Ministry of Public Works
Republic of Indonesia

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

Final Report

Vol. II
Main Report

March 1990

Japan International Cooperation Agency

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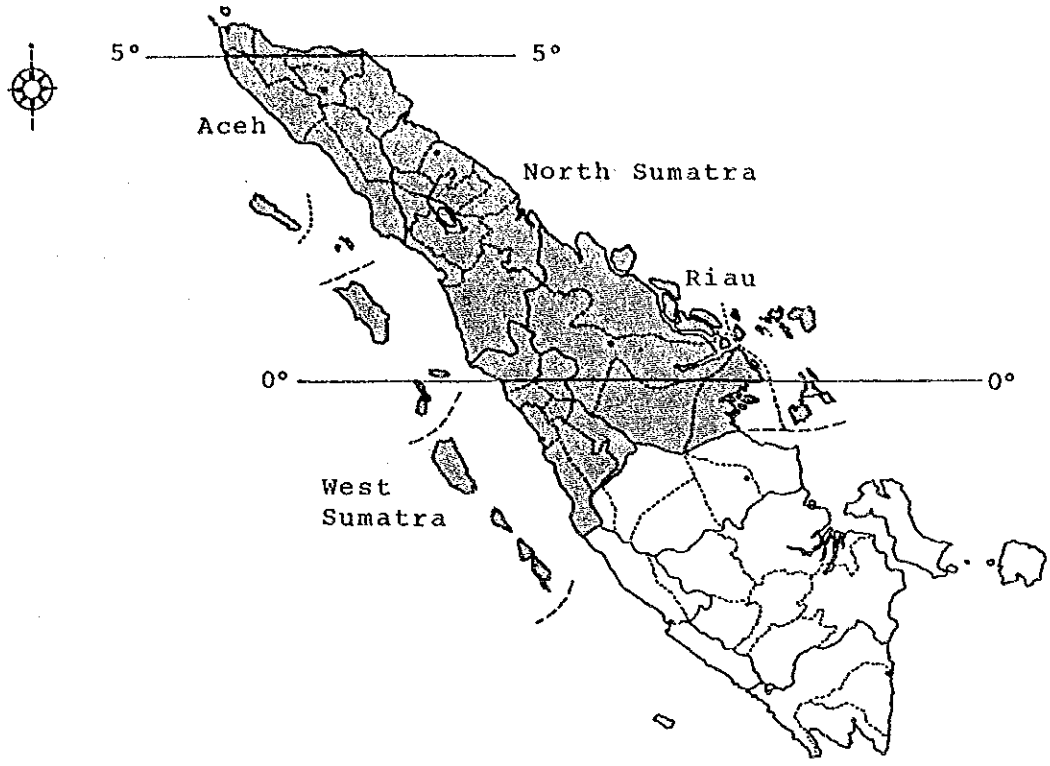
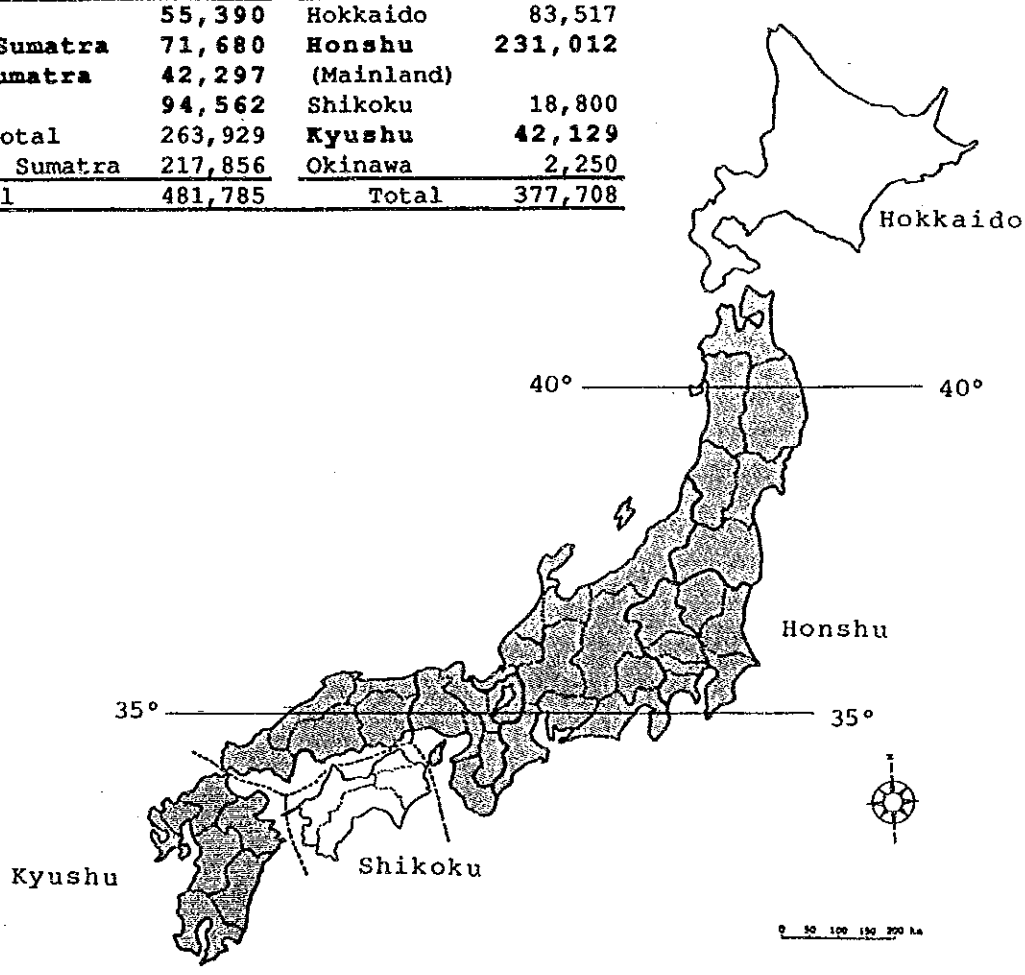


Comparison of Land Area: Sumatra and Japan

Sumatra	(km2)	Japan	(km2)
Aceh	**55,390**	Hokkaido	83,517
North Sumatra	**71,680**	**Honshu**	**231,012**
West Sumatra	**42,297**	(Mainland)	
Riau	**94,562**	Shikoku	18,800
Subtotal	263,929	**Kyushu**	**42,129**
Southern Sumatra	217,856	Okinawa	2,250
Total	481,785	Total	377,708



VOL. I EXECUTIVE SUMMARY

VOL. II MAIN REPORT

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FINAL REPORT
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MAIN REPORT

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ABBREVIATIONS

AAC	Annual Allowable Cut
AARD	Agency for Agricultural Research and Development
AATE	Agency for Agricultural Training and Education
ADB	Asian Development Bank
ADP	Area Development Program
AGRARIA	Badan Pertanahan Nasional
APBD	Anggaran Pendapatan dan Belanja Daerah
APBN	Anggaran Pendapan dan Belana Negara
ASEAN	Association of Southeast Asian Nations
BANGDA	Pembangunan Daerah
BANGDES	Pembangunan Desa
BAPPEDA	Badan Perencanaan Pembangunan Daerah
BAPPENAS	Badan Perencauaan Pembanguuan Nasional
BBN	Bea Balik Nama
BHN	Basic human needs
BIPIK	Small-scale Industry Development Guidance
BKPM	Badan Koordinasi Penanaman Modal
BKPMD	Badan Koordinasi Penanaman Modal Daerah
BMG	Institute of Meteorology and Geophysics
BNA	Basic Needs Approach
BOE	Barreles of Oil Equivalent
BPAM	Water supply management unit
BPLPs	Tourism Development and Training Schools
BPPI	Marine Fishery Development Center
BPPT	Agency for the Assessment and Application of Technology
BPS	Biro Pusat Statistik
BUTSI	Badan Urusan Tenaga Sukarela Indonesia
CAD/CAM	Computer Aided Design/Computer Aided Manufacturing
CIDA	Canadian International Development Agency
CNG	Compressed Natural Gas
CPUE	Catch per Unit Effort
CRIFC	Central Research Institute for Food Crops
CV	Central Valley Area
DAS	Daerdh Aliran Sungai
DB	Directorate of Coal
DBM	Dinas Bina Marga
DDC	District Development Center
DEG	Directorate of Environmental Geology
DGCK	Directorate General of Cipta Karya
DGENE	Directorate General of Electric Power and New Energy
DGF	Directorate General of Fisheries
DGH	Directorate General of Highways
DGLC	Directorate General of Land Communication
DGSC	Directorate Genral of Sea Communications
DGT	Directorate General of Tourism
DGWRD	Directorate General for Water Resources Development
DJA	Direktorat Jendral Agraria
DJPU	Direktorat Jenderal Perhubungan Udara
DPEB	Direktorat Pengembangan Energi Baru
DPMA	Institute of Hydraulic Engineering
DPP	Dewan Pimpinan Pusat
DPU	Departemen Pekerjaan Umum
EC	The European Community
EEZ	Exclusive Economic Zone
EP	Eastern Plateu Area
ESCAP	Economic and Social Commission for Asia and the Pacific
Ex-Im Bank	Export-Import Bank
F/S	Feasibility Study
FAD	Fish Aggregating Device
FAO	Food and Agriculture Organization
FETC	Forestry Education and Training Center

FRDC	Forest Research and Development Center
GBHN	Garis-garis Besan Haluan Negara
GDP	Gross domestic product
GOI	Government of Indonesia
GRDP	Gross Regional Domestic Product
GTZ	Gesellschaft fur Techische Zusammenarbeit
HPH	Hak Pengusahaan Hutan (forest concession)
HPHH	Forest concession of short term and small scale
HPPS	Hydro Power Potentials Study
HRD	Human Resources Development
HTI	Hutan Tanaman Industri
IBRD	International Bank for Reconstruction and Development
ICOR	Incremental Capital Output Ratio
IDC	Interprovincial Development Center
IDCJ	International Development Center of Japan
IDEP	Integrated Development Program
IFPRI	International Food Policy Research Institute
IGGI	Inter-Governmental Group on Indonesia
IIMI	International Irrigation Management Institute
IKK	Ibu Kota Kecamatan
ILOR	Incremental labor-output ratio
ILS	Instrument Landing System
IMCE	Inter-ministerial Committee on Electrification
IMF	International Monetary Fund
IMTCE	Inter-ministerial Technical Committee on Energy
INPRES	Instruksi Presiden
INTAM	Tambak intensification
IPEDA	Iuran Pembangunaan Daerah
IRR	Internal Rate of Return
ITU	International Telecommunication Union
IUIDP	Integrated Urban Infrastructure Development Program
JAIDO	Japan International Development Organization
JICA	Japan International Cooperation Agency
KADIN	Indonesian Chamber of Commerce and Industry
KBOE	Thousand Barrels of Oil Equivalent
KIK	Small investment credit
KIP	Kampung Improvement Programme
KLH	Kependudukan dan Lingkungan Hidup
KMKP	Permanent working capital credit
KPD	Rural development extension worker
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LSC	Local Service Center
MIGA	Multilateral Investment Guarantee Agency
MITI	Ministry of International Trade and Industry
MMBOE	Million Barrels of Oil Equivalent
MME	Ministry of Mines and Energy
MMSCFD	Million Standard Cubic Feet Per Day
MOA	Ministry of Agriculture
MSY	Maximum Sustainable Yield
MUDP	Medan Urban Development Project
NAIEs	Newly Agro-industrializing Economies
NDC	National Development Center
NEDO	New Energy and Industrial Technology Development Organization
NES	Nucleus Estate Scheme
NG	Natural Gas
NGO	Non-governmental Organization
NIEs	Newly Industrializing Economies
NRER	New and Renewable Energy Resources
NUDS	The National Urban Development Strategy Project
NWC	North Western Coast Area
O&M	Operation and maintenance
ODA	Official Development Assistance

OECF	Overseas Economic Cooperation Fund
OMR	Operaion, Maintenance and Repair
OPMC	Outside Plant Maintenance Center
P3KT	Program Peningkatan Perbaikan Kampung Terpadu
PDAM	Perusahaan Daerah Air Minum
PDC	Provincial Development Center
PDP	Provincial Development Program
PELNI	Pelayaran Nasional Indonesia
PEMDA	Pemenrintah Daerah
PERUMTEL	Perusahaan Umum Telekomunikasi
PHPA	Pelesterian Hutan dan Perlindungan Alam
PIR	Perkebunan Inti Rakyat
PJKA	Perusahaan Jawatan Kereta Api
PKB	Pajak Kendaraan Bermotor
PLN	Perusahaan Listrik Negara
PMUs	Project Management Units
POSTEL	Ministry of Tourism, Post and Telecommunication
PPI	Provincial fish landing center
PPW	Proyek Pengembangan Wilayah
PSB	P.T. Perikanan Samudra Besar
PUSDATA	Pusat Pengolahan Data
PUSIDO	Pusat *Informasi dan Dokumentasi*
RDC	Regional Development Center
RE	Rural Electrification
RSE	*Remote Sensing Engineering Project*
SATUGAS	Satuan Tugas
SBK	Small satellite station
SDM	Directorate of Mineral Resources
SKDP	Sambungan Komunikasi Data Packet (Packet Data Communication Systems)
SLDD	Subscriber long distance dialing
STDP	Smallholer Tree Crops Development Project
SUA	Strategic Urban Areas
SWC	South Western Coast Area
TDMA	Time Division Multiple Access
TEU	Twenty-foot Equivalent Unit
TGHK	Tata guna hutan kesepakatan (concensus on Forest Land Use)
TK.I.	Tingkat I (level I)
TPI	Forest management system
U.K.	United Kingdom
U.S.A.	United States of America
UNCHS	United Nations Centre for Human Settlements
UNDP	United Nations Development Programme
UPPI	Provincial level marine fisheries development unit
US	United States
USAID	United States Agency for International Development
USSR	Union of Soviet Socialist Republics
VROM	Direktorat Perumahan Negeri (Pemerintahan) Belanda
WMTC	Watershed Management Technology Center

I. INTRODUCTION

A. Background

1. The Study on the Integrated Regional Development Plan for the Northern Part of Sumatra (hereafter referred to as "the Study") was first identified in 1984 as a project under cooperation between the Government of the Republic of Indonesia and the Government of Japan. Subsequently in 1985, the Government of Indonesia requested the Government of Japan to undertake the Study, and, in 1987, an agreement was reached between the Governments upon the implementation of the Study. According to the agreement, the Study was proposed to be undertaken by the Japan International Cooperation Agency (JICA) in close cooperation with the Directorate General of Human Settlements (DGCK), Ministry of Public Works and the other central and provincial government agencies concerned. After the Scope of Work for the Study was signed on 13 January 1988, JICA formed a study team (hereinafter referred to as "the Team") consisting of 16 experts (the number was later raised to 18) and the Team commenced their work in March 1988 and submitted the Final Report in March 1990.

2. The Study covers the northern part of Sumatra, namely, the provinces of Aceh, North Sumatra, West Sumatra and Riau. This region will also be referred to as Northern Sumatra or, simply, the Region. The four provinces have a combined area of 264,000 square kilometers (14% of the national land), inhabited by a population of 19 million in 1985 (11%).

B. Objectives of the Study

3. The objectives of the Study are summarized as follows:

(i) to formulate an integrated regional development plan as part of the National Development Plan for balanced socio-economic and physical development in the Region, by taking into full account the on-going and completed development projects;

(ii) to delineate basic development scenarios with well-balanced spatial and sectoral focus in accordance with the framework of the regional plan above;

(iii) to identify priority projects and undertake their preparatory studies; and

(iv) to strengthen the planning and coordinating capability of the Provincial Planning Boards.

4. The integrated regional plan will encompass a time span of 20 years (1988/89-2008/09) and it is expected to contribute to the restructuring of the national economy with regard to its heavy dependence on oil and high concentration of economic activities in Java. Since the Region has too vast an area to be covered evenly, the Study will try to focus on high-priority projects with appropriate spatial and sectoral balance, which will lead to harmonious regional development.

C. Work Program

Year/ Month	Stage	Operation in Indonesia	Workshop/ Briefing	Report	Target
88/4	I. Initial Operation	A B C D		Inception	Inception
5					
6	II. Development of Strategies		▲	Progress I	
7					
8			△		
9			△		
10	III. Selection of Projects/ Programs		▲	Progress II	Repelita V
11					
12			△ △		
89/1					
2			△ △ ▲	Interim	IGGI Proposal
3					
4	IV. Preparatory Studies of Priority Projects/ Programs				
5					
6					
7			△		
8					
9					
10			△ △ ▲	Progress III	Budget for 1990
11	V. Finalization of Report				
12				Draft Final	
90/1			▲		
2					
3				Final	IGGI Proposal

Notes: 1) Bars show approximate itinerary for:
(A) Takase, Toyomane, Sato, (Homma), Miki, Matsuda, Hatao
(B) (Fujimura), Fukao, Ishida, Ichihara, Yoshimeki, Fujii
(C) Osada, Nagamatsu, Iwai
(D) Kawabata, Ueda, (Oyama), (Fujiwara), Shiroya, Watanabe
2) ▲ Workshop, ▲ Mini-workshop, △ Briefing

Figure 1. Indicative Work Program of the Study

5. The work program of the Study is shown in Figure 1. As is seen, the entire period is divided into five stages, each of which has a specific target of administrative significance like "IGGI proposal" and "budget for 1990." This program is a modified one, advancing the selection of priority projects by seven months and expanding the period of preparatory study of high-priority projects from 5 to 7 months. These modifications were strongly requested by the Indonesian government to facilitate the Indonesian govenment's process of Repelita V preparation and agreed at the first workshop held in June 1988. The original (as shown in the Scope of Work) and modified time frames are compared as follows:

Stage	Original		Modified	
I.	Analysis of present situation and identification of development potentials	3/88-6/88	Analysis of present situation and identification of development potentials	3/88-6/88
II.	Establishment of development framework and strategies	6/88-11/88	Establishment of development framework and strategies	6/88-9/88
III.	Preparation of integrated regional development plan	11/88-3/89	Preparation of integrated regional development plan and identification of high-priority projects (selection of priority projects 2/89)	10/88-3/89
IV.	Identification of high-priority projects (selection of priority projects 9/89)	5/89-9/89	Preparatory study of high-priority projects	4/89-10/89
V.	Preparatory study of high-priority projects	8/89-12/89	Finalization of report	11/89-1/90

At the end of each stage, a workshop was held in Jakarta to discuss the report drafted by the Team and give guidance for study implementation. Major discussions were recorded in minutes (see Appendix 2). A series of mini-workshops were also held in the provinces to solicit local opinions and comments. Incorporating those comments, the draft report was then finalized for the formal submission to DGCK.

D. Study Organization

6. The overall organizational framework to implement this Study is shown in Figure 2. The Steering Committee consists of the Ministry of Public Works, BAPPENAS, the Ministry of Home Affairs and four BAPPEDA concerned. The Advisory Committee is set up by JICA to provide the Team with appropriate advice on study implementation. The names of

participants in the Study are listed in Appendix 3. The Team has worked closely with the Government Counterparts on a day-to-day basis. In addition, six Counterpart members including three senior government officials made a study trip to Japan for two to three weeks during the Study period.

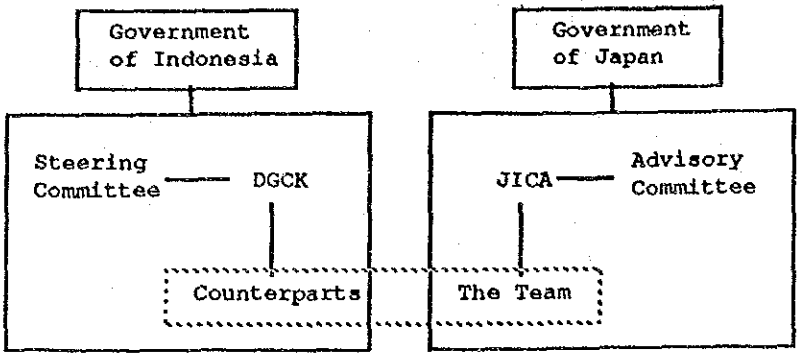

Figure 2. Organizational Framework

E. Performance of the Study

7. Throughout the two-year period of the Study, continuous policy dialogue was maintained between the two governments, which has contributed to formulation broad consensus on the development philosophy and reaching 4 I-principles to guide the Study. The idea is that the outcome of the Study should be: (i) implementable; (ii) internationally acceptable; (iii) integrated; and (iv) institutionally capable. Brief explanations of the Study's performance are given below.

8. Implementable. In order to be implementable, the outcome of the Study should be in accordance with the Government's priority and budget, and timely submitted to match the Government's operational schedule. The Team's work was carried out along this line as described in the modified time schedule above. As a result, several projects identified in the Study have already been taken up by respective donors for implementation in 1989/90.

9. Internationally Acceptable. Since the identified projects are so diversified in terms of their sectors and types and require so much investment and expertise, major donors should be requested to consider their assistance. Thus, the report should be prepared to be internationally acceptable and convincing. The Team has visited major donor's representatives in Indonesia and exchanged views on their approach to development of the Region as well as the entire Indonesia.

10. Integrated. While very few successful experiences exist in the past, sectoral and spatial integration is the key of this Study to maximize the efficiency of development of such a vast Region within a limited financial resources. Through a systematic approach starting from development goals, objectives and strategies based on macroeconomic and spatial frameworks, the Team identified 11 Integrated Development Programs (IDEPs), as a core of this Study.

11. Institutionally Capable. Probably, one of the largest reasons of failure in any type of past development would be lack of institutional capability of the executing agencies. Though this is a highly sensitive area for outsiders to tackle, the Team suggested

general management mechanism and technical cooperation to be followed up.

F. The Final Report

12. This Report, covering major findings and all relevant information obtained during the Study, is divided into the following fire volumes:

Volume I Executive Summary
This is a self-contained briefing of the Study results detailed in Volumes II, III and IV.

Volume II Main Report
This Volume describes the main outputs of the Study, explaining (i) the planning procedure; (ii) the development goals, frameworks and strategies; (iii) the selection of priority projects; (iv) the Integrated Development Programs (IDEPs); and (v) financial and institutional aspects relevant to project implementation. Also included here is the administrative outline of the Study.

Volume III Sectoral Analyses
This Volume consists of detailed descriptions of sectoral analyses and their results.

Volume IV Priority Projects and Project Information
This Volume consists of (i) the Long List of the identified projects; (ii) the project profiles; and (iii) the Guideline for Study for some selected high priority projects.

Volume V Land Use Maps
Land use maps of the Region (16 leaves) compiled from Landsat images are included together in this volume.

II. THE REGION

A. Overview

13. Geography. The Region as defined in this Study consists of four provinces: Aceh, North Sumatra, West Sumatra and Riau. It lies in the western most part of Indonesia, extending about 1,200 km from Banda Aceh ($6^{o}N$) to the border of West Sumatra Province ($3^{o}S$) crossing the equator in West Sumatra and Riau. Geographically seen, the Region consists of four distinct parts: the Barisan range running through the Region like a spine, the vast alluvial plains on the eastern side of the range, the narrow coastal strip along the western coast, and the two archipelagoes both on the west and east sides of the mainland. Across the Malacca Straits, almost parallel to the island of Sumatra lies the Malaysia Peninsular, whose southern end is punctuated by Singapore. The Region mostly belongs to the equatorial, humid tropics, and thus is characterized by high and constant temperature throughout the year and heavy rainfall ranging from 1,500 to 5,000 mm per year. Since the Region is on an active fault and volcanic area, potential earthquake risks should be taken into account in making designs of important infrastructures.

14. Population. In 1988 the Region was inhabited by 20.0 million population (11.4% of national total) on its 264,000 km^2 land (13.8% of national land). Its population density of 76 heads per km^2 was slightly below the national average (91), but far below that of Java (800). Population growth over 1980-85 was more rapid than that of the nation as a whole, reflecting a steady inflow of migrants from outside (especially to Riau) and higher fertility rates. Urbanization is still limited in the Region as well as in Indonesia (the Region's urbanization rate was 23.3% in 1985, while the national figure was 26.2%). Accordingly, the city system remains underdeveloped. Nonetheless, the Region has the largest city outside Java: Medan, the capital city of North Sumatra. With a population of 1.8 million (about one tenth of the Region's total), Medan is not only the capital of North Sumatra but also the economic center of the whole Region. Supplementing Medan's functions, Padang, the capital city of West Sumatra, also serves the central part of Sumatra. Though it is much smaller than Medan in population size (about 400,000), Padang's importance to the Region is nonetheless great because the city is the largest urban center on the western coast of Sumatra, which has significant natual, as well as geographical, development potential toward the 21st century.

15. Economy. The Region, a vast land of various physical features and historical backgrounds, is far from uniform: strong religious heritage in Aceh; Batak and Malay traditions in North Sumatra; a unique matrilineal society in West Sumatra; and frontier spirit in Riau. Their diverse courses of development since independence more or less reflect the diversity among the four provinces both in cultural and economic terms. Internally diverse though it is, the Region taken as a whole occupies rather a unique position in the nation. As Table 1 shows, the Region is feeding itself sufficiently, keeping a respectable manufacturing base, and exporting both oil/gas and non-oil/gas commodities substantially. In fact the Region has achieved self-sufficiency in rice and its surplus (estimated at 400,000 tons annually) is currently supplied to the other parts of Indonesia. Manufacturing production is also active, particularly in the eastern coastal zone from Aceh to North Sumatra. This zone

Table 1. Northern Part of Sumatra in Indonesia

Index	Aceh	North Sumatra	West Sumatra	Riau	Northern Sumatra	INDONESIA
1. Land area (km^2)	55,390	71,680	42,297	94,562	263,929 (13.8)	1,919,443 (100.0)
2. Population (x1,000, 1988)	3,225	10,104	3,839	2,821	19,989 (11.4)	174,825 (100.0)
3. Population growth rate (%, 1988-93)	2.54	2.23	1.05	3.11	2.19	1.91
4. GDP (with oil/gas) (Rp.billion, 1986 current prices)	5,979	5,041	1,833	5,583	18,436 (19.1)	96,489 (100.0)
5. GDP per capita (Rp. million)	1.95	0.54	0.49	2.12	0.97	0.57
6. GDP (*without oil/gas*) (Rp.billion, 1986 current prices)	1,873	4,839	1,833	1,427	9,972 (12.1)	82,302 (100.0)
7. GDP per capita (Rp. million)	0.61	0.51	0.49	0.54	0.53	0.49
8. Rice production (unhusked, 1,000 Mt, 1986)	1,039	2,068	1,422	366	4,895 (12.3)	39,727 (100.0)
9. Rice demand (unhusked, 1,000 Mt, 1986)	721	2,246	892	618	4,478	-
10. Total wet farm land (1,000 ha, 1986)	324	518	224	179	1,245 (16.4)	7,600 (100.0)
11. Estate (1,000 ha, 1986)	339	1,133	247	691	2,410 (27.1)	8,891 (100.0)
12. Manufacturing employees (large and medium, x1,000, 1985)	11	89	11	24	135 (8.2)	1,635 (100.0)
13. Commodity export (port base, US$ million, 1987)						
-Crude oil and oil products	658	37	0	3,681	4,376 (71.1)	6,157 (100.0)
-Natural gas and other gasses	1,363	0	0	0	1,363 (56.8)	2,399 (100.0)
-Non-oil/gas	90	1,275	180	280	1,825 (21.3)	8,580 (100.0)
Total	2,111	1,312	180	3,961	7,564 (44.1)	17,136 (100.0)

Sources:
1. Dalam Angka of each province
2, 3. Team's estimates
4, 5, 6, 7. Regional Income 1983-1986 of each province; BPS, National Income of Indonesia 1983-1986
8. BPS, Statistical Year Book of Indonesia 1987
9. Team's estimates
10, 11.. BPS, Land Area by Utilization in Java (1986) and Land Area by Utilization Outer Java (1986)
12. Dalam Angka of each province; BPS, Economic Census 1986
13. Compiled from BPS, Indonesia Foreign Trade Statistics: Exports 1987

actually forms the largest industrial base outside Java. With regard to export, the Region is a mighty national leader, accounting for 44% of national total commodity export in 1987 (71% of oil, 57% of natural gas and 21% of other commodities originated from the Region). To this adds export of services, one major form of which is tourism, where the Region's contribution is now becoming significant, too.

16. GDP per capita. The GDP figures in Table 1 reveal a remarkable discrepancy between regional GDP including oil and gas (oil/gas GDP) and regional GDP excluding oil and gas (non-oil/gas GDP). In terms of per capita GDP, the Region's figures are compared with national figures as in Table 2. The high values of oil/gas GDP per capita for Aceh and Riau are misleading, however, since those are largely owing to the oil and natural gas production in the respective provinces which does not contribute much to their welfare. When non-oil/gas GDP per capita is compared, the four provinces are at almost the same level, slightly higher than the national average. This regional average, however, conceals a wide discrepancy in the income level within the Region. If the Region is divided into the eastern and western sides, the western side is generally lagging behind the eastern side in its development. This is especially the case when several islands along the western coast are concerned. There are also some backward areas on and off the eastern coast, particularly in Riau.

Table 2. GDP Per Capita (1986)

(Rp.million, current prices)

	Aceh	North Sumatra	West Sumatra	Riau	Northern Sumatra	INDONESIA
With oil/gas	1.95	0.54	0.49	2.12	0.97	0.57
Without oil/gas	0.61	0.51	0.49	0.54	0.53	0.49

Sources: Calculated from Regional Income 1983-1986 of each province, BPS, National Income of Indonesia 1983-1986, and BPS, Statistical Year Book of Indonesia 1987.

17. Infrastructure. Viewed nationally, the Region has comparatively good, well-developed systems of infrastructure. This is especially the case with transportation. The Region has an artery road network structured around the trans-Sumatra highway, two independent railway systems (in North Sumatra and West Sumatra) and an extensive route network of air transportation, for instance. Nevertheless, those infrastructures still need substantial upgrading to support social and economic activities envisaged in the future.

B. The Region's Advantages

18. To summarize, the Region's position in Indonesia is one of the intermediate. The Region definitely leads the country in some aspects, but on the whole it is situated between Java, the most advanced region, and the rest. With respect to development potential, however, the Region ranks among the highest. The Region has a variety of advantages when its development is concerned:

(i) Abundant natural resources. The Region is endowed with a huge area of underutilized land (e.g., unirrigated fields, convertible forest, swamp, grass land), heavy rainfall, unexploited marine resources, thick tropical rain forests, various mineral deposits (e.g., oil and gas, tin, coal, limestone, rare metals) and so on. The current level of their utilization is still low, leaving much potential for future development.

(ii) Exportable commodities. The Region is already the national top exporter of oil, LNG, processed rubber and palm oil. In addition, its exports of coffee, plywood, sawn timber, shrimp and cement, for instance, are also substantial. Currently, these export commodities are mainly from the primary sectors, but more manufactured goods should be sold overseas in the future as the manufacturing sector gradually grows and consolidates in the Region. Also, a wider range of primary commodities (e.g., vegetable, meat) will become exportable in the long run. In view of the need for Indonesia to increase non-oil/gas export while sustaining oil/gas export, the Region's contribution with this respect must be considerable.

(iii) The largest industrial base outside Java. The manufacturing sector in the Region is still limited in its development, but nonetheless the industrial base there is the largest one outside Java. The zone stretching from Lhokseumawe in Aceh to Kisaran and Tanjung Balai in North Sumatra is in fact emerging as an advanced industrial area, whose center is Medan. The city's importance is not confined to the area alone, since it must and will serve the whole Region not only as the industrial center but also activities.

(iv) Relatively well-developed infrastructure. Compared with the eastern part of Indonesia, the Region has better systems of infrastructure. The trans-Sumatra highway runs through the Region serving as a communication backbone whereas two railway systems are in operation mainly to transport bulky cargo (palm oil and coal). Also the trans-Sumatra analog microwave system has been completed for several years.

(v) A variety of tourist attractions such as Lake Toba. Tourism is a booming industry in many Asian countries, and Indonesia is no exception. As the number of foreign tourists visiting the country is soaring, tourism is given high priority in the national development. The Region currently attracts 300,000 foreign visitors per year (out of one million nationally) mostly from Malaysia, Singapore and the Netherlands. Lake Toba is a well-known, very popular destination, but many other places have good potential to attract more tourists. Among them are Lake Tawar in Aceh, Nias island in North Sumatra, the Minang Highlands in West Sumatra, Batam and Bintan islands in Riau, just to name a few.

(vi) Proximity to Singapore and Malaysia as well as easy access to the international navigation route. It is a special asset being close to Singapore and Malaysia. The two countries are good markets for various commodities and services originated from the Region, which Singapore in particular serves as a transit base for international exports. Also, the Malacca Straits are an international navigation route to which several ports of the Region have good access.

What is the most advantageous with the Region is the fact that it enjoys these favorable conditions as a set. No other region outside Java is in such an advantageous position.

C. Provinces

19. As noted earlier, the four provinces making up the Region have very diverse characteristics. Following are descriptive summaries of them.

1. Aceh

20. Three areas. Aceh Province can be divided into three areas: eastern coast, western coast, and central mountain area. The eastern coast is characterized by a large chemical industrial zone around Lhokseumawe. The area is also the province's food basket, typified by a stretch of irrigated paddy fields and tambak ponds for fish culture. The western coast and the central mountain area, on the other hand, are generally lagging behind the east as clearly indicated by the lack of an adequate road system there. Nonetheless, the western coast has developed smallholder plantations of export crops (oil palm, rubber, patchouly, nutmeg, clove) and has good prospects for mineral resources, while the central mountain area is the largest grower of arabica coffee in Indonesia.

21. Dualism. The provincial economy at present is one of the dualistic economy, with the modern oil and LNG sector dominating over and separated from the traditional productive sectors. Also dualistic in spatial terms, the economy has seen a substantial number of job-seeking migrants moving from the central and western parts to Lhokseumawe and its surrounding areas. This has, on the one hand, created a variety of urban problems in the destination, while on the other depressing agricultural production in the origin with fewer male population working their land.

22. Industry. Except for a small number of modern establishments, the industrial base of Aceh is still at an infant stage. However, high-potential natural resources which can lead the development of local industries are amply identified in the province: the richest tropical forest resources in the Region, coastal areas suited for tambak fish culture, prospects for non-metallic as well as metallic deposits, possibility of hydroelectric power plants, and so on.

23. Prospects and problems. One serious obstacle to the province's development is its inadequate transport infrastructure. Lack of good roads on the western coast and through the central mountain area is especially disadvantageous to the areas. Also, ports are grossly insufficient both in number and capacity. So far, natural gas and oil have been the leader of the Aceh economy in terms of GDP expansion. They will keep their leading position for the foreseeable future, but the economy's dualism must be overcome in the long run. In view of the province's current economic structure, agriculture seems the best candidate to take the lead. It is expected for agriculture to increase its export earnings and provide raw materials to agro-industry, in addition to keep more-than-self-sufficient rice production.

2. North Sumatra

24. Three areas. North Sumatra accounts for about half of the Region's total population. Its economy is active, with Medan, the capital, being the economic center of the Region as well. Like Aceh, this province can also be divided into three sub-provincial areas: eastern coast, central mountain area and western coast. The eastern coast has long seen a development of large-scale estate (rubber, oil palm) on the fertile alluvial land since the Dutch colonial period. In and around Medan, an array of industries have grown supplying the northern part of Sumatra as well as North Sumatra Province with basic manufactured goods. The central part is mountainous, but, unlike Aceh, topography and soil allow cultivation on a wider scale, with some parts specializing in intensive horticultural production mainly for export. Lake Toba is a precious asset for this area, both as a tourist attraction and as large reservoir of water resources. The western coast is relatively backward lacking, among other thing, a basic system of transport infrastructure.

25. Advantages. With respect to infrastructure, however, North Sumatra generally enjoys the best system in the Region. Its road network is comparatively well-formulated, while a railway system is in operation interconnecting major towns on the eastern coast. The Belawan port, a major gateway in the Region, is linked to Medan by a newly constructed toll road. Several major irrigation and drainage schemes have been completed, while the hydroelectric power plants on Asahan and other rivers are in full operation. Natural resources are not in short supply, either: rich fishery resources in the Malacca Straits as well as a potential tuna reserve in the western sea; the only man-made forest established in the Region; a huge amount of natural water reserved in Lake Toba to be used for irrigation, power generation and, possibly, industrial production; to name a few.

26. Prospects as the center. As the leading sector of the provincial economy, which is not endowed with oil or gas, agriculture may keep its role for the moment. However, the province's manufacturing base has a chance of a rapid expansion by diversifying itself and nurturing up- and down-stream industries. The province could become the Region's industrial center in the next century. Medan, in particular, with its stronger linkage to other parts of the Region, would serve as the main service center equipped with adequate urban infrastructure.

3. West Sumatra

27. Tradition. Traditionally, a West Sumatran boy was supposed to outmigrate to some other part of the country, earning his living for himself and remitting some money to people back home. This tradition was rooted in the relative dearth of arable land in the province, where smallholders with less than one hectare still make up the majority of agricultural population. The province, however, has long produced surplus rice, thanks mainly to good volcanic soils and well developed small-scale irrigation systems. With respect to other primary sectors like fishery and forestry, their activity levels are relatively low. However, the province accounts for the most of the fishing households engaged in fresh water aquaculture in the Region.

28. Rich energy. Coal mines at Ombilin represent a major energy source in Indonesia. Prospects for other mineral resources, especially geothermal energy, are bright. As an example of non-metallic resources utilization, there is one cement factory in Indarung, the largest in the country. With several lakes at high altitudes, the province has good potential for hydroelectric generation. One on Lake Maninjau,

first of such schemes, was completed in 1982 and is now in full operation.

29. Locational problem. Despite those available resources, the manufacturing sector is still small in size, and their utilization is limited. One major disadvantage of the province with respect especially to the export-oriented industry is its westward location. Indonesia's trade partners are now mostly in the Pacific region, putting West Sumatra into an inferior position to compete with other provinces which have eastward access. Transport infrastructure is in relatively better condition except for some road connection in the southern part and the shipping service between the west coast islands and the mainland. The province's scenic beauty can be a major tourist attraction in Indonesia. However, tourism-related infrastructure has yet to be developed to its full potential.

30. Prospects in agriculture. The province's comparative advantage lies in its agricultural production in general and rice production in particular. It will remain the major supplier of rice to Riau, Jambi and, to a lesser extent, North Sumatra. However, government-controlled low rice prices have worked as a strong disincentive, and crop diversification (rubber cocoa, coffee, etc.) is taking place as a result, somewhat undermining the province's comparative advantage. The province may rather become a producer of agriculture and fishery inputs like seeds and fry, which can possibly yield higher value added per hectare. Industrial development will be slow, at best. The emphasis should be put on small rather than large factories in order to prepare its manufacturing base for future expansion.

4. Riau

31. Composition. Broadly, Riau consists of two distinct parts: mainland with a very low population density and islands scattered off the eastern shore with small but long settled communities. The mainland Riau is characterized by its vast stretch of swamp and marsh land. Without proper drainage and irrigation, such land cannot yield much agricultural product. Hence, the province still imports some 40% of its rice consumption from other rice-surplus provinces, notably West Sumatra. Instead, Riau's agriculture is dominated by estate crops like oil palm, coconut and rubber. Being already the largest coconut producer in the Region(and the second largest in the nation), the province has recently taken a step further carrying out an experimental scheme where hybrid coconuts are to be planted in tidal irrigation areas. The mainland Riau also provides many settlement areas for transmigrants. In part because of this active migration, the province has recorded a high rate of population growth over recent years.

32. Island close to Singapore. The islands off the east coast, in addition to their mineral and fishery resources, have a special kind of asset of being close to Singapore and Malaysia. Fishery production there is traditionally directed to those markets, while the industrial zone on the Batam island and recreational projects on the Batam and Bintan islands are more recent conceptions which try to make the most of their locational advantage. Swamp areas as well as insular settlements, however, suggest the magnitude of difficulty in transportation over the province. Transportation means is virtually nonexistent for many parts of Riau, except for the waterway.

33. Oil production. The provincial economy as a whole is being led by oil production, which accounts for more than half of the national output and raises the province's per capita GDP well above the

national average. The oil sector aside, the economy largely remains one of the rudimentary structure, yet its manufacturing output per capita in 1985 was the highest in the Region. The province's manufacturing base consists mainly of industries which process natural resources: petroleum refineries, palm oil mills, sawmills and plywood factories, an alumina plant, among others.

34. Future course. Oil is one of the unrenewable resources and cannot last forever. In the very long run, Riau must transform itself into an economy where agriculture takes a definite lead. In this view, the development of swamp areas through providing irrigation and drainage merits a close examination. Transmigration schemes and nucleus estate projects, coupled with the swamp irrigation/drainage and the transport system development, can have a significant influence on the province's future course toward a full-fledged economy.

III. PLANNING PROCEDURE

A. Needs for Integrated Approach

35. This chapter's objective is to outline the procedure of preparing the Integrated Regional Development Plan for the northern part of Sumatra. The remaining chapters of this report will roughly follow the procedure, describing each step's tasks and outcomes in detail. Figure 3 schematically depicts the procedure.

36. The ultimate aim of this whole planning practice is the identification of priority projects to be implemented in the Region during the 20-year planning period in general and during Repelita V in particular. To this end, this Study has adopted an approach which combines the sectoral and the area approach to development. The hybrid approach is to identify several sub-regions to focus on and prescribe sectoral projects within the sub-region's particular setting as well as the regional (or even national) perspective. In this way the identified projects are at one time consistent with the broad framework of the Region's development and meeting specific needs of local population. The outcome of this approach is eleven programs which, termed Integrated Development Program (IDEP), constitute the central pillars of the Regional Development Plan.

37. The reason why the Team advocates an integrated area development approach to devising and implementing specific development projects is as follows. The development of the vast Region, which is comparative to Japan's entire territory, with limited financial resources calls for the most effective planning of high priority projects in various sectors with a proper sequence. However, under the current administrative setup sectoral projects are administered by respective sectoral agencies according to their own priority, and that hence there is no guarantee of a locality having necessary projects in a proper sequence in a well-coordinated and integrated manner. This problem can badly undermine any efficiency-minded development effort. What is needed therefore is a mechanism by which projects of various sectors are so coordinated that their timely combination will magnify their impact significantly. The Team proposes the Integrated Development Program (IDEP) to meet this need. The following sections will respectively describe the steps in this planning procedure.

B. Goals, Objectives and Frameworks

38. The long-term development goals for the Region are first clarified taking into account the national goals set forth in a series of Repelita and other official documents. They are (i) growth, (ii) equity and (iii) stability. More specific objectives are then identified to attain those general goals. After studying the Region's present conditions and future potentials, the Team specifies five objectives: (i) food base; (ii) export/tourism; (iii) industry base; (iv) in-migration; and (v) economic linkage. Those objectives should be achieved in the real world, and a likely course of the Region's development is projected in two forms of frameworks; one deals with a set of macroeconomic indicators (GDP, population, investment, etc.) and the other with spatial configuration of economic activities (urban system, transportation system, distribution of production, etc.). The two forms of frameworks serve as the concrete targets to aim at.

C. Strategy

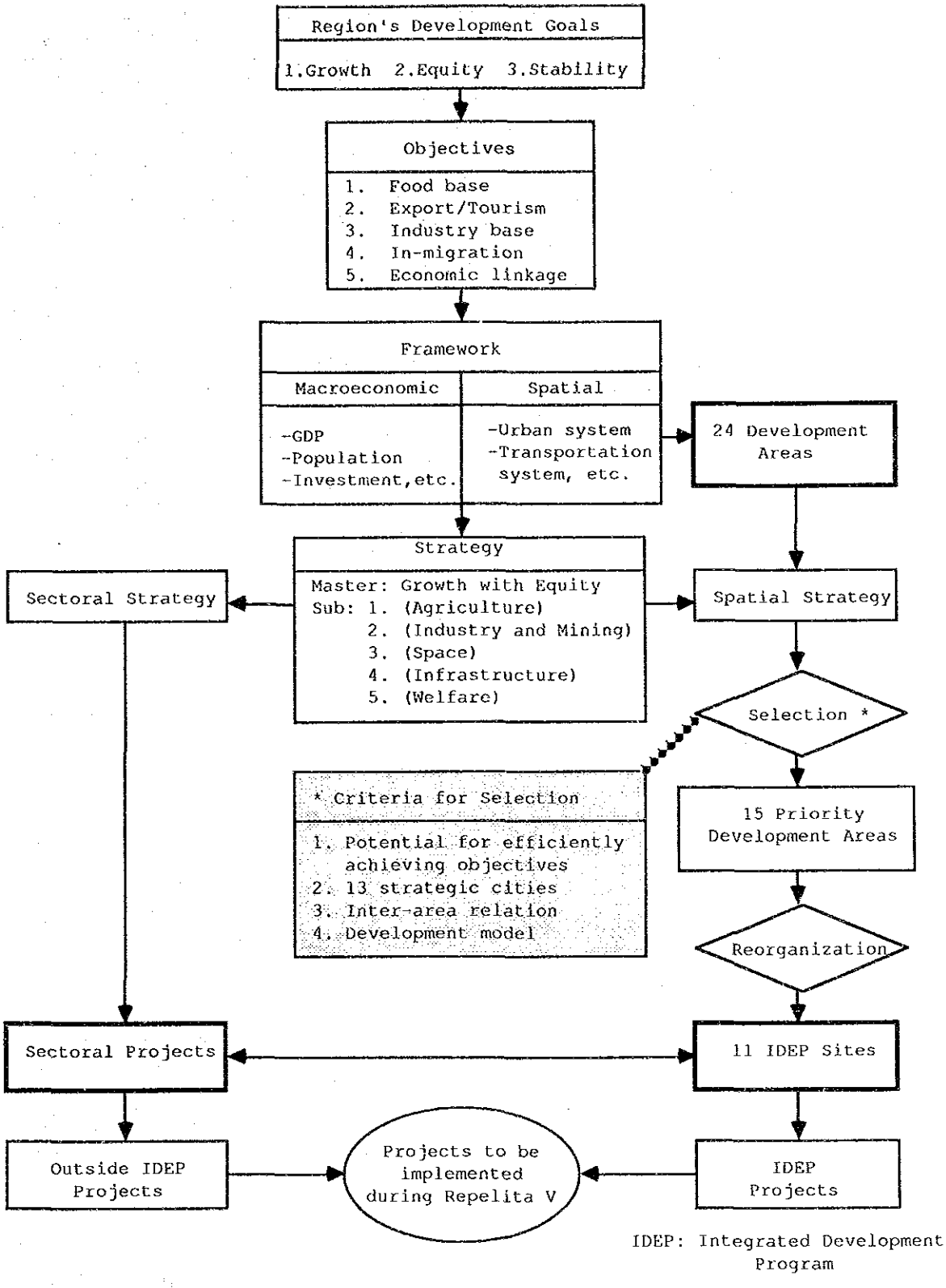

Figure 3. Overall Planning Procedure

39. Given the goals, objectives and frameworks, strategy to achieve them are then formulated. The master strategy is "growth with equity," that is, to develop the Region efficiently while paying due attention to equity. This master strategy is interpreted into aspect-specific five sub-strategies: (i) agriculture; (ii) industry and mining; (iii) space; (iv) infrastructure, and (v) welfare. The above set of strategies are then translated into the spatial and sectoral strategies expressed in more specific terms. Since the spatial and sectoral strategies are formulated within a broad (regional or national) perspective, they guarantee consistency in later selecting IDEP sites and formulating sectoral projects.

D. Development Areas

40. Sectoral projects must be identified not only according to the sector's own strategy but also taking specific local conditions and needs into full consideration. This Study has adopted the IDEP approach to fulfill this requirement. The vastness of the Region, however, necessitates selecting some sub-regional areas for prospective sites of IDEP planning and implementation. To carry out this selection, the Region is first divided into 24 sub-regional areas (termed development areas) to assess development potentials and priority systematically. Those areas are then classified very broadly into three categories:

Category I	Advanced areas
Category II	Less advanced areas
Category III	Remote islands

Each category's role in achieving the Region's development objectives is then specified to provide basis for the selection of priority development areas.

E. Priority Development Areas

41. Based on the spatial strategy, priority development areas are chosen with respect to the following criteria: (i) potential for efficiently achieving objectives; (ii) 13 strategic cities; (iii) inter-area relation; and (iv) development model. The result is 15 development areas given priority to become sites for IDEP.

F. Integrated Development Program (IDEP) Sites

42. The 15 development areas selected in the previous step are prospective sites for IDEP. Before delineating the IDEP sites exactly, however, the priority development areas are reorganized to sharpen each IDEP's characteristics as much as possible. This reorganization finally brings forth 11 sites for IDEP. An IDEP is then formulated for each of the 11 sites according to its role to play in the Region's long-term development.

G. IDEP Projects and Sectoral Projects

43. An IDEP actually consists of a set of projects (IDEP projects). Given a specific IDEP site, IDEP projects are identified which are necessary to perform the site's role effectively and efficiently. Basically, IDEP projects are thus more local needs-oriented. In their identification, however, sectoral projects formulated according to the sectoral strategy in a broad perspective are constantly referred to, and both IDEP and sectoral projects are modified if necessary to ensure their mutual consistency within the

wider framework and the IDEP approach. Those sectoral projects which are not located in any IDEP site are called outside IDEP projects. Thus, "IDEP" is defined as group of sectorally integrated priority projects in 11 strategically high development potential areas selected in the Region to maximize "growth with equity" effects. Other high priority projects, which are selected outside 11 IDEP areas in the Region and integrated sectorally and spatially to maximize "growth with equity" effects are defined as "outside IDEP projects."

44. In total, more than 400 projects are identified in this Study. They are classified according to the timing of implementation (short-term projects to be initiated during Repelita V, middle-term during Repelita VI, and long-term during Repelita VII and VIII). This classification or priority-setting is done by evaluating each project with respect to a certain set of criteria. All the projects are listed in the long list in Volume IV with their classification specified.

IV. DEVELOPMENT CONCEPT

A. National Development Policy

1. Review of Repelita I-IV (1969/70-1988/89)

45. Since Repelita I which started in 1969, Indonesia has adopted three goals (the Trilogy) as the guideline for its development. They are: equity, growth and stability. Although priority among the three changed from time to time, they have been the most fundamental goals of national development to guide the formulation of the subsequent Repelita. While the first priority during Repelita I was "stability with special emphasis on rehabilitation of devastated infrastructures during the political crisis period" and during Repelita II it was "growth with initiating construction of major infrastructure", the priority order during Repelita III and IV was: (i) equity, (ii) growth, and (iii) stability.

46. During this 20-year period, national development policy achieved a considerable success, attaining self-sufficiency in rice and an average annual GDP growth rate of 4.8% in real terms during 1965-1985. This was the second highest among the ASEAN countries, only next to Singapore. However, the steady softening of the international oil market and the decline in the real prices of Indonesia's main primary exports, starting in the early 1980s, produced negative terms of trade effects to the Indonesian economy. The sharp appreciation of the Japanese yen vis a vis the US dollar since 1986 has also contributed to reduce export prices relative to import prices and raised the debt burden of Indonesia.

47. In order to reduce its balance of payment deficit, the Government introduced a series of economic stabilization program and structural adjustments since 1983. They included budgetary cuts, tax reforms, devaluations of the rupiah, promotion of non-oil/gas exports, privatization, decentralization and deregulation in production, investment, transportation and financial and banking sectors. The IGGI supported these Government's policies and provided a large amount of special assistance or policy-based lending in the forms of untied fast-disbursing program and local currency lending for immediate balance of payment support and local-cost financing for the budget.

2. Goals of Repelita V (1989/90-1993/94) and Beyond

48. Repelita V represents the last 5-year period of the first 25-year Long-Term Development starting in 1969. The primary task of this closing phase is to accomplish the structural adjustment of the Indonesian economy, a task which became evident after the sharp decline in oil prices in the early 1980s. This structural adjustment is a prerequisite for further economic and social development envisaged for the next 25-year Long-Term Development, which will start in 1994/95. The People's Consultative Assembly decided in March 1988 that Indonesia was to enter its "take-off" process during Repelita VI, the first phase of the second 25-year Long-Term Development.[1,2] Thus, Repelita V must

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[1] "By the end of the Repelita V a strong foundation must be built in order that the Indonesian people can continue to grow and advance, so that in Repelita VI the nation's development can enter the take-off stage. This will accelerate development by its own strength, leading to the realization of a just and prosperous society founded on Pancasila." Department of Information, Decrees of the People's Consultative Assembly of the Republic of Indonesia, March 1988, p.33.

also serve as the strong springboard to accelerate the country's economic growth into the sustainable "take-off" stage. The priority order of the trilogy has remained intact in Repelita V, as (i) equity, (ii) growth, and (iii) stability.[3]

49. On 7 January 1989, President Soeharto submitted to parliament a Draft Repelita V Plan, which was approved and implemented from 1 April 1989. Two main targets in Repelita V are: (i) raising the living standard, enlighten the mind and improve the well-being of the whole of the people more evenly and equitably; and (ii) laying a solid foundation of subsequent development stage.

50. Against these targets, the Plan expects 1.9% of the average annual population growth rate and estimats the labor population will increase by 11.9 million during the period of Repelita V, from 74.5 million in 1989/90 to 86.4 million in 1993/94. In order to give them productive and remunerative employment, the Plan determines that the average annual rate of economic growth should be 5%.

51. The Plan places priority on harmonious development of agriculture (self-sufficiency in food-stuff and increasing other agricultural outputs for domestic demand and export) and industry (producing export-oriented goods and absorbing manpower). By increasing non-oil/gas export, the debt-service-ratio will be reduced from around 35% currently to under 25% by the final year of Repelita V.

52. In order to reach an average annual GDP growth rate of 5%, an investment of around Rp.239 trillion (26.4% of the GDP) will be required for the next 5-year period. Out of this total, about Rp.107 trillion (126% increase from Rp.47.5 trillion for Repelita IV) or 45% comes from state development budget, while about Rp.132 trillion or 55% is expected to come from the business world and the public themselves. The state budget and the sectoral planning in Repelita V is summarized in Table 3.

Table 3 Major Target of Repelita V (1989/90-93/94)

(i) State Budget

Rp. billion

	Revenue				Expenditure		
Year	Oil/gas	Non oil/gas	Foreign Aid	Total	Routine	Develop-ment	Total
1989/90	7,899.7	17,350.1	11,325.1	36,174.9	23,445.0	13,129.9	36,174.9
90/91	9,148.7	20,283.8	11,566.0	40,998.5	24,829.6	16,168.9	40,998.5
91/92	9,705.9	25,150.6	12,644.8	47,501.3	26,591.6	20,909.7	47,501.3
92/93	10,950.2	30,516.2	12,195.0	53,661.4	27,974.4	25,687.0	53,661.4
93/94	11,779.2	37,130.2	12,687.0	61,596.4	29,959.8	31,636.6	61,596.4
Total	49,483.7	130,430.9	60,417.9	240,332.5	132,800.4	107,532.1	240,332.5

Source: Repelita V, Government of Indonesia, 7 January, 1989

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[2] The concept of economic "take-off," due originally to Rostow, has allowed various interpretations. In fact if strictly applied his criteria to Indonesia, it appears to have already accomplished its "take-off." Rostow's original definition is therefore irrelevant in the above context. One possible alternative way of specifying the "take-off" point is to compare the GDP shares of agriculture and manufacturing. When the two sectoral shares become equal and the manufacturing's share starts to exceed the agriculture's, an economy may be said to have accomplished its "take-off." The Team adopts this interpretation in this Report.

[3] "The execution of development in Repelita V continues to be guided by the Trilogy of Development with the emphasis on the equitable spread of development and distribution of its fruits, which will lead to the realization of social justice for all the Indonesian people. This is to be attained by a reasonably high rate of economic growth in a state of healthy and dynamic national stability. These three elements of the Trilogy of Development are interrelated and should continue to grow in harmony, in an integrated way and mutually reinforcing." Ibid.,p.34.

(ii) Sectoral Planning

Sector	Annual Growth Rate of GDP(%)	Annual Growth Rate of Employment(%)	State Development Budget (Rp.Billion)	Contribution to GDP(%) 1988	1993
Agriculture	3.6	2.0	17,343(16.1%)	23.2	21.6
Mining	0.4	1)	11,193(10.4%)	15.9	12.6
Industry	8.5	6.7	2,119(2.0%)	14.4	16.9
Construction	6.0	4.4	2)	5.6	5.8
Commerce	6.0	4.5	1,429(1.3%)	15.9	16.7
Transportation and Communication	6.4	4.0	20,512(19.1%)	5.7	6.0
Others	6.1	1)	54,934[3] (51.0%)	19.3	20.4
Total	5.0	3.0	107,530(100%)	100.0	100.0

Notes: 1) Not available.
2) No figures specified but distributed into other items.
3) Including 10,711(10.0%) for regional development and 16,981(15.8%) for education/youth/culture.

Source: Repelita V, Government of Indonesia, 7 January 1989.

53. The state development budget for 1989/90 (first year of Repelita V) amounts to Rp.36.5 trillion (about US$21.4 billion, if converted by Rp.1,700 per US$1), calling on the nation to launch an all-out straggle to raise tax revenues. This amount is 26% increase over the previous year's budget, with a breakdown of declining by 11% of the oil/gas earning (Rp.8 trillion) and of increasing by 34% of the non-oil/gas revenue (Rp.17 trillion). These targets are undoubtedly ambitious, but the economic performance of the country so far is excellent, with (i)the successful macro-economic structural changes and deregulation measures undertaken by the Government in the recent years, (ii)current favorable international prices of oil/gas, (iii)people's enthusiasm for development and (iv)the political stability of the resource-rich country. Reflecting these good performances, Mr. Sumarin, the Minister of Finance was awarded as "The Minister of Finance of the Year 1989" at the time of the IBRD/IMF Annual Meeting in Washington, D.C., in September 1989.

54. It is worthwhile to look at the Indonesian economy from international point of view. As already well known, Asian economies, particularly those of NIEs and ASEAN countries, have outperformed other regions in the world. Those economies have achieved a rapid export-led growth as the governments have shifted their development strategies from import-substitution to export promotion coupled with encouraging foreign direct investments. The bulk of exports from NIEs (over 90%) are manufactured goods, while primary commodities and mineral/fuel still comprise large shares in ASEAN's exports. It is almost certain that the western rim of the Pacific Ocean consisting of East and Southeast Asian countries would be one of the three global economic powers with the West European and North American Economic Zones around the turn of the century, the period which this Study is aiming at. Then, Indonesia, the fifth largest country in its population and 14th

largest in its land in the world with full varieties of natural resources would play an important role as the south-western part of the West Pacific Economic Zone.

B. The Region's Development Goals

55. The Trilogy represents the Region's long-term goals as well. However, the current priority order among the Trilogy -- (i) equity, (ii) growth and (iii) stability -- does not need to apply uniformly to all regions or sectors in Indonesia. Rather, in order to make the most efficient use of the Region's comparative advantages, the Team considers it appropriate to set the priority order for the Region as (i) growth, (ii) equity and (iii) stability throughout the planning period. Needless to say, due attention should and will be paid to equity and stability within the Region even though economic efficiency is adopted as the main theme of its development. This modified order of the Trilogy for the Region's development goals was approved by the Steering Committee during the Second Workshop held in October 1988. Thus, the goals for the Region's development assumed by the Team are as follows:

(i) Economic growth to lead the Indonesian economy to the "take-off" after the end of Repelita V;

(ii) Social equity to ensure productive employment and remunerative income; and

(iii) Sustained stability from political, environmental and natural resources points of view.

C. The Region's Development Objectives

56. In order to realize an average annual national growth rate of 5% during Repelita V, the Region should aim at 6% of the average annual growth rate during the same period, to fully utilize its comparative advantages in both resource-rich and strategic geographical conditions. These advantages should be exploited as quickly as possible to form Region's development objectives as follows:

(i) To become a major foodstuff production base for domestic consumption (local, Sumatra and Indonesia);

(ii) To remain a leading exporter/foreign exchange earner (oil and gas, agricultural products, manufactured goods. tourism);

(iii) To establish an industrial base second largest in Indonesia;

(iv) To act as a major recipient of out-migrants from Java (via urban growth and transmigration); and

(v) To integrate the Region's potentials as a strong supporter of the national development.

57. Although implied in objectives (i) to (iv) above, creating more job opportunities[1] deserves a separate, explicit mention, since concern about the quickly bulging labor force has got very serious

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[1] Internationally ESCAP considered that human resources development (HRD), including employment and manpower development, science and technology and quality of life, as the ultimate development of successful socio-economic development and adopted Jakarta Plan of Action on HRD in April 1988.

lately to become one of the dominant issues in Repelita V. In fact economically active population is projected to increase by 2.84% annually during 1988 - 1993 adding about 2 million workers a year to the already crowded labor pool. Even though outright unemployment appears rare, underemployment is prevalent throughout the Region, and the continuous entry of a mass of youth can only worsen the situation unless some substantial effort is launched soon. It is thus our principle to see that more employment be created as the Region attains its general goals.

58. The Team will also pay particular attention to environment,[1] another important development issue. The rich natural environment the Region is endowed with is a valuable asset not to the Region alone but also to the nation and even to the world. In order not to work irreversible damage on the asset, the Team stresses two principles: first, conserve to develop and, second, develop to conserve. That is, proper effort of conservation is required with development projects and, more positively, development projects aimed at the conservation and enhancement of the natural environment should also be devised and carried out. The principles are reflected in the identification of projects as shown by a special column labeled "Environment Considerations" in the long list and by several projects specifically targeted at conservation.

D. Macroeconomic Framework

59. This Section provides 20-year projections (1988-2008) of some macroeconomic indicators. The projections are meant to form the macroeconomic framework for the Region within which its 20-year development (or, more specifically, individual projects) is planned.

1. Regional GDP

60. When calculating regional GDP for the four provinces, GDP excluding oil and gas production (so-called non-oil/gas GDP) is more relevant than GDP with oil and gas, because oil and gas revenues are directly transferred to the central government and have little impact on the provincial economies. Hence the Team chooses non-oil and gas GDP as the main economic indicator. For the purpose of comparison, however, GDP with oil and gas is also projected.

61. Non-oil/gas GDP by sector is projected for each province taking into consideration various factors like (i) past performance, (ii) growth potential, (iii) BAPPENAS and BAPPEDA projections for the Repelita V period (1989/90-1993/94), and (iv) the development strategy adopted by this Study.

62. GDP with oil and gas is based on the following assumptions made by the Team about the oil/gas related growth rates in the Region:

(i) The natural gas mining sector: 4% (throughout 1988 - 2008)

(ii) The oil mining sector: 2.5% (1988 - 1998), 3.0% (1998 - 2008)

(iii) The oil/gas related manufacturing sector: 7.0% (1988 - 1993), 6.2% (1993 - 1998), 4.3 % (1998 - 2008)

(iv) The oil/gas related service sector: 4.5% (1988 - 1993), 4.9% (1993 - 1998), 6.2% (1998 - 2008)

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[1] Starting from the Ottawa Summit of the seven major developed countries in June 1988, a number of international conferences on environment have been held.

63. Projections are summarized in Tables 4 and 5. Note that the growth rate projections for 1988-93 slightly differ from the Repelita V targets for 1989/90-93/94. This is explained as follows. Non-oil/gas GDP is projected first for Indonesia, and then for the Region as a whole to be broken down later into four provincial figures. There exist some studies as to the national growth in the short run, but their pictures are unanimously pessimistic.[1] Long-run projections, on the other hand, are very scarce naturally because of the high uncertainty prevailing in the international economy.[2] Referring to such existing studies, the Team has prepared its own projections on the national non-oil/gas GDP growth. The growth rates for the Region are then set at a level 0.8 to 1.0 percentage point higher than the national rates, hereby conforming to our primary emphasis on economic efficiency in the Region's development. The regional figures are then broken down into respective provincial sectoral growth rates accordingly to the supposed growth pattern tabulated above.

64. As noted earlier, the Team's projections have taken various factors into consideration, one of which is BAPPENAS and BAPPEDA projections for Repelita V. Table 6 lists their growth estimates along with the Team's, which are reproduced here from Table 5. In general, JICA Team gives a higher rate for agriculture and a lower one for other sectors and total GDP. These discrepancies can be attributed to the Team's intention to be as realistic as possible about the immediate five-year period. The pessimistic tone in the many short-run projections has undoubtedly wrought some effects. With regard to agriculture, on the other hand, the Team is rather optimistic about the four provinces' potential. According to our observation, there exist a variety of latent opportunities in the agricultural sector which are ready for immediate exploitation (quality improvement, for instance). Some might, perhaps justly, criticize those projections for being too optimistic. Acknowledging that this criticism might prove right, the Team as planners still likes to place the "necessity" of a growth of this magnitude over its "plausibility." A planner's duty after all is to prescribe a plan for achieving a set of targets that are chosen in some way or other. In the Team's view, the Region needs to grow at such a pace as prescribed to attain its long-term objectives stated at the outset. The plan will be so designed as to materialize this required growth.

2. Population

65. To estimate population as finely as possible, the planning period is divided evenly into 5-year sub-periods instead of the usual 5-5- and 10-year sub-periods. Note also that projections were originally made for 1990, 1995, 2000, 2005 and 2010. The results were then converted to the 1988-2008 series as is to be shown. National population projections for 1990-2005 are given by BPS (Biro Pusat Statistik). Provincial projections for 1990 are also given by BPS, but used with some modifications. Other figures are projected with the following set of assumptions:

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[1] *See, for instance, World Bank,* Indonesia: Strategy for Economic Recovery (World Bank, 1987); Sarwar Hobohm, Indonesia to 1991 (The Economist Intelligence Unit, 1987); International Development Center of Japan, Study for Formulating an Economic Aid Plan: Indonesia (IDCJ, 1988). Their short-term (up to 1995) projections are in the range of 2-4% annually.

[2] A World Bank report projects non-oil/gas GDP growth at 4.5% for 1987-89 and 5.9% for 1989-2000. See World Bank, Indonesia: Adjustment, Growth and Sustainable Development (World Bank, 1988), Table 2.4.

Table 4. Oil/Gas GDP (1983 constant price)

Province	Sector	Oil/Gas GDP (Rp. billion)				Average Annual Growth Rate (%)				Share (%)			
		1988	1993	1998	2008	1988-1993	1993-1998	1998-2008	*1988-2008*	1988	1993	1998	2008
Aceh	Agriculture	699	859	1,070	1,662	4.2	4.5	4.5	*4.4*	11.5	11.3	11.2	10.8
	Mining	4,504	5,480	6,667	9,869	4.0	4.0	4.0	*4.0*	74.2	72.4	69.9	64.0
	Manufacturing	182	274	421	1,044	8.5	9.0	9.5	*9.1*	3.0	3.6	4.4	6.8
	Others	683	958	1,375	2,834	7.0	7.5	7.5	*7.4*	11.3	12.7	14.4	18.4
	GDP	6,068	7,570	9,533	15,408	4.5	4.7	4.9	*4.8*	100.0	100.0	100.0	100.0
North Sumatra	Agriculture	1,438	1,792	2,255	3,673	4.5	4.7	5.0	*4.8*	33.7	31.7	28.8	21.8
	Mining	160	181	205	275	2.5	2.5	3.0	*2.7*	3.8	3.2	2.6	1.6
	Manufacturing	666	979	1,541	3,996	8.0	9.5	10.0	*9.4*	15.6	17.3	19.7	23.7
	Others	2,000	2,702	3,825	8,890	6.2	7.2	8.8	*7.7*	46.9	47.8	48.9	52.8
	GDP	4,264	5,653	7,825	16,834	5.8	6.7	8.0	*7.1*	100.0	100.0	100.0	100.0
West Sumatra	Agriculture	490	625	817	1,396	5.0	5.5	5.5	*5.4*	32.1	31.3	30.5	27.6
	Mining	19	25	36	73	6.0	7.0	7.5	*7.0*	1.2	1.3	1.3	1.5
	Manufacturing	165	231	332	787	7.0	7.5	9.0	*8.1*	10.8	11.6	12.4	15.5
	Others	854	1,116	1,494	2,804	5.5	6.0	6.5	*6.1*	55.9	55.9	55.8	55.4
	GDP	1,528	1,998	2,679	5,060	5.5	6.0	6.6	*6.2*	100.0	100.0	100.0	100.0
Riau	Agriculture	347	430	557	1,096	4.4	5.3	7.0	*5.9*	4.6	4.9	5.4	7.0
	Mining	5,799	6,561	7,423	9,976	2.5	2.5	3.0	*2.7*	77.5	74.9	71.8	64.1
	Manufacturing	442	620	849	1,521	7.0	6.5	6.0	*6.4*	5.9	7.1	8.2	9.8
	Others	890	1,147	1,506	2,962	5.2	5.6	7.0	*6.2*	11.9	13.1	14.6	19.0
	GDP	7,478	8,758	10,336	15,556	3.2	3.4	4.2	*3.7*	100.0	100.0	100.0	100.0
Northern Sumatra	Agriculture	2,974	3,706	4,699	7,826	4.5	4.9	5.2	*5.0*	15.4	15.5	15.5	14.8
	Mining	10,482	12,247	14,331	20,194	3.2	3.2	3.5	*3.3*	54.2	51.1	47.2	38.2
	Manufacturing	1,455	2,104	3,143	7,347	7.7	8.4	8.9	*8.4*	7.5	8.8	10.3	13.9
	Others	4,427	5,923	8,200	17,491	6.0	6.7	7.9	*7.1*	22.9	24.7	27.0	33.1
	GDP	19,338	23,980	30,373	52,858	4.4	4.8	5.7	*5.2*	100.0	100.0	100.0	100.0
INDONESIA	Agriculture	20,603	23,654	27,421	38,680	2.8	3.0	3.5	*3.2*	23.2	21.3	19.1	14.9
	Mining	14,805	17,024	19,738	27,906	2.8	3.0	3.5	*3.2*	16.7	15.3	13.7	10.8
	Manufacturing	12,755	17,735	25,270	54,337	6.8	7.3	8.0	*7.5*	14.4	16.0	17.6	21.0
	Others	40,527	52,521	71,361	138,214	5.3	6.3	6.8	*6.3*	45.7	47.3	49.6	53.3
	GDP	88,690	110,934	143,790	259,137	4.6	5.3	6.1	*5.5*	100.0	100.0	100.0	100.0

Source: Team's estimates.

Table 5. Non-Oil/Gas GDP (1983 constant price)

Province	Sector	Non-Oil/Gas GDP (Rp. billion)				Average Annual Growth Rate (%)				Share (%)			
		1988	1993	1998	2008	1988-1993	1993-1998	1998-2008	*1988-2008*	1988	1993	1998	2008
Aceh	Agriculture	699	859	1,070	1,662	4.2	4.5	4.5	*4.4*	44.6	41.0	37.3	29.9
	Mining	4	5	6	9	4.2	4.2	4.2	*4.2*	0.3	0.2	0.2	0.2
	Manufacturing	182	274	421	1,044	8.5	9.0	9.5	*9.1*	11.6	13.1	14.7	18.8
	Others	683	958	1,375	2,834	7.0	7.5	7.5	*7.4*	43.6	45.7	47.9	51.1
	GDP	1,568	2,095	2,872	5,549	6.0	6.5	6.8	*6.5*	100.0	100.0	100.0	100.0
North Sumatra	Agriculture	1,438	1,792	2,255	3,673	4.5	4.7	5.0	*4.8*	35.1	32.8	29.7	22.3
	Mining	2	2	3	4	2.0	3.0	5.0	*3.7*	0.0	0.0	0.0	0.0
	Manufacturing	653	959	1,510	3,918	8.0	9.5	10.0	*9.4*	16.0	17.6	19.9	23.8
	Others	2,000	2,702	3,825	8,890	6.2	7.2	8.8	*7.7*	48.9	49.5	50.4	53.9
	GDP	4,093	5,455	7,593	16,485	5.9	6.8	8.1	*7.2*	100.0	100.0	100.0	100.0
West Sumatra	Agriculture	490	625	817	1,396	5.0	5.5	5.5	*5.4*	32.1	31.3	30.5	27.6
	Mining	19	25	36	73	6.0	7.0	7.5	*7.0*	1.2	1.3	1.3	1.5
	Manufacturing	165	231	332	787	7.0	7.5	9.0	*8.1*	10.8	11.6	12.4	15.5
	Others	854	1,116	1,494	2,804	5.5	6.0	6.5	*6.1*	55.9	55.9	55.8	55.4
	GDP	1,528	1,998	2,679	5,060	5.5	6.0	6.6	*6.2*	100.0	100.0	100.0	100.0
Riau	Agriculture	347	430	557	1,096	4.4	5.3	7.0	*5.9*	28.1	27.0	26.5	25.7
	Mining	99	123	154	250	4.5	4.5	5.0	*4.7*	8.0	7.7	7.3	5.9
	Manufacturing	106	149	213	554	7.0	7.5	10.0	*8.6*	8.6	9.3	10.1	13.0
	Others	684	890	1,179	2,364	5.4	5.8	7.2	*6.4*	55.3	55.9	56.1	55.4
	GDP	1,236	1,592	2,104	4,264	5.2	5.7	7.3	*6.4*	100.0	100.0	100.0	100.0
Northern Sumatra	Agriculture	2,974	3,706	4,699	7,826	4.5	4.9	5.2	*5.0*	35.3	33.3	30.8	25.0
	Mining	124	156	198	337	4.7	4.9	5.5	*5.1*	1.5	1.4	1.3	1.1
	Manufacturing	1,106	1,613	2,477	6,301	7.8	9.0	9.8	*9.1*	13.1	14.5	16.2	20.1
	Others	4,221	5,666	7,873	16,892	6.1	6.8	7.9	*7.2*	50.1	50.9	51.6	53.9
	GDP	8,425	11,141	15,248	31,357	5.7	6.5	7.5	*6.8*	100.0	100.0	100.0	100.0
INDONESIA	Agriculture	20,603	23,654	27,421	38,680	2.8	3.0	3.5	*3.2*	23.2	21.3	19.1	14.9
	Mining	674	801	1,022	2,010	3.5	5.0	7.0	*5.6*	0.8	0.7	0.7	0.8
	Manufacturing	8,355	11,718	17,218	40,761	7.0	8.0	9.0	*8.2*	9.4	10.6	12.0	15.7
	Others	40,527	52,521	71,361	138,214	5.3	6.3	6.8	*6.3*	45.7	47.3	49.6	53.3
	GDP	70,159	88,693	117,021	219,665	4.8	5.7	6.5	*5.9*	79.1	80.0	81.4	84.8

Source: Team's estimates.

Table 6. Comparison of Non-Oil/Gas GDP Growth Rates

Province	Sector	Average annual growth rate	
		BAPPENAS/BAPPEDA (Repelita V)	JICA Team (1988-1993)
Aceh	Agriculture	2.8	4.2
	Mining	1.5	4.2
	Manufacturing	10.0	8.5
	Others	- 1)	7.0
	GDP	5.8	6.0
North Sumatra	Agriculture	4.7	4.5
	Mining	4.5	2.0
	Manufacturing	11.0	8.0
	Others	-	6.2
	GDP	6.2	5.9
West Sumatra	Agriculture	4.4	5.0
	Mining	10.8	6.0
	Manufacturing	8.5	7.0
	Others	-	5.5
	GDP	5.9	5.5
Riau	Agriculture	4.4	4.4
	Mining	6.9	4.5
	Manufacturing	8.5	7.0
	Others	-	5.4
	GDP	6.0	5.2
Northern Sumatra	Agriculture	-	4.5(4.5) 2)
	Mining	-	4.7(3.2)
	Manufacturing	-	7.8(7.7)
	Others	-	6.1(6.0)
	GDP	-	5.7(4.4)
Indonesia	Agriculture	3.6(3.6) 2)	2.8(2.8) 2)
	Mining	8.0(0.4)	3.5(2.8)
	Manufacturing	10.0(8.5)	7.0(6.8)
	Others	-(-)	5.0(5.3)
	GDP	6.2(5.0)	4.8(4.6)

Notes: 1) - indicates not available.
2) In parentheses are growth rates of GDP with oil/gas for comparison.

(i) The annual growth rate of Sumatra will keep about 0.9 percentage point higher than the national average;

(ii) While the current high growth rate of Southern Sumatra will continue until around 2000, Northern Sumatra's, after a modest decrease, will eventually increase to surpass the former after 2005;.

(iii) Aceh will see in-migrants increase due mainly to industrialization on the eastern coast;

(iv) North Sumatra will experience a rapid population growth after 2000 with the development of the industrial base in and around Medan;'

(v) West Sumatra will see continued outmigration, but its rate will gradually decline; and.

(vi) Riau will keep a high population growth as spontaneous migrants and transmigrants continue moving in.

Tables 7 through 9 show the projections.

66. Population growth is less subject to policy intervention than economic growth is. Its projection is therefore more amenable to modeling, and there exist various projection methods which are well established. Biro Pusat Statistik (BPS), using such methods, publishes long-term projections for the national population. Currently, up-to-date estimates are available for 1990-2005,[1] which the Team has used without any modification.

67. Unlike national population, however, provincial population is considerably difficult to project because of the existence of interprovincial migration. Migration within a nation fluctuates widely in the long run, being highly responsive to local economic conditions. This prevents BPS from attempting any long-term projection of provincial population. Nonetheless, they have preliminary estimates for 1990, which the Team has used in its projection after making some adjustments (1985-90 growth rate for North Sumatra, from 2.20 to 2.30; for Riau, from 2.99 to 3.34) taking the latest information into account. For the years after 1995, projections are basically the Team's own. Their assumptions were explained above.

68. Resultant growth rates and shares are tabulated in Tables 8 and 9. The growth rate will decline continuously, though slowly, in both Aceh and Riau mainly reflecting a drop in the fertility rate. North Sumatra and West Sumatra, on the other hand, will see an upward turn during 1998-2003, which is large enough to entail a higher growth rate on Northern Sumatra as a whole. This upward shift is largely attributed, in North Sumatra, to the expansion of Medan accelerated by an industrial development and, in West Sumatra, to the maturing of its provincial economy starting finally to offset the massive out-migration which is part of the Minankabau tradition. This trend is expected to continue while gathering some momentum into the next 2003-2008 period. In terms of population share, Sumatra as a whole will steadily increase its national share from 20.4% in 1988 to 24.4% in 2008. Within Sumatra, the northern part will lose some of its share before 2003 (from 56.0% to 52.2%) owing to the very rapid growth of the southern

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[1] Biro Pusat Statistik, Proyeksi Penduduk Indonesia 1985-2005 (BPS, 1987).

Table 7. Population

Province	Population (x 1000)				
	1988	1993	1998	2003	2008
Aceh	3,225	3,656	4,105	4,586	5,121
North Sumatra	10,104	11,284	12,534	13,954	15,658
West Sumatra	3,839	4,044	4,236	4,442	4,665
Riau	2,821	3,289	3,801	4,378	5,031
Northern Sumatra	**19,989**	**22,273**	**24,676**	**27,360**	**30,475**
Southern Sumatra	15,731	18,768	21,963	25,104	27,948
SUMATRA	35,720	41,041	46,639	52,464	58,422
INDONESIA	**174,825**	**192,200**	**208,854**	**224,598**	**239,580**

Source: Team's estimates.

Table 8. Population Growth Rate

Province	Average Annual Growth Rate (%)				
	1988-1993	1993-1998	1998-2003	2003-2008	*1988-2008*
Aceh	2.54	2.34	2.24	2.23	*2.34*
North Sumatra	2.23	2.12	2.17	2.33	*2.21*
West Sumatra	1.05	0.93	0.95	0.98	*0.98*
Riau	3.11	2.94	2.87	2.82	*2.93*
Northern Sumatra	**2.19**	**2.07**	**2.09**	**2.18**	***2.13***
Southern Sumatra	3.59	3.19	2.71	2.17	*2.92*
SUMATRA	2.82	2.59	2.38	2.17	*2.49*
INDONESIA	**1.91**	**1.68**	**1.46**	**1.30**	***1.59***

Source: Team's estimates.

Table 9. Population Share (Indonesia = 100)

Province	Population Share (%)				
	1988	1993	1998	2003	2008
Aceh	1.8	1.9	2.0	2.0	2.1
North Sumatra	5.8	5.9	6.0	6.2	6.5
West Sumatra	2.2	2.1	2.0	2.0	1.9
Riau	1.6	1.7	1.8	1.9	2.1
Northern Sumatra	**11.4**	**11.6**	**11.8**	**12.2**	**12.7**
Southern Sumatra	9.0	9.8	10.5	11.2	11.7
SUMATRA	20.4	21.4	22.3	23.4	24.4
INDONESIA	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: Team's estimates.

part, but will recover the loss slightly in 2008. Southern Sumatra's extremely high growth (nearly 4% a year at present) is likely to continue for some time to come, but the Team expects it to taper off in the long run as congestion eventually sets in. With respect to the share within the Region, West Sumatra will experience a marked decline, with most of the loss becoming the gain to Riau.

3. Economically Active Population

69. Economically active population is defined in the census as "population 10 years and over" minus "population who are not working and not looking for work." Note that this includes the unemployed. To project economically active population, total employment is therefore first estimated(next paragraph) and then the figure is deflated by some constant proportion to count unemployment. The unemployment rates are taken from the 1985 census and assumed to be constant over the 20 year period. They are by province: Aceh 2.0%, North Sumatra 2.0%, West Sumatra 2.1%, Riau 3.0% and Indonesia 2.1%. Table 10 shows the projections.

4. Employment

70. Employment by sector and province is projected by specifying labor elasticities, that is, by estimating how much percentage of employment will add when GDP expands by one percentage point. The projections thus basically mean labor requirement to achieve the prescribed sectoral growth. ILOR (incremental labor-output ratio) is the conceptually same method which can be used for this purpose. The projections are summarized in Table 11. As projected in Table 11, employment in the Region will increase by more than one million during the period from 1988 to 1993.

5. Urbanization

71. BPS has preliminary projections of urban population by province for 1990 and 1995. Referring to those figures, the Team has made its own projections taking into account such factors as: (i) overall GDP growth, (ii) industrialization, (iii) agricultural potential, (iv) net migration, and (v) transmigration. The results are shown in Tables 12 and 13. Net migration is influenced by rural-to-urban migration within the province as well as spontaneous interprovincial migration lured by employment and education opportunities in the major cities. The results show a steady shift of population to the urban sector in all provinces (Table 13), though its rate differs among them. The average annual growth rate of urban population during 1988-2008 can be calculated from Table 12 as: Aceh 4.6%, North Sumatra 3.6%, West Sumatra 2.8%, and Riau 4.0%. Aceh's high rate is due to the industrial development envisaged on its north eastern coast as well as to the solid growth of its capital, Banda Aceh. Note, however, that the rate is somewhat exaggerated because of the very small size of its initial urban population (294,000 in 1985). West Sumatra, in contrast, shows a modest growth rate of 2.8% per annum. This is so because, first, the province's mainstay will remain agriculture and, second, the traditional out-migration weakens the rural-urban movement within the province which would otherwise expand the cities at a faster pace.

6. GDP per Capita

72. GDP per capita, both with oil/gas and without oil/gas, is calculated from the GDP and population projections. A problem with GDP per capita of an oil/gas producing province is that neither with

Table 10. Economically Active Population

Province	Economically active population (x 1000)				
	1988	1993	1998	2003	2008
Aceh	1,246	1,447	1,633	1,830	2,042
North Sumatra	3,763	4,295	4,907	5,676	6,603
West Sumatra	1,441	1,634	1,822	1,999	2,188
Riau	966	1,172	1,416	1,698	2,027
Northern Sumatra	7,415	8,547	9,777	11,201	12,856
INDONESIA	70,748	81,401	92,866	104,609	116,387

Note: Economically active population is defined as "population 10 years and over" minus "population who are not working and not looking for work."

Source: Team's estimates.

Table 11. Employment by Sector

Province	Sector	Employment (x 1000)				
		1988	1993	1998	2003	2008
Aceh	Agriculture	811	900	965	1,019	1,067
	Mining	4	4	4	4	4
	Manufacturing	57	71	87	109	135
	Others	349	444	545	663	797
	Total	**1,222**	**1,419**	**1,601**	**1,795**	**2,002**
North Sumatra	Agriculture	2,230	2,364	2,477	2,590	2,709
	Mining	19	19	20	21	21
	Manufacturing	191	232	295	386	504
	Others	1,248	1,594	2,017	2,566	3,236
	Total	**3,687**	**4,209**	**4,809**	**5,563**	**6,471**
West Sumatra	Agriculture	876	977	1,060	1,117	1,167
	Mining	7	8	9	9	10
	Manufacturing	69	76	85	94	103
	Others	459	540	631	738	863
	Total	**1,411**	**1,601**	**1,785**	**1,958**	**2,143**
Riau	Agriculture	558	663	785	926	1,082
	Mining	9	9	10	10	10
	Manufacturing	36	41	47	54	63
	Others	335	424	532	657	812
	Total	**937**	**1,137**	**1,373**	**1,647**	**1,966**
Northern Sumatra	Agriculture	4,476	4,904	5,287	5,653	6,024
	Mining	39	40	42	43	45
	Manufacturing	353	420	514	643	805
	Others	2,390	3,001	3,726	4,624	5,708
	Total	**7,258**	**8,366**	**9,569**	**10,963**	**12,583**
INDONESIA	Agriculture	37,319	41,462	45,330	48,762	51,376
	Mining	425	436	453	477	503
	Manufacturing	6,508	7,730	9,048	10,566	12,072
	Others	24,979	30,027	36,044	42,561	49,942
	Total	**69,231**	**79,655**	**90,875**	**102,366**	**113,892**

Source: Team's estimates.

Table 12. Urban and Rural Population

Province		Urban and Rural Population (x1000)					Average Annual Growth Rate (%)			
		1988	1993	1998	2003	2008	1988-1993	1993-1998	1998-2003	2003-2008
Aceh	Urban	335	416	524	661	828	4.45	4.71	4.73	4.63
	Rural	2,890	3,240	3,581	3,926	4,293	2.31	2.02	1.85	1.80
	Total	**3,225**	**3,656**	**4,105**	**4,586**	**5,121**	**2.54**	**2.34**	**2.24**	**2.23**
North Sumatra	Urban	3,154	3,790	4,488	5,325	6,369	3.74	3.44	3.48	3.65
	Rural	6,950	7,494	8,046	8,629	9,289	1.52	1.43	1.41	1.48
	Total	**10,104**	**11,284**	**12,534**	**13,954**	**15,658**	**2.23**	**2.12**	**2.17**	**2.33**
West Sumatra	Urban	564	643	737	849	982	2.66	2.76	2.86	2.96
	Rural	3,275	3,401	3,499	3,593	3,683	0.76	0.57	0.53	0.49
	Total	**3,839**	**4,044**	**4,236**	**4,442**	**4,665**	**1.05**	**0.93**	**0.95**	**0.98**
Riau	Urban	860	1,074	1,310	1,576	1,884	4.54	4.04	3.77	3.64
	Rural	1,961	2,214	2,491	2,802	3,147	2.46	2.38	2.38	2.35
	Total	**2,821**	**3,289**	**3,801**	**4,378**	**5,031**	**3.11**	**2.94**	**2.87**	**2.82**
Northern Sumatra	Urban	4,913	5,923	7,059	8,410	10,063	3.81	3.57	3.56	3.66
	Rural	15,076	16,349	17,618	18,950	20,411	1.63	1.51	1.47	1.50
	Total	**19,989**	**22,273**	**24,676**	**27,360**	**30,475**	**2.19**	**2.07**	**2.09**	**2.18**
INDONESIA	Urban	49,648	61,278	73,533	85,467	96,924	4.30	3.71	3.05	2.55
	Rural	125,177	130,921	135,322	139,130	142,657	0.90	0.66	0.56	0.50
	Total	**174,825**	**192,200**	**208,854**	**224,598**	**239,580**	**1.91**	**1.68**	**1.46**	**1.30**

Source: Team's estimates.

Table 13. Urban and Rural Population Share

Province		Share (%)				
		1988	1993	1998	2003	2008
Aceh	Urban	10.4	11.4	12.8	14.4	16.2
	Rural	89.6	88.6	87.2	85.6	83.8
North Sumatra	Urban	31.2	33.6	35.8	38.2	40.7
	Rural	68.8	66.4	64.2	61.8	59.3
West Sumatra	Urban	14.7	15.9	17.4	19.1	21.1
	Rural	85.3	84.1	82.6	80.9	78.9
Riau	Urban	30.5	32.7	34.5	36.0	37.4
	Rural	69.5	67.3	65.5	64.0	62.6
Northern Sumatra	Urban	24.6	26.6	28.6	30.7	33.0
	Rural	75.4	73.4	71.4	69.3	67.0
INDONESIA	Urban	28.4	31.9	35.2	38.1	40.5
	Rural	71.6	68.1	64.8	61.9	59.5

Source: Team's estimates.

oil/gas nor without oil/gas series can correctly indicate the province's income level. This is so because part of the value added originating from the oil/gas sector does spill over into the provincial economy through, among other things, labor payment. Therefore if with oil/gas GDP per capita is misleadingly too high, without oil/gas GDP per capita is unduly too low. One attempt is made in Table 14 to correct this distortion. Assuming that 5% of the value added originating from the oil/gas sector can be credited to the province, the Team has adjusted the without oil/gas series and shown the results in parentheses.

73. One case to be noted here is Riau. Currently, Riau's per capita GDP (without oil/gas) is Rp. 0.44 million, slightly above the regional average of Rp. 0.42 million. In 2008, the figure will be Rp.0.85 million, far below the Rp. 1.03 million regional average.(0.96 and 1.07 respectively if adjusted.). There are two reasons for this poor performance. One is the relatively low GDP growth projected for 1988-1998, due mainly to some lead time necessary for the newly planted trees to mature. The other, more significant reason is the high (but still modest in view of the past trend) rate of transmigration assumed throughout the 20-year period (10 to 15 thousand a year for 1988-1993, 30 to 40 thousand a year for 2003-2008, for instance). If Riau stops accepting transmigrants, its per capita GDP will improve, but this option is rather hard to take. For one thing, it is against the national policy, and Riau needs more population anyway to open up its vast potential land. This case, therefore, should be viewed within a longer-term perspective; Riau's willingness to accept transmigrants will be eventually paid off sometime after 2008. The Team opts for this view.

7. Investment

74. The amount of capital investment required to achieve the projected GDP growth is estimated by using the concept of ICOR (incremental capital output ratio). ICOR is an index which measures the efficiency of capital investment in terms of GDP generation, and defined as

$$ICOR = \frac{\text{Gross fixed capital formation}}{\text{GDP increase}} = \frac{I}{\Delta GDP}$$

The smaller ICOR is, the more efficient becomes investment. (According to one estimate based on the World Bank data, ICOR for Indonesia was 2.8 in the 1960s, 2.3 in the '70s, but shot up to 7.4 in 1980-85 suggesting a marked decline in efficiency. Thailand figures were 2.5, 3.7 and 4.9, respectively.) If a value of ICOR is known for some year, we can estimate the amount of capital investment needed to increase GDP by some given amount within that year. Namely, investment is calculated by

$$I = ICOR \times \Delta GDP$$

Data and projections are summarized in Table 15. As is seen, ICOR values are expected to rise during 1988 - 93. This is due to the lower efficiency of investment during the period resulting from a larger portion of investment going into infrastructure either to build up the minimum or to sustain the existing systems while continuing the economy's restructuring. The investment requirements are shown in Table 16 both at 1983 and 1988 constant prices. The 1988 constant

Table 14. GDP per Capita

Province	GDP per Capita (1983 constant price, Rp. million)							
	1988	Adjusted	1993	Adjusted	1998	Adjusted	2008	Adjusted
Non-Oil/Gas								
Aceh	0.49	(0.56)	0.57	(0.65)	0.70	(0.78)	1.08	(1.18)
North Sumatra	0.41	(0.41)	0.48	(0.48)	0.61	(0.61)	1.05	(1.05)
West Sumatra	0.40	(0.40)	0.49	(0.49)	0.63	(0.63)	1.08	(1.08)
Riau	0.44	(0.55)	0.48	(0.59)	0.55	(0.66)	0.85	(0.96)
Northern Sumatra	0.42	(0.45)	0.50	(0.53)	0.62	(0.65)	1.03	(1.07)
INDONESIA	0.40		0.46		0.56		0.92	
Oil/Gas								
Aceh	1.88		2.07		2.32		3.01	
North Sumatra	0.42		0.50		0.62		1.08	
West Sumatra	0.40		0.49		0.63		1.08	
Riau	2.65		2.66		2.72		3.09	
Northern Sumatra	0.97		1.08		1.23		1.73	
INDONESIA	0.51		0.58		0.69		1.08	

Note: In perentheses are per capita GDP adjusted by counting spill-over from the oil/gas sector. The adjustment is based on the assumption that 5% of the value added originating from the oil/gas sector can be credited to the province.

Source: Team's estimates.

Table 15. ICOR Projections

Province	ICOR			
	1984-88	1988-93	1993-98	1998-2008
Aceh	4.11	4.4	4.0	3.7
North Sumatra	3.88	4.2	3.8	3.4
West Sumatra	2.82	3.2	3.0	2.8
Riau	7.35	7.5	6.4	5.2
Northern Sumatra	4.28	4.5	4.0	3.6

Note: For alternative projections for Aceh and West Sumatra see text.

Source: 1984-88 figures are estimated from data provided by the Ministry of Finance. Others are the Team's estimates.

Table 16. Investment Requirement (for Non-Oil/Gas GDP)

1983 constant price

Province		Investment Requirement (1983 constant price, Rp. billion)			
		1989-1993	1994-1998	1999-2008	1989-2008
Aceh	Total	2,320	3,109	9,901	**15,329**
	Annual Average	464	622	990	**766**
	% of GDP	*26.3*	*26.1*	*25.2*	***25.5***
North Sumatra	Total	5,722	8,120	30,235	**44,077**
	Annual Average	1,144	1,624	3,023	**2,204**
	% of GDP	*24.8*	*26.0*	*27.4*	***26.8***
West Sumatra	Total	1,505	2,041	6,667	**10,214**
	Annual Average	301	408	667	**511**
	% of GDP	*17.6*	*18.1*	*18.4*	***18.2***
Riau	Total	2,671	3,274	11,234	**17,179**
	Annual Average	534	655	1,123	**859**
	% of GDP	*39.0*	*36.7*	*38.1*	***37.9***
Northern Sumatra	Total	12,218	16,544	58,037	**86,800**
	Annual Average	2,444	3,309	5,804	**4,340**
	% of GDP	*25.9*	*26.1*	*26.9*	***26.6***

1988 constant price

Province		Investment Requirement (1988 constant price, Rp. billion)			
		1989-1993	1994-1998	1999-2008	1989-2008
Aceh	Total	3,480	4,664	14,852	**22,994**
	Annual Average	696	933	1,485	**1,149**
	% of GDP	*25.4*	*25.2*	*24.4*	***24.7***
North Sumatra	Total	8,583	12,180	45,353	**66,116**
	Annual Average	1,716	2,436	4,535	**3,306**
	% of GDP	*24.0*	*25.1*	*26.5*	***25.9***
West Sumatra	Total	2,258	3,062	10,001	**15,321**
	Annual Average	452	612	1,001	**767**
	% of GDP	*17.0*	*17.5*	*17.8*	***17.6***
Riau	Total	4,007	4,911	16,851	**25,769**
	Annual Average	801	983	1,685	**1,289**
	% of GDP	*37.7*	*35.5*	*36.8*	***36.6***
Northern Sumatra	Total	18,327	24,816	87,056	**130,200**
	Annual Average	3,666	4,964	8,706	**6,510**
	% of GDP	*25.0*	*25.2*	*26.0*	***25.7***

Notes: 1) *Implicit deflators for GDP and gross domestic investment are assumed as follows:*

	1983	1988
GDP	100	150
Gross Domestic Investment	100	145

2) For alternative projections for Aceh and West Sumatra see text.

Source: Team's estimates.

Table 17. Population by Development Area

Province	Area No.	Development Area	Population (x1000)				Share (%)				Annual Growth Rate (%)				Land Area (km2)	Density (head/km2)			
			1988	1993	1998	2008	1988	1993	1998	2008	1988-1993	1993-1998	1998-2008	*1988-2008*		1988	1993	1998	2008
Aceh	1	Aceh Besar	419	481	544	688	13.0	13.2	13.3	13.4	2.82	2.51	2.36	*2.51*	3,240	129	148	168	212
	2	North Aceh	1,381	1,559	1,744	2,155	42.8	42.6	42.5	42.1	2.46	2.27	2.14	*2.25*	13,745	100	113	127	157
	3	East Aceh	568	669	773	1,004	17.6	18.3	18.8	19.6	3.31	2.95	2.65	*2.89*	7,760	73	86	100	129
	4	Southeast Aceh	190	211	232	282	5.9	5.8	5.7	5.5	2.15	1.94	1.94	*1.99*	9,635	20	22	24	29
	5	West Aceh	341	375	413	511	10.6	10.3	10.1	10.0	1.92	1.95	2.15	*2.04*	12,100	29	32	35	43
	6	South Aceh	326	361	398	481	10.1	9.9	9.7	9.4	2.05	1.95	1.93	*1.96*	8,910	36	40	44	54
	7	Aceh Islands*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Total	3,225	3,656	4,105	5,121	100.0	100.0	100.0	100.0	2.54	2.34	2.24	*2.34*	55,390	58	66	74	92
North Sumatra	8	Medan	1,836	2,161	2,497	3,382	18.2	19.1	19.9	21.6	3.32	2.94	3.08	*3.10*	265	6,926	8,153	9,424	12,763
	9	East Coast	5,148	5,660	6,208	7,532	50.9	50.2	49.5	48.1	1.91	1.87	1.95	*1.92*	29,124	177	194	213	259
	10	Karo Highlands	552	607	667	820	5.5	5.4	5.3	5.2	1.92	1.90	2.09	*2.00*	5,273	105	115	127	156
	11	North Tapanuli	761	803	851	988	7.5	7.1	6.8	6.3	1.09	1.17	1.50	*1.31*	10,605	72	76	80	93
	12	Southern Tapanuli	1,223	1,386	1,557	1,974	12.1	12.3	12.4	12.6	2.54	2.35	2.40	*2.42*	21,095	58	66	74	94
	13	Nias	585	667	753	962	5.8	5.9	6.0	6.1	2.66	2.47	2.47	*2.52*	5,318	110	125	142	181
		Total	10,104	11,284	12,534	15,658	100.0	100.0	100.0	100.0	2.23	2.12	2.25	*2.21*	71,680	141	157	175	218
West Sumatra	14	Central West Sumatra	1,871	1,939	2,003	2,159	48.7	47.9	47.3	46.3	0.72	0.65	0.75	*0.72*	4,788	394	411	428	471
	15	Pasaman	427	464	498	569	11.1	11.5	11.8	12.2	1.68	1.43	1.32	*1.44*	7,835	54	56	58	61
	16	Lima Puluh Kota	386	400	412	444	10.1	9.9	9.7	9.5	0.71	0.62	0.74	*0.70*	3,434	112	116	120	129
	17	Southeast West Sumatra	739	798	855	974	19.2	19.7	20.2	20.9	1.55	1.38	1.31	*1.39*	13,521	54	59	63	71
	18	Pesisir Selatan	365	390	412	462	9.5	9.6	9.7	9.9	1.31	1.13	1.14	*1.18*	5,701	63	68	72	81
	19	Mentawai Islands	51	53	55	58	1.3	1.3	1.3	1.2	0.77	0.74	0.53	*0.65*	7,018	7	8	8	9
		Total	3,839	4,044	4,236	4,665	100.0	100.0	100.0	100.0	1.05	0.93	0.97	*0.98*	42,297	91	96	100	110
Riau	20	Kampar	802	972	1,154	1,592	28.4	29.5	30.4	31.6	3.92	3.50	3.27	*3.49*	28,355	28	35	41	56
	21	Bengkalis	805	995	1,202	1,689	28.5	30.3	31.6	33.6	4.35	3.85	3.46	*3.78*	30,647	24	29	34	46
	22	Indragiri Hulu	328	363	402	507	11.6	11.0	10.6	10.1	2.03	2.06	2.36	*2.20*	15,854	21	23	25	32
	23	Indragiri Hilir	425	474	531	674	15.1	14.4	14.0	13.4	2.21	2.30	2.42	*2.34*	11,606	39	45	50	62
	24	Riau Islands	462	486	512	569	16.4	14.8	13.5	11.3	1.00	1.07	1.06	*1.05*	8,100	60	68	76	98
		Total	2,821	3,289	3,801	5,031	100.0	100.0	100.0	100.0	3.12	2.94	2.84	*2.93*	94,562	30	35	40	53
Northern Sumatra			19,989	22,273	24,676	30,475					2.19	2.07	2.13	*2.13*	263,929	76	84	93	115

Notes: * is included in 5. West Aceh and 6. South Aceh.
Because of rounding figures may not add up.

Source: Team's estimates.

Table 18. GDP by Development Area

Province	Area No.	Development Area	Non-Oil/Gas GDP (Rp. billion, 1983 constant price)				GDP Share (%)				GDP Growth Rate (%)				GDP per Capita (Rp. million)				
			1988	1993	1998	2008	1988	1993	1998	2008	1988-1993	1993-1998	1998-2008	*1988-2008*		1988	1993	1998	2008
Aceh	1	Aceh Besar	279	369	491	877	17.8	17.6	17.1	15.8	5.7	5.9	6.0	*5.9*		0.67	0.77	0.90	1.27
	2	North Aceh	659	888	1,227	2,419	42.0	42.4	42.7	43.6	6.2	6.7	7.0	*6.7*		0.48	0.57	0.70	1.12
	3	East Aceh	278	379	540	1,104	17.7	18.1	18.8	19.9	6.4	7.3	7.4	*7.1*		0.49	0.57	0.70	1.10
	4	Southeast Aceh	86	111	146	266	5.5	5.3	5.1	4.8	5.2	5.7	6.2	*5.8*		0.45	0.53	0.63	0.95
	5	West Aceh	135	176	238	461	8.6	8.4	8.3	8.3	5.5	6.3	6.8	*6.3*		0.40	0.47	0.58	0.90
	6	South Aceh	132	172	230	422	8.4	8.2	8.0	7.6	5.5	6.0	6.3	*6.0*		0.40	0.48	0.58	0.88
	7	Aceh Islands*	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
		Total	1,568	2,095	2,872	5,549	100.0	100.0	100.0	100.0	6.0	6.5	6.8	*6.5*		0.49	0.57	0.70	1.08
North Sumatra	8	Medan	1,044	1,380	1,913	4,171	25.5	25.3	25.2	25.3	5.7	6.7	8.1	*7.2*		0.57	0.64	0.77	1.23
	9	East Coast	2,141	2,864	3,979	8,457	52.3	52.5	52.4	51.3	6.0	6.8	7.8	*7.1*		0.42	0.51	0.64	1.12
	10	Karo Highlands	201	267	372	808	4.9	4.9	4.9	4.9	5.9	6.8	8.1	*7.2*		0.36	0.44	0.56	0.99
	11	North Tapanuli	217	284	387	775	5.3	5.2	5.1	4.7	5.5	6.4	7.2	*6.6*		0.29	0.35	0.45	0.78
	12	Southern Tapanuli	381	513	729	1,747	9.3	9.4	9.6	10.6	6.1	7.3	9.1	*7.9*		0.31	0.37	0.47	0.89
	13	Nias	111	147	213	528	2.7	2.7	2.8	3.2	5.9	7.6	9.5	*8.1*		0.19	0.22	0.28	0.55
		Total	4,093	5,455	7,593	16,485	100.0	100.0	100.0	100.0	5.9	6.8	8.1	*7.2*		0.41	0.48	0.61	1.05
West Sumatra	14	Central West Sumatra	839	1,101	1,479	2,782	54.9	55.1	55.2	55.0	5.6	6.1	6.5	*6.2*		0.45	0.57	0.74	1.29
	15	Pasaman	141	186	249	460	9.2	9.3	9.3	9.1	5.7	6.0	6.3	*6.1*		0.33	0.40	0.50	0.81
	16	Lima Puluh Kota	156	202	276	536	10.2	10.1	10.3	10.6	5.3	6.5	6.9	*6.4*		0.40	0.50	0.67	1.21
	17	Southeast West Sumatra	266	348	463	885	17.4	17.4	17.3	17.5	5.5	5.9	6.7	*6.2*		0.36	0.44	0.54	0.91
	18	Pesisir Selatan	118	152	198	374	7.7	7.6	7.4	7.4	5.2	5.5	6.6	*6.0*		0.32	0.39	0.48	0.81
	19	Mentawai Islands	9	10	13	21	0.6	0.5	0.5	0.4	2.1	5.4	4.9	*4.3*		0.18	0.19	0.24	0.36
		Total	1,528	1,998	2,679	5,060	100.0	100.0	100.0	100.0	5.5	6.0	6.6	*6.2*		0.40	0.49	0.63	1.08
Riau	20	Kampar	347	451	597	1,219	28.1	28.3	28.4	28.6	5.3	5.8	7.4	*6.5*		0.43	0.46	0.52	0.77
	21	Bengkalis	408	527	690	1,373	33.0	33.1	32.8	32.2	5.3	5.5	7.1	*6.3*		0.51	0.53	0.57	0.81
	22	Indragiri Hulu	94	115	149	320	7.6	7.2	7.1	7.5	4.1	5.4	7.9	*6.3*		0.29	0.32	0.37	0.63
	23	Indragiri Hilir	152	193	257	529	12.3	12.1	12.2	12.4	4.8	5.9	7.5	*6.4*		0.36	0.41	0.48	0.78
	24	Riau Islands	235	307	410	823	19.0	19.3	19.5	19.3	5.5	5.9	7.2	*6.5*		0.51	0.63	0.80	1.45
		Total	1,236	1,592	2,104	4,264	100.0	100.0	100.0	100.0	5.2	5.7	7.3	*6.4*		0.44	0.48	0.55	0.85
Northern Sumatra			8,425	11,141	15,248	31,357					5.7	6.5	7.5	*6.8*		0.42	0.50	0.62	1.03

Notes: * is included in 5. West Aceh and 6. South Aceh.

Source: Team's estimates.

price series is added here to gauge the magnitude in more realistic terms, but it should be noted that it presents only rough estimates.

75. Alternative, higher ICOR projections (1988 - 93) for Aceh and West Sumatra are 5.0 and 4.5, respectively. This series results in the following investment requirements for 1989 - 93:

(Rp. billion)

	1983 constant price	1988 constant price
Aceh	2,636 (29.8)	3,954 (28.8)
West Sumatra	2,117 (24.8)	3,176 (24.0)
Northern Sumatra	13,146 (27.8)	19,719 (26.9)

In parentheses are % of GDP.

8. Macroeconomic Indicators by Development Area

76. Some of the main indicators projected above are broken down into 24 development areas, which are the geographical units for analysis and planning in this Study and will be explained later on in Chapter V. The projections, which include population, population density, non-oil/gas GDP and per capita GDP, are summarized in Tables 17 and 18.

D. Spatial Framework

77. The macroeconomic framework described above quantifies the Region's expected performance during the planning period. An important question then is how should the consequence spread over the Region. A spatial framework is thus needed to guide the distribution of economic activities and the layout of infrastructure over the Region. This subject, however, will be dealt with later in Chapter V in conjunction with spatial strategy and IDEP formulation.

E. Development Strategy

1. Constraints

78. Before specifying sectoral and spatial strategies in more concrete terms, the Team sets forth overall strategy to attain the goals and objectives. In formulating the overall strategy, two constraints must be taken into account: one is its large land inhabited by relatively sparse population; the other is the limitation with the funds available especially from the government budget. The Region, with 20 million inhabitants in 1988, is no small segment in terms of total population. The problem is its vast land area and consequent low population density (76 heads per km^2 compared with 800 in Java in 1988). This situation is sometimes regarded as a potential rather than a constraint especially when compared with Java where land limitation and overcrowdedness are severe. Nonetheless, low population density has adverse effects on the speed of development because it, in general, also entails low density of development efforts denying economies of scale and significant impact. Thus the Region's low population density is considered here to be a constraint, because the Team puts more emphasis on the speedy development of the Region. The second constraint, budget limitation, is nothing novel, but has some significance in the Region's case. It is expected that one third of

the funds to finance projects in the Region will come from the national government's development budget, which in turn heavily relies on oil and gas revenue. The international market for oil will be at best volatile, however, and the long-range prospects for oil revenue should be modest. Unless a drastic measure comes into effect to expand the provincial tax base, budget available for the Region's development should remain at a prudent level.

79. Those two constraints are the principal ones which affect the formulation of the strategies. Given limited financial resources and low population density, the Team must in any case be highly selective in identifying future projects and programs. The question is how selective. The strategies to be described below set the guideline for this selection.

2. Growth with Equity: Master Strategy

80. The most fundamental strategic choice facing us is between growth and equity: the Government can concentrate its given budget on some spots or sectors that are likely to grow fastest; or the Government can spend the same amount in some backward areas to improve the well-being of population living there. The Team's basic thinking about this is that the Region can and must grow first to make the economic pie bigger, quickly. Otherwise, the small pie cannot satisfy everyone even if it is divided equally. However, this does not mean that growth and equity are in trade-off relation. In fact, recent experiences in developing countries show that a strong positive relationship hold between economic growth and the performance of most social indicators.[1] On the other hand, it is unavoidable for the equity gap to widen at some point of the development process, where Indonesia seems to have just arrived. Growth with equity is thus adopted as the master strategy for the Region's development, where growth should receive basic strategic choice, with due attention to equity within the Region.

81. This master strategy is fundamental enough to apply to numerous aspects. The following five corollaries or sub-strategies are aspect-specific interpretations of this master strategy:

(i) (Agriculture) Strengthening the agricultural sector to vitalize the local economies, give basis for agro-industries, and provide employment and income opportunities;

(ii) (Industry and mining) Establishing resource-oriented manufacturing bases to attain efficient economic growth and export expansion;

(iii) (Space) Promoting city-based development while efficiently spreading effects through urban-rural linkages and developing Medan as the regional center of social and economic activities;

(iv) (Infrastructure) Providing infrastructures as needed to support economic and spatial development; and

(v) (Welfare) Aiming at the reduction of regional disparities and the realization of a balanced development.

A brief explanation of those five sub-strategies will follow.

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[1] "Report of A Panel of the Role of The Asian Development Bank in the 1990s," Asian Development Bank, January 1989, page 16.

3. Agriculture

82. Agriculture is and will be the basis of most local economies in the Region and this sector's role must be a major one in various respects: To grow out of subsistence agriculture to become a foodstuff production base (objective 1); to expand exportable crop production (objective 2); and to provide sufficient materials to agro-industries to be established (objective 3). The strengthening of the agricultural sector also means creating employment and raising income levels in a very effective way. Thus, agriculture is a sector of strategic importance. One thing to be noted, however, is that it is difficult to transform subsistence agriculture into highly market-oriented one overnight. Crop specialization is not common yet, as formers tend to grow the same crops everywhere. It is therefore almost inevitable that this sector's strategy, at least for some time to come, should be even attention to various crops rather than specialization.

4. Industry and Mining

83. The manufacturing sector is still limited in its size but its contribution should be large in achieving high GDP growth rates, providing job opportunities, and increasing exports. There is good potential for resource-oriented industries to establish in the Region utilizing abundant natural resources available there. Manufacturing industries processing agricultural and mineral resources have especially bright prospects. In the Medan area other industries have to be promoted as well. Medan must become the regional center of the manufacturing sector.

5. Space

84. Given generally low population density of the Region, the Team's strategy favors urban-rural development linkage for two reasons:

(i) Higher density of population and economic activity in urban areas warrants more efficient growth; and

(ii) If structured properly, cities can serve as bases for the efficient development of surrounding rural areas.

To achieve efficient and equitable development, an urban center and its surrounding rural areas are taken together to form a conceptual unit of development. Through urban-rural linkages, effects of urban development will spread to benefit the rural areas eventually. This strategy is the basis for the formulation of IDEP which generally covers an area large enough to include some major urban centers.

85. In this respect, Medan's importance cannot be over-emphasized. The city must function as the regional center of various activities like manufacturing, financing, trading, communication, education and so on. It is no exaggeration that the successful development of the whole Region hinges in many ways upon the smooth and dynamic development of Medan. As the leader of the regional economy, the city deserves special attention and treatment.

6. Infrastructure

86. Even though infrastructure systems in the Region is relatively well developed, there remain many inadequate parts which need substantial improvement. Infrastructure is indispensable to support future social and economic activities, but its development

should not go alone. In view of the current financial difficulties facing the Indonesian government and past experiences of infrastructural development, the strategy for infrastructure should be a prudent one, stressing the maintenance of the existing systems, the strengthening of strategic linkages and closer coordination with productive sectors.

7. Welfare

87. Developing backward areas is a direct requirement of equity consideration, but it does not necessarily contradict the growth goal in the long run. The backwardness often results from the lack of adequate means of transportation even though some good potentials exist. By exploiting those latent opportunities, such areas can develop hereby contributing to the reduction of regional disparities and, ultimately, to the stability of the development process of the Region.

8. Intersectoral Relationships

88. As the five sub-strategies explained above imply, all the sectors involved in this Study relate themselves to each other in an intricate manner. Figure 4 illustrates the intersectoral relationships.

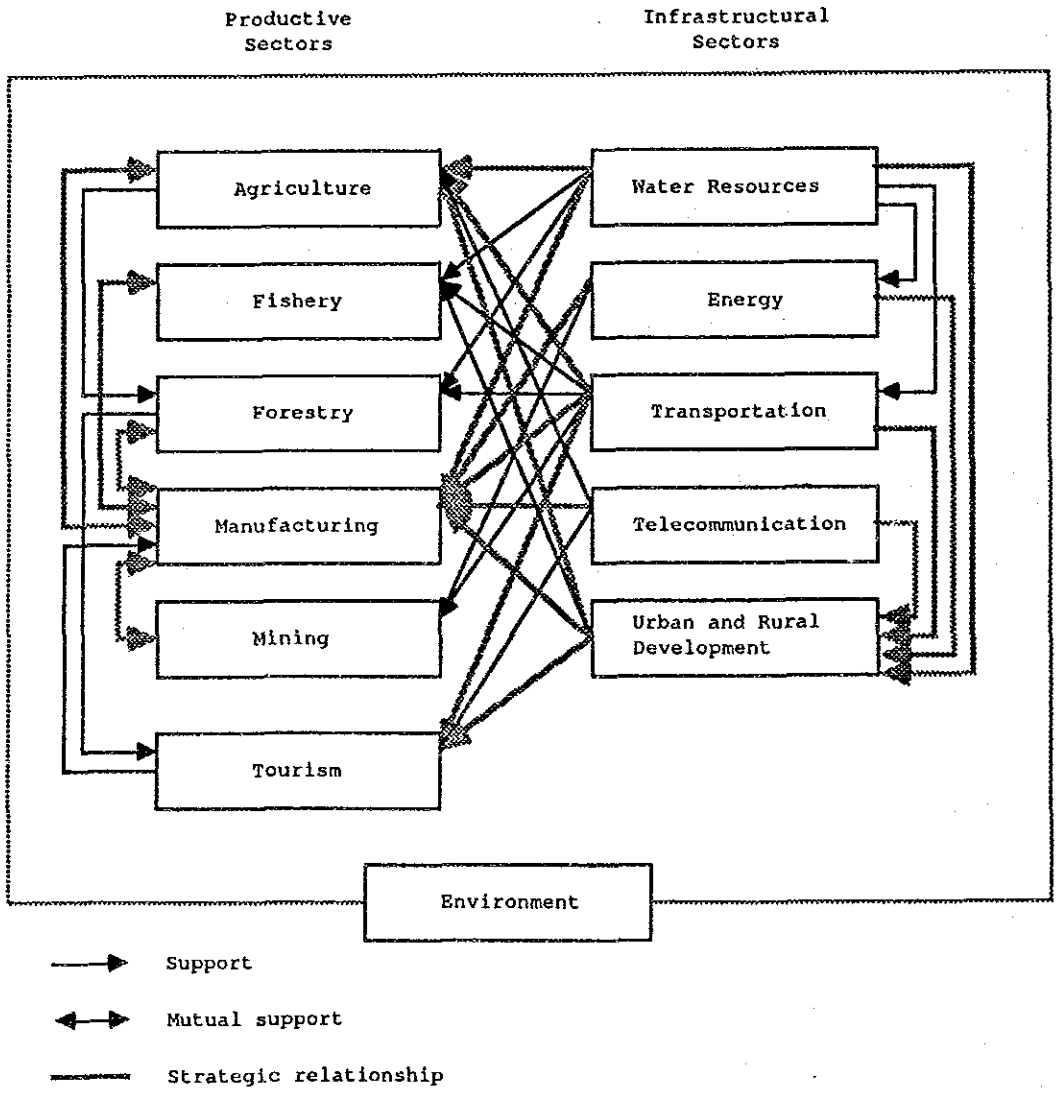


Figure 4. Intersectoral Relationships

V. SPATIAL DEVELOPMENT STRATEGY

A. Spatial Framework

89. The purpose of this Section is to describe the spatial framework which guides the Region's long-term spatial development. The framework basically deals with how to distribute economic activities and supporting infrastructures over the Region. This Section will draw an overall picture of their distribution thereby designing the spatial structure of the whole Region. Given this picture, the Team will later introduce a division of the whole Region into 24 "development areas" and specify some basic indicators for each of them, drawing a finer version of spatial framework.

1. Topography and Development Pattern

90. As described in Chapter II, the Region consists of four distinct parts: the mountainous areas along the Barisan range, the vast alluvial plains on the eastern coast, the narrow coastal strip along the western coast, and the islands off the eastern and the western coast. This general topography has greatly influenced the spatial pattern of development. Rift valleys and plateaus in the Barisan range are among the first to be settled thanks to cool, malaria-free climate, fertile volcanic soils and gentle slopes best for irrigation. A large portion of population still inhabit such mountainous places. It is later that settlements extended to the plains on the eastern side where flood, swampy areas and pests were far more common. Nonetheless, the development of the eastern side (North Sumatra, in particular) started in a large scale during the Dutch colonial period establishing many plantations of rubber and oil palm. Plantation development has been active since then, extending further southward into Riau, where a vast stretch of land is still available. In contrast, the coastal strip on the western side has generally been in an inferior position, lacking enough arable land and easy transportation access. The conditions are worse for the islands off the mainland. As a consequence, these areas largely remain backward compared with the other parts of the Region.

2. Population and Transportation System

2.1. Present Status

91. The general pattern of development described above has direct relevance to the present pattern of population distribution and transportation system (road system, especially). As seen in Figure 5, major settlements are distributed in the eastern plains (northern half) and in the Barisan range (southern half), with the trans-Sumatra highway exactly connecting them together. Notice that there exists a trans-Barisan twist (from east to west) in the current population-transportation axis.

2.2. Future Concept

92. It is natural and efficient that a major trunk road runs connecting major cities. The current population-transportation axis can be justified in this respect. The problem with it, however, is that it is not sufficient to form the future spatial structure of the Region. To make the Region more internally coherent and related, there must emerge another axis which exactly counterbalances the existing one. It runs through the western part of Aceh, then crosses the

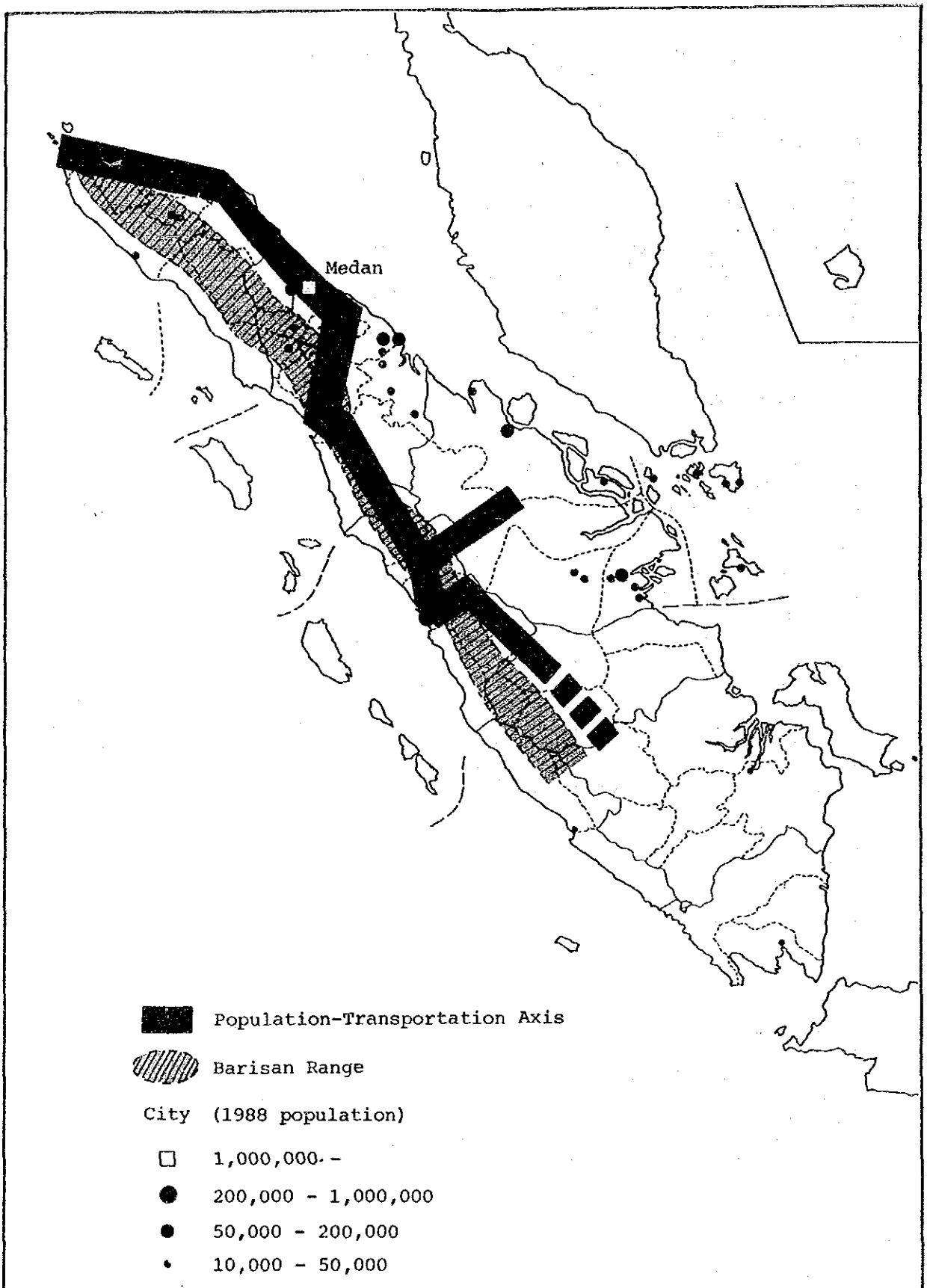


Figure 5. Population-Transportation Axis of the Region (Present Status)

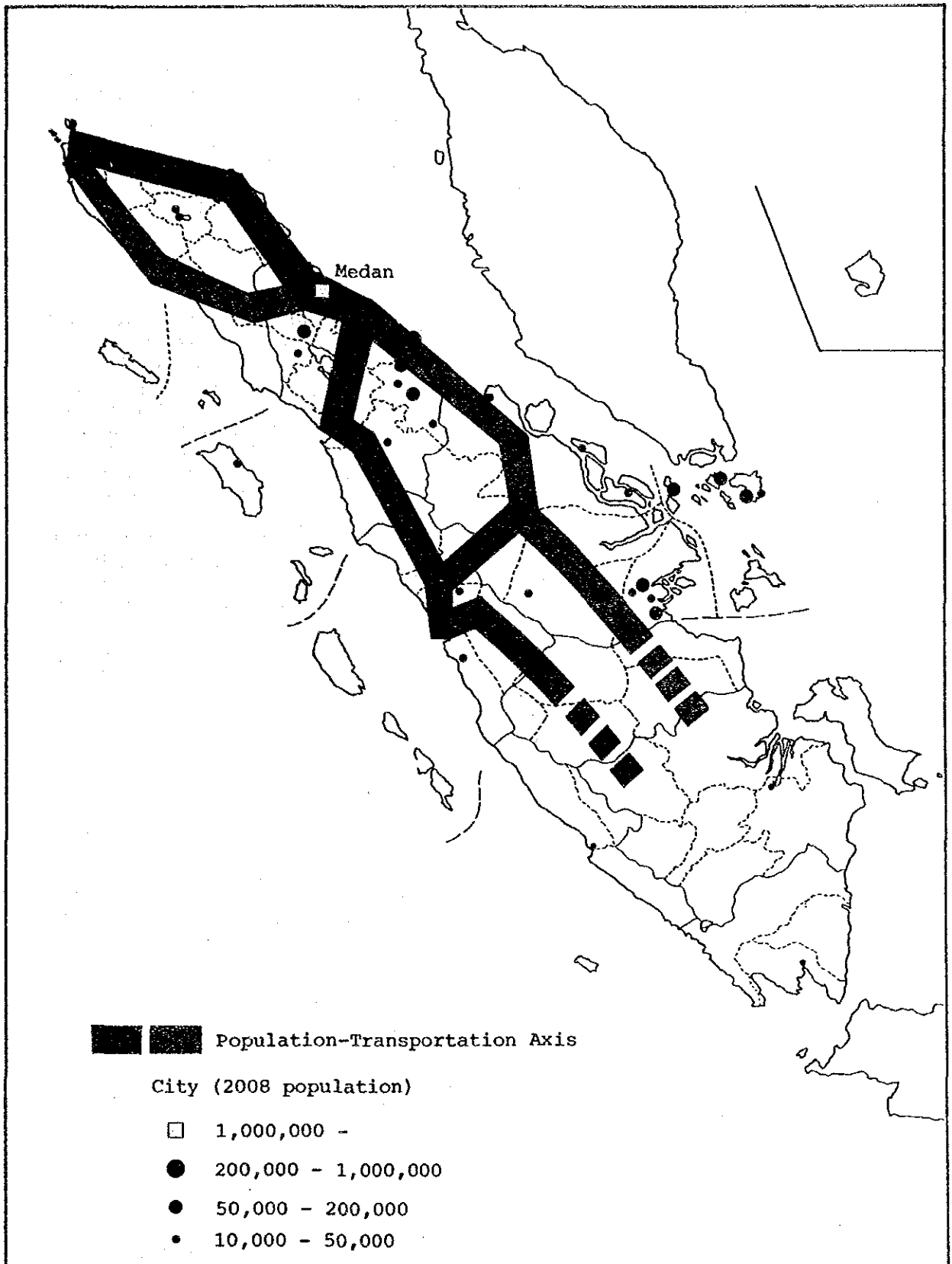


Figure 6. Population-Transportation Axes of the Region (Future Concept)

Barisan range to reach Medan and extends on the eastern coast to Riau and beyond. Several east-west ladder roads link the two axes whereas extensive transportation networks should be constructed around two major nodes, Medan and Padang. Medan becomes particularly important in this structure because of its location at the crossing of the two axes. This concept is illustrated in Figure 6.

3. Production and Land Use

3.1. Present Status

93. Agriculture is the mainstay of the Region's economy accounting for 35% of non-oil/gas GDP and 62% of employment (1988 estimates). Except for some plantation crops, agricultural production shows little local variation, with several main crops (notably, rice, coconut and rubber) being almost ubiquitous. On the other hand, large-scale estates concentrate in the eastern plains, North Sumatra and Riau in particular. This agricultural land use pattern, when combined with forest distribution, more or less represents the general land use pattern of the Region since manufacturing and other production activities are almost insignificant in terms of actual land use (see Maps 1 to 5 in Chapter VI of this volume). Nonetheless, several urban centers should be noted as manufacturing centers: Lhokseumawe (Aceh), Medan, Tebin Tinggi (North Sumatra), Padang (West Sumatra), Pekanbaru, Dumai, Batam Island (Riau). As such, industrial agglomeration has yet to emerge in the Region, but the eastern coastal belt from Lhokseumawe to Medan to Kisaran/Tanjungbalai has good prospects to grow into a major industrial zone in Indonesia. The distribution of per capita regional GDP shows a pattern similar to the current population-transportation axis. That is, higher values are found in the eastern belt from Aceh to North Sumatra and in the Padang area.

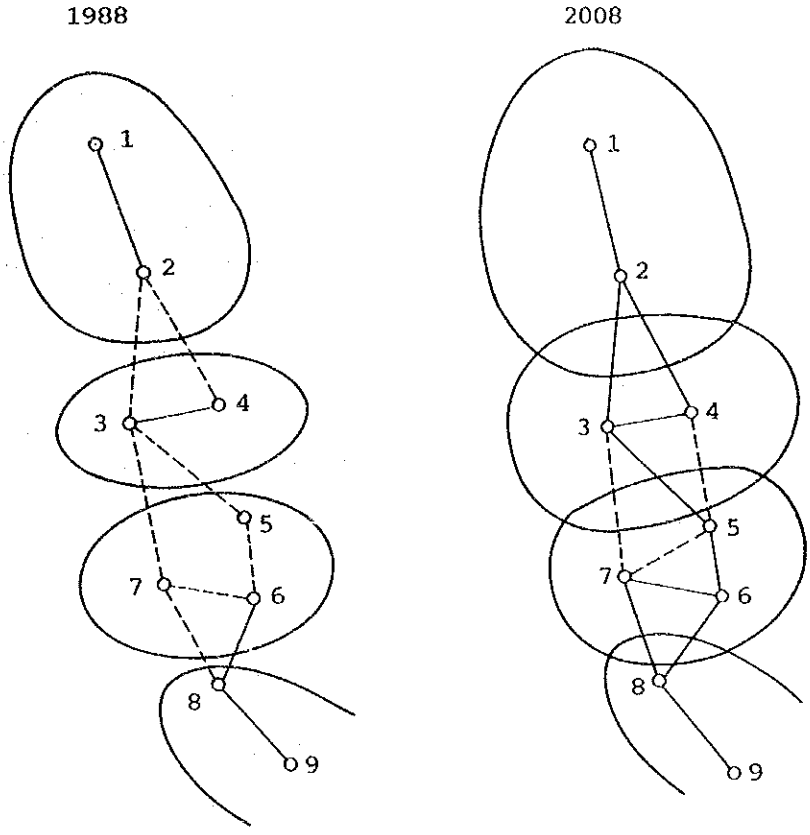
3.2. Future Concept

94. Agriculture will remain the leading sector in the Region even though its relative position will decline in importance (non-oil/gas GDP share 25%, employment share 48% in 2008). It is expected that as population increase more land will be brought under cultivation while some cultivated land (especially in and around major cities) will be converted to industrial and housing uses. Despite those countless local changes, the overall land use pattern of the Region will not change significantly except for the emergence of the Aceh-North Sumatra industrial zone and the expansion of large-scale estates in Riau and, to the lesser extent, along the western coast of Aceh and North Sumatra. In contrast, the general picture of the distribution of per capita GDP will show some considerable shift, according to the macroeconomic framework. That is, disparities will generally reduce owing to the equity-oriented efforts.

4. Economic Spheres and Regional Center

4.1. Present Status

95. One of the development objectives is the integration of the Region's potentials. In this respect, Sumatra has not integrated itself yet into one economic region, as sketched in Figure 7. Instead, there now exist four economic spheres with little interaction among them. They are: northern sphere (Aceh, North Sumatra), central sphere (West Sumatra, Riau), southern sphere (Jambi, Bengkulu, South Sumatra), and Lampung, which is rather strongly connected to Jakarta forming an economic sphere of its own. In other words, interprovincial linkage is still weak in Sumatra reflecting the low level of industrialization.



1	Aceh	2	North Sumatra	3	West Sumatra
4	Riau	5	Jambi	6	South Sumatra
7	Bengkulu	8	Lampung	9	Jakarta

o——o Strong Linkage

o- - -o Weak Linkage

Economic Sphere

Note: Interprovincial linkage here is presented as a summary indicator of various connections at work; for instance, historical background and social ties, market areas of basic commodities, transportation networks and traffic volumes (cargo and passenger). To avoid undue complication, the figure omits linkages with Jakarta, Malaysia and Singapore even though their importance is great to some provinces.

Figure 7. Evolution of Interprovincial Linkage and Economic Spheres

Each economic sphere identified above has its own center: Medan, Padang, Palembang and Bandar Lampung, respectively. These regional centers at present are basically local in nature, not structured into a Sumatra-wide city system.

4.2. Future Concept

96. The current condition described above will change as economic development quickens its pace. In 2008, after the development strategy specified elsewhere in this Report is successfully carried out, there will emerge a clear structure of interprovincial linkage on Sumatra, with the four economic spheres overlapping (Figure 7). Accordingly, the four regional centers will consolidate their position to serve their sphere more thoroughly while increasing their interrelations. The hierarchical structure among the four centers will also emerge, with Medan becoming the center for the northern and the central sphere (namely, the Region) and Palembang for the rest. When the integration of the Region is concerned, it is indeed Medan's strong centripetal force that can conjoin the four provinces. The city, largest in Sumatra, will be located at the crossing of the two population-transportation axes, serving simultaneously as a market, supplier, trader, transit base, and an arena for various social activities. Its strategic implications may be too evident to delve into.

5. Summary

97. Summarizing the above descriptions and arguments, Figure 8 depicts some principal components of the spatial framework of the Region in 2008.

B. Spatial Development Strategy

1. Provincial Development Concept

98. The five objectives stated in Section C, Chapter IV, are for the Region as a whole. To achieve them, the four provinces must take concerted action while making the best use of their own endowments. The provinces, with distinct characteristics and potentials, should each play a role different from others' in the course of development toward 2008. Table 19 conceptually specifies each province's role in attaining the overall objectives. Figure 9 illustrates how the four provinces are interconnected given their specific role.

2. Population-Transportation Axes

99. As described in Section A, there now exists a population-transportation axis along the trans-Sumatra highway and another new axis is necessary to supplement this and formulate the basic spatial structure of the Region. It is thus strategically imperative to develop the two axes by stimulating local economies along them and providing better transportation systems there. This represents a general strategy for spatial development.

3. Urban-Rural Development Linkage

100. One of the sub-strategies specified earlier is concerned with space: promoting city-based development while efficiently spreading effects through urban-rural linkages. This is another general strategy concerning space. This strategy is actually two-step and works as follows. Suppose there are a provincial capital, a local city and rural areas surrounding the local city. Then,

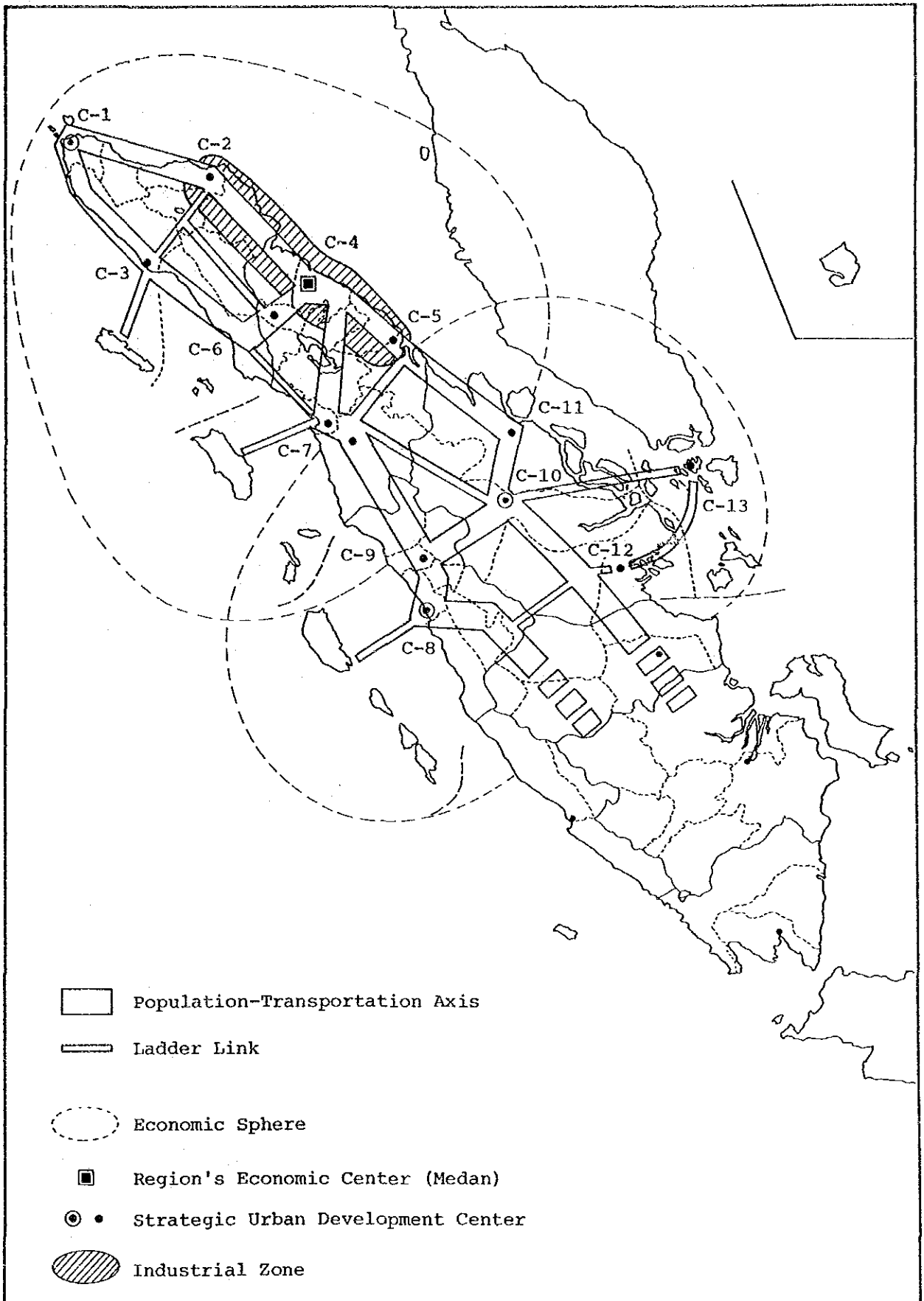


Figure 8. Spacial Framework (2008)

Table 19. Objectives and Provincial Development Concept

Region	Objectives	Province	Development Concept toward 2008
Northern Sumatra	(i) Food base (ii) Export/Tourisma (iii) Industrial base (iv) In-migration (v) Economic linkage	Aceh	Northeast: *Food supply base *Agro-industry on local resources *Chemical industry base Southwest: *Open access to East *Model for remote area development
		North Sumatra	East: *The center for the Region *Industrial center *Estate base linked to agroindustry *International tourism zone West: *Diversified, market-oriented agriculture *Model for island development
		West Sumatra	Whole province: *Advanced agricultural center for the Region *Light industry base *Model for island development
		Riau	Hillside: *Estate base *Settlements for transmigrants Lowland: *Model for swamp development

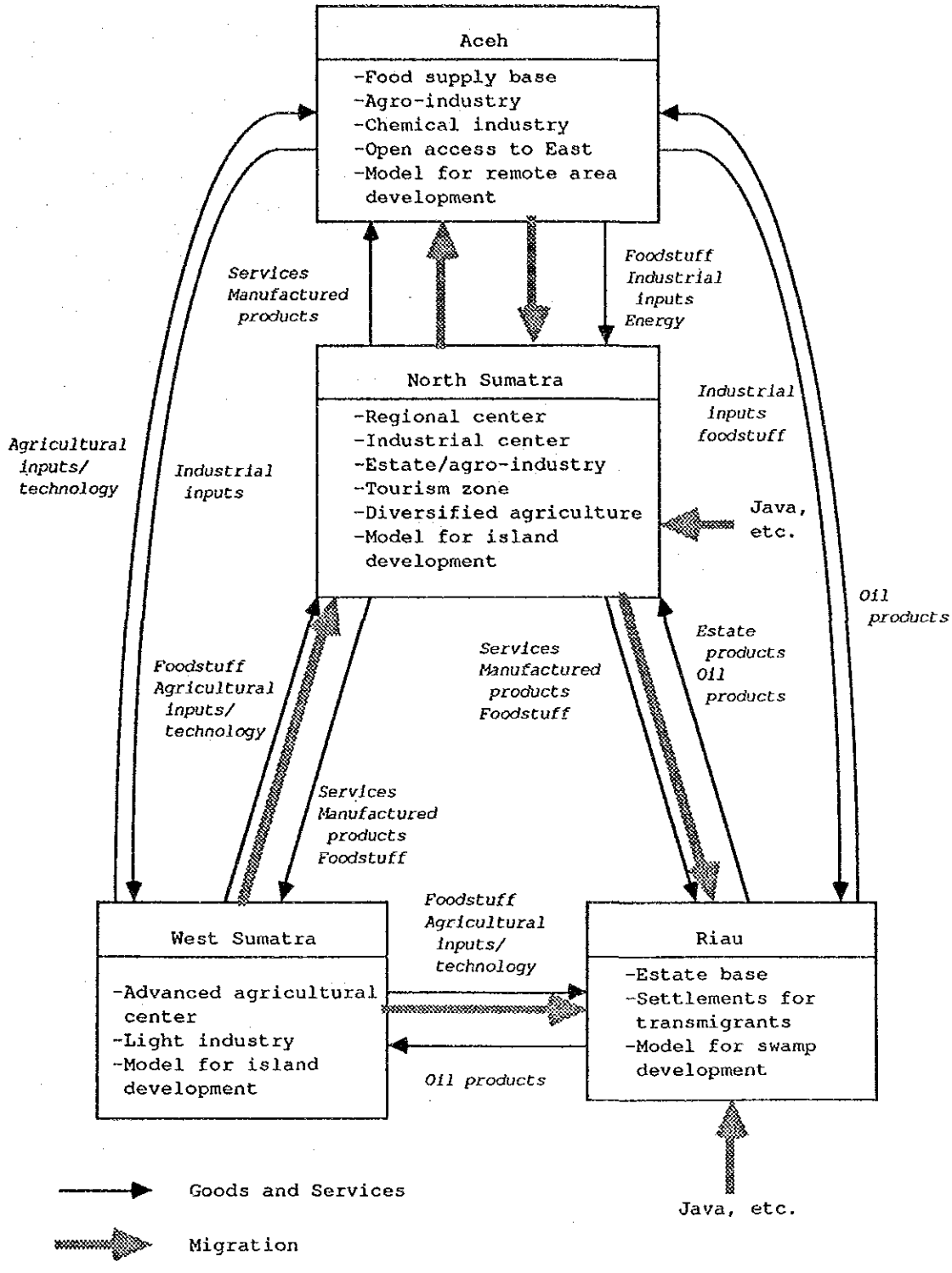


Figure 9. Provincial Interconnections (2008)

(i) First, strengthen the capital, the local city and their links;

(ii) Second, keeping the local city growing, strengthen linkage between the city and its surrounding rural areas.

In this way the cities, more advanced areas, will lead growth while the rural areas are preparing to grow. At a later stage, the advancement will be channeled into the rural areas through the urban-rural linkage. Figure 10 schematically depicts this strategy. For this purpose the area development approach is very effective if both the cities and rural areas are covered by one same program. This is one reason why the Team adopts the IDEP approach for the Region's development.

101. Applying this strategy, the Team identifies following 13 cities (or city groups) as strategic development centers (Figure 8):

C-1	Banda Aceh
C-2	Lhokseumawe
C-3	Meulaboh
C-4	Medan
C-5	Kisaran/Tanjungbalai
C-6	Kabanjahe
C-7	Sibolga/Padangsidempuan
C-8	Padang
C-9	Bukittinggi
C-10	Pekanbaru
C-11	Dumai
C-12	Tembilahan
C-13	Batam

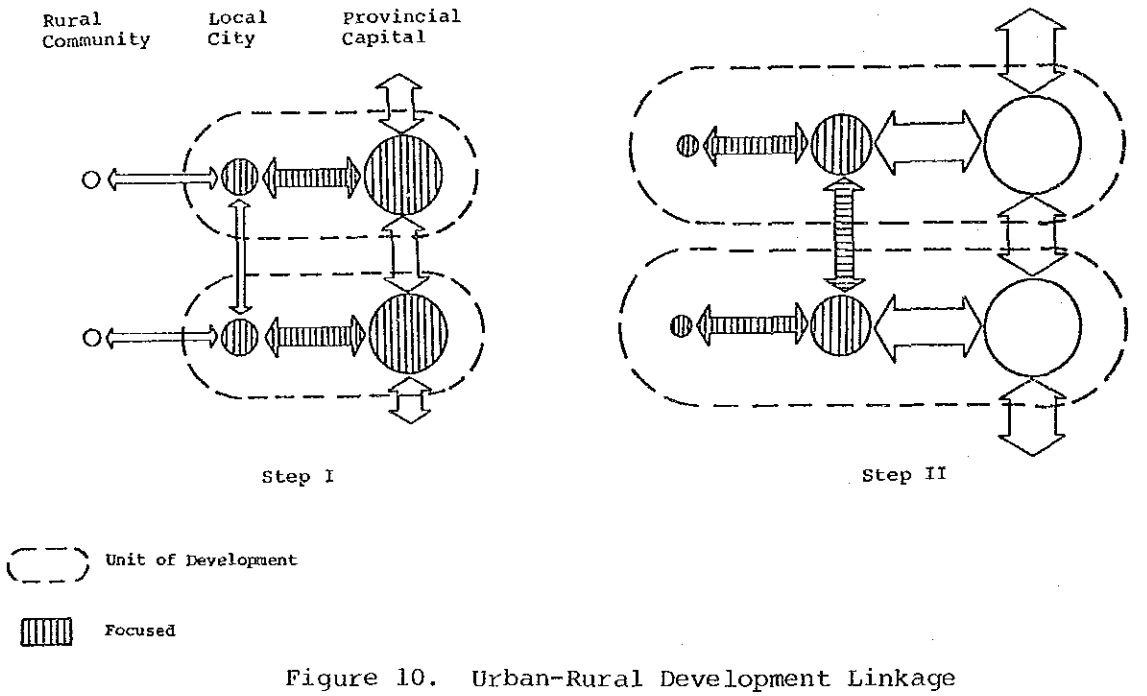


Figure 10. Urban-Rural Development Linkage

Those cities are basically located on the two population-transportation axes (two exceptions are Tembilahan and Batam). Their prescribed functions and geographic location are the criteria for their selection. Those cities are situated at a vantage point being able to serve its surrounding rural areas efficiently. They, together with the two axes, form the basis for the spatial development of the Region and become one criterion for selecting IDEP sites later on.

4. Integrated Development Program (IDEP)

102. The Team strongly advocates an integrated area development program approach, termed the Integrated Development Program, as the strategy for devising and implementing specific development projects. This strategy is particularly related to the strategy of population-transportation axes and of urban-rural linkage. The Team has just identified two axes and strategic urban centers as the bases for development. According to its strategy, those cities' sound economic growth is the critical precondition for the development of remaining areas. Then, the Team obviously has to focus its efforts on those cities, which are mostly located on the two axes. The problem, however, is that under the current administrative setup, sectoral projects are administered by respective sectoral agencies according to their own priority, and that there is no guarantee of such a city's having necessary projects in a proper sequence in a well-coordinated manner. The Integrated Development Program (IDEP) is proposed to meet this need.

103. An IDEP covers an area (usually kabupaten size) and consists of various sectoral projects which are so interconnected and phased as to attain their maximum possible effects. The IDEP represents a unified, location-specific development concept integrating spatial and sectoral perspectives and strategies. An important merit of the Program is that not all the sectoral projects under it are of high priority with respect to the sector's criteria. Some low-priority projects may be included if they are indispensable from the area's standpoint. Only in this way can one expects a whole, well-balanced development of an area, a kind of efficient development that is quite hard to achieve with sectoral consistency alone. It is thus the Team's strategy to formulate an IDEP for whichever area best suited to have one.

C. Development Areas and IDEP

1. IDEP Approach

104. So far, the Team has specified overall goals and strategies. These overall strategies will then be translated into specific project ideas, which represent the Study's ultimate outcome. In carrying out this task, the Team may have two alternative ways of project identification. One is to identify sectoral priority projects first and then organize them intersectorally and spatially. The other way is to pick up some appropriate areas first and then identify sectoral projects within them. Those two ways are both valid in principle, but the Team chooses the second way as particularly suitable for this Study for the following reason: Given the vast land area of the Region and limited financial resources available for its development, one has anyway to concentrate its efforts in some priority areas. If the team first elaborates on sectoral projects, they may widely spread over the Region hereby making it difficult to coordinate them into a spatially coherent plan. Rather, it may be more efficient to select some areas first and then consider what to do there paying careful attention to

intersectoral relations. This approach combines the sectoral and the area development approach. The outcome of this hybrid approach is a program specifically tailored to some area. This program is termed an Integrated Development Program (IDEP) and represents the central concept of the Northern Sumatra Regional Development Plan.

105. As will turn out, an IDEP typically covers one or two kabupaten and consists of some 30-40 various sectoral projects which in general are so formulated that they are closely interrelated to each other. The concept of areawide development program, of which IDEP provides another example, is nothing novel to regional planning practice. In Indonesia, Area Development Program (ADP) and Provincial Development Program (PDP) are well known predecessors of this concept. Actually, IDEP is an extension of the ADP and PDP concepts which have two major purposes: (i) to decentralize administrative and financial authority to the provincial and kabupaten governments through BAPPEDA, and (ii) to increase productivity and income of the rural population. What is new about IDEP, however, is its heavier stress on the productive sectors and the urban-rural linkage. Accordingly, an IDEP has a much larger scale than an ADP or PDP in terms of area and sector coverage (normally covering a strategic city and its surrounding rural areas), program component (wider sectoral integration) and necessary budget (average more than $ 1 billion of IDEP as compared to $ 20 million of ADP/PDP).

106. Selection of some appropriate areas for IDEP implementation, however, should not be arbitrary. It necessitates a systematic, if not thorough, assessment of development priority of sub-regional areas, and this, in turn, requires a division of the whole Region into some number of sub-regional areas. After studying each area's characteristics and assessing its development potential, the Team may be able to judge its development priority from the Region's wider point of view. Thus, the Team first divides the Region to identify prospective sites for IDEP.

2. Subdivision of the Region and Development Areas

107. The subdivision of the Region is carried out with respect to three criteria:

(i) as homogeneous as possible in terms of physical-economic characteristic;

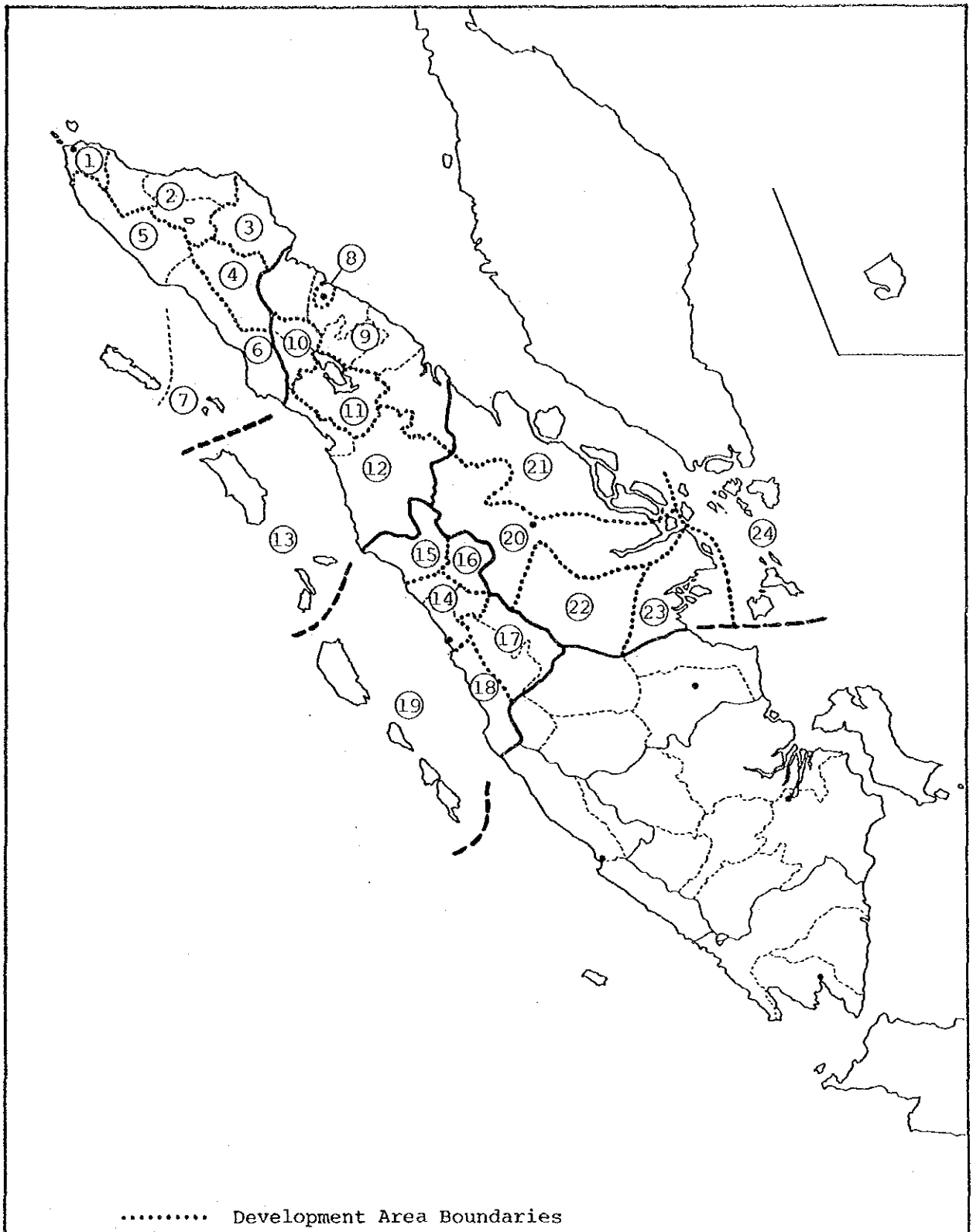
(ii) as few as possible; and

(iii) as much coincidence with kabupaten boundaries as possible.

The first criterion, homogeneity, is necessary to facilitate project identification. With homogeneous areas, it may become easier to clarify what types or kinds of projects are needed in each of them. The second criterion is added for practicality. Without this, we would end up with a very fine subdivision which is unworkable in practice. The last criterion is also needed for another practical reason that most available data are on a kabupaten basis. The results are 24 areas listed below and shown in Figure 11.

Development Areas (24)

Aceh (7)
1. Aceh Besar
2. North Aceh
3. East Aceh
4. Southeast Aceh
5. West Aceh



..... Development Area Boundaries

Figure 11. Development Areas

	6. South Aceh
	7. Aceh Islands
North Sumatra (6)	8. Medan
	9. East Coast
	10. Karo Highlands
	11. North Tapanuli
	12. Southern Tapanuli
	13. Nias
West Sumatra (6)	14. Central West Sumatra
	15. Pasaman
	16. Lima Puluh Koto
	17. Southeast West Sumatra
	18. Pesisir Selatan
	19. Mentawai Islands
Riau (5)	20. Kampar
	21. Bengkalis
	22. Indragiri Hulu
	23. Indragiri Hilir
	24. Riau Islands

3. Analysis of Development Areas

108. The development areas are then subjected to a systematic review of their characteristics, priority sectors and inter-area relations. Tables 20 through 23 summarize some main characteristics and priority sectors of each development area. Inter-area relations among the development areas are an important factor to be considered in selecting appropriate sites for IDEP. This is so because such a selection in general is an outcome of simultaneous assessment of various, often conflicting, factors. The principal factor in this assessment is the efficiency criterion. Efficiency, however, can mislead us to a false assessment. Suppose we are only concerned with growth in economic terms and that we mistake growth simply for "growth in sectoral production." Then we may pick up an area which has tremendous prospects of modern industrial development but is completely isolated from the rest of the Region. The area will surely generate a large amount of economic gain, but it is confined to the area without spreading over or multiplying itself. Thus, it is clear that "growth in sectoral and spatial interaction" should also be a vital criterion of our assessment.

109. Growth in sectoral production may be judged from the rough description of area characteristics summarized in the tables above, but efficiency in sectoral and spatial interaction is hard to grasp there. This requires an inter-area input-output table, whose construction is far beyond this Study's capacity. Nonetheless, a grossly simplified version is tried and shown as Figure 12. The table lists only areas, with no sectoral breakdown. An asterisk in the cell shows that if some development takes place in the corresponding area on the left side, some benefit will be felt by the corresponding area on the upper side. Viewing this table row-wise, one can have some rough idea of which area may have more development leverage. Also, an asterisk off diagonal (intraprovincial) blocks indicates interprovincial relation. Those areas which have such asterisks on their row may be favored because of their particular function of spreading economic benefit across provincial borders. These considerations are not the only factors to be taken into our assessment of development priority. Nonetheless,

Table 20. Development Areas (Aceh)

Provincial sectoral priority for Repelita V	(1) Infrastructure	(2) Agriculture (except forestry)	(3) Manufacturing (small/medium)

Development Area	Characteristics	Priority Sectors	
		Productive	Infrastructure
1. Aceh Besar	- Hinterland of Banda Aceh (Administrative city) - Paddy fields unirrigated/irrigated but with problem	- Agriculture (rice, vegetable, fruit, livestock)	- Irrigation - Road
2. North Aceh	- Food Basket of Aceh - Large industrial establishments in Lhokseumawe - Traditional shrimp culture - Coffee plantation around Takengon (for export) - Tourism potential of Lake Tawar - Unemployment in Lhokseumawe	- Agriculture (rice, secondary crops, coffee) - Fishery (tambak) - Manufacturing (gas down-stream industry, agro-industry) - Forestry (timber estate)	- Bridge - Water
3. East Aceh	- Medium industrial establishments in Langsa area - Possible hydroelectric power plant site closest to Medan	- Manufacturing (agro-industry)	- Energy (hydro-electric power, for Medan)
4. Southeast Aceh	- Isolated area due to poor road connection	- Agriculture	- Road
5. West Aceh	- Little arable land except, for Meulaboh area - Poor road condition, lack of port - Log production	- Agriculture (small-holder/estate tree crop)	- Road - Port - Irrigation (Jeuram)
6. South Aceh	- Swamp and sandy soil, little arable land - Especially bad road condition - Lack of port - Log production	- Agriculture (smallholder/estate tree crop)	- Road - Bridge - Port - Irrigation (Blangpidie)
7. Aceh Islands	- Abundant forestry resources (timber, rattan)	- Forestry	- Communication with mainland

Table 21. Development Areas (North Sumatra)

Provincial sectoral priority for Repelita V	(1) Manufacturing	(2) Agriculture	(3) Tourism
Development Area	Characteristics	Priority Sectors	
		Productive	Infrastructure
8. Medan	- 2 million population, the largest city in Sumatra - Export industries, Urban industries	- Manufacturing (agro-industry, metal and machinery industry, etc.) - Industrial estate of international standard	- Energy (electricity) - Urban infrastructure - Water supply - Telecommunication
9. East Coast	- Long-established estate zone - Vast paddy fields - Large concentration of population - Mangrove areas good for tambak	- Agriculture (rice) - Fishery (tambak) - Manufacturing (agro-industry) - Forestry (watershed management)	- Flood control/river improvement - Irrigation
10. Karo Highlands	- Fertile soil, highland climate suitable for vegetable, fruit, horticulture - Paddy production around Sidikalan - Tourist attractions around Lake Toba	- Agriculture (marketing) - Tourism - Forestry (reforestation, timber estate)	- Road (Brastagi-Prapat, tourist course)
11. North Tapanuli	- Paddy fields with poor drainage (single harvest) - Tourist attractions around Lake Toba	- Agriculture (rice, secondary crop) - Tourism	- Irrigation/ drainage
12. Southern Tapanuli	- Limited land - Vast stretch of semiarid hilly area in southeast - New establishment of estate - Sibolga as a major port	- Agriculture (rice, livestock, estate) - Fishery (off-shore, marine culture) - Mining (Coal)	- Road
13. Nias	- Half million population on Nias island - Potential of agriculture - Potential of tourism	- Agriculture (rice, livestock) - Forestry - Tourism	- Communication with mainland - Irrigation - Road

Table 22. Development Areas (West Sumatra)

Provincial sectoral priority for Repelita V	(1) Agriculture	(2) Small-scale Industry	(3) Tourism
Development Area	Characteristics	Priority Sectors	
		Productive	Infrastructure
14. Central West Sumatra	- Concentration of population - Well-developed paddy fields with simple irrigation - Seed of small/cottage industries (craft, textile) - Volcanos, lakes, *woodlands as tourism* resources	- Agriculture (rice, vegetable) - Fishery (fresh water fishing pond) - Tourism - Manufacturing (small)	- Flood control (Padang) - Urban infrastructure
15. Pasaman	- Limited land in East Pasaman - Area Development Project (West Germany) in West Pasaman	- Agriculture (rice, small-holder tree crop, estate) - Fishery (off-shore, fresh water fishing pond)	- Irrigation (Rao)
16. Lima Puluh Kota	- Payakumbuh (second largest city) in rice field area -Mountainous areas slow to develop	- Agriculture (rice)	
17. Southeast West Sumatra	- Cities (Solok, Sawahlunto, Sijunjung-Muaro) in north - Flat areas in south, opened after Trans-Sumatra Highway - Estate development in south - Limited but well-developed paddy fields in west	- Agriculture (rice, estate, horticulture) - Mining (coal)	- Irrigation (Sungaidareh, Muaralabuh) - Road (east-west)
18. Pesisir Selatan	- Paddy fields on the skirt of mountains - Swamp along coast - Road in poor condition	- Agriculture	- Road
19. Mentawai Islands	- Forestry resources	- Forestry	- Communication with mainland

Table 23. Development Areas (Riau)

Provincial sectoral priority for Repelita V	(1) Agriculture	(2) Infrastructure	(3) Manufacturing
Development Area	Characteristics	Priority Sectors	
		Productive	Infrastructure
20. Kampar	- Riau's largest population concentration along Pekanbaru-Bangkinang - Large paddy field area around Bangkinang - Estate development along the western hillside - Vast swamp and woodland in east	- Agriculture (rice, estate) - Forestry - Manufacturing (wood processing)	- Irrigation - River transport
21. Bengkalis	- Scattered settlements, very low population density - Base of oil production, oil-related infrastructure - Very poor new settlements along Pekanbaru-Dumai - Old fishing villages	- Mining (oil) - Manufacturing (Dumai: Petrochemical, palmoil processing, fishery products) - Fishery	- Port - Water supply (Dumai)
22. Indragiri Hulu	- Smallholder rubber plantation as mainstay - Some paddy fields along Indragiri River - Slow growth	- Agriculture (estate) - Mining (coal)	- Road (Lipat Kain-Talukkuantan)
23. Indragiri Hilir	- Paddy production in tidal swamp areas - Large coconut plantations to be developed - Idea of Kualaenok port - Tembilahan without road connection	- Agriculture (estate) - Manufacturing (agro-industry)	- Road - River transport - Port
24. Riau Islands	- Batam island as a national project - Development taking advantage of closeness to Singapore and Malaysia - High tourism potential	- Manufacturing - Fishery (for export) - Tourism	- Interisland transport

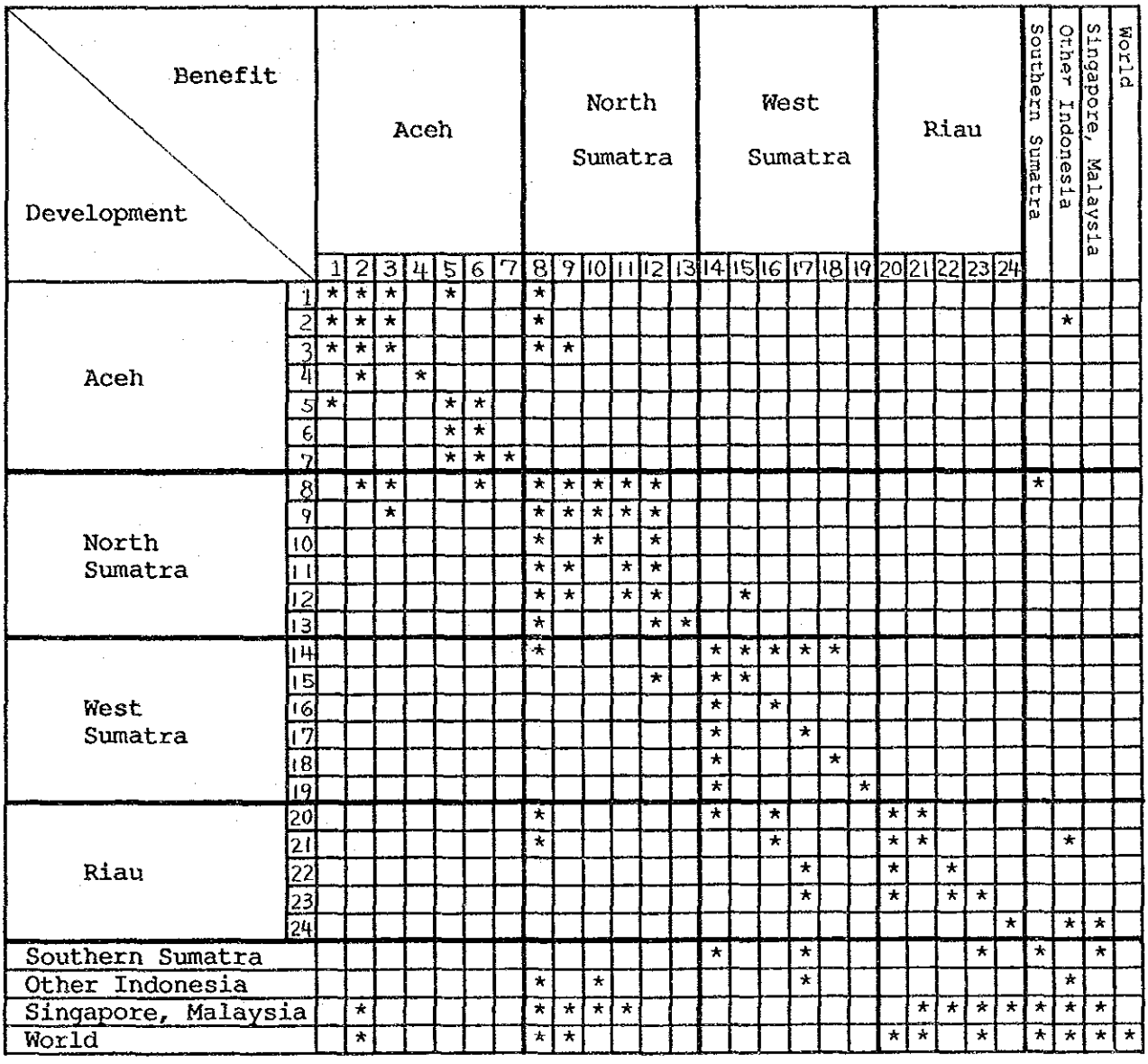


Figure 12. Inter-Area Development-Benefit Table

those areas which are favored with respect to the above criteria will generally receive higher priority in the selection process later on.

4. Development Concept

110. Based on the analytical review described above, a development concept is then specified for each area. To this end, the 24 development areas are first classified very broadly into three categories:

Category I Advanced areas
Category II Less advanced areas
Category III Remote islands

Figure 13 shows the pattern of this classification. Obviously, the role to play in the Region's development cannot be the same among the three categories. Table 24 below summarizes how each category can contribute to the achievement of the five development objectives.

Table 24. Expected Contribution by Category

	Objectives				
Category	Food base	Export/ tourism	Industry base	In-migration	Economic linkage
I	**	**	**	*	-Leader of the regional economy -Medan, regional center
II	*	*	*	**	-Strengthen link to advanced areas
III		*			-Become more involve in the regional economy

Note: ** denotes substantial contribution;
* significant contribution

Taking into consideration those expected contributions, provincial development concepts described in Chapter IV are further broken down specicically into those of development areas. Table 25 summarily shows both the provincial and development area concepts.

5. Priority Development Areas

111. Priority development areas are then chosen with respect to the following criteria:

(i) High potential for efficiently achieving the development objectives;

(ii) Areas where strategic cities are located;

(iii) Areas with strong or potentially strong inter-area relation; and

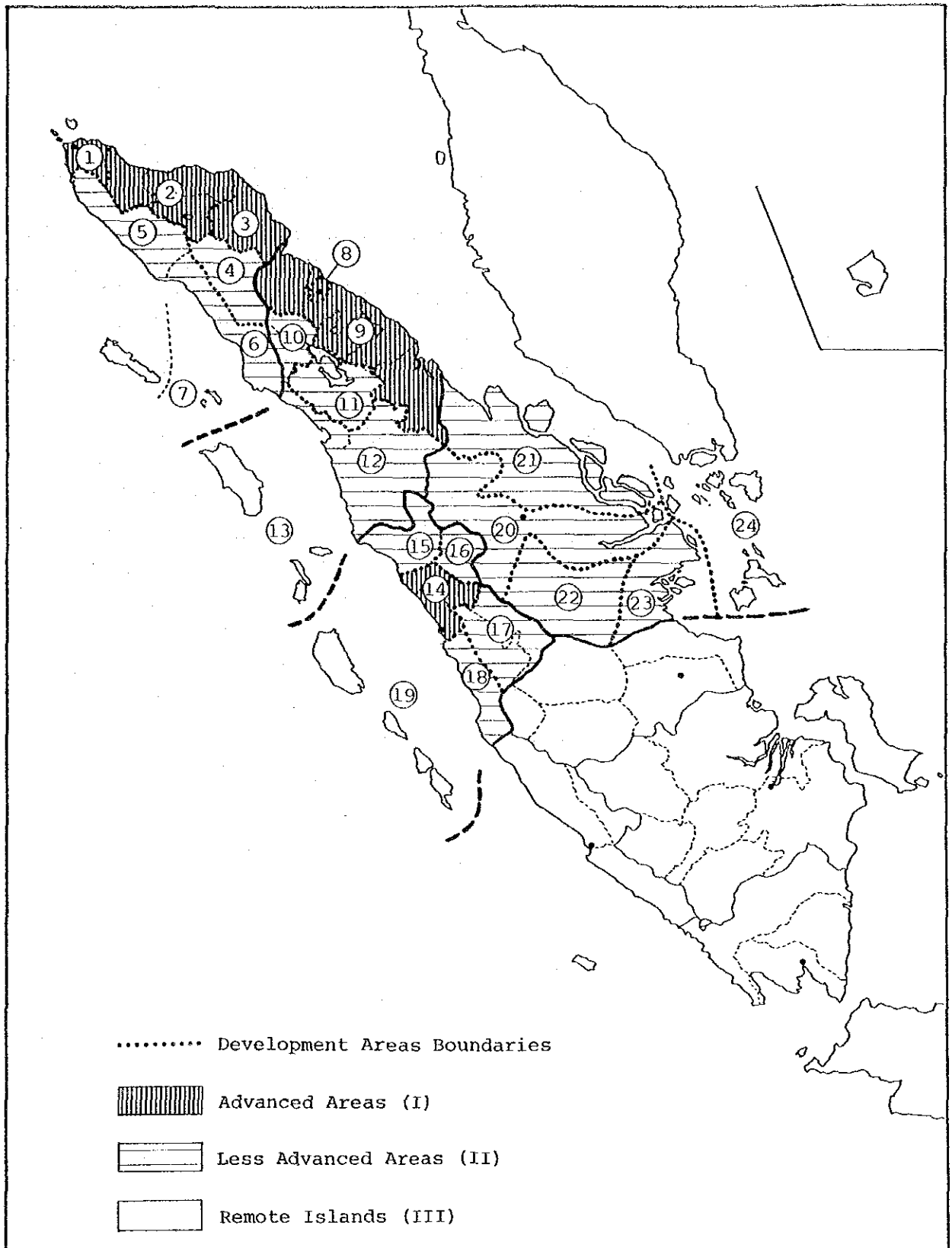


Figure 13. Development Areas in Three Categories

Table 25. Development Concept by Development Area

Province	Development Concept toward 2008	Development Area No	Development Area Name	Specific Development Concept toward 2008
Aceh	Northeast: * Food supply base * Agro-industry on local resources * Chemical industry base Southwest: * Open access to East * Model for remote area development	1	Aceh Besar	Food supply base for Banda Aceh, an administrative city
		2	North Aceh	Food supply base for Aceh and North Sumatra / Chemical industry base/ Agro-industry base
		3	East Aceh	Medium/small-scale industry base (incl. agro-industry)/ Fishery base
		4	Southeast Aceh	Agricultural development stimulated by better access to Medan
		5	West Aceh	Meulaboh, development center for Aceh west coast/ Smallholder tree crop base
		6	South Aceh	Agricultural development stimulated by better access to Medan
		7	Aceh Islands	Better access to mainland/ Infrastructure for BHN
North Sumatra	East: * The Center for the Region * Industrial center * Estate base linked to agro-industry * International tourism zone West: * Diversified, market-oriented agriculture * Model for island development	8	Medan	Primary city of the Region/ Industrial center for the Region/ Gateway to foreign tourists
		9	East Coast	Urban-oriented diversified agricultural zone / Estate base/ Agro-industry base
		10	Karo Highlands	Highland horticultural zone/ Tourism base
		11	North Tapanuli	Diversified agricultural zone/ Tourism base
		12	Southern Tapanuli	Sibolga/Padangsidempuan, development center / Diversified agricultural zone
		13	Nias	Better access to mainland/ Infrastructure for BHN/ Model for island development
West Sumatra	Whole province: * Advanced agricultural center for the Region * Light industry base * Model for island development	14	Central West Sumatra	Advanced agricultural center for the Region/ Food supply base/ Light industry base/ Tourism base
		15	Pasaman	Diversified agricultural zone
		16	Lima Puluh Kota	Food supply base for West Sumatra and Riau
		17	Southeast West Sumatra	Large-scale agricultural development zone
		18	Pesisir Selatan	Diversified agricultural zone
		19	Mentawai Islands	Better access to mainland/ Infrastructure for BHN
Riau	Hillside: * Estate base Lowland: * Model for swamp development	20	Kampar	Estate base/ Agro-industry base / Settlement area for in-migrants
		21	Bengkalis	Petrochemical industry base/ Settlement area for in-migrants
		22	Indragiri Hulu	Estate base/ Smallholder tree crop base/ Model for swamp development/ Settlement area for in-migrants
		23	Indragiri Hilir	Model for swamp development/ Estate base
		24	Riau Islands	Singapore-oriented development

(iv) Areas which can serve as a development model with some unique aspect.

The selection is basically category-wise. That is, priority areas are chosen within each category. Table 26 summarily shows the selection procedure and the final choices.

6. Integrated Development Program (IDEP) Sites

112. As shown in Table 26, 15 development areas are selected as priority development areas, which form the basis for IDEPs. Some of those areas, however, turn out to be covering too large area to highlight their specific potentials (development areas 9 and 20, for instance). To sharpen each IDEP's characteristics as much as possible, the selected areas are then reorganized taking a few other viewpoints into consideration (excluding Kotamadya Batam from development area 24, for instance). This reorganization of 15 priority development areas finally brings forth 11 sites, which are listed below. Table 27 shows the relation between the priority development areas and the IDEP sites. The IDEP's locations are roughly indicated in Figure 14 along with the population-transportation axes. As is seen, three category-I IDEPs (P-1, P-3, P-6) are all situated on the same population-transportation axis, and so are two category-II IDEPs (P-4, P-7) taking a strategic location inbetween. The other three category-II IDEPs are on the other population-transportation axis which also define the Region's spatial structure. The exact delineation of the IDEP sites is shown in Figure 15. Table 28 summarizes each IDEP's role to play in the Region's long-term development. Sectoral projects are then identified in each IDEP which are needed to perform the role effectively and efficiently.

P-1 Northern Aceh (Aceh)
P-2 West Aceh (Aceh)
P-3 Metropolitan Medan (North Sumatra)
P-4 West Coast Tapanuli (North Sumatra)
P-5 Nias Island (North Sumatra)
P-6 Minang Highlands (West Sumatra)
P-7 South Sijunjung (West Sumatra)
P-8 Mentawai Islands (West Sumatra)
P-9 Rokan Basin (Riau)
P-10 Indragiri River (Riau)
P-11 Riau Islands (Riau)

7. Geographical Advantage of the West Coast of Sumatra

113. Six IDEPs out of 11 are selected on or close to the west coast of Sumatra, which is presently less developed compared to the east coast. In addition, it is considered that the west coast will be increasingly important as a gateway of the future West Pacific Economic Zone open to huge potential market of the Indian Ocean surrounded by South Asian, Middle East and African countries. For example, India and Pakistan are already among the five major importing countries of palm oil in the World with EC, US and Japan. It is predicted that several other countries, such as Egypt, Iraq, Turkey, Yemen, Iran, USSR, China and a few African countries, may join this group to obtain this low-price edible oil. Total global demand in the year 2000 with their increasing population will reach 30 million tons per year, more than 50 per cent increase of the present consumption. Then, the west coast of Sumatra will be the nearest exporting base of palm oil to those high-demanding countries provided that the palm oil industry has been well established in the hinterland of the west coast of Sumatra, where the six IDEPs are situated.

Table 26. Selection of Priority Development Areas

Category	Development area[1]	Criterion[2] (1)[3] Food base	Export/ Tourism	Industry base	In-migration	Economic linkage	(2) Strategic city	(3) Inter-area relation	(4) Model
I	1	○				○	○	○	
	2	◎	◎	◎		○	○	○	
	3		○	○				○	
	8		◎	◎		◎	○	◎	
	9	○	◎	◎			○	○	
	14	◎	○	○		◎	○	◎	
II	4	○							
	5	○	○				○	○	
	6	○	○					○	
	10	◎	◎			○	○	○	
	11	○	◎			○			
	12	◎	○	○		◎	○	○	
	15	○	○						
	16	◎						○	
	17	◎		○	○			○	
	18	○			○				
	20		◎	○	◎	○	○	○	○
	21		○	○	◎		○	○	
	22		○		◎				○
	23	○	◎	○	◎		○		○
III	7								
	13	○	○			○			○
	19		○		○				○
	24	○	◎	◎		○	○		

Notes: 1) Shaded (▨) development areas are those selected.
2) ○ denotes meeting the criterion; ◎ with significance.
3) Boxes (▭ and ▭) denote the objectives where a substantial and significant (respectively) contribution is expected.

Table 27. Development Areas and IDEPs

	Selection ▽ Dev. Areas	Reorganization ▽ Priority Dev.Areas	IDEP (Dev.Area)
Category			
I	1		P-1 Northern Aceh (2)
	2	2	
	3	8	P-3 Metropolitan Medan (8,9,10)
	8	9	
	9	14	P-6 Minang Highlands (14,16,17)
II	4,5		P-2 West Aceh (5)
	6,10	5,10	P-4 West Coast Tapanuli (12)
	11,12	12,16	
	15,16	17,20	P-7 South Sijunjung (17)
	17,18	22,23	
	20,21		P-9 Rokan Basin (20)
	22,23		P-10 Indragiri River (22,23)
III	7		P-5 Nias Island (13)
	13	13	
	19	19	P-8 Mentawai Islands (19)
	24	24	
			P-11 Riau Islands (24)

Table 28. IDEP's Role in Regional Development

Category	IDEP	Role
I. Advanced Areas	P-1 Northern Aceh	A major industrial base on the primary axis, with close interaction with agriculture
	P-3 Metropolitan Medan	The center for the Region with strong industrial and service activities
	P-6 Minang Highlands	The agricultural center for the Region, located on the primary axis and on a major gateway to the west
II. Less Advanced Areas	P-2 West Aceh	The development base for the entire western side of Aceh; a gateway to the west
	P-4 West Coast Tapanuli	A high potential area on the primary axis between Medan and Padang; a gateway to the west and the base for Nias
	P-7 South Sijunjung	A resettlement area with high potential for commercially-oriented agriculture
	P-9 Rokan Basin	A high potential resettlement area combining NES/PIR and food crop production
	P-10 Indragiri River	A model for interprovincial river basin development and management with special attention to low-land swamp
III. Remote Islands	P-5 Nias Island	A model for island development aiming at a higher integration with outside economies
	P-8 Mentawai Islands	A model for environmentally conscious development in harmony with the traditional ways of life
	P-11 Riau Islands	A highly export-oriented area with high potential in fisheries

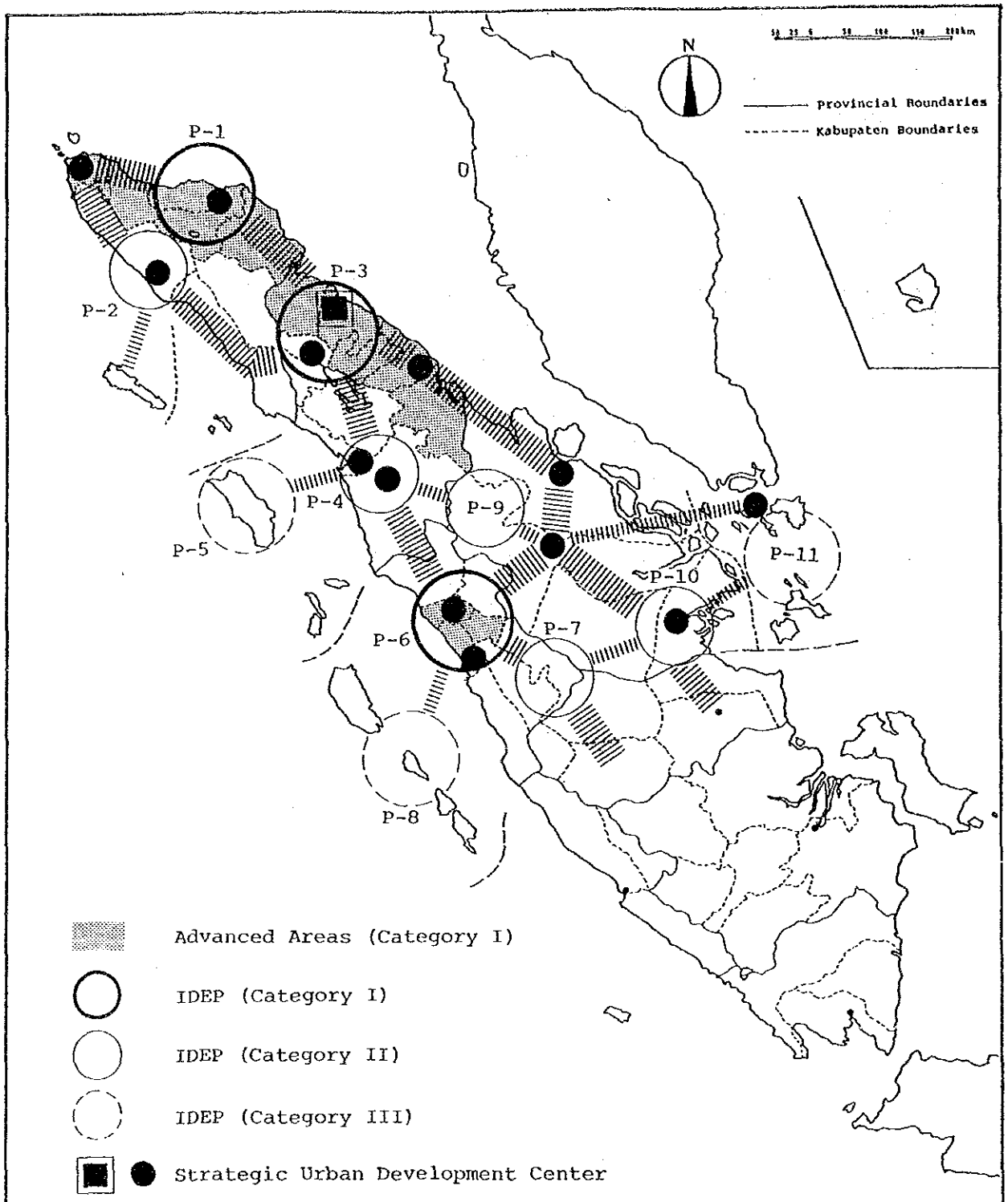
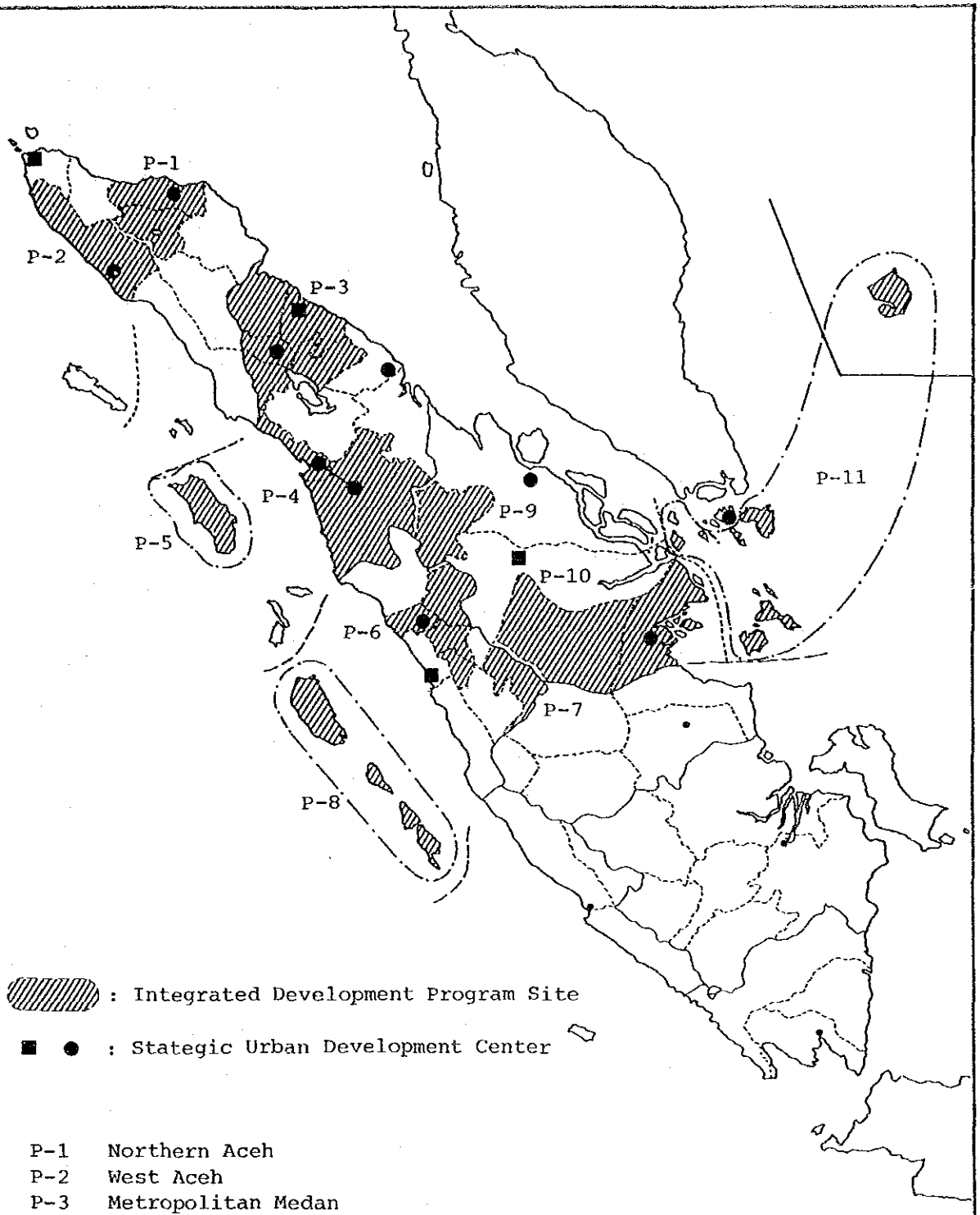


Figure 14. IDEPs and Their Interrelations



P-1 Northern Aceh
P-2 West Aceh
P-3 Metropolitan Medan
P-4 West Coast Tapanuli
P-5 Nias Island
P-6 Minang Highlands
P-7 South Sijunjung
P-8 Mentawai Islands
P-9 Rokan Basin
P-10 Indragiri River
P-11 Riau Islands

Figure 15. Delineation of IDEP Sites

VI. SECTORAL DEVELOPMENT STRATEGY

A. Agriculture and Fishery

1. Agriculture

1.1. Food Crops

114. National goals. The national goals for agricultural development at present aims at food self-sufficiency on the broad sense, which basically consists of the maintenance of rice self-sufficiency and the agricultural diversification. The diversification has many dimensions, but in the food crop subsector, it primarily means the increased production of palawija crops and horticultural crops.

115. Nutrition. Average per capita calory intake in Indonesia improved from 1,920 Cal/day in 1965 to 2,380 Cal/day in 1982[1], more than 2,100 Cal/day which is considered nutrition requirement. But average protein intake marginally improved during the same period from 42 gram/day to 51 gram/day[1] which is far short compared to 70 gram/day of the requirement. This implies that Indonesian agriculture should address more to encourage production of protein-oriented food including livestock, fisheries, and diversified food crops such as maize, soybean and pulse both for human and animal consumption.

116.. Region's objectives. Taken together, the Northern Sumatra Region is now estimated to be more than self-sufficient in rice, but its production of secondary crops has been of relatively minor importance. In view of the national goals, the overall objectives for the Region during the next two decades is firstly to maintain its self-sufficiency in rice and secondly to establish the capacity of producing increased secondary and horticultural crops.

117. Rice. The strategy for rice is essentially the continuation of those programs which have been proven successful in Indonesia during the last decade or so. Namely, it is based on the combination of irrigation development and utilization of better rice varieties, fertilizers and agricultural chemicals and other modern inputs. However, the implementation will be pursued under gradual reduction of subsidization on inputs, including irrigation water. Assuming the present regional surplus in the range of 400,000 - 500,000 tons (dry unhusked rice), rice production in the Region is estimated to increase by 1.5% per annum to 7.3 million tons in 2008. This would require an expansion of wetland harvested areas by about 400,000 ha. By taking into consideration of the vast land area of the Region, the location for irrigation development will be distributed to ensure a safe degree of local autarchy of rice supply. However, before the end of the first decade, it is necessary to reorient the policy framework of rice production in the Region from the viewpoint of efficient regional and local specialization.

118. Palawija crops. The strategy for palawija crops would emphasize maize, cassava, soybean and peanut, mainly because of the demand prospects (urban consumers, livestock/poultry farms, processing industries) in the Region, but some, at least soybean, could be shipped outside the Region. It should aim at the promotion of multiple

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1 FAO Basic Data Unit, 4 Febraury 1985.

cropping with rice on wetland and the cropping system development on dryland (=upland) fields. The former requires the support to self-help efforts among local small farmers in wetland improvement, including better drainage and land preparation methods. The latter requires the development of environmentally sustainable land utilization methods, which are feasible and manageable by small farmers. This would require the increased supply of better seeds, the improvement and diffusion of locally suitable production and post-harvest practices, the growth of agro-industries (vertical diversification), and the development of effective intra-regional and inter-regional produce marketing systems in addition to the on-going national market information development.

119. Promotion of palawija. The location for palawija crop promotion would be much more selective than irrigation development for rice, at least in the beginning. The proximity and/or good transportation access to the major urban centers (e.g. 13 strategic cities) in the Region, and to a lesser extent outside markets (chiefly Southern Sumatra and Western Java) would be most important. From the viewpoint of balanced growth within the Region, it will be necessary to select a limited number of underdeveloped areas on the basis of long-term provincial development objectives. Also from the equity perspective, the priority of dryland production would be in transmigration areas and other newly developing areas in the Region.

120. Horticulture. With respect to horticultural crops, the priority need be given to areas of higher altitudes, especially the already existing production centers like the Karo, the Minang and the Gayo Highlands. The market prospects in urban centers outside the Region and in the neighboring countries are generally promising, but in view of perishability of crops, volatile price movements and quality control requirements, among others, it will be essential to organize effective marketing arrangements among traders, to provide basic post-harvest infrastructure like terminal facilities for collection, grading, packaging, storage and shipping, and to encourage private investments. For other areas, the location-specific strategy should be devised on the basis of local market prospects as part of the diversification drive on wetland and dryland areas. This need be supported by the strengthening of public programs and private enterprises for better seed production and distribution chiefly on the provincial level.

1.2. Tree/Estate Crops

121. National goals. The national goals for tree/estate crops are to increase non-oil exports, to promote related agro-industries for increased commodity value added and employment generation, and to improve the income of a great number of smallholder growers. The Region traditionally has large shares of national tree crop production, especially those crops grown in large-scale estates such as oil palm, rubber and recently cacao. The smallholders also have substantial shares of such crops as rubber, coconut, coffee, clove and other minor tree/estate crops. In line with the national goals, the strategy should aim at improving the performance of large-scale estates and smallholders.

122. Large scale estates. From the viewpoint of efficiency, large-scale estates are expected to generate increased foreign exchange earnings in the foreseeable future from the large investments in the public sector estates realized during the last two development plan periods and from the on-going or scheduled private sector investments. Such prospects need be strengthened by the improvement of operation/maintenance and quality control, and especially in relation

to the promotion of private estates, by the provision of credit facilities and further deregulation on production and trade.

123. Major tree crops. Among the major tree crops, oil palm would increase its output most dynamically, at an annual rate of about 6% over the two decades, being supported by the expected growth of demand for edible oil in developing countries. Rubber and coconut would grow more slowly, at around 3% and 4% respectively per annum, in line with the expected growth of world demand for rubber and of mainly domestic demand for coconut. Coffee, mostly grown by smallholders, has so far had relatively favorable growth performance, but in view of the world market prospects, the growth would be slower, at around 2%.

124. Smallholders. The growth prospects of the smallholder tree/estate crops are not as clearcut as the estates, because of their generally aged trees and poor maintenance and harvest technologies. The strategy is to implement programs of project management units, emphasizing relatively under-developed areas along the west coast and provincial boundaries. In relation to coffee, the first priority should be given to the rehabilitation of arabica coffee above appropriate altitudes to ensure exportability.

1.3. Livestock and Poultry

125. National goals. The national objectives for livestock/poultry subsector are to increase the production all around chiefly for domestic consumption and nutritional improvement, and to increase the population of large ruminants as draft animals and sources of manure for supporting the production of various crops. In line with the objectives, the production and consumption of livestock and poultry products would be increased in the Region, by emphasizing broilers and layers in the areas with good access to major urban centers, and promoting the Region's comparative advantage in pork and beef production, some of which could be exported to the neighboring countries.

126. Considerable efforts. The expansion of livestock/poultry raising in the Region, as elsewhere in the country, would require considerable efforts at strengthening extension and veterinary services and improving marketing and processing infrastructure such as slaughtering, meat processing and cold storage facilities, especially when inter-regional trade and exports are to be promoted in the Region. Part of such requirements could be shouldered by commercial farms which have been growing in the Region.

127. Small farmers. The majority of small farmers are not oriented to meat production, even though all farmers keep a certain combination of livestock and poultry, as draft animals, as subsidiary sources of cash income, or for home consumption. There is a great need to educate the farmers on improved livestock/poultry management, especially animal/poultry nutrition and disease control.

128. Cattle raising. The vast grassland and particially wooded land available in the Region are suitable for extensive types of cattle raising for beef production, which could be managed by private investors or communally by groups of local villagers. It would be useful to establish pilot ranches to demonstrate the improved nutrition and disease control, grassland management, and forage crop production and feed preparation.

2. Fishery

129. Importance. Although the contribution to agricultural GDP is somewhat smaller (7%) than the livestock subsector, the fishery subsector in Indonesia appears to be more important at least in two respects; namely its already established export performance and as major source of animal protein. The Region's total fishery production volume grew by 6% per annum during 1981-87, and the value of its exports at 16%, with the share in the national total exports increasing from 12% to 17% over the period. The Region's estimated per capita consumption (23kg) is larger than the national average (15kg), and this seems to correspond with figures estimated by two separate household surveys. However, it must be pointed out that the higher per capita consumption is likely to be related to the difficulty of transportation and marketing the production, especially in remote islands.

130. Marine fishery. Marine fishery, which currently accounts for nearly 90% of the Region's production, is largely concentrated along or off the east coast. Both the volume of fish catch and the number of fishermen along the east coast are a little over three times as large as along the west coast, and the motorization rate of fishing boats is also higher at 44% compared with 25% of the west coast. However, the resource base in the Malacca Straits is already nearly fully exploited, wheres in the western waters, mostly within the 12-mile territorial limits, the estimated exploitation is 60 to 70%, and moreover, a vast reserve of fish resources is likely to exist in offshore waters within the 200-mile exclusive economic zone.

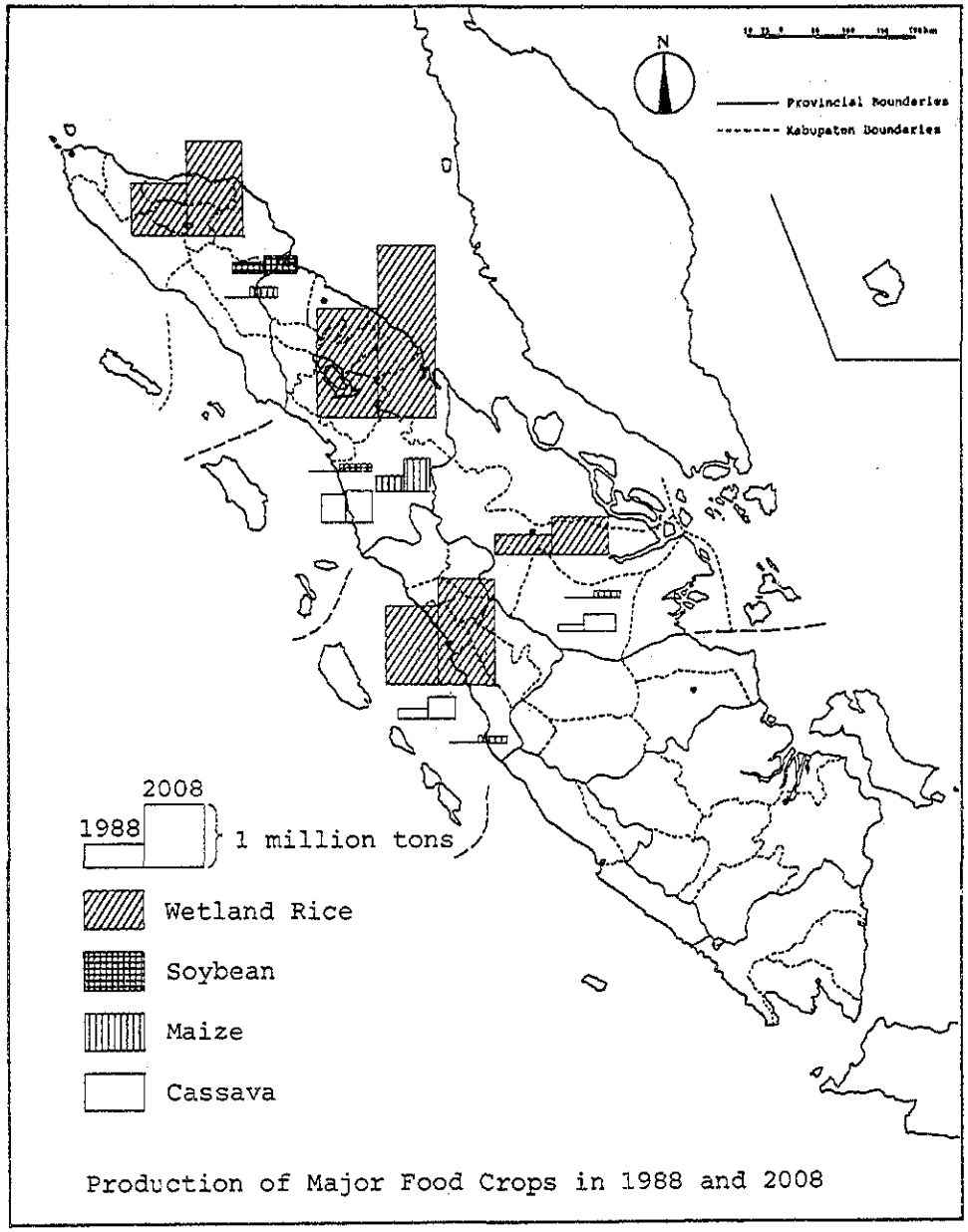
131. Development scenario. Chiefly on the basis of resource potentials, it appears possible to increase the Region's fishery production at the same rate achieved during 1981-87 through the turn of the next century, or to about 1 million tons in 2008. The possible scenario is to raise the level of exploitation in the western coastal resources and step up the development of aquaculture and inland fisheries in the medium term, and to develop offshore fisheries in the long term. In order to increase exports, the bulk of which consist of shrimp and some marine fish, it will be essential to expand and intensify brackish water aquaculture (tambaks) and net cage culture in view of the declining catch from the Malacca Straits. It will be also indispensable to prepare and execute an appropriate coastal fishery resources management program in the Malacca Straits, including the intensive and consecutive stock assessment, preparation of better fishing grounds, and development of coastal aquaculture.

132. Private and public tasks. From the viewpoint of efficient growth, the above scenario can be implemented by the private sector initiative in capital-intensive investments, especially in relation to the development of off-shore fisheries and intensive tambak aquaculture, and by the improvement of fiscal and financial incentives. The government should support services/facilities, such as resource surveys, infrastructural development (fishing port and cold storage, irrigation canals for tambaks), laboratories for pre-harvest and post-harvest quality control, establishment of research and training institutions and so forth.

133. Traditional fishermen. From the viewpoint of income/employment generation for traditional fishermen, such government supports as above are important but not enough. According to the data from the Directorate General of Fisheries, there are some 277,000 coastal fishermen, of which 70% are full-time, and 30% of them are found along the west coast including offshore islands. According to the 1983 agricultural census, there are approximately 200,000 households which

engage in some forms of fisheries, but only 40,000 households are solely dependent on fisheries (40% found in ten districts along the west coast). The exact profiles of their technologies and economic conditions are not known, but it is unlikely for them to have enough income to invest in better fishing gear and boats or in the development of more intensive tambak and other types of aquaculture.

134. Actions. One of the possible ways is to initiate small pilot projects, preferably as part of some integrated area development programs. Second possibility is to integrate them in the NES manner with capital-intensive private investments in aquaculture as being considered by the Government and some donors. The third possibility is to promote small-scale fishery development projects, along with strengthening of the cooperative's organization and their activities through the possible institutional and financial supports from the Government, e.g., preparation of fishing ground with installation of fish aggregating device (FAD), fish marketing promotion in remote areas, and infrastructural improvement.



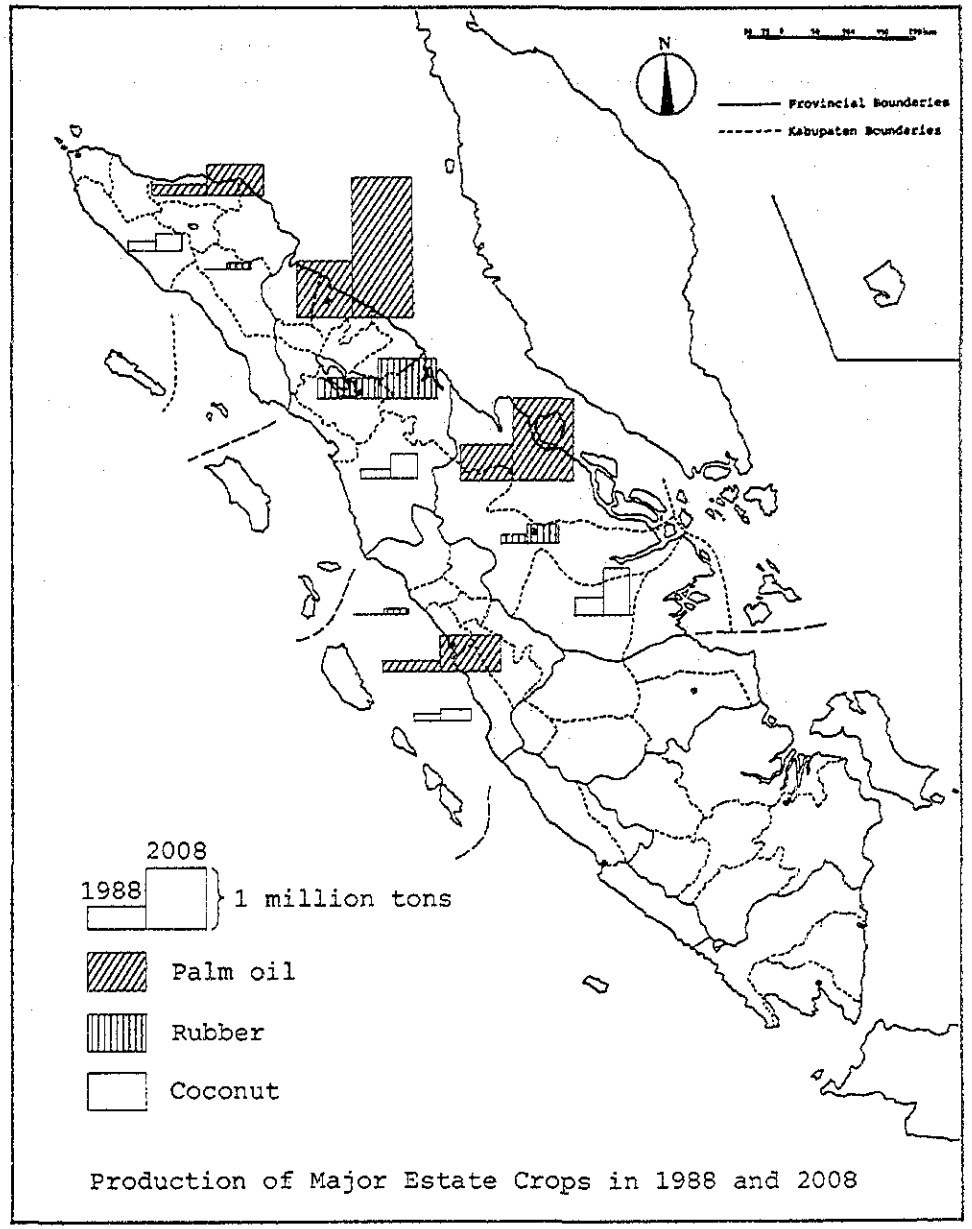


Figure 16. Development Prospect (Argiculture)

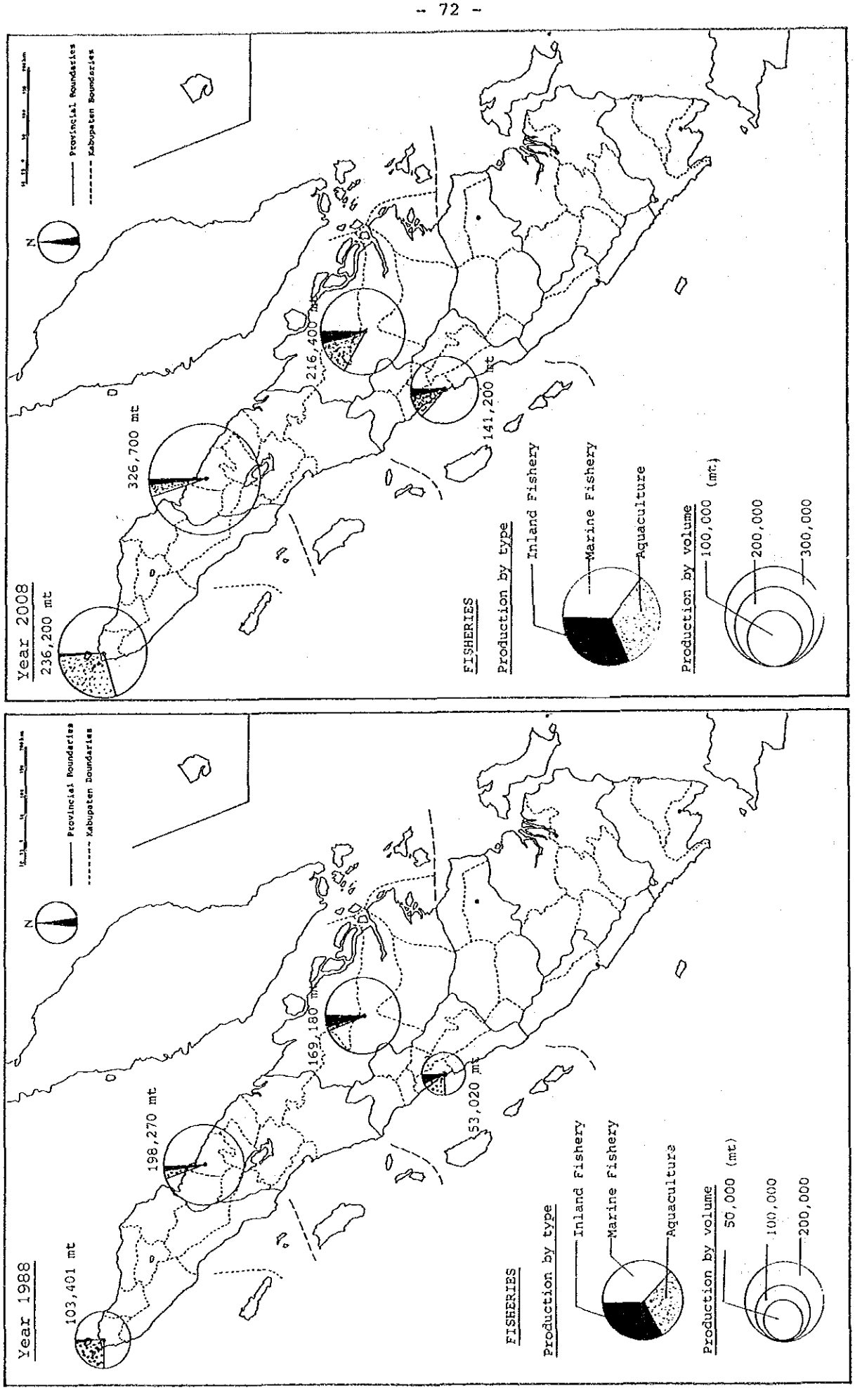


Figure 17. Development Prospect (Fishery)