SOUTHERN COAST DEVELOPMENT PLAN EAST JAVA

THE REPUBLIC OF INDONESIA

DRAFT REPORT

LTA—14
JAVA REGIONAL STUDY
PART A, PHASE II,
EAST JAVA

MARCH, 1979

JAPAN INTERNATIONAL COOPERATION AGENCY

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SUMMARY AND RECOMMENDATIONS

S.1 General

S.1.1 Assessment of the Present Situation

During the Repelita I and II periods, the Central Provincial and local governments made great efforts to develop the Study Area which consists of KB Pacitan, KB Ponorogo, KB Trenggalek, KB Tulungagung, KB/KDY Kediri, KB/KDY Blitar and southern part of KB Malang. One of those efforts resulted in an expansion of irrigated areas especially along Brantas River. Despite of those efforts, our estimate shows that the income gap between the Study Area and the rest of East Java has not been closing yet. This existing income gap is partly reflected on population growth rate of the Study Area. The population statistics estimated by East Java Provincial government shows the population increased annually at 1.32%, 1.17% and 0.08% between 1971 and 1978 in Central, Northern and the Study Areas, respectively. The relatively slow population growth in the Study Area is partly due to outmigration from the Area. However, development efforts towards economically unfavorable areas during Repelita II has been gradually bearing fruits in several places.

One of the rapidly growing sectors is the fishery sector. Even though its GRDP share is small, fish catch has been increasing by more than 50% a year in recent years. Fishing activities in Trenggalek produced 2,700 tons of fish catch averaging Rp.1.6 million sales a day. This rapid growth is mainly due to introduction of the purse seine fishing method.

During the last couple of years, motors were rather easily available. The innovative fishermen started introducing motors and purse seines, and have increased their catch tremendously.

The development in agriculture is also very significant in several crops. Growth rates of paddy, maize and cassava production have been higher in the Study Area than in East Java as a whole. But production growth of other crops such as peanut, soy bean and sweet potato were far below the East Java average.

The large increase in paddy production in the Study Area would be mainly due to heavy public investment in water resources development duirng the Repelita I and II periods. There are still major on-going projects which will produce significant benefits along Brantas River in the future. Those projects will bring benefits mainly to Blitar, Tulungagung, Kediri and partly to Trenggalek and will enhance the level of economic activities in the Study Area.

The improvement of roads and bus transportation systems is remarkable. No completed highway development project in a large scale was found, but numerous partial improvements were already completed or are on-going. But the available resources for the public investment are smaller in the Study Area than in the rest of East Java, the road conditions in the Area are still below those in the rest of East Java.

Manufacturing has not been an important sector in the Study Area. Especially the labor intensive and skill-oriented industries presently spreading from Surabaya have not reached the Study Area yet. But agro-based industries such as corn oil processing have been established in and around Kediri and are encouraging agricultural production in the upper Brantas Basin area. Recent large investments in Kediri are agro-processing industries which produce sugar, cigarettes, wooden boxes, gunny sacks and furnitures. And they will be the bases which create backward and foreward linkages of industrial development in the future.

One of the important on-going projects is the Prigi fishery port project which started in the 1977/78 fiscal year. The scale of the porject is not very big and the financial appropriation is presently limited. But the iniciation of new fishery port construction seems to be significant for development of the southern coastal area.

S.1.2 Geographic Aspects of Development

Presently there are three main provincial highways to the Study Area from the national highway leading to the west from Surabaya as shown in Figure S.1.

(1) Surabaya-Malang axis,

(2) The south bound routes from Kertosono or Nganjuk on the national highway,

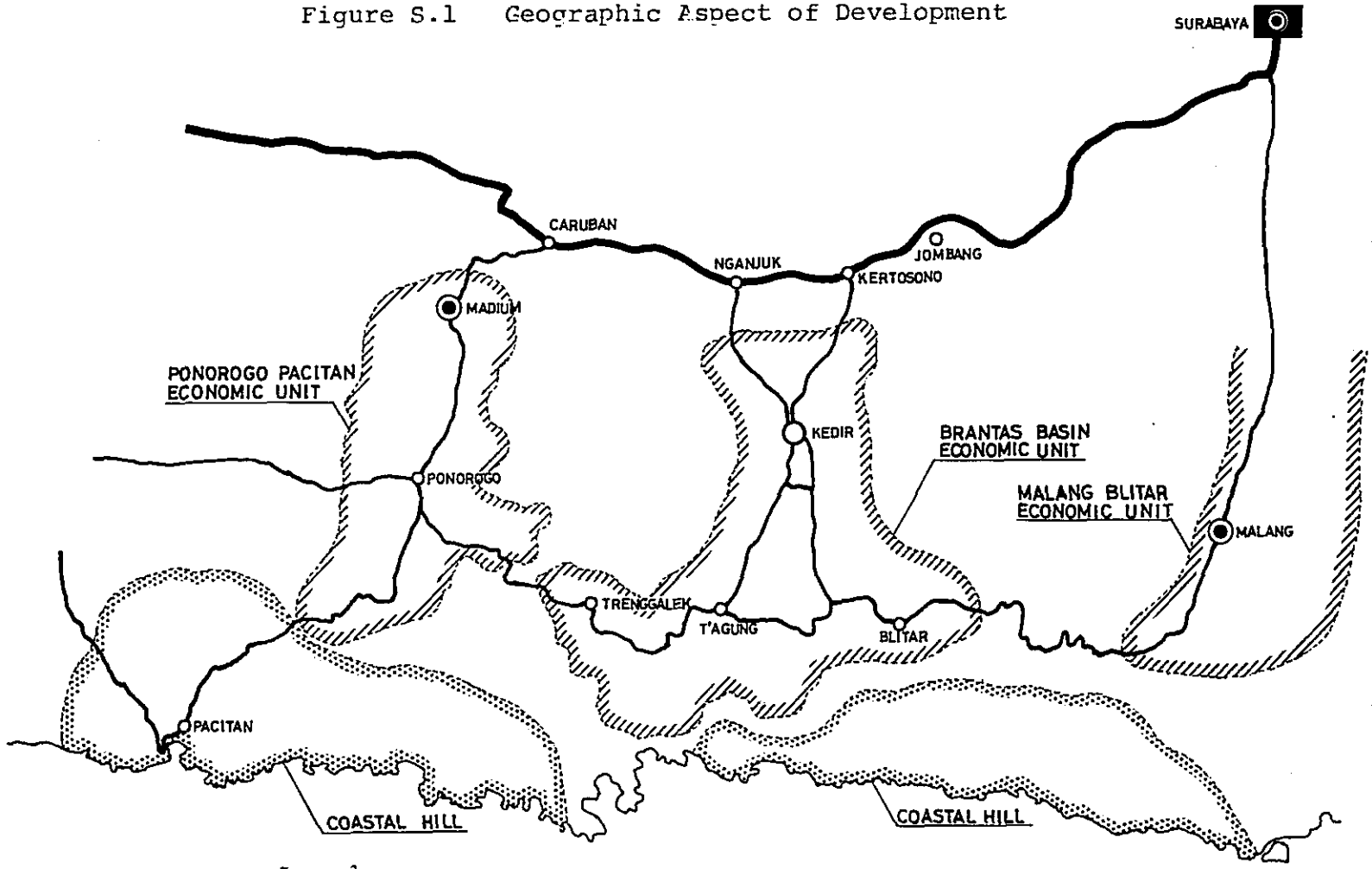
(3) The south bound route from Madiun.

Since the development spreading from Surabaya mainly come through the national highway, the closer a city is located to the national highway, the higher level of development it has attained.

Because the three routes storngly influence the spatial structure of the Area's economy, the Study Area's economy can be separated into three units. The first one is southern Malang and western Blitar economic unit which is closely linked to Kotamadya Malang as its center. This area, being predominantly an agricultural area, provides foods and industrial raw materials for the center.

The second unit is upper Brantas Basin area which includes parts of Trenggalek, Tulungagung and Blitar, and most parts of Kediri and its economy is closely linked to Kotamadya Kediri as its center. Trenggalek, Tulungagung and Blitar mainly specialize in agriculture and fishery, and provide their products for Kotamadya Kediri. Kediri performs almost all functions for this area ranging from industrial production to commercial activities.

Figure S.1 Geographic Aspect of Development



The third unit is Ponorogo-Pacitan area along the provincial highway from Madiun to Pacitan, and Kotamadya Madiun functions as the areal center. This area specializes in sugar, soy bean and other industrial raw material production in its agriculture. However, influence of Madiun's economic activities over those in Pacitan are rather small partly due to lack of adequate investment in infrastructure along the provincial highway and partly due to small population of Kotamadya Madiun. So far Pacitan's economy has been rather linked to Solo economy in Central Java.

The south-side of coastal hills which is mainly limestone area do not form any single clearly identifiable economic unit. But it is rather linked loosely to one of the above mentioned areal economies directly north of it and almost left behind. This situation is partly due to poor feeder road systems which connect the area with provincial highways and partly due to lack of sufficient water resources.

S.2 Development Objectives and Strategy

S.2.1 Development Objectives

Although its emphasis varied among objectives, Repelita III is planning to attain overall objectives of (1) equitable distribution of welfare and social justice, (2) economic growth at a reasonable rate, and (3) national stability. Based on the development frameworks at the national and the provincial levels, and on the specific aspects for development in the Study Area, a set of overall and specific objectives with their weight has been identified as in the following table.

	Objective	Weight
Overall Objective I:	Distribution	14
I.1	Economic development of less developed areas	2
I.2	Employment expansion	2
I.3	Urban and rural linkages	2
I.4	Environmental balance	2
I.5	Critical minimum services	4
I.6	Basic human resources development	2
Overall Objective II:	Growth	6
II.1	Production expansion and diversification	1
II.2	Industrial modernization	1
II.3	Interregional linkages	1
II.4	Natural resources exploitation	1
II.5	Productive infrastructure development	1
II.6	Skilled manpower and technological development	1

These objectives with their weight are to be used as criteria to assess and prioritize alternative strategies and proposed projects.

S.2.2 Development Strategy

From the examination of the present situation and development potentials which have been identified by the sectoral experts, the Team formulated three strategies: (1) Brantas Basin development strategy, (2) Coastal Hill development strategy, and (3) Central Belt link strategy. Each of the strategy is consistent with the two pronged development strategy, "pulling from the top" and "pushing from the bottom" strategy, identified in "Republic of Indonesia, Java Regional Study--Phase I, Part A: East Java."

(a) Brantas Basin Development Strategy

Brantas Basin extending from Blitar to Kediri through Tulungagung is a comparatively developed area in the

Study Area. This Basin will continue to be the area which possesses the highest development potentials. First of all, Kediri being a center in Brantas Basin will be the engine which will promote the growth of this area.

A large amount of public investment has fallen in the Basin during the Repelita I and II periods to develop productive infrastructure, especially irrigation systems and expanded irrigated agricultural areas. Although the Basin has great potentials of agricultural production through the past investments, they are not being fully exploited yet. One way to utilize the past investments and to exploit the potentials efficiently is to construct anti-disaster facilities such as Mt. Kelut debris control works and middle reaches improvement works. Another way is to promote intensive cropping systems and better water management through extension services. By these ways, productivity of paddy land in this area will increase significantly.

This alternative development strategy would be economically most efficient as compared with other alternatives, i.e., the highest economic growth can be achieved with a given amount of investment resources. The major components of public investment required for the strategy would be as follows:

(1) Investment in infrastructure including flood control systems around Mt. Kelut, a commercial and fishery port and new medium scale dams for irrigation.
(2) Investment in the industrial development.
(3) Investment in the agricultural development including an introduction of double cropping systems and extension services.

A possible adverse effect of this strategy is to widen disparities between Brantas Basin and the rest of the Study Area in the levels of development. However, the above mentioned development projects will create job openings which will absorb unemployed and underemployed labor forces from the less developed section of the Study Area.

(b) Coastal Hill Development Strategy

This strategy is mainly to enhance the living standards in low income rural areas with emphasis on non-irrigated areas especially in Blitar, Pacitan, Ponorogo and Trenggalek. The areas are hilly covered with limestone. Agricultural land is mainly non-irrigated dry land which can produce only cassava, corn and several kinds of beans. Some problems in these areas are difficulty in the marketing of agricultural produce and insufficient knowledge about the kinds of crops suitable to the areas. A prototype of development package may consist of the following components:

(1) The small scale water resource development including exploitation of groundwater.
(2) Facilities and services which meet basic human needs.
(3) Reforestation which protects existing and planned investments.
(4) Agricultural extension services with emphasis on farming of upland cash crops such as cassava, soy beans, groundnuts, clove and corn combined with livestock production.

The prospects for this kind of development in those highland are not necessarily assured. Marginal efficienty of investment is generally small, and organizational and marketing improvements would require substantial amount of skilled manpower because the number of people involved would be enormously large. Also a number of uncertainties have not yet been clarified in the methods of rural development.

(c) Central Belt Link Strategy

By separating the Area into three economic units, this strategy may utilize their resource endowments more efficiently. Taking the advantage of easy access to other domestic markets and the agglomeration of markets existing at Surabaya and Surakarta, this strategy links up each part of the Study Area to the fairly well developed trunk highways

from Surabaya to Mojokerto, Kediri, Madiun and Surakarta in the west, and from Surabaya to Malang in the south.

To implement this strategy, better coordination of existing programs is needed for more effective development of rural areas as well as production sectors. Particular attention should be directed to strengthening rural organizations which would play a central role in development, although some priority projects should be undertaken for improving the living conditions immediately. The main advantage of this strategy is to exploit untapped resources separately through the existing infrastructure. The necessary measures for this strategy will be as follows:

(1) Improvement of transportation systems including feeder roads.
(2) Improvement of existing small scale manufacturing industries along main provincial highways in the Study Area.
(3) Organization of effective and efficient marketing systems.

Even though this strategy has several merits compared with the other strategies, it requries a large amount of development funds to create tangible benefits. Since investment will be spread almost evently throughout the three sub-areas each project will be subject to severe budget constraints and may not obtain enough funds to break through a threshold point beyond which benefits will be created.

S.2.3 Selection of a Strategy

Sectoral experts have identified programs and projects, as instruments of each strategy, to be implemented in development zones and a regional planner has classified all instruments into the three strategies. Thus, they are in the form of alternative sets of projects. In order to select the best strategy, an attempt has been made to measure the objective achievements of every project and to aggregate them

into total achievement of respective alternative strategies toward objective-mix. Viability of three alternative strategies viz-a-viz the objective-mix can, then, be assessed by computing weighted average of achievement toward specific objectives.

An assessment shows that Coastal Hill development strategy attains distribution objective the most followed by Brantas Basin development strategy and Central Belt link strategy. In attaining growth objective, Brantas Basin development strategy is the best followed by Central Belt link strategy and Coastal Hill development strategy. Consequently, Coastal Hill development strategy appears to be the most viable in attaining the overall objective-mix in which distribution objective is given higher priority than growth objective at respective weights of 14 and 6.

S.2.4 Project Packaging and Priority Setting

A project will be more viable if it is packaged with other complementary or supporting projects. In the Study Area, water resource development project obviously needs to be packaged with critical area rehabilitation project for the sake of protecting irrigation systems form sedimentation. If projects are packaged in a proper manner before being screened, it is possible to include such projects that would otherwise be given low priority and put aside for its insignificance as individual projects. Limited resources also warrant the projects packaged within a limited space so as to maximize agglomeration effects.

After packaging projects, this Study has proposed fourteen project packages comprising of 118 projects and 88 individual projects in addition. Total costs of all these projects amount to Rp.139,901 million whereas the size of budget available for the Study Area is only Rp.56,727 million. In consequence, all proposed projects can not necessarily be implemented during the Repelita III period. Respective projects, then, need to be given priority with a view to

selecting only those to be implemented within the given period of time. After putting priority on each project and project package, the Team selected 12 priority projects shown in the next section.

S.3 Recommended Development Projects

S.3.1 Recommended Priority Development Projects

The development strategy described above for the Study Area has been translated into a number of priority development projects. Those priority projects are specific to the Study Area, but not inconsistent with the Third Five Year Development Plan of East Java and need to be implemented soon for more efficient realization of the development objectives.

The Team has selected 12 priority projects, but it does not mean that all other programs should be neglected. Unless stated explicitly to the contrary elsewhere, the current and planned policies and programs should be undertaken. What the Team described below are restricted essentially to new programs or reorganization of existing programs which require particular attention.

The priority programs described below are mostly intersectoral and therefore, their implementation requires special coordinating efforts. The projects are listed below:

(1) Western Pacitan Rural Development Project Package
(2) Pacitan Bay Area Development Project Package
(3) East Pacitan Rural Development Package
(4) Southern Blitar Rural Development Package
(5) Prigi Bay Area Integrated Degelopment Package
(6) Western Malang Rural Development Project Package
(7) Southern Tulungagung Rural Development Project Package
(8) East Ponorogo Rural Development Project Package

(9) Trenggalek-Tulungagung-Blitar Axis Road Network Development Project Package
(10) Southern Coastal Basin Development Planning Project
(11) Kampak Dam Project
(12) Kediri Irrigated Agricultural Pilot Center Project

For each project, its location, objectives, project components and related programs are briefly described in the following (see also Figure 5.6):

PP. I: Western Pacitan Rural Development Project Package

A. Location: Western part of Kabupaten Pacitan

B. Duration: 1979-1983[1/]

C. Score: 22.96

D. Objectives: (1) Rehabilitation of natural environment for watershed management and productive agriculture, (2) promotion of dryland agriculture, and (3) supply of basic human needs to isolated scattered settlements.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A02	Pacitan Draft Cattle Breeding Promotion Program	20
Fr05	West Pacitan Critical Area Rehabilitation	815
I09	Pacitan Hire-purchase Program for Agroindustries (HPPAI): Coconut Oil	2
I10	Pacitan HPPAI: Rice Mill	2
I13	Pacitan HPPAI: Cassava Mill	2
W07	Tinator Dam Project	3,800
W09	Grindulu Dam Project	1,000
W13	West Pacitan Saml1 Check Dam Development (five dams)	750
R01	Ponorogo-Pacitan Provincial Highway Betterment (PBH)	2,280
R24	Pringkuku-Pacitan Kabupaten Road Upgrading (KRU)	60
R32	Kebonagung-Walawali KRU	82
R36	Bandar-Ngunut KRU	36
R80	West Pacitan Desa Road Development (DRD)	1,516
R82	Central and North Pacitan DRD	774
	Total Costs	11,139

F. Related Programs: Critical Area Rehabilitation Program, Hire-Purchase Program for Agro-Industries, Small Check Dam Development Program, Rural Water Supply Program, Provincial Highway Betterment Program, and Kabupaten Road Upgrading Program and Desa Road Development Program.

1/ Only 65% of project R80 will be implemented during the 1979-83 time period due to budgetary constraints.

PP. II: Pacitan Bay Area Development Project Package

A. Location: Southeast of KT Pacitan, including Pacitan Port

B. Duration: 1979-1983

C. Score: 20.44

D. Objectives: (1) Promotion and modernization of the fishery sector in the short-run, and (2) defelopment of KT Pacitan-Pacitan Bay area as a center of economic activities in the kabupaten in the long-run.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fs01	Pacitan Fishing Vessel and Gear Modernization	26
Fs10	Pacitan Fishery Cooperative	23
Fs14	Pactian Cold Strage Project	374
I05	Pacitan Metal Engineering Workshop	19
P02	Pacitan Fishing Port Feasibility Study Project	62
P04	Pacitan Commercial Port Feasibility Study Project	123
R33	Punung-Kalak KRU	98
R98	Pacitan Bay Area DRD	464
	Total Costs	1,267

F. Related Programs: Fishery Vessel and Gear Modernization Program, Fishery Cooperative Program, Metal and Engineering Workshop Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. III: East Pacitan Rural Development Project Package

A. Location: Southeastern part of Kabupaten Pacitan

B. Duration: 1979-1983

C. Score: 21.26

D. Objectives: (1) Rehabilitation of natural environment for watershed management and agricultural production in potential areas, and (2) supply of basic human needs such as drinking water and communication facilities.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fr06	East Pacitan Critical Area Rehabilitation	163
Fs02	Luruh Fishery Vessel and Gear Modernization	20
W14	East Pacitan Small Check Dam Development (five dams)	750
W19	East Pacitan Rural Water Supply (five systems)	750
T01	Pacitan Community Telephone System Development	50
R07	Bandar-Tegalombo KRU	60
R08	Sudimoro-Ngadirejo KRU	84
R09	Dongko-Karangan KRU	60
R34	Ngadiluwih-Koripan KRU	36
R35	Tulakan-Slahung KRU	175
R37	Ngadirejo-Tanggung KRU	35
R38	Sudimoro-Panggul KRU	66
R81	East Pacitan DRD	774
	Total Costs	3,023

F. Related Programs: Critical Area Rehabilitation Program, Fishery Vessel and Gear Modernization Program, Small Check Dam Development Program, Rural Water Supply Program, Community Telephone System Development Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. IV: Southern Blitar Rural Development Project Package

A. Location: Southern part of Kabupaten Blitar

B. Duration: 1979-1983

C. Score: 19.86

D. Objectives: (1) Rehabilitation of natural environment for watershed management and agricultural production in potential areas, (2) expansion of income earning opportunities for farmers in unproductive lands through animal husbandry, sericulture, etc., and (3) supply of basic human needs such as drinking water.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A03	Blitar Draft Cattle Breeding	20
A16	Sericulture Pilot Project	615
Er01	Blitar Critical Area Rehabilitation	295
W11	Wiringin Dam Project	1,000
W16	Blitar Small Check Dam Development (five dams)	750
W21	Blitar Rural Water Supply (five systems)	750
R14	Margomulyo-Panggungrejo KRU	66
R15	Suruhwadang-Kademangan KRU	30
R16	Baking-Lorejo KRU	24
R48	Lorejo-Coast KRU	30
R49	Sumerglagah-Watudor KRU	36
R50	Panggung-Coast KRU	42
R95	Southern Blitar DRD I	790
R96	Southern Blitar DRD II	316
	Total Costs	4,764

F. Related Programs: Draft Cattle Breeding Program, Critical Area Reahbilitation Program, Small Check Dam Development Program, Rural Water Supply Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. V: Prigi Bay Area Integrated Development Project Package

A. Location: Prigi port area and its hinterlands, Kabupaten Trenggalek

B. Duration: 1979-1983[1/]

C. Score: 23.94

D. Objectives: (1) Promotion and modernization of fishery and related activities, and (2) developing Prigi Bay area as a center of urban and rural development in the kabupaten and its vicinities.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A01	Southern Belt Crop Experiment Station Project	1,845
Fs04	Prigi Fishing Vessel and Gear Modernization	26
Fs09	Fishery Experiment Station Project	15
Fs11	Prigi Fishery Cooperative	23
Fs12	Tulungagung Cold Storage Project	126
Fs13	Trenggalek Cold Storage Project	126
W23	Prigi Water Supply Project	70
P01	Prigi Fishing Port Improvement Project	4,182
P03	Prigi Commercial Port Feasibility Study Project	123
PW01	Prigi-Tulungagung Transmission Line Development Project	500
PW07	Prigi Electrification Project	300
T02	Prigi Community Telephone System	50
R44	Watulimo-Prigi Kabupaten Road Upgrading	60
R85	Prigi Desa Road Development	375
R86	Southern Trenggalek DRD II	375
	Total Costs	8,196

F. Related Programs: Fishing Vessel and Gear Modernization Program, Fishery Cooperative Program, Rural Electrification Program, Community Telephone System Development Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

1/ Only Phase I of the Project P01 will be completed by 1983 taking into account budgetary constraints and overall speed of development in the area.

PP. VI: Western Malang Rural Development Project Package

A. Location: Southeastern part of Kabupaten Malang

B. Duration: 1979-1983

C. Score: 22.66

D. Objectives: (1) Expansion and diversification of production of marketable products, (2) acceleration of interactions between the area and major urban centers of the Study Area, and (3) supply of basic human needs such as drinking water.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A06	Malang Draft Cattle Breeding	20
W12	Penguluran Dam Project	1,000
W17	Malang Small Check Dam (five dams)	750
W22	Malang Rural Water Supply	750
R06	Malang-Turen PHB	390
R30	Kesamben-Binaugung KRU	48
R72	Pagak-Tumpakejo KRU	100
R73	Damit-Tembakasri KRU	150
R90	Western Malang DRD	1,769
R91	Southern Malang DRD	1,769
	Total Costs	6,746

F. Related Programs: Draft Cattle Breeding Program, Small Check Dam Development Program, Rural Water Supply Program, Provincial Highway Betterment Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. VII: Southern Tulungagung Rural Development Project Package

A. Location: Southern part of Kabupaten Tulungagung

B. Duration: 1979-1983

C. Score: 20.21

D. Objectives: (1) Maintenance of environmental balance of the area, and (2) promotion of efficient exploitation and marketing of potential resources.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fr02	Tulungagung Critical Area Rehabilitation	166
Fs05	Popoh Fishing Vessel and Gear Modernization	20
R89	Southern Tulungagung DRD II	246
	Total Costs	432

F. Related Programs: Critical Area Rehabilitation Program, Fishing Vessel and Gear Modernization Program and Desa Road Development Program.

PP. VIII: East Ponorogo Rural Development Project Package

A. Location: Eastern part of Ponorogo

B. Duration: 1979-1983[1/]

C. Score: 19.12

D. Objectives: (1) Irrigation for extensive single cropping paddy area, (2) promotion of environmental control, erosion control in particular and (3) construction of feeder roads for agricultural production and marketing.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fr04	Ponorogo Critical Area Rehabilitation	185
W04	Bendo Dam Project	17,999
R93	Eastern Ponorogo DRD	789
	Total Costs	18,973

F. Related Programs: Critical Area Rehabilitation Program and Desa Road Development Program.

1/ Only 75% of porject W04 will be completed during the 1979-83 time period due to budgetary constraints.

pp. IX: Trenggalek-Tulungagung-Blitar (TTB) Axis Road Network Development Project Package

A. Location: Northern parts of Kabupaten Trenggalek, Tulungagung and Blitar.

B. Duration: 1979-1983

C. Score: 23.35

D. Objectives: (1) Acceleration of interactions among the three kabupatens by eliminating bottlenecks in existing road network and thus creation of the urban development belt extending from Kota Trenggalek through Kota Blitar as a bakcbone of developmental activities in Brantas River Basin as well as in presently lagging areas along southern coast, and (2) establishment of better accessibilities for comparatively isolated settlements within the three kabupatens.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
R02	Ponorogo-Trenggalek PHB	620
R03	Blitar-Srengat PHB	225
R18	Kampak-Gandusari KRU	24
R64	Pagerwojo-Bendungan KRU	60
R97	Northern Blitar DRD	474
	Total Costs	1,403

F. Related Programs: Provincial Highway Betterment Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

W06: Southern Coastal Basins Development Planning Project

A. Location: A Project office be located in the most relevant place in the southern coastal area.

B. Duration:

C. Score: 30

D. Objectives: (1) Establishment a framework for rational and effective watershed management in the whole southern coastal area, including KB Pacitan, southern KB Trenggalek, southern KB Tulungagung, southern KB Blitar and southeastern KB Malnag, and (2) formulation of a plan for integrated socio-economic development of the area.

E. Total Cost: Rp.200 million.

W03: Kampak Dam Project

A. Location: Kampak, Northern part of Kabupaten Trenggalek

B. Duration:

C. Score: 30

D. Objectives: (1) Irrigating potential single cropping paddy areas around KT Trenggalek.

E. Total Cost: Rp.400 million.

A10: Kediri Irrigated Agriculture Development Pilot Center Project

A. Location: Wonokerto, Kabupaten Kediri

B. Duration: 1979-1983

C. Score: 20

D. Objectives: (1) Full utilization of on-going and proposed groundwater irrigation systems by conducting research on the use of farm input and water management and dissemination of relevant technologies therefrom.

E. Total Cost: Rp.600 million.

S.3.2 Immediate Action Needed

The recommended development projects should receive immediate and special attention of both the Central, Provincial and local governments since the projects are addressed to the most critical development needs of the Study Area. Among the projects listed, two projects packages need immediate special attention since their amounts of investment required are large and some of projects in the packages are already planned for implementation based on a short-run projection. They are (1) the Western Pacitan Rural Development Project Package and (2) the Prigi Bay Integrated Development Project Package.

In the Western Pacitan Rural Development Project Package, the projects aim at (1) rehabilitating natural environment for watershed management and higher agricultural production, (2) promoting dry land agriculture and (3) providing basic human needs. There are two core projects, which will be paid special attention, the southern coastal basin development planning project and the Ponorogo-Pacitan provincial highway betterment project.

In the Prigi Bay Area Integrated Development Project Package, the projects aim at (1) promoting and modernizing the fishery sector and related activities, and (2) developing Prigi Bay area as a center of urban and rural development in KB Trenggalek and its vicinities. Development efforts in this Package should concentrate on the Prigi fishing port improvement project and include other projects as supporting ones.

To plan, design and coordinate development activities for the two project packages, a prefeasibility study should be started immediately. It will examine natural conditions of project areas, select the best among several alternatives, estimate benefits and costs at the prefeasibility (feasibility for one project) level and prepare necessary materials for

feasibility studies. In the prefeasibility study, the following four subjects should be included:

(1) Prigi fishing port improvement project (at the feasibility study level) including Watulimo-Prigi kabupaten road upgrading project and planning of Prigi commercial port,

(2) Prigi electrification project with Prigi community telephone system project,

(3) Ponorogo-Pacitan provincial highway betterment project including Pringkuku-Pacitan and Kebonagung-Walawali kabupaten road upgrading projects, and

(4) West Pacitan small check dam development project along Tinator and Brungkah Rivers.

The above prefeasibility (including some feasibility) study will be undertaken by an expatriate expert team which is supported by a counterpart team of Indonesian nationals. Required man-months for it are estimated as shown in Table S.1 and required cost for it will amount to US$400,000 approximately.

Table S.1 Man-months for the Prefeasibility Study

(Unit: Man-month)

	Expert	Expatriate Team	Counterpart Team
1.	Project Manager	4	4
2.	Water Resource Planner	4	4
3.	Water Resource Engineer	3	3
4.	Transport Planner	3	3
5.	Transport Engineer	3	3
6.	Port Planner	3	3
7.	Port Engineer	3	3
8.	Fishery Engineer	2	2
9.	Electric Engineer	3	3
10.	Electronics Engineer	2	2
11.	Soil Engineer	3	3
12.	Economic and Financial Analyst	5	5
13.	Draftsman	2	0
14.	One Special Consultant	1	0
	Total	41	38

S.3.3 Recommended Administrative Organization for Implementation

Projects proposed in this Study may not be implemented effectively without proper institutional arrangements and viable machineries for planning and implementation. Since this Study has identified projects mostly in the form of pacakge, a package approach is recommended for their implementation as well. The project packages include a number of large-scale projects which can be implemented only by the Central Government, but large- and small-scale projects are often complementary each other.

