, and challenges faced by, the forestry sector, the responsibility for the sector was elevated from that of a Directorate General in the Ministry of Agriculture to a full-fledged Ministry of Forestry, in 1983.

Measures have been undertaken by the Government of Indonesia to reduce the costs of forestry activities, and at the same time to expand the sector's contribution to the economic development of the country.

A functional classification of forest lands was established in the 1970's. Some lands were defined as protection and conservation areas and closed to logging activities. In those areas, environmental protection and conservation were the sole functions. Other lands were set aside for conversion to non-forestry use, and production forests were defined to constitute the permanent, sustainable resource base where the harvesting of timber and non-timber products is allowed.

A complex and conservative system for the management of natural production forests (the TPI and now the TPTI), was established to be followed by the forest concessionaires. The TPI, a selection management system, specifies that a sufficient stock of trees should remain in each cutting block to ensure total regeneration of the forests to its pre-harvest potential, within the period of a cutting cycle.

Log exports were phased out to ensure that the people benefited more from the harvesting of their forests, through: growth and value added in the pro cessing sector, generation of income and employment, and reduced outflow of economic rent. Concessionaires were required to establish wood-based industries as part of the forestry agreement on which concessions were granted.

To permit sustainable growth of forestry as an important part of the socio-economic development, ambitious targets for industrial timber plantations were defined. In order to fund the plantation programme, a reforestation fee was imposed on every cubic meter of logs produced in the concession area.

The forestry sector contribution to economic growth was brought about by timber-based activities, i.e., harvesting and processing of the natural forest timber. The focus was on utilizing the existing resource.

Some of the recent measures to be highlighted in this connection are: an increase of reforestation fee from US$ 4 to US$ 10 per cubic meter; a performance evaluation of forest concessions and imposition of sanctions and penalties for non-compliance of regulations; the introduction of flexible and improved system of forest management; the introduction of concession rights for industrial timber estates with a duration of up to 35 years, extendable by one cutting cycle; the enactment of legislation on the Conservation of Living Resources and Their Ecosystems; and a Presidential Decree stipulating timber royalty assessment based on

measurement of logs instead of processed output, aimed at increasing processing efficiency (MOF/FAO,1991).

### 10.1.4 Nature Reserves and Past/On-Going Environment-Related Projects

The national or local governments have officially designated many areas as several kinds of conservation reserves to protect forest's hydrological function, rare flora and fauna, recreation potential and game species. The estimates of the areas and their permitted/prohibited activities are shown in Tables 10.1.13 and 10.1.14, while some features are briefly described below by province. And major past/on-going projects are listed up in Table 10.1.15.

(1) Jambi

A part of the province covers some area (about 5,900 $km^2$) of Kerinci Seblat National Park, which were declared in 1982. And two coastal reserves are located in the province: Kelompok Hutan/Bakau Pantai Timus (nature reserve) and Berbak (wildilife reserve). Both have acquired a great significance recently with the discovery that they include the breeding grounds of the rare Milky Stork (Mycteria cinerea) and comprise a vital link in the seasonal passage of waders, some very rare, in addition to mangrove and swamp forest.

(2) South Sumatra

The government is investing in a large program for forest regeneration in degraded scrub and grassland areas in the province, following declaration of Kerinci Seblat and Bukit Barisan Selatan National Parks that occupy some part of the province. Such officially gazetted nature reserves include the Terusan Dalam area for fringing mangrove conservation. Moreover, endangered species such as crocodile, scaled turtle and elephant have been bred artificially within the province.

(3) Bengkulu

Up to now, area of more than 8,500 $km^2$ has been officially gazetted as wildlife reserve, hunting park, protection forest, natural reserve and recreation park, in addition to some parts of two national parks: Kerinci Seblat and Bukit Barisan Selatan both of which were declared by the Indonesian Government in 1982.

(4) Lampung

Area of some 7,300 $km^2$ has been officially set for nature protection, of which major ones are a south part of Bukit Barisan Selatan and Way Kambas National Parks declared in 1982 and 1989 respectively. These reserved area also include marine protection area such as Krakatau to protect marine or seaward ecosystem for mangrove, coral reef, turtles and reef-linked fisheries. Indonesian government has been investing in a large programme for forest regeneration in degraded scrub and grassland areas in Lampung, as well. Since 1980 up to now, the provincial government has been resettling people from the protection forest for more than 65,000 families.

Table 10.1.13 Estimated Areas of Existing Natural Reserve and Protection Forest ($km^2$)

| Category | Jambi | S.Sumatra | Bengkulu | Lampung | Region |
|---|---|---|---|---|---|
| 1. National Park | 5,900 | 2,290 | 3,760 | 4,100 | 16,050 |
| - Kerinci Seblat | 5,900 | 2,100 | 3,100 | - | 11,100 |
| - Bukit Barisan Selatan | - | 190 | 660 | 2,800 | 3,650 |
| - Way Kambas | - | - | - | 1,300 | 1,300 |
| 2. Natural Reserve | 66 | - | 12 | 25 | 103 |
| 3. Wildlife Reserve | 1,900 | 2,209 | - | - | 4,109 |
| 4. Recreation Park | - | 1 | 135 | - | 136 |
| 5. Hunting Park | - | - | 253 | - | 253 |
| 6. Protection Forest | 1,812 | 7,747 | 4,411 | 3,234 | 17,204 |
| Total Protected Areas | 9,678 | 12,247 | 8,571 | 7,359 | 37,855 |

Main Sources for Estimation :
Priority Projects and Strategic Areas in the Province of Jambi (a special report to this study, 1991); Forest Resources and Land Use in Indonesia (MOF/FAO, 1989); Environment and Conservation Aspects of Forestry in Indonesia (MOF/FAO, 1989); and Statistik Kehutanan Bidang Perlindungan Hutan Dan Pelestarian Alam Tahun 1989/1990 (MOF, 1990)

Table 10.1.14 Activities Permitted (O) and Prohibited (X) in Different Categories of Protected Area

| Categories / Activities | National Park | Nature Reserve | Wildlife Reserve | Recreation Park | Hunting Park | Protection Forest |
|---|---|---|---|---|---|---|
| Growing food crops | X | X | X | X | X | X |
| Growing tree crops | X | X | X | O | O | O |
| Human settlement | X | X | X | X | X | X |
| Commercial logging | X | X | X | X | X | X |
| Collecting herbs & firewood | X | X | O | X | X | O |
| Hunting | X | X | X | X | O | O |
| Fishing | O | X | X | X | O | O |
| Camping | O | X | O | O | O | O |
| Scientific collecting w.permit | O | X | O | O | O | O |
| Active habitat management | O | X | O | O | O | O |
| Non-exotic introduction | O | X | O | O | O | O |
| Collecting rattan & poles w.p. | X | X | X | X | O | O |
| Mineral exploration | O | X | O | X | O | O |
| Wildlife control | O | X | O | O | O | O |
| Visitor use | O | X | O | O | O | O |
| Exotic introduction | X | X | X | O | X | O |

Source : Environment and Conservation Aspects of Forestry in Indonesia (MOF/FAO, 1989)

