

IX. FORESTRY/ENVIRONMENT/LAND USE

A. Forestry

1. Present Situation

416. Forest land area (nonconvertible forest) in the Region is 16.3 million ha, accounting for about 14.4 percent of the entire forest land area in Indonesia of 113.43 million ha. Forest land area in the Region includes 10.12 million ha of production forest (a total of limited production forest and nonconvertible production forest), which accounts for 15.7 percent of the entire production forest in Indonesia of 64.39 million ha. The total area of four provinces in the Region is 26.39 million ha including forest land area of 16.3 million ha, accounting for 38.0 percent. Analysis of forest land area by province in the Region indicates West Sumatra the highest of 69.6 percent and North Sumatra the lowest of 49.2 percent.

417. Distribution of forest land in the Region shows that it is highly mixed with farm land, shifting cultivation land and critical area, making its management and control extremely disadvantageous. As the actual situation of such land use having its own history and background, quick improvement may be difficult, it is essential to determine forest land area through review of division of land utilization and implementation of well-planned improvement, based on the comprehensive viewpoint of conservation of natural environment, stabilization of life of residents, and optimum land utilization.

Table 102. Land Utilization Design Based on Forest Land Use by Consensus up to May 1984

Province	Land Area of Province (A) (1,000 ha)	Protection Forest (1,000 ha)	Park & Reserve Forest (1,000 ha)	Limited Production Forest (1,000 ha)	Non-Convertible Production Forest (1,000 ha)	Total Non-Convertible Forest (B) (1,000 ha)	Percentage of Land Area (B)/(A) (%)	Non-Convertible Production Forest (1,000 ha)
Aceh	5,539	1,051	667	1,376	188	3,282	59.3	193
North Sumatra	7,168	1,391	254	1,350	532	3,527	49.2	254
West Sumatra	4,230	1,207	600	540	597	2,944	69.6	438
Riau	9,456	742	267	2,765	2,773	6,547	69.2	1,754
Total	26,393	4,391	1,788	6,031	4,090	16,300	61.8	2,639
Indonesia	193,072	30,316	18,725	30,525	33,867	113,433	58.8	30,537

418. As a result of forest inventory, decreasing trend of productive forest became clear. This is caused by reduction of forest estimated 1,155,000 ha annually (namely, production forest: 625,000 ha/year, protection forest: 430,000 ha/year, park and reserve forest: 100,000 ha/year) disappeared by pioneers' development, shifting cultivation, excessed cattle grazing, thievish cutting, forest fire and so forth. The potential prospect of log supply (for 8 years from 1987/88 to 1994/95) of commercial species from fixed production forest as well as limited production forest excluding Irian Jaya is shown in Table 103.

Table 103. Potential Prospect of Log Supply

Year	Volume (million m ³)
1987/88	27,188
1988/89	26,947
1989/90	26,628
1990/91	26,309
1991/92	26,012
1992/93	25,713
1993/94	25,414
1994/95	25,107

As being clear from the above table, the potential prospect of log supply tends to be reduced by average 300,000 m³ annually. The Government limited the total log production up to 157 million m³ for 5 years (annual average 31.4 million m³) by Replita V in order to keep forest conservation and effective log usage, among which 132.7 million m³ (annual average 26.5 million m³) is out of Sumatra, Kalimantan, Sulawesi, Maluku, and the rest of 24.3 million m³ is produced from Irian Jaya, convertible forest and private forest. Meanwhile, the HPHH of forest concessions for short terms or small scale were nullified.

419. The standing stock of commercial species in the Region is summarized in Table 104. It shows that Aceh province is the highest among the four provinces both in terms of standing stock and standing stock per hectare. From the nation-wide point of view, however the quality of forest resources in the Region is comparatively poor.

420. The area of critical land is shown in Table 105. North Sumatra province accounts for 53.2% of total critical land area in the Region.

Table 104. Standing Stock (Dec. 1987)

Province	Standing Stock	Working area	Standing Stock/ha
	1,000 m ³	1,000 ha	m ³
Aceh	160,945	1,792	90
North Sumatra	92,435	1,112	83
West Sumatra	83,399	1,214	69
Riau	365,049	6,297	58
Total	701,828	10,415	67
Indonesia	5,506,170	66,914	82

Note: Commercial species.

Source: Forestry Statistics of Indonesia 1987/1988.

Table 105. Remainder of Critical Area (1987/1988)

Province	Land Area of Province (A)	Remainder of Critical Area		B/A
		(B)		
Aceh	5,539,000 ha	447,639 ha	26.8%	8.1%
North Sumatra	7,168,000	887,027	53.2	12.4
West Sumatra	4,230,000	93,013	5.6	2.2
Riau	9,456,000	240,778	14.4	2.5
Total	26,393,000	1,668,457	100.0	6.3
Indonesia	193,072,000	9,442,045		4.9

Source: Forestry Statistics of Indonesia 1987/1988.

421. Briefly speaking, the silviculture in Indonesia is divided into two parts. The first one is Reboisasi (Reforestation) on the Forest Lands by Land Status and the second is Penghijauan (Regreening) on the non-Forest Lands. Recently as Hutan Tanaman Industri (HTI) or Industrial Timber Plantation by involving Forest Land or Private Lands, a large scale of Re/Afforestation has been started for purpose to produce fire wood or industrial materials such as saw-mill, plywood-mill or pulp & paper mill. The Planned and Implemented Reforestation and Land Rehabilitation by Presidential Instruction Budget during Pelita IV up to 1987/88 is shown in Table 106. The area is shown in equivalent ha.

Table 106. Planned and Implemented Reforestation and Land Rehabilitation, during Pelita IV up to 1987/88 (ha)

Province	Planned	Implemented
Aceh	4,056	3,936
North Sumatra	18,845	12,570
West Sumatra	9,120	7,845
Riau	23,140	16,872
Total	55,161	41,223
Indonesia	291,823	242,396

Note: by Presidential Instruction Budget.
Source: Forestry Statistics of Indonesia 1987/88.

422. Also the Government is promoting to expand community forest by local inhabitants, and its record by Pelita IV is shown in Table 107.

Table 107. Planned and Implemented Regreening Activity by INPRESS, during Pelita IV up to 1987/88 (ha)

Province	Community Forest		Sampling Unit	
	Planned	Implemented	Planned	Implemented
Aceh	3,050	2,675	11,750	10,500
North Sumatra	12,640	11,853	32,500	29,500
West Sumatra	2,442	2,442	12,750	10,750
Riau	200	200	15,500	14,000
Total	18,332	17,170	72,500	64,750
Indonesia	44,267	35,804	541,500	471,750

Source: Forestry Statistics of Indonesia 1987/88.

423. According to statistics of each Province, Industrial Timber Plantation shows that 700 ha of plantation has been fulfilled by 1987/88 against 35,000 ha plantation plan at Padang Lawas in Sumatra, and that 1,800 ha planted by the same time against 150,000 ha of the plan at Tapanuli Utara, Tapanuli Selatan, Simalungun by PT Inti Indorayon. Further, PT Sumatra Sinar Plywood Industry performed 2,000 ha of plantation with HTI by 1987/88, and in Riau 4 units of HTI have been executed and reached to 5,259 ha of plantation by 1987/88. In West Sumatra 4 units have been planned to plant 142,000 ha, but have not been realized yet. At D.I. Aceh, PT alas Helau is performing HTI on the clear cut land of natural Pinus Merkusii land. In the Region, since plantation of Pinus Merkusii was introduced by line planting system to Alang-alang grassland in North Sumatra in 1928, it has gradually been expanded. There are 66,000 ha of Pinus Merkusii plantation in the Region. Due to lack of sufficient tending, however,

the trees on those plantations are inferior in quality and marketability for sawntimber industry. But recently a market has developed as a raw materials of pulp industry.

424. The area under shifting cultivation in four provinces totals 480,000 ha, of which 40% is found in North Sumatra.

Table 108. Area under Shifting Cultivation (1985)

Province	Shifting Cultivation Area (ha)
Aceh	116,471
North Sumatra	191,763
West Sumatra	92,870
Riau	76,187
Total	477,291

Source: BPS, Agricultural Survey: Land-Area by Utilization in Outer Jawa 1985.

425. Commercial forest cutting in Indonesia is being operated pursuant to the Fundamentals of Forestry Law enforced in 1967 through issuance of Forest Concession (HPH: Hak Pengusahaan Hutan) with 20 years' lease. When an HPH holder undertakes cutting, he is liable to comply with the Forest Agreement. Analysis of HPH holders by province in the Region shows that Riau accounts for the majority in the Region.

Table 109. Forest Concessions by Province (1988)

Province	HPH	Forest Area (1,000 ha)
Aceh	20	1,457
North Sumatra	15	1,404
West Sumatra	12	912
Riau	63	6,072
Total	110	9,845
Indonesia	538	55,468

Source: Forestry Statistics of Indonesia 1987/1988.

426. Points verified about problems with respect to forest cutting during the field survey are as follows:

- (i) The number of marketable commercial species has been on the decline.
- (ii) Cutting toward the interior has pushed up production cost every year.
- (iii) Aging cutting machinery has also contributed to rising production cost.
- (iv) While HPH holders are liable to construction of processing facility pursuant to the Forest Agreement, some of them have failed to do so. Strict steps are being taken to such HPH holders including cancellation of HPH.

427. Maximum annual allowable cutting in the Region is 12.05 million m³, which accounts for 16.0 percent of maximum annual allowable cutting in Indonesia of 75.24 million m³. Maximum annual allowable cutting by province in the Region is Riau, 6.02 million m³ or 50.0

percent of the Region and Aceh, 3.05 million m³ or 25.3 percent. These two provinces account for 75.3 percent.

428. Also with respect to Dipterocarpaceae which is called a typical species of tropical rain forest, both Riau and Aceh have overwhelmingly largest forest of this species, accounting for 73.3 percent of the Region. Allowable cutting of Bakau (mangrove) is entirely taken by Riau and Aceh.

429. TPI (Tebang Pilih Indonesia) has been adopted as a natural forest management system in Indonesia. TPI is a selective cutting system, at a cutting cycle of 35 years, providing enrichment planting and/or soil surface treatment, if necessary. Generally, TPI is an effective system for tropical rain forest composing of Shorea, Dryobalanops, Gonystylus and many other useful tree species, but the tending for the selective logged-over forest has been almost abandoned due to its costly operation. Consequently, natural forests have been degraded both in quality and in quantity. Such a situation is commonly observed in the Region.

Table 110. Annual Cut Production Released
(December 1987)

Province	Standing Stock (1,000 m ³)	Working Area (1,000 ha)	Minimum AAC (1,000 m ³)	Maximum AAC (1,000 m ³)
Aceh	160,945	1,792	1,771	3,052
North Sumatra	92,435	1,112	938	1,517
West Sumatra	83,399	1,214	879	1,459
Riau	365,049	6,297	3,612	6,017
Total	701,828	10,415	7,200	12,045
Indonesia	5,506,170	66,914	45,583	75,237

Note: AAC; Annual Allowable Cut.

Source: Forestry Statistics of Indonesia 1987/1988.

The log production (1984/85 - 1987/88) in the Region is shown Table 111, and the rapid growth of log production in Aceh and Riau (1987/88) is noticeable.

Table 111. Log Production by Province, 1984/1985 - 1987/1988

Province	1984/1985	1985/1986	1986/1987	1987/1988 (m ³)
Aceh	628,314	387,783	817,608	2,014,744
North Sumatra	309,519	208,976	552,568	679,969
West Sumatra	397,719	467,609	477,290	585,637
Riau	1,198,039	1,236,150	1,825,533	2,797,384
Total (B)	2,533,591	2,300,518	3,672,999	6,077,734
(B)/(A) %	16%	16%	19%	22%
Indonesia (A)	15,957,641	14,551,950	19,698,094	27,565,919*

Note: * Preliminary Data.

Source: Forestry Statistics of Indonesia 1987/1988.

430. Sawn timber production in Indonesia is considerably lower than its productive capacity due mainly to the disadvantageous locations of saw mills and unfavorable market conditions. In the Region, the industry faces a still harder situation. Many saw mills

lag behind in modernization; inadequate port facilities allow only small-lot shipment which greatly reduces international competitiveness; and the procurement of sawn logs is getting more difficult.

Table 112. Number of Sawmills (HPH) and Productive Capacity (March 1988)

Province	Number of mills	Productive capacity (m ³)
Aceh	11	327,000
North Sumatra	15	533,500
West Sumatra	5	112,000
Riau	36	876,500
Total	67	1,849,000
Indonesia	296	8,803,100

Source: Ministry of Forestry, Statistics 1987/1988.

431. Plywood is the number one export commodity among the timber products. Its export value expanded ten times during 1981 and 1987. Plywood production in the Region is rather concentrated in Riau and North Sumatra as shown in Table 113.

Table 113. Number of Plywood Mills and Productive Capacity (1987/1988)

Province	Number of mills	Productive capacity (m ³)
Aceh	2	166,400
North Sumatra	4	245,400
West Sumatra	1	35,700
Riau	8	484,700
Total	15	932,200
Indonesia	102	6,265,863

Source: Ministry of Forestry, Statistics 1987/1988.

432. Indonesian pulp production in 1988 was 467,000 tons which was made of wood, straw, bagas, bamboo and other materials (excluding recycled pulp from waste paper). However, the portion of wood pulp was not clear and assumed to be low level, however, expected to increase substantially in near future. In the Region there are 3 pulp and paper mills whose capacities are shown in Table 114.

Table 114. Pulp and Paper Industries

(unit: M.Ton/Year)				
Province	Unit	Name of Company	Raw Materials	Productive Capacity
Aceh	1	P.T. Kertas Kraft Aceh	Pinus Merkusii Mixed tropical hardwood	Pulp 140,000 Kraft paper & Kraft liner board 175,000
North Sumatra	1	P.T. Inti Indorayon Utama	Pinus Merkusii	Unbleached & bleached pulp 165,000
Riau	1	P.T. Indah Kiat Pulp & Paper	Mixed tropical hardwood	Pulp 100,000 Paper 125,000

Source: Pulp & Paper International, 1989, Aug.

433. Non-timber forest products (rattan, resin and others) are income sources for local people. So, appropriate forest management must be fulfilled to meet their requirement of those products consistently. Nowadays rattan are collected from natural forest, but in the Region artificial rattan plantation has been executed experimentally for 20 ha in West Sumatra. According to statistics in each province, the production volume of rattan and other products are shown in Table 115.

Table 115. Non-Timber Forest Production (1987/1988)

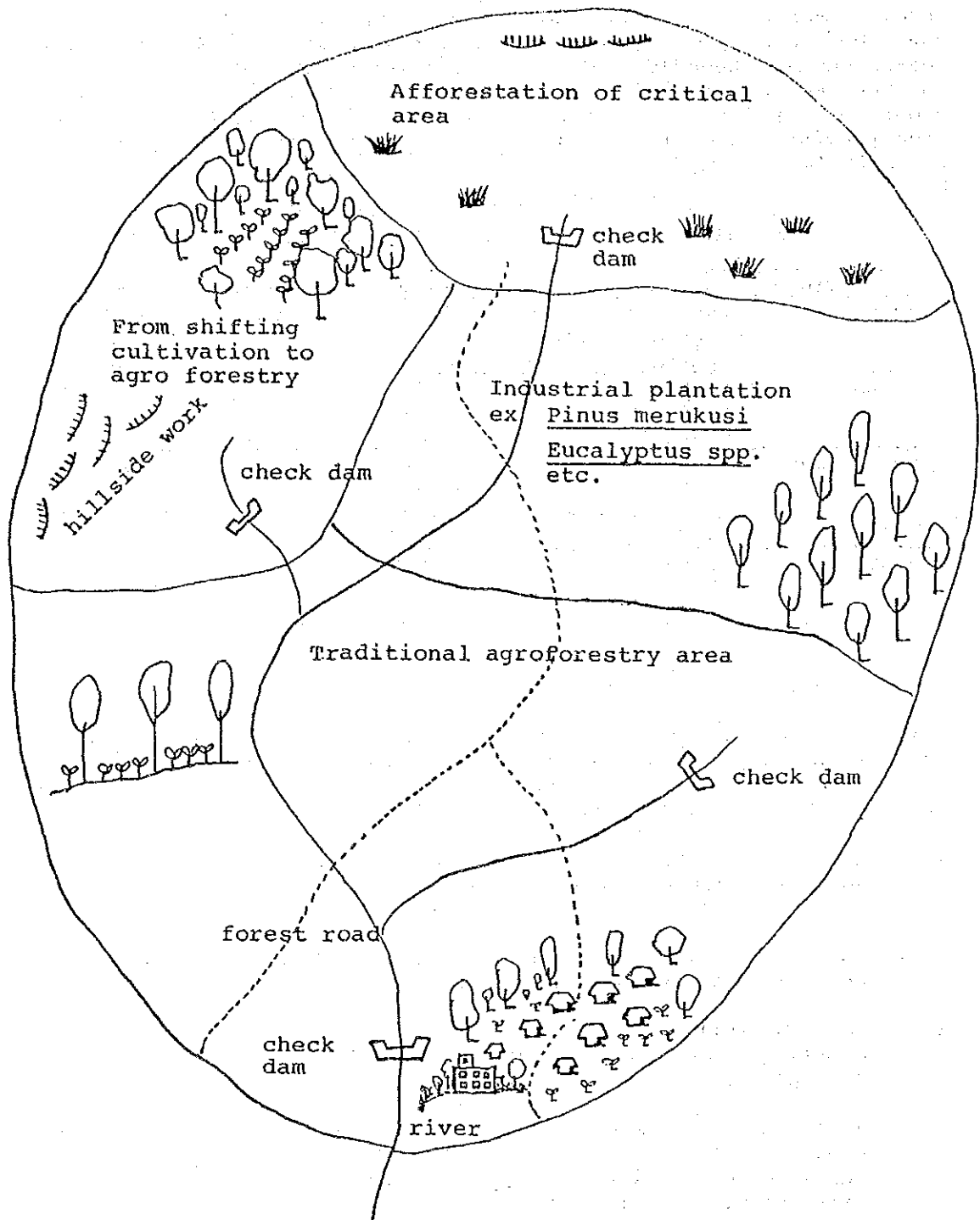
Province	Commodities	Volume	Unit	Remarks
Aceh	Rattan manau	26,922	stalk	Exported
	Rattan semambu	75,748	stalk	Exported
	Charcol	6,179.5	ton	Exported
North Sumatra	Rattan	646.1	ton	Production
	Bark	64.3	ton	Production
	Charcol	2,458	ton	Production
West Sumatra	Rattan manau	1,351,320	stalk	Production
	Rattan	707,975	kg	Production
	Resin (Agathis)	485,000	kg	Production
	Bird nest	710	kg	Production
Riau	Rattan	1,538	ton	Production
	Charcol	10,053	ton	Production
	Resin	211	ton	Production

2. Development Potentials

434. In view of the present situation described above, need for forestry development in the Region is enormous. Generally, we consider the following tasks very important. Timber production should be increased by following measures:

- (i) In order to improve forest productivity, the introduction of an adequate natural forest management system and the expansion of re/afforestation are required.
- (ii) In order to put TPI into an effective and reasonable practice, the guidance and supervision of loggers are required.
- (iii) In expanding re/afforestation, the enforcement of site-species matching test, tree breeding and seed control (collection, storage, etc.) is required.
- (iv) A forest management system must be feasible in terms of profitability. In that sense, it is necessary to predict timber demands and prices and to decide suitable tree species, silvicultural systems and the age of final cutting.
- (v) Increase in timber production and well-being of inhabitants should be realized through the social forestry system. For this purpose, it may be desirable to perform an experiment of integrated forestry planning as a new concept of integrating traditional agroforestry into other types of development within one watershed (Figure 58).

435. Wood processing industries should be promoted positively, because they can generate more value added in timber production and create more employment. In this view, the very low operation rate of sawmill industry represents a serious problem. One possible solution to this is securing a stable supply of material logs by increasing log



Note: Other development components such as roads, plantation crops, hydropower, agro-industry, livestock and tourism may be integrated into this planning scheme.

Fig. 58. Concept Map of Integrated Forestry Planning

production. Also on the sales side, it is necessary to produce high quality and marketable timber products through modernization of production facilities. Raw materials for the pulp industry are abundant but logs produced in natural forests are heterogeneous. The stable supply of homogeneous wood which is produced in man-made forests must be expected in the future.