Several basic principles can be mentioned for an implementation framework relevant to the project packages. First, for one project package, a strong planning, implementing and coordinating body needs to be established at some intermediate level between national and kecamatan/desa levels. Second, planning and evaluation should be done by that body in an integrated and iterative manner but clear division of works in implementation should be made between the national executing bodies which are in change of large-scale projects of national or regional importance and the provincial executing bodies or those at lower levels which are in charge of small-scale projects of provincial or local importance. This is essential in the sense that large- and small-scale projects need to be linked effectively and that project package approach should be fit in the current institutional set-up. Third, institutional and financial system for the project packages should be designed primarily for ensuring quick and effective implementation of physical infrastructures of both large and small scale. Based on the three principles above, the Central and Provincial Government should attempt to formulate proper organizations for implementing projects as packages.[1/]

1/ See more details in Chapter IV, Section 2.

PART I

CHAPTER I

OVERVIEW

1.1 Background

A series of regional studies started in Indonesia during the Repelita I period. In these studies greater attention has been given for achievement of equitable distribution of development. This increasing attention given to equity is consistent with the national policies of development which are expressed in the successive Repelita's and in President Soeharto's speech of August 16, 1978.

The selection of the Southern Coastal Area for Phase II of East Java Regional Study is particularly opportune. The Province of East Java as a whole was studied by a team of Japan International Cooperation Agency headed by Dr. Koichi Mera during 1975. The study started in March, 1975, by preliminary agreement on the scope of work and was highlighted by the mission for the intensive field survey from July 9 to August 23. The final report entitled "Republic of Indonesia, Java Regional Study--Phase I, Part A: East Java" was submitted in December, 1975.

The Phase I Study recommended a dual development strategy: "pulling from the top" and "pushing from the bottom". Major elements in the pulling-from-the-top strategy are industrialization and more intensified planning activities at the level of provincial government, and those in the pushing-from-the-bottom strategy include rural development

and water resource development. Two points should be considered in this connection: first, the development policies should aim at taking the advantage of easy access to abroad and other domestic markets as well as to the agglomeration existing at Surabaya, and second, efforts should be made to spread the development from Surabaya outward to other parts of East Java even into Central Java (see Figure 1.1 obtained from Phase I, S-7, Figure S.1).

On the basis of the strategy recommended, eight priorities and supporting programs were proposed. They are:

(1) Industrialization Program,
(2) Water Resources Development Program,
(3) Madura Agricultural Development Program,
(4) Southern Coast Development Program,
(5) Rural Development Program,
(6) Community Facility System Development Program,
(7) Provincial Education Program, and
(8) Strengthening of BAPPEDA Program.

The Phase II Study is a follow-up of the above recommendations with emphasis on Programs (4) and (5).

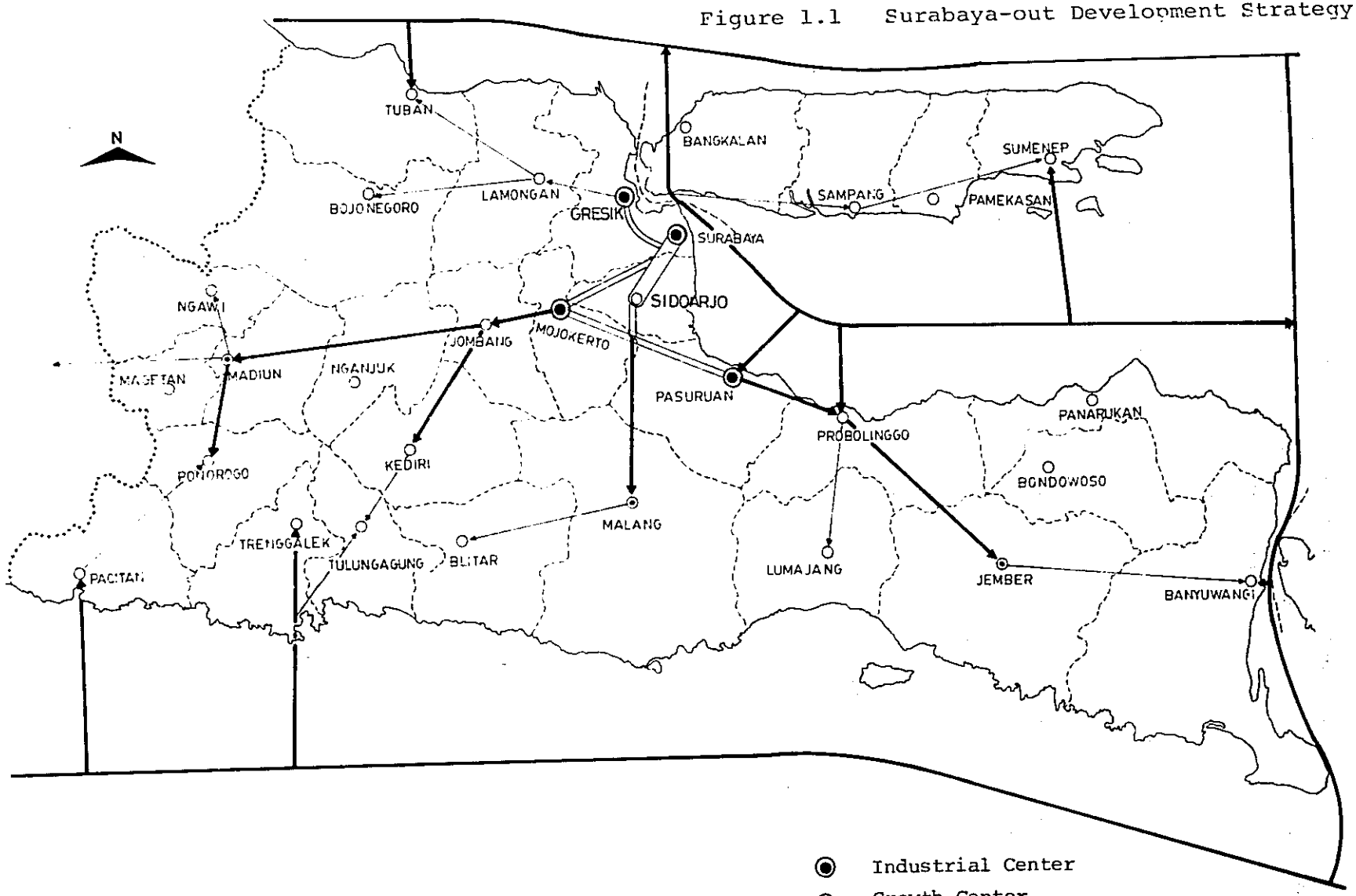
The Southern Coast of East Java extending from Pacitan to southern Malang was identified as the least developed area within East Java. The Phase I Study identified a number of development potentialities within the area:

(1) Potentiality for port development at Prigi, Pacitan and Puger;
(2) Potentiality for mineral exploitation; and
(3) Agro-industrial development potentiality.

In addition, the need for improving infrastructure such as accessibility, telecommunication, power supply, and other urban services was stressed.

The scope of work for the Phase II Study was worked out on the basis of recommendations contained in the Phase I Study through discussion between the both parties involved and was virtually completed in August, 1978.

Figure 1.1 Surabaya-out Development Strategy



As defined in the scope of work, the Study has been undertaken for the area comprising KB and KDY Kediri, KB and KDY Blitar, KB Tulungagung, KB Trenggalek, KB Ponorogo, KB Pacitan and the southern Malang (the Study Area), and aimed at identification of a development strategy and accompanying projects to develop the Study Area and estimating their economic and social effects on the Area. However, the Study did not look into every aspect of economic and social development due to limited resources. Instead, the Study tried to identify individual programs and projects which appear to have potentials for the Area's development in the following fields:

(1) Agriculture, forestry and animal husbandry;
(2) Agro-industry and manufacturing industry;
(3) Mining industry;
(4) Fishery;
(5) Port development;
(6) Land transportation development; and
(7) Water resource development.

But it does not imply that the Study is restricted in the fields mentioned above.

1.2 Areal Characteristics and Development Potentials

The Study Area is about 8,310 km^2 or 17.3% of East Java land area which is 47,992 km^2. The population in the Area is around 5.6 million which is 20.6% of the total population of East Java and increasing at around 1.3% a year, a relatively slow growth rate compared with 1.9 and 1.5% in Northern and Central Belts of East Java, respectively.

The Study Area can be divided into three distinctive sub-areas in terms of topography, river basin areas, limestone mountain areas and hilly cultivated dry land areas. Lands are well cultivated and irrigated in the flat river basin areas, whereas the hilly cultivated dry land areas are mostly

rain-fed fields. The limestone mountain areas show relatively low productivity in agriculture.

An areal framework has been worked out as a basis for (1) identifying alternative strategies for spatial allocation of resources and (2) integrating projects proposed in various sectors into several sets of project package. Settlement pattern and land use have been used as key variables to identify the areal framework.

The area has been divided into five kota regions first, by using travelling time in Table 1.1 (see Figure 1.2). If these criteria are rigidly followed, each center would have one hinterland of its own. However, the Team has added some modifications in favor of combining the three of Trenggalek, Tulungagung and Blitar areas into an unified economic zone.

Second, land of Study Area has been classified into the categories in Table 1.2 from the viewpoint of agricultural potentials and environmental management (see Figure 1.3).

By overlaying the kota region map and the land use map, nine development zones have been formed as shown in Figure 1.4. They include:

Development Zone (DZ)	Areas to be Included
DZ Pacitan	KB Pacitan
DZ Southern Trenggalek	Southern KB Trenggalek
DZ Soutehrn Coast	Southern KB Tulungagung and southern KB Blitar
DZ Western Malang	Eastern KB Blitar and southwestern KB Malang
DZ Ponorogo	KB Ponorogo
DZ Northwest Hill	Eastern KB Ponorogo, northern KB Trenggalek and western KB Kediri
DZ Kediri	KB Kediri
DZ TTB Axis	Central KB Trenggalek, northern KB Tulungagung and central KB Blitar
DZ Northeast Hill	Southeastern KB Kediri and northern KB Blitar

Table 1.1 Criteria Used to Define Kota Regions

<table>
<tr><th>Center</th><th colspan="3">Hinterlands</th></tr>
<tr><td>Kecamatan Center</td><td colspan="3">All desa's in the same kecamatan</td></tr>
<tr><td>Kabupaten Center</td><td colspan="3">Those kecamatans whose centers are located closer to the kabupaten center concerned than to any other kabupaten centers in terms of travelling time.

The travelling time is estimated on the following criteria:</td></tr>
<tr><td></td><td>Road Condition / Topography</td><td>Asphalted</td><td>Non-asphalted</td></tr>
<tr><td></td><td>Flat Land (area without contour lines)</td><td>60 km/h</td><td>30 km/h</td></tr>
<tr><td></td><td>Slope land (area with contour lines)</td><td>35 km/h or (kabupaten road)

50 km/h (provincial road)</td><td>15 km/h</td></tr>
<tr><td>City</td><td colspan="3">Those kabupatens whose centers are located closer to the city concerned than to any other cities in terms of travelling time.</td></tr>
<tr><td>Surabaya</td><td colspan="3">Whole provincial area, at least.</td></tr>
</table>

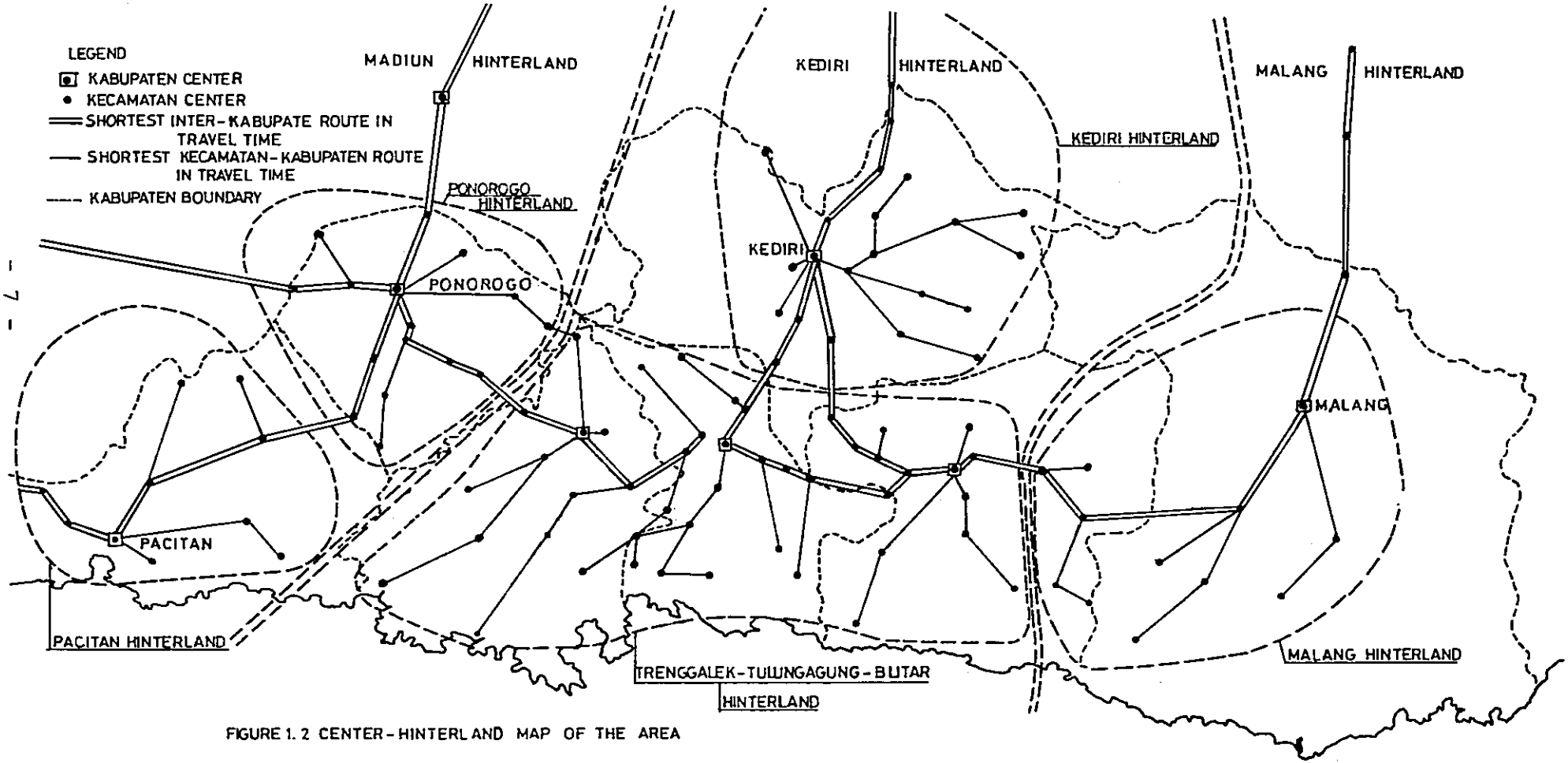


FIGURE 1.2 CENTER-HINTERLAND MAP OF THE AREA

Table 1.2 Categories for Land Classification

Land Use Classification			Most Conceivable Policy Inputs	Potential Outputs
Paddy land including human settlements		Double cropping area	Technical and institutional improvement in rice farming and water management	Increased agricultural production
		Single cropping area	Irrigation development	
Dry land	Non-critical area	With a large number of human settlements	Introduction of multiple cropping	Environmental balance and increased cash earning opportunities for farmers
		With a small number of human settlements	Regreening/ reforestration	
	Critical area	With a large number of human settlements	Regreening	
		With a small number of human settlements	Reforestration	
Forest land		Productive forest Primary forest	Preservation	Environmental balance, well-protected watershed in particular

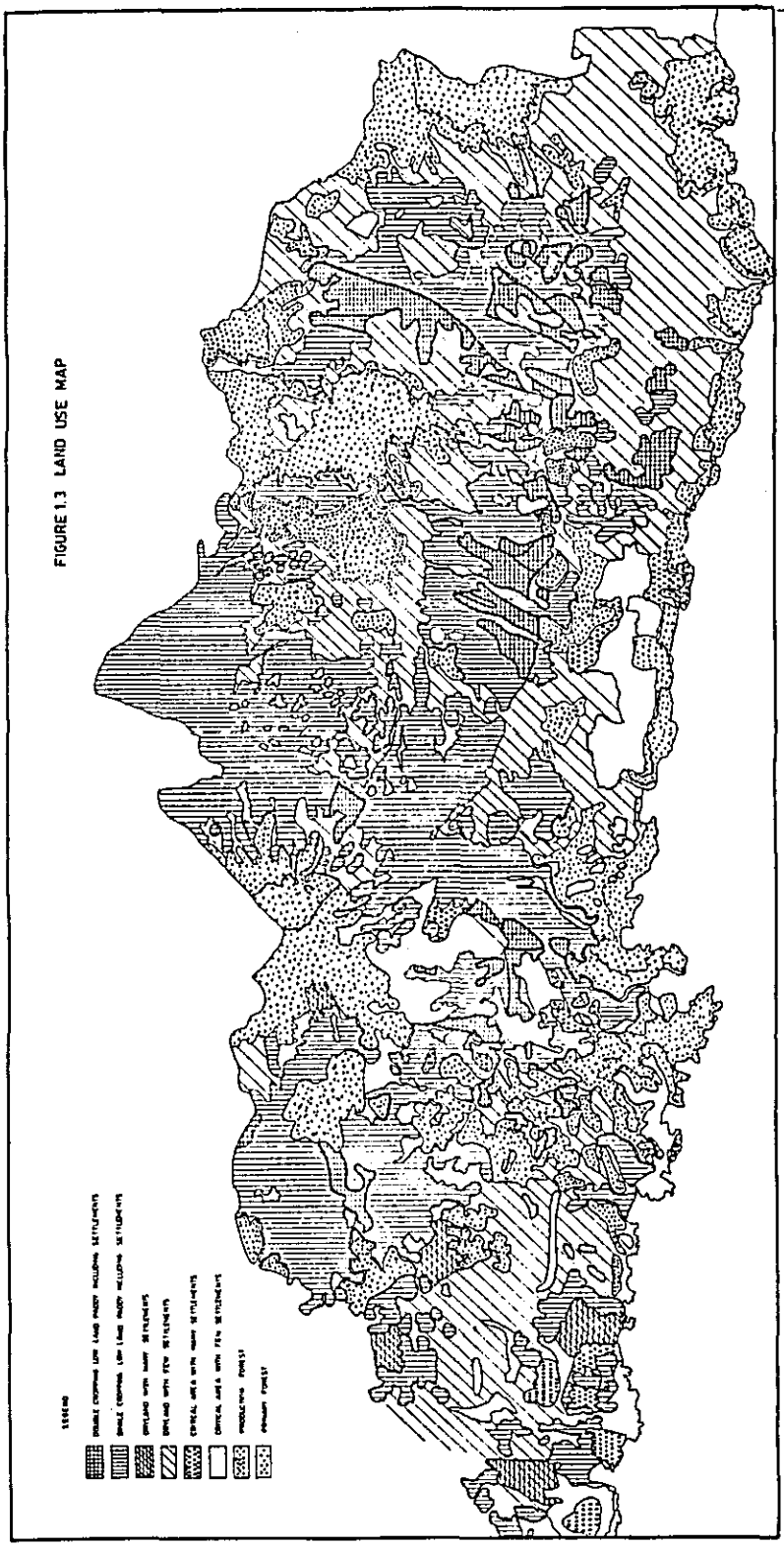
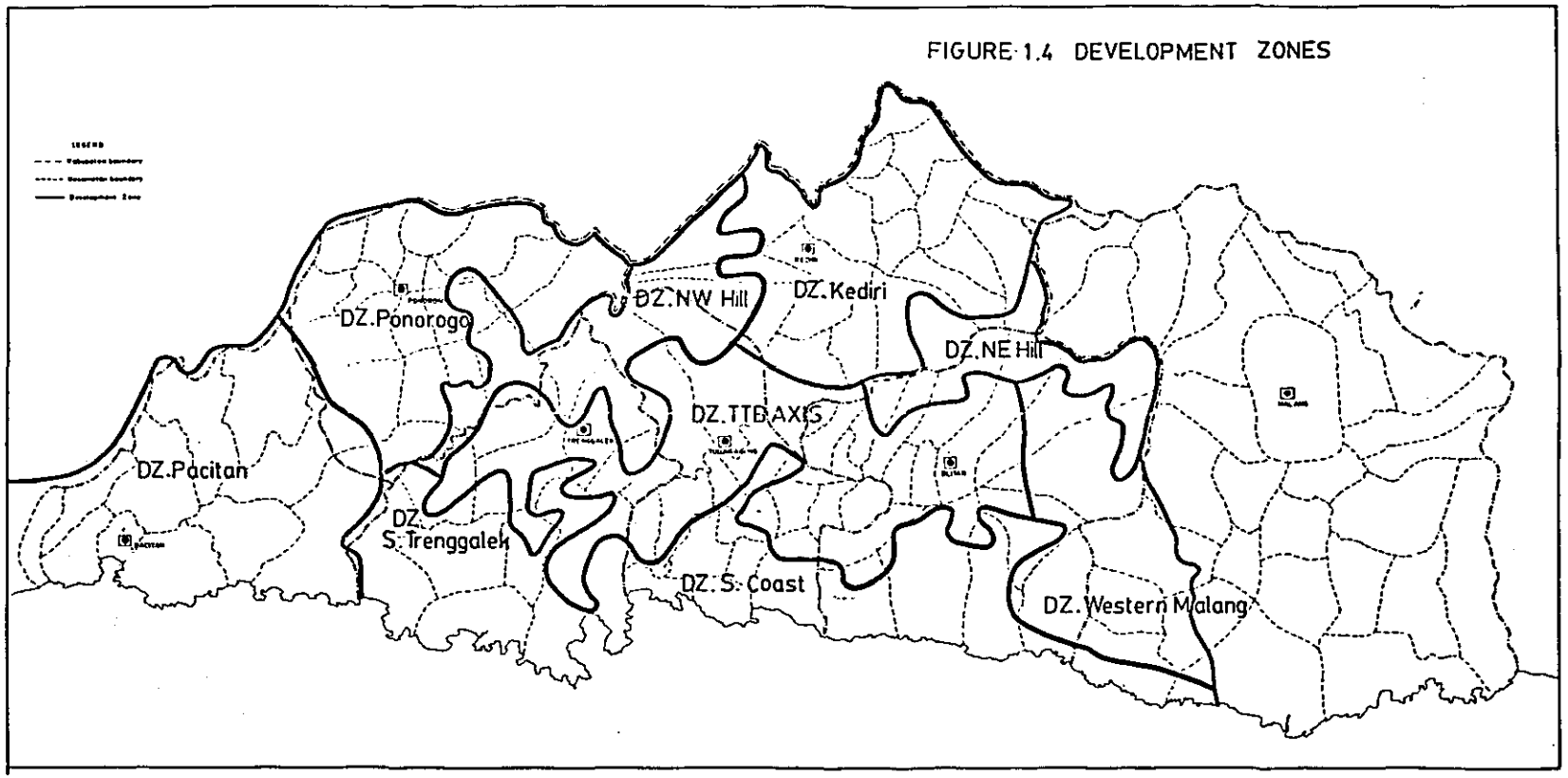


FIGURE 1.3 LAND USE MAP

FIGURE 1.4 DEVELOPMENT ZONES



Potentials, problems and their implications to development strategy are summarized in the following:

(1) DZ Pacitan

The whole area is hilly except flat land of a limited size around Kota Pacitan. Land suitable for agriculture is limited and scattered. Settlements are also scattered and isolated among others as well as from major routes of road networks. Since dry land cultivation, extends even up to the top of the hills, it is causing soil erosion. Critical areas have thus been expanding. Some settlements encroach on the critical areas because of limited population absorptive capacity of the area and they suffer from shortage of drinking water. The area is connected with DZ Ponorogo by a provincial road but the road conditions are bad. Though cassava production is dominant in terms of area coverage, clove which is produced mainly on the hills is an important source of cash income of farmers. This area accounts for 50% of clove production of East Java. Beans are another potential crops for dry land agriculture of the area. There are small fishery villages along the coastal line and fishing is done in a traditional way and the production level is much lower than that in Prigi. There is no industry exporting manufactured products outside the area except the copra industry.

(2) DZ Southern Trenggalek

The area is a part of the least developed coastal belt extending from Pacitan to the southern part of Malang, but has relatively higher agricultural potentials in the belt. There are some rivers whose water can be tapped

by constructing small dams for an irrigation purpose. Paddy cultivation extends along these rivers already, though it is still single cropping. Clove production is also a major agricultural activity of the area. It accounts for 20% of the total provincial clove production. Dry land is likely to be suitable for producing spices and nuts. At Panggul, there is a deposit of marble whose quality is better than that of presently exploited one at Besole though the deposit size is yet unknown. Road networks between kabupatens and between kecamatans are not well developed and those networks do not have sufficient feeder roads.

(3) DZ Southern Coast

The area, being the most depressed, extends from the immediate east of Prigi Bay as far as to western Malang. Most of the area is covered with limestone which is the primary factor for the very low yield per hectare. There are few rivers which are suitable for irrigation even in small scale. Extensive critical areas exist in the southern part of Blitar and soil erosion is a serious problem. The narrow areas along the coastal line are designated as primary forests in which no developmental activity is permitted by the Ministry of Agriculture. This has been creating conflicts with local governments, the people who want to extract mineral resources such as limestone and marble, and the people who want to plant crops. Although there are some potentials in clove production, sericulture and fishery, inadequate feeder roads connecting the area with kota kabupatens are the bottlenecks for development of the area along those economic activities.

Though limestone deposit of the area is unlimitedly large, the large scale operation of limestone extraction is not likely to be justifiable at least in short and medium terms on account of balanced supply-demand relation of limestone at the national level and inadequate transport facilities in this area. Lack of sufficient drinking water is another serious problem for the people in this area.

(4) DZ Western Malang

Although the area is a part of the limestone area along the coast line, there are some paddy cultivation and extensive dry land crop cultivation partly because of availability of water from small rivers and partly because of fairly moderate topography which keeps top soil from being washed away. There is potential groundwater which, if tapped, will be a great contribution to increasing intensity of rice farming and converting potential dry lands into irrigated ones. There are many large human settlements along small rivers. Food processing industries have been growing in these settlements already thanks presemably to a short distance to a large local market, kota Malang.

(5) DZ Ponorogo

Alluvium flat land covers most of the area. The area has more than sufficient surface water with Madiun River and its branches over the area. Groundwater is likely to be available in the western part of the area. The area is still single cropping despite of its high potentials in terms of land fertility and water availability. A large scale project is underway for rehabilitation of the existing irrigation systems with assistance from the World Bank.

Groundwater is also being explored by the Department of Public Works.

As for 'dry land' agriculture, an integrated agricultural development project is being proposed with Taiwanese assistance. This will substantially upgrade infrastructure and farming technics in dry land areas. Agricultural productivity is as high as in Brantas River Basin in terms of labor productivity as well as yield per hectar. From Kota Ponorogo, the center of the area, provincial roads stretch to Pacitan to the south, to Solo to the west, to Madiun to the north and to Trenggalek to the east. These provincial roads together with comparatively well developed intra-area road networks contribute to the area's high agricultural potentials in terms of market accessibility. Kota Ponorogo and its immediate surrounding areas have the third largest industrial agglomentation next to Kediri and Tulungagung and their industries are more skill-oriented than resource-oriented. However, a very limited number of industrial units export their products outside the area.

(6) DZ Northwest Hill

The area is covered with fairly steep slope land. Few settlements exist in the area. However, critical areas have been expanding due to inadequate efforts to maintain forests. The soil washed away from the critical areas has been silting up irrigation canals and rivers, and causing perrenial floods in Brantas River Basin. The area has high potentials in teak production.

(7) DZ Kediri

The area is a part of Brantas River Basin and covered with the largest alluvium flat land in the Study Area. Rice cultivation is a major agricultural activity of the area but its yield per hectar is not as high as that in Trenggalek-Tulungagung-Blitar area due to perrenial floods of Brantas River and its branches. Dredging of these rivers is underway. There are four on-going irrigation projects, consisting of three using river water from branches of Brantas River and one using groundwater in Nganjuk. Paddy production of this area will sharply increase with completion of these projects. Another remarkable trend in the area's agriculture is increasing food production for urban consumption such as eggs, milk, fresh vegetables and fruits. Growth of Kota Kediri will further increase demands for these products. Industrial agglomeration in Kota Kediri and its surroundings is the largest in the Study Area. Food processing and weaving are major types of industries. Settlements extending all over the area are well connected with feeder and kabupaten roads.

(8) DZ Trenggalek-Tulungagung-Blitar Axis (DZ TTB)

The area is also a part of Brantas River Basin. Single cropping paddy is a dominant land use but some parts around Kota Trenggalek and Kota Blitar are already double cropping areas. Similarly to DZ Kediri large sized settlements cover the area almost continiously. There are three large scale on-going irrigation projects. Completion of these projects will be a great contribution to paddy production in this area. The southern part of Tulungagung

is an unused swamp of 3,000 ha which exists due to lack of sufficient erosion control in the mountains along Brantas River.

DZ TTB extends down to Prigi Bay area where there are the most viable fishery activities in the Study Area. Prigi is suitable for port development as well. A large number of population together with an expected increase in agricultural productivities in the Brantas River Basin area will ensure sufficient local markets for fish and fish products. Three kota kabupatens are centers of manufacturing industries of this area including Tulungagung specialized in the batik and wearing industries, Trenggalek in the roof-tile industry and Blitar in the food processing industry. Road networks within the area are well developed in terms of not only kabupaten-kecamatan roads but their feeder roads. But roads connecting the area with Ponorogo, Prigi, Malang and Kediri need to be upgraded in view of expected increase in the traffic demand along these routes.

(9) DZ Northeast Hill

The area is situated on the hill between Kediri and Malang. The most serious problem of this area is volcanic rocks and ashes from Mt. Kelut which cause sedimentation of Brantas River and its branches. Construction of a sufficient number of check dams could reduce the sedimentation to a great extent since the area is well covered with primary forests. The area has extensive plantation estates of cacao and clove. Coffee and tea may be potential crops for estate agriculture of this area in future. The existing managerial know-how of estate agriculture will enable the

area to specialize in estate agriculture and related manufacturing industries.

1.3 Relative Economic Position of the Study Area

In order to show a relative economic position of the Study Area, the economies of the Study Area and the rest of East Java have been compared from several points of view. Table 1.3 compares sectoral composition of employment in 1978 for the Study Area and East Java. As shown, the share of agricultural employment is larger in the Study Area than that in East Java. Another sector which has a larger share in the Study Area than in East Java is the industry sector. However, the industrial sector in East Java is supposedly more capital intensive than that in the Study Area: so even the share of industrial employment is larger in the Study Area, the share of industrial output in gross regional domestic product (GRDP) will be smaller in the Study Area than in East Java.