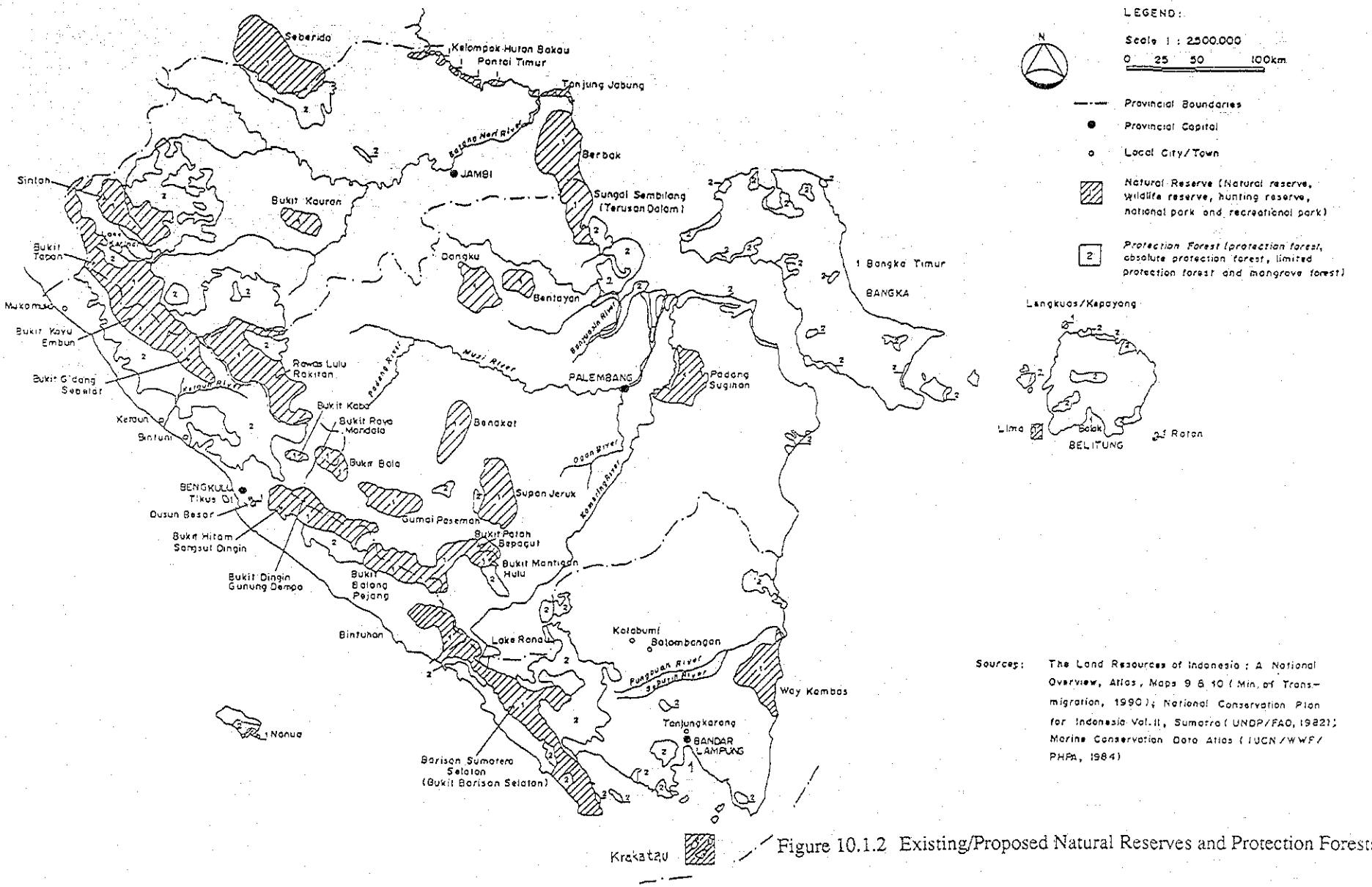



Figure 10.1.2 Existing/Proposed Natural Reserves and Protection Forests

Table 10.1.15 Major Past/On-Going Projects Related to Land Use, Forestry and Environment Sectors

| Project/Activity | | Duration | Executing/ Funding Agencies | Target Province |
|---|---|---|---|---|
| 1. | Palembang Water Supply (to improve drinking water conditions) | 1975~89 | Netherlands | S.Sumatra |
| 2. | National Parks Development (Way Kambas, Bukit Barisan Selatan and Kerinci Seblat) | 1978~ | PHPA/FAO | all four provinces |
| 3. | Reforestation Technology Center (2,100 ha; Benakat) | 1979~88 | MOF/Japan | S.Sumatra |
| 4. | Land Resource Evaluation and Planning | 1985~91 | BAKOSURTANAL/ BAPPEDA/ADB | all four provinces |
| 5. | Reforestation Development (provision of equipments) | 1985 | MOF/Japan | Lampung |
| 6. | Rural Water Supply and Sanitation | 1987~90 | UNDP/WHO | Lampung & Bengkulu |
| 7. | Integrating Wetlands Conservation with Land Use Development | 1987~91 | PHPA/AWB | S.Sumatra & Jambi |
| 8. | River Purification (PROKASIH) (Pungbuan, Septih and Musi Rivers) | 1989~ | KLH/BAPEDAL/ ADB | Lampung & S.Sumatra |
| 9. | Management of Natural Resources & Living Environment (environmental & emission standards) | 1989~93 | KLH | Lampung |
| 10. | F/S and Project Preparation for Tree Crops Development in Transmigration Areas | 1990 | GOI/FAO | S.Sumatra |
| 11. | Bandar Lampung Water Supply and Sewerage Disposal | 1991 | ADB | Lampung |
| 12. | Sustainable Mangrove and Coastal Zone Management | 1991~ | MOF/ADB | S.Sumatra Jambi and Lampung |

Sources: Development Co-operation, Indonesia, 1989 Report (UNDP, 1990); and the individual project reports.

## 10.2 FUTURE CONSERVATION INTEREST

### 10.2.1 Jambi

The province is of high conservation potential and interest, as a higher proportion of the province is still forested than the neighboring provinces. In particular, the parts of the forested Barisan range within this province spread the most extensively, have the most complete fauna found along the chain, and are the last such in the southern part of Sumatra. The Barisan range which is split by graben faults throughout its length down Sumatra is widely split in Jambi with interesting and scenic lakes and volcanoes adding to the natural features.

This area and its surroundings take about 40% of the potential for tourism from the whole province (according to the local government). Apart from such tourism value and biological significance as genetic source, the forest on the eastern slopes of the Barisan range has served important hydrological functions in protecting water supplies and controlling run-off rates. Therefore, at present but also in the future, the development of the province will not be separated from the rehabilitation, preservation and development of the Barisan range and the forest areas around it.

Another important area is the coastal tidal swamps forested with mangrove, nipah palm (Nipah fruticans) and nibong palm (Oncosperma tigillarium). The mangrove forest is growing marine life such as prawns, so that the commercial catch of prawns in offshore waters is directly proportional to the area of natural mangrove forest along the adjacent coast. Their protection also prevents land erosion and future land accretion which can measure several meters a year in the province, while the palms beneficially bring natural products such as sugar, leaf roofing material and rot-resistant poles/planks.

### 10.2.2 South Sumatra

The importance of the western mountain forests in protecting catchment areas is greater in the province than the other three provinces, because the water drains very gently through very large areas of lowland agricultural land which supports so many people. As a matter of fact, the lowlands including Palembang along the Musi, Ogan and Komering Rivers are usually as liable to flooding as the northeast coastal zone.

The extensive peat swamp forests are of very great interest biologically. The whole mangrove complex from the Banyuasin north to Sungai Sembilang covers a wide variety of saline, brackish and freshwater habitants and is little disturbed although vulnerable to various development projects. There are extensive and rapidly expanding mudflats which are important both for local fisheries and for migratory waterbirds, including the endangered Asian Dowitcher (Limnodromus semipalmatus). In addition, the lowland dipterocarp forests are among the richest in Sumatra and are distinct from those of the west coast.

Of another special interest in the province are the important ironwood forests dominated by Ulin (Euzideroxylon zwageri), which is now very much reduced due to great value and importance of the Ulin timber.

### 10.2.3 Bengkulu

This province also represents an area of distinct and high conservation importance. Although climatically and geologically similar, the vegetation communities growing on the east and west side of the Barisan range of mountains are quite distinct. Thus, the province together with a small part of Lampung constitutes the only available area for the protection of residual lowland forest on non-volcanic rocks on the west side of Barisan chain. Such forests, in general beneath an altitude of roughly 1,200 m, have an extremely diverse flora and fauna with a high proportion of rare wildlife species. In particular the province contains virtually all the known localities of the famous parasitic plant Rafflesia arnoldi, the largest flower in the world, and the Barisan range provides the sole habitat for the rare endemic Sumatra hare Nesolagus netscheri. There are also many commercially valuable timber species but scattered widely, including "meranti" (Shorea species, most of these are Dipterocarps). In addition, the province contains some very important water catchment areas, so that most of the forested slopes of the Barisan mountains should be well protected to safeguard these.

On the other hand, the islands of Enggano and Tikus as well as beaches between Mukomuko and Bintuhan have an important potential value as leatherback turtle nesting sites or as nice sea coast scenery.

### 10.2.4 Lampung

The province still contains some excellent wild habitats, and being close to the big population centers of West Java these have considerable conservation value. The most important area is the Barisan range (about 3,600 km$^2$). It skirts Lake Ranau and continues to the southern tip of Lampung, covering the typical lowland flora and fauna of southern Sumatra. In addition the forested areas play an enormously important role in water catchment and control upon which the extensive agriculture and large human population in the lowlands are very dependent.

Way Kambas area (1,300 km$^2$) in the eastern plain has long been renowned for its wildlife including elephants, tapirs, tigers, sunbears, deer, six species of monkeys, wild dogs, crocodiles, gharials and about 200 species of birds, one of which is the rare and endangered White-winged Wood Duck, Cairina scutulata. So, this area has good potential for viewing large game, could be developed further for visitor use as well as primatological field studies, and could also be used as a release area for additional elephants and even Javan rhinoceros.

It is very important therefore that these higher or wildlife areas are maintained as at least protection forests for such environmental reasons as protection of rare fauna and flora (biological diversity), hydrological protection and visitor potential.

## 10.3 FORESTRY DEVELOPMENT CENCEPT

Based on assumptions regarding factors influencing the future demand and supply, scenarios of outlook for the future developed by MOF/FAO are introduced and applied to the 4 provinces targeted in this study.

### 10.3.1 Demand Outlook

Outlook for domestic consumption of sawnwood, wood-based panels, paper and other forest products were projected by MOF/FAO for four different scenarios: high, base, low and market. The base projection was made considering the relationship between GDP and consumption level for the commodity, reflected in income elasticities. The high and low scenarios assume a deviation of plus and minus 25 percent respectively from the projected average GDP growth rate. The market scenario shows a level at which markets clear, that is, demand and supply are fully balanced through the operation of market mechanism and price movements. In this study only the base scenario was taken because provincial data necessary for the other scenarios were not fully available.

By adding the volumes projected for regional consumption, a measure of total demand is obtained (Table 10.3.1). The base demand indicates an average and feasible situation. Under the base scenario, total industrial wood demand could increase to 1.6 million cubic meters by 1995 and to 6.6 million cubic meters by 2030.