436. Conservation of natural environment is another important task. Urgently needed is the establishment of man-made forests on the critical land of about 1.67 million ha in the Region. This can effectively control the watershed areas. To remedy the adverse effects of shifting cultivation, it will be necessary to introduce effective agroforestry schemes. For this purpose, the integrated forestry mentioned above seems appropriate. In addition to those measures, soil conservation works (check dams, hillside works, etc.) should be implemented to achieve a systematic management of watershed area. Finally, the conservation of wildlife must be given a high priority not only in the wildlife sanctuary but also in general forests, since the Region is a world's famous habitat of wildlife.

437. Generally speaking, financial feasibility of forestry development tends to be low because of the sector's such characteristics as the long maturing period, difficulty of production control, and low profitability. However, forests also have important social functions: soil conservation, securing water resources, to name a few. Therefore it is necessary to give a full consideration to such social functions in identifying the potential of forestry development.

438. Tables 116 and 117 show very rough estimates of standing stock and annual allowable cut by province. A basic assumption is that the annual net increment of standing stock is a very low 2.5%, although a more realistic rate would be about 7%.

Table 116. Estimation of Standing Stock

Province	1987		2008	
	Standing (1,000 m ³)	per ha (m ³)	Standing (1,000 m ³)	per ha (m ³)
Aceh	160,945	90	263,724	147
North Sumatra	92,435	83	151,463	136
West Sumatra	83,399	69	136,658	123
Riau	365,049	58	598,169	95
Total	701,828	67	1,150,014	110

Source: Team's estimate.

Note: The 2008 figures are calculated by the following equation.

$$V' = V \times \left(1 + \frac{P}{100}\right)^n$$

where

V': growing stock in 2008

V : growing stock in 1987

P : 2.5: net increments
(gross increments minus cutting volume)

n : 20 years

Table 117. Annual Allowable Cut

Province	1986	2008
	(1,000 m ³)	(1,000 m ³)
Aceh	3,052	4,985
North Sumatra	1,517	2,486
West Sumatra	1,459	2,601
Riau	6,017	9,855
Total	12,045	19,927

Source: Team's estimate.

Note: The 2008 figures are calculated by:

$$E' = E \times \frac{V'}{V}$$

where

E': annual allowable cut in 2008

E : annual allowable cut in 1987

V': growing stock in 2008

V : growing stock in 1987

439. Wood processing industries in the Region will and should play a leading role in the forestry sector. If production facilities are improved, the number of sawmills, plywood mills and pulp mills in the Region is kept constant while there will be no shortage in the supply of logs in terms of quantity. Considerable degradation in quality of material logs will occur, however, especially for sawntimber and plywood production.

440. To realize the modernization towards the year 2008, the following tasks should be done, even though hard situations are anticipated;

- (i) Utilization of lesser-known tree species in the province of Riau.
- (ii) Development of high quality log products by strengthening the natural forest management system (TPI) and re/afforestation including integrated forestry.

441. It seems quite difficult to settle down shifting cultivators by means of traditional agroforestry schemes. Farmers often end up with subsistence agriculture where market for their produce is far or nonexistent. Therefore, as mentioned earlier, the development of integrated forestry which is a modification of the conventional concept of agroforestry seems to merit a close examination. Practical research on this scheme should be carried out in each province, taking into account its unique social and physical conditions.

3. Development Strategies

442. The total area of non-Convertible Forest in the Region is 16.3 million ha which occupies 61.7% of the huge Region area 26.39 million ha. The total non-Convertible Forest 16.3 million ha (100%) is consisting of Protection Forest 4.39 million ha (27%), Park & Reserve Forest 1.79 million ha (11%) and Production Forest 10.12 million ha (62%). Although the non-timber forest products such as non-timber, rattan etc. are produced from the above Production Forest and Convertible Production Forest 2.64 million ha, sustainable forest products are produced from 110 HPH (Forest Concession) 9.85 million ha allocated in the Production Forest.

443. Meanwhile, as a result of forest inventory survey by the Government, it became apparent that potential prospect of log supply of commercial species from Productive Forest shows declining tendency. This is the reasons of pioneer's development, shifting cultivation, excessing cattle grazing, illegal cutting, forest fire and so forth. Therefore, the Government limited the total log production volume by Replita V up to 157 million m³ for five years (annually 31.4 million m³) in order to preserve forest resources and to utilize them effectively, and HPHH (forest concession of short term and small scale) was nullified by January 1989. So, log production volume was limited and expansions of production capacity by sawmills and plywood factories are not approved any more. In order to maintain and develop wood processing industry, it is quite important to sustain and enlarge forest resources. Log production are now operated by system TPI (Tebang Pilih Indonesia: Indonesian selective cutting system) by 110 HPH holders, however, it is required for them not only to practice TPI system strictly as logger, but also to reinforce forest reproductivity through reforestation such as enrichment planting and sanitary operation as the forest management as well as to improve the yield of forest productivity out of standing trees.

444. Adding to the above extensive management, aggressive promotion of Industrial Timber Plantation (HTI: Hutan Tanaman Industri) is required to produce raw materials through artificial reforestation for future wood processing industry; namely sawmill, plywood, pulp and paper mill and energy use. Also, quite useful is the practice of HTI especially on bare lands and grass land to convert non-productive land into forest productive land and to conserve water and soil. Actual performance of HTI in the Region by 1987/88 were 3 units 4,500 ha in North Sumatra and 2 units 12,721 ha in Riau, and the HTI study and planning are progressing in 4 provinces respectively in the Region.

445. As the Government organizations perform Re/Afforestation on Forest Land as core area, surrounding people of the core area will make afforestation on non-forest land by PIR system (Perkabunan Inti Rakyat: nuclear system). Then they can organize HTI as a single unity, and this would become one of the good methods to enlarge HTI. Further, the above afforestation by local people, besides compiling one element of HTI program, should be advertised and promoted to induce expansion of community forest and social forest which respond to local demands for their own construction materials and firewood. Social forestry projects will have to be designed and implemented in conjunction with effective watershed reforestation and greening in order to establish various types of agroforestry land use systems which combine agricultural growing trees on uplands with arable crops, livestock rearing and rangeland in accordance with community forest development scheme.

446. In the Region, eight watersheds (4 in North Sumatra and 2 each in Aceh and Riau) are identified as most critical sites with the critical land conditions which reach to 311,700 ha. For most of the eight watersheds, flood control projects are either being implemented or planning stage. In order to support these works, it will be necessary to step up afforestation/reforestation efforts in the upstream areas. In addition, patches for the eroded areas are scattered in many places in Aceh, North Sumatra and West Sumatra, which become to 1.67 million ha, and they also require afforestation/reforestation or greening to conserve soil conditions and to utilize non-industrial wood for local people. Because most of the erosion is brought about by more or less uncontrolled activities to develop agricultural land (e.g. shifting cultivation along with steep slopes) or illegal tree cutting by non-HPH sawmillers or local people to obtain fire wood, so afforestation/reforestation programs must be

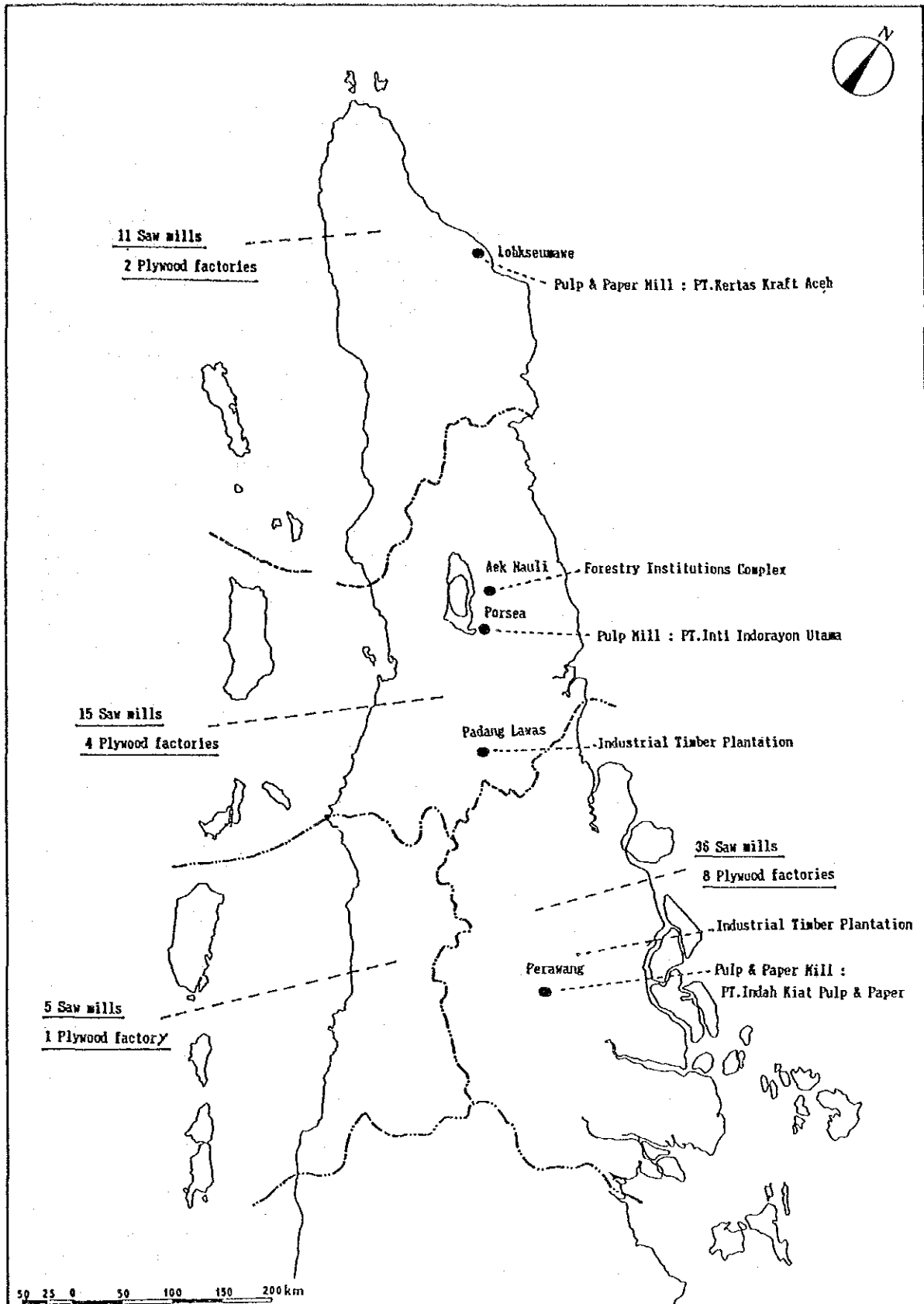
established, not simply to recover forest/vegetation cover but also to sustain continued utilization of wood and land for local people.

447. Log production in 1987/88 in the Region was 6.08 million m³, and there are 67 HPH sawmills, 453 non-HPH sawmills, 15 plywood factories, and 3 pulp and paper mills. For those industries, the capacity use against productivity by sawmills in 1987/88 was low as 33.8% in Riau and 29.1% in North Sumatra, and the same by plywood factories was 61.7% in Riau and 84.7% in North Sumatra. One of the reasons to have such a low level is not able to operate smooth procurement of logs. Additionally some good logs produced in West Sumatra and West Aceh are taken away to outside areas such as Java (domestic sale), so those logs are desirable to be utilized within the Region with internal transportation system to maintain stable development of the industries in the Region. Further, at present only commercial species are utilized, however, in future lesser-known species should also be utilized in order to meet the industries' requirement as well as to increase productivity per ha of forest resources.

448. The yield of finished products against log (1987/88) was 44.7% for sawmill and 49.8% for plywood in Riau, and as declining tendency of log availability is prospected in future, high yield of final products and high utilization of the wasted portion are required. In this Region, 3 modern pulp and paper mills started operation from the end of 1988 as new installments or expansion. Their total production capacity becomes 405,000 M Tons/Year, and their requirement for raw materials will be reached to 1.6 million m³ of logs. In consequence currently a large scale of cutting are going on, so connectedly artificial reforestation should be commenced without delay to recover forest resources in considering of environmental conservation. As non-timber forest products (rattan, resin, and others) are income source, they should be continuously produced as raw materials to meet local small industries. For this purpose too, appropriate forest management is essential. Artificial rattan plantation has been executed for 20 ha experimentally in West Sumatra in the Region, and its expansion to industrial scale to meet future rattan demand will be realized when the experimental result proves feasibility.

449. With respect to prospect of forest development and conservation in the Region, special coordination must be made to some important nation-wide projects to be implemented with external financial and technical assistance. Through compiling data of forest inventory, strengthening appropriate research and manpower training, and preparing investment projects for priority areas (including plantation development), the World Bank assisted Forestry Institutions and Conservation Project, especially its forest research, forest planning and management strategies for sustainable forest development and management. In this connection, the FAO technical team has prepared a set of recommendations to strengthen the system of fire control and forest protection in major forest regions including North Sumatra and Aceh. In addition, a feasibility study has been conducted by the British team on the development of a forestry radio-communication system. These projects will identify specific investment requirement and opportunities, including forest conservation efforts in the Region before the end of Repelita V.

450. Forests, as a decisive element in the ecosystem and renewable natural resources, play a major role in sustaining environment including land, water, air and climate and subsequently social benefit. All development efforts should be carried out in a balanced way in the long term, whereby sectoral and regional targets are achieved and the environment is preserved.



LEGEND :

Fig. 59. LOCATION OF DEVELOPMENT PROJECTS
IN FORESTRY SECTOR

THE STUDY ON THE INTEGRATED REGIONAL
DEVELOPMENT PLAN FOR
THE NORTHERN PART OF SUMATERA

B. Environment

1. Present Situation and Development Potentials

1.1. Background of Environmental Issues

451. Indonesia's record of economic growth has been impressive over the past two decades. This growth was essential to provide employment opportunities for the expanding labor force, but it is also true that Indonesia is heavily dependent on its natural resource base for employment generation and export growth. Thus, this proves the importance of recent natural resources and environmental problems such as deterioration of tropical rain forests, soil erosion and degradation of genetic resources. Moreover, industrial and energy development will also add to water and air pollution, unless appropriate preventive measures are taken.

452. The Region is blessed with rich natural resources, as well as a strong national and regional government commitment to sound natural and environmental resource management. Because of these initial conditions, it is possible to pursue the efficiency, equity and growth-oriented strategy consistent with a sustainable utilization of natural resources. While, environmental problems are closely linked to population pressures which may cause additional demands for agricultural lands and natural resources, and for waste management, and to poverty which may cause deforestation by marginalized poor farmers. Therefore, more integrated approach to ecological, cultural and economic issues are needed in the regional development policy to alleviate various types of confliction on the environment.

1.2. Natural Resources and Environmental Issues in the Region

(1) Watershed Management

453. The most serious environmental issue in the Region is watershed management. Watershed management principally focuses on the conservation and sustainable development of land and water resources of a basin, emphasizing understanding of cross-sectoral, systematic linkage of natural resource utilization. Watershed management policy is to be based on integrated river basin planning, thus the regional governments are responsible for river basin management with assistance from national government's conservation, rehabilitation, agricultural and rural development programs. Implementation of these policies depends on close coordination and cooperation among national, regional, and local governments, but it has not always been successful in spite of great and continuous efforts of concerned agencies.

454. In the Region, there are two major causes of watershed degradation, one is the uncontrolled extensification of agricultural production systems including the shifting cultivation, and resource extraction activities into marginal land, and the other is inappropriate land use programs. For example, about 1.5 million ha, or about 10% of permanent forest area, which are to be remained as the forest lands, have been cultivated in the Region (Refer to Table 121 below).

455. Marginal lands are defined as lands incapable of sustaining intensive agricultural crop cultivation under current technology. Therefore, critical marginal lands include those state and privately-owned lands which have been degraded to a point at which their productivity is markedly declining or which has already been abandoned. At present, the following eight watersheds are considered to have the

most critical lands, and their total critical area is estimated about 3,117km² or about 12% of the Region (Refer to Figure 60).

Province	Watershed	Critical Land (km ²)
Aceh	Krueng Aceh, Jambu Aye, Krueng Pase	599
North Sumatra	Asahan, Barumun	1,254
	Wampu, Ular	598
West Sumatra and Riau	Indragiri, Rokan	666
	Total	3,117

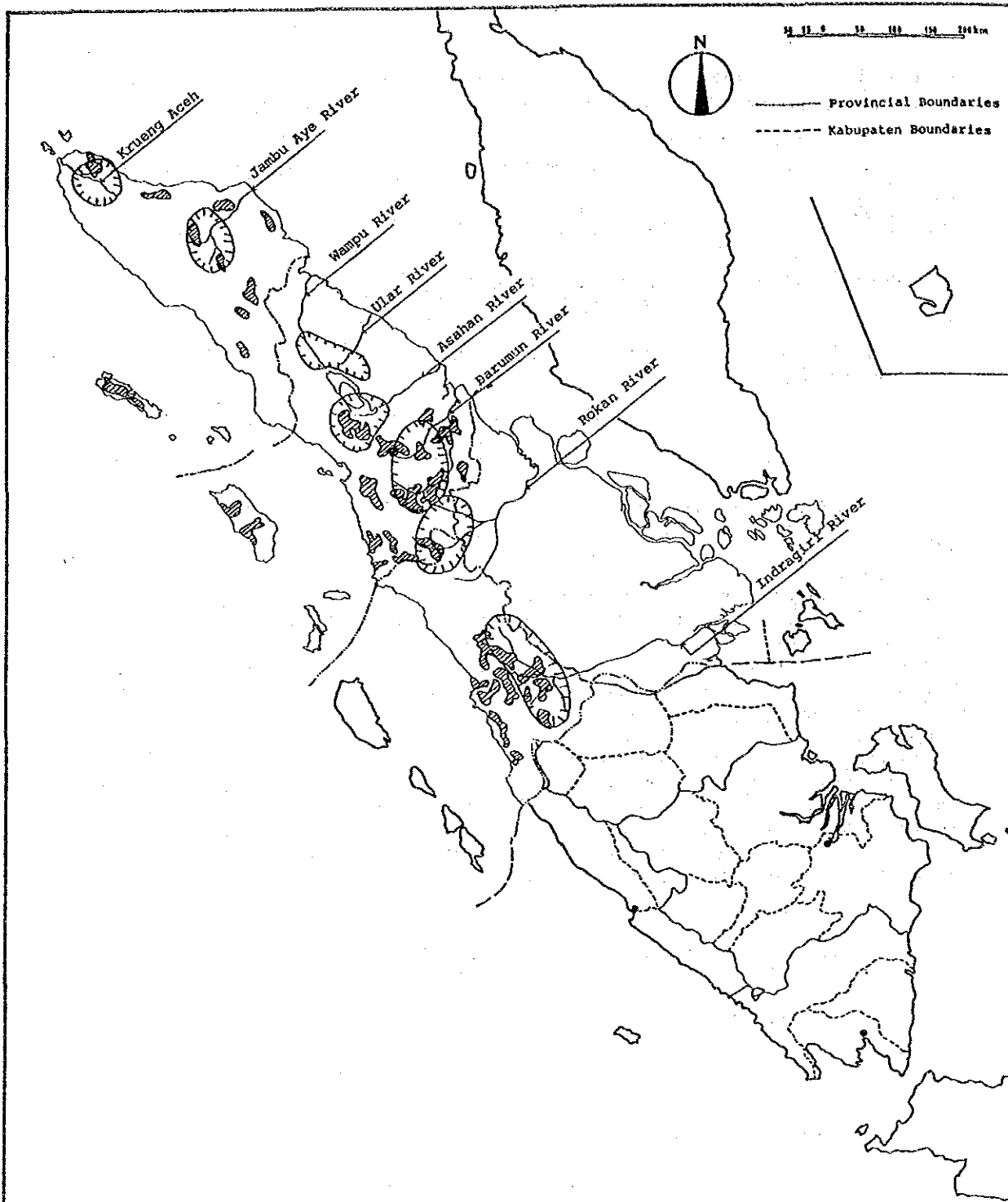
Source: Ministry of Forestry, DAS/Sub-DAS Prioritas Serta Lokasi, 1985.

456. Beyond the issue of critical lands, there is a problem of extensification of inappropriate land use systems in a variety of fragile ecosystem types. These often include settling and farming systems in tidal swamp, uplands, high mountain lands, logged-over tropical forest lands, and conservation forests. The principal watershed management program is based on tree planting or mixed tree crop/annual crops on terraces along with the construction of physical infrastructure, and inducing proper farming system. Taking into account the existing distribution of critical lands, the following 13 watershed management programs have been carried out in the Region (Refer to Figure 59). Since these program areas cover the almost all critical lands in the Region, effective promotion of them would contribute to prevent watershed degradation.