Table 1.3 Estimates of Employment Share in the Study Area and East Java in 1978

(Unit: %)

Sector	Study Area 1/	East Java 2/
Agriculture	64.7	60.5
Trade	10.1	11.4
Services	9.2	10.4
Industry	8.2	7.2
Transportation and Communication	0.8	1.5
Construction	1.2	1.6
Other	5.8	1.4
Total	100.0	100.0

Notes: 1/ Figures are estimated by the Team members.

2/ Source: Pemerintah Daerah Propinsi Daerah Tingkat I, Pola Dasar Pembinaan Latihan Kerja, p. 27.

An analysis of figures in Table 1.3 together with those in Table 1.4 reveals some important implications of the economic activities to the areal economies. According to the figures in Table 1.4, value added per worker is the lowest in the agricultural sector and the highest in the banking sector. If an economy has a larger share of agricultural employment and smaller shares of other employment than the other economy, overall value added of the former economy is smaller than that of the latter economy. In other words, the Study Area's income per capita is smaller than that of East Java.

Table 1.4 Value Added per Worker by Sector and its Growth

Sector	1975 (Rp)	1977 (Rp)	Growth Between 1975 & 1977 (%)
Agriculture	159,203	243,025	53
Mining	188,400	270,417	44
Industry	290,593	430,173	48
Electricity, Water Resource	753,500	940,619	25
Construction	172,700	434,692	152
Transportation and Communication	393,130	575,122	46
Trade	373,532	543,375	45
Bank	1,495,911	3,140,919	110
Services	128,730	207,720	61

Sources: 1. Labor force figures to obtain value added are from Pemerintah Daerah Propinsi Daerah Tingkat I, Pola Dasar Pembinaan Latihan Kerja.

2. Gross regional product data is from BAPPEDA, Jawa Timur.

As shown in Table 1.4, growth rates of value added per worker are almost same in agricultural, industrial, transportation and communication, and trade sectors. Value added per worker in other sectors is significantly higher than that in the above mentioned sectors. The economy, which has larger GRDP shares in the sectors of rapidly growing value added, grows faster than the economy which has small GRDP shares in the same sectors. The figures imply that per capita income in the Study Area have been growing slower. As a result, the income disparity between the Study Area and East Java have been widening during the 1975-77 time period.

Since 1969, a large portion of the public investment in the economic fields was made to raise agricultural productivity by the Central and Provincial Governments. In the Study Area, the public investment has heavily fallen in the upper Brantas River Basin area which have brought benefits to Kediri, the northern parts of Tulungagung and Blitar. Table 1.5 shows changes in the total production of major crops for both the Study Area and East Java from 1972 to 1975. Growth rates of paddy, maize and cassava production are higher in the Study Area, while those of peanut, sweet potato and soy bean production are lower. Figures by kabupaten reveal that all kabupaten except Ponorogo achieved higher growth rates in paddy production than East Java did. In maize production, only Pacitan and Malang failed to attain East Java's growth rate and in cassava production, Pacitan and Malang achievements are far behind those of the Study Area and East Java.

Large increases in paddy production in the Study Area would be due to heavy public investment for water resources development during the Repelita I and II periods. There are still several major on-going projects which will produce significant benefits along Brantas River in the future. Those projects will bring benefits mainly to Blitar, Tulungagung, Kediri and partly to Trenggalek and will enhance the level

of economic activities in the Study Area. Thus, regional economic disparities between the Study Area and the rest of East Java will be reduced.

Table 1.5 Growth in the Total Production of Major Crops from 1972 to 1975

(Unit: %)

	Paddy	Maize	Cassava	Peanut	Sweet Potato	Soy Bean
Ponorogo	2.84	9.21	26.83	73.64	34.77	2.16
Pacitan	11.15	-9.00	1.75	-11.54	6.42	-20.63
Kediri	8.98	35.02	9.14	41.42	-6.07	-20.97
Blitar	10.27	14.57	13.66	-2.39	22.31	-7.01
Tulungagung	11.58	21.08	4.03	1.87	0	-12.31
Trenggalek	7.67	20.95	24.16	1.72	23.56	0
Malang	6.44	1.98	-4.94	10.17	0	-30.99
Study Area	8.20	11.27	8.53	8.64	7.48	-11.50
East Java	4.64	9.99	4.88	11.36	11.34	0

Source: Dinas Pertanian, Jawa Timur.

But the past and on-going projects may create a gap between the upper Brantas area and Pacitan-Ponorogo area. Table 1.5 shows that Pacitan attained growth rates of Study Area and East Java only in paddy production and that Ponorogo's growth rate of paddy production was far behind that of the Study area. If the present trends continue in the Area, the gap will become bigger and Pacitan-Ponorogo area will be left behind from the progress of East Java. These results may be partly due to severe natural conditions in Pacitan-Ponorogo area, and partly due to smaller past and present public investment in comparison to upper Brantas Basin area.

One of the rapidly growing sectors in the Study Area is the fishery sector (see Table 8.1). Even though its GRDP share is small, fishing activities in Trenggalek produced about 2,700 tons in 1977 averaging around Rp.1.6 million sales a day. The production increased by over 100% from the previous year. A simple comparison of fishing catch in the area with that in East Java clearly indicates remarkable growth of the sector as shows in the following table.

(Unit: Ton)

	1974	1975	1976	1977
Trenggalek	478	1,679	1,190	2,746
Study Area	610	1,919	1,712	4,276
East Java	56,664	90,766	126,413	139,431

The rapid growth of fish production in the Area is mainly due to introduction of the purse seine fishing method. This method has been used widely in Java Sea; however, it was not used widely in the Area until 1974. Since most of fishery boats were not motorized, fishermen could not use the method. During the last couple of years, motors were rather easily available, and inovative fishermen started introducing motors and purse seiners and increased their catch tremendously. Also the increase in fish catch implies that potential markets have been expanding partly due to increase in per capita income and partly due to improved transportation systems including kabupaten and provincial roads. Still the future potentials of this sector will expand as income per capita increases and as the presently proposed highway betterment projects are implemented.

The investment in road construction and rehabilitation was mainly channeled into National and Provincial roads which mostly fall in Central Belt. Other types of the public

investment by the Central Government also went into this area. The development budgets of kabupaten and kotamadya governments depend on IPEDA and other several tax revenues whose sizes are largely determined by land productivity and the level of economic activities of kabupaten and kotamadya. So the available resources for the public investment are also higher, in term of total as well as per capita figures, in Central Belt than in the Study Area. In terms of per capita figure, Pacitan is the lowest and Ponorogo is the third lowerest kabupaten in East Java as shown in the following table. Average per capita investment from kabupaten and kotamadya revenues in East Java is Rp.4,752 and no kabupaten in the Study Area spend more than the provincial average.

KB/KDY	Per Capita Investment During Repelita II (Rp)
KB Pacitan	3,106
KB Ponorogo	2,947
KB Kediri	4,517
KB Blitar	4,063
KB Tulungagung	4,228
KB Trenggalek	3,366
KB Malang	4,138
KDY Kediri	5,338
KDY Blitar	7,737
Average in East Java	4,752

During the Repelita I and II periods, a large portion of the private investment was made also in Central Belt. From 1968 to 1977 Central Belt accounted to 69.7% of the private investment in the province, whereas the shares of Northern Belt and the Study Area are 27.5% and 2.8%, respectively. The investment fell in the Study Area is only Rp.12 billion, of which the major part was invested in Kediri.

Our estimates, which are based on population statistics of 1971 and 1978 population estimated by East Java Provincial Government, show the population in East Java is increasing at around 0.90% a year. On the other hand, the population in the Study Area is increasing at around 0.08% a year, which is very slow in comparison to 1.32 and 1.17% in Central and Northern Belts, respectively. These figures for three areas seem to be under estimated significantly. Among kabupatens and kotamadyas in East Java, KDY Surabaya has the highest population growth rate (2.90%) followed by KDY Pasuruan (2.14%), KB Gresik (2.07%), KB Sidoarjo (2.02%) and KB Mojokerto (1.87%). In the Study Area, KDY Kediri has the highest population growth rate (1.83%), followed by KB Kediri (1.35%), KB Tulungagung (0.94%) and KB Ponorogo (0.71%). KB Pacitan is the only kabupaten whose population declined since 1971.

The population of the Study Area is 5.03 million that is 18.3% of the provincial population in 1978, whereas its share was 19.3% in 1971. The relatively slow population growth in the Area is partly due outmigration from the Area which has lower GRDP per capita.

The above statistical comparison between the Study Area and the rest of East Java indicates that the economic position of the Study Area is still behind Central and Northern Belts despite of development efforts made in the Study Area. However, the distribution of development efforts towards economically unfavorable areas during Repelita II has been gradually bearing fruits in several places. Those fruits may not be recognized immediately due to the smallness of their sizes and due to the time lag between data collection and publication in monitering development performance. During our field trips in the Area, we observed many significant achievement for development during the last couple of years. The Central, Provincial and regencies governments implemented many programs and projects for development. For water resource

development, for instance, some projects completed are Lahor Dam, Wlingi Dam Project, Kediri-Nganjuk Ground Water Development Project and Mt. Kelut Debris Control Project. In the agricultural sector, the project which investigates multiple cropping system and the regreening project are on-going.

The improvement of roads and bus transportation system is remarkable. No completed highway development project of a large scale was found, but numerous partial improvements were already completed or are on-going. Particularly, the improvement of the Prigi access road from Bandung and the Ponorogo-Pacitan trunk route is remarkable. Also, bus transportation systems have expanded rapidly both in the intercity long distant and in the suburban services. The Team members are deeply impressed with many mini-bus services organized by private bus owners on the access roads from Trenggalek to Prigi.

The electricity and other public utilities have expanded partly even to the remote towns and villages in the southern parts of KB Pacitan and Trenggalek, even though an electricity network has not penetrated to every corner of the Study Area. But the expansion of supply networks and the installation of many small scale generators provide not only better living conditions for the people in rural areas but the bases for development of rural industries.

The efforts towards strengthening planning capabilities of local governments are impressive. It seems that BAPPEDA and planning units in kabupaten offices have been trying to improve their planning capabilities. In all kabupaten offices the Team members visited, the improvement of their planning capabilities was clearly observed as a distinguished result of the upgrading efforts.

Agro-base industries such as corn oil processing have been established in and aorund Kediri and are encouraging agricultural production in the upper Brantas Basin area. Recent large domestic and foreign investments in Kediri area

are mainly in the agro-base industries which produce sugar, cigarettes, wooden boxes, gunny sacks and furnitures. And they will be the bases which accelerate industrial growth in the Study Area.

Lastly, the most important project the Team members have observed is the Prigi fishery port project which started in the last fiscal year. The scale of the project is not very big and the financial appropriation is presently limited only to Rp.23.5 million for two years. But the iniciation of construction of a new fishery port seems to be a very significant even in the history of the southern coast development. As a result of exhaustive efforts made by the Central and local governments, this will be one of the most symbolic events for the future development of the Study Area.

In sum, the major development efforts during Repelita II in the Study Area have been directed largely to the infrastructure sectors. Even though the returns of those investments are higher than those in other sectors, the returns have not been fully realized yet. But the tangible results and returns will be obtained sometime during the Repelita III period.

CHAPTER II

DEVELOPMENT OBJECTIVES

2.1 Chanllenges for Development

The central government has set broad policy guidelines for development during the period under Repelita III based on the assessment of development performance during the period under Repelita II. The guidelines conclude:

(1) Repelita III will address itself to the issues which have not been solved or attained by Repelita II. Such issues include economic development of lagging areas, improvement of economic well-being for the poor majority, supply of a minimum level of basic human needs and promotion of transmigration.

(2) Repelita II has been successful in maintaining the country's economic growth at a reasonable rate. The efforts to expand the national economy will continuously be made during the Repelita III period with particular emphasis on the full mobilization of resources available in different parts of the country.

Repelita III has then been launched with overall objectives of (1) equal distribution of welfare and social justice, (2) economic growth at a reasonable rate and (3) national stability. Accordingly, development objectives for the East Java province have been set as follows:

(1) Improving living conditions and human capabilities of the people, and distributing economic well-being and welfare among them equally as well as fairly; and

(2) Creating solid socio-economic foundations of development for the forthcoming steps.

For regional development in particular, the Provincial Repelita III has spelled out the following specific objectives:

(1) Integrating sectoral and regional development,

(2) Redistributing income and welfare,

(3) Providing infrastructure especially in the less development areas,

(4) Promoting rural development,

(5) Strengthening urban-rural linkages,

(6) Reinforcing financial bases of provincial and local governments, and

(7) Maintaining natural environmental balance.

In the light of overall objectives set at the national and provincial levels, the past development performance of the Study Area has been summarized as in Table 2.1.

2.2 Development Objectives

Based on development frameworks at the national and the provincial levels and the specific challenges for development objectives has been identified as follows:

(1) Overall objective I

Distributing equally and effectively the benefits of development among all sections of the area and the people.

Specific objectives set under this objective are:

1.1 Promoting economic development of less developed areas,

1.2 Expanding employment opportunities,

Table 2.1 Past Development Performance of the Study Area

Field	Overall Objectives: Distribution of Economic Well-being and Welfare	Regional Economic Growth
Agriculture	. Development took place only in limited areas leaving other areas behind.	. Production expansion was limited. Especially, few crops could earn income through inter-regional export.
Industry	. Industries were not viable enough to provide adequate job opportunities in rural area.	. Strong bases were not established yet for the long term industrialization of the area.
Natural resource development, including mining, fishery, forestry and water resources development	. Improper management of natural resources caused a vicious circle of environmental inbalance and low productivity of depressed areas, viz, critical areas, erosion, etc.	. Potential resources were not fully exploited yet. . Methods of exploitation were inefficient.
Physical infrastructure	. Provision of basic services for the people was inadequate and critical minimum levels of the basic services were not ensured in some depressed areas.	. Productive infrastructures were still inadequate or, if any, not fully utilized for the Area's economy.
	. Rural areas were isolated from urban centers due to lack of sufficient transport networks within the area.	. Lack of adequate transportation network between the Area and advanced areas outside hindered economic development.
Human resources development	. Majority of the poor could not meaningfully participate in development due to inadequate basic human capabilities; viz, primary education, nutrition, etc.	. Skilled human resources were not adequately developed or retained in the Area.

1.3 Strengthening urban-rural linkages within the Area,

1.4 Maintaining and rehabilitation natural resources for a better environmental balance,

1.5 Ensuring critical minimum levels of basic services for the all population in the Area, and

1.6 Developing and improving basic human resources.

(2) Overall objective II

Accelerating economic growth thus contributing to national and provincial economies.

Specific objectives set under this objective are:

2.1 Expanding production with an emphasis on the Area's export expansion and diversification,

2.2 Modernizing industries including manufacturing and other industries, for continuous growth of the Area's economy over forthcoming periods,

2.3 Strengthening linkages between the Area and advanced areas outside the Area,

2.4 Efficiently and fully exploiting potential natural resources,

2.5 Developing and utilizing productive infrastructures to the maximum extent, and

2.6 Promoting development of skilled manpower and technologies.

Overall objective I (Distribution) is a short term one because it is urgently needed in every field of development of the Area while overall objective II (Growth) is a long-term one

because it will take a longer time for the Area to attain in view of a relative position of the Area in the national economy.

Given the time period of five years for this development plan, overall objective I is given priority over overall objective II. Specific objectives are equally important under respective overall objectives but specific objective 1.5 needs to be placed in a special position in a weight scale in view of its urgency and essential nature. Hence, weight among objectives have been set as in Table 2.2. These objectives with their weight are to be used as criteria to assess and prioritize alternative strategies and proposed projects using a scoring method.

Table 2.2 Weight of Objectives

Objectives		Weight
Overall objective I: Distribution		14
1.1	Economic development of less developed areas	2
1.2	Employment expansion	2
1.3	Urban & rural linkages	2
1.4	Environmental balance	2
1.5	Critical minimum services	4
1.6	Basic human resources development	2
Overall objective II: Growth		6
2.1	Production/export expansion and diversification	1
2.2	Industrial modernization	1
2.3	Interregional linkages	1
2.4	Natural resources exploitation	1
2.5	Productive infrastructure development	1
2.6	Skilled manpower and technological development	1

2.3 Evaluation Method of Alternative Strategies

Evaluation of alternative development strategies will be made in reference to the objectives for development already identified above. The basic method is that, for each objective, the performance of each program or project contained in a strategy will be evaluated and be given a score and that the scores of all programs and projects contained in a strategy will be added up and the sum will be defined as the score of the strategy as shown in Figure 2.1. For the purpose of evaluating alternative strategies, the score given to each strategy will be compared.

If this method is used properly, each program or project is evaluated within the context of the strategy in which the project is included. Even if an identical project is included in two different strategies, its performance may be different depending upon the composition of other programs and projects contained in each strategy.

Figure 2.1 Form for Evaluating Strategies

Strategy: Coastal Hill Development Strategy

Program/Project	Objectives: Overall Objective I Distribution 1.1	1.2	1.3	1.4	1.5	1.6	Overall Objective II Growth 2.1	2.2	2.3	2.4	2.5	2.6	Project Score Total
1. Drinking Water Project in S. Malang	2	1	0	0	2	1	0	0	0	0	1	0	13
2. Feeder Roads in S. Blitar	1	1	1	2	2	0	1	2	2	0	1	2	26
3.													
N.													
Strategy Total Score													

CHAPTER III

DEVELOPMENT PERSPECTIVE

3.1 Review of Regional Development Strategy of East Java

During the transitional period from Repelita II to Repelita III, governmental officials of East Java were preparing detail programs of the Third Five Year Development Plan. The overall framework of East Java development is described in Rencana Pembangunan di Daerah Tingkat I Jawa Timur published by East Java Provincial Government. Bab 3, Buku I of the Rencana describes the overall framework as follows:

(1) To attain the development objectives, sectoral and regional development should be coordinated and integrated and the sectoral development should exploit potentials in the region;

(2) To integrate national and regional development, the development strategy should incorporate several measures in itself such as those for improving transportation and communications;

(3) To promote regional development, participation of local governments at various levels and people is essential. The participation would include financial and administrative contributions. Also each area has to increase its capability to maintain environment, to solve problems and to establish healthy living environment.

The Rencana also mentiones that the above development efforts of East Java will be in every social, economic and otehr fields such as agriculture, health, education and development administration.

To achieve development effectively, East Java needs a set of policies and strategies which integrates sectoral and areal development. In order to formulate a regional development strategy, the Rencana divides East Java into five development areas as similarly done by the Second Five Year Development Plan of East Java. Each of them has different development potentials and prospects as follows:

(1) Central development area with Surabaya as its center: This area specializes mainly in industrial activities, trading, and public services.

(2) Middle high plateau development area with Malang as its center: A major sectors of this area is the agricultural and estate crop sector. Malang and its vicinity can be center of industries mainly of agro-processing in the future.

(3) Westside low plain development area with Madiun as its center: The area is for forestry and mining exploitation.

(4) Eastside low plain development area with Jember as its center: The area produces mainly food and estate crops, and their production can be increased by intensive cultivation and irrigation. Banyuwangi port will be used for export from the area.

(5) Madura development area with Sumenep as its center: The area is for agricultural production and the production can be increased by exploitation of agricultural resources available on the island.

The leading sector of the region of East Java would gradually shift from agriculture to industry. Among various types of industries, skill-oriented and labor intensive industries should be considered as leading industries. The roles of such industries would be largely import substitution which is essential for the development of the country at this stage. The development of those industries would center around Surabaya as they are now. The future pattern would be slightly more dispersed. Their location will be determined by linkages among themselves, their markets and infrastructure. With fairly well developed trunk highways to Mojokerto, Kediri and Madiun in the West, to Malang to the South and to Pasuruan, Probolinggo, Jember and Banyuwangi to the East, development of industries will spread to the above major cities including three development centers Madiun, Malang and Jember from Surabaya.

To link industrialization and rural development programs, there should be a conscious effort for regionalization of development. In this sense, establishment of the five zones with their own centers is a proper frame of regionalization scheme. Spreading industries from Surabaya can be one of the approaches of the "pulling from the top" development. It is particularly desirable from distributional considerations. On the other hand, each center could function as a center to organize the grassroot effort for rural development. This is an essential part of the "pushing from the bottom" development.

As stated in various sections of the Rencana, one of the most important objectives of the Third Five Year Development Plan of East Java is to reduce disparities in income, social welfare and overall development among various areas within the province. To attain this objective, two-prong approach of "pulling form the top" and "pushing from the bottom" is an appropriate way. This approach needs such programs and projects that can fully utilize available resources and potentials.

As stated in the Rencana, the economic development of the five growth centers will serve as channels for delivering national development down to grassroot level and for stimulating participation of people into development activities. But it is too optimistic to expect that the development originating at Surabaya will reach those centers within the near future without conscious efforts. For this reason, more specific and well-coordinated policies and strategies for regional development are required at the various levels of government in East Java.

3.2 Development Prospective of the Study Area in the Inter-areal Context

Major cities within the Study Area and its vicinity, and their population in 1978 are as follows:

(1)	KDY Malang	449,070
(2)	KDY Kediri	198,499
(3)	KDY Madiun	139,735
(4)	KDY Blitar	70,153
(5)	KDY Mojokerto	65,548

A closer examination indicates that there is a relatively high concentration of population in the central part of the Province along Surabaya-Malang axis. There are also densely populated areas along the national highway from Surabaya to Ngawi through Mojokerto, Jombang and Nganjuk and along the provincial highway from Caruban to Solo through Madiun and Magetan.

Presently there are three main access routes to the Study Area from the Central Belt Area:

(1) Surabaya-Malang axis,
(2) The south bound routes from Kertosono or Nganjuk on the national highway, and
(3) The south bound route from Madiun.

These three are linked fairly well developed provincial highways down to the southern coastal hills.

Since the three routes strongly influence the spatial structure of the Area's economy, it may not be appropriate to regard the economy as one unit, but be appropriate to separate the Study Area's economy into three units. The first one is the southern Malang and the western Blitar economic unit which is closely linked to Kotamadya Malang as its center. This sub-area, being predominantly an agricultural area, provides foods and industrial raw materials for the center.

The second unit is the upper Brantas Basin area which includes parts of Trenggalek, Tulungagung and Blitar, and most parts of Kediri and its economy is closely linked to Kotamadya Kediri as its center. Trenggalek, Tulungagung and Blitar mainly specialize in food production, industrial raw material production and fishery, and provide their products for Kotamadya Kediri. Kediri performs almost all functions for the sub-area ranging from industrial production to commercial activities. Kediri can be also a distribution center of marine products once a fishery port is developed in Prigi Bay in the future.

The third unit is Ponorogo-Pacitan sub-area along the provincial highway from Madiun to Pacitan, and Kotamadya Madiun functions as the sub-areal center. This sub-area specializes in sugar, soy bean and other industrial raw material production in its agriculture. However, influence of Madiun's economic activities over those in Pacitan are rather small partly due to lack of adequate investment in infrastructure along the provincial highway and partly due to small population size of Kotamadya Madiun. So far Pacitan's economy has been rather linked to Solo economy in Central Java.

The south-side of coastal hills which is mainly limestone area do not form any single clearly identifiable economic unit. But it is rather linked loosely to one of the above mentioned sub-areal economies directly north of it and

almost left behind. This situation is partly due to poor feeder road systems which connect the area with provincial highways and partly due to lack of sufficient water resources.

Since the Study Area is a part of East Jaya, the Area's economy depends heavily on entire East Java economic activities. Mainly the outside economic influence comes through major surrounding cities such as Malang, Mojokerto and Madiun since they provide major markets for the Study Area's economy. Malang is the second largest city after Surabaya in entire East Java. In addition to its distributional functions, major economic activities of Malang are based on agricultural and horticultural production exploiting favorable geographical and topographical conditions of its hinterland. Along with agricultural and horticultural production, the agro-processing and other related industries have expanded in the city which attracted Rp.40,085 million large domestic and foreign investment during the 1968-1977 period. In Repelita II of East Java, Malang was designated as one of the growth centers which would lead economic activities of their surrounding areas.

Mojokerto was not designated as one of the growth centers, however, the city is a part of the greater Surabaya economic area and linked to Surabaya, Pasuruan and Gresik through fairly well developed trunk highways. In the future, Mojokerto will increase its importance in linking the Study Area with the rest of East Java and its importance also can be seen from the major domestic and foreign investments which amounted to Rp.23,439 million during the 1968-1977 period.

The last city among the three is Madiun which is located on the western part of the Central Belt Area, and the city functions as commercial and agro-processing center for its surrounding areas. In the Growth lenter Scheme, the city is also designated as a growth center which specializes in agricultural, mining and forestry production, and related processing industries. Due to its location, the city also has

a very close tie with the economy of the southern part of the Central Java and the economies of Ponorogo-Pacitan area, Surabaya and Solo. The major domestic and foreign investments during the 1968-1977 period amounted to Rp.2,490 million, the beggest in the western part of East Java.

At present, industrialization is spreading from Surabaya to those the cities surrounding the Study Area. The future pattern will be more dispersed one and those cities will be more closely linked with the Study Area. However, the future pattern will be determined by market conditions and infrastructure. By improving infrastructure between those cities and the Study Area as well as within the Study Area, the "pulling from the top" approach will expand the size of markets for the Study Area. On the other hand, by improving social facilities and infrastructure within the Area, the "pushing from the bottom" approach will exploit existing small but important potentials and develop human resource capabilities.

3.3 Future Pattern of Development

The most developed area in the Study Area is the upper Brantas Basin. Its population was about 3.0 million in 1978 and average population density was estimated at 847 persons per square kilometer. The population grwoth rate of KDY Kediri was 1.81% during the 1961-1971 period. KDY Kediri which is a grwoth center of the primary level in the Area functions as a commercial and industrial center of the Basin with its 200,000 population and no other city in the Study Area can compete with it in almost any respect. During the 1968-1977 period, major domestic and foreign investments made in Kediri and other areas in the Study Area are as follows:

KDY	Kediri	Rp.8,642 million
KB	Tulungagung	1,716
KB	Pacitan	1,101
KB	Ponorogo	462

The approved private investments in Kediri are corn oil industries, pelletizing industries, cigarette industries, gunny sack industries, wood industries and others. In the future, Kediri is still expected to be the primary growth center and a full-fledged industrial center which attracts skill-oriented and labor intensive industries now spreading from Surabaya.

Growth centers of the secondary level are Ponorogo, Trenggalek, Tulungagung and Blitar. Since Kediri is a relatively well developed town development spreading from Surabaya will reach at Trenggalek and Tulungagung mainly through Kediri. But, at the same time, it is possible that the development will partly reach at the two cities by means of sea transportation if Prigi prot is constructed in the future. To Blitar, the development will come partly through Kediri and partly through Malang, but influence of Kediri's economy will be getting stronger than that of Malang's one in the future.

Since Ponorogo is topographically separated from Kediri, the development will come from Madiun which is one of the five major growth centers in East Java. And further development goes to Pacitan through Ponorogo. Possessing a good bay for port construction, Pacitan will be able to establish a channel to link its economy with the major cities such as Jakarta and Surabaya on Java Island by sea transportation in the future and will be a growth center of the tertiary level.