Table 10.3.1 Total Potential Industrial Wood Demand in the Region Based on Base Scenario

('000 cubic meters)

| Province | 1990 | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|---|
| Jambi | 134 | 159 | 225 | 332 | 701 |
| South Sumatra | 701 | 901 | 1,173 | 1,733 | 3,650 |
| Bengkulu | 50 | 63 | 82 | 121 | 256 |
| Lampung | 392 | 505 | 657 | 971 | 2,045 |
| Total | 1,277 | 1,628 | 2,137 | 3,157 | 6,652 |

Source: Supply-Demand Projections for the Indonesian Forestry Sector, MOF/FAO 1990.

Fuelwood consumption requirement was likewise projected (Table 10.3.2). The projection of fuelwood requirement indicates a slower growth rate than assumed economic growth, reflecting the increasing use of other energy sources. Total wood requirement under the base scenario is given in Table 10.3.3.

Table 10.3.2 Regional Fuelwood Demand

('000 cubic meters)

| Province | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|
| Jambi | 1,522 | 1,607 | 1,775 | 2,165 |
| South Sumatra | 4,461 | 4,708 | 5,201 | 6,344 |
| Bengkulu | 855 | 903 | 997 | 1,217 |
| Lampung | 5,758 | 6,077 | 6,713 | 8,189 |
| Total | 12,596 | 13,295 | 14,686 | 17,915 |

Sources: Supply-Demand Projections for the Indonesian Forestry Sector, MOF/FAO, 1990; and Forestry Studies Indonesia: Project Findings and Recommendations, FAO, 1991.

Table 10.3.3 Summary of Demand Scenario for Industrial Wood and Fuelwood of the Region

(million cubic meters)

| | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|
| Domestic Fuelwood Demand | 12.6 | 13.3 | 14.7 | 17.9 |
| Total Industrial Demand | 1.6 | 2.1 | 3.2 | 6.7 |
| Total Wood Demand | 14.2 | 15.4 | 17.9 | 24.6 |

## 10.3.2 Supply Outlook

Wood supply outlook will be influenced by deforestation and land-use changes affecting the area of production forest, development of forest plantations, production gains through improved technology and efficiency, availability of wood form non-forest sources and other factors.

Natural forest cover outlook: Natural forest cover outlook based on projections indicates that it can be expected to decline in the Region from the present estimated area of 3.9 million hectares to about 2.4 million hectares by 2030. For the purpose of projecting timber supply, only conversion and production forests with management potential are considered. It is assumed further that deforestation or land-use changes will hardly affect the conservation and protection forests (Table 10.3.4).

Table 10.3.4 Projection of Total Natural Forest Land: 1990 - 2030

($km^2$)

| Province | 1990 | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|---|
| Jambi | 16,029 | 14,729 | 13,878 | 12,462 | 10,129 |
| South Sumatra | 19,099 | 17,448 | 16,312 | 14,470 | 11,518 |
| Bengkulu | 2,636 | 2,399 | 2,276 | 2,080 | 1,759 |
| Lampung | 783 | 559 | 473 | 356 | 211 |
| Total | 38,547 | 35,135 | 33,239 | 29,368 | 23,617 |

Source: Supply-Demand Projections for the Indonesian Forestry Sector, MOF/FAO, 1990.

Outlook of forest plantations: There are different types of forest plantations established for different purposes and with different objectives, e.g. reforestation/rehabilitation plantations are now established with objectives other than timber production. Although these plantations can contribute to timber supply, they are left out of the supply outlook. Others,

such as those established under the HTI (Industrial Timber Estate) programme are single-use industrial plantations. The total effective extent of timber production plantations as of 1990 is about 20,230 hectares (Table.10.3.5).

Based on past experience and with a view to established high quality and high production plantations, a plantation model has been developed which will result in increase of area under industrial plantations as given in Table 10.3.5. The MOF/FAO's model incorporates assumptions regarding species combinations, rotation period, recoverable yields in terms of saw-veneer logs, smallwood, pulpwood, etc.

Table 10.3.5 Outlook for Industrial Forest Plantations

(ha)

| Province | 1990 | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|---|
| Jambi | 4,910 | 21,960 | 42,310 | 114,250 | 407,620 |
| South Sumatra | 1,550 | 9,300 | 18,550 | 51,250 | 184,600 |
| Bengkulu | 8,680 | 52,080 | 103,880 | 287,000 | 1,033,760 |
| Lampung | 5,090 | 19,040 | 35,690 | 94,550 | 334,580 |
| Total | 20,230 | 102,380 | 200,430 | 547,050 | 1,960,560 |

Source:Supply-Demand Projections for the Indonesian Forestry Sector, MOF/FAO,1990

Other sources: Production and conversion forests as well as industrial plantations are the traditional supply sources that have received most of the government's attention in the past. Other potential sources of wood supply which need to be tapped are estate crops (mainly rubber, coconut and oil palm) and home gardens.

Based on assumption regarding: production forests and plantation areas, their intensity of management and productivity, yield per unit area for various categories of forests under different treatments, availability of non-forest sources of wood and other factors influencing wood supply, three scenarios were developed by FAO/MOF, namely optimistic, base and non-development.

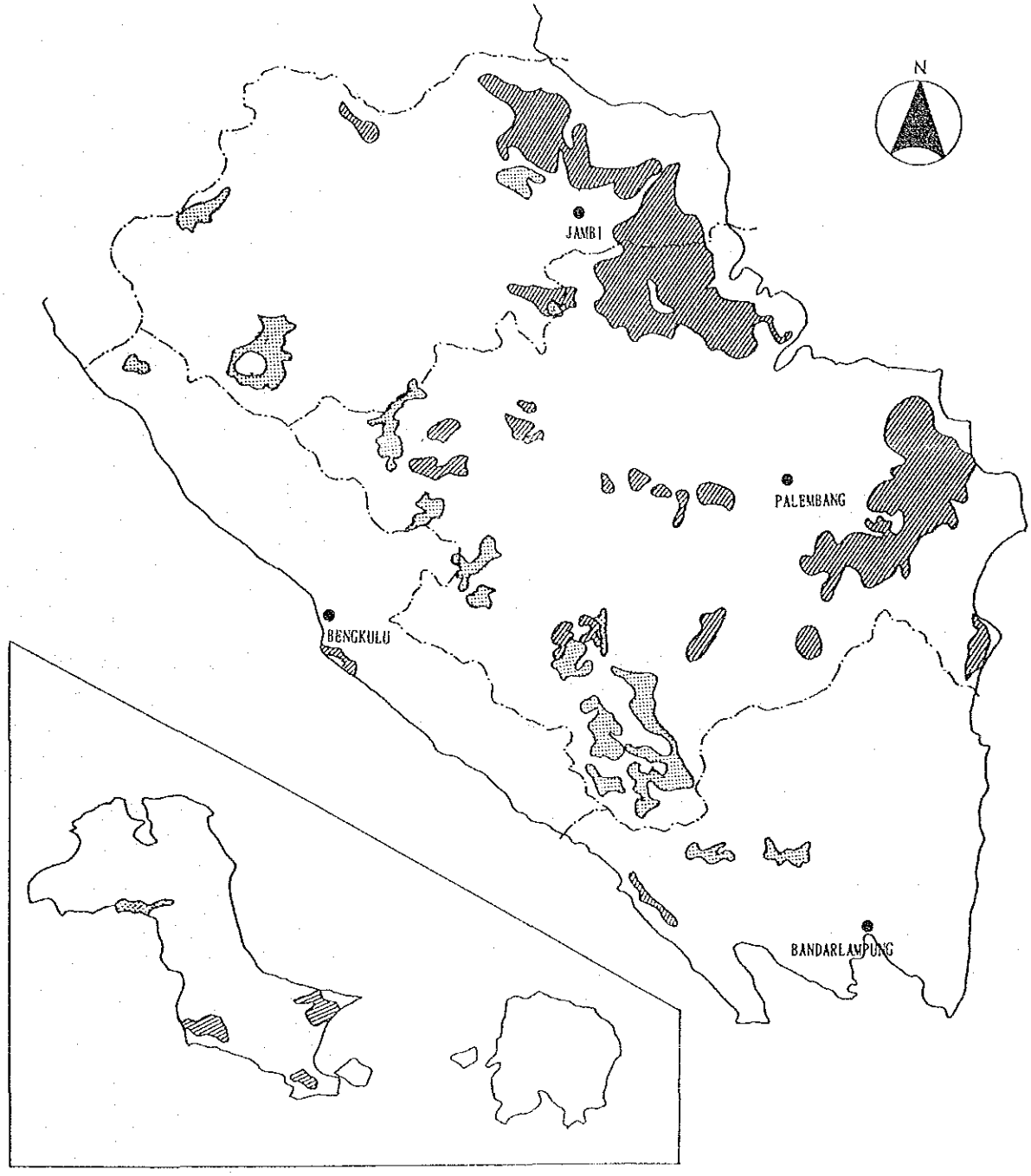
The base scenario incorporates productivity gains in natural forests, the plantation programme discussed above and utilization of estate crops and home-garden's timber. `This base scenario provides a medium estimate of potential industrial wood supply.