Province	Watershed Management Program
Aceh	-Krueng Aceh
North Sumatra	-Peusangan River
	-Lake Toba Basin
	-Wampu River
	-Ilung River
	-Ular River
West Sumatra	-Lake Maninjau Basin
	-Lake Singkarak Basin
	-Batanghari River
	-Ombilin River
Riau	-Rokan River
	-Kampar River
	-Indragiri River

(2) Environmental Effects on Aquatic Resources

457. The Region is also blessed rich aquatic resources, and the fishery sector not only plays a substantial role in supplying fish to the local people but also contributes to the regional economy through increasing export of fishery products. However, Region's aquatic



Sumber :
Data Pokok untuk Pembangunan D.I.Aceh, Sumatera-
Utara, Sumatera Barat, Riau
Direktorat Tata Guna Tanah, Direktorat Jenderal Agraria

LEGEND :



-  : Critical Watershed
-  : Erosion Area

Figure 60.

Critical Watershed and Erosion
Area in The Region

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resources are often threatened by declining water quality, habitat alterations, and inefficiencies in regulation and management. In the Region, sedimentation is a major problem in most estuaries at the mouths of river basins with heavy human settlement. The northern part of the Riau Province's coastal zone, for example, is reported that once this area was a well known fishing area but the combination of oil drilling in the area and heavy sediment load in the Rokan River from new settlements have virtually eliminated brackishwater fisheries there. In addition to this, the physical alternation of mangrove and tidal wetlands by logging or the construction of "Tambak" and new settlements have probably contributed significantly to the decline of fish population, as well as overexploitation of some fish stocks.

(3) Environmental Effects on Forest Resources

458. The dominant force driving the planning of industrial forestry development programs is the desire to expand timber production, which reflects the national interest in increasing non-oil exports. Although the selective logging system has been induced in Indonesia since 1972, there are few economic incentives for the private sector to follow this system. And it is considered that the ecological features of tropical rain forests present special technical difficulties for sustainable production under this system. Thus, underlying the issue of the sustainability of selective logging could be the lack of basic biological and ecological data, and management technics including the forest fire control on the Region's tropical forest.

459. As mentioned in "Land Use" in this Chapter, the forest lands in the Region have divided into five categories by determinating each function. However, some cultivated lands and settlement areas can be also found in the Nature Reserves or Protection Forest Lands. Therefore, a well-managed land use system and its control is required for conservation of forest and sustainable development of forestry.

(4) Biological Diversity

460. The Region is included in the area which has the richest biological diversity in Indonesia. Despite this richness and the importance of biological diversity, few resources have been devoted to taking inventories, classifying species, or to covering habitats and germ plasm. Without an increased awareness of the importance of this diversity, as well as actions taken to preserve it, the likely impacts on both Region's sustainable development and the people's legacy to future generation will be serious.

461. Due to the low individual/species ratio per hectare, current forestry faces great limits of the number of species that can be harvested as exportable quality timber. This is very inefficient way because a much larger area of forest than necessary must be selectively cut in order to bring adequate returns on investment. The lack of inventorying and classification of hardwood species contributes to this low intensity management of the Region's forests, which increases the risk of further forest loss because of the uncertainties associated with natural regeneration.

462. The current measure for preserving Region's biological diversity is through the establishment of Nature Reserves in the forest lands. The present condition of Nature Reserves in the Region is shown in Table 118. In the Region, there are 17 Nature Reserve, 12 Game Reserve, 8 Recreation Park and 1 Hunting Park, and these areas occupy about 1.4 million ha (about 5% of the total area in the Region). The

Table 118. National Park and Nature Conservation Area in the Region

Aceh	Size (ha)
- Raflesia I/II Serbojadi NR	300.00
- Jantthoi NR	8,000.00
- Gunung leuser GR	416,500.00
- Kluet GR	20,000.00
- Kappi GR	142,800.00
- Pulau Weh RP	1,300.00
- Gurah RP	9,200.00
- Lingga Isaq Hp	80,000.00
Sub Total	678,100.00
North Sumatra	
- Dolok Saut NR	39.00
- Dolok Tinggi Raja NR	167.00
- Batu Gajah NR	1.00
- Sibolangit NR	90.00
- Batu Ginurit NR	0.50
- Liang Balik NR	0.50
- Dolok Sibual-buali NR	5,000.00
- Dolok Sipirok NR	6,970.00
- Langkat Barat GR	51,900.00
- Langkat Selatan GR	82,985.00
- Sikunder GR	79,100.00
- Dolok Surungan GR	23,800.00
- Karang Gading Langkat Timur Laut GR	15,765.00
- Lau Debuk-debuk RP	7.00
- Sibolangit RP	24.85
- Sikunder RP	18,500.00
Sub Total	284,350.00
West Sumatra	
- Baringin Sakti NR	0.30
- Lembah Anai NR	221.00
- Batang Palupuh NR	3.40
- Rimbo Panti NR	2,830.00
- Lembah Harau NR	270.00
- Indrapura NR	221,130.00
- Tai-Tai Batti GR	56,500.00
- Mega Mendung RP	12.50
- Rimbo Panti RP	570.00
- Lembah Harau RP	27.50
Sub Total	281,565.20
Riau	
- Pulau Berkeh NR	500.00
- Kerumutan GR	120,000.00
- Danau P. Besar/Danau Bawah GR	25,000.00
- Pulau Rempang GR	16,000.00
Sub Total	161,500.00
Total	1,405,515.20

Notes: NR = Nature Reserve (Cagar Alam)
 GR = Game Reserve (Suaka Margasatwa)
 RP = Recreation Park (Taman Wisata)
 HP = Hunting Park (Taman Buru)
 Source: Direktorat Pelestarian Alam in Bogor

largest Nature Reserve is Indrapura Nature Reserve in West Sumatra (221,130 ha), but others have rather small areas. Major Game Reserves are Gunung Leuser (416,500 ha) in Aceh and Kerumutan (120,000 ha) in Riau.

463. Nature conservation is under the jurisdiction of the Ministry of Forestry's Directorate General of Forest Protection and Nature Conservation (PHPA). But mainly due to lack of well-trained staff, establishment of sizable areas and buffer zones for nature conservation, and management of designated areas are sometimes not so efficient. While, some protected animals such as elephant (Elephas maximus) sometimes damage the agricultural products especially in Aceh and Riau. Although several countermeasures are now considered by concerned agencies, the exact ecological conditions of these animals are not clear yet. Therefore, more proper countermeasures must be taken after the sufficient survey related to basic ecology, habitats and activities of the protected animals, and damages by them.

(5) Pollution Issues

464. Although large scale pollution issues have not been observed yet, several pollution issues such as air and water quality deterioration can be found in the Region, and some complaint from the local people are also reported to local and regional governments. For example, air quality pollution by dust discharge from a cement factory in Padang, and water quality pollution by discharging waste water which contain a lot of suspended solids from a coal mine site in Ombilin and by discharging untreated waste water from pulp and paper, and oil palm processing factories. A main cause of these pollution issues is lack of sufficient treatment process before discharging contaminated substances to the environment. Principally the first responsibility for environmental pollution control is considered to be on polluters. So, concerned national and regional agencies are needed to take more aggressive activities in order to control environmental pollution.

465. Besides these issues, environmental deterioration in large cities such as river water pollution by domestic waste water discharge in Medan, is often pronounced recently. Therefore, a comprehensive pollution control system would be needed for large cities with appropriate environmental monitoring system of air and water quality.

1.3. Activities of Non-Governmental Organizations

466. The citizen's environmental movement has been steadily growing since the Ministry of Population and Environment (KLH) was established in 1978. At present, it is estimated that there are over 600 NGOs which range from unsophisticated grass roots organizations at the community level to medium and large established organizations at the national and provincial level. The most Indonesian NGOs have concerned about sustainable development for the rural and urban poor who depend on the environment for their livelihood, and many of them cooperate with international networks and funding agencies such as Environmental Liaison Center, Pesticide Action Network and Rainforest Action Network.

467. There has been a recent increase in NGO activities in the aspect of biological diversity, and many NGOs are anxious to get biological diversity projects underway. Some promising fields in which NGOs are currently working on include the following aspects:

- social forestry development

- community nurseries and seed banks
- development of national park buffer zones and biological inventories
- research on appropriate indigenous farming systems
- marine and coastal zone habitat conservation and fishery development

2. Development Strategies

468. Taking into account the current environmental conditions and issues mentioned in the previous sections, the following environmental considerations are recommended to promote and attain the sustainable development in the Region:

2.1. Watershed Management:

- to implement and complete planned and on-going watershed management programs with closer cooperation of concerned agencies
- to improve and establish watershed management systems, especially planning methods, technologies and farming system research on marginal lands
- to undertake experimental watershed management projects as a model development of watershed management in the Region

2.2. Forest and Aquatic Resources:

- to promote forest and aquatic resources inventorying, classification, and land use planning
- to research lesser-known useful species, reproduction and ecological conditions, and habitats conservation
- to develop reserves and national parks, and to integrate resources utilization

2.3. Biological Diversity:

- to promote inventorying of biological resources and to research ecological conditions
- to assess and review of adverse impacts of development projects to the biological resources

2.4. Pollution Issues:

- to strengthen pollution control activities with establishing "Polluter Pay Principle"
- to promote environmental impact assessment in accordance with the existing EIA system
- to monitor environmental conditions especially in large and congested urban areas and to establish proper environmental management systems

C. Land Use

1. Present Situation and Development Potentials

1.1. Present Land Use Conditions in the Region

469. To optimize the limited natural resources which are scattered in different locations, well-planned spatial and land use planning is very important for the regional development. Although many types of land use map have been prepared by different agencies, different time which they were prepared, and for different purposes. Therefore, it is stressed that almost all existing maps do not show the correctly up-to-date land use conditions because land use is so dynamic. Thus, the lack of sufficient information related to current land use conditions, and of adequate land use planning system and criteria is considered as major constraint on efficient and sustainable area development in the Region.

470. At present, there are several sources of land use map, such as BAKOSURTANAL Geography Department (offset color at 1:250,000 scale), AGRARIA (maps of various scales), Center for Soil Research (maps at 1:500,000, 1:250,000). Since land use data become out of date quite quickly, the preferable source of data for this Study must be one where the maps are based on recent information with a fairly detailed map legend. Therefore, the following two sources were used in order to grasp a current land use condition in the Region:

- Land use maps which are prepared by interpreting the most recent LANDSAT images for the Study; and
- Land use maps of "Regional Physical Planning Program for Transmigration (RePPP) Project" which are prepared by using satellite, radar and aerial photograph imagery, combined with a review of available and recent land use maps.

471. The current land use conditions in the Region by using data mentioned above is shown in Table 119, and depicted in the color maps in Volume II. More than 60% of the total land of Aceh, West Sumatra and Riau Province are shown as still covered by forest. In fact, a large proportion in the more accessible areas in these provinces has been exploited, and it will be also logged over in future. Secondary forest and natural scrub areas outside the cultivation cycle, which are classified "bush/scrub" on the Table, share about 12.9%, and grassland about 4.9% in the Region. Shifting cultivation, which is characterized by a mosaic of scattered arable plots in regrowth of ages up to about 5 years, and this may include small plots of permanent cultivation and tree crops, and small pockets of secondary forest, covers about 4.1% of the total land in the Region. Approximately 17.3% of the Region could be considered permanent agricultural land of which 3.1% is upland (dryland) cultivation, 5.7% is cultivated under wetland rice (including irrigated rice field) and 8.5% is classed as tree crop estates. Almost three fifth of the estates are located around Medan in North Sumatra. The permanent upland arable areas occur mainly in the North Sumatra highlands where market-gardening for vegetables is practised, and in the undulating and rolling plains of West Sumatra for food crop production. Wetland cultivation is also considered permanent in the sense that the "sawah" or "padi" fields are used for at least one crop a year, and are associated with permanent villages. Therefore, it is considered that wetland has little availability for area development (but may possibly be considered for future intensification), while

areas of scrub, grassland and shifting cultivation are all considered available for area development planning.

1.2. Classification of Forest Land in the Region

472. The forest lands of Indonesia are divided into five functional classes based on the 1982 Consensus on Forest Land Use (Tata Guna Hutan Kesepakatan, TGHK). The method of classification has been recently outlined by the Ministry of Forest (1987), and summarized as follows:

Function	Purpose	Permitted Exploitation
1. Nature Reserves*	Genetic conservation, Recreation	None
2. Protection Forest	Watershed protection	None
3. Limited Production Forest	Timber production	Selective felling
4. Normal Production Forest	Timber production	Controlled clear felling
5. Convertible Forest	Timber production, Conversion to agricultural land	Clear felling

Note: * Nature Reserves include National Park, Game Reserve, Recreation Park and Hunting Reserve as well as Protected Forest.

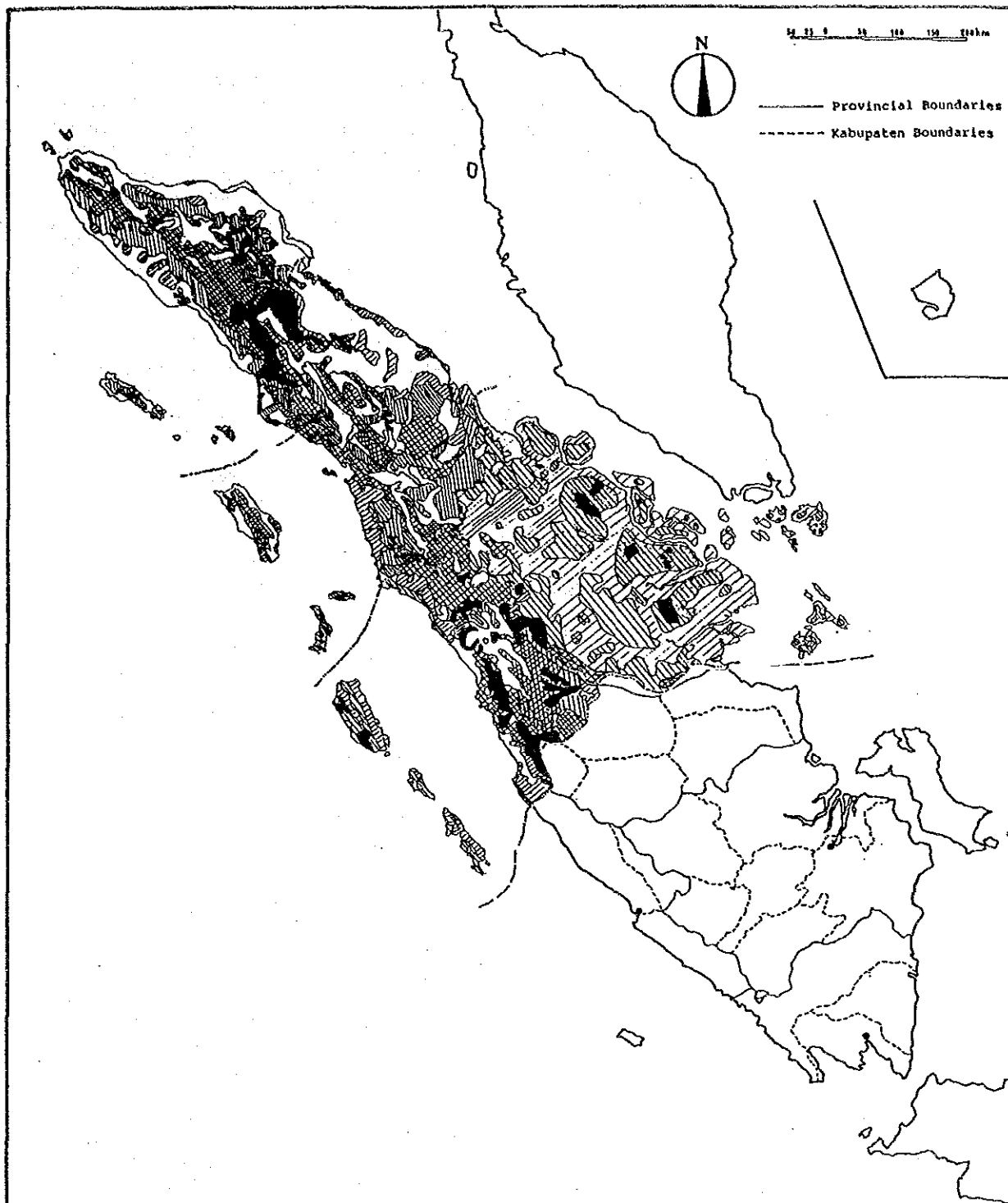
This demarcation recognizes that besides two dominant uses of forests, supply of timber and provision of land for agriculture, the forests serve many additional functions such as production of non-timber products, watershed protection, recreation and tourism spots, stabilization of microclimates, livelihood for indigenous people and repositories of fauna and flora. Thus the better use of forest lands becomes more important through recognition of these functions.

473. The boundary of those forest functions is established by inter-ministerial consensus for each province. The agreed forest function boundaries are intended to delimit the functional zones within the forest areas and so assist macro planning. In principle, no development is permitted within Nature Reserves, Protection Forest, Limited Production Forest on the assumption that these are the lands which require strict conservation and protection from erosion. Normal Production Forest on lower and less steep lands, however, may be available for clearing and development if it contains no forest of high timber potential. Convertible Forest is usually available for clearing and development.

474. The present TGHK in the Region is summarized in Table 120, and Figure 61. At present, 7% of the total area of the Region is designated for Nature Reserves, 16% for Protection Forest, 19% for Limited Production Forest, 12% for Normal Production Forest and 22% for Convertible Forest, and 76% for total.

1.3. Land Use Intensity and Development Concept in the Region

475. In order to see the land use intensity and development concept in the Region, a comparison of agreed forest function area and current land use is conducted in the Study. Land can be divided by



Source : Data Pokok Untuk Pembangunan
DI Aceh, Sumatera Utara, Sumatera Barat, Riau
Direktorat Tata Guna Tanah, Direktorat Jenderal Agraria

LEGEND :






-  Nature Reserve
-  Protection Forest
-  Limited Production Forest
-  Normal Production Forest
-  Convertible Forest

Figure 61.

Distribution of Forest by
Function

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using categorized forest functions by TGHK, namely Permanent Forest Land, in which no conversion from forest to other land use is allowed, includes Nature Reserves, Protection Forest, Limited Production Forest and Normal Production Forest. Convertible Land includes Convertible Forest and Others. As for the current land use conditions, forest area could be considered as an intact or undeveloped area, but others are considered more or less as developed areas. Therefore, the following development or conservation concept could be applied by each combination of the Permanent Forest/Convertible Land and the current land use:

Land Category	Current Land Use	Development/Conservation Concept
Permanent Forest Land	Forest Area	-Forest and Nature Conservation -Forestry Development with sustainable manner
	Bush/Scrub/Grassland Area	-Afforestation or Reforestation -Watershed Management -Land Rehabilitation/Conservation
	Cultivated and Settled	-Extension of Appropriate Agricultural Area Practice -Cultivated Land Conservation and Control -Resettlement of Local People
Convertible Land	Forest Area	-Forestry Development -Conversion to Agricultural Land/ Aquacultural Land
	Bush/Scrub/Grassland Area	-Primary Conversion to Agricultural Land -Agriculture and Livestock Development
	Cultivated and Settled Area	-Land Rehabilitation/Conservation -Intensification of Agricultural Products -Rural and Urban Development

476. The land use intensity in the Region is shown in Table 121 and Appendix 5 to Volume II. In the Region, about 55% (14.4 million ha) of the total area is covered by the Permanent Forest Land and rest of 45% (12.0 million ha) is by the Convertible Land. The land use intensity in the Convertible Land is about 0.70, which shows 70 % of total Convertible Land has been cultivated or settled in the Region. On the other hand, the land use intensity in the Permanent Forest Land is about 0.10, which shows that 10 % of the Permanent Forest Land would be needed appropriate counter measures to cope with marginal land cultivation and to prevent further deterioration of forest lands.

477. Despite of its rather wide Convertible Land (3.6 million ha), North Sumatra shows the highest land use intensity (0.89) in its Convertible Land. Moreover, it is notable that more than 40% of its Permanent Forest Land has been changed from forest to another land utilization. Thus, North Sumatra could be under relatively tight land use conditions, and also it would be needed more effective land use management programs. West Sumatra also has tight land use potential, but its forest area in the Permanent Forest Land seems to have been kept relatively good conditions as well as Aceh. On the other hand, Riau still has considerable room for spatial development and its land use intensity in the Convertible Land is the lowest (0.58) in the Region.

2. Development Strategies

478. Although slope is one of effective indices for land classification, the areas which have conceivable threshold slope over 15%, are almost included in the Permanent Forest Land. Therefore, the criteria selected for land potential evaluation which are adopted in this Study, are the agreed forest function area and erosion area.