The future pattern of development largely depends on spatial allocation of the public investment. Two development patterns, "Kediri Lead Pattern" and "Decentralized Pattern," are shown in Figures 3.1 and 3.2 and either one of them is most likely to appear during next 15 to 20 years depending on the allocation of public investments. If the public investment falls heavily on Brantas Basin, the future pattern will be "Kediri Lead Pattern." Kediri will further strengthen its

Figure 3.1 Kediri Lead Pattern

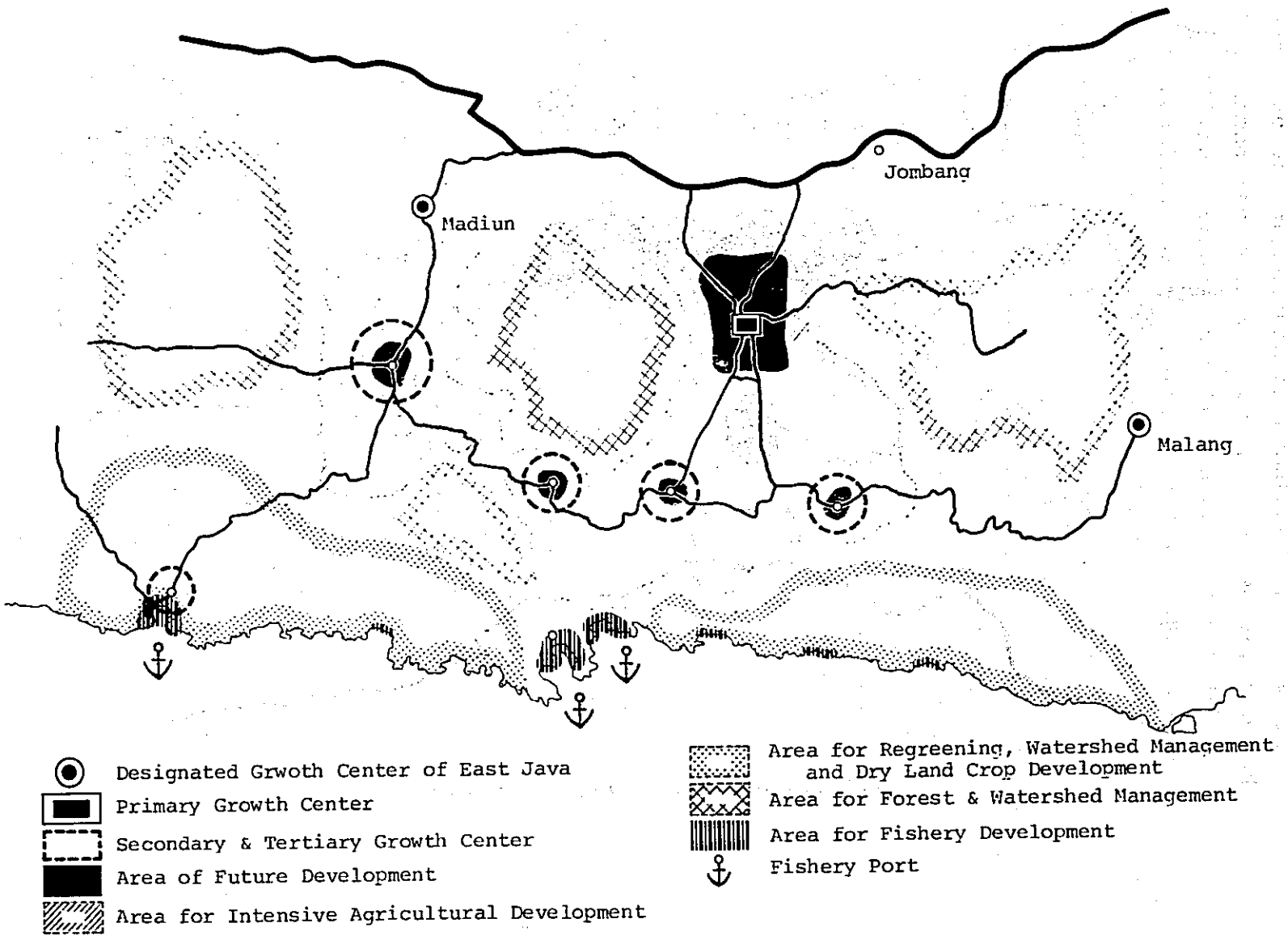
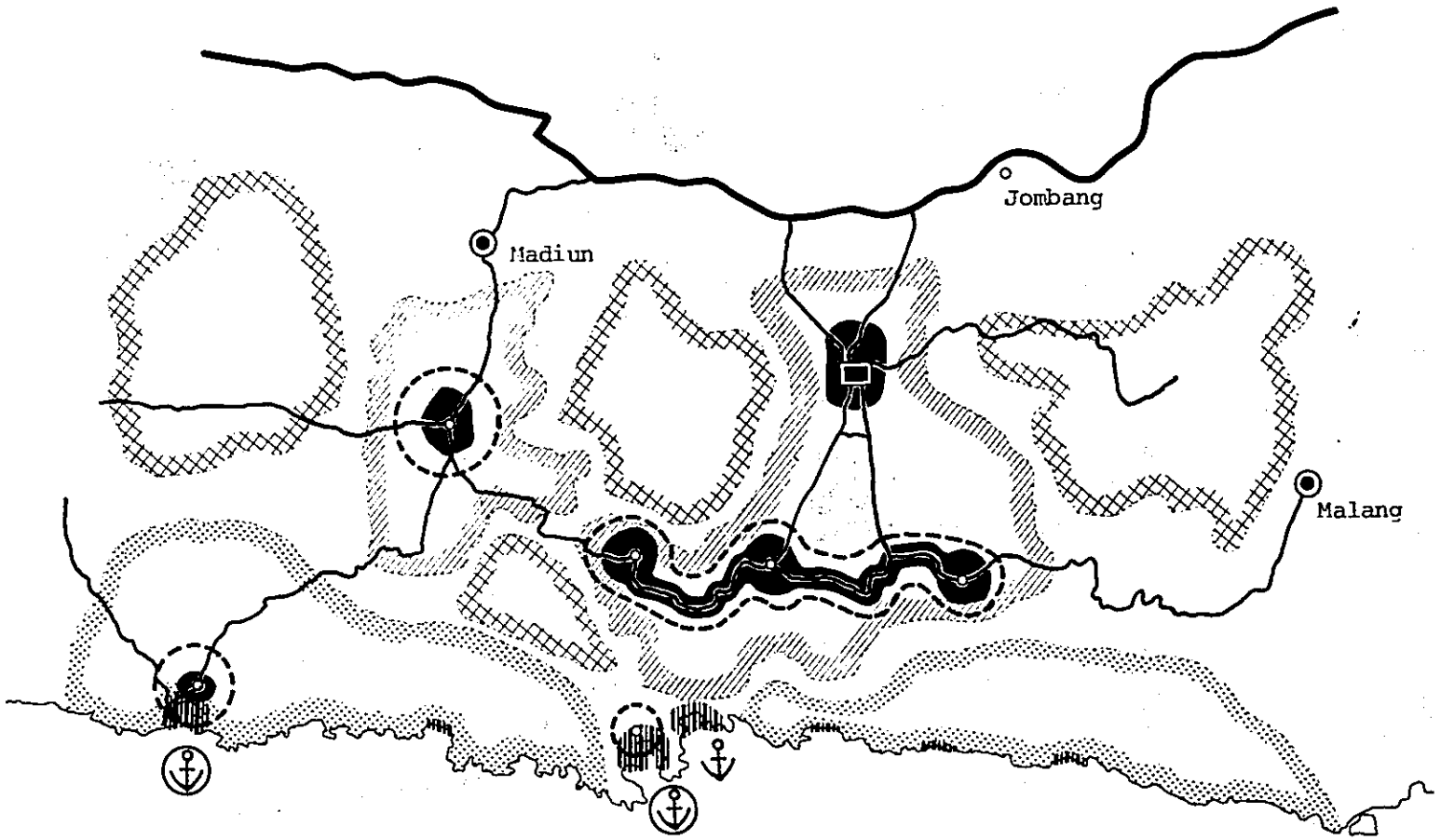


Figure 3.2 Decentralized Pattern



functions as a growth center of the primary level in the Area and attract more domestic as well as foreign investments. As the productivity of agriculture in Brantas Basin goes up, Kediri will exapnd its role as a commercial center, too and become a really full-fledged growth center. Trenggalek, Tulungagung and Blitar also expand their functions as growth centers of the secondary level in the Study Area.

Ponorogo, a growth center of the secondary level, is also located in an intensive agricultural area and its hinterlands are a paddy area in Madiun River Basin and forest areas on mountain slopes. Since the size of this growth center is small in comparison to the area of Trenggalek, Tulungagung and Blitar, its functions will be mainly to collect products from its hinterlands and to ship them to the rest of East Java. It also functions as a distribution center of input to its hinterland.

As fishery activities expand on the southern coast, Prigi, Pacitan and Popoh will possess fishery ports with a complete set of facilities such as cold storage and processing plants. The fishery products from these towns will be mainly distributed to the growth centers through cold storage systems.

If the public investment falls heavily on the coastal hill, the future pattern will be "Decentralized Pattern" as shown in Figure 3.2. Kediri still functions as a growth center of the primary level in the Area and attract private investments. But Trenggalek, Tulungagung and Blitar are likely to form a growth zone as shown in the figure in stead of establishing three different growth centers. The three cities are located in an intensive agricultural area and possess a paddy area in Brantas Basin and a dry land crop area on the coastal hill as their hinterland. So they will provide important markets for the products produced in the two hinterlands and supply input to them for their production. Since Trenggalek and Tulungagung are close to two potential sites for fishery development on the coast, they will also provide major markets for fishery products.

As fishery activities expand, Prigi and Pacitan will be full-fledged fishery towns. Also their fishery ports will be likely to function as a commercial port in this development pattern, and Prigi and Pacitan will be growth center of the tertiary level. In this case, the industrial development spreading from Surabaya will reach at Prigi and Pacitan by means of sea transportation.

Which pattern of the Area's development will be and whether or not each growth center will be full-fledged growth center at the respective level depends on traction of "pulling-from-the-top" and thrust of "pushing-from-the-bottom." Since the traction is expected to be not strong enough except for Kediri in the near future, development of the secondary and tertiary growth centers largely depends on the thrust, economic activities of their hinterlands. Judgeing from the specific development objectives during the Repeltia III period, the Team members consider decentralized development pattern in Figure 3.2 as a desirable pattern for the Study Area.

CHAPTER IV

ALTERNATIVE STRATEGIES AND STRATEGY SELECTION

4.1 Alternative Resource Allocations Between the Study Area and the Rest of East Java

Alternative development strategies can be conceived with respect to resource allocation between the Study Area and the rest of East Java, and resource allocation within the Study Area. In this case, the resources refers to investable funds of the Central Government and local governments. The resource allocation of the former case (resource alternative, thereafter) will be discussed in this section, while that of the latter case (development strategy, thereafter) will be discussed in the second section in this chapter.

In order to estimate the amount of public financial resources available for the Study Area in the future, it is necessary to estimate governmental revenues and the expected availability of external financing. The procedure to be followed here is to make a projection of development expenditures by the Central Government up to fiscal year 1983/84 on the basis of the past performance. Given the national budgetary frame, a similar procedure will be followed to project the amounts of public resources at the provincial and local government levels.

4.1.1 Central Governmental Development Expenditures

Table 4.1 shows the development expenditures by the Central Government during Repelita II. Reflecting the economic slowdown in recent years, the growth rate of total expenditures has decreased slightly. The share of East Java

Table 4.1 Development Budgets for East Java and the Study Area by Source

(Unit: Rp.Million)

		1974/75	1975/76	1976/77	1977/78	1978/79	Total
APBN	East Java	18,416	35,596	44,214	67,840	81,797	247,863
	Study Area	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
APBD DT I	East Java	9,417	13,128	15,442	16,438	16,878	71,304
	Study Area	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
APBD DT II	East Java	16,277	21,533	26,342	33,194	34,281	131,627
	Study Area	3,498	4,722	5,714	6,604	7,180	27,718
INPRES SD	East Java	3,613	8,383	9,522	13,742	18,675	53,935
	Study Area	716	1,707	2,024	1,908	4,200	10,555
INPRES DESA	East Java	1,663	2,495	2,502	2,919	2,917	12,496
	Study Area	393	589	589	687	687	2,945
INPRES KESEHATAN	East Java	521	2,607	2,998	1,568	1,057	8,751
	Study Area	96	619	n.a.	456	292	1,463
INPRES PASAR	East Java	-	-	2,195	3,010	2,465	7,720
	Study Area	-	-	233	520	n.a.	753
INPRES GREENING	East Java	-	-	-	-	1,481	1,481
	Study Area	-	-	-	-	n.a.	n.a.
Total	East Java	22,074	35,018	40,561	54,433	56,930	203,263
	Study Area						

Source: Bereau of Finance, East Java.

in the total expenditures was around 8% during that period and it has been decreasing slightly. However, per capita figures indicate East Java's position more clearly. During the first three years, per capita expenditure in East Java was Rp.3,800 and it was one of the lowest among the provinces.

One of the reasons for this low per capita expenditure may be that East Java is the most developed province except DKI Jakarta and that the Central Government allocated more resources to the less developed provinces than to East Java. Another reason can be that major public work projects have already been implemented substantially and the investment priority of East Java is lower than that of other provinces.

4.1.2 INPRES Provincial and Local Government Expenditures

Sources of the provincial development budget called as APBD DT I are provincial own resources and subsidy, INPRES DT I, which is allocated for provincial development activities by the Central Government. The amount of this budget during the Repelita II are also shown in Table 4.1. In this case, the provincial revenues from tax payers are not large; so a large part of APBD DT I is from INPRES DT I.

Other subsidies from the Central Government are program specific. They include INPRES DT II, INPRES SD, INPRES DESA, INPRES HEALTH, INPRES PASAR and INPRES GREENING. The total amount of those subsidies depends on present situations of infrastructure, the size of population, numbers of desa and some other factors. As a result, the total amount to a particular province differ significantly from other provinces. However, subsidies per capita do not differ significantly from a province to another. Table 4.1 shows APBD DT II and INPRES program budgets for East Java as a whole and for the Study Area. Among them, APBD DT II includes not only INPRES DT II but the expenditures from

kabupaten's and kotamadya's own revenues. Since the amount of kabupaten and kotamadya revenues in the Study Area is usually small, a large part of APBD DT II is mainly from INPRES DT II.

Since many investment projects were implemented especially along Brantas River during Repelita I and II, more than 40% of the investment for provincial water resource projects has been allocated to the Study Area. Even though we cannot estimate how much amount of the Central Government development expenditures has been invested exactly in the Study Area, our estimates show that the Central Government development resources allocated to the Study Area have been around 35% of the available funds.

Location of the projects by APBD DT I funds is even more difficult to identify, because many small projects and programs have been implemented beyond each regency boundry. We assume that the share of investments in the Study Area has been the same as the Study Area's population share in East Java for the following reasons:

(1) Provincial development project emphasizes more even distribution of development efforts than the Central Government project does.

(2) Since each project is small and number of projects is large, it is easier for a decision maker to allocate and distribute projects evenly to each regency.

Development expenditures which are specific to the regencies can be divided easily among respective regencies. The allocation of those development expenditures to the Study Area is shown in Table 4.1. In the table, the Study Area's share is around 25% of the provincial total in the development expenditures for this type. This percentage is larger than the population share of the Study Area.

4.1.3 Development Expenditures of the Province: A Projection

Revenues of the Central Government as well as local governments are strongly affected by the growth of gross domestic product (GDP) and the rate of inflation, since most of the tax systems in this country are progressive ones. As the first step, the Team members fix prices at the 1978 level, and then assume that GDP and GRDP of East Java grow at 6.5% and 6.8% a year, respectively. After discussing with officials in the Central Government as well as the provincial government, the Team members consider that these growth rates can be attainable without much difficulty, even though emphasis is given to the even distribution of income. Another assumption is that the shares of development budgets to East Java will be the same as those in the past. Based on the above assumptions, the development budgets available to East Java are estimated as shown in Table 4.2.

4.1.4 Development Budgets Available to the Study Area

Since major projects along Brantas River have almost completed, the share of development budgets allocated to the Study Area is expected to decline slightly unless major development projects are identified. The Team members assume that the share of the budget will decrease from 35% to 30% under Resource Alternative I (RA I) and to 31.5% under Resource Alternative (RA II). The total amounts of development budgets will be Rp.372 billion and Rp.392 billion for RA I and RA II, respectively.

But the Central, Provincial and local governments cannot use up these amounts for new projects since many on-going projects will take a large share of Repelita III development budgets. Our estimation indicates that Rp.214 billion will be spent for the on-going Central Government projects, while Rp.118 million will be spent for on-going INRPES programs and provincial and local government projects. For this reason, the amounts available for newly implemented

Table 4.2 Development Budgets Available to Jawa Timur Projection

(Unit: Rp. Million)

	1979/80	1980/81	1981/82	1982/83	1983/84	Repelita III
Central Government Development Budget (APBN)	114,800	126,280	138,908	152,799	168,078	700,866
Provincial Government Development Budget (Including Inpres DT I)	18,903	21,171	23,712	26,557	29,744	120,087
INPRES DT II	15,000 (350)	18,771 (400)	19,262 (400)	22,970 (450)	24,348 (450)	100,351
KB/KDY own Development Budget	22,520	25,222	28,249	31,639	35,435	143,065
INPRES DESA	3,357	3,357	3,861	3,861	4,440	18,876
Other INPRES	26,046	28,650	31,515	34,667	38,134	159,012
Total	200,626	223,451	245,507	272,493	300,179	1,242,256

Notes: 1/ The estimates are based on 1978 market prices.

2/ Figures in parenthesis indicate the per capita allocation.

projects during Repelita III are Rp. 40 billion and Rp. 60 million for RA I and RA II, respectively. These figures will be used in Chapter V for an economic analysis of a selected strategy.

4.2 Alternative Development Strategies with Respect to Resource Allocation within the Study Area

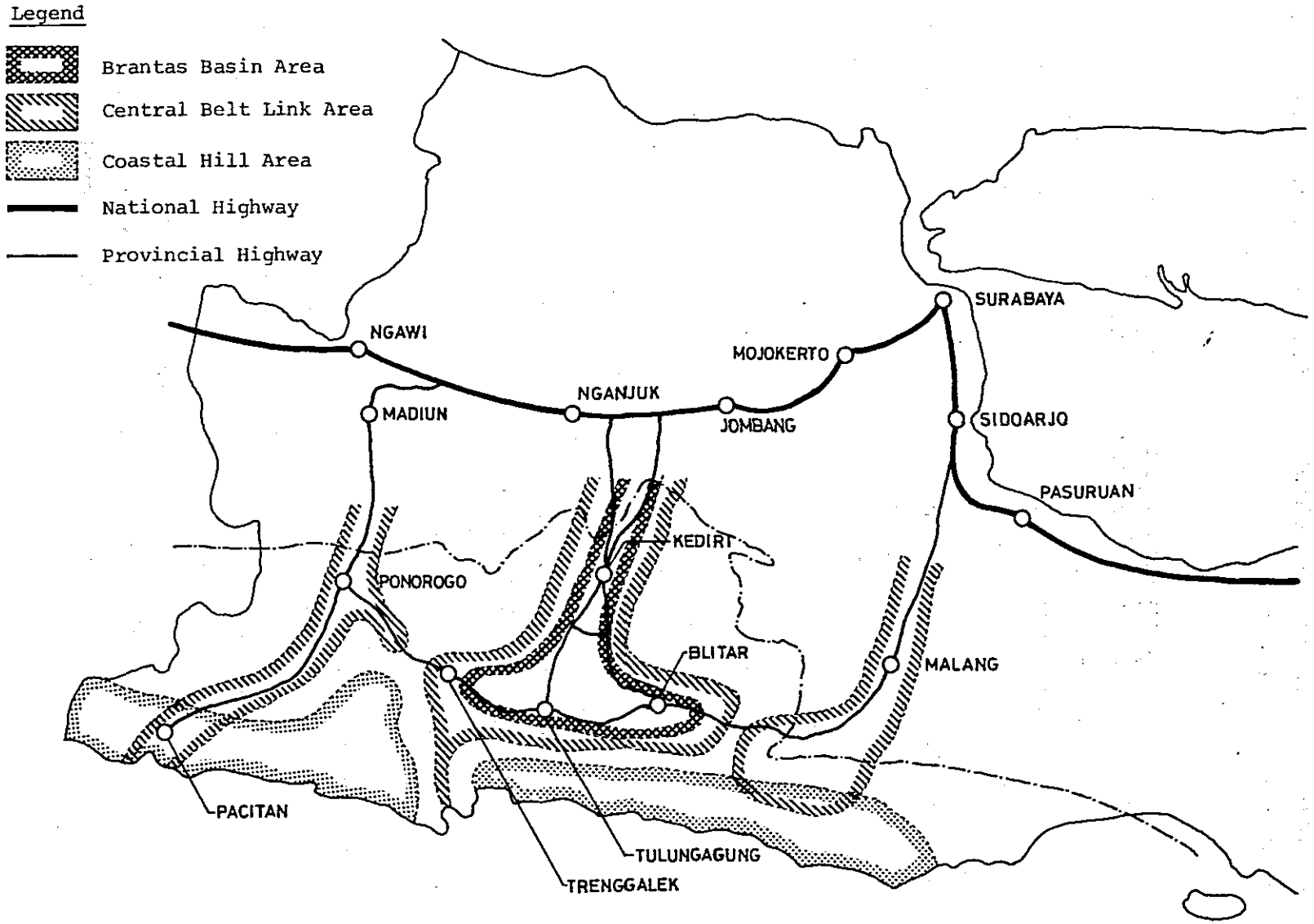
The strategies in this section is concerned with geographic distribution of resources and sectoral resource allocation. Based on the examination of the present situations and development potentials identified by the Team members, the following three alternative development strategies are formulated to attain the future pattern of development in Figure 3.2, and their priority areas are roughly defined in Figure 4.1.

4.2.1 Brantas Basin Development Strategy

Brantas Basin which extends from Blitar to Kediri through Tulungagung is a comparatively developed area in the Study Area. This Basin will continue to be the area which has the highest development potential. First of all, Kediri being its center will be the engine which will promote the growth of this Basin. Kediri possesses a large agricultural area which produces mainly paddy, coffee, tobacco, sugar and other upland crops.

A large amount of public investment has fallen in this area during the Repelita I and II period to develop productive infrastructure, especially irrigation systems, and expanded irrigated agricultural areas. In addition, several on-going irrigation projects along Brantas River will further expand irrigated agricultural areas rapidly. One of them is Lodoyo Irrigation Project which covers 13,500 ha in both Blitar and Tulungagung when it is completed in 1982. Other major on-gonig water resource development projects are:

Figure 4.1 Priority Areas of the Strategies



(1) Southern Tulungagung River Diversion Project: A flood control project on the upper reaches of Ngrowo River, diverting floods to the Indonesian Ocean through Parit Raya and Neyama Tunnel.

(2) Mt. Kelut Debris Control Works: Debris control works on the slopes and ravines of Mt. Kelut to protect rivers and reservoirs from sedimentation.

Even though this Basin has great potentials of agricultural production through the past investments, they are not being utilized fully at this moment. One way to utilize them efficiently is to construct anti-disaster facilities such as Mt. Kelut debris control works and middle reaches improvement works to protect the past investments. Another way is to promote intensive cropping systems and better water management through extension services. By these ways, productivity of paddy land in this area will be improved significantly.

Along the southern coast of the Basin, Prigi Bay could be a prospective site for new port development. Topographically, the bay is well sheltered by several heads and has a wide sand coast. The water depth is sufficiently deep for port development. Fish catch in Prigi last year amounted to about 2,500 tons averaging around Rp. 1.6 million sales a day. If fishing activities are promoted through port construction, the fishery can be an important sector to expand employment opportunities as well as to increase income in this area.

Several agricultural processing plants using agricultural produce in this area have been established in and around Kediri. They include corn oil manufacturing, gunny sack manufacturing, tobacco manufacturing, sugar processing and others. In the future, Kediri is expected to attract skill-oriented and labor intensive industries now

spreading from Surabaya and thus, it should prepare for laying foundations for basic industries by introducing and improving such industries as metal processing and mechanical engineering industries.

This alternative development strategy would be economically most efficient as compared with other alternatives, i.e., the highest economic growth can be achieved with a given amount of investment resources. The major components of public investment required for the strategy would be as follows:

(1) Investment in infrastructure including flood control systems around Mt. Kelut, a commercial and fishery port and new medium scale dams for irrigation.
(2) Investment in the industrial development.
(3) Investment in the agricultural development including an introduction of double cropping systems and extension services.

A possible adverse effect of this strategy is to widen disparities between Brantas Basin and the rest of the Study Area in the level of development. However, the above mentioned development projects will create job openings which will absorb unemployed and underemployed labor forces from the less developed section of the Study Area.

4.2.2 Coastal Hill Development Strategy

This strategy is to enhance the living standards in low income rural areas with emphasis on non-irrigated areas especially in Blitar, Pacitan, Ponorogo and Trenggalek, and to quickly attain a major objective of the present development plan, the redistribution objective. In this area, the underdeveloped areas consist of several places including the south of Brantas River in KB Malang and KB Blitar and hilly parts of KB Trenggalek, KB Ponorogo and KB Pacitan. The major problem in those areas is that

agricultural land is mainly non-irrigated dry land which can produce only cassava, corn and several kinds of beans. Other problems in those areas are difficulty in the marketing of agricultural produce and insufficient knowledge about the kinds of crops suitable to the areas. Also along the coast, there are many small fishing villages; however, due to lack of transportation systems, their markets are very limited. Therefore, when the highway and feeder road improvement is combined with appropriate extension services and development of marketing systems, the area may be able to attain higher income levels. A prototype of rural development package may consist of the following components:

(1) The small scale water resource development including exploitation of groundwater.
(2) Facilities and services which satisfy basic human needs of the people.
(3) Reforestation to protect existing and planned investments.
(4) Agricultural extension services with emphasis on farming of upland cash crops such as cassava, soy beans, groundnuts, clove and corn combined with livestock production.

The prospects for this type of rural development in those highlands are not necessarily assured. First, marginal efficiency of investment is generally small. Organizational and marketing improvements would require substantial amount of skilled manpower because the number of people involved would be enormously large. Second, a number of uncertainties have not yet been clarified in the methods of rural development. Even though fish markets are at equilibrium at present, the markets may collapse due to increased harvests with several development projects. Also an exploitation of limestone deposits required a large amount of investments and managerial skill which are not easily available in this area.

4.2.3 Central Belt Link Strategy

This strategy regards the Area as three different economic units which consist of southern Malang, Brantas Basin, and Pacitan and Ponorogo areas. By separating the Area into three economic units, this strategy will utilize their resource endowments more efficiently. Taking the advantage of easy access to other domestic markets and the agglomeration of markets existing at Surabaya and Surakarta, the strategy links up each part of the Study Area to the fairly well developed trunk highways from Surabaya to Mojokerto, Kediri, Madiun and Surakarta in the west, and from Surabaya to Malang in the south. At the same time, it is possible to connect the Study Area by means of sea transport in the Indonesia Ocean. However, this strategy is primarily concerned with linking the Study Area to the existing infrastructure in Central Belt.

To implement this strategy, better coordination of existing programs is needed for more effective development of rural areas as well as production sectors. Particular attention should be directed to strengthening rural organizations which would play a central role in development, although some priority projects should be undertaken for improving the living conditions immediately. The main advantage of this strategy is to exploit untapped resources separately through the existing infrastructure.
The necessary measures for this strategy will be as follows:

(1) Improvement of transportation systems including feeder roads.
(2) Improvement of existing small scale manufacturing industries along main provincial highways in the Study Area.
(3) Organization of effective and efficient marketing systems.

Even though this strategy has several merits compared with the other strategies, it requires a large amount of development funds to create tangible benefits. Since investment will be spread almost evently throughout three sub-areas each project will be subject to severe budget constraints and may not obtain enough funds to break through a threshold point beyond which benefits will be created.

A migration study in Central Java indicates that people in the rural areas are quite mobile. If each sub-area is linked to a larger city in Central Belt area, many people may migrate readily to the city. This strategy will reduce rural unemployment and underemployment by creating an easy access to growth centers of other parts of East Java. But at the same time, it may create congestion and urban poverty in growth centers. Thus, this strategy requires a well coordinated policy package which provides easy access to growth centers and creates employment opportunities in three sub-areas.

In view of spatial implications of three alternative strategies, the priority areas for investments under respective strategies have been defined within the areal framework as shown in Table 4.3.

Table 4.3 Development Strategy and Its Priority Area

Development Strategy	Priority Areas	Non-Priority Areas
Brantas Basin Development Strategy	DZ Kediri, DZ TTB Axis, DZ NW Hill and DZ NE Hill	DZ Ponorogo, DZ Pacitan, DZ S. Trenggalek, DZ Southern Coast, and DZ W. Malang
Coastal Hill Development Strategy	DZ Pacitan, DZ S. Trenggalek, DZ Southern Coast and DZ W. Malang	DZ Ponorogo, DZ Kediri, DZ TTM Axis, DZ NW Hill, and DZ NE Hill
Central Belt Link Strategy	DZ Ponorogo, DZ Kediri, DZ S. Trenggalek, DZ TTB Axis, DZ W. Malang DZ	DZ Pacitan, DZ NW Hill, DZ NE Hill and DZ Southern Coast

4.3 Objective Achievement of Alternative Strategies

Each of the three alternatives has specified its priority area, while sectoral programs have identified the needed actions to be taken in respective development zones, namely projects, from the viewpoint of sectoral development. Thus, the three strategies are in the form of alternative sets of projects.

Brantas Basin Development Strategy includes agricultural extension projects to be integrated with on-going water resource development projects along Brantas River and projects for promoting livestock production for urban consumers. For industrial development, skill-oriented industrial development projects such as engineering workshop and hire-purchase for large-scale agro-industries, have been proposed under this strategy. Supporting infrastructure projects include dam construction projects, road development projects, Prigi port improvement project and related infrastructure projects.

On the contrary, Coastal Hill Development Strategy includes more poverty-oriented and small-scale projects such as draft cattle breeding and sericulture projects to increase farmer's income in depressed areas, critical area rehabilitation projects to be integrated with both medium- and small-scale dam construction projects and fishery development projects for coastal villages such as credits for fishery activities and establishment of fishermen's cooperative. To support these activities and to supply basic human needs to the people in depressed areas, this strategy proposes rural water supply projects, community telephone system development projects and road development projects with an emphasis on desa road improvement.

Since its priority area overlaps those of other two strategies, Central Belt Link Strategy contains many of those proposed under either Brantas Basin Development

Strategy or Coastal Hill Development Strategy. In addition, the projects proposed in Ponorogo area are highlighted under Central Belt Link Strategy for the area is a gateway to the Study Area from Surabaya and Madiun and its potential agricultural resources have not been fully exploited yet due to the past development strategy in favor of Brantas River basins.

Table 4.4 lists up the proposed projects with their crude cost estimates, magnitude of objective achievements[1/] and locations in terms of administrative jurisdiction as well as priority and non-priority areas under respective alternative strategies. In addition to the projects in Table 4.4, some other projects are identified or suggested during the two meetings for report presentation. But their achievement of development objectives are not evaluated since their characteristics are not well known to the Team members who evaluated projects in Table 4.4. So the projects identified later are summarized in Table 4.5.

The best among three development strategies has to be selected in the light of (1) achievement of development objectives vis-a-vis (2) costs required.

In order to select the best strategy, an attempt has been made to measure the objective achievements of every project and to aggregate them into total achievement of respective alternative strategies toward objective-mix. The method used is briefly explained as follows:

(1) Quantification of achievements by each project toward respective objectives by using a scoring method. The guidelines in Table 4.6 are set to assign scores to respective projects.

1/ Method of quantification of objective achievement is described in the next paragraph.