The optimistic development scenario incorporates all the assumption of the base scenario but has a slightly more ambitious reforestation programme in terms of area with substantially higher yields, to be realized sooner with very intensive management of forest plantations.

The non-development scenario ignores development. `It reflects a policy of no active interventions in the sector, no improvement in forest management, no productivity gains, no HTI plantations and no industrial utilization of estate crops and home-garden's timber.

The optimistic and non-development scenarios represent the upper and lower bounds on industrial wood supply in the future, reflecting various degrees of investment in the sector and various types of projects that are to be implemented.` Since the base scenario reflects the most likely outcome and the other two scenarios don't provide data by province, only the base scenario is taken here as outlook of the supply side.

In the base scenario the total supply from the Region would amount to about 3.6 million cubic meters by the year 1995 and to about 16.5 million cubic meters by the year 2030. Break-down by component supply sources is given in Table 10.3.6. (Figures 10.3.1 and 10.3.2 for location. Comparing with Figure 10.3.1, these Figures of suggested zoning roughly imply that the reduced sources from production forests will be compensated with supply from tree crops or home gardens in the future.)




LEGEND :

Fixed production forest

Limited production forest

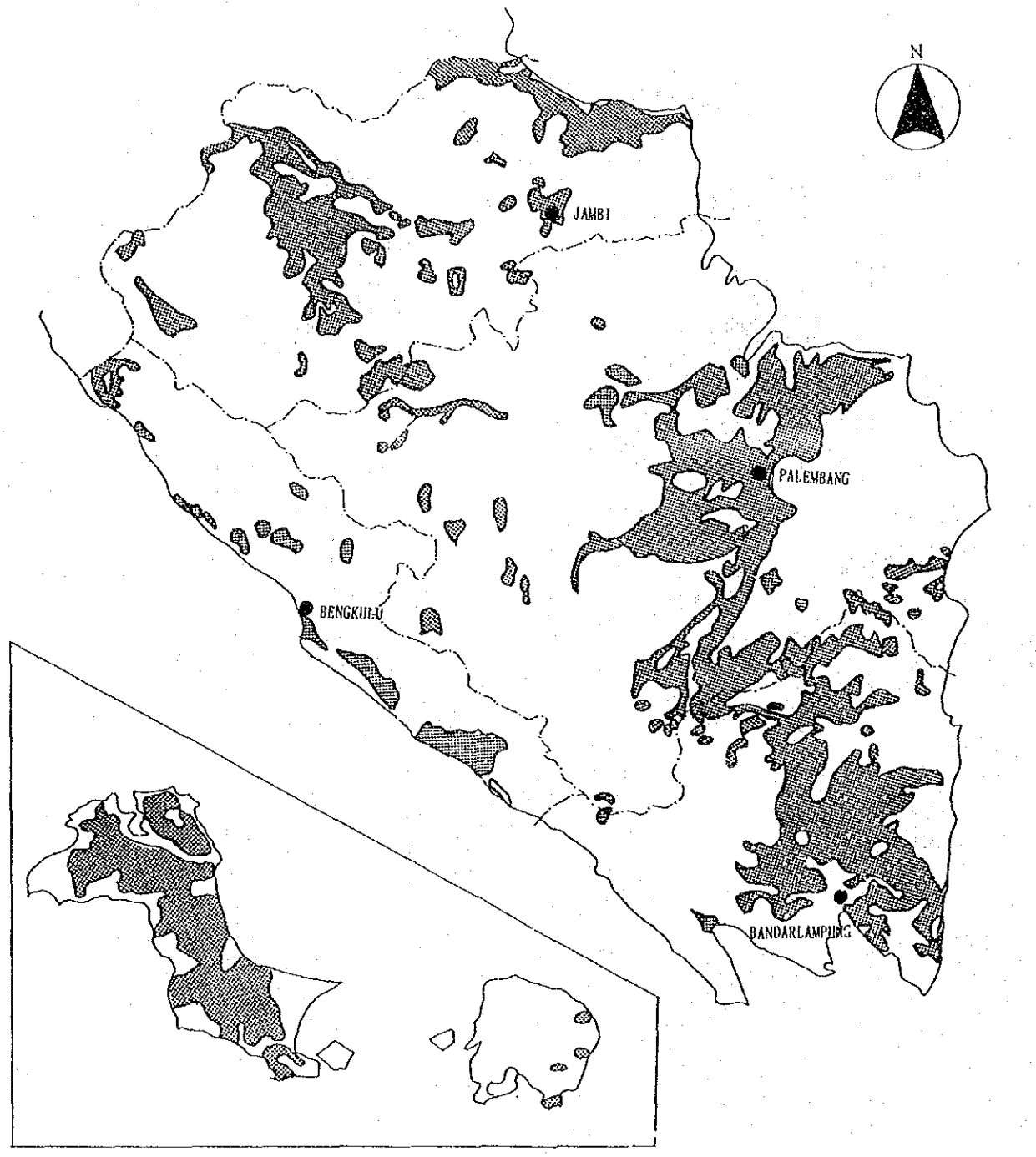
Provincial border

SCALE

0 25 50 75 100 km

SOURCE: Land Resources of Indonesia, A National Overview: Atlas, Min. of Transmigration, 1990

Figure 10.3.1 Suggested Zoning of Production Forest: TGHK




LEGEND :

Tree-crops and home-gardens

Provincial border

SCALE

0 25 50 75 100 km

SOURCE:Land Resources of Indonesia, A National Overview:Atlas, Min. of Transmigration, 1990

Figure 10.3.2 Suggested Zoning of Tree-Crops and Home-Gardens: TGHK

Table 10.3.6 Total Potential Industrial Wood Supply in the Region by Source and Province of Base Scenario

(cubic meters)

| SOURCE | 1990 | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|---|
| Jambi | 1,463,387 | 1,483,311 | 1,368,707 | 2,069,146 | 4,422,748 |
| Natural | 455,375 | 444,274 | 443,251 | 408,705 | 353,406 |
| Conversion | 383,400 | 311,400 | 86,400 | 68,400 | 0 |
| Plantations | 8,838 | 8,838 | 8,039 | 491,275 | 2,119,624 |
| Estate crops | 603,602 | 706,627 | 818,845 | 1,088,594 | 1,937,546 |
| Home gardens | 12,172 | 12,172 | 12,172 | 12,172 | 12,172 |
| South Sumatra | 1,622,963 | 1,640,790 | 1,591,594 | 2,006,526 | 3,433,904 |
| Natural | 709,218 | 666,315 | 640,534 | 579,137 | 472,906 |
| Conversion | 237,600 | 192,600 | 54,000 | 41,400 | 0 |
| Plantations | 2,790 | 2,,790 | 3,525 | 220,375 | 959,920 |
| Estate crops | 647,719 | 753,449 | 867,899 | 1,139,978 | 1,975,442 |
| Home gardens | 25,636 | 25,636 | 25,636 | 25,636 | 25,636 |
| Bengkulu | 198,286 | 202,022 | 175,406 | 1,430,314 | 6,010,573 |
| Natural | 0 | 0 | 0 | 0 | 0 |
| Conversion | 886,400 | 70,200 | 19,800 | 16,200 | 0 |
| Plantations | 15,624 | 15,624 | 19,737 | 1,234,100 | 5,375,552 |
| Estate crops | 91,039 | 110,975 | 130,646 | 174,791 | 314,900 |
| Home gardens | 5,223 | 5,223 | 5,223 | 5,223 | 5,223 |
| Lampung | 278,305 | 311,243 | 355,858 | 880,796 | 2,661,042 |
| Natural | 41,150 | 28,966 | 24,456 | 18,297 | 10,989 |
| Conversion | 0 | 0 | 0 | 0 | 0 |
| Plantations | 9,162 | 9,162 | 6,781 | 406,565 | 1,739,816 |
| Estate crops | 219,631 | 264,753 | 316,259 | 447,572 | 901,875 |
| Home gardens | 8,362 | 8,362 | 8,362 | 8,362 | 8,362 |
| Total | 3,562,941 | 3,637,366 | 3,491,565 | 6,386,782 | 16,528,267 |

Source: Supply-Demand Projections for the Indonesian Forestry Sector, MOF/FAO, 1990.

Regarding fuelwood supply, it is assumed that resulting from promotion of home gardens, residues from estate tree crops, etc. some 18 million cubic meters of fuelwood would be available from non-forest sources (Table 10.3.7). This estimation is based on some calculated ratio to the national fuelwood supply of 120 million cubic meters, due to lack of direct provincial data.

Table 10.3.7 Estimation of Fuelwood Supply from Non-Forest Sources

('000 $m^3$)

| Province | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|
| Jambi | 7,200 | 7,200 | 7,200 | 7,200 |
| South Sumatra | 7,200 | 7,200 | 7,200 | 7,200 |
| Bengkulu | 1,200 | 1,200 | 1,200 | 1,200 |
| Lampung | 2,400 | 2,400 | 2,400 | 2,400 |
| Region | 18,000 | 18,000 | 18,000 | 18,000 |

Sources: Table 10.3.6 and Supply-Demand Projections for the Indonesian Forestry Sector, MOF/FAO, 1990.

### 10.3.3 Outlook of Material Balance

Forest planners typically develop projections of demand and supply of forest products through the so-called gap or balance models. Gap models compare a projection of industrial wood (or other forest product) supply, with projection of industrial wood (or other forest product) requirements. If projected supply exceeds projected demand, then harvest rates can be reduced. Alternatively, consumption or exports can be increased. If requirements

exceed supply, imports may be needed or exports may have to be reduced. Alternatively the gap may be closed through increased plantation activities, by depleting the natural forest stock faster, or by other means. The gap will also indicate the behavior of prices, facilitating a balance of demand and supply.

The demand and supply outlooks shown in the earlier section are compared in Table 10.3.8 to identify surplus/deficit situations. The industrial wood surplus could be 2 million cubic meters in 1995 increasing to 9.8 million cubic meters by 2030. A surplus indicates export opportunities. It also indicates the development programme for wood production could be slowed down, if these predictions are truly appropriate.

Table 10.3.8 Comparison of Demand and Supply Scenario for Industrial Wood of the Region

(million cubic meters)

| | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|
| Regional Industrial Demand | 1.6 | 2.1 | 3.2 | 6.7 |
| Total Industrial Supply | 3.6 | 3.5 | 6.4 | 16.5 |
| Total Industrial Supply excluding Estate Crops and Home Gardens | 1.8 | 1.3 | 3.5 | 11.3 |
| Surplus/Deficit | 2.0 | 1.4 | 3.2 | 9.8 |
| Surplus/Deficit excluding Estate Crops and Home Gardens | 0.2 | -0.8 | 0.3 | 4.6 |

Industrial wood from estate crops and home gardens was included in the supply scenario discussed above. There is, however, no data on present utilization patterns of estate crops and home-garden's wood. It may be that such wood is already fully utilized, partially as industrial wood and partially as fuelwood. In that case the measure of total demand is biased downwards (that is, it underestimates true demand because it ignores consumption of wood of estate crops); and estate-crop's supply cannot be considered available in the projections. When wood from estate crops and home gardens are ignored, industrial wood surplus decreases.

Table 10.3.9 repeats the materials balance analysis for both fuelwood and industrial wood. The results indicate a wood surplus increasing from 7.4 million cubic meters in 1995 to 9.9 million cubic meters in 2030.

Table 10.3.9 Comparison of Demand and Supply Scenario for Industrial Wood and Fuelwood

(million cubic meters)

| | 1995 | 2000 | 2010 | 2030 |
|---|---|---|---|---|
| Regional fuelwood demand | 12.6 | 13.3 | 14.7 | 17.9 |
| Total industrial wood demand | 1.6 | 2.1 | 3.2 | 6.7 |
| Total wood demand | 14.2 | 15.4 | 17.9 | 24.6 |
| Fuelwood supply from Non - forest sources | 18.0 | 18.0 | 18.0 | 18.0 |
| Total industrial wood supply | 3.6 | 3.5 | 6.4 | 16.5 |
| Total wood supply | 21.6 | 21.5 | 24.4 | 34.5 |
| Total wood surplus/deficit | 7.4 | 6.1 | 6.5 | 9.9 |

Projections of surplus or deficits are useful for planning. However, surpluses or deficits in supply do not actually occur. Markets must clear, that is, demand must equal supply; and for that to happen, some variables will be adjusted by market forces. In the case of a surplus, demand will have to increase and supply to decline.

### 10.3.4 Implications of the Outlook

The analysis given in the earlier section indicates that as a result of growth in population and income, the outlook of the forestry sector in 2030 compared to the present will be characterized by a 2 to 4 fold increase in industrial wood demand for the regional consumption; an increase of about 30 percent in the demand for fuelwood; a reduction of some 39 percent in the total area under natural forests and natural production forest; some 25 to 35 percent fall in the industrial wood supply from natural forests; and a potential to generate wood supply of 0.04 to 10 million cubic meters from forest plantations and an additional 3.4 million cubic meters from estate crops and home gardens.

Among the scenarios of demand and supply discussed, the base scenario represents the most likely outlook. For a better appreciation of the range of situations and feasible actions, it will be useful to compare the implication - economic, social and environmental - of the non-development (causing declining supply) and optimistic scenarios of wood demand and supply.

For want of statistical information for NTFP (Non-Timber Forest Products), specific outlook scenarios were not developed. Development of NTFP is, however, linked to the management of forests and can be integrated as a complementary activity with timber stand management. Consideration has been given to this while analyzing the implications of the scenarios.

The implications of the outlook scenarios can be examined with reference to their impact on employment, income, government revenue, trade, operational efficiency, community welfare and environmental conservation, as follows:

Employment: Forestry and forest industry activities have considerable employment multiplier effect. The scenarios assume opportunities for increasing availability of wood raw material through establishment of forest plantations, and developing non-forest sources of wood. It would result in increasing employment in wood-land management, wood production and processing. For example, extension of pulpwood plantations can support emergence of pulp and paper industry as a dominant wood-based processing activity. Paper industry has an employment multiplier of about two (GOI/FAO,1991). Reduced pressure on natural forests for timber would facilitate development of NTFP, which will provide added employment. Programmes of forest plantations can also be extended to include NTFP such as sago, rattan and sandalwood.

Income and trade: An expanded forest sector activity as reflected in the scenario will support significant increase in incomes, locally. In the most likely situation of base supply and demand, the general indication is that the Region could shift considerable supply from regional markets to international and domestic markets.

Operational efficiency: In the interest of efficiency, both in wood production and processing, it is necessary to aim at the base supply scenario at least, for providing adequate incentive in the form of profit for improved utilization. Improved conversion ratio often will have to be achieved through appropriate changes in raw material pricing.

Environmental conservation: The base scenarios assume improved forest management and investment on industrial timber plantations. These measures will favorably influence environmental contributions and improve the environmental services of the forests. High yielding tree plantations have special advantages because of their environmental and economic contributions. Reasonably good and suitable land should be allocated for industrial (production) plantations. Such land, for clear felling and planting, can be found in areas classified as conversion forests and some of the degraded production forests. Some alang-alang also occur in good land, and these will be suitable for raising plantations.

## 10.4 MAJOR ENVIRONMENTAL ISSUES BY PROVINCE

### 10.4.1 Jambi

The Kerinci valley is well populated (about 250,000 inhabitants) and has 14,000 families to be settled out of the reserve area. A solution must be found to their uncontrolled expansion with clear-cutting (cleared expansion from 110 $km^2$, 1985 to some 500 $km^2$, 1990) further up the steep hills of the valley, which are vital not only to the success of the nature reservation but also to welfare of the human population there. Shortages of fuel and water are already experienced and the water level of the Kerinci Lake drops gradually year by year: a sure sign that man is exceeding the land capability with his current land uses. Besides, some kinds of the protected animals such as deer and crocodile have decreased their population due to hunting activity.

The mangrove has been degraded partially by early settlements of Bugis who also drain the swamps with the parit (local ditch) system. Moreover, logging directly behind mangroves has changed the levels of water run-off and sedimentation, which result in killing of the mangroves and are accelerated by numerous unlicensed and illegal sawmills operating in the province.

Several negative impacts that stem from such forest-cutting, without successful control or expedients, give rise to problems of flooding, landslides and damage to cultivated areas (paddy and horticultural lands of about 5,938 ha) as well as numerous natural species that affect the livelihood and development not only in these limited areas but also in the whole province.

### 10.4.2 South Sumatra

The province had been generally rich in wildlife with all the typical large game of Sumatra, and its forests are the home of countless invertebrates and numerous animal species. But, recently, the forests have been so heavily cleared that its fauna and flora such as Ulin and elephants are becoming rare through loss of their habitat and that the chances of preserving any extensive tracts are small. For example, more than 39 illegal sawmills are operating on the Padang and Sugihan Rivers, and an estimated 2.2 million $m^3$ of logs are taken illegally each year around the both rivers with a large cover of swamp forest, seriously affecting the ability of the forest to regenerate.

Apart from illegal logging, transmigration and encroaching cultivation are another threats to nature conservation. These are obvious in Bentayan (193 $km^2$), Dangkau (291 $km^2$) and Benakat (300 $km^2$) which are all particularly important areas of valuable forest as well as potential game animals. There are some similar threats in the islands of Bangka and Belitung that are probably in short supply of local timber for general construction. It is that there is little control of forest protection, and that some development plans don't take into account important habitat for fauna and flora.

Another environmental issue of the province, most oil producing and industrialized of the region, is the increasing liquid, gaseous and solid waste. In addition to oil refining and oil-related chemical industry, middle- or large-scaled factories have been rapidly established for manufacturing of pulp, textile, food, etc. Some of these factories don't have enough facilities for their waste treatment and pollute water and air. The Musi River which is an important water resource is an obvious example of water pollution due to wasted organic matters.

### 10.4.3 Bengkulu

Most areas of the province are liable to flooding and landslides which cause seasonal crop damage in most alluvial tracts, and the province doesn't have sufficient arable wetland or dryland. So considerable pressure is exerted by cultivators on excessively steep land for subsistence crops. This has resulted in habitat destruction, accelerating soil erosion and serious increase in flooding downstream in cooperation with seasonal heavy rainfall. For instance, the Ketahun River catchment is identified as containing degraded land both inside and outside of forest areas which require reforestation, exceeding 1,000 $km^2$.

Threats other than such agricultural encroachment to the officially protected areas of conservation interest, especially to forests, are overhunting (as the province is called "Sumatra's Hunting State", timber stealing (e.g. rattan collection) and shifting cultivation. One of the miserable result due to these threats has been some loss of the localities of Rafflesia arnoldi and Surat Keputusan because they were not mapped, marked or guarded well enough. Moreover, it will be difficult for local people to recognize and respect the protected land since the boundaries for them do not entirely follow clear topographical features. The province will need more guards to manage and protect these important areas, and adequate training facilities for these recruitments will be necessary.

While there exists no serious public nuisance at present, some future potential of water pollution due to coal/gold mining as well as deforestation, and solid waste disposal treatment problems in the urban has been reported.

### 10.4.4 Lampung

The province has been closed for large-scale transmigration for more than ten years. But, serious and widespread damage to forest has been still caused by illegal felling and cultivation of excessively steep land in the high hills in the west as a pressure from spontaneous transmigrants. As a result, severe floods have occurred in south Lampung. Now the spontaneous settlers of these areas are finding land elsewhere in the province. As the population growth is too high, such a condition of land conflicts that people are going to the sloping areas as well as to the protection forests to open up land for agriculture, is expected to continue. At the moment it is recorded that still 20,000 families stay in the protection forests.

In Way Kambas area, there are still some poaching, uncontrolled influx of spontaneous transmigrates and small scale operators removing logs by rafting them down the rivers to the coast, although official logging has ceased there. Lampung has thus faced serious threats to areas of conservation interest from the uncontrolled legal or illegal activities of logging, hunting, road construction and shifting cultivation.

Water pollution of the rivers is the most serious problem in the urban areas, and the major polluters are the existing tapioca/palm oil processing factories and mining. Among the polluted rivers, the Pungbuan River is especially important as water resource.

## 10.5 STRATEGY FOR SUSTAINABLE DEVELOPMENT

The analysis of implication of the scenario (Section 10.3.4) indicates the opportunities for forestry development in the Region and the interventions needed to realize the opportunities. It is the premise that the Region will initially aim to realize the base supply scenario in combination with base demand scenario after suitable adjustments in supply. Strategies and programmes are designed for assumptions inherent in these base scenarios.

The realization of the opportunities and sustainable forest management by solving some issues pre-supposes: appropriate policies, adequate availability of skills and human resources development, adequate resources for research and technology development, institutional support, and a viable investment programme, in addition to the following strategic options against the issues.

### 10.5.1 Forest Inventory and Land-Use Planning

It is essential that land-use allocations be made for defined purposes -- e.g. conservation, forest production, soil protection, agricultural development, etc. based on reliable and detailed inventories and field studies. Detailed inventory is also required for proper land-use planning. The conceptual basis of the present TGHK land allocation is rational, but it does not represent the situation in the field. As a result, lands are being put to wrong uses in some cases. Lack of reliable maps and demarcation of boundaries are important constraints. In order to counter and improve the situation, the following strategies are therefore recommended:

1) The forest land classification criteria be reviewed.
2) The existing land-use maps be suitably modified.
3) Functional land-use allocation be properly delineated on the ground with least delay.
4) Forest resource inventory be strengthened and institutionalized.
5) Adequate measures be taken to control deforestation and inappropriate land-use changes.

### 10.5.2 Incentives and Controls in Natural Forest Management

Sustainability of the multiple functions in the natural forests is more complex than sustainability of wood production in man-made forests. The natural forests set aside for timber production also have to provide environmental services. Thus, the silvicultural systems, cutting cycle, logging methods and harvesting of non-timber forest products have to be carefully designed. Institutionally, private sector concessionaires are responsible, under supervision of the Ministry of Forestry, for forest management in the Region. Efficient, sustainable forest management is often a function of proper and controlled incentives. Security and continuity of tenure and performance-linked rewards can serve as effective incentives for sustainable forest management.

The comparatively low level of charges on natural forest timber, inadequate data on growth and yield and other management information, insufficient enforcement of management controls and regulations, inadequate participation of local communities are some of the constraints to be addressed. Strategic options in this connection include:

1) The forest concessions and other production unit be managed under a comprehensive scientifically prepared management plan.
2) The tenure of concession be made continuous, conditional to satisfactory performance of management obligations.
3) The annual allowable cut be regulated under a system of area control, rather than volume control.
4) An area based annual concession fee/premium be introduced to capture the value of quality differentials between areas and of assured long term supply.
5) A system of rebate or defraying of costs against the expenditure involved in preparation of management plans, silvicultural operations, etc. be introduced, if these activities are required to be carried out by the concessionaires.
6) Provision of adequate rights and privileges for the forest-dwelling communities.

### 10.5.3 Residue Reduction and Improved Utilization

Another issue related to sustainable management is the large amount of residues left in the forest, amounting to over 40 percent of the total utilizable volume involved (MOF/FAO,1991). This results from removing only high value/high quality logs for profit maximizing. This issue is all the more relevant in view of the need to use resources efficiently

for ensuring its sustainability. Logging practices (including salvage logging) are designed to promote fuller utilization of both the well-known and lesser-known species, as follows:

1) Alternate panel products, which can be produced from logging and process residues, and small dimensioned materials be promoted for waste-free of resources and to meet domestic demand for panels.
2) Logging systems and practices be made more efficient to reduce logging damages and wastages.
3) The concessionaires be required to prepare a residue utilization plan and implement it.

### 10.5.4 Forest Plantations

In view of the growth in demand for wood products, brought about by the increase in population and income (and in order to conserve natural forests), it is necessary to find alternative sources of wood raw material, to meet the needs of industry and the local population. Industrial forest plantations (and also fuelwood plantations and wood-lots, agro-forestry plots, home gardens, and estate crops) can provide additional supply and help to reduce pressure on natural forests.

Plantations can be grown in secondary forests, in some types of degraded lands, or on bare lands, to meet national and local needs, and also to increase the percentage of land under forest cover. With proper protection, plantations can develop sufficient natural undergrowth and set in motion a process of ecological progression. Forest plantations are an important factor in ensuring sustainable forest development.

There are a number of constraints in this regard such as: need for increased planning and managerial inputs; heavy investment needs; intensive activities requiring special skills in areas related to seed technology, nursery development, species trials, tree improvement, etc; low profitability (especially if timber/wood is to be sold at rates comparable to the low royalty of natural forest timber) and so on. These constraints can however be removed with effort and/or investment, including:

1) A master plan for forest plantations be prepared, as a priority, indicating the location, extent, species, markets, etc. for future plantation development and specifying areas of existing plantations requiring rehabilitation.
2) Private sector investment in plantation development be promoted, and community participation encouraged, through provision of adequate incentives.
3) Emphasis be placed on quality and productivity per unit area of plantation, rather than on increasing of area per se.
4) The policy of pricing of logs and other products be reviewed and revised for increasing price realistic for plantation logs, and to improve profitability of forest plantation ventures.
5) Measures such as interplanting and underplanting with valuable crops be tried in forest plantations, to provide intermediate yields, to improve the rate of return on investments.
6) Silvicultural practices be refined and improved for increased sustainable yields from natural forests of both timber and non-timber forest products.

### 10.5.5 Efficiency in Forest-Based Processing and Trade

Constraints related to forest-based processing, marketing and trade include lack of adequate product research, market research and extention, lack of adequate skills, and inadequate intersectoral co-ordination (i.e., with industry and trade). Promotion of small-scale industries is an aspect deserving special consideration. The strategic counter-measures include:

1) The structure of forest-based industries, in terms of type of product, size of processing units, nature of integration, and regional spread be reviewed and modified, to reflect changes in raw material and market situations; the process of such developments be undertaken on the basis of a national master plan.
2) Forest-based processing industry be diversified for efficiency in resource utilization and other economic advantages.
3) Forest-based small scale enterprises be promoted for its socio-economic roles and for supporting rural development.
4) Adjustments be made in process technology for utilizing raw material of differing quality and properties such as second growth timber from natural forests, plantation grown timber, and timber from non-traditional/non-forest sources.
5) Utilization of lesser known species of natural forests be promoted for producing quality products with a view to improve the commercial value of natural forest resources.
6) Allocation of well known commercial tree species for export and domestic uses be rationalized for maximizing economic benefits, and product substitution be encouraged in domestic market.
7) The policy in support of downstream-processing for increased retained value and other benefits for the country be revamped through improved standards of quality control, niche marketing, improved marketing services, and efficient distribution network.
8) The use of trade policy instruments such as bans and taxes be regularly reviewed and modified to see that it does not result in undue protection, leading to inefficiency.
9) Adequate investment be ensured to develop required skills/capabilities and R & D in support of efficient forest resource utilization, and co-ordination be ensured among forestry, industry, trade and human resources sectors.

### 10.5.6 Environmental Conservation

All aspects of forest management discussed here have varying degrees of direct or indirect influences on the environment. Neglect of management specifications, in addition to a host of other factors such as expansion of agriculture, shifting cultivation and lack of land-use planning, can lead to environmental degradation. Nature has limits of tolerance, and care is needed to see that the limit is not exceeded. Conservation of biodiversity and the protection of wildlife and wilderness areas require a critical mass of forests with a minimum of disturbance. Accordingly, it is necessary to establish and manage an adequate extent of protected areas.

Forest and environmental conservation relies considerably on communities depending on forests for employment, income and essential goods and services. If the communities do not perceive any direct benefit in forest conservation, and if in spite of forest conservation their poverty is perpetuated, then it will be practically impossible to protect and conserve forest resources.

Benefits of forest protection, watershed management and environmental conservation are difficult to quantify using conventional economic analysis. An issue often raised is: who should pay the bill for environmental conservation?. "The pollutor pays" argument often takes the responsibility outside national boundaries; and this is especially true in respect of tropical forests.

Constraints to environmental conservation include poverty and economic backwardness, lack of awareness, short-term perspective of business operators, and the difficulty of quantifying costs and benefits. In spite of this, there is general acceptance that environmental conservation is important and should be an imperative of policies. The following strategies should therefore be considered:

1) Adequate attention and investment be directed towards effective management and control of the protected area system; special emphasis be placed on maintenance of bio-diversity, wildlife conservation, and protection of the integrity of the different types of reserves.
2) Buffer zones be developed around National Parks and vulnerable reserves, with involvement and participation of the local community.
3) Income earning activities, which are environmentally least damaging, such as eco-tourism, wildlife farming and sustainable utilization of genetic materials be promoted; and plans be made immediately to initiate such activities on a pilot scale, to be replicated in other suitable areas.
4) A system of forest resource accounting be established, as a measure of environmental monitoring to achieve national development and conservation objectives.
5) Safe minimum standards of environmental conservation be established for different ecosystems, to be applied while evaluating the feasibility of investment projects.

### 10.5.7 Welfare of Forest Communities

The welfare of the forest-dwelling and forest-dependant communities should be assured if they are to have the necessary incentives to support sustainable forest management. Depending upon the situation, forest communities can participate in various capacities and ways in forest management, forest plantation development, and the harvesting and processing of non-timber forest products.

A group of communities requiring increased attention is the shifting cultivators. Shifting cultivation in Indonesia can be categorized in several ways depending on various factors. Such categorization based on practical criteria is essential to design measures for rationalizing the practise and to sedentarise the community as far as it is socially and culturally acceptable. So some of the strategic approaches are:

1) Social contributions of forestry such as provision of employment and off-farm income, development of rural infrastructure, supply of fuelwood and other products of daily use, and support for agricultural development be enhanced through adequate investment and appropriate programmes.
2) Programmes of social forestry and participatory forestry be suitably designed to address the community needs related to social welfare and economic development.
3) The current practice of shifting cultivation be rationalized through programmes capable of addressing all aspects of the problems being faced by the shifting cultivators; efforts be made to fully rationalize shifting cultivation within a period of 10 to 15 years through *in-situ* and *ex-situ* programmes, as appropriate.
4) Social research relevant to forestry be carried out to provide information necessary to design programmes and activities contributing to local and regional development.

# Part 2 Communities

## KESIMPULAN HASIL PENELITIAN SOSIAL-BUDAYA

### Program Penelitian Sosial-Budaya

Adalah empat Universitas yang turut ambil bagian program penelitian sosial-budaya, yaitu Universitas Jambi; Universitas Sriwijaya, di Palembang; Universitas Bengkulu; dan Universitas Lampung.

Topik-topik penelitian seperti berikut: lembaga-lembaga sosial dan proses perencanaan di tingkat desa; masyarakat, penggunaan tanah dan lingkungan; dan sumber daya manusia. Pada umumnya, para peserta penelitian itu turun kelapangan di setiap propinsi bulan Januari 1992 sampai bulan Mei 1992.

### Tujuan Penelitian Sosial Budaya

Dalam rangka mempersiapkan Rencana Terpadu Daerah Sumatera Bagian Selatan, sasaran program penelitian sosial-budaya sebagai berikut:

* pengembangan sumber-sumber data tentang aspek-aspek sosial-budaya melalui penelitian yang lebih terperinci

* mempergunakan keahlian dan pengalaman Universitas-Universitas tersebut

* mempertinggi kemampuan para peserta untuk melaksanakan penelitian yang bersangkutan dengan proses perencanaan

### Kesimpulan Penelitian dalam Garis Besar

* Faktor-faktor sosial-budaya telah berpengaruh penting dalam membentuk pola-pola pembangunan

* Di SumBagSel adalah bermacam-macam bentuk budaya, adat-istiadat dan pola organisasi sosial dari penduduk asli dan dari kelompok pendatang

* Pola-pola ini mempengaruhi, antara lain, perencanaan dan pengembangan desa; penggunaan tanah; pengelolaan lingkungan pada tingkat masyarakat; dan organisasi tenaga kerja

* Pertumbuhan penduduk yang sangat cepat di Sumatera Bagian Selatan pada abad ke 20 mengakibatkan penggunaan sumber daya alam yang sangat intensif

* Dacrah pedesaan sedang mengalami perubahan yang besar dalam kegiatan-kegiatan produktif dengan dampak-dampak baik positip ataupun negatif bagi masyarakat

### Beberapa Masalah Khusus

* Umumnya desa-desa di SumBagSel menggunakan mekanisme adat untuk bekerja-sama, berunding, dan pemecahan persoalan, tetapi mekanisme adat ini sering tidak dipelihara dalam proses pembangunan

* Dalam proses perencanaan LKMD dan LMD relatif lemah

* Mekanisme adat dan Marga untuk pengelolaan lingkungan makin lama makin lemah

* Prosedur untuk melindungi rakyat kecil (pemilik tanah) sangat diperlukan sehingga mereka tidak mengalami pemindahan atau penggusuran.Untuk itu perubahan kepemilikan tanah sebagai salah satu penyebab kepergian petani tak terlatih ke kota-kota atau ke lingkungan tanah rawan tersebut harus dihindarkan

* Penggunaan sumberdaya alam sering mengakibatkan dampak-dampak negatif bagi orang pedesaan, terutama untuk petani-petani kecil dan orang yang menggunakan hasil hutan

* Penduduk pedesaan yang kurang mampu sudah mulai berpindah ke kota. Di sana mereka masuk kelompok miskin dan sektor informil, dengan akibat berat bagi sarana perkotaan. Di sektor pertanian para buruh harian mendapatkan penghasilan rendah sehingga mereka pindah ke kota

* Walaupun jumlah tamatan SMA sudah mulai meningkat , tetapi banyak tamatan SMA tersebut belum mendapat pekerjaan.

## Saran-saran

Untuk mengatasi masalah-masalah di atas daftar saran-saran sudah dipersiapkan pada akhir laporan ini. Secara singkat adalah sebagai berikut:

* Pola-pola budaya dan kependudukan harus masuk dalam perencanaan terperinci dan rancangan proyek-proyek pembangunan di SumBagSel

* Partisipasi masyarakat dalam perencanaan akan mempertinggi kemampuan dan keinginan penduduk untuk turut serta dalam sumbangan dan mengambil manfaat dari pembangunan

* Analisa sosial diperlukan dalam studi kelayakan dan perencanaan proyek yang akan mempengaruhi kehidupan penduduk secara langsung.

# 1. INTRODUCTION: WHY SOCIO-CULTURAL FACTORS?

## 1.1 DEVELOPMENT PERSPECTIVES

Why are socio-cultural factors important in development? Socio-cultural factors can be studied for a variety of reasons, depending on the views held about development. There are a number of ways of seeing culture, from different perspectives.

Some people see culture as an obstacle, constraint or impediment, whereby the old ties of cultural values and practices hold back or delay progress towards a better quality of life for all. In this view, cultural factors may be seen as irrational pressures from the past, which should have no bearing on the supposedly rational pursuit of development aims. Consequently, socio-cultural factors may be studied so that they can be overcome, by-passed or circumvented in development practice. Traditional family organisation, patterns of status, power and prestige, traditional attitudes and practices with respect to work, and traditional belief systems might all or in part be considered to obstruct acceptance of supposedly rational attitudes towards streamlined social organisation, efficient work practice, and technological change.

Others see culture as a mystifying force, whereby traditional beliefs and practices amount to little more than a collective illusion which conceals the workings of real power and politics. Or, still others may see culture as a kind of folklore, with little to offer the modern world but picturesque and entertaining stories, dances and music (Geertz 1984).

Alternatively, culture may be viewed as a stimulus to development. Some traditional forms of organisation can potentially be drawn on to enhance the prospects of successful development initiatives by making those initiatives workable in terms of the existing culture. Co-operative work practices, traditional dispute resolution methods, market institutions, groups savings and mutual help mechanisms, environmental management practices and group consultative procedures might all be seen as potentially contributing to positive social transformation. An underlying assumption is that if new development initiatives can be made to harmonise with, complement and strengthen existing practices, rather than to replace or destroy them, then people will more readily accept and sustain the new initiatives, and negative social effects will be minimised. This may be particularly so in situations of rapid social change, with much social disruption. People holding this view often study traditional societies in transition to understand how the kinds of mechanisms listed above will work, and how development projects could be modified to make use of them.

## 1.2 PLANNING FROM BELOW

Over the past 20 years, "participatory" or "bottom-up" development has gained increasing support by governments, international agencies and non-government organisations. This approach is based on the assumption that local people know best the problems they face and how to overcome them. So, if government and aid agencies agree, key elements of planning and implementation shift to the people involved. In this, however, the assumption that truly decentralised, open and participatory methods can be incorporated into development planning may conflict with the people's traditional socio-cultural beliefs and practices. Many people now argue that participatory approaches need to build on traditional structures, which may be hierarchical in nature, rather than create new and unsustainable ones. Again, people proposing this approach will study traditional societies to understand the decision-making processes and methods for co-operative working together. This will be necessary, also, for setting up a process of information exchange in which local people can put forward their own preferences.

## 2. PURPOSE AND SCOPE OF THE RESEARCH PROGRAM

### 2.1 PURPOSE OF THE RESEARCH

The JICA Team introduced a framework for co-operation with four major provincial universities in the Southern Part of Sumatra to provide focussed social and cultural research supporting the preparation of the Regional Plan. The objectives of this research program were three-fold:

1) To strengthen and extend the data base on key social and cultural issues within each of the four provinces, allowing micro-level analysis through detailed case studies;

2) To draw upon the research expertise of each university, providing a mechanism for their participation in the preparation of the Regional Plan, in accordance with their official mandate to assist Pemerintah Daerah (Local Government) through research for planning;

3) To enhance the capacity of the regional universities to plan, design and conduct relevant social and cultural research.

The research conducted under this program is important in its own right. It also forms an essential input to the analysis of social viability and sustainability conducted for the preparation of the Regional Plan, by expanding the socio-cultural information base of knowledge for the Region.

### 2.2 SCOPE OF THE RESEARCH PROGRAM

Following an initial field survey of the Region (July-August 1991) the JICA Team identified two broad topics as themes for the social and cultural research program:

**1. Population, Land Use and Environment**
**2. Social Institutions and the Planning Process**

The JICA Team proposed case study research through participant-observation, possibly supplemented by mini-surveys, as particularly appropriate methods for micro-level social and cultural research. The research timeframe given was November 1991 to May 30, 1992.

Each of the four main provincial universities was invited to submit specific proposals within this broad thematic framework to the JICA Team, via the Balai or Pusat Penelitian (Research Centre of each university). Specific proposals were presented to the JICA Team in November 1991. Each proposal was evaluated on the basis of:

1) Intrinsic merit, clarity of research objectives and coherence of the research design;

2) Feasibility of completion within the given timeframe and budget limitation;

3) Congruence with the identified JICA social and cultural thematic research framework.

A total of ten studies were selected for funding on the basis of these criteria.

## 3. THE KEY THEMES IN CONTEXT

This section gives a brief description of adat, which is essential to understanding the different cultural traditions of the Region. Three key themes from the research are then

introduced. The aim of the Section is to provide a broad Regional context for the research, showing why the researchers picked certain topics, and how they interrelate with the wider trends within the Region.

## 3.1 ADAT

### 3.1.1 What is Adat?

Adat, very broadly, means the social custom of particular groups, used to set standards to achieve harmonious social relations within communities. This includes key aspects of social organisation such as marriage, residence patterns, land use and ownership, and inheritance. Adat varies between ethnic groups in the Region. It constitutes the basic pattern of each cultural tradition in the Region. Whilst many elements of adat survive within the different cultural groups in the Region it is often difficult to tell which elements of adat survive intact from "pre-contact" traditional society. Adat is not a static concept, but a fluid one, allowing each society to change in a coherent fashion in response to changing circumstances.

Many different adat forms are described during the course of the research. Some key terms used in the research are briefly explained here. Within the Region, kinship links and inheritance of property or titles may be patrilineal, matrilineal or bilateral. Patrilineal descent means property and titles are inherited through the father's line; whilst matrilineal descent works through the mother's line. Bilateral descent means that property can be inherited from both mother's and father's line. Virilocal residence means that a wife, on marriage, lives within her husband's kin group; whilst in uxorilocal residence the husband follows his wife's family. In neolocal residence the young married couple set up their own household independently. The various combinations of these patterns affect the way families, wider kin groups and communities are organised, who their leaders are, and the way property, including different types of land, is treated. Throughout the Region, adat co-exists with major religions, principally Islam. Like adat leaders, Islamic leaders and teachers have wide influence within the community.

### 3.1.2 Introducing Adat Law

Adat law is not an indigenous term, but rather was used by colonial jurists to differentiate traditional Indonesian beliefs and practices from imported legal systems (Dutch, Muslim, Napoleonic). During the colonial period "official" adat law was written down by colonial scholars. Although through this process it often became ossified and decontextualised, "official" adat law influenced the practice of traditional adat law, and became the basis for colonial administrative systems. Two complementary colonial and indigenous legal systems operated: Dutch law for Europeans, non-Indonesians and serious cases; and adat law for less serious cases and disputes amongst Indonesians. In Lampung, for example, adat law existed only informally after 1879 when Western-based legal and administrative systems were introduced, but in 1928 an "official" version of adat law was resurrected, together with a Marga administrative system. This caused problems since "adat is customary, relevant to everyday life in a state of flux, not a set of regulations to be isolated from the social context, codified and moulded to suit government aims" (Kingston, 1987).

Despite such difficulties of interpretation, some general characteristics of adat law are as follows. Adat law is usually unwritten, not codified, with the community reinterpreting it according to new situations. Basic principles are expressed as admonitions, formulated as proverbs, parables and allegory which must be interpreted by the adat judge. Religious beliefs are closely interconnected with adat principles. Individual interests are often hard to separate from communal interests, and business from private interests. There is little coercion used in implementing judgements other than a sense of shame, obligation and a desire to restore social harmony (Koesnoe 1971). The adat judge collects evidence and establishes facts; decides right and wrong according to adat; searches for principles to solve the case; formulates a judgement which can be understood by the community and declares it implemented. The aim is to resolve

social conflict and restore harmony by an agent recognised by the whole community, so minimising the likelihood of retaliation by injured parties, and escalation of the dispute.

Adat law has decreased in importance since Independence. In the 1950s the judicial power of the Pasirah (Marga head) was abolished, along with adat courts of the Marga. However, adat law still functions informally for conciliation and arbitration, for example in the Rejang village tribunals (Bengkulu) as described by Jaspan (1971). Adat law was still informally practised by certain Pasirah up until the early 1980s. These Pasirah were sought out by community members because of their recognised wisdom and experience in dispute resolution. There are still informal, adat-based mechanisms for the resolution of disputes which work at hamlet and village level throughout the Region. According to Jaspan, adat law is "still the final haven...before crossing into the relatively alien, Westernised and expensive territory of 'Government' Law." In some areas adat law is giving way to Islamic law, especially in matters of inheritance.

### 3.1.3 Adat and Marga

Throughout most of the Region in colonial times the Marga was the basic unit of local government. It was controlled indirectly by the Government. Through the Marga court, it was also the highest institution of adat law. Like adat law, the Marga was a concept borrowed from traditional forms of social organisation, where it usually meant some kind of kin-related group, like a clan or lineage, depending on the prevailing adat. Colonial rulers used Marga as a basis for the administrative system, so making it into a territorial concept. Marga in the Region were structured in various ways influenced by differences in local adat, but most commonly an elected Pasirah (or Depati) had far-reaching legislative, executive and judicial authority, and was assisted by Marga officials. The Pasirah tended to be elected from certain powerful families whose members had already demonstrated an ability to lead the people according to the prevailing adat.

The Marga had an annual budget derived from various sources, including taxes, services, market permits, and income derived from its own natural resources. Often the largest component of the Marga budget, this included the annual auction of resources such as fisheries, rivers and riverbanks, especially in South Sumatra (Kato 1989); leasing of Marga land to outsiders (for example in Southern Sumatra and Jambi swampland might be leased to Bugis for pasang surut tidal swamp cultivation (Tsubouchi 1980)); the sale of forest products from Marga forestation programs or, as in Jambi, the auction of rights to collect 10 per cent rubber taxes (Kato 1989). The annual budget could be quite substantial. One Marga in South Sumatra was able to pay its Pasirah a salary higher than the annual salary of Javanese District (Wedana) Heads (Romsan, 1989). So the Marga controlled the use of its own resources, had revenue raising capacity and could use the funds for development. The Pasirah regulated the use of the Marga natural resource base, to preserve it for future generations of the adat group.

Whilst this system worked well in many parts of the Region to achieve environmental conservation, in some places where population pressure was rising very rapidly, such as some of the watersheds in Lampung, these safeguards were no longer sufficient to protect the environment, and significant damage resulted from overuse of the resources even prior to 1979. Not surprisingly, the quality of the Pasirah's decision making also varied. For example whilst many Pasirah commanded respect and loyalty, others used the position only as a stepping stone to further their careers, for example during the 1960s and 1970s in the Rejang area (Galizia 1990). Some Pasirah were considered to be corrupt but effective as leaders.

These issues feature in a number of the research topics from all Provinces in the Region, with examples of the Pasirah's regulatory power with respect to land for cultivation, forest land, fishing rights and forest products.