479. The result of land potential evaluation of 24 Development Area is shown on Tables 122 to 126, and it is summarized hereunder:

- (i) Development Areas which have high land use potential for new development activities are the four Areas in Riau, 5) West Aceh, 2) Northern Aceh, 6) South Aceh, 12) Southern Tapanuli and 19) Mentawai Islands. Among them, Southern Tapanuli would need proper soil conservation programs for achievement of sustainable development because of its relatively wide erosion areas.
- (ii) Development Areas which their development strategy should be put higher priority on land use intensification than others are the five Areas in West Sumatra, the four Areas in North Sumatra and 1) Aceh Besar. These Areas almost have relatively high land use intensity in Convertible Land.
- (iii) Development Areas which would need proper soil conservation or land rehabilitation programs are 11) North Tapanuli, 12) Southern Tapanuli and 14) Central West Sumatra.
- (iv) Development Areas which should put high priority on forest conservation and re/afforestation programs in the Permanent Forest Land are 9) East Coast, 10) Karo Highlands, 12) Southern Tapanuli and 13) Nias.

480. Taking into account the result of land use potential evaluation mentioned above, the following points should be applied on land use strategy for development of the Region:

- (i) Since almost all lands with steep slope are included in the Permanent Forest Land, development activities in the Permanent Forest Land should be avoided, in principle, except for forestry development with proper reforestation programs;
- (ii) Development activities especially large scale projects should be conducted in the Convertible Land taking into account of wildlife conservation;
- (iii) Land use intensification should be put higher priority than land use extensification, and enhancement of land productivity should be also promoted for increase of agricultural production with proper erosion control;
- (iv) Soil conservation and land rehabilitation measures should be introduced to the cultivation areas having erosion problems;
- (v) Reforestation of forest production/concession areas should be strengthened with proper forestry management; and
- (vi) Main infrastructure-related land issues are the construction of new roads which penetrate tropical primary forest area, and land acquisition for other new kinds of infrastructure such as industrial sites, dams and airports. These issues should be addressed on individual project basis within a broad framework of land use policies.

Table 119. Current Land Use Conditions in the Region

Land Use	Aceh		North Sumatra		West Sumatra		Riau		Region	
	x1,000ha	%	x1,000ha	%	x1,000ha	%	x1,000ha	%	x1,000ha	%
1) Forest *1	3,644.8	65.8	2,491.3	34.8	2,631.4	62.2	5,819.9	61.5	14,587.4	55.3
2) Bush/Scrub *2	576.6	10.4	964.9	13.5	558.6	13.2	1,291.9	13.7	3,392.0	12.9
3) Grassland	307.8	5.6	596.1	8.3	192.0	4.5	201.3	2.1	1,297.2	4.9
4) Shifting Cult.	71.3	1.3	398.7	5.6	124.3	2.9	491.6	5.2	1,085.9	4.1
5) Upland *3	46.5	0.8	565.1	7.9	156.1	3.7	41.3	0.4	809.0	3.1
6) Wetland *4	273.4	4.9	512.3	7.1	310.7	7.3	419.7	4.4	1,516.1	5.7
7) Tree Crop *5	280.3	5.1	1,335.0	18.6	79.8	1.9	561.5	5.9	2,256.6	8.5
8) Unvegetated *6	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	0.0
9) Settlement	108.4	2.0	169.4	2.4	147.1	3.5	153.9	1.6	578.8	2.2
10) Others *7	227.8	4.1	135.2	1.9	30.0	0.7	474.9	5.0	867.9	3.3
Total	5,539.0	100.0	7,168.0	100.0	4,230.0	100.0	9,456.0	100.0	26,393.0	100.0

Notes: *1: Various types of primary forest such as montane, lowland, bamboo, mangrove, etc.
 *2: Secondary forest, bush, scrub outside the present cultivation cycle.
 *3: Upland crops, horticultural crops and vegetables.
 *4: Irrigated and rainfed rice, tidal wetland rice, etc.
 *5: All kind of estate crops.
 *6: Beaches, dunes, scree, rock outcrops, etc.
 *7: Rivers, lakes and others.

Source: REPPROT Project, 1988, Ministry of Transmigration (partially modified by the Team)

Table 120. Agreed Forest Function Areas in the Region

Forest function	Aceh		North Sumatra		West Sumatra		Riau		Region	
	x1,000ha	%	x1,000ha	%	x1,000ha	%	x1,000ha	%	x1,000ha	%
Nature reserves	667	12	254	4	600	14	411	4	1,932	7
Protection forest	1,051	19	1,391	19	1,207	29	530	6	4,179	16
Limited production forest	1,376	25	1,350	19	540	13	1,820	19	5,086	19
Normal production forest	188	3	532	7	597	14	1,874	20	3,191	12
Convertible forest	193	3	254	4	438	10	4,821	51	5,706	22
Others	2,064	37	3,387	47	848	20	0	0	6,299	24
Total	5,539	100	7,168	100	4,230	100	9,456	100	26,393	100

Source:-- Data Popok Untuk Pembangunan, DI Aceh, Sumatra Utara, Sumatra Barat, Riau, Direktorat Tata Guna Tanah, Direktorat Jenderal Agraria

- Kantor Staistik Dan Bappeda, 1986, Propinsi Dalam Angka, DI Aceh, Sumatra Utara, Sumatra Barat, Riau

Table 121. Evaluation of Land Use Intensity in the Region

Category	Aceh		North Sumatra		West Sumatra		Riau		Region	
	x1,000ha	%	x1,000ha	%	x1,000ha	%	x1,000ha	%	x1,000ha	%
1. Permanent Forest Land										
(1) Forest	2,883.9	52.1	2,075.7	29.0	2,200.2	52.0	3,790.2	40.1	10,950.0	41.5
(2) Bush/Scrub/Grassland	221.1	4.0	834.6	11.6	472.0	11.2	418.1	4.4	1,945.8	7.4
(3) Cultivated/Settled/Others	177.0	3.2	616.7	8.6	271.8	6.4	426.7	4.5	1,492.2	5.7
(4) sub total	3,282.0	59.3	3,527.0	49.2	2,944.0	69.6	4,635.0	49.0	14,388.0	54.5
2. Convertible Forest Land and Others										
(5) Forest	760.9	13.7	415.6	5.8	431.2	10.2	2,029.7	21.5	3,637.4	13.8
(6) Bush/Scrub/Grassland	663.3	12.0	726.4	10.1	278.6	6.6	1,075.1	11.4	2,743.4	10.4
(7) Cultivated/Settled/Others	832.8	15.0	2,499.0	34.9	576.2	13.6	1,716.2	18.1	5,624.2	21.3
(8) sub total	2,257.0	40.7	3,641.0	50.8	1,286.0	30.4	4,821.0	51.0	12,005.0	45.5
(9) total [(4)+(8)]	5,539.0	100.0	7,168.0	100.0	4,230.0	100.0	9,456.0	100.0	26,393.0	100.0
3. Forest Remaining Ratio in Permanent Forest Land [(1)/(4)]	-	0.88	-	0.59	-	0.75	-	0.82	-	0.76
4. Land Use Intensity in Permanent Forest Land [(3)/(4)]	-	0.05	-	0.17	-	0.09	-	0.09	-	0.10
5. Land Use Intensity in Convertible Land [((6)+(7))/(8)]	-	0.66	-	0.89	-	0.66	-	0.58	-	0.70
6. Total Land Use Intensity [((3)+(6)+(7))/(8)]	-	0.74	-	1.06	-	0.88	-	0.67	-	0.82

Source: Estimated by the Team

Table 122. Evaluation of Land Use Potential by Development Area (Aceh)

Evaluation item	1) Aceh Besar		2) North Aceh		3) East Aceh		4) Southeast Aceh		5) West Aceh		6) South Aceh		7) Aceh Islands		Total	
	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%
1. Permanent Forest																
(1) Forest	92	28	633	46	365	47	751	78	501	46	463	55	-	-	2,805	51
(2) Bush/Scrub/Grassland	35	11	58	4	50	1	22	0	35	3	12	1	-	-	212	4
(3) Cultivated/Settled/Others	19	6	31	2	40	5	8	1	23	2	42	5	-	-	163	3
(4) sub total	146	45	722	53	455	59	781	81	559	52	517	62	102	58	3,282	59
2. Convertible Forest/Others																
(5) Forest	23	7	145	11	78	10	55	6	246	23	198	24	-	-	745	13
(6) Bush/Scrub/Grassland	95	29	193	14	70	9	78	8	167	15	22	3	-	-	625	11
(7) Cultivated/Settled/Others	62	19	315	23	173	22	48	5	113	10	103	12	-	-	814	15
(8) sub total	180	55	653	47	321	41	181	19	526	48	323	38	73	42	2,257	41
(9) total [(4)+(8)]	326	100	1,375	100	776	100	962	100	1,085	100	840	100	175	100	5,539	100
3. Erosion Area																
(10) Total erosion area	45	14	58	4	10	1	53	6	0	0	20	2	0	0	186	3
(11) Erosion Area in Convertible Forest Area	30	-	35	-	10	-	0	-	0	-	0	-	0	-	75	-
4. Forest Remaining Ratio in Permanent Forest [(1)/(4)]	-	0.6	-	0.9	-	0.8	-	1.0	-	0.9	-	0.9	-	-	-	0.9
5. Land Use Intensity in Convertible Area [(6)+(7)/(8)]	-	0.9	-	0.8	-	0.8	-	0.7	-	0.5	-	0.4	-	-	-	0.6
6. Total Potential Land Area for Development [(8)-(11)]	150	46	618	45	311	40	181	19	526	48	323	38	73	42	2,182	39

Source: Estimated by the Team

Table 123. Evaluation of Land Use Potential by Development Area (North Sumatra)

Evaluation item	8) Medan		9) East Coast		10) Karo Highlands		11) N. Tapanuli		12) S. Tapanuli		13) Nias		Total	
	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%
1. Permanent Forest														
(1) Forest	0	0	390	13	163	31	444	42	941	45	138	26	2,076	29
(2) Bush/Scrub/Grassland	0	0	87	3	90	17	136	13	404	19	118	22	835	12
(3) Cultivated/Settled/Others	0	0	338	12	47	9	123	12	91	4	17	3	616	9
(4) sub total	0	0	815	28	300	57	703	66	1,436	68	273	51	3,527	49
2. Convertible Forest/Others														
(5) Forest	0	0	97	3	35	7	98	9	149	7	37	7	416	6
(6) Bush/Scrub/Grassland	0	0	192	7	32	6	148	14	198	9	156	29	726	10
(7) Cultivated/Settled/Others	26	100	1,808	62	160	30	112	11	327	15	66	12	2,499	35
(8) sub total	26	100	2,097	72	227	43	358	34	674	32	259	49	3,641	51
(9) total [(4)+(8)]	26	100	2,912	100	527	100	1,061	100	2,110	100	532	100	7,168	100
3. Erosion Area														
(10) Total Erosion Area	0	0	168	6	95	18	246	23	341	16	128	24	978	14
(11) Erosion Area in Convertible Forest Area	0	-	113	-	35	-	98	-	56	-	60	-	362	-
4. Forest Remaining Ratio in Permanent Forest [(1)/(4)]	-	-	-	0.5	-	0.5	-	0.6	-	0.7	-	0.5	-	0.6
5. Land Use Intensity in Convertible Area [(6)+(7)/(8)]	-	1.0	-	1.0	-	0.8	-	0.7	-	0.8	-	0.9	-	0.9
6. Total Potential Land Area for Development [(8)-(11)]	26	100	1,984	68	192	36	260	25	618	29	199	37	3,279	46

Source: Estimated by the Team

Table 124. Evaluation of Land Use Potential by Development Area (West Sumatra)

Evaluation item	14) Central WS		15) Pasaman		16) Lima Puluh		17) Southeast WS		18) Pesisir S'tan		19) Mentawai I's		Total	
	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%
1. Permanent Forest														
(1) Forest	148	27	371	47	193	56	785	58	308	54	395	62	2,200	52
(2) Bush/Scrub/Grassland	35	6	90	11	63	18	204	15	57	10	23	4	472	11
(3) Cultivated/Settled/Others	85	16	82	10	19	6	63	5	18	3	5	1	272	6
(4) sub total	268	49	543	69	275	80	1,052	78	383	67	423	67	2,944	70
2. Convertible Forest/Others														
(5) Forest	43	8	52	7	25	7	75	6	58	10	179	28	432	10
(6) Bush/Scrub/Grassland	49	9	58	7	5	1	102	8	37	6	27	4	278	7
(7) Cultivated/Settled/Others	186	34	131	17	38	11	123	9	92	16	6	1	576	14
(8) sub total	278	51	241	31	68	20	300	22	187	33	212	33	1,286	30
(9) total [(4)+(8)]	546	100	784	100	343	100	1,352	100	570	100	635	100	4,230	100
3. Erosion Area														
(10) Total Erosion Area	205	38	143	18	173	50	168	12	101	18	0	0	790	19
(11) Erosion Area in Convertible Forest Area	65	-	28	-	50	-	73	-	41	-	0	-	257	-
4. Forest Remaining Ratio in Permanent Forest [(1)/(4)]	-	0.6	-	0.7	-	0.7	-	0.7	-	0.8	-	0.9	-	0.7
5. Land Use Intensity in Convertible Area [(6)+(7)/(8)]	-	0.8	-	0.8	-	0.6	-	0.8	-	0.7	-	0.2	-	0.7
6. Total Potential Land Area for Development [(8)-(11)]	213	39	213	27	18	5	227	17	146	26	212	33	1,029	24

Source: Estimated by the Team

Table 125. Evaluation of Land Use Potential by Development Area (Riau)

Evaluation item	20) Kampar		21) Bengkalis		22) In'giri Hulu		23) In'giri Hilir		24) Riau Islands		Total	
	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%	1000ha	%
1. Permanent Forest												
(1) Forest	1,175	41	1,492	49	717	45	351	30	-	-	3,735	39
(2) Bush/Scrub/Grassland	208	7	93	3	68	4	20	2	-	-	389	4
(3) Cultivated/Settled/Others	117	4	116	4	55	3	23	2	-	-	311	3
(4) sub total	1,500	53	1,701	55	840	53	394	34	200	25	4,635	49
2. Convertible Forest/Others												
(5) Forest	446	16	683	22	367	23	321	28	-	-	1,817	19
(6) Bush/Scrub/Grassland	553	20	198	6	223	14	20	2	-	-	994	11
(7) Cultivated/Settled/Others	336	12	483	16	155	10	426	37	-	-	1,400	15
(8) sub total	1,335	47	1,364	45	745	47	767	66	610	75	4,821	51
(9) total [(4)+(8)]	2,835	100	3,065	100	1,585	100	1,161	100	810	100	9,456	100
3. Erosion Area												
(10) Total Erosion Area	0	0	0	0	0	0	0	0	0	0	0	0
(11) Erosion Area in Convertible Forest Area	0	-	0	-	0	-	0	-	0	-	0	-
4. Forest Remaining Ratio in Permanent Forest [(1)/(4)]	-	0.8	-	0.9	-	0.9	-	0.9	-	-	-	0.8
5. Land Use Intensity in Convertible Area [(6)+(7)/(8)]	-	0.7	-	0.5	-	0.5	-	0.6	-	-	-	0.5
6. Total Potential Land Area for Development [(8)-(11)]	1,335	47	1,364	45	745	47	767	66	610	75	4,821	51

Source: Estimated by the Team

Table 126. Evaluation of Land Use Potential

Province	Development Area	Total Area	Erosion Area	Forest Remaining	Land Use Intensity**	Total Potential Land Area		Potential Area for New Dev.***	
		x1000ha	x1000ha	Ratio*		x1000ha	%	x1000ha	%
Aceh	1) Aceh Besar	326	45	0.6	0.9	150	46	15	5
	2) North Aceh	1,375	58	0.9	0.8	618	45	124	9
	3) East Aceh	776	10	0.8	0.8	311	40	62	8
	4) Southeast Aceh	962	53	1.0	0.7	181	19	54	6
	5) West Aceh	1,085	0	0.9	0.5	526	48	263	24
	6) South Aceh	840	20	0.9	0.4	323	38	194	23
	7) Aceh Islands	175	0	-	-	73	42	-	-
	sub-total	5,539	186	0.9	0.6	2,182	39	873	16
North Sumatra	8) Medan Met.	26	0	0.0	1.0	26	100	0	0
	9) East Coast	2,912	168	0.5	1.0	1,984	68	0	0
	10) Karo Highland	527	95	0.5	0.8	192	36	38	7
	11) N.Tapanuli	1,061	246	0.6	0.7	260	25	78	7
	12) S. Tapanuli	2,110	341	0.7	0.8	618	29	124	6
	13) Nias	532	128	0.5	0.9	199	37	20	4
	sub-total	7,168	978	0.6	0.9	3,279	46	328	5
West Sumatra	14) Central W.S.	546	205	0.6	0.8	213	39	43	8
	15) Pasaman	784	143	0.7	0.8	213	27	43	5
	16) Lima Puluh	343	173	0.7	0.6	18	5	7	2
	17) Southeast W.S.	1,352	168	0.7	0.8	227	17	45	3
	18) P. Silatan	570	101	0.8	0.7	146	26	44	8
	19) Mentawai	635	0	0.9	0.2	212	33	170	27
	sub-total	4,230	790	0.7	0.7	1,029	24	309	7
Riau	20) Kampar	2,835	0	0.8	0.7	1,335	47	401	14
	21) Bengkalis	3,065	0	0.9	0.5	1,364	45	682	22
	22) Ind. Hulu	1,585	0	0.9	0.5	745	47	373	24
	23) Ind. Hilir	1,161	0	0.9	0.6	767	66	307	26
	24) Riau Islands	810	0	-	-	610	75	-	-
	sub-total	9,456	0	0.8	0.5	4,821	51	2,411	25
Region	Total	26,393	1,954	0.8	0.7	11,311	43	3,920	15

notes: *: Forest Remaining Ratio in Permanent Forest Area =Current Forest Area /Permanent Forest Area.

** : Land Use Intensity in Convertible Area.

*** : Potential Area for New Development =Land Use Intensity x Total Potential land Area.

Source: Estimated by the Team

X. TOURISM

A. Present Situation and Development Potentials

1. International Tourism

481. The number of foreign tourists in Indonesia has been steadily increasing in recent years (Table 127). The increase is about 46 thousands during the last 5 years, and the number has become almost 1.8 times larger than before. In terms of international comparison with other ASEAN countries, however, the number of foreign tourists is still just the fourth among them (Table 128). For instance, it is just about one third of Singapore's, Thailand's and Malaysia's.

Table 127. Number of Foreign Tourists Arrival

	1982	1983	1984	1985	1986	1987
Number	598,145	637,614	700,910	749,351	825,035	1,060,347
Index	100	107	117	125	138	177

Sources: BPS, Statistical Year Book of Indonesia, 1986, and D.G. Tourism, Tourism in Indonesia 1987.

Table 128. Number of Foreign Tourists in ASEAN Countries (1987)

	Number of Tourists (000)	Rank	Index
Indonesia	1,060	4	1.0
Singapore	3,679	1	3.5
Thailand	3,483	2	3.3
Malaysia	3,146	3	3.0
Philippines	795	5	0.8

Source: Tourism Office of D.I. Aceh, Lokakarya Pemasaran Bersama Pariwisata Sumatra Bagian Utara, 1989.

482. Presently the most attractive areas for foreign tourists are Bali and Java. Besides the two islands, Lake Toba in Sumatra, Tanah Toraja and Menado in Sulawesi are also well known. Indonesia has a number of other fascinating tourism resources with latent development potentials. Few of them have been developed or utilized yet, however, which indicates that the tourism in Indonesia as a whole is still at an early stage of development.

483. The number of foreign tourists in the Region has also been growing steadily. In particular, North Sumatra and Riau have recently received over 10% of the nation's total foreign tourists, and play dominant roles in tourism in the Region (Table 129).

484. The composition of foreign tourists by nationality differs by province (Table 130). In North Sumatra and Riau the tourists from the two neighboring countries, Malaysia and Singapore, account for a majority. On the other hand, in Aceh and West Sumatra the tourists from European countries, the United States, Australia and New Zealand are dominant. The number of Japanese tourists recently ranks third in Indonesia. In the Region, however, it ranks only fourth to eighth depending on the province.

Table 129. Number of Foreign Tourists in the Region

	1982	1983	1984	1985	1986	1987
Aceh	148	159	235	358	1,721	2,073
North Sumatra	56,219	68,229	83,185	86,936	88,217	107,490
West Sumatra	11,567	12,514	14,289	16,404	19,303	22,816
Riau	20,678	23,783	50,393	60,161	80,267	151,312
Region	88,612	104,685	148,102	163,859	189,508	283,691
Indonesia	598,145	637,614	700,910	749,351	825,035	1,060,347

Sources: Data from Tourism office of each Province, D.G. Tourism, Tourism in Indonesia 1987.

Table 130. Rank and Share of Foreign Tourists by Country

	Country's Share (%)			Year
	1st	2nd	3rd	
Aceh	Holland (15.6)	U.S.A. (13.1)	West Germany (11.3)	1987
North Sumatra	Malaysia (38.1)	Singapore (21.0)	Holland (11.6)	1987
West Sumatra	Holland (16.3)	Australia & New Zealand (12.9)	Malaysia (10.6)	1986
Riau	Singapore (80.4)	Malaysia (10.8)	U.S.A. (2.7)	1988
Indonesia	Australia (14.8)	Singapore (14.2)	Japan (12.0)	1986

Sources: Data from Tourism Office of each Province, and BPS, Statistical Year Book of Indonesia, 1986.

2. Characteristics of Domestic Tourism

485. It is the policy of the Government to stimulate domestic tourism including youth tourism. The domestic tourism is becoming increasingly important and being given development priority as a means of redistributing income throughout the country, providing a necessary change of environment for urbanities and encouraging a sense of national unity among Indonesia's many ethnic groups. In fact, the domestic tourist has gradually increased in line with the international tourist. However, an arising problem is the absence of adequate system for collecting necessary data needed by the government institutions, or other tourism industries in the private sector. This has become a big constraint in making an accurate analysis for future planning.

486. Some information on the domestic tourism can be found in the 1981 and 1984 surveys on domestic tourism done by the Central Bureau of Statistics (BPS). The surveys covered 30,000 households, so the total coverage was about 150,000 people which was about 0.1% of the total population. Even though the sample size is not large enough for statistical analysis, the surveys show us general characteristics of the domestic tourism. Table 131 is a brief summary of the surveys.

487. The Directorate General of Tourism pointed out the existence of following supporting factors and conditions in Indonesia today for developing domestic tourism.

- a) The political stability and safe situation which enable people having a comfortable, free and safe travel.
- b) The increase of national economic growth rate and per capita income that has made it possible for the people to dispose some of their income for travelling.
- c) The average education and knowledge level of the people has increased, which is a great stimulus for them to widen their horizon by travelling.
- d) The better quality of infrastructure such as road, telecommunication and transportation facilities has stimulated and eased people in travelling.
- e) The construction of tourist infra- and supra-structure such as accommodation, recreation parks, transportation, restaurant, etc.

488. Major travel modes for tourists in the Region are air transport and land transport. In addition, sea transport is also available. Air transport is the easiest and most comfortable means of travel to the Region from outside areas. Air services are available to the provincial capitals and other remote areas such as Batam, Pulau Bintan, Nias, by several airlines. The flight network is shown in Progress Report I (refer to the transportation sector). Train services are only available around Padang in West Sumatra and Medan in North Sumatra. Therefore, the role of railway is minor for tourism. Bus services are available throughout the Region and interregional services such as the Bali-Banda Aceh route and the Java-Sumatra route are also available (Table 132). The role of bus services is very important for domestic tourism.

Table 131. General Characteristics of Domestic Tourism

(1) Purpose of Trips (in 1981 and 1984)	- Four major purposes: (i) Visit to friends and relatives (38%, 42%) (ii) Holiday, recreation (34%, 23%) (iii) Business (10%, 12%) (iv) Pilgrimage (4%, 7%)
(2) Number of Travellers (in 1984)	- 10% of the total sample made a trip: among the 10% people 79%: one trip 13%: two trips 7%: more than two trips - Men's share to the total trips is 63%.
(3) Trip mode for recreational purposes (in 1984)	- 62%: by bus or taxi 18%: by private or government car 2%: by train 1%: by air plane
(4) Origin and destination (in 1984)	- Region of Origin Sumatra 18% Central Java 12% West Java 26% Jakarta 5% East Java 12% Yogyakarta 3% - Destination (i) Sumatrans spend 94% in Sumatra and 5% in Java (mainly Jakarta). (ii) Javanese spend 98% within Java.
(5) Destination objects for holiday and recreation (in 1984)	- Two major destinations (i) 28%: Beach and sea garden (ii) 17%: Recreation park - Four sub-destinations (i) 11%: Zoo (ii) 8%: Lake, dam, cave (iii) 8%: Tourism park (iv) 8%: Historical attraction
(6) Length of stay (in 1984)	- Day trip is dominant - Share of day trippers (i) 38%: All visits (ii) 65%: Visits to tourism objects (iii) 79%: Visits to beaches and sea gardens
(7) Accommodations (in 1984)	- Of tourists who stay overnight, more than 50% stay in an own or family house. Only 3 to 4% tourists stay at hotels and quest houses.
(8) Tourist expenditure (in 1979)	- Transportation 41 to 47% - Food and drink 22 to 26% - Lodging accommodation 10 to 15% The cost of public and private transport is critical for the growth of domestic travel.

- Sources: (1) (1) - (7): BPS, Survei Perjalanan Penduduk Tahun 1981 and 1984.
(2) (8): TTI, Laporan Survei Wisatawan Domestik, Balai Penelitian Pendidikan, Bandung, 1979.
(3) UNDP, Marine Tourism Plan for Indonesia, 1988.

Table 132. Major Bus Service Routes

[From Medan]		[From Padang]	
Route	Distance (km)	Route	Distance (km)
Medan-		Padang-	
Meulaboh	616	Pekanbaru	312
Tapaktuan	397	Dumai	498
Cotgirek	338	Sibolga	470
Lhokseumawe	308		
Banda Aceh	880		
Peureulak	222		
Padang	869		
Pariaman	802		
Takengon	491		
Sigli	484		
Birueun	388		
Kuala Simpang	137		
Bukittinggi	729		
Payakumbuh	761		
Air Bangis	768		
Pekanbaru	949		
Dumai	994		

[Java - Sumatra]	
Route	Distance (km)
Jakarta-	
Padang	1,493
Bukittinggi	1,547
Pariaman	1,627
Banda Aceh	2,219

Source: Directorate General of Tourism, Indonesia Travel Planner '88.

489. PELNI, a state-owned shipping company has six regular sailing routes serving all main ports of Indonesia. Four of them cover the ports in the Region, which are Malahayati (Banda Aceh), Lhokseumawe, Belawan, Dumai, Sibolga, and Padang. Sailing offers an alternative to flying or other travel means. As the sailing schedules are presently only bi-weekly, however, utilization of sailing for tourism in the Region is still limited.

490. The present situation of hotel accommodation is shown in Table 133 and 134. The regional composition of classified hotels resembles the nations total. Presently, however, the Region doesn't have any five star hotels yet, even though other major tourist destinations such as Bali and Jakarta have them.

Table. 133. Number of Classified Hotel and Non-Classified Hotels and Rooms by Province and Classification (1987/1988)

Province	1 Star		2 Star		3 Star		4 Star		5 Star		Total	
	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	1988	
	Hotel	Room	Hotel	Room	Hotel	Room	Hotel	Room	Hotel	Room	Hotel	Room
Aceh	7	258	3	147	2	61	0	0	0	0	12	466
North Sumatra	14	594	12	743	5	671	2	463	0	0	33	2,471
West Sumatra	9	229	4	223	1	54	0	0	0	0	14	506
Riau	7	324	4	311	2	130	1	196	0	0	14	961
Region	37	1,405	24	1,424	10	916	3	659	0	0	73	4,404
(%)	(50)	(32)	(33)	(32)	(13)	(21)	(4)	(15)	(0)	(0)	(100)	(100)
Indonesia	200	7,493	118	7,381	65	6,779	19	4,315	11	5,214	413	31,182
(%)	(48)	(24)	(28)	(23)	(16)	(22)	(5)	(14)	(3)	(17)	(100)	(100)

Source: D.G. Tourism, Tourism in Indonesia 1988.

Table 134. Number of Non-Classified Hotels and Rooms (1987/1988)

Province	Accommodations	Rooms
Aceh	92	1,704
North Sumatra	285	5,510
West Sumatra	74	1,553
Riau	110	2,694
Region	561	11,461
Indonesia	3,336	68,462

Source: D.G. Tourism, Tourism in Indonesia 1988.

3. Identification of Development Potentials

491. North Sumatra and West Sumatra have been designated as two of the ten major tourist destinations in the country by the Directorate General of Tourism, the Department of Tourism, Post and Telecommunications. Recently, seven other provinces including Aceh and Riau have been added to the destinations. It means that all the provinces in the Region are defined as an area with tourism development potentials.

492. In Aceh two major centers of tourism were identified in the provincial tourism master plan. They are the Banda Aceh zone and the Takengon zone. The development plan of the Lhoknga-Lampuuk area in the former zone was proposed in 1986. It is basically crucial to the tourism promotion in this province to improve the accessibility from other areas and to foster tourism industries.

493. North Sumatra has been playing a leading role in tourism in the Region. Lake Toba and its vicinity, Nias island and Sibolga may be pointed out as areas with high development potentials. The improvement of roads and telecommunication facilities in the Nias island and the Samosir island is rather urgent for utilization of their potentials. Furthermore, the development of the interprovincial route connecting Medan, Lake Toba, and Padang is getting more important to compete with other regions.

494. Tourism resources in West Sumatra are mainly based on its natural splendour and its unique Minangkabau culture. Bukittinggi and its vicinity in the Minang highlands have the highest development potential. Recently, however, a shortage in hotels in Bukittinggi often causes cancellation of international group tours. The coastal zone in the south of Padang is also prospective for marine sports.

495. In Riau, marine sports have the most prospective potential, in particular, in Bintan island and Batam island. The Ministry of Tourism, Post and Telecommunications recently completed the marine tourism plan for Indonesia which defined the both islands as a prospective marine sports area in the country.

496. An inventory has been made of natural, cultural and historical attractions of the Region. The availability of tourism attractions is a precondition for the development of tourism areas and resorts, and further a combination of natural, cultural and historical attractions will strengthen the tourism product of an area. Such areas will attract tourists with a varied range of motivations. The inventory shown from Table 135 to 140 has two parts, a classification of tourism objects by their characteristics and a list of possible tourism activities per object. The development potential of each object has been roughly evaluated by its total score of marked items in the two parts of the inventory; the score of a double circled item is 2

and a single circled item is 1. The evaluation criteria are as follows:

Grade A (object with very high potential): the score is more than 8.
Grade B (object with high potential): the score is between 4 and 7.
Grade C (other object): the score is less than 3.

497. Presently, there is no single place in the Region which can attract as many tourists as Bali. Therefore, it is a key to the tourism promotion in the Region to develop international, interregional and interprovincial travel routes and package tour programs. The following possible routes, for instance, can be pointed out for further study.

- (i) Bali - Java - Northern Sumatra
- (ii) Java - Northern Sumatra - Java, or Bali - Northern Sumatra - Bali
- (iii) Singapore - Northern Sumatra - Penang

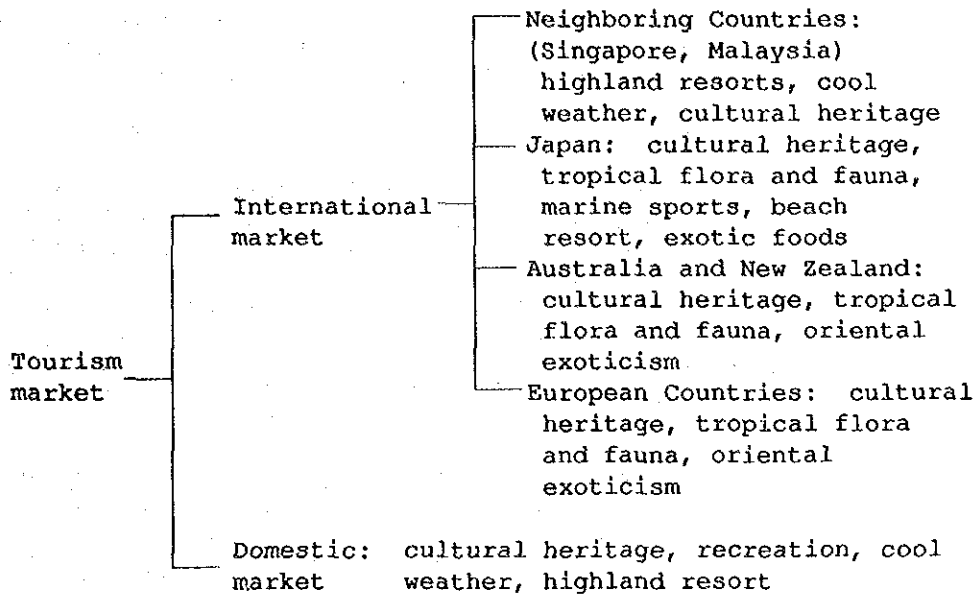
4. Potential Market

498. It is very important for the tourism promotion in the Region to meet various needs of the different sub-markets. First, the market may be divided into two sub-markets, namely, the international and the domestic markets. Second, the international market may be divided into four-sub markets. These sub-markets are summarized in Table 141.

Table 138. Possible Tourism Activities per Object, North Sumatra

Location/object	Sight-seeing										Grade			
	- art & craft	- folklore, festival	- nostalgic tour	- wild life tour	- naive way of life	Recreation						- camping		
						- rest & relax	- swimming, sunbath	- sailing	- game fishing	- diving/scuba diving	- windsurfing, waterskiing	- hunting	- hiking, trekking	- golf, tennis, etc.
Medan and the vicinity														
Istana Sultan Deli	○	○												
Mesjid Raya	○	○												
Sunggal														
Percut						○	○							
Pantai Cermin						○	○		○					
Orange Utan Rehabilitation Center					○									
Lake Toba and the vicinity														
Parapat - Ajibata		⊙	○				⊙	○	○		○		⊙	○
Tongging				○			○					○		
Tuk-tuk Siadong	○	○	○				⊙	○				○	○	○
Simanindo		○	○		○									○
Tomok		○	○											
Pangururan														
Gurgur				○			○							
Meat				○			○							
Nias														
Bawomataluo		○		⊙										
Telk Dalam							○	○	○					
Hilisimaetano		○		⊙										
Lagundri							○	⊙	○	⊙				
Lahusa - Gomo		○		⊙										
Karo														
Brastagi		○					⊙					○	⊙	○
Tongkoh							○							
Kampung Lingga	○	○	○											
Sibolga														
Pandan							○	○	○					
Pulau Poncan							○	○		○				
Pulau Mursala							○	○		○				

Table 141. Tourism Sub-Market Structure and Their Needs



499. Tourists' needs may differ by submarket. It is very crucial to grasp those diversified needs correctly and program a tourism promotion based on the market segments properly. In terms of foreign exchange earnings, the international markets are very important, but also it will become more important than today in terms of economic and social aspects to respond properly to the recently growing domestic tourism market.

B. Development Strategy

1. Development Goals

500. The major development strategy may be summarized as follows:

- to develop tourism routes responding to different submarkets based on the tourism networks in the Region.
- to improve or build up the relevant infrastructure such as roads, seaports, airports, telecommunications, water supply, and so forth, to strengthen the tourism networks, and to induce private investments. Practically, it is desirable to implement integrated development programs with other related sectors.
- to take necessary actions for conservation of tourism resources such as historic remains, nature reserves, cultural activities and so forth.
- to promote the private tourism industry with incentives such as tax exemption and subsidy.
- to develop human resources in the tourism industry and the relevant government offices and to standardize the level of services responding to various needs of visiting tourists.

501. It will take long time and a great deal of cost to do all the above, however. Therefore, the Team recommends the following strategy: improvement in the service sector should come first to enhance service

quality; this should be supported by the government's investment in tourism-related minimum infrastructure. Then, with more tourists visiting the Region private investors may well be attracted to make investments in tourism facilities. As a result, more tourists will come, and more infrastructure can be developed subsequently.

2. Growth Targets for Tourism in the Region

502. The government target is to reach 1.2 million international arrivals per year by the end of Repelita IV (in March, 1989) with an average stay of 12 to 14 nights and the expected foreign exchange revenue between US\$1,080 and 2,100 million. According to the recent announcement by the government, the number of foreign tourists to Indonesia from January to December in 1988 has surpassed the target of 1,254,000 tourists set for 1988 and has reached 1,286,000, bringing in foreign exchange amounting to US\$1,061 million. It implies that the above target for 1988/89 can be achieved as was expected.

503. However, even with very effective measures from the public and private sectors, tourism is not likely to keep increasing at the present fast pace after 1988/89. The achievement of sustained growth for the next 20 years depends to a great extent on the capability of the public sector to launch the highly ambitious marketing and promotion program. Without intensive and adequate promotion, the international tourists will fail to come and Indonesia will face serious problems in making sufficient returns on its investments in the tourism industry.

504. Table 142 and Figure 62 present the growth targets for tourists from the international markets. As a basis for the projection of tourist flows to the Region a moderate growth of 6.4% has been used. At this growth rate, arrivals will reach 1.3 million in 2008 which is more than triple arrivals in 1988. The main flows of international tourists in the next 20 years are shown in Figure 63.

Table 142. Growth Targets for Foreign Visitor Arrivals (1988 - 2008)

	1988	1993	1998	2003	2008	(x 1,000) Average Annual Growth Rate
Aceh	3	7	13	20	37	13.6%
North Sumatra	116	189	277	368	465	7.2%
West Sumatra	26	44	59	74	96	6.7%
Riau	233	329	425	564	700	5.7%
Region	378	569	773	1,026	1,298	6.4%

Source: Team's estimate.

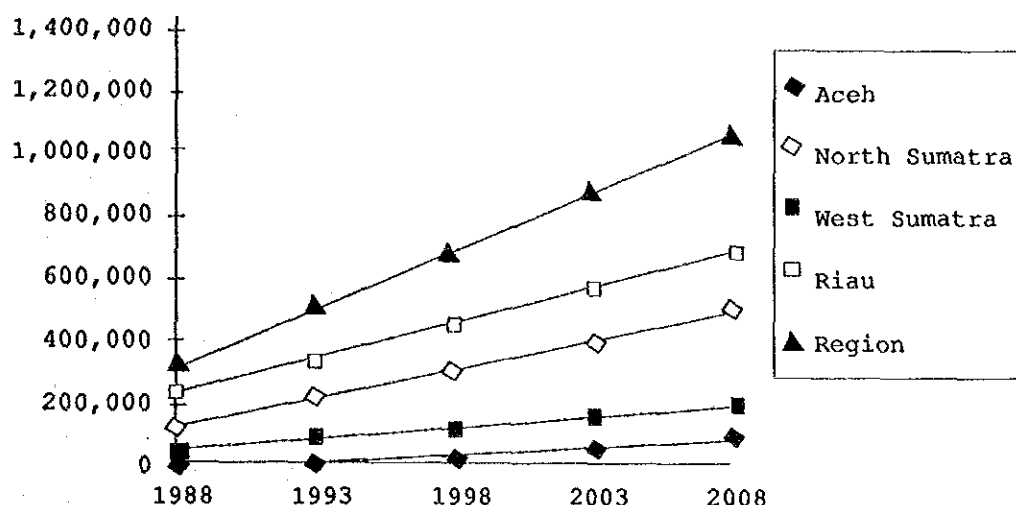


Figure 62. Growth Targets for Foreign Visitor Arrivals (1988 - 2008)

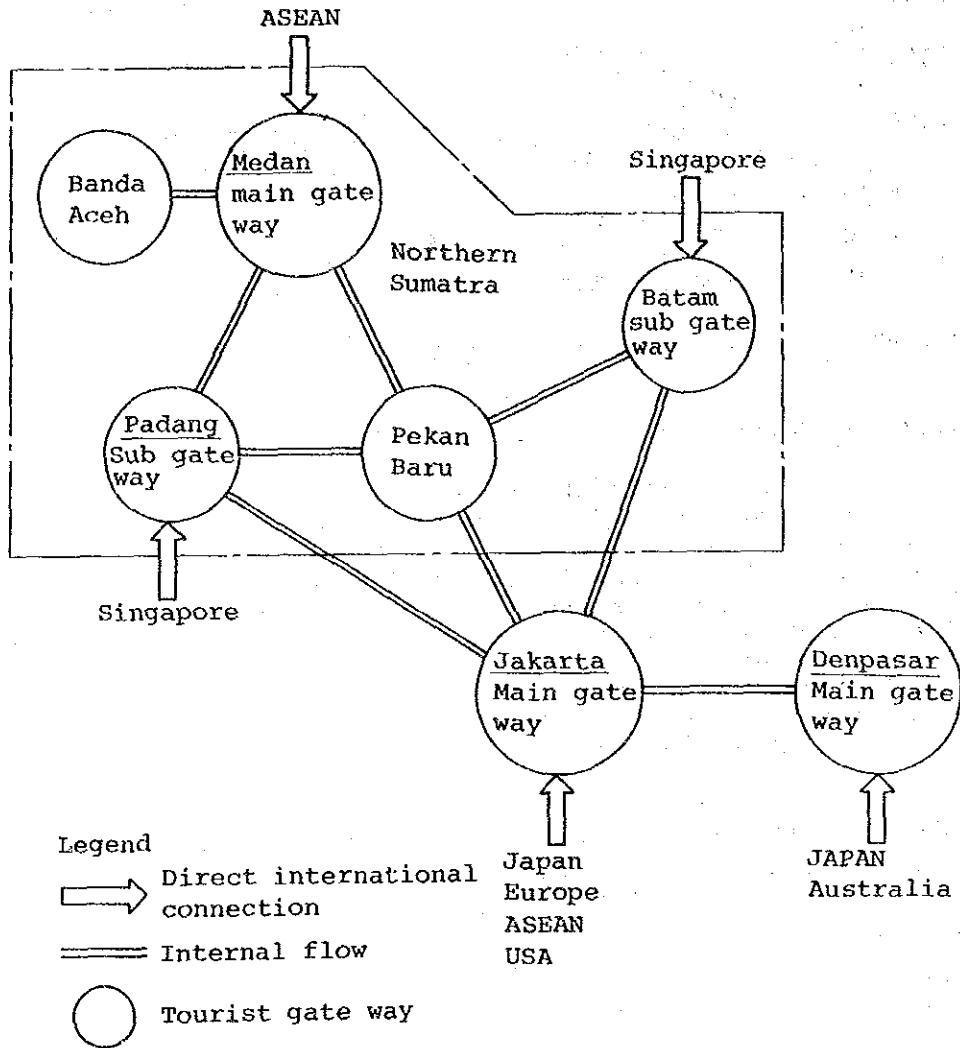
3. Number of Rooms Required in the Region

505. The total number of foreign visitors to be attracted to the Region on the short term (in 1993) has been estimated to be 569,000, those on the long term (in 2008) 1,298,000 (Table 143). The average length of stay of visitors in the Region may be estimated around 6 days. This is in line with the present length of stay of visitors from Singapore and Malaysia whose share to the total visitors is and will remain very dominant in the Region. In addition, the visitors from Australia, U.S.A. and Europe who significantly stay longer than visitors from Singapore and Malaysia tend to visit more than one destination in the country during one trip.

Table 143. Average Length of Stay of Foreign Visitors, 1984/1985

Country	By country of residence (days)	By nationality	
		All visitors (days)	Holiday makers (days)
Singapore	5.8	5.6	5.7
Australia	11.8	11.8	11.7
Japan	8.8	8.6	6.7
U.S.A.	14.5	13.3	11.5
Malaysia	5.8	5.7	5.4
U.K.	12.0	11.6	10.7
The Netherlands	26.1	25.1	25.6
West Germany	21.7	21.0	22.1
France	22.0	22.6	22.8
Italy	13.0	12.7	12.9
Overall	12.7	12.7	12.5

Source: BPS, Foreign Visitor Survey 1984/85.



Source: UNDP, Marine Tourism Plan for Indonesia, 1988.
Modified by the team

Figure 63. Scheme of International Tourism Access to the Region

Table 144. Classified Hotel Accommodation in the Region

Class	No. of Hotels	No. of Rooms
4 star	3	659
3 star	10	916
2 star	24	1,424
1 star	37	1,405
Total	73	4,404

Source: D.G. Tourism, Tourism in Indonesia 1988.

506. Supposing that 15% of arrivals can be expected to come in the peak month, December, 85,350 foreign visitors will come in the peak month in 1993, and 194,700 in 2008. Given the number of 85,350 visitors in 1993, the total number of beds required will be 17,070, (number of visitors x average length of stay/30 days) the number of rooms 8,535 (two beds/room). In 2008, the number of beds required will be 38,940, the number of rooms 19,470. At present the number of rooms in classified hotels in the Region is 4,404 (Table 144), and generally most of the foreign visitors stay at classified hotels (in particular three, four and five-star hotels). Therefore, at least 4,131 rooms of the classified hotels will have to be provided by 1993 and 15,067 rooms by 2008 (Table 145).

Table 145. Rooms to be Provided by 1993 and 2008

	1993	2008
Visitors per year	569,000	1,298,000
Visitors in peak month	85,350	194,700
Beds required	17,070	38,940
Rooms required	8,535	19,470
Present stock of rooms	4,403	4,403
Additional rooms required	4,131	15,067

Source: Team's estimate.

4. Estimated Absorption of Manpower

507. According to the Directorate General of Tourism (Tourism in Indonesia 1988), the estimated absorption of Indonesian manpower in the tourism sector either direct or indirect one is as follows;

- Each foreign tourist absorbed one labourer
- Every 10 domestic tourists absorbed one labourer

508. Based on the above assumptions an estimation of 378,000 foreign tourist arrivals in the Region in 1988 would absorb 378,000 labourers in the tourism sector (Table 146). Because of a lack of the sufficient data on the domestic tourism the effect of the domestic tourism is uncertain at present. The following is the number of manpower that will be absorbed by the foreign tourists by the year of 2008.

Table 146. Manpower Absorption in the Tourism Sector in the Region

Year	Foreign Tourists	Manpower Absorption
1988	378,000	378,000
1993	569,000	569,000
1998	773,000	773,000
2003	1,026,000	1,026,000
2008	1,298,000	1,298,000

Source: Team's estimate.

509. It is expected that the tourism sector will absorb 920,000 additional labourers from 1988 to 2008 by the growth of international tourism. Furthermore, the growing domestic tourism also will absorb new labourers. Therefore, human resource development responding to the needs of the different tourism markets is quite crucial to the tourism promotion in the Region.

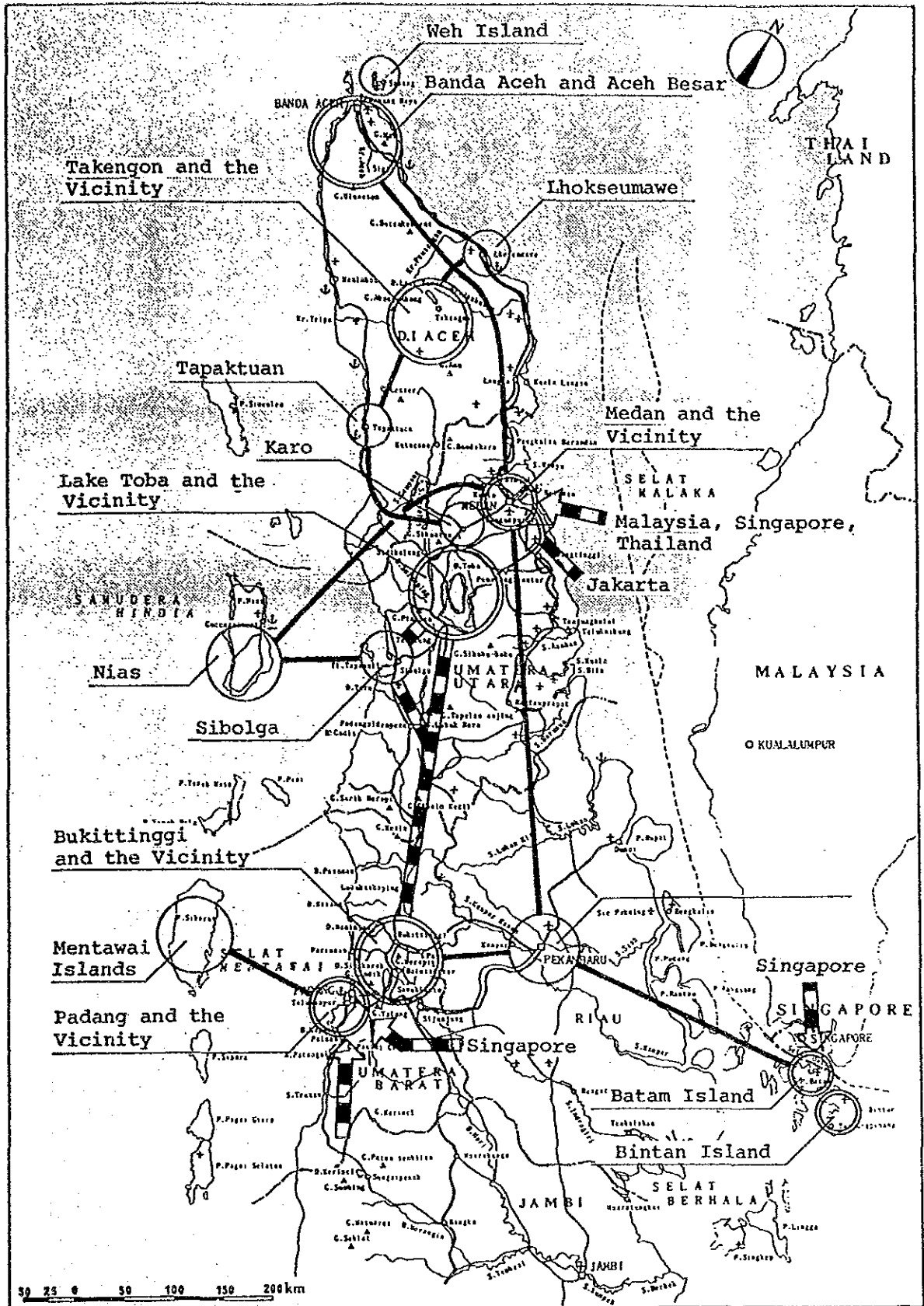
5. Development Concept for the Potential Areas in the Region

510. Based on the inventory, the following areas have been identified as a main tourism development area which must have at least two tourism objects with grade A and/or has a tourist gateway city to the Region in the area:

Aceh	-Banda Aceh and Aceh Besar -Takengon and the vicinity
North Sumatra	-Medan and the vicinity -Lake Toba and the vicinity
West Sumatra	-Padang and the vicinity -Bukittinggi and the vicinity
Riau	-Batam Island -Bintan Island

Some other areas have been identified as a sub tourism development area. Figure 64 presents the tourism network system in the Region.

511. The tourism development concept for each potential area is shown in Table 147. Needless to say, the main areas should be given the higher development priority than the sub areas, as the former areas are very important key components for the formation of efficient and attractive tourism network system which will determine major tourist routes and flows in the Region. The sub areas will utilize efficiently their own attractiveness to a great extent only after the establishment of the region-wide network.



LEGEND :





-  Main Area
  Main Axis
-  Sub Area
  Sub Axis

Figure 64.

Tourism Network System
in the Region

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Table 147. Development Concept for Each Area

Potential Area	Development Status	Target Market			Development Concept toward 2008
		Inter-national	Foreign resident	Domestic	
Banda Aceh and Aceh Besar	main area	⊙	○	○	Urban sightseeing for Acehese cultural heritage and beach resort development. Accessibility improvement from Medan, one of main gateway cities to the region
Weh Island	sub area	○	⊙	○	Marine sports resort and comfort ferry service from Banda Aceh to Sabang
Lhokseumawe	sub area		○	⊙	Beach resort development and Urban sightseeing for young people's educational tour (industrial complex)
Takengon and the vicinity	main area	○	⊙	○	Lake resort and wild life tour base development including hunting. Accessibility improvement from Lhokseumawe
Tapaktuan	sub area			⊙	Recreation area development for day trippers
Medan and the vicinity	main area	⊙	○	⊙	Major gateway city development. Urban sightseeing, shopping and entertainment
Lake Toba and the vicinity	main area	⊙	⊙	⊙	Lake resort development utilizing Toba Batak cultural heritage. Tourism network development with Karo highlands and Minang highlands.
Nias	sub area	⊙	○	○	Marine sports and beach resort development and sightseeing for unique Nias cultural heritage. Accessibility improvement from Sibolga by ferry and Medan by air plane.

Table 147. Continued

Potential Area	Development Status	Target Market			Development Concept toward 2008
		Inter-national	Foreign resident	Domestic	
Karo	sub area	○	⊙	⊙	Weekend resort and recreation area development
Sibolga	sub area	○	○	⊙	Beach resort development and sightseeing for cultural heritage
Padang and the vicinity	main area	○	○	⊙	Gateway city development to Minang highlands and Mentawai islands. Urban sightseeing and beach resort development
Bukittinggi and the vicinity	main area	⊙	⊙	⊙	Highland resort development utilizing Minang Kabau cultural heritage. Accessibility improvement from Lake Toba area and Riau
Mentawai Islands	sub area	⊙	○	○	Adventurous sightseeing for naive way of life. Tourism route development with Nias, Minang highlands
Batam Island	main area	⊙	○	○	Gateway to Riau archipelago development. Beach resort development for tourists from and via Singapore, and business tourism development in accord with on-going industrial and commercial developments in the island.
Bintan Island	main area	⊙	○	○	Marine sports and beach resort development in cooperation with Batam Island development
Pekanbaru and the vicinity	sub area	○	○	⊙	Sightseeing for cultural heritage and wild life tour development

XI. URBAN AND RURAL DEVELOPMENT

A. Present Situation and Development Issues

1. Population Growth in the Region

512. In 1980, 22% of the nation's total population, that is 32.8 million people, lived in urban areas. In the Region the ratio of urban population was 20%, slightly below the national average (Table 148). The National Urban Development Strategy Project (NUDS) concluded about urbanization in Indonesia as follows:

- (i) Primacy is not a significant problem in Indonesia compared to other developing countries, even though Jakarta's growth rate is the fastest among metropolitan areas.
- (ii) Indonesia has a reasonably balanced distribution of cities over the size-hierarchy.
- (iii) There appears little need for massive adjustments to recent trends in the hierarchy.
- (iv) Trends and conditions in urban systems however, differ significantly by region.

513. These trends are basically still applicable to the present situation in Indonesia.

Table 148. Urban Population Growth Pattern

	Total Population (000)			Urban Population (000) (% of Total Pop.)			Annual growth rate of urban population (%)	
	1971	1980	2000	1971	1980	2000	1971- 1980	1980- 2000
Aceh	2,009	2,611	4,370	143 (7.12)	233 (8.92)	581 (13.30)	5.36	4.57
North Sumatra	6,622	8,361	13,160	1,497 (22.49)	2,127 (25.30)	4,638 (35.24)	3.86	3.93
West Sumatra	2,793	3,407	4,490	296 (10.88)	433 (13.03)	958 (21.34)	4.16	3.85
Riau	1,642	2,168	5,076	391 (23.81)	548 (25.28)	1,458 (28.72)	3.71	4.89
Sumatra	20,809	28,016	51,368	3,635 (17.47)	5,490 (19.60)	12,944 (25.20)	4.53	4.29
Java	76,086	91,270	113,530	16,360 (21.50)	22,874 (25.06)	49,642 (43.73)	3.68	3.87
Indonesia	119,209	146,935	209,840	22,912 (19.22)	32,844 (22.35)	75,837 (36.14)	3.96	4.18

Source: NUDS Final Reports 1: Sumatra, 1985

514. Most of Indonesia's cities are located in Java which accounts for 62% of the 384 cities with population of 10,000 or more. Northern Sumatra's share is about 11% which is the highest among non-Java islands (Table 149).

Table 149. Number of Cities by Population Size, 1980

	Northern Sumatra	Southern Sumatra	Java	Others	Indonesia
1M & above	1	-	3	-	4
500K - 1M	-	1	3	1	5
200 - 500K	1	1	6	5	13
100 - 200K	2	1	14	3	20
50 - 100K	8	2	26	7	43
20 - 50K	13	10	81	23	127
10 - 20K	19	13	106	34	172
Total	44	28	239	73	384

Source: NUDS Data Base

Note: M = million, K = thousand

515. According to the National Urban Development Strategy Project (NUDS) primacy is not a significant problem in Indonesia compared to other developing countries. In the Region Medan is the primate city and its urban population share in 1980 was 38%. Judging from the share we may say that the primary is relatively not so serious at present, but Medan's share in the Region was much larger than that of Jakarta in the nation (20%).

516. In terms of urban growth in the 1970s, Northern Sumatra had rather unique characteristics. Namely, growth was most rapid in the 200,000 - 500,000 class (Padang). The small and medium cities had also high growth rates, such as Lhokseumawe, Langsa, Kisaran, Tanjung Balai, Dumai and so forth. On the other hand, the primate city, Medan, declined in share during the period. The Urbanization has been accelerated in the Region, but has not brought about the over concentration of population in the primate city yet.

517. The Region as a whole seemingly has a relatively balanced distribution of cities over the size-hierarchy. In the provincial level, however, the distribution patterns are different from each other (Table 150).

Table 150. Hierarchical Distribution of Cities by Province, 1980

	Aceh	North Sumatra	West Sumatra	Riau	Indonesia
1M & above	-	1	-	-	4
500K - 1M	-	-	-	-	4
200 - 500K	-	-	1	-	13
100 - 200K	-	1	-	1	20
50 - 100K	1	5	1	1	43
20 - 50K	1	4	1	6	127
20K or less	14	14	8	11	296
Total	16	25	11	19	508

Source: NUDS Data Base

Note: M = million, K = thousand

518. The urban system in Aceh is characterized by two major urban centers, Banda Aceh and Lhokseumawe, and a large number of small towns with a population below 20,000. Urban linkages are strongest along the east coast. Cross linkages between the east coast and the southwest coast are at present nonexistent, however. It will become one of major

tasks to allocate and demarcate urban service functions harmoniously to the two centers. In particular, it is very crucial to a formulation of a well balanced urban system to strengthen Banda Aceh's urban functions.

519. North Sumatra has the most mature urban system outside Java, especially in the northern coastal zone. The coastal urban axis, Pangkalan Brandan - Medan - Kisaran - Tanjung Balai forms a strong linkage. Interprovincial linkages are also relatively strong. Medan is playing a role of main service center for the Region.

520. In West Sumatra the urban system is characterized by Padang's primacy. The other urban centers such as Bukittinggi, Sawahlunto and Payakumbu form a compact network of towns serving their rural hinterlands. Strong linkages exist between Riau and North Sumatra.

521. Riau has a poorly integrated urban system and weak intraprovincial linkages due to the lack of an appropriate land and sea communication network which can cover wide swamp areas and scattered islands. The urban system is dominated by Pekanbaru and Dumai. Batam, Tanjung Pinang and Tembilahan are characterized as the secondary urban centers.

522. The present distribution of urban centers is a base of the future urban system which will be characterized by two major urbanized axes; the first is an axis connecting Lhokseumawe, Medan and Tanjung Balai, and the second is another axis connecting Padang, Pekanbaru and Dumai. It will become very important for the development of the Region to strengthen these axes functionally and physically.

2. Development Trends of Rural Areas

523. Approximately 80% of the total population lived in rural areas in 1980. The ratio of rural population has remained still at the high level. It is estimated around 78% in 1988 in the Region. Rural development is quite crucial to the development of the Region as a whole. One of the major and basic planning goals is to free the rural areas from physical, economic and social isolation.

524. Villages in the country are classified into the following three categories by their socio-economic conditions, that is to say, (i) swadaya (traditional), (ii) swakarya (transitional) and (iii) swasembada (developed). The classification of villages is reviewed every year by BANGDES (Direktorat Pembangunan Desa, Directorate of Village Development, Ministry of Home Affairs). Therefore, the classification data shows the development status of villages in chronological order. Figure 65 indicates the shift of development status of villages by province and Table 151 shows the number of villages by category by province.

Table 151. Number of villages by development status (1986/1987)

	Aceh	North Sumatra	West Sumatra	Riau
Traditional Village (Desa Swadaya)	718 (13.2%)	459 (8.1%)	161 (4.6%)	154 (13.9%)
Transitional Village (Desa Swakarya)	3,826 (70.0%)	3,421 (60.4%)	1,086 (30.7%)	626 (56.4%)
Developed Village (Desa Swasembada)	919 (16.8%)	1,780 (31.5%)	2,286 (64.7%)	330 (29.7%)
Total	5,463 (100%)	5,660 (100%)	3,533 (100%)	1,110 (100%)

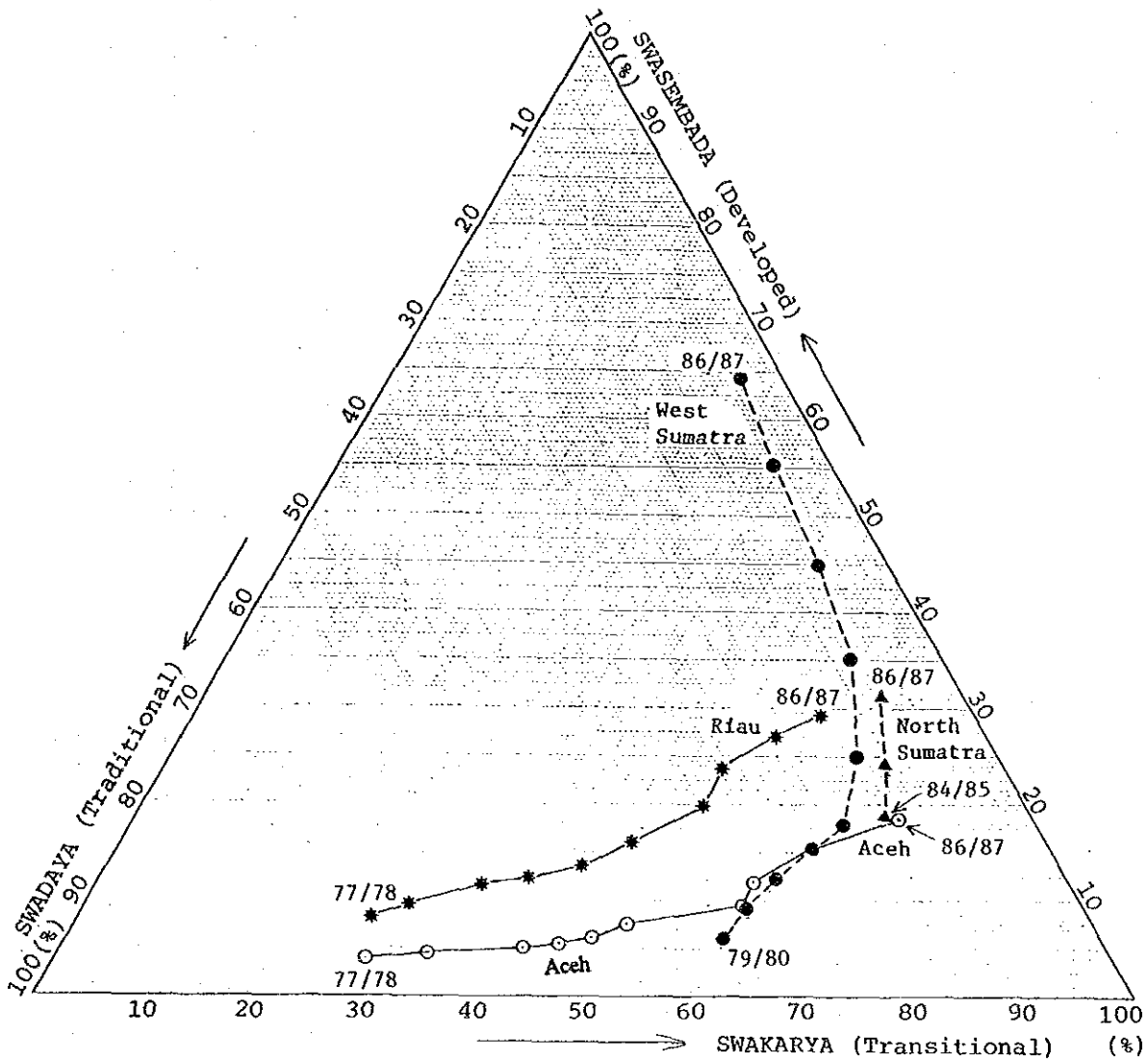


Figure 65. Shift of Development Status of Villages by Province.

Source: BANGDES of each province.

525. According to the above two tables, the development status of villages in terms of socio-economic conditions has been relatively smoothly improved, in particular West Sumatra whose status is approximately 3 or 4 years ahead of the other three provinces. However, Desa Swasembada (Developed Village) in the provinces of the Region except West Sumatra is not a majority yet. The following problems in the rural areas are pointed out:

- (i) necessity of resettlement due to unbalanced population sizes among villages;
- (ii) relatively less developed status of fishing villages;
- (iii) lack of education and insufficient administrative capacity of villages; and
- (iv) little significant economic development potential.

3. Characteristic of Future Population Growth in the Region

526. The total regional population in 1988 was around 20 million. It is estimated that this population will reach about 30 million by the year 2008 at an average annual growth rate of 2.1% over the 20 year period. The urban population, however, is expected to grow from 4.9 million in 1988 to some 10 million in 2008. This indicates that an average annual growth rate is nearly 3.7%, far higher than the average growth rate of the total population (Figure 66).

527. Considering the above trends, this means that both the number of cities as well as the population and area of existing cities will increase continuously. Needless to say, it will become more important than ever to establish a well-balanced and functionally integrated urban system in the Region. In terms of absolute value, however, the rural population growth, 5.3 million is still larger than the urban growth, 5.2 million. The rural area also must respond to this rather large population growth properly.

4. Urban Growth Pattern in the Region

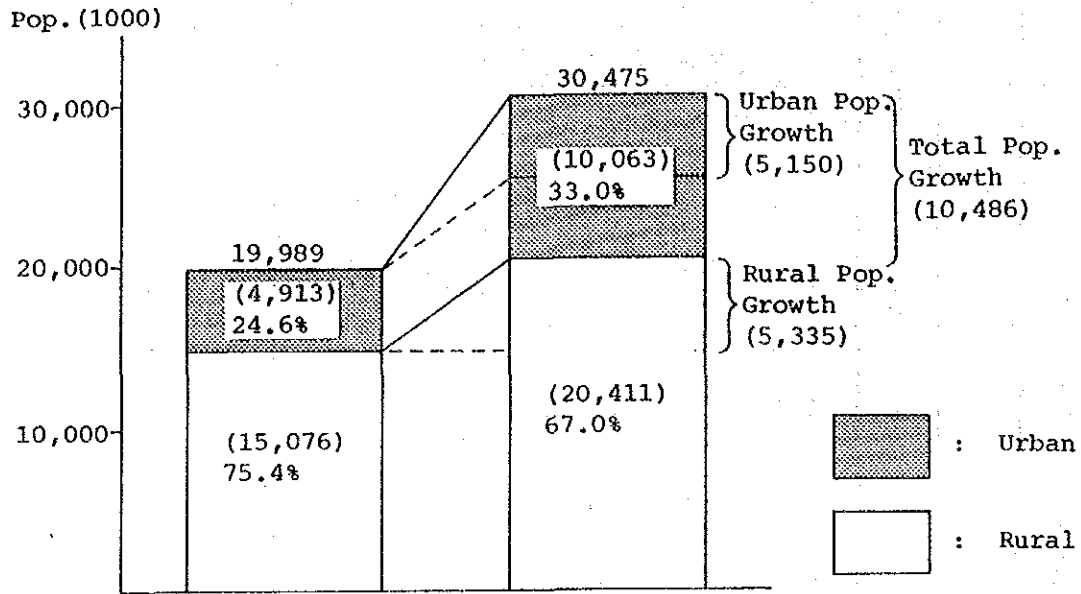
528. Urban growth patterns will differ from each other in the provincial level for next 20 years. In 1985, the National Urban Development Strategy (NUDS) defined 71 Strategic Urban Areas (SUA) in the Region. They will continue to play important roles functionally and spatially in the regional urban system. Table 152 shows urban population changes of SUAs from 1980 to 2008 and implies that SUAs in North Sumatra and Riau will grow rather stably, especially medium scale SUAs (population size from 50,000 to 500,000). Their growths will contribute to strengthen the regional urban system in the planning period.

529. Major cities in the Region also will grow stably (Table 153). The city order by urban population size won't change very much, but the points are: (i) the share of the regional primary city, Medan will continuously decrease from 37.5% in 1988 to 33.6% in 2008, and (ii) the total share of top 15 major cities will remain stable. These trends are very favorable to prevention against overagglomeration of urban population in few large urban centers and to the establishment of well balanced urban system in the Region. To sustain the above trends, it is quite crucial to develop secondary cities and absorb new emerging urban population in those cities.

Table 152. Urban Population Changes of Major Cities (1988 - 2008)

City	1988		1993		1998		2008	
	Pop. (1000)	Share (%)	Pop. (1000)	Share (%)	Pop. (1000)	Share (%)	Pop. (1000)	Share (%)
Medan	1,836	37.4	2,161	36.5	2,497	35.4	3,382	33.6
Padang	386	7.9	442	7.5	510	7.2	694	6.9
Pekanbaru	290	5.9	358	6.1	434	6.1	612	6.1
Pem. Siantar	236	4.8	268	4.5	298	4.2	379	3.8
Binjai	126	2.6	167	2.8	218	3.1	376	3.8
Kisaran	110	2.2	153	2.6	207	2.9	371	3.7
Tebing Tinggi	103	2.1	121	2.0	151	2.1	258	2.6
Banda Aceh	96	2.0	118	2.0	149	2.1	228	2.3
Sibolga	96	2.0	114	1.9	136	1.9	218	2.2
Padang Sidemp.	83	1.7	113	1.9	133	1.9	198	2.0
Dumai	82	1.7	98	1.7	128	1.8	170	1.7
Tembilahan	78	1.6	97	1.6	112	1.6	161	1.6
Tanjung Balai	74	1.5	95	1.6	112	1.6	152	1.5
Bukittinggi	62	1.3	66	1.1	88	1.3	152	1.5
Pangk. Brandan	47	1.0	65	1.1	70	1.0	129	1.3
Total	3,704	75.4	4,436	74.9	5,245	74.3	7,477	74.3
Region	4,913	100.0	5,923	100.0	7,059	100.0	10,063	100.0

Source: Team's estimate



Source: Team's estimate

Figure 66. Regional Population Growth (1988-2008)

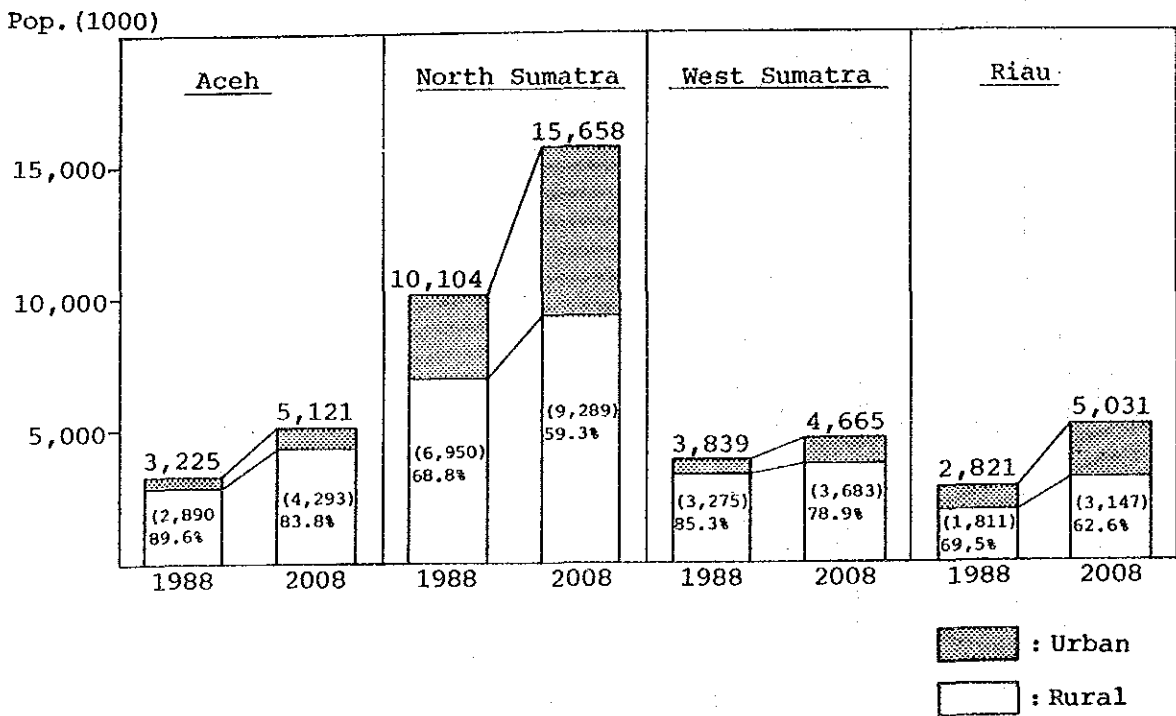


Figure 67. Total and Rural Population Growth by Province (1988-2008)

Table 153. Urban Population Changes of Strategic Urban Areas*
(1980 - 2008)

Province Year	Aceh				North Sumatra				West Sumatra				Riau			
	'80	'88	'98	'08	'80	'88	'98	'08	'80	'88	'98	'08	'80	'88	'98	'08
Population Size																
(1000)																
1,000 and above					1	1	1	1								
500 - 1,000											1	1				1
200 - 500						1	3	5	1	1				1	1	1
100 - 200			1	2	1	3	4	3					1		2	2
50 - 100	1	1	1	1	5	3	3	4	1	1	1	2	1	2	4	5
20 - 50	1	2	5	6	4	5	4	3	1	1	1	2	6	8	7	8
- 20	14	13	9	7	14	12	10	9	8	8	8	6	11	8	5	2
Total	16 SUA **				25 SUA				11 SUA				19 SUA			

* defined by NUDS (National Urban Development Strategy, 1985)

** SUA: Strategic Urban Area

*** Urban population is based on NUDS definition and is different from the population in the administrative boundary.

Source: Team's estimate

5. Rural Population Growth in the Region

530. The rural population in 1988 was approximately 15 million and the ratio to the total population is about 75%. The rural population in 2008 is estimated around 20 million. Even though the urban population growth rate will be much higher than that of the rural population, its share will still remain at the high level, that is, around 67%. In particular, Aceh and West Sumatra will retain the relatively higher rural population ratio than the two other provinces (Figure 67). The role of rural development will become more important than ever to achieve the regional development goals.

6. Development Issues

531. Urban development should be continued in a well-planned and integrated program, taking into account the growing population to ensure the maintenance of a healthy climate in which people work and live. Proper relationships should be established between the city and the surrounding rural areas and between the city and neighboring towns.

532. "Policies for Urban Development" presented by the coordination team for urban development are functioning as the basic planning guidelines in Indonesia, which also should be taken into consideration in this Study. They are stated in the following six policies:

Policy 1: Development of urban infrastructure and the operation maintenance thereof, in principle, is within the authority and responsibility of the Local Governments, with the assistance and guidance of the Provincial (Level I) and Central Governments.

Policy 2: Planning, programming and identification of investment priorities by all levels of Government for urban development will continue to be improved by means of a decentralized and integrated approach which, among others, has already started through the "Integrated Urban Infrastructure Development Programming" (IUIDP/P3KT) system.

- Policy 3: In order to develop Local Government responsibility for providing urban infrastructure services, there will be further strengthening of the Local Government's capacity to mobilize resources and optimize the use of funds.
- Policy 4: In accordance with the principles of decentralization of urban infrastructure responsibilities, the Government will, in addition to the measures described under policy 3, endeavor to improve the financing system for urban infrastructure systems.
- Policy 5: The capability of Provincial (Level I) and Local Government staff and institutions to execute urban development activities more effectively in the context of strengthening their roles and responsibilities will be enhanced by institutional development procedural improvement where appropriate, as well as training to be provided by means of a coordinated program of local government manpower development.
- Policy 6: Coordination and consultation between the various agencies and levels of Government (Central, Provincial and Local) involved in the development of urban infrastructure and services will continue to be strengthened for the smooth implementation of development activities and to provide a mechanism for review and formulation of future sector policy recommendations.

533. Based on the present situation the following development issues are extracted:

- (i) to support IUIDP in the Region technically and financially for further implementation of urban development. Close coordination with different donor agencies, such as IBRD, ADB and so forth is necessary for this program;
- (ii) to stabilize and diversify major cities' urban activities, in particular, Medan and Padang;
- (iii) to establish a regional multi-sectoral development fund including urban and rural development in the Region;
- (iv) to develop hinterland service functions in medium- and small-size urban centers to serve local villages, and transmigration settlement areas. For this purpose, improvement of road networks especially linking to smaller centers is crucial in hinterlands; and
- (v) to execute multi-sectoral development programs such as PDP (Provincial Development Program), and ADP (Area Development Project) for the areas located in strategic hinterlands. It is necessary for the formation of the program to integrate various sectors into some program packages under the common and unified planning goals and objectives.

B. Development Strategies

1. Development Objectives

534. The planning objectives for urban and rural development may be crystalized into the followings:

- (i) to achieve more balanced spatial development and increased regional integration, namely, to build up balanced settlement patterns harmonized to the efficient urban system and hierarchy

based on the appropriate functional interdependency among cities and rural areas;

- (ii) to provide adequate urban services capable of meeting basic human needs in the Region, in particular, to improve urban and rural infrastructure such as water supply, drainage system, solid waste management system, electricity, sanitation facilities, housing, communication facilities and so forth. The emphasis should be put on secondary cities as well as the primary city;
- (iii) to realize more rapid labor absorption in particular, in urban centers, and to increase and diversify income-earning opportunities, in particular, in rural areas; and
- (iv) to establish an efficient institutional framework and to strengthen financial capabilities of the local government for urban and rural development.

2. Development Concept

535. The 71 SUAs in the Region are classified into the following 6 hierarchical categories based on future functional roles in the urban system (Table 154). This classification is utilized as planning guidelines for the establishment of the regional urban system.

(i) National development Center (NDC)

Primary urban growth center with diversified urban functions and functional hub in the urban system not only in the Region, but also in the national level.

(ii) Regional Development Center (RDC)

Urban growth center with high potential for growth in the Region, namely, with the higher administrative status and functions than cities in the other categories except NDC, and/or with high industrial growth potential. NDC and RDC will function as the primary node in the regional urban system.

(iii) Interprovincial Development Center (IDC)

Urban growth center with potential for growth in interprovincial functional linkages and communication. IDC will function as the secondary node in the regional urban system.

(iv) Provincial Development Center (PDC)

Urban center mainly with hinterland support functions in provincial and interkabupaten (subregion) levels.

Table 154. Functional City Classification

	Aceh	North Sumatra	West Sumatra	Riau
National Dev. Center		Medan, Binjai, Tebin Tinggi, Lubuk Pakam	Padang	
Regional Dev. Center	Banda Aceh, Lhokseumawe	Kisaran/Tanjung Balai		Pekan Baru
Interprovincial Dev. Center	Banda Aceh, Lhokseumawe	Sibolga	Bukittinggi	Tanjung Pinang, Dumai, Tembilahan, Batam
Provincial Dev. Center	Langsa, Meulaboh	P. Sidempuan, P. Siantar, Pangkalan Brandan Rantau Prapat, Kabanjahe	Solok	
District Dev. Center	Sigili, Takengon, Tapak Tuan, Kutacane	Sidikalang, Tarutung	Padang Panjang, Payakumbuh, Sawalunto	Bangkinang, Rengat
Local Service Center	Sabang, Jantoi, Bireuon, Lhoksukon, Idi Rayouk, Blangkejeren, Labuhan Haji, Kuala Simpang	Tanjung Pura, Stabat, Brastagi, Galang, Serbalawan, Perdagangan, Prapat, Balige, Aek Karopanm, Kotaopan, Gunung Sitoli	Lubuk Sikaping, Batusangkar, Pariaman, Painan, Muaro Sijunjung	Bagian Siapi-api, Bengkalis, Pasir Pengarayan, Air Molek, Selat Panjang, Tanjung Balai, Kandar Tanjung Kijang, Tempulung, Enok, Pulau Kijang, Singkep

Source: Team's definition.

Table 155. Hierarchy of Urban Center in the Region

Category	Level	Radius of influence in KM	Service area in Sq. Km.	Population in Service Area	Population in Center
National Dev. Center	Nation, 4 Provinces	400	500,000	15,000,000	4,000,000
		200	100,000	5,000,000	500,000
Regional Dev. Center	Inter-province	200	100,000	5,000,000	500,000
		150	70,000	3,000,000	300,000
Inter-provincial Dev. Center	Inter-province, province	150	70,000	3,000,000	300,000
		100	30,000	1,000,000	100,000
Provincial Dev. Center	Province, Inter-Kabupaten	100	30,000	1,000,000	100,000
		50	7,500	250,000	30,000
District Dev. Center	Kabupaten, Inter-Kecamatan	50	7,500	250,000	30,000
		20	1,200	40,000	10,000
Local Service Center	Kecamatan	20	1,200	40,000	10,000
		10	300	10,000	2,000

(v) District Development Center (DDC)

536. Urban center with hinterland support functions in kabupaten and inter-kecamatan (subdistrict) levels.

(vi) Local Service Center (LSC)

537. Service center of kecamatan.

538. The proposed urban system in the Region is shown in Figure 68 based on the classification.

539 Two different strategic development areas are defined for urban and rural development. Their definitions are as follows:

(i) Strategic Urban Development Area: this area is defined as an urban development hub which has high development potentials and is expected to function as an important central node in the proposed future urban system. In this category some rural areas which have strong physical and functional linkages to urban centers are also included.

(ii) Key Hinterland Development Area: this area is defined as a strategic hinterland which is at present relatively less developed and will decline without strong support from development activities, even though it has a latent but high development potential. In other words, this is an area which should receive strong policy support at present; otherwise it might give adverse effects on the development of the whole Region in the future. If the area is developed properly and smoothly, it will strengthen not only its own economic and social base but also that of the strategic urban development area.

540. Harmonizing the development of the two different areas will be quite crucial to the development of the Region as whole.

541. Area categorized into the two defined areas are listed below (Figure 69).

(Strategic Urban Development Area)

- (i) Banda Aceh
- (ii) Lhokseumawe-Langsa
- (iii) Medan-Tanjung Balai/Kisaran
- (iv) Sibolga-Padangsidempuan
- (v) Padang-Urban centers in the Minang highlands
- (vi) Pekanbaru-Bankinang
- (vii) Dumai
- (viii) Batam-Tanjung Pinang

(Key Hinterland Development Area)

- (i) Aceh Besar-Pidie
- (ii) Western Coastal Zone of Aceh
- (iii) Tapanuli Selatan
- (iv) Nias
- (v) West Pasaman
- (vi) Pesisir Selatan
- (vii) North Kampar and West Bengkalis
- (viii) Indragiri Hulu and Indragiri Hilir

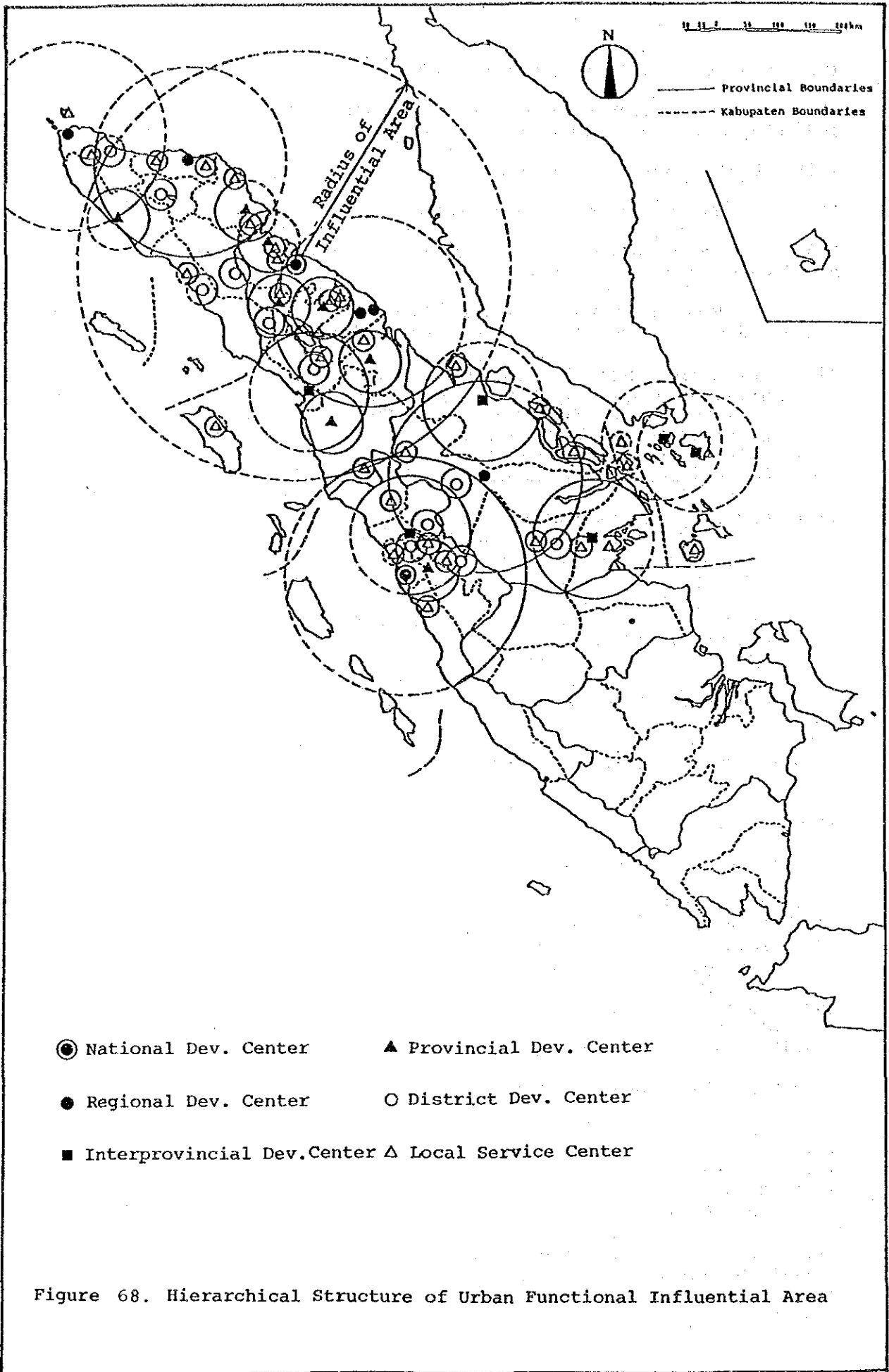


Figure 68. Hierarchical Structure of Urban Functional Influential Area

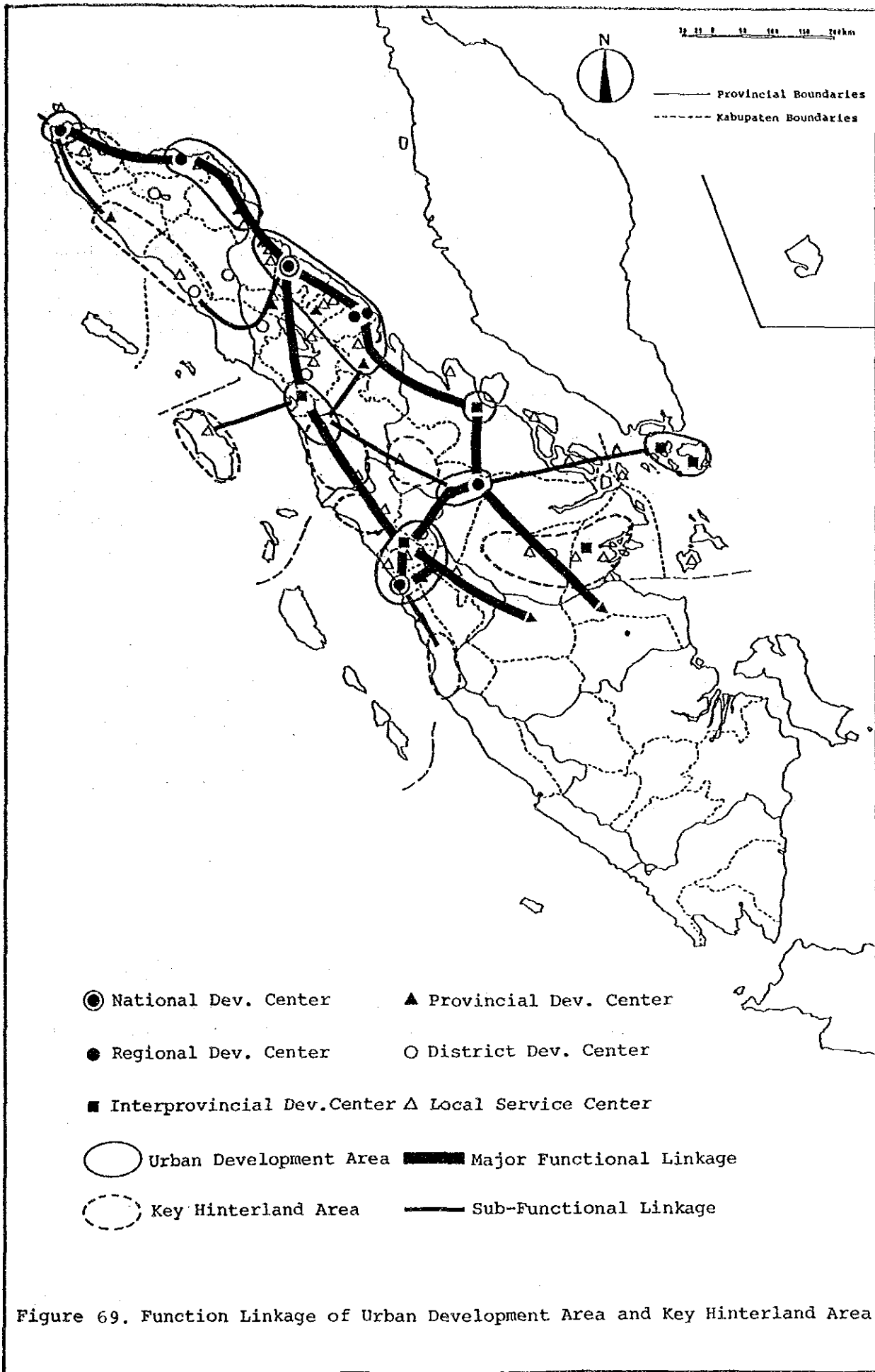


Figure 69. Function Linkage of Urban Development Area and Key Hinterland Area

3. Urban Infrastructure Development Needs in the Major Cities

542. As already pointed out before (Table 152), the urban population share of the top 15 larger cities amount and will amount to around 75%. Those cities will determine to a great extent the direction of urbanization in the Region and further each of them will function as a key node in the regional urban system. It is very much favorable to a formation of the well balanced urban system to develop those key node cities properly, that is to say, the development of the cities classified into NDC (National Development Center), RDC (Regional Development Center), IDC (Interprovincial Development Center), and PDC (Provincial Development Center). Further more, in terms of prevention against overagglomeration of urban functions and population to the primary city, the development of the secondary cities, namely, RDC, IDC and PDC should be given high priority as well as that of NDC.

543. Table 156 presents the urban infrastructure development needs in the major cities. Three planning components can be extracted as a common urgent development target for a group of major cities as a whole. Namely, they are (i) water supply (ii) flood control and drainage and (iii) urban roads. Generally those three components should be taken up prior to the other components in the future projects/programs, in particular, for the short term planning period. In addition, the solid waste management and the kampung improvement program also should be dealt in the same manner.

4. Planning Guidelines of Area Development Program for Rural Development

544. In the last decade several integrated rural development programs called PDP (the Provincial Development Program) have been implemented in the Region, in particular, in Aceh and West Sumatra as well as in the other regions in the country. The PDP is one of area development strategies which has been mainly applied to the development of underserved, poor and isolated areas. Generally speaking, the PDP has brought about very positive effects on the rural development in the Region. But PDP as an area development strategy still remains in an experimental stage to some extent. There are a lot of crucial feed back from past experiences to make the strategy more efficient and effective.

545. An area development program based on the PDP approach will function as an important development booster to the key hinterland development areas in the Region. Table 157 presents the planning guidelines of area development program suggested by the Team after taking the past experiences into consideration. Each area will have each own different program responding to unique local needs and problems, but the guidelines will be utilized in the process of program formation.

Table 156. Urban Infrastructure Development Needs in the Major Cities

City	IUIDP Planning Element											
	1. Urban Planning	2. Water Supply	3. Flood Control & Drainage	4. Human Waste	5. Solid Waste Management System	6. Kampung Improvement Program	7. Market Area Management	8. Rental Housing	9. Urban Renewal	10. New Town	11. Housing	12. Urban Roads
National Dev. Center												
Medan	●	●	○	○	○	○						●
Padang	●	●	△	○	○	○		△			●	●
Regional Dev. Center												
Banda Aceh	○	●	●	△	○	○	○					●
Lhokseumawe	○	●	●		○	○						△
Kisaran/Tanj. Balai			●		○	○		○			○	○
Pekanbaru	○	●	○		○	●					○	○
Interprovincial Dev. Center												
Sibolga	●	●			○	○						○
Bukittinggi	●	●	△		○	○	○				○	●
Tanjung Pinang	●	○			○	○					○	○
Dumai	●	●			○	○	○					●
Tembilahan	●	○			○	○						●
Provincial Dev. Center												
Langsa	●	○			○	○						△
Meulaboh	●	○			○	○						
P. Sidempuan	○	○			○	○						●
P. Siantar	○				△	○					○	●
Pangkalan Brandan	○	○			△	○						○
Rantauprapat	●	●			△	○						●
Kabanjahe	●	○			○	○						○
Solok	●	●	○		○	○	○				○	●

Legend: ● : Urgent, ○ : very important, △ : important

Source: hearing from Cipta Karya of the Provincial Government

Table 157. Guideline for Area Development Program

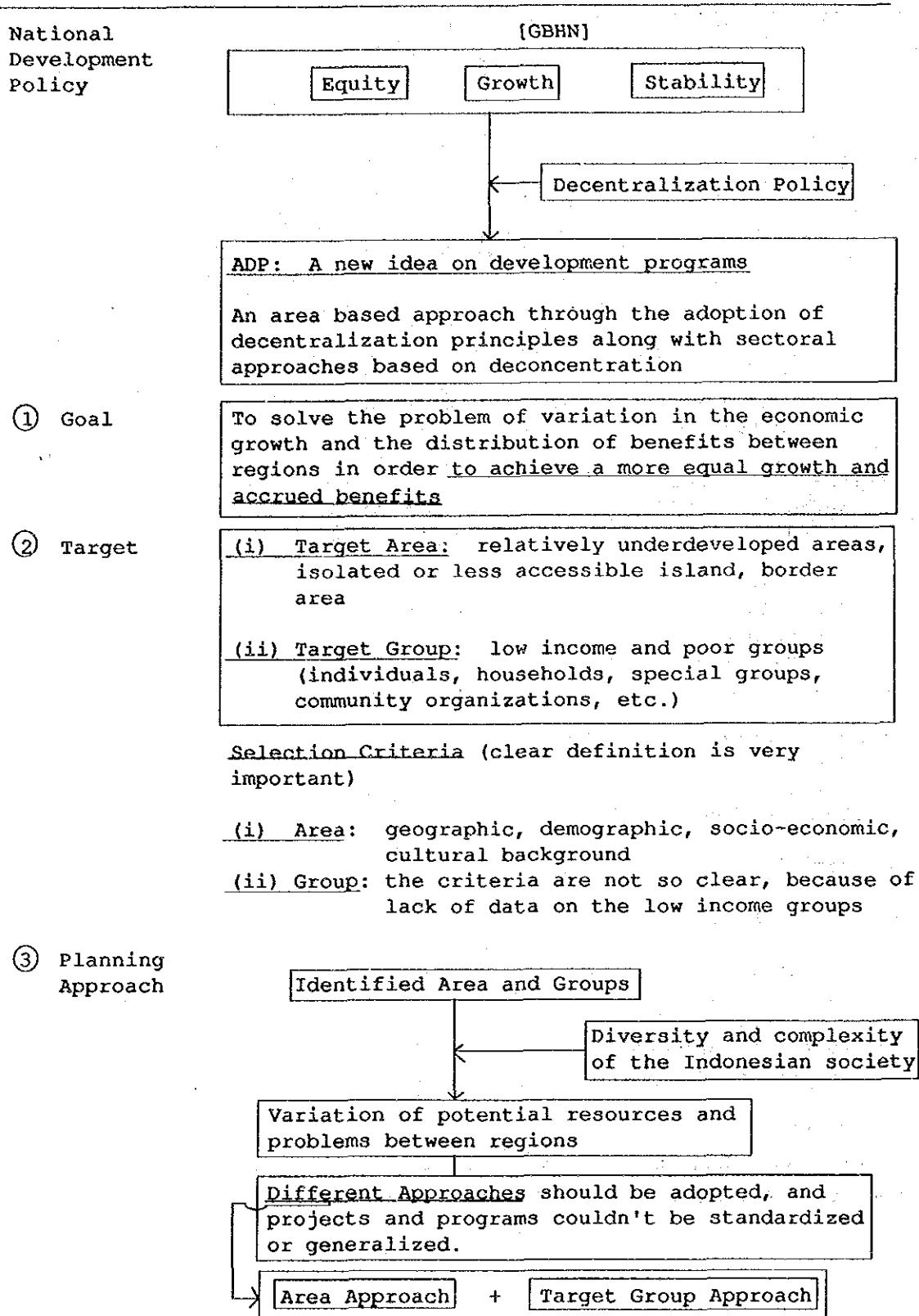


Table 157. continued

④ Typical Planning Components

(i) Productive Sector

- o Agriculture
 - paddy, secondary crops (other grains), livestock, tree crops, fishery, forestry
 - dry land agriculture, etc.
- o Industry
 - small scale/home industry
 - agro industry
 - area resource based industry

(ii) Infrastructure Sector

- o Irrigation
 - small scale/rural irrigation (OMR included)
- o Transportation and communication
 - road network, feeder road, farm to market road
 - telephone network
- o Environment protection
- o Energy (rural electrification, etc.)
- o Post harvest facilities and system
- o Water supply and sanitation, etc.

(iii) Institutional Building and Education

- o Programme management training (OJT)
 - The staff of PEMDA (the local governments) institutions or agencies both at the planning and implementation units
 - To strengthen the institutional capacity of social organization to achieve self sustaining capacity through the mobilization and training of cadres and community leaders as change agents (LKMD and LSM (NGO))
- o Rural credit
- o Rural technology extention center
- o Home technology extention center (PKK)
- o Demonstration plots or projects, extension services
- o Marketing

⑤ Time Period

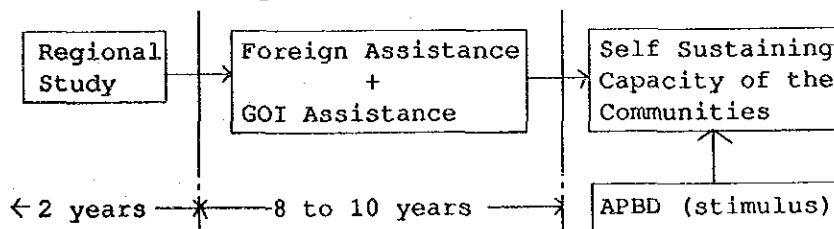


Table 157. continued

⑥ Problems and Suggestions

(i)

The approach was too micro oriented where inter-regional linkages of relationship did not into picture

Poor linkage with other efforts in the other areas on a macro level

ADP concept was not so effective as expected

ADP should be an integrated part of overall development schemes in the regions

(ii)

Selection of target groups is very difficult due to lack of data on the low income groups

An inter-diciplinary approach should be adopted in identifying the target groups

The problems identification in a particular area must be based on the specific characteristics of the target groups to be proposed programs

(iii) In the operational manual, one can still find some "centralized and top down approaches"

The top down approach may be appropriate to control project expenditures more effectively

- More involvement of the regional government, especially the agencies at level II and BAPPEDA
- Training, especially in the fields of planning and management for level II apparatus.

(iv)

The role of technical agencies were dominant

D.J. CK produced programs and projects only indicative and not ready for implementation

RJM (Rencana Jangka Menengah, Middle Phase Plan) and ROT (Rencana Operasional Tahunan, Annual Operational Plan) are dominated by sectoral approaches

The planning capacity of BAPPEDA TK. II needs to be improved.

Table 157. continued

- (v) Social institutions should be encouraged to grow and achieve self-sufficiency.
ex. LKMD
- (vi) Village area development planning and implementation through the activation of NGOs (LSM, Lembaga Swadaya Masyarakat) is expected to spur creative ability of the communities
- Meetings of LKMD, UDKP, and other institutions
 - Involve LSMs in joint activities
 - Provision of program and technical assistance and credit facility to stimulate village community development by the LSMs
 - Presentations of rewards for outstanding achievements in community development efforts

⑦ Termination Steps Termination of ADP under foreign assistance, steps should be taken as follows:

- (i) Evaluation based on;
(a) physical quantitative outcomes
(b) qualitative impacts
- (ii) ADP should be further developed and replicated in other regions/areas in order to achieve "sustainable development."
- (iii) ADP should be reviewed and synchronized with the system of bottom up planning as delineated in Permendagri No. 9/1982.
- (iv) The local government should begin to include the program into one of the programs of APBD
- To gradually reduce and eventually banish the community dependency to government

⑧ Recommendation

- Key Factors:
- Involvement of broader development sectors
 - Human resource development
 - System and mechanism of marketing and credit institution
 - Stronger financial and institutional capabilities of the local governments

Reference: Prepared by the Team based on its observations and PDP Experience and Indonesian Rural Development Strategy, Directorate General of Regional Development Ministry of Home Affairs and others, 1988