Table 4.4 List of Proposed Programs and Projects

Sector	Code Number	Program/Project Title	Cost (Rp. Million)	Degree of Objective Contribution 1/ Weighed Average Score	Distribution 123456	Growth 123456	Location	Priority Area 2/ EBDS	CBDS	CBLS
Agriculture	A01	Southern Belt Crop Experiment Station Project	1.845	20	210011	210212	Prigi, S. Trenggalek	X		X
		Draft Cattle Breeding Promotion Program (DCBPP)	80	16.50						
	A03	Blitar DCBP	20	21	210012	210211	6 KCs, S. Blitar		X	
	A04	Tulungagung DCBP	20	15	210011	100101	5 KCs, S. Tulungagung		X	
	A05	Trenggalek DCBP	20	14	210101	110101	7 KCs, S. Trenggalek		X	X
	A06	Malang DCBP	20	16	210011	100201	5 KCs, S.W. Malang		X	X
		Beef Cattle Breeding Promotion Program (BCBPP)	80	14.00						
	A07	Blitar BCBP	20	13	210001	110111	4 KCs, N. Blitar	X		X
	A08	Tulungagung BCBP	20	16	210011	110011	7 KCs, N. Tulungagung	X		X
	A09	Trenggalek BCBP	20	13	110002	110201	4 KCs, N. Trenggalek	X		X
	A10	Malang BCBP	20	14	210001	210201	W. Malang		X	X
		Dairy Cattle Breeding Promotion Program (DYCBPP)	120	11.50						
	A11	Blitar DYCB	20	8	110001	000101	KT Blitar, N. Blitar	X		X
	A12	Tulungagung DYCBP	20	10	110001	110011	KT Tulungagung, N. Tulunggagung	X		X
	A13	Trenggalek DYCBP	20	9	110001	110100	KT Trenggalek, N. Trenggalek	X		X
	A14	Malang DYCBP	20	10	110001	110101	Sumberputjung, W. Malang		X	X
	A15	Kediri DYCBP	40	16	110012	010111	Kediri	X		X
	A16	Sericulture Pilot Project	615	14	120001	210102	Suruhwadang, S. Blitar		X	
		Irrigated Agriculture Development Program (IADP)	1.800	18.33						
	A17	Ponorogo IADP Pilot Center	600	18	210102	120012	Siman, Ponorogo		X	
	A18	Kediri IADP Pilot Center	600	20	210012	120012	Wonokerto, Kediri	X		X
	A19	Tulungagung IADP Pilot Center	600	17	210011	110012	Sukarejo, N. Tulunggung	X		X
Forestry		Critical Area Rehabilitation Program (CARP)	1.845	14.31						
	Fr01	Blitar CAR	295	19	110211	110210	S. Blitar		X	
	Fr02	Tulungagung CAR	166	16	100211	100210	S. Tulungagung		X	
	Fr03	Trenggalek CAR	221	12	100210	000200	S. Trenggalek		X	X
	Fr04	Ponorogo CAR	185	15	100211	000210	Ponorogo			X
	Fr05	West Pacitan CAR	815	13	210200	100110	Pacitan		X	
	Fr06	East Pacitan CAR	163	13	210200	100110	Pacitan		X	

(to be cont'd)

Sector	Code Number	Program/Project Title	Cost (Rp. Million)	Degree of Objective Contribution 1/ Weighed Average Score	Distribution 123456	Growth 123456	Location	Priority Area 2/ BBDS	CHDS	CBLS
Fishery		Fishing Vessel and Gear Modernization Program (FVGMP)	172	18.30						
	Fs01	Pacitan FVGM	26	22	222000	222202	KT. Pacitan, Pacitan		X	
	Fs02	Lurug FVGM	20	15	220001	020201	Lurug, S. Pacitan		X	
	Fs03	Panggul FVGM	20	17	210001	121212	Panggul, S. Trenggalek		X	X
	Fs04	Perigi FVGM	26	15	210001	220201	Prigi, S. Trenggalek	X		X
	Fs05	Popoh FVGM	20	21	210011	120202	Popoh, S. Tulungagung		X	
	Fs06	Burumum FVGM	20	19	210011	120202	Burumbun, S. Tulungagung		X	
	Fs07	Sang FVGM	20	19	210011	120202	Sang, S. Tulungagung		X	
	Fs08	Serang FVGM	20	19	210011	120202	Serang, S. Blitar		X	
	Fs09	Fishery Experiment Station Project	15	15	110002	120112	Prigi, S. Trenggalek	X		X
		Fishery Cooperative Program (FCP)	46	15.50						
	Fs10	Pacitan FC	23	16	121001	111111	KT. Pacitan, Pacitan		X	
	Fs11	Prigi FC	23	15	110002	120211	Prigi, S. Trenggalek	X		X
Mining	M01	Marble Exploitation Feasibility Study Project	62	13	210000	211201	Panggul, S. Trenggalek		X	X
Manufacturing		Metal and Engineering Workshop Program (MEWP)	189	13.80						
	I01	Tulungagung MEW, Metal	19	14	120001	121002	KT. Tulungagung, N. Tulungagung	X		X
	I02	Trenggalek MEW, Metal	19	12	110001	120012	KT. Trenggalek, N. Trenggalek	X		X
	I03	Blitar MEW, Metal	19	12	110001	120012	KT. Blitar, N. Blitar	X		X
	I04	Ponorogo MEW, Metal	19	13	110001	120022	KT. Ponorogo, Ponorogo			X
	I05	Pacitan MEW, Metal	19	14	110001	120122	KT. Pacitan, Pacitan		X	
	I06	Kediri MEW, Metal Engineering	94	14	110001	220022	KT. Kediri, Kediri	X		X
		Hire-Purchase Program for Agro-Industries (HPPAI)	90	14.98						
	I07	Tulungagung HPPAI, Coconut Oil	2	12	110001	120111	Kalidawit, N. Tulungagung	X		X
	I08	Trenggalek HPPAI, Coconut Oil	2	14	210000	220211	Panggul, S. Trenggalek		X	X
	I09	Pacitan HPPAI, Coconut Oil	2	16	210001	220211	KT. Pacitan, Pacitan		X	
	I10	Pacitan HPPAI, Rice Mill	2	18	210011	120111	Pacitan		X	
	I11	Trenggalek HPPAI Rice Mill	2	13	110011	020012	N. Trenggalek	X		X
	I12	Ponorogo HPPAI, Cassave Mill	2	19	220001	220122	KT. Ponorogo, Ponorogo			X
	I13	Pacitan HPPAI, Cassava Mill	2	16	210001	220211	KT. Pacitan, Pacitan		X	
	I14	Kediri HPPAI, Maize Mill	2	12	110001	120012	Kediri	X		X
	I15	Tulungagung HPPAI, Maize Mill	2	13	210001	120011	N. Tulungagung	X		X
	I16	Blitar HPPAI, Maize Mill	2	14	210001	220011	N. Blitar	X		X
	I17	Kediri HPPAI, Peanut Threshing	2	12	110001	120012	Kediri	X		X

(to be cont'd)

Sector	Code Number	Program/Project Title	Cost (Rp. Million)	Degree of Objective Contribution 1/ Weighed Average Score	Distribution 123456	Growth 123456	Location	Priority Area 2/ BBDS	CHDS	CBLS
Manufacturing	I18	Tulungagung HPPAI, Peanut Threshing	2	13	210001	120011	N. Tulungagung	X		X
	I19	Blitar HPPAI, Peanut Threshing	2	14	210001	120011	N. Blitar	X		X
	I20	Trenggalek HPPAI, Charcoal Making	20	16	110011	120201	S. Trenggalek		X	X
	I21	Kediri HPPAI, Charcoal Making	20	15	110010	120211	Kediri	X		X
	I22	Trenggalek HPPAI, Saw Mill	2	11	110000	220201	S. Trenggalek		X	X
	I23	Kediri HPPAI, Saw Mill	2	17	120010	120211	Kediri	X		X
	I24	Kediri HPPAI, Fruits Processing	20	14	110001	120212	Kediri	X		X
	I25	Malang Limestone Processing Project	880	16	220200	120201	Bantur, W. Malang		X	X
	I26	Tulungagung Limestone Processing Project	880	14	210001	120201	Gamping, S. Tulungagung		X	
	I27	Tulungagung Tile & Artistic Marble Manufacturing Project	30	17	220001	220201	Besole, S. Tulungagung		X	
	I28	Trenggalek Tile & Artistic Marble Manufacturing Project	30	19	220001	221202	Panggul, S. Trenggalek		X	X
	I29	Marble Tile Manufacturing Project	440	18	220001	211202	Panggul, S. Trenggalek		X	X
	I30	Ceramic Research INstitute Project	71	16	111001	120211	S. Tulungagung		X	
Water Resource Development	W01	Bagong Dam Project	4.000	17	100111	110120	Bagong, N. Trenggalek	X		X
	W02	Tugu Dam Project	500	17	100111	110120	Tugu, N. Trenggalek	X		X
	W03	Kampuk Dam Project	400	30	220221	120221	Kampuk, N. Trenggalek	X		X
	W04	Bendo Dam Project	24.000	19	110111	210121	Bendo, Ponorogo			X
	W05	Badegan Dam Project	48.000	15	110010	120121	Badegan, Ponorogo			X
	W06	Southern Coastal Basins Development Planning Project	200	30	210222	120221			X	
	W07	Tinator Dam Project	3.600	21	220110	110221	Tinator, Pacitan		X	
	W08	Lorong Dam Project	800	21	220110	110221	Lorong, Pacitan		X	
	W09	Grindle Dam Project	1,000	20	211110	110220	Grindle, Pacitan		X	
	W10	Panggul Dam Project	1,000	17	110111	110210	Panggul, S. Trenggalek		X	X
	W11	Wiringin Dam Project	1,000	18	210110	110220	Wilingi, S. Blitar		X	
	W12	Penguluran Dam Project	1,000	23	210211	110221	Penguluran, W. Malang		X	X
		Small Check Dam Development Program (SCDDP)	3.750	22.40						
	W13	West Pacitan SCDD (5 dams)	750	22	120120	110220	Pacitan		X	
	W14	East Pacitan SCDD (5 dams)	750	22	120120	110220	Pacitan		X	
	W15	Trenggalek SCDD (5 dams)	750	19	210110	020221	S. Trenggalek		X	X
	W16	Blitar SCDD (5 dams)	750	24	110221	110220	S. Blitar		X	
	W17	Malang SCDD (5 dams)	750	25	210022	100220	W. Malang		X	X
		Rural Water Supply Program (RWSP)	3.750	16.60						
	W18	West Pacitan RWS (5 systems)	750	16	110021	000110	Pacitan		X	
	W19	East Pacitan RWS (5 systems)	750	16	110021	000110	Pacitan		X	
	W20	Trenggalek RWS (5 systems)	750	15	000022	000111	S. Trenggalek		X	X

(to be cont'd)

Sector	Code Number	Program/Project Title	Cost (Rp. Million)	Degree of Objective Contribution 1/ Weighed Average Score	Distribution 123456	Growth 123456	Location	Priority Area 2/ BBDS	CHDS	CBLS
Water Resource Development	W21	Blitar RWS (5 systems)	750	18	100122	010010	S. Blitar		X	
	W22	Malang RWS (5 systems)	750	18	100122	000011	W. Malang		X	X
	W23	Prigi Water Supply Project	70	23	210022	110111	Prigi, S. Trenggalek	X		X
	W24	Pacitan River Realighnment Project	2,000	12	110110	100010	KT. Pacitan, Pacitan		X	
Port	P01	Prigi Fishing Port Improvement Project	4,182	26	221011	221221	Prigi, S. Trenggalek	X		X
	P02	Pacitan Fishing Port Feasibility Study Project	62	21	220011	121111	KT. Pacitan, Pacitan		X	
	P03	Prigi Commercial Port Feasibility Study Project	123	25	212011	212121	Prigi, S. Trenggalek	X		X
	P04	Pacitan Commercial Port Feasibility Study Project	123	22	211010	222121	KT. Pacitan, Pacitan		X	
Power	Pw01	Prigi-Tulungagung Transmission Line Development Project	500	22	220011	121121	Prigi, S. Trenggalek	X		X
	Pw07	Prigi Electrification Project	300	27	220022	021022	Prigi, S. Trenggalek	X		X
Telecommunication		Community Telephone System Development Program (CTSDP)	100	23.00						
	T01	Pacitan CTSD	50	23	112022	010011	Sudimoro, Pacitan		X	
	T02	Prigi CTSD	50	23	111022	011012	Prigi, S. Trenggalek	X		X
Road		Provincial Highway Betterment Program (PHBP)	4,160	25.30						
	R01	Ponorogo-Pacitan PHB	2,280	28	222011	222121	Pacitan		X	
	R02	Ponorogo-Trenggalek PHB	620	23	122010	222021	Ponorogo			X
	R03	Blitar-Srengat PHB	225	20	112010	222011	N. Blitar	X		X
	R04	Wlingi-Kepanjen PHB	360	20	212010	122010	W. Malang		X	X
	R05	Kepanjen-Malang PHB	265	20	212010	212010	W. Malang		X	X
	R06	Malang-Turen PHB	390	25	222011	112021	W. Malang		X	X
		Kabupaten Road Upgrading Program (KRUP)	3,192	16.95						
	R07	Bandar-Tegalombo KRU	60	24	212022	100110	Pacitan		X	
	R08	Sudimoro-Ngadirejo KRU	84	23	212021	100110	Pacitan		X	
	R09	Dongko-Karangan KRU	60	24	212011	211220	N. Trenggalek	X		X
	R10	Dongko-Panggul KRU	30	24	212011	211220	Panggul, S. Trenggalek			X
	R11	Munjungan-Kampak KRU	56	25	212021	201110	S. Trenggalek		X	X
	R12	Trenggalek-Bendungan KRU	60	22	112021	101110	N. Trenggalek	X		X
	R13	Lodoyo-Binangun KRU	108	14	101010	211020	S. Blitar		X	
	R14	Margamulyo-Panggungrejo KRU	66	21	212011	111110	S. Blitar		X	

(to be cont'd)

Sector	Code Number	Program/Project Title	Cost (Rp. Million)	Degree of Objective Contribution 1/ Weighed Average Score	Distribution 123456	Growth 123456	Location	Priority Area 2/ BBDS	CHDS	CBLS
	R15	Suruhwadang-Kademangan KRU	50	19	102021	001110	S. Blitar		X	
	R16	Bakung-Lorejo KRU	24	23	212021	001110	S. Blitar		X	
	R17	Talun-Gandusari KRU	24	11	102010	000010	N. Blitar	X		X
	R18	Kampak-Gandusari KRU	24	20	212011	101110	N. Trenggalek	X		X
	R19	Kalidawir-Pucanglaban KRU	90	18	102021	000110	S. Tulungagung		X	
	R24	Pringkuku-Pacitan KRU	60	12	102010	001010	Pacitan		X	
	R25	Mantren-Borden KRU	48	20	212020	001010	Pacitan		X	
	R26	Tegalombo-Tulakan KRU	96	16	202011	001010	Pacitan		X	
	R27	Pogalan-Rejowinangun KRU	42	8	001010	010010	N. Trenggalek	X		X
	R28	Gandusari-Durenan KRU	48	9	101010	000010	N. Trenggalek	X		X
	R29	Lodoyo-Karangah KRU	54	10	101010	010010	N. Blitar	X		X
	R30	Kesamben-Binangun KRU	48	13	101010	112010	W. Malang		X	X
	R32	Kebonagung-Walawali KRU	82	21	202021	101010	Pacitan		X	
	R33	Punung-Kalak KRU	98	20	202021	001010	Pacitan		X	
	R34	Ngadiluwih-Koripan KRU	36	22	202021	101110	Pacitan		X	
	R35	Tulakan-Slaung KRU	175	22	202021	101110	Pacitan		X	
	R36	Bandar-Ngunut KRU	36	21	201021	000110	Pacitan		X	
	R37	Ngadirejo-Tanggung KRU	35	21	221011	101120	Pacitan		X	
Road	R38	Sudimoro-Panggul KRU	66	17	2120100	001110	Pacitan		X	
	R39	Panggul-Tankil KRU	72	16	211010	010120	Panggul, S. Trenggalek		X	X
	R40	Panggul-Bongun KRU	36	19	212010	111220	Panggul, S. Trenggalek		X	X
	R41	Jombak-Sidomuljo KRU	108	13	201010	100110	N. Trenggalek	X		X
	R42	Dongko-Kampak KRU	102	14	202010	000110	S. Trenggalek		X	X
	R43	Kampak-Watulimo KRU	90	17	212010	100110	S. Trenggalek		X	X
	R44	Watulimo-Prigi KRU	60	24	212011	211121	Prigi, S. Trenggalek	X		X
	R45	Pogalon-Cori KRU	42	14	111010	200020	N. Trenggalek	X		X
	R46	Nglongsar-Pakel KRU	30	15	202010	100110	N. Trenggalek	X		X
	R47	Craken-Bendorota KRU	54	12	202021	100110	S. Trenggalek		X	X
	R48	Lorejo-Coast KRU	30	12	101011	000110	S. Blitar		X	
	R49	Sumberglagah-Watudor KRU	36	9	101010	000010	S. Blitar		X	
	R50	Panggung-Coast KRU	42	18	212010	200110	S. Blitar		X	
	R51	Bendorejo-Udanawu KRU	48	10	101010	100010	N. Tulungagung		X	
	R52	Jatilengger-Bendorejo KRU	54	10	101010	100010	N. Tulungagung	X		X
	R53	Popoh-Besole KRU	30	20	202011	210120	S. Tulungagung	X		X
	R54	Besole-Teluk Brumbun KRU	28	24	211021	210120	S. Tulungagung		X	

Sector	Code Number	Program/Project Title	Cost (Rp. Million)	Degree of Objective Contribution 1/ Weighed Average Score	Distribution 123456	Growth 123456	Location	Priority Area 2/ BBDS	CHDS	CBLS
	R55	Tanggunggunung-Kalinenur KRU	72	11	101010	001110	S. Tulungagung		X	
	R56	Kalimenur-Teluk Sene KRU	49	17	201011	210110	S. Tulungagung		X	
	R57	Pagerwojo-Bendung KRU	70	12	201010	000110	S. Tulungagung		X	
	R58	Ngadi-Doro KRU	70	19	102021	100020	Kediri	X		X
	R59	Mojo-Besuki KRU	64	19	102021	100020	Kediri	X		X
	R60	Sambirejo-Goliwan KRU	74	19	102021	100020	Kediri	X		X
	R61	Tiron-Kalimanis KRU	48	19	102021	100020	Kediri	X		X
	R62	Berbek-Blangko KRU	42	19	102021	100020	Kediri	X		X
	R63	Berbek-Sawahan KRU	98	19	102021	100020	Kediri	X		X
	R64	Pagerwojo-Bendungan KRU	60	20	202011	202110	N. Trenggalek	X		X
	Desa	Road Development Program (DRDP)	14,625	23.93						
	R80	West Pacitan DRD	2.322	27	212021	111220	Pacitan		X	
	R81	East Pacitan DRD	774	27	212021	111220	Pacitan		X	
	R82	Central & North Pacitan DRD	774	27	212021	111220	Pacitan		X	
Road	R83	Panggul DRD	750	22	212011	111120	Panggul, S. Trenggalek		X	X
	R84	Southern Trenggalek DRD.I	1.125	22	212011	111120	S. Trenggalek		X	X
	R85	Prigi DRD	375	23	212011	111121	Prigi, S. Trenggalek	X		X
	R86	Southern Trenggalek DRD.II	246	22	212011	111120	S. Trenggalek		X	X
	R87	Northern Trenggalek DRD	1.125	21	212020	001020	N. Trenggalek	X		X
	R88	Southern Tulungagung DRD.I	369	23	212020	111020	S. Tulungagung		X	
	R89	Southern Tulungagung DRD.II	246	23	212020	111020	S. Tulungagung		X	
	R90	Western Malang DRD	1.769	23	212021	010110	W. Malang		X	X
	R91	Southern Malang DRD	1.769	23	212021	010110	W. Malang		X	X
	R92	Central Ponorogo DRD	526	23	212020	100121	Ponorogo			X
	R93	Eastern Ponorogo DRD	789	23	212020	100121	Ponorogo			X
	R94	Kediri DRD	84	25	212021	111020	Kediri	X		X
	R95	Southern Blitar DRD.I	790	24	211021	011121	S. Blitar		X	
	R96	Southern Blitar DRD.II	316	24	211021	011121	S. Blitar		X	
	R97	Northern Blitar DRD	474	26	212021	111021	N. Blitar	X		X

Notes: 1/ Numbers from 1 to 6 refer to the following specific objectives:

Distribution:
1. Economic development of less developed area
2. Employment expansion
3. Urban-rural linkages
4. Environmental balance
5. Critical minimum services
6. Basic human resources development

Growth:
1. Productive/export expansion and diversification
2. Industrial modernization
3. Inter-regional linkages
4. Natural resources exploitation
5. Productive infrastructure development
6. Skilled manpower and technological development

2/ BBDS: Brantas Basin Development Strategy
CHDS: Coastal Hill Development Strategy
CBLS: Central Belt Link Strategy

Table 4.5 List of Additionally Proposed Programs and Projects

Sector	Code No.	Program/Project Title 1/	(Rp. Million)	Location	Priority Area BBDS	CHDS	CBLS
Ag.	A 02	Pacitan DCBP	20	W. Pacitan		X	
Fishery	FS12	Tulungagung CSP	126	KT. Tulungagung	X		X
	FS13	Trenggalek	126	KT. Trenggalek	X		X
	FS14	Pacitan CSP	374	KT. Pacitan		X	
Manufacturing	I 31	Pohorogo RMGP	7	KT. Ponorogo			X
	I 32	Trenggalek RMGP	7	KT. Trenggalek		X	
	I 33	Tulungagung RMGP	7	KT. Tulungagung	X		X
	I 34	Pacitan BCSP	4	KT. Pacitan		X	
	I 35	Trenggalek BCSP	4	KT. Trenggalek	X		X
	I 36	Blitar BCSP	4	KT. Blitar	X		X
Power	Pw02	Tulungagung-Trenggalek-Ponorogo TLDP	1,495	T'agung, Trenggalek, Ponorogo	X		X
	Pw03	Ponorogo-Pacitan TLDP	1,409	Ponorogo, Pacitan		X	X
	Pw04	Madiun-Ponorogo TLDP	759	Ponorogo			X
	Pw05	Wlingi-Blitar-Tulungagung TLDP	974	Blitur, T'agung	X		
	Pw06	Tulungagung-Kediri TLDP	664	T'agung, Kediri	X		
Road	R 20	Sumpung-Sumoroto KRV	72	W. Ponorogo			X
	R 21	Tenangan-Ngebel KRV	78	N. Ponorogo			X
	R 22	Pulung-Soko KRV	60	E. Ponorogo			X
	R 23	Sulaung-Ngrayun	42	S. Ponorogo			X
	R 65	Sumoroto-Pok KRV	42	N. Ponorogo			X
	R 66	Ponorogo-Kedungbanteng KRV	44	N. Ponorogo			X
	R 67	Jenangan-Kasugihan KRV	45	N. Ponorogo			X
	R 68	Ngling-Obada KRV	54	N. Ponorogo			X
	R 69	Pulang-Banaran KRV	50	E. Ponorogo			X
	R 70	Sambit-Hghndeng KRV	40	E. Ponorogo			X
	R 71	Ngrayum-G. Tumrang KRV	42	S. Ponorogo			X
	R 72	Payak-Tumpakejo KRV	100	S. Ponorogo			X
	R 73	Dampit-Tembakashi	150	S. Malang		X	
	R 74	Langurdowo-Teluk Sipelot	105	S. Malang		X	
	R 75	Tamansari-Lebaksat	60	S. Malang		X	
	R 76	Pucanglaban-Coast	49	S. Tulungagung		X	
	R 77	Katjangan-Puse	42	E. Tulungagung		X	
	R 78	Karangatatug-Ngledok	60	Tulungagung		X	
	R 79	Sendan-Penampean	54	N. Tulungagung	X		X
	R 98	Pacitan Bay Area DRD	464	Pacitan		X	
	R 99	Railroad Feasibility Study	200	The Study Area	X		X

Note: 1/ Abbreviations are the same as in Table 4.4.

Table 4.6 Score of Attainment

Score	Degree/Nature of Objective Achievement
2	- The project attains the objective concerned significantly.
	- The project is indispensable for the area concerned to attain the objective.
	- The project is urgently needed for objective achievement.
1	- The project attains the objective concerned fairly or indirectly.
	- The project is useful for the area but other alternatives are conceivable as well.
	- The project is needed but not urgently.
0	- The project hardly attains the objective concerned.
	- The project is irrelevant to the objective.
	- The project is unfeasible in the given period of time.

(2) Evaluation of the magnitude of objective achievements by multiplying scores of a project by the project cost on the assumption that scores represent per unit cost achievement of projects.

(3) Evaluation of the magnitude of achievement of alternative strategies toward respective objectives by cumulating achievements by individual projects. The results are summarized in Table 4.7.

Viability of three alternative strategy viz-a-viz the objective-mix can, then, be assessed by computing weighted average of achievement toward specific objectives. Weight assigned to each objective is shown in Chapter II: Development Objectives. The result are given in Table 4.8.

Coastal Hill Development Strategy attains distribution objective the most followed by Brantas Basin Development Strategy and Central Belt Link Strategy. To attain the growth objective, Brantas Basin Development Strategy is the best

followed by Central Belt Link Strategy and Coastal Hill Development Strategy. Consequently, Coastal Hill Development Strategy appears to be the most viable in attaining the overall objective-mix in which distribution objective is given higher priority over growth objective at respective weights of 14 and 6.

Table 4.7 Achievement of Specific Objectives by Alternative Strategies

Overall Objectives	Specific Objectives	Brantas Basin Development Strategy	Coastal Hill Development Strategy	Central Belt Link Strategy
Distribution	Economic development of less development areas	1.65	1.71	1.22
	Employment expansion	1.00	1.17	1.00
	Urban rural linkages	0.64	0.81	0.28
	Environmental balance	0.31	0.56	0.35
	Critical minimum services	1.15	1.30	1.08
	Basic human resources	0.92	0.72	0.51
Growth	Production/export expansion and diversification	1.30	0.85	1.23
	Industrial modernization	1.26	0.94	1.48
	Inter-regional linkages	0.48	0.40	0.14
	Natural resource exploitation	1.13	1.33	1.05
	Productive infrastructure development	1.74	1.47	1.86
	Skilled manpower and technological development	0.81	0.44	0.89

Table 4.8 Achievement of Overall Objectives by Alternative Strategies

Overall Objective / Strategy	Brantas Basin Development Strategy	Coastal Hill Development Strategy	Central Belt Link Strategy
Distribution	6.86	7.57	4.44
Growth	6.72	5.43	5.42
Overall objective-mix (Distribution with growth)	19.64	20.57	17.3

CHAPTER V

PROJECT PACKAGING AND PRIORITY SETTING

5.1 Project Packaging

A project will be more viable if it is packaged with other complementary or supporting projects. In the Study Area, a water resource development project obviously needs to be packaged with a critical area rehabilitation project for the sake of protecting irrigation systems from sedimentation. At the implementation stage, it is one of the effective and practical ways to coordinate and to monitor a group of projects as a package if an inter-departmental agency is given authority and/or funds to urge executing agencies to take necessary actions. In this Study, projects proposed by sectoral experts are packaged not only for these considerations but for streamlining the process of project priority setting. If projects are packaged in a proper manner before being screened, it is possible to include such projects that would otherwise be given low priority and put aside because of their insignificance as individual projects. Limited resources also warrant the projects packaged within a limited space so as to maximize agglomeration effects.

Based on the understanding that geographical space is the best platform for linking and coordinating projects, projects have been packaged in the following manner:

(1) Plotting all proposed projects (see Figure 5.1, 5.2, 5.3, 5.4 and 5.5) on one topography map

FIGURE 5.1 PROPOSED AGRICULTURAL AND FOREST PROJECTS

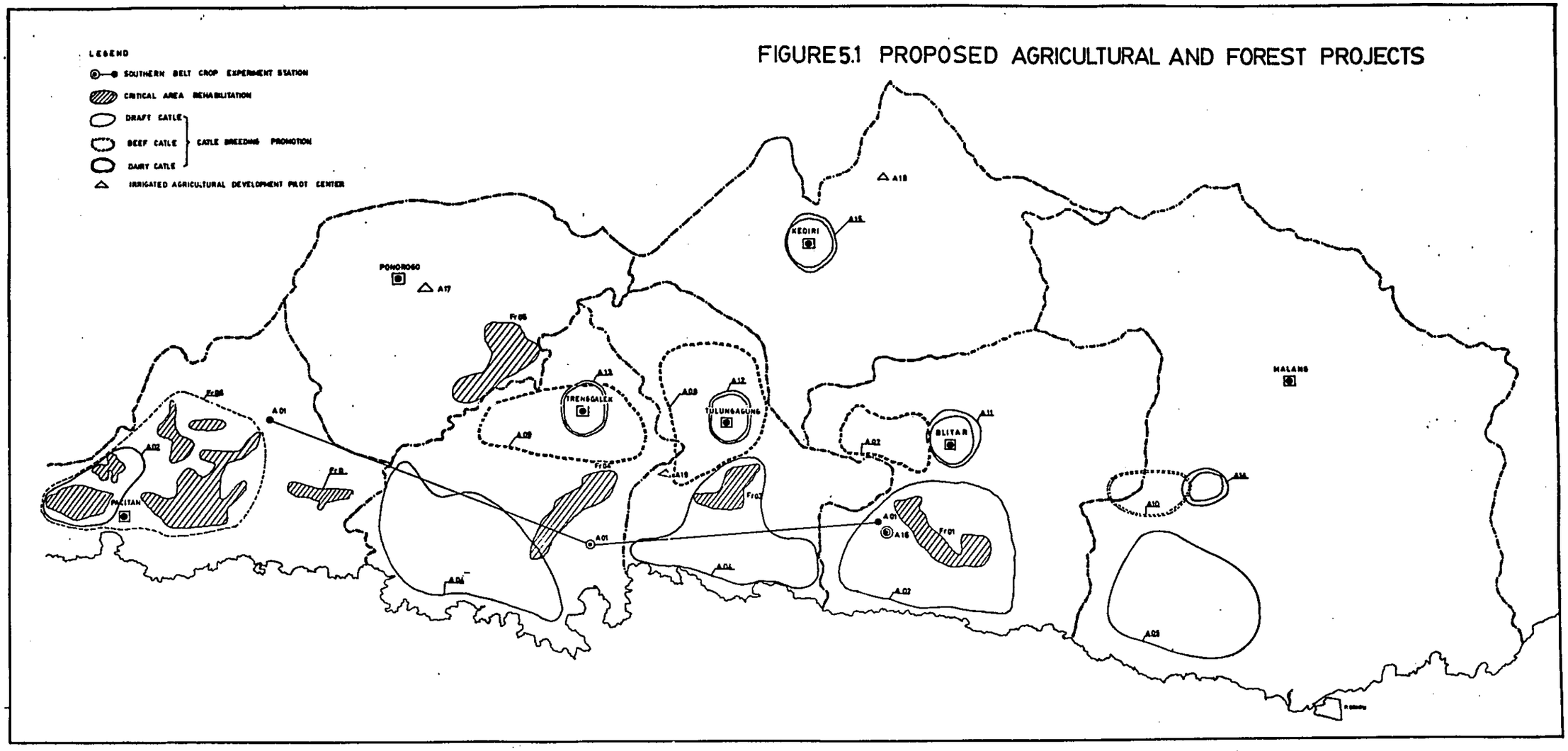


FIGURE 5.2 PROPOSED PROJECTS FOR MINING, MANUFACTURING, FISHERY, PORT, POWER AND TELECOMMUNICATION

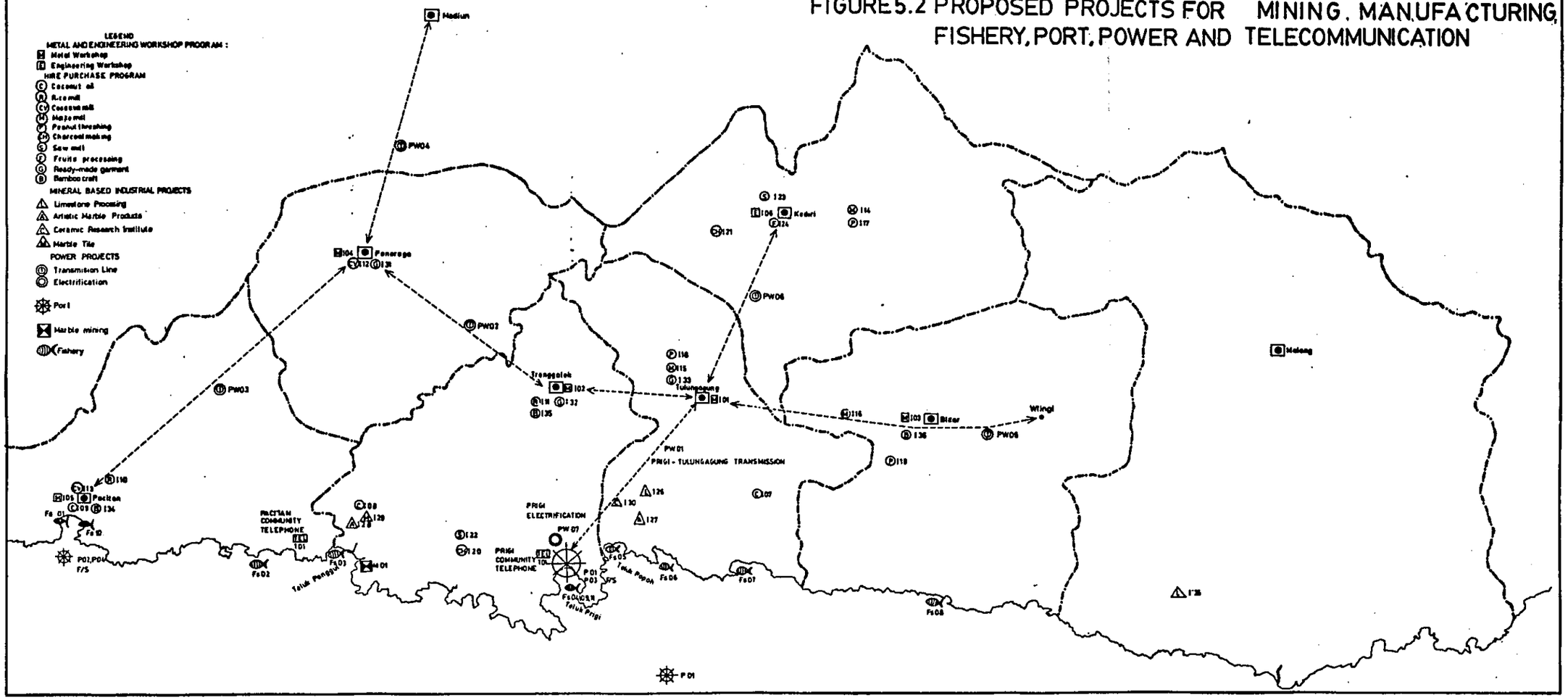


FIGURE 5.3 ON-GOING PROPOSED WATER RESOURCE DEVELOPMENT PROJECTS

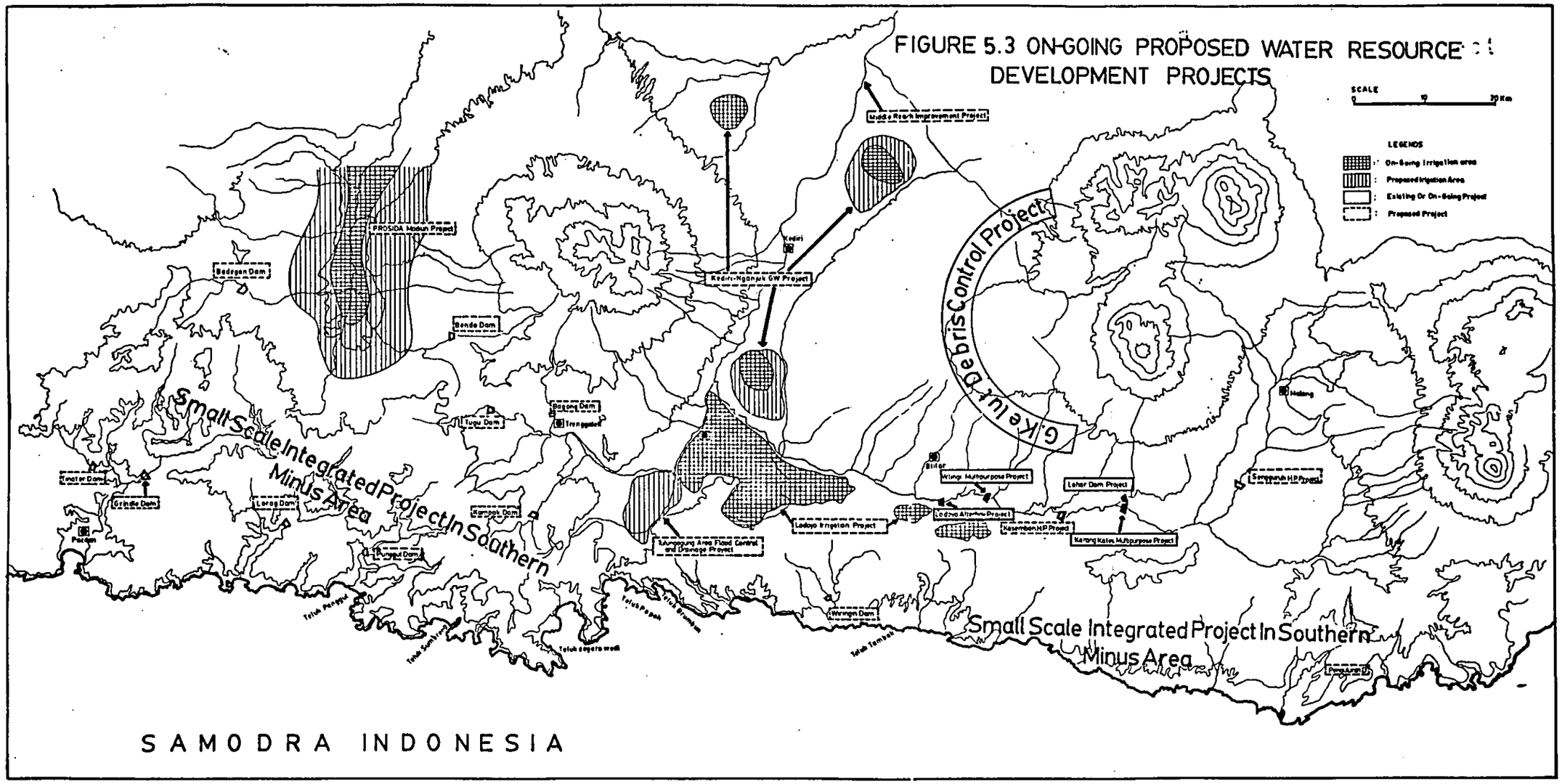


FIGURE 5.4 THE LOCATION OF HIGH PRIOLITY ROAD PROJECTS

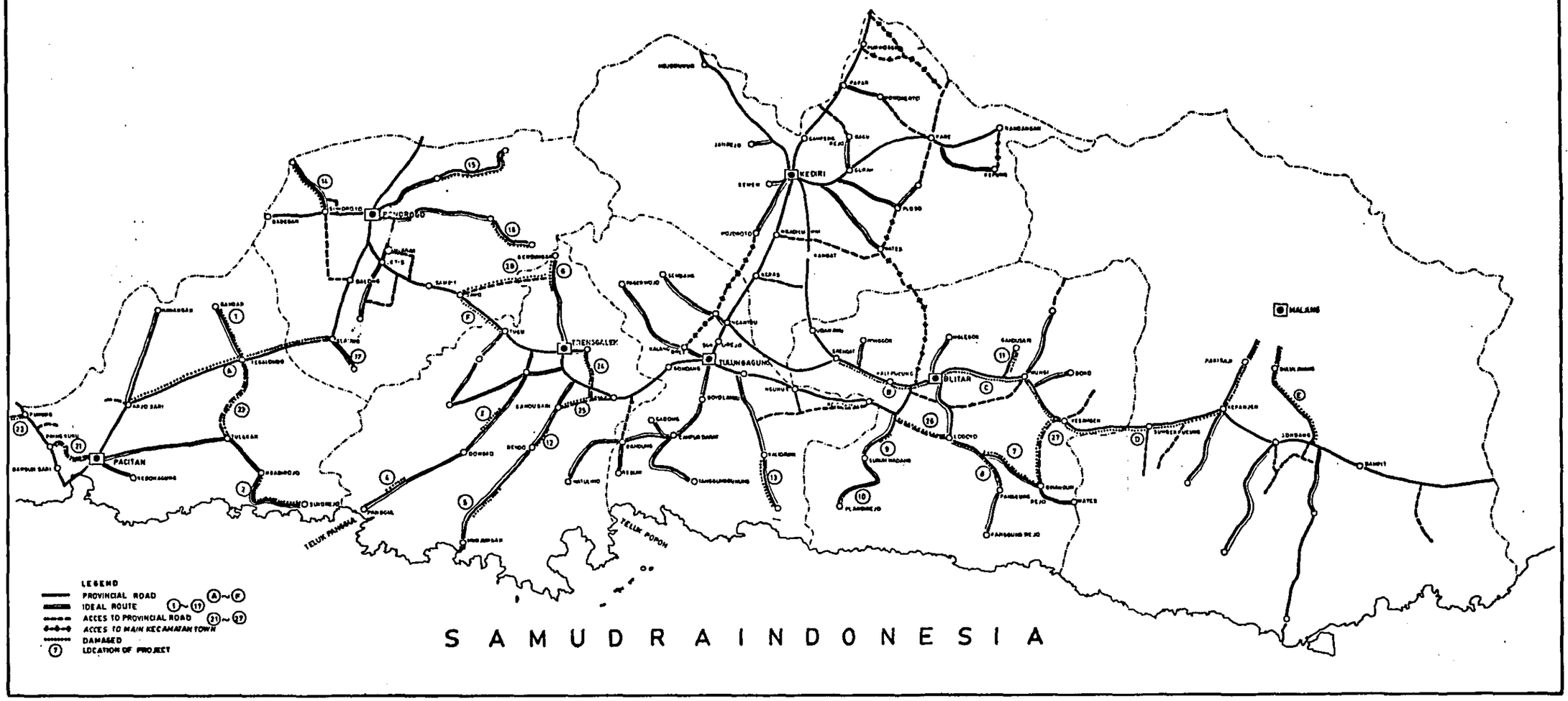
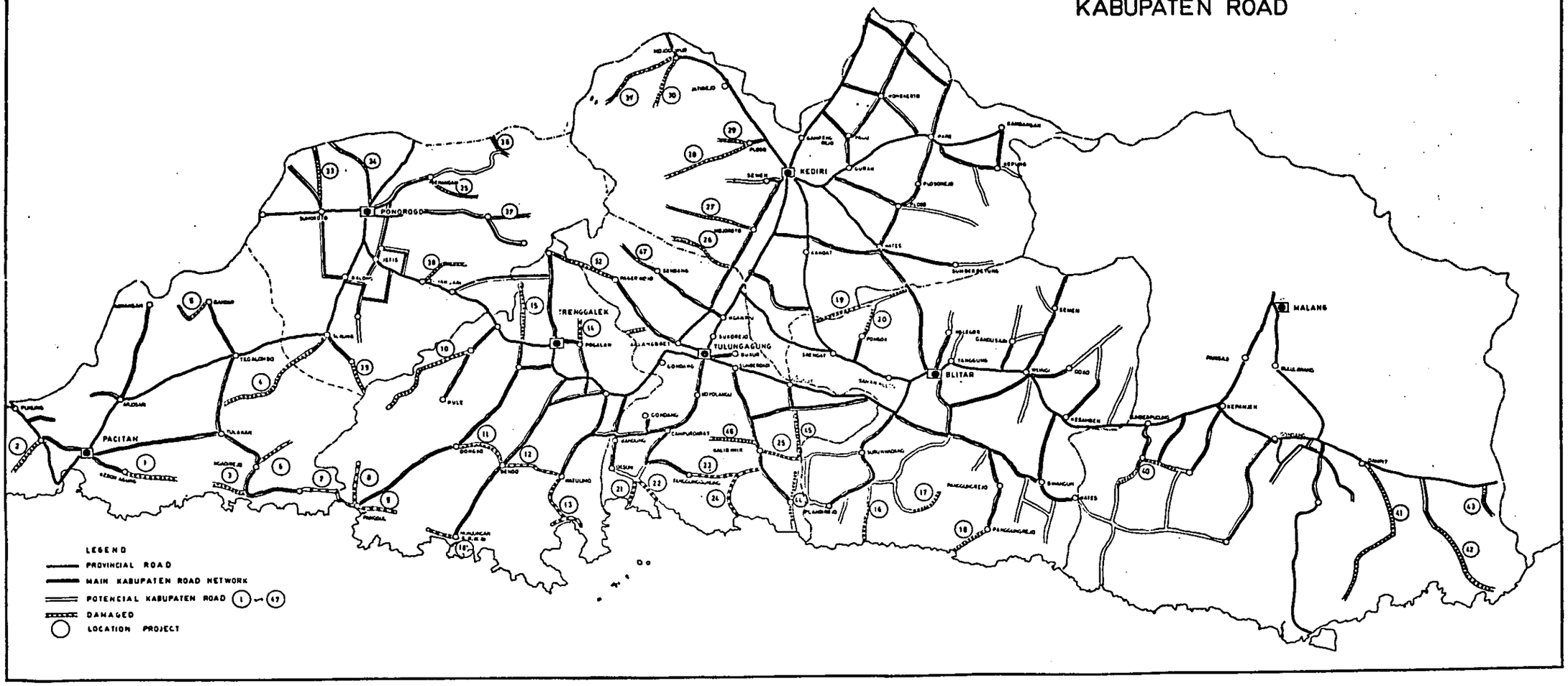


FIGURE 5.5 THE PROJECT LOCATION OF POTENCIAL KABUPATEN ROAD



of 1 to 250,000 scale and linking only those projects which have obvious complimentarities[1/] for the first-round packaging;

(2) Finding critical missing projects in the first-round project packages and adding them as new projects;

(3) Prioritizing projects, of which some are packaged already and others remain unpackaged (Method of priority setting has been described in more detail in the next section).

(4) Screening packaged and individual projects of higher priority and then repacking them taking into account spatial distribution of projects and the areal framework worked out in Chapter I: Overview.

(5) Repackaging projects after finishing the screening higher priority projects.

Table 5.1 lists up project packages emerged in the first-round packaging.

5.2 Selection of the Priority Projects

So far, this Study has proposed fourteen project packages comprising of 118 projects and 88 individual projects

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1/ The Team has employed the following criteria for complimentarity assessment:
1. Key and supporting projects, e.g., power for port.
2. Backward and forward linkages, e.g., metal workshop for fishery modernization.
3. Multiplier effects, e.g., feeder roads for newly irrigated area.
4. Protecting projects from adverse effects, e.g., critical rehabilitation for dams and irrigation canals.
5. Common use of scarce resources, e.g., small-scale irrigation and rural water supply projects.
6. Linking long- and short-run programs, e.g., a feasibility study on commercial port development at a fishing port project area.

Table 5.1 List of Project Packages: First-Round Packaging

Development Zone	Project Package Code No,	Project Package Title	Code Number of Projects Included: Ag., Forestry and Fishery	Mining and Manuf.	Water Resources	Port, Power and Telecomm.	Road
DZ Pacitan	PP01	West Pacitan Ag. and Water Resource Develop't	A02*, Fr05	I09, I10 I13	W07, W09 W13		R24, R32 R80
	PP02	Pacitan Bay Area Develop't	Fs01, Fs10 Fs14*	I05		P02, P04	R33, R98
	PP03	East Pacitan Rural Develop't	Fr06, Fs02		W14, W19	T01	R09, R34 R37, R38 R81
DZ Southern Trenggalek	PP04	Panggul Bay Area Develop't	Fs03	I01, I08 I20, I22 I28, I29	W10		R10, R36 R39, R40 R84
	PP05	S. Treuggalek Ag. and Water Resource Develop't	A05 Fr03		W15 W20		R11, R47 R86
	PP06	Prigi Bay Area Develop't	A01, Fs04 Fs09, Fs11 Fs12*, Fs13*		W23	T02, P01 P03, PW01 PW07	R44, R85
DZ Southern Coast	PP07	S. Tulungajung Mining and Manuf. Develop't		I26, I27 I30		PW05*	R53, R54 R89
	PP08	S. Blitar Ag. and Water Resource Develop't	A03, A16		W11, W16		R14, R15 R16, R48 R49, R50 R95
DZ Western Malang	PP09	W. Malang Ag. and Water Resource Develop't	A06		W17 W22		R30, R90 R72*, R73*
DZ Ponorogo	PP10	C. Ponorogo Ag. and Water Resource Develop't	A17		W05		R92
	PP11	E. Ponorogo Ag. and Water Resource Develop't	Fr04		W04		R93
DZ Kediti	PP12	C. Kediti Area Develop't	A15	I06, I14 I17, I21 I23, I24		PW06*	R94
	PP13	N. Trenggalek Ag. and Water Resource Develop't	A09 A13	I11	W01 W02		R12, R45 R46, R87
	PP14	N. Tulungagung Ag. Develop't	A08, A12 A19	I07, I15 I18			

Notes: 1/ Project codes with an asterisk mark indicate that they are not included for score calculation.

in addition. Total costs of all these projects amount to Rp.139.901 million, whereas the size of budget available for the Study Area is only Rp.56.727 million.[2/] In consequence, many proposed projects can not be implemented during the Repelita III period. The proposed projects, then, need to be given priority with a view to selecting only those to be implemented within the given period of time. Those projects which fail to be included in the final project proposal should be either kept for the next planning period or brought back to if necessary because they have been identified as needed actions to be taken for the Study Area.

Selection of the priority projects involve the following:

(1) Allocating available funds between priority and non-priority areas;
(2) Setting priority scores on project packages and projects;
(3) Arranging projects in priority order separately for priority and non-priority areas, and examining to what extent proposed projects can be accommodated in the available funds;
(4) If necessary, modifying the projects on the boundary lines of budgetary limits by adjusting project duration and size; and
(5) Determining the projects to be executed during the Repelita III period.

In allocating funds between priority and non-priority areas, three variables have been used on the assumption that investment should be allocated according to spatial distribution of potentialities such as single cropping paddy areas which can be converted into double cropping ones, upland dry land

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2/ The amount does not include the budgets for on-going projects and includes the amount of foreign currency portion which is estimated as 43% of the local currency portion.

cultivation, a main source of cash earnings for farmers and urban development activity, a key factor to trigger off the growth of the Study Area. The variables, therefore, are (1) area of single cropping paddy land, (2) area of dry land farming and (3) non-farm labor force. If it is assumed that the amount of investment required to create one additional employment in single cropping paddy area is twice as much as that in dry land cultivation area and just as much as that in urban area for the same purpose, the following formula would give the investment allocation:

$$im = (pm + \frac{1}{2}dm + um) \; / \; \Sigma(pm + \frac{1}{2}dm + um)$$

where

- im: percentage of the total investment to be made in the area m,
- pm: area of single cropping paddy (ha) in the area m,
- dm: area of dry land farming (ha) in the area m, and
- um: non-farm labor force (person) in the area m.

However, the Study has made some modifications in favor of the investment for dry land area development in consonance to the underlying idea of Coastal Hill Development Strategy selected in the last chapter. Thus the modified formula is:

$$im = (\frac{1}{2}pm + dm + \frac{1}{2}um) \; / \; \Sigma(\frac{1}{2}pm + dm + \frac{1}{2}um)$$

where respective symbols represent the same as in the previous formula.

Table 5.2 shows the proposed allocation of investments between priority and non-priority areas with population and GRDP distribution just for comparison. Breakdown of the available funds to priority and non-priority areas has been figures out as demonstrated in Table 5.3.

Table 5.2 Proposed Allocation of Investments Between Priority and Non-Priority Area, Population Distribution and GRDP Distribution

(Unit: %)

	Priority Area	Non-Priority Area	Total
Proposed Allocation of Investments	34	66	100
Population Distribution	26	74	100
GRDP Distribution	28	72	100

Source: Population and GRDP data are obtained from BAPPEDA Java Timur.

Table 5.3 Funds Available for the Projects Proposed in the Study

(Unit: Rp. Million)

	Total Area	Priority Area	Non-Priority Area
Total Local Currency Funds Available	372,000	126,000 (34%) 1/	244,000 (66%)
(a) For On-going Projects 2/	332,000	101,700	230,300
(b) For Proposed Projects	40,000	19,300	20,700
Expected Foreign Currency Funds Matching with (b) above 3/	17,143	8,271	8,872
Total Funds for Proposed Projects	57,143	27,571	29,572

Notes: 1/ Figures are derived from Table 5.2.

2/ Funds for on-going projects have been deducted from the total funds available as described in Section 3.1, Chapter IV.

3/ Expected foreign currency portion has been estimated at 43% of local currency portion (30% of the total amount of funds).

Table 5.4 shows the project packages and individual projects in priority order. Southern Coastal Basins Development Planning Project (score: 30), a research and development project and Kampak Dam Project (score: 30), a dam propsoed in northern Trenggalek appear to rank first in the priority order. Some of road development projects such as the provincial road betterment and desa road development follow these. Among the project packages, Pacitan Bay Area Development Project Package (score: 24.95) ranks first followd by Prigi Bay Area Development Package (score: 23.94). In the priority area, the available funds can cover the costs of the first 19 projects. While in non-priority area, the available funds can cover the first 9 projects. If the 10th project is included in the non-priority area, the total costs of 10 project packages and projects exceed the budget ceiling to a considerable extend due to a huge amount of investment required for Bendo Dam Porject, a component of East Ponorogo Agricultural and Water Resource Development Project Package. A part of the project implementation has to be postponed to the next planning period.

5.3 Project Proposal

After the project packages and projects with high priority being identified, they have been repackaged particularly from the views of geographical proximity and similarity (see Figure 5.6). Finally, eight area development project packages, one road development project package and three individual projects have emerged.[3/] The followings are brief descriptions on them:

3/ The project packages are put different titles from those emerged in the first-round packaging in correspondence to more diversified sector-mix in the final project packages.

Table 5.4 List of Proposed Projects in Priority Order

(Unit: Rp. Million)

Priority Order	Code Number	Title of Project or Project Package	Score	Those in Priority Area	Priority Area Cost	Priority Area Cumulative Amount	Non-Priority Area Cost	Non-Priority Area Cumulative Amount
1	W06	Southern Coastal Basins Development Planning Project	30	x	200	200		
2	W03	Kampak Dam Project	30				400	400
3	R01	Ponorogo Pacitan Provincial Highway Betterment (PHB) Project	28	x	2,280	2,480		
4	R82	Central and North Pacitan Desa Road Development (DRD) Project	27	x	774	3,254		
5	R97	Northern Blitar DRD Project	26				474	874
6	R06	Malang-Turen PHB Project	25	x	390	3,644		
7	PP02	Pacitan Bay Area Development Project Package	24.95	x	1,499	5,143		
8	R07	Bandar-Tegalombo Kabupaten Road Upgrading (KRU) Project	24	x	60	5,203		
9	R96	Southern Blitar DRD II Project	24	x	316	5,519		
10	R09	Dongko-Karangan KRU Project	24				60	934
11	PP06	Prigi Bay Area Development Project Package	23.94				7,821	8,755
12	Fr02	Tulungagung Critical Area Rehabilitation (CAR) Project	23	x	166	5,685		
13	W12	Penguluran Dam Project	23	x	1,000	6,685		
14	R89	Southern Tulungagung DRD II Project	23	x	246	6,931		
15	R91	Southern Malang DRD Project	23	x	1,796	8,727		
16	R02	Ponorogo-Trenggalek PHB Project	23				620	9,375
17	PP09	Western Malang Agriculture and Water Resource Development Project Package	22.12	x	3,587	12,314		
18	R35	Tulakan-Slahung KRU Project	22	x	175	12,489		
19	R86	Southern Trenggalek DRD II Project	22	x	245	12,735		
20	PP01	West Pacitan Agricultural and Water Resource Development Project Package	21.74	x	8,855	21,590		
21	PP03	East Pacitan Rural Development Project Package	21.10	x	2,728	24,318		
22	Fs05	Popoh Fishing Vessel and Gear Modernization (FVGM) Project	21	x	20	24,338		
23	R36	Bandar-Ngunut KRU Project	21	x	36	24,374		
24	PP08	Southern Blitar Agricultural and Water Resource Development Project Package	20.10	x	4,433	28,807		

(to be cont'd)

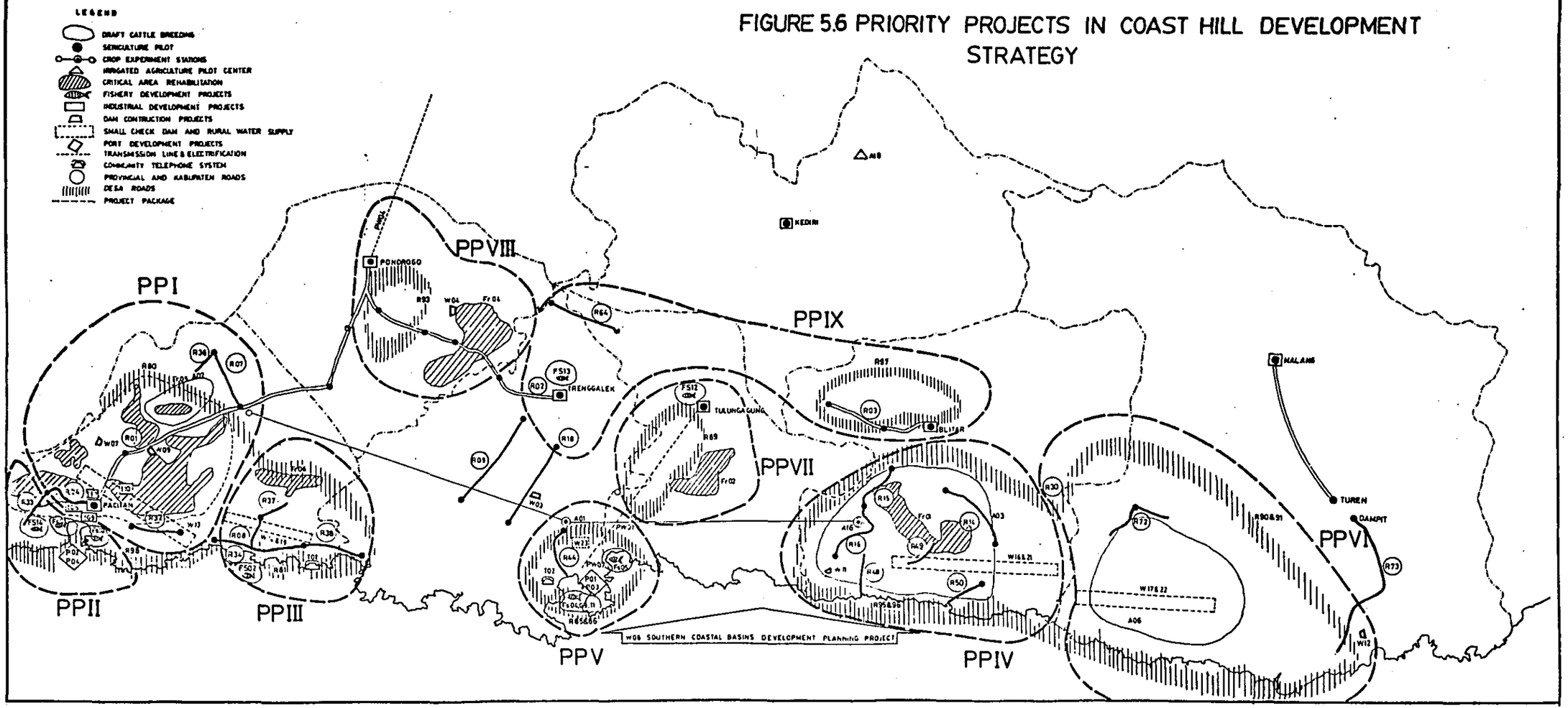
(Unit: Rp. Million)

Priority Order	Code Number	Title of Project or Project Package	Score	Those in Priority Area	Priority Area Cost	Priority Area Cumulative Amount	Non-Priority Area Cost	Non-Priority Area Cumulative Amount
25	R04	Wlingi-Kepanjen PHB Project	20	x	360	29,167		
26	R05	Kepanjen-Malang PHB Project	20	x	285	29,452		
27	R25	Mantren-Borden KRU Project	20	x	48	29,500		
28	A18	Kediri Irrigated Agriculture Development Pilot Center Project	20				600	9,975
29	R03	Blitar-Srengat PHB Project	20				225	10,200
30	R18	Kampak-Gandusari KRU Project	20				24	10,224
31	R64	Pagerwojo-Bendungan KRU Project	20				60	10,284
32	PP04	Panggul Bay Area Development Project Package	19.15	x	2,875	32,375		
33	PP11	East Ponorogo Agricultural and Water Resource Development Project Package	19.10				24,974	35,258
34	Fs06	Burumbun FVGM Project	19	x	20	32,395		
35	Fs07	Sang FVGM Project	19	x	20	32,415		
36	I12	Ponorogo Higher Purchase Program for Agro-Industry (HPPAI), Cassava Mill	19				2	35,260
37	R58	Ngadi-Doro KRU Project	19				70	35,330
38	R59	Mojo-Besuki KRU Project	19				64	35,394
39	R60	Sambirejo-Goliwan KRU Project	19				74	35,468
40	R61	Tiron-Kalimanis KRU Project	19				48	35,516
41	R62	Berhek-Blangko KRU Project	19				42	35,558
42	R63	Berhek-Sawahan KRU Project	19				98	35,656
43	R19	Kalidawair-Pucanglaban KRU Project	18	x	90	32,505		
44	PP13	Northern Trenggalek Agricultural and Water Resource Development Project Package	17.76				5,799	41,455
45	PP05	Southern Trenggalek Agricultural and Water Resource Development Project Package	17.35	x	2,206	34,709		
46	R43	Kampak-Watulimo KRU Project	17	x	90	34,799		
47	R56	Kalimenur-Teluk Sene KRU Project	17	x	49	34,848		
48	PP14	Northern Tulungagung Agricultural Development Project Package	16.71				646	42,101
49	PP07	Southern Tulungagung Mining Manufacturing Development Project Package	16.26	x	2,259	34,107		
50	I25	Malang Limestone Processing Project	16	x	880	37,987		

(to be cont'd)

Priority Order	Code Number	Title of Project or Project Package	Score	Those in Priority Area	Priority Area Cost	Priority Area Cumulative Amount	Non-Priority Area Cost	Non-Priority Area Cumulative Amount
51	R26	Tegalombo-Tulakan KRU Project	16	x	96	38,083		
52	PP10	Central Ponorogo Agricultural and Water Resource Development Project Package	15.15				49,126	91,227
53	PP12	Central Kediri Area Development Project Package	15.12				1,503	92,730
54	A04	Tulungagung Draft Cattle Breeding Promotion (DCBP) Project	15	x	20	38,108		
55	A10	Malang DCBP Project	14	x	20	38,123		
56	R13	Lodoyo-Binangun KRU Project	14	x	108	38,231		
57	R42	Dongko-Kampak KRU Project	14	x	102	38,333		
58	I01	Tulungagung Metal Workshop Project	14				19	92,749
59	I16	Blitar HPPAI, Maize Mill	14				2	92,751
60	I10	Blitar HPPAI, Peanut Thrashing	14				2	92,753
61	A07	Blitar Beef Cattle Breeding Promotion (BCBP) Project	13				20	92,773
62	I04	Ponorogo Metal Workshop Project	13				19	92,792
63	R41	Jombak-Sidomuljo KRU Project	13				108	92,900
64	W24	Pacitan River Realignment Project	12	x	2,000	40,333		
65	R57	Pagerwojo-Bendung KRU Project	12	x	70	40,403		
66	I02	Trenggalek Metal Workshop Project	12				19	92,919
67	I03	Blitar Metal Workshop Project	12				19	92,938
68	R55	Tangunggunung-Kalinenur KRU Project	11	x	72	40,475		
69	R17	Talun-Gandusari KRU Project	11				24	92,962
70	A14	Malang Dairy Cattle Breeding Promotion (DYCBP) Project	10	x	20	40,495		
71	R29	Lodoyo-Karangan KRU Project	10				54	93,016
72	R51	Bendorejo-Udanawu KRU Project	10				48	93,064
73	R52	Jatilengger-Bendorejo KRU Project	10				54	93,118
74	R28	Gandusari-Durenan KRU Project	9				48	93,166
75	A11	Blitar DYCBP Project	8				20	93,186
76	R27	Pogalan-Rejowinangun KRU Project	8				42	93,228

FIGURE 5.6 PRIORITY PROJECTS IN COAST HILL DEVELOPMENT STRATEGY



PP. I: Western Pacitan Rural Development Project Package

A. Location: Western part of Kabupaten Pacitan

B. Duration: 1979-1983[1/]

C. Score: 22.96

D. Objectives: (1) Rehabilitation of natural environment for watershed management and productive agriculture, (2) promotion of dryland agriculture, and (3) supply of basic human needs to isolated scattered settlements.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A02	Pacitan Draft Cattle Breeding Promotion Program	20
Fr05	West Pacitan Critical Area Rehabilitation	815
I09	Pacitan Hire-purchase Program for Agroindustries (HPPAI): Coconut Oil	2
I10	Pacitan HPPAI: Rice Mill	2
I13	Pacitan HPPAI: Cassava Mill	2
W07	Tinator Dam Project	3,800
W09	Grindulu Dam Project	1,000
W13	West Pacitan Saml1 Check Dam Development (five dams)	750
R01	Ponorogo-Pacitan Provincial Highway Betterment (PBH)	2,280
R24	Pringkuku-Pacitan Kabupaten Road Upgrading (KRU)	60
R32	Kebonagung-Walawali KRU	82
R36	Bandar-Ngunut KRU	36
R80	West Pacitan Desa Road Development (DRD)	1,516
R82	Central and North Pacitan DRD	774
	Total Costs	11,139

F. Related Programs: Critical Area Rehabilitation Program, Hire-Purchase Program for Agro-Industries, Small Check Dam Development Program, Rural Water Supply Program, Provincial Highway Betterment Program, and Kabupaten Road Upgrading Program and Desa Road Development Program.

1/ Only 65% of project R80 will be implemented during the 1979-83 time period due to budgetary constraints.

PP. II: Pacitan Bay Area Development Project Package

A. Location: Southeast of KT Pacitan, including Pacitan Port

B. Duration: 1979-1983

C. Score: 20.44

D. Objectives: (1) Promotion and modernization of the fishery sector in the short-run, and (2) defelopment of KT Pacitan-Pacitan Bay area as a center of economic activities in the kabupaten in the long-run.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fs01	Pacitan Fishing Vessel and Gear Modernization	26
Fs10	Pacitan Fishery Cooperative	23
Fs14	Pactian Cold Strage Project	374
I05	Pacitan Metal Engineering Workshop	19
P02	Pacitan Fishing Port Feasibility Study Project	62
P04	Pacitan Commercial Port Feasibility Study Project	123
R33	Punung-Kalak KRU	98
R98	Pacitan Bay Area DRD	464
	Total Costs	1,267

F. Related Programs: Fishery Vessel and Gear Modernization Program, Fishery Cooperative Program, Metal and Engineering Workshop Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. III: East Pacitan Rural Development Project Package

A. Location: Southeastern part of Kabupaten Pacitan

B. Duration: 1979-1983

C. Score: 21.26

D. Objectives: (1) Rehabilitation of natural environment for watershed management and agricultural production in potential areas, and (2) supply of basic human needs such as drinking water and communication facilities.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fr06	East Pacitan Critical Area Rehabilitation	163
Fs02	Luruh Fishery Vessel and Gear Modernization	20
W14	East Pacitan Small Check Dam Development (five dams)	750
W19	East Pacitan Rural Water Supply (five systems)	750
T01	Pacitan Community Telephone System Development	50
R07	Bandar-Tegalombo KRU	60
R08	Sudimoro-Ngadirejo KRU	84
R09	Dongko-Karangan KRU	60
R34	Ngadiluwih-Koripan KRU	36
R35	Tulakan-Slahung KRU	175
R37	Ngadirejo-Tanggung KRU	35
R38	Sudimoro-Panggul KRU	66
R81	East Pacitan DRD	774
	Total Costs	3,023

F. Related Programs: Critical Area Rehabilitation Program, Fishery Vessel and Gear Modernization Program, Small Check Dam Development Program, Rural Water Supply Program, Community Telephone System Development Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. IV: Southern Blitar Rural Development Project Package

A. Location: Southern part of Kabupaten Blitar

B. Duration: 1979-1983

C. Score: 19.86

D. Objectives: (1) Rehabilitation of natural environment for watershed management and agricultural production in potential areas, (2) expansion of income earning opportunities for farmers in unproductive lands through animal husbandry, sericulture, etc., and (3) supply of basic human needs such as drinking water.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A03	Blitar Draft Cattle Breeding	20
A16	Sericulture Pilot Project	615
Er01	Blitar Critical Area Rehabilitation	295
W11	Wiringin Dam Project	1,000
W16	Blitar Small Check Dam Development (five dams)	750
W21	Blitar Rural Water Supply (five systems)	750
R14	Margomulyo-Panggungrejo KRU	66
R15	Suruhwadang-Kademangan KRU	30
R16	Baking-Lorejo KRU	24
R48	Lorejo-Coast KRU	30
R49	Sumerglagah-Watudor KRU	36
R50	Panggung-Coast KRU	42
R95	Southern Blitar DRD I	790
R96	Southern Blitar DRD II	316
	Total Costs	4,764

F. Related Programs: Draft Cattle Breeding Program, Critical Area Reahbilitation Program, Small Check Dam Development Program, Rural Water Supply Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. V: Prigi Bay Area Integrated Development Project Package

A. Location: Prigi port area and its hinterlands, Kabupaten Trenggalek

B. Duration: 1979-1983[1/]

C. Score: 23.94

D. Objectives: (1) Promotion and modernization of fishery and related activities, and (2) developing Prigi Bay area as a center of urban and rural development in the kabupaten and its vicinities.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A01	Southern Belt Crop Experiment Station Project	1,845
Fs04	Prigi Fishing Vessel and Gear Modernization	26
Fs09	Fishery Experiment Station Project	15
Fs11	Prigi Fishery Cooperative	23
Fs12	Tulungagung Cold Storage Project	126
Fs13	Trenggalek Cold Storage Project	126
W23	Prigi Water Supply Project	70
P01	Prigi Fishing Port Improvement Project	4,182
P03	Prigi Commercial Port Feasibility Study Project	123
PW01	Prigi-Tulungagung Transmission Line Development Project	500
PW07	Prigi Electrification Project	300
T02	Prigi Community Telephone System	50
R44	Watulimo-Prigi Kabupaten Road Upgrading	60
R85	Prigi Desa Road Development	375
R86	Southern Trenggalek DRD II	375
	Total Costs	8,196

F. Related Programs: Fishing Vessel and Gear Modernization Program, Fishery Cooperative Program, Rural Electrification Program, Community Telephone System Development Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

1/ Only Phase I of the Project P01 will be completed by 1983 taking into account budgetary constraints and overall speed of development in the area.

PP. VI: Western Malang Rural Development Project Package

A. Location: Southeastern part of Kabupaten Malang

B. Duration: 1979-1983

C. Score: 22.66

D. Objectives: (1) Expansion and diversification of production of marketable products, (2) acceleration of interactions between the area and major urban centers of the Study Area, and (3) supply of basic human needs such as drinking water.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
A06	Malang Draft Cattle Breeding	20
W12	Penguluran Dam Project	1,000
W17	Malang Small Check Dam (five dams)	750
W22	Malang Rural Water Supply	750
R06	Malang-Turen PHB	390
R30	Kesamben-Binaugung KRU	48
R72	Pagak-Tumpakejo KRU	100
R73	Damit-Tembakasri KRU	150
R90	Western Malang DRD	1,769
R91	Southern Malang DRD	1,769
	Total Costs	6,746

F. Related Programs: Draft Cattle Breeding Program, Small Check Dam Development Program, Rural Water Supply Program, Provincial Highway Betterment Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

PP. VII: Southern Tulungagung Rural Development Project Package

A. Location: Southern part of Kabupaten Tulungagung

B. Duration: 1979-1983

C. Score: 20.21

D. Objectives: (1) Maintenance of environmental balance of the area, and (2) promotion of efficient exploitation and marketing of potential resources.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fr02	Tulungagung Critical Area Rehabilitation	166
Fs05	Popoh Fishing Vessel and Gear Modernization	20
R89	Southern Tulungagung DRD II	246
	Total Costs	432

F. Related Programs: Critical Area Rehabilitation Program, Fishing Vessel and Gear Modernization Program and Desa Road Development Program.

PP. VIII: East Ponorogo Rural Development Project Package

A. Location: Eastern part of Ponorogo

B. Duration: 1979-1983[1/]

C. Score: 19.12

D. Objectives: (1) Irrigation for extensive single cropping paddy area, (2) promotion of environmental control, erosion control in particular and (3) construction of feeder roads for agricultural production and marketing.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
Fr04	Ponorogo Critical Area Rehabilitation	185
W04	Bendo Dam Project	17,999
R93	Eastern Ponorogo DRD	789
	Total Costs	18,973

F. Related Programs: Critical Area Rehabilitation Program and Desa Road Development Program.

1/ Only 75% of porject W04 will be completed during the 1979-83 time period due to budgetary constraints.

PP. IX: Trenggalek-Tulungagung-Blitar (TTB) Axis Road Network Development Project Package

A. Location: Northern parts of Kabupaten Trenggalek, Tulungagung and Blitar.

B. Duration: 1979-1983

C. Score: 23.35

D. Objectives: (1) Acceleration of interactions among the three kabupatens by eliminating bottlenecks in existing road network and thus creation of the urban development belt extending from Kota Trenggalek through Kota Blitar as a bakcbone of developmental activities in Brantas River Basin as well as in presently lagging areas along southern coast, and (2) establishment of better accessibilities for comparatively isolated settlements within the three kabupatens.

E. Project Components:

(Unit: Rp. Million)

Code Number	Title	Crude Cost Estimates
R02	Ponorogo-Trenggalek PHB	620
R03	Blitar-Srengat PHB	225
R18	Kampak-Gandusari KRU	24
R64	Pagerwojo-Bendungan KRU	60
R97	Northern Blitar DRD	474
	Total Costs	1,403

F. Related Programs: Provincial Highway Betterment Program, Kabupaten Road Upgrading Program and Desa Road Development Program.

W06: Southern Coastal Basins Development Planning Project

A. Location: A Project office be located in the most relevant place in the southern coastal area.

B. Duration:

C. Score: 30

D. Objectives: (1) Establishment a framework for rational and effective watershed management in the whole southern coastal area, including KB Pacitan, southern KB Trenggalek, southern KB Tulungagung, southern KB Blitar and southeastern KB Malnag, and (2) formulation of a plan for integrated socio-economic development of the area.

E. Total Cost: Rp.200 million.

W03: Kampak Dam Project

A. Location: Kampak, Northern part of Kabupaten Trenggalek

B. Duration:

C. Score: 30

D. Objectives: (1) Irrigating potential single cropping paddy areas around KT Trenggalek.

E. Total Cost: Rp.400 million.

A10: Kediri Irrigated Agriculture Development Pilot Center Project

A. Location: Wonokerto, Kabupaten Kediri

B. Duration: 1979-1983

C. Score: 20

D. Objectives: (1) Full utilization of on-going and proposed groundwater irrigation systems by conducting research on the use of farm input and water management and dissemination of relevant technologies therefrom.

E. Total Cost: Rp.600 million.

5.4 Economic Evaluation of the Proposed Strategy

Before evaluating economic effects of the selected strategy, let us summarize the bases which are employed for estimating per capita income in the Study Area.

(1) Capital-output ratios of the Study Area and East Java economies are 2.5.

(2) 6.6% of existing capital stocks in the present production systems will become physically too old and be scrapped each year.

(3) The amount of private investment is assumed as a simple function of public investment. The assumed function is as follows:

$$I_{prv} = 0.663 * I_{pub}$$

where

I_{prv}: private investment, and

I_{pub}: public investment.

(4) Investment schedules in the Study Area are summarized in Table 5.5. For the projects and programs of the selected strategy, there are two sets of investment schedules, Resource Alternatives I and II. The amount of Resource Alternative II is 50% larger than that of Resource Alternative I.

(5) Population and per capita income by kabupaten and kotamadya in 1978 are estimated by the team members as shown in Table 5.6.

(6) Originally the Study Area includes a part of KB Malang. But, for analysis in this section, it is eliminated since its population and per capita income information could not be obtained.

Table 5.5 Public and Private Investment

(Unit: Rp. Billion)

		1979	1980	1981	1982	1983	Total
Resource for On-going Projects	(1) Public Investment in On-going projects	58.10	62.80	66.10	69.90	75.40	332.30
	(2) Private Investment Induced by (1)	38.32	38.60	43.63	44.79	75.88	241.22
Resource Alternative I	(3) Investment in the Proposed Projects	9.93	10.72	11.27	11.94	12.87	56.73
	(4) Private Investment Induced by (3)	6.58	7.10	7.47	7.91	8.52	35.58
	(5) (1)+(2)+(3)+(4)	112.93	119.22	128.47	134.54	172.67	665.83
Resource Alternative II	(6) Investment in the Proposed Projects	14.90	16.08	16.91	17.92	19.31	85.12
	(7) Private Investment Induced by (6)	9.87	10.65	11.21	11.87	12.78	56.38
	(8) (1)+(2)+(6)+(7)	121.19	128.13	137.85	144.48	183.37	715.02

Source: All figures are estimated by the Team members.

Table 5.6 Population and Per Capita Income in 1978 by KB/KDY

KB/KDY (1)	Population (2)	Share of Population (%) (3)	Per Capita Income (Rp) (4)	(4) Area Per Capita Income (5)
KB Ponorogo	768,828	15.3	57,414	0.83
KB Pacitan	476,821	9.5	53,333	0.77
KB Kediri	1,156,795	23.0	78,259	1.13
KB Blitar	1,003,329	20.0	64,023	0.93
KB Tulungagung	806,253	16.0	76,177	1.10
KB Trenggalek	545,514	10.9	68,065	0.98
KDY Blitar	70,153	1.4	81,532	1.18
KDY Kediri	198,499	3.9	97,062	1.40
Total	5,026,192	100.0	69,190	1.00

Sources: 1. Population figures are obtained from BAPPEDA, JATIM.

2. Income figures are estimated on the basis of information from BAPPEDA, JATIM by the Team members.

First, under Resource Alternative I, per capita income increases due to the public investment in on-going projects and the private investment induced by it. The public and private investments of this type are shown on rows (1) and (2) in Table 5.5. For five years during the Repelita III period, the total public and private investments will amount to Rp.332.3 and Rp.241.22 billion, respectively. Per capita income produced by this type of investment is estimated in Table 5.7. Average per capita income in the Area will increase by Rp.14,030, from Rp.69,190 to Rp.83,220, but the sizes of increase are not even. The largest increase is in KDY Blitar followed by KDY Kediri, while the lowest increase is in KB Pacitan. This result indicates that the income gap between the largest and the smallest income kabupatens in the Study Area will widen through the further investment in the on-going projects.

Table 5.7 Per Capita Income in 1983 Created by the Public Investment in On-going Projects

KB/KDY		Per Capita Income (Rp)	Ratio to the Area Average
KB	Ponorogo	67,993	0.82
KB	Pacitan	63,074	0.76
KB	Kediri	95,161	1.14
KB	Blitar	76,355	0.92
KB	Tulungagung	91,544	1.10
KB	Trenggalek	81,697	0.98
KDY	Blitar	104,000	1.25
KDY	Kediri	119,487	1.44
	Average	83,220	1.00

Source: All figures are estimated by the Team members.

The public investment based on the selected strategy will be done as shown on row (3) in Table 5.5. And the private investment induced by it is shown on row (4) in the same table. During next five years, the investments in the proposed projects amount to Rp.56.73 billion, while the induced private investment amounts to Rp.21.6 billion. Distribution of the public investment among kabupatens and kotamadyas are shown on column (2) in Table 5.8. Figures in column (4) are incremental per capita income produced by the projects and programs in the selected strategy, while those in column (6) are per capita income produced by the public investments in on-going projects as well as projects in the selected strategy. Since the selected strategy allocates large amounts of available investable resources to least developed parts of the Study Area, the largest income increase will be created in Pacitan followed by Ponorogo and Trenggalek.

Table 5.8 Per Capita Income Created by the Selected Strategy

KB/KDY	Share of Investment (%)		Population in 1983	Incremental Per Capita Income (Rp)		Per Capita Income (Rp)		Ratio to Area Average	
	RA I	RA II		RA I	RA II	RA I	RA II	RA I	RA II
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
KB Ponorogo	30.7	31.4	796,212	12,693	22,315	80,686	90,308	0,90	0.95
KB Pacitan	34.2	21.6	494,380	22,774	24,413	85,848	87,487	0.96	0.92
KB Kediri	1.3	0.7	1,196,920	358	358	95,519	95,519	1.07	1.01
KB Blitar	10.4	5.5	1,040,800	3,290	3,450	79,645	79,994	0.89	0.85
KB Tulungagung	1.8	7.3	832,640	712	4,899	92,256	96,443	1.04	1.02
KB Trenggalek	19.6	31.8	567,236	11,374	31,325	93,071	113,022	1.05	1.20
KDY Blitar	1.0	0.5	72,856	4,516	4,516	108,516	108,516	1.21	1.15
KDY Kediri	1.0	1.3	202,956	1,621	3,579	121,108	123,066	1.35	1.31
Total or Average	100.0	100.0	5,204,000	6,354	9,609	89,546	94,165	1.00	1.00

Source: All figures are estimated by the Team members.

Note: 1. RA I and RA II indicate Resource Alternatives I and II, respectively.

Column (9) indicates ratios of kabupaten and kotamadya per capita incomes to the Area's average per capita income. A comparison of the figures in this column with those in column (5) in Table 5.6 reveals that the selected strategy closes the income gap between the lowest and the highest per capita incomes significantly. In 1978, the lowest per capita income is Rp.53,333 in KB Pacitan, whereas the highest one is Rp.97,062 in KDY Kediri. The ratio of the lowest per capita income to the highest one is 0.55. If the selected strategy is taken during the Repelita III period, the lowest per capita income will be Rp.79,645 in KB Blitar, whereas the highest one will be Rp.121,108 in KDY Kediri. The ratio of the lowest per capita income to the highest one will be 0.66. As the result of the strategy, the ratio will be improved by 22% and Pacitan's per capita income will increase by Rp.32,515, from Rp.53,333 to Rp.85,848 and then move up to the third lowest position from the lowest one.

The strategy will affect East Java economy slightly, while its effects on Indonesian economy will be almost nil. In Table 5.9, estimated gross product, population and per capita income created by the strategy are shown for Indonesia as a whole, East Java and the Study Area. Due to per capita income differences among the three economies, population movement is still expected to continue from the Study Area to the outside. Per capita income in the Study Area is 47% of the national level in 1979, while it will be 48% of the national per capita income in 1983. Improvement of per capita income in the Study Area in this sense is not remarkable partly due to the smallness of investable funds available for this strategy.

Table 5.9 Estimated Gross Product, Population and Per Capita Income Induced by the Strategy

	1979	1980	1981	1982	1983	1984	1985	Growth Rate (%)
Gross Product (Rp. Billion)								
Indonesia	22,207	23,651	25,188	26,825	28,569	30,426	32,404	6.50
East Java	3,000	3,204	3,422	3,655	3,903	4,168	4,452	6.81
Study Area	369	391	415	440	466	494	524	6.07
Population (1,000)								
Indonesia	144,912	147,955	151,062	154,235	157,473	160,780	164,157	2.10
East Java	28,000	28,490	28,989	29,496	30,012	30,537	31,072	1.75
Study Area	5,061	5,096	5,132	5,168	5,204	5,241	5,277	0.69
Per Capita Income (Rp)								
Indonesia	153,245 (100)	159,853	166,739	173,923	181,422 (100)	189,240	197,396 (100)	4.31
East Java	107,143 (70)	112,468	118,058	123,925	130,084 (72)	136,549	143,336 (73)	4.97
Study Area	72,857 (48)	76,718	80,784	85,066	89,574 (49)	94,322	99,321 (50)	5.30

Notes: 1. All figures are estimated by the Team members.

2. Figures in parentheses are ratios of respective per capita income relative to Indonesia per capita income.

If the public investment for the strategy is done on the basis of Resource Alternative II, effects of the investment on per capita income will be as shown in Table 5.10. Since the amount of investment in this strategy is still very small in comparison to that of the national investment, the effect of this strategy is nil on per capita income of Indonesia. But per capita incomes in the Study Area and East Java are affected tangibly and ratios of the Study Area and East Java per capita incomes to Indonesian one increase by 3% and 1% from Resource Alternative I investment schedule, respectively.

The relative position of the Study Area will improve anyway either with Resource Alternative I or II investment schedule. And also the economic position of lower income kabupatens in the Study Area improve significantly. However, the some reversal in income per capita between the lower per capita income and higher per capita income kabupatens can be considered excessive for the purpose of improving inter-kabupaten income disparity in Resource Alternative II. It would be better to reduce investable resource allocation to the Study Area to Resource Alternative I level and reallocate the rest to the other potential parts of East Java. In this way, a faster growth can be achieved while improving the distributional equity.

Table 5.10 Estimated Per Capita Income

	1979	1980	1981	1982	1983	1984	1985	Growth Rate (%)
Indonesia	153,245 (100)	159,853	166,739	173,923	181,422 (100)	189,240	197,396 (100)	4.31
East Java	107,378 (70)	112,962	118,835	125,015	131,516 (73)	138,355	145,549 (74)	5.00
Study Area	73,334 (48)	78,064	83,099	88,459	94,165 (52)	100,239	106,704 (54)	6.45

Notes: 1. All figures are estimated by the Team members.

2. Figures in parentheses are ratios of respective per capita income relative to Indonesian per capita income.

CHAPTER VI

RECOMMENDATIONS FOR IMPLEMENTATING THE SELECTED DEVELOPMENT STRATEGY 1979/80-1983/84

In Chapter IV, the Team members selected Coastal Hill Development Strategy as the best among the three development strategies in the Study Area. In the strategy, the priority area is DZ Pacitan, DZ Southern Trenggalek, DZ Southern Coast and DZ West Malang, whereas the non-priority area is DZ Ponorogo, DZ Kediri, DZ TTB Axis, DZ Northwest Hill and DZ Northeast Hill. In Chapter V, the selected strategy ahs been translated into a number of project packages with their priorities. For their effective implementation, this Chapter examines and recommends several measures including a feasibility study and desirable institutinal arrangements.

6.1 Recommended Development Projects

6.1.1 Recommended Projects

The main development projects which are recommended by the Team members are summarized in order of their priorities in Table 6.1. These development projects should receive immediate and special attention of both the Central and local governments in the priority order since the projects are

Table 6.1 Priority Projects, Their Follow-up Measures and Major Sectors for Follow-up

(Unit: Rp. Million)

	Project/Project Package	Cost	Score	Study for Planning	PFS or FS	Research or Development Through Foreign Grants	Implementation Through Commercial Funds
W06	Southern Coastal Basin Development Planning	200	30.00	Water resource development			
W03	Kampak Dam Project	400	30.00				Dam rehabilitation
PPV	Prigi Bay Area Integrated	8,196	23.94		Fishery port improvement FS Community telephone system PFS		
PPIX	TTB Axis Road Network Development Project Package	1,403	23.35				Provincial highway betterment including access roads
PPI	Western Pacitan Rural Development Project Package	11,139	22.90	Water resource development	Provincial highway betterment PFS		
PPVI	Western Malang Rural Development Project Package	6,746	22.66	Water resource development			Provincial highway betterment including access roads
PPIII	East Pacitan Rural Development Package	3,023	21.26	Water resource development	Community telephone system PFS		
PPII	Pacitan Bay Area Development Project Package	1,267	20.44		Fishery port PFS		
PPVII	Southern Tulungagung Rural Development Project Package	432	20.21	Critical area rehabilitation			
A7	Kediri Irrigated Agriculture Pilot Center Project	600	20.00			Agricultural pilot center	
PPIV	Southern Blitar Rural Development Project Package	4,764	19.86	Water resource development		Sericulture pilot center	
PPVIII	East Ponorogo Rural Development Project Package	18,973	19.12	Water resource development			

addressed to the most critical development needs of the Study

(1) Achievement of more equitable income through creation of greater employment opportunities,
(2) Provision of basic human needs to the people in the less developed areas, and
(3) Maintenance of moderate economic growth to attain a high standard of living of the people as a whole.

In order to meet development needs of the Study Area effectively, concerted efforts are called for among the various government agencies concerned, as these efforts must be coordinated both inter-sectorally and inter-areally.

6.1.2 Recommended Projects and Their Follow-up Measures

Immediately following the completion of this report, several follow-up measures should be conducted in order to pave the way for implementation of the recommended projects. To classify the proposed projects into several follow-up measures, the Team took into account (1) the present level of technical and economic data availability, (2) know-how, costs and the amount of investment required for project implementation, and (3) the magnitude of financial risks involved for each project. In addition, the Team also evaluated average scores of projects by sector such as agriculture, fishery and water resources to identify which types of individual project have higher priority among the projects as shown in Table 6.2.

The scores of port, roads, power and community telephone system, and water resources are significantly higher than those of agriculture, forestry, fishery and manufacturing. This priority order indicates that the lack of investment in infrastructure has created higher social demand for it. On the basis of the above reasoning, the Team selected follow-up measures as indicated in Table 6.1.

Table 6.2 Priority Scores by Sector

Sector	Priority Score
Agriculture & Forestry	17.57
Fishery	17.12
Manufacturing	15.29
Port	25.62
Road	24.74
Power & Telecommunication	23.37
Water	23.11
Weighted Average	23.24

6.1.3 Projects Needed Special Attention Immediately

Among the projects listed in Table 6.1, two project packages need immediate special attention since their amounts of investment required are large and some of projects in the packages are already planned for implementation based on a short-run projection. They are the Western Pacitan Rural Development Project Package (PPI) and the Prigi Bay Integrated Development Package (PPV).

Code No.	Title	Major Area Contained
PPI	Western Pacitan Rural Development Project Package	KB Pacitan
PPV	Prigi Vay Integrated Development Project Package	Southern and Central KB Trenggalek

In Western Pacitan Rural Development Project Package, the projects aims at (1) rehabilitating natural environment for watershed management and higher agricultural production,

(2) promoting dry land agriculture and (3) providing basic human needs such as drinking water and access roads for isolated scattered settlements. In addition, projects, Ponorogo-Pacitan provincial highway betterment projects, in this package will connect Pacitan area with Central Belt through Ponorogo by improving a provincial highway.

Although many projects are included in each sector as shown in Table 6.3, there is a core project in it. It is the planning project in the water resource sector, whereas it is Ponorogo-Pacitan provincial highway betterment project in the land transport sector. Each follow-up measure should sharply aim at a selective core project and consider other projects as a part or supporting projects of it. With the core projects, two concrete follow-up measures emerge from this Project Package, the southern coastal basin development planning study and the Ponorogo-Pacitan provincial highway betterment prefeasibility study.

Table 6.3 Development Sectors in Western Pacitan Rural Development Project Package

Sector	Instruments
Water Resources and Related Items	Tinator Dam Project
	Grindulu Dam Project
	West Pacitan Small Check Dam Development (five dams)
	West Pacitan Rural Water Supply (five dams)
	West Pacitan Critical Area Rehabilitation
	Southern Coastal Basin Development Planning Project
Land Transport	Ponorogo-Pacitan Provincial Highway Betterment
	Pringkuku-Pacitan Kabupaten Road Upgrading
	Kebonagung-Walawali Kabupaten Road Upgrading
	West Pacitan Desa Road Development
	Central and Northern Pacitan Desa Road Development

In Prigi Bay Area Integrated Development Project Package, the projects aim at (1) promoting and modernizing the fishery sector and related activities, and (2) developing Prigi Bay area as a center of urban and rural development in KB Trenggalek and its vicinities. In addition, the southern belt crop experiment station project which aims at identifying better dry land cropping systems is in this project package.

The four sectors to be studied in this package are summarized as in Table 6.4. Immediate development efforts in this Package should concentrate on the Prigi fishing port improvement project and include other projects, the Prigi electrification project, the Prigi community telephone system and the road upgrading projects, as supporting projects. The southern belt crop experiment station project can be started somewhat later since it has to be based on a very long-run perspective.

Table 6.4 Development Sectors in Prigi Bay Area Integrated Development Project Package

Sector	Instruments
Fishery	Prigi Fishing Vessel and Gear Modernization Fishery Experiment Station Project Prigi Fishery Cooperative Prigi Fishing Port Improvement Project
Power	Prigi-Tulungagung Transmission Line Development Project Prigi Eelctrification Project Prigi Community Telephone System
Land Transport	Watulimo-Prigi Kabupaten Road Upgrading Prigi Desa Road Development
Agriculture	Southern Belt Crop Experiment Station Project

6.1.4 Immediate Action Needed

Since some of the projects in the Packages are already under implementation and they are based on a short-run projection, a prefeasibility study for the projects should be started immediately for designing and coordinating development activities in the Study Area. It will examine natural conditions of project

areas carefully, select the best among several alternatives, estimate benefits and costs at the prefeasibility (feasibility for one project) level and prepare necessary materials for feasibility studies. In it, the following four subjects should be included.

(1) Prigi fishing port improvement project (at the feasibility study level) including Watulimo-Prigi kabupaten road upgrading project and planning of Prigi commercial port,

(2) Prigi electrification project with Prigi community telephone system project,

(3) Ponorogo-Pacitan provincial highway betterment project including Pringkuku-Pacitan and Kebonagung-Walawali kabupaten roads upgrading projects, and

(4) West Pacitan small check dams development project along Tinatar and Brungkah Rivers.

The above prefeasibility (including some feasibility) study will be undertaken by an expatriate expert team which is supported by a counterpart team of Indonesian nationals. Required man-months for it are estimated as shown in Table 6.5 and the required cost for it will amount to US$400,000 approximately.

Table 6.5 Man-months for the Prefeasibility Study

(Unit: Man-month)

Expert	Expatriate Team	Counterpart Team
1. Project Manager	4	4
2. Water Resource Planner	4	4
3. Water Resource Engineer	3	3
4. Transport Planner	3	3
5. Transport Engineer	3	3
6. Port Planner	3	3
7. Port Engineer	3	3
8. Fishery Engineer	2	2
9. Electric Engineer	3	3
10. Electronics Engineer	2	2
11. Soil Engineer	3	3
12. Economic & Financial Analyst	5	5
13. Draftsman	2	0
14. One Special Consultant	1	0
Total	41	38

6.2 Recommendation for Development Administration

Projects proposed in this Study may not be implemented effectively without proper institutional arrangements and viable machineries for planning and implementation. Since this Study has identified projects mostly in the form of package, a package approach is recommended for their implementation as well. Several attemps have been made for implementing projects as packages, including Provincial Development Program (PDP) innitiated by the Ministry of Interior with assistnace from USAID.

PDP started October 20, 1978, with the prupose of developing the least developed areas in an integrated manner. Two pilot projects are underway in North Sumatra and West Java. Projects under the PDP are mostly of small-scale. Under PDP, initial project proposals are made by kecamatan or desa and submitted to BAPPEMKA for review and ocmpilation and then to BAPPEDA for preliminary screening. BAPPEDA sends priority projects to the inter-ministrial steering committee established for PDP at the national level. The steering committee finally decides the projects to be implemented and send the project proposals to the donor institution (USAID). Then the donor institution provides, on reimbursement basis, the necessary funds straight to bupati or provincial governor thorugh the Bank of Indonesia and Bank Rakyat Indonesia. The bupati or provincial ogvernor is appointed as project officer of all the projects under PDP. He is authorized not only to receive funds directly from funding institutions and disburse them but to monitor and direct all implementation activities.

There are common as well as different natures observed in PDP and project packages proposed in this Study. Both stress inter-sectoral and -departmental coordinations at planning and implementation stages. Also, many small-scale projects are involved in both. PDP seems to aim at not only efficient implementation but strengthening of autonomy and administrative capabilities of local governments. Efficient

implementation of the project packages also requires active participation and strong administrative capabilities of local governments.

However, whereas PDP is designed mainly for small-scale projects which can be planned and implemented by local governments at the lowest level, the project packages involve a number of large-scale projects which can be implemented only by the national government. Moreover, large- and small-scale projects are often complementary each other within project packages. Another difference is that in the project packages physical infrastructures are the dominant components and they are packaged from the viewpoint mainly of inter-sectoral linkages and spatial integration while PDP seems to involve various types of activities, including training, institution building and development of physical infrastructure and an emphasis seems to be given to the packaging of activities of different types.

From the examinations above, several basic principles can be derived for framework relevant to implementation of project packages. First, for one project package, a strong planning, implementing and coordinating body needs to be established at some intermediate level between national and kecamatan/desa levels. Second, planning and evaluation should be done by that body in an integrated and iterative manner but clear division of works in implementation should be made between the national executing bodies which are in change of large-scale projects of national or regional importance and the provincial executing bodies or those at lower levels which are in charge of small-scale projects of provincial or local importance. This is essential in the sense that large- and small-scale projects need to be linked effectively and that project package approach should be fit in the current institutional set-up. Third, institutional and financial system for the project packages should be designed primarily for ensuring quick and effective implementation of physical infrastructure of both large and small-scale.

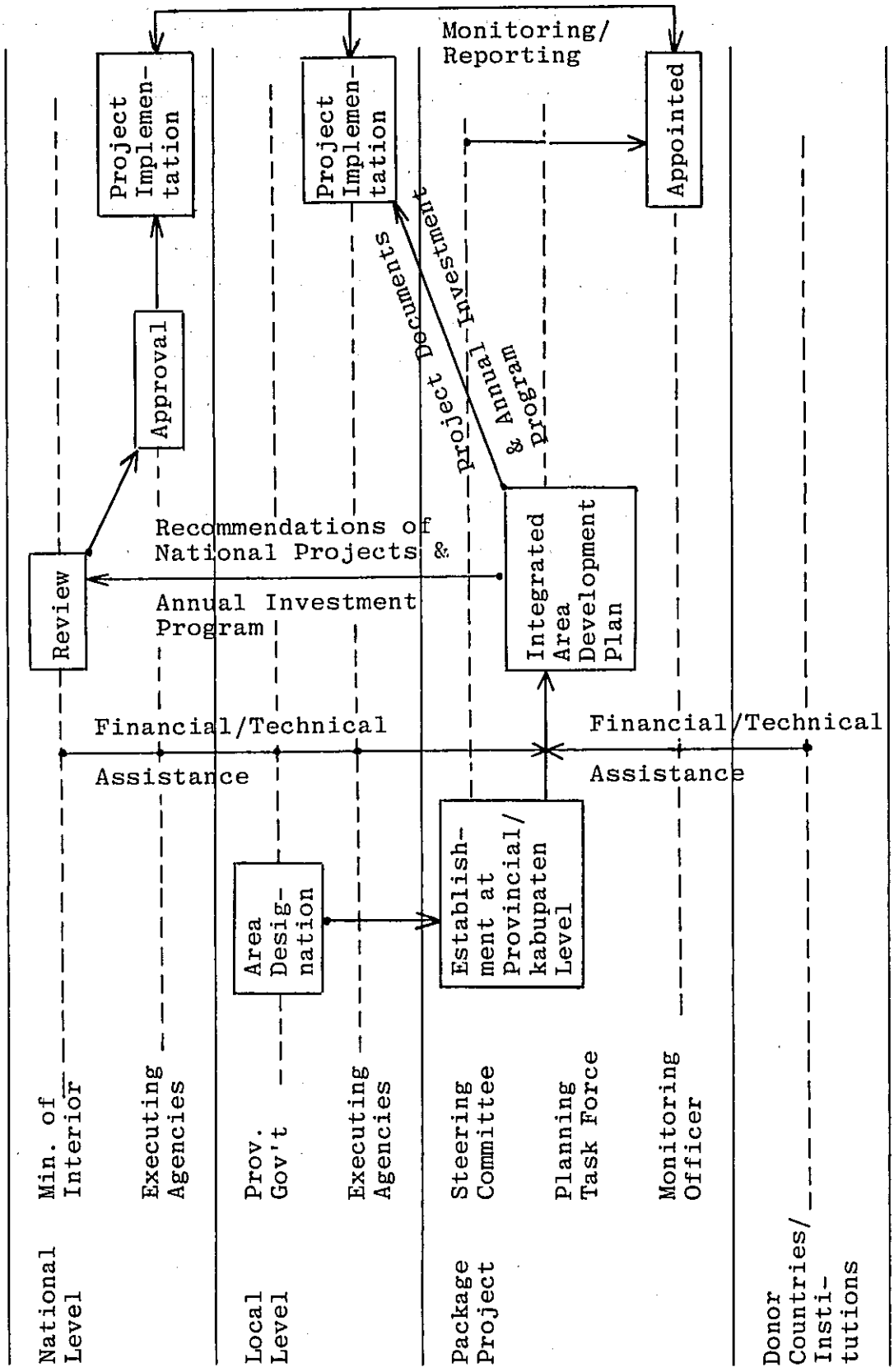
Keeping these principles in mind, the Team recommends the following arrangements be considered for implementation of the project packages. Flows of procedures are schematically shown in Figure 6.1.

(1) The areas for implementation of project packages should be designated by the provincial government after reviewing potential projects to be implemented as packages including those being proposed in this Study and consulting with the governmental agencies and people concerned.

(2) For each designated area, steering committees should be set up at either provincial or kabupaten level depending on magnitude and complexity of the project packages. They are responsible for planning and post-evaluation of project packages, monitoring of project implementation and financial contribution to executing agencies. A steering committee is constituted by the Provincial government, kabupaten governments concerned, line departments concerned at provincial and kabupaten levels and representatives from the private sector in the designated area. It is chaired by either provincial governor or bupati.

(3) Under each steering committee, planning task forces should be organized to technically backstop decision making activities of the steering committee. Members of the task force includes planners and experts from provincial and kabupaten governments and line departments at various levels. In order to attract capable planners and experts to the task forces and to further develop their capabilities, some financial and technical inputs may be required, including foreign assistance.

Figure 6.1 Flows of Procedures for Project Package Implementation



(4) A steering committee should first prepare the plan for integrated development of the designated area and propose the projects of two types, namely national projects and other projects. National projects are to be recommended for line ministries at the national level for implementation. Other projects including provincial, kabupaten, kecamatan and desa are to be identified as those to be implemented by local governments at respective levels under the supervision of the steering committee. When national projects are recommended, the steering committee should identify what kinds of and how much benefits are expected to be generated directly for the people in the designated area.

(5) National projects are to be implemented by line ministries at the central level subject to their project approval.

(6) Other projects are to be implemented by any of province, kabupaten, kecamatan and desa. At the same time, the steering committee appoints the provincial governor or bupati as project monitoring officer. Its responsibilities are to monitor implementation activities and to report their progress to the heads of local governments as well as line departments involved.

(7) As for funding, the vital role of the steering committee is to make contributions to executing agencies regardless of national and others. The steering committee should first prepare annual investment program with breakdown of the expenditures to be born by respective executing agencies and those for which contributions are made by the steering

committee. It should also have a breakdown of domestic and foreign currency portions for the respective categories of expenditures. The annual investment program should be submitted to the Ministry of Interior for its approval through relevant channels including BAPPEDA.

(8) As to the domestic currency portion to be born by executing agencies, the Ministry of Interior should sent the annual investment program to respective executing agencies in charge. The actual disbursement is subject to the decisions by executing agencies in case of national project and not in case of other projects.

(9) The amount of domestic currency portion to be contributed by the steering committee should immediately be allocated straight to the steering committee by the Ministry of Interior.

(10) A quite similar arrangement can be conceived for disbursement of foreign currency portions by donor countries/institutions with the Ministry of Interior as single channel of request and the Bank of Indonesia as single channel of disbursement.

P A R T II

CHAPTER VII

AGRICULTURE

7.1 Introduction

In the Study Area, agricultural land per agricultural household is slightly larger than the provincial average despite its mountainous feature. Favorable rainfall is an advantage to grow dry land crops (polowijo) extensively even on the steep slopes. From land use pattern (see Table 7.1), the Area can be roughly classified into four zones, (1) the lowland paddy zone, (2) the coastal hill dry crop zone, (3) the western hill dry crop zone, and (4) the central hill tree crop zone. The profile of each zone can be better understood when stated according to the classification as follows.

7.1.1 Lowland Paddy Zone

This zone which roughly consists of DZ TTB Axis and DZ Ponorogo is the highly productive paddy area. Also some places where double cropping of paddy is not practiced produce polowijo crops in the dry season. The problems of the zone are identified as (1) extremely small land holding, (2) limited irrigation facilities, (3) high ground water level, (4) occasional floods, and (5) reluctancy of the poorer farmers towards technological changes.

Table 7.1 Land Use of Southern Belt, 1977

	Total Land (1)	Agricultural Land (2)	Agricultural Land Ratio; (2)/(1)x100 (3)	Agricultural Land/Agri-cultural Household (4)	Gross Cultivated Land (5)	Intensity: (5)/(2)x100 (6)	Critical Land (7)
JATIM	4,792,200	2,954,975	61.66	0.67			170,977
South Belt	759,813	584,044	76.87	0.7	565,561	96.83	135,869
Ponorogo	133,738	104,900	78.44	0.9	110,325	105.17	13,831
Pacitan	133,058	127,695	95.97	1.2	105,682	82.76	71,492
Kediri	136,885	116,087	84.81	0.5	127,413	109.76	1,372
Blitar	160,392	112,726	70.28	0.7	121,060	107.40	22,419
Tulungagung	105,022	64,661	61.57	0.5	54,118	83.70	10,511
Trenggalek	161,295	58,025	45.61	0.7	49,463	80.94	16,244

	Critical Land Ratio; (7)/(1)x100 (8)	Sawah (9)	Sawah Tanda Hujan (10)	Tegal Land (11)	Forest (12)	Homestead Land (13)
JATIM	3.6	1,169,289	277,178	1,249,083	1,214,060	689,827
South Belt	18	163,360	23,190	266,556	132,681	146,469
Ponorogo	10	35,842	4,561	48,842	28,783	20,466
Pacitan	54	14,875	8,481	91,891	1,967	20,927
Kediri	1	46,350	2,904	35,588	n.a.	35,424
Blitar	14	32,126	983	42,015	30,875	30,568
Tulungagung	10	19,434	2,687	19,073	36,487	24,879
Trenggalek	13	14,673	3,574	29,147	61,368	14,205

Source: Laporan Tahunan 1977, Dinas Pertanian, JATIM.

Since the soil is mainly the most fertile alluvial one, there is still a good potentiality in paddy production through the following measures.

(1) Constructing more technical irrigation as well as drainage systems in addition to dredging rivers to prevent floods and to lower ground water levels. Ground water tapping is hopeful in the most areas of this zone.

(2) More intensive extension services for better water management, plant protection and post harvest loss prevention which are the must for further crop intensification.

Potentials are also found in the geographical characteristics of the zone whose draw of population from surrounding hilly areas for industrialization provides good markets for vegetable, fruits and livestock products.

7.1.2 Coastal Hill Dry Crop Zone

This zone is almost the same as DZ S. Coast and it is relatively thinly populated limestone area where soil is poor and includes vast land called "critical land." Land fertility is being lost by the continuous mono-cropping. Moreover the top soil is washed away by the heavy rain. A soil conservation method with multiple cropping is being introduced by the governmental programs but the number of extension workers as well as their facilities are not sufficient and a majority of farmers are left untouched. However, the potentiality is not absent since the zone has vast land and the farmers' land holding are larger than their counterparts of the lowland. Some rivers can be utilized for irrigation through construction of small multipurpose dams.

Although experimental data are not enough, there are some indications that a certain kind of trees, teak for

instance, can grow very well in limestone areas. Since a mulberry tree can generally grow well on alkali soil, there is a possibility of starting a pilot scheme of sericulture which will provide the local farmers much needed cash incomes as well as employment opportunities for rural underemployed, especially for women. The potentials of the zone are summarized as follows:

(1) Forestation and tree crop plantation on critical land,
(2) Improvement of land productivity through land conservation and intensification of polowijo crops through multiple cropping,
(3) Strengthening of extension and experiment activities,
(4) Small irrigation scheme, and
(5) Sericulture.

7.1.3 Western Hill Dry Crop Zone

This zone includes most areas of DZ Pacitan, DZ Trenggalek and the southern hilly part of Ponorogo. It represents terrace farming areas mixed with tree crops and also extensive critical land areas due to excessive cultivation on the steep slope land. The problems are mostly the same as described in 7.1.2, even though its soil and topography differ from the coastal hilly dry crop zone. In addition, there is a problem of marketing of cash crops. This zone, Pacitan and Trenggalek for instance, produces about 70% of total clove production of East Java and Pacitan has 25% of coconut trees of the Study Area. Besides, it produces the largest per capita production of fruits in East Java. The potentials in this zone are as follows in addition to the five points stated in 7.1.2.

(1) Development of farmers' marketing cooperatives particularly for coconuts and spice products.
(2) Paddy cultivation on terrace with small irrigation systems.

7.1.4 Central Hill Tree Crop Zone

This zone is almost identical with DZ NW Hill and DZ NE Hill. It has thick forests and extensive tree crop plantations, and the farmers are generally richer than in other zones.

The zone is relatively problem free except occasional floods of the small streams from Mt. Kelut. The scope of development lies in the field of tree crops, of which new varieties can be well introduced for trials. Since its location is close to the large markets of Kediri-Tulungagung-Blitar area, vegetables and fruits cultivation as well as animal husbandry are also considered to have a good potentiality.

7.2 Development Strategies and Instruments

7.2.1 Development of Growth Potentials

As mentioned above the Study Area has many potentials in agriculture as driving forces for regional development. When the economic growth keeps the same pace as now, the huge demand for superior foods, which may be currentry thought unlikely to appear, may come out while the traditional main food of rice remains ever important. Development planning will have to prepare to meet the changing demand and lead thus the farmers gradually to specialize in profitable crops to increase their income. Here several measures for development are identified as follows:

(1) Intensification of paddy cultivation in wet land through the measures described in 7.1.1,
(2) Intensification of polowijo crops in the dry crop zones,
(3) Development of horticulture in the suburban areas of growing urban centers,

(4) Promotion of dairy beef and poultry production, and

(5) Increasing draft cattles among the small land holders in lowland paddy zone where double crop paddy field is expanding.

Among these, measures (1) and (2) are regarded as good ones also for attaining the equity objective since unintensive paddy area such as single crop paddy area and also dry crop area are less productive and the farmers there are poorer. Measures (3), (4) and (5) can be for attaining the equity objective when the poorer farmers are given priority during implementation of the measures.

7.2.2 Improvement of Equity

At present selective measures for the lowland and for the hilly dry land are recommended to improve the equity among the farmers of Study Area. The following measures are considered to be effective for the lowland area.

(1) Distribution of cattles to the farmers near markets in the scope of providing them with extra income earning opportunities from beet and milk production.

(2) Construction and improvement of irrigation and drainage systems in ill-equipped parts of irrigated areas.

(3) Extension of intensive farming methods such as vegetable and flower cultivation.

Measures (1) and (3) will provide additional employment opportunities for many of the underemployed small holders and landless peasants within their own farms or their own communities, while measure (2) will be benefitial for all the farmers in the project areas. It will also attain an improvement in equity since the farmers in the area of poor irrigation facilities are generally poorer than those in the areas of good irrigation and/or drainage facilities.

For the hilly dry land, the following measures are considered to be important.

(1) All sort of rehabilitation measures of the critical land.
(2) Small irrigation scheme.
(3) Intensification of polowijo crop production.
(4) Horticultural development especially of tree crops.
(5) Sericultural development to exploit the potentials of the limestone area.
(6) Promotion of the use of draft cattle to intensify polowijo farming.

All the six measures are useful for improvement of equity because the hilly dry crop zones is generally less productive and the farmers are poorer than those of the lowland. And uplifting the zones as a whole will not widen the income gap in the zones for the land is more evenly distributed than in the lowland.

7.2.3 Conservation of Environment

Eighty percent of East Java's total critical land which amounts to 136,000 ha needs some land conservation measures. Above all, Pacitan has the largest 71,000 ha and the critical land area is increasing despites of regreening efforts by the government. This barren steep land does not hold rain water at all, and keeps sending the top soil down to the vallies, filling up dams and raising riverbeds. For this critical land, the following instruments are counted.

(1) Reforestation for timber production and conservation.
(2) Regreening by planting trees for timber and horticultural production as well as soil conservation purpose. While trees are still small, dry land crops should be planted between the trees.

(3) Land conservation to stop erosion and also to make slope land available for farming.

7.3 Development Programs and Projects

7.3.1 Intensification of Paddy Production

There are following measures which should be implemented for intensification of paddy production.

(1) Construction of large and small dams and tube-wells for irrigation and drainage facilities down to the minor channels (measures are identified in the Chapter XI: 11.2 and 11.4).

(2) Promotion of extension service activities especially for better water management, plant protection and prevention of post harvest losses.

(3) Establishment of marketing cooperatives equipped with driers, hullers and milling machines.

The beneficiaries are owners in the lowland paddy zone where single crop paddy field can be converted into double crop paddy field (for example in DZ TTB Axis). The tenants and landless laborers can also benefit from increased land productivity and expanded employment opportunities in extended paddy cultivation. Among the three measures the priority should be given in the above order.

7.3.2 Intensification of Polowijo Crops and Selection of Alternative Crops

The following measures are the most important and a priority is given in this order.

(1) Expansion of experiment works on the best suited crops and cropping systems in each locality.

(2) Strengthening extension services for the recommended cropping systems.
(3) Rehabilitation of the low productivity land through land conservation measures.

These are essential for the majority of farmers in the hilly dry crop zones to increase their income.

7.3.3 Critical Land Rehabilitation

Since it is considered to be difficult for land owners to invest in reforestation, the government should take some measures to encourage land owners for reforestation. One of the measures for the government is to plant trees on private and desa lands besides activities of Dinas Forestry on government land and share profits with the land owners after trees are cut down and sold. Another measure for the government is to pay a certain amount of money every year until trees are sold just like paying rent to the owners. Also from horticultural point of view, more fruit and spice plants should be distributed since the demand for them is much higher than the currently distributed ones. Land conservation in terms of terrace building is important but usually the cost is much higher than the subsidy of Rp.16,250/ha currently given to farmers. To spped up the rate of terrace building, raising the amount of the subsidies is required. Thus the measures for regreening are as follows:

(1) Increasing the distribution of the seedlings which have larger demand from the land owners,
(2) Raising the amount of subsidies for terrace building to accelerate the speed of the activity, and
(3) Experimental works to study the kinds of trees and the method of planting in relation to each local conditions to prevent plants from failing to grow.

The priorities should be given to the first one for the immediate implementation. The last one takes time but it is important as a precondition for success in the whole project. The benefit of this is generally distributed to all the inhabitants in the same catchment area but specifically for the hard working small holders of the critical land in least privileged area.

7.3.4 Horticulture Development

There is a growing demand for vegetables, fruits and a certain kind of tree crops and there exist vast land for planting trees. Also vegetables and fruits are recommended to be planted close to the large markets such as Kediri and other lowland areas. Effective measures are as follows:

(1) Distribution of seeds and seedlings among the farmers at the subsidized prices,
(2) Subsidies for planting trees, and
(3) Credits for establishing processing units of fruit juice, jam and other fruits-based industrial products.

The priorities should be given to measures (1) and (2). Measure (3) has to be preceded by a study on market situations and technical viabilities. This project will benefit small but hardworking farmers who live close to large markets.

7.3.5 Livestock Promotion

To fill the gap between demand and supply in most of livestock products is essential in the long term planning. And the following measures are considered to be effective for closing the gap:

(1) Cattle fattening promotion through a profit sharing system,
(2) Dairy farming promotion through credits and intensive extension services,

(3) Promotion of large scale poultry farms thorugh credits and intensive extension services,

(4) Construction and upgrading of slaughter houses at major markets,

(5) Processing units of dairy milk for sterilization and packing at major markets, and

(6) Manufacturing plants of poultry feed at good locations near the markets.

Most of the measures are beneficial for relatively richer farmers who have better access to know-how, credit and institutional assistance to start raising animals, but cattle fattening is small holder-oriented since it is labor intensive and requires little initial investment.

In addition, the following program is thought to be useful since it has two or three fold effects not only on meat production but also on drafts capability and compost production.

(7) Distribution of draft cattle among cattleless farmers in the lowland paddy zone as well as in the dry crop zones.

The last measure will help the poorer farmers exploit their limited land resource more fully.

7.4 Recommended Projects

7.4.1 Cropping System Development Project

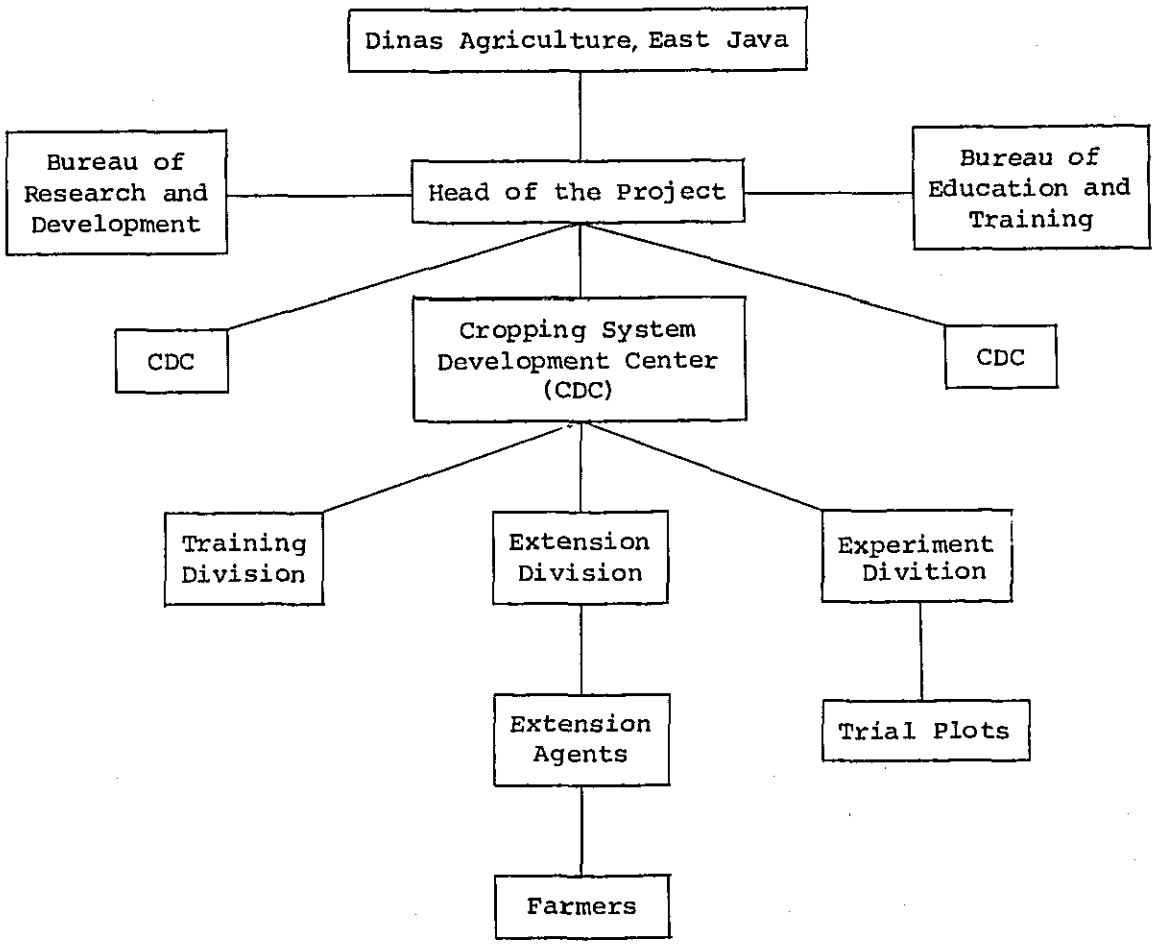
To study and identify the best suited cropping systems in each major agro-climatic areas in the dry crop zones, cropping system development centers are set up. They will have the divisions of experiment, extension and training and will function as cores for modernization of agriculture in the region.

Provincial Dinas Agriculture executes the project. A head of the project is assigned to be responsible for the

activities of all the centers. He is advised by the bureaus of extension and training, and of research and development. The organization of the project is shown in Figure 7.1.

Locations:	Trenggalek, southern Blitar and northern Pacitan.
Project duration:	5 years from 1980 to 1984.
Costs:	US$3,000,000.

Figure 7.1 Organization Chart of the Project



7.4.2 Critical Land Rehabilitation Project

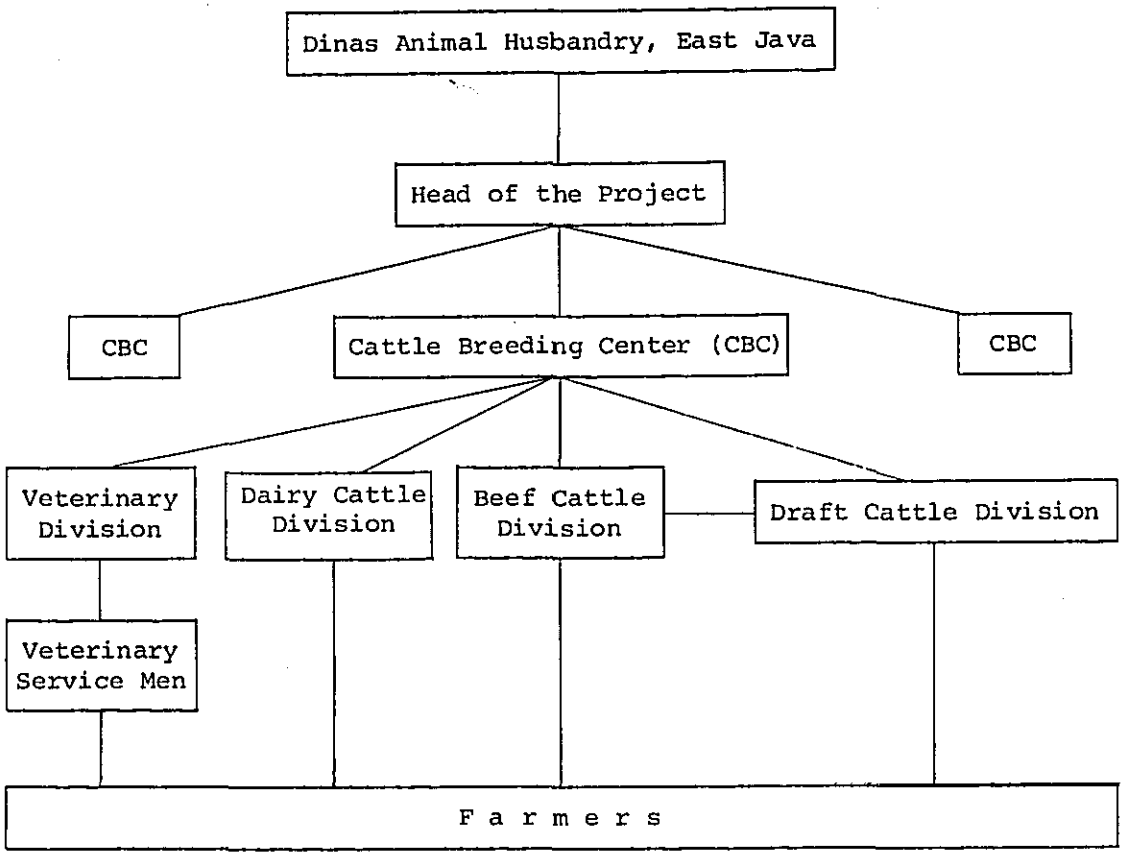
To decrease flood damages and soil erosion and to rehabilitate critical land, the project will strengthen the on-going regreening and reforestation programs. Regreening measures include horticultural development through planting fruit, spice and medicinal trees.

Locations:	Critical areas in Blitar, Tulungagung, Trenggalek, Ponorogo and Pacitan.
Project duration:	5 years.
Costs:	US$3,000,000.

7.4.3 Cattle Breeding Promotion Project

To increase the number of cattle in rural areas, the project consists of three kinds of programs for, draft cattle, beef cattle and dairy cattle. Provincial Dinas Animal Husbandry executes the project. A head of the project is assigned to supervise all the activities which are handled by three cattle breeding centers (CBC). Each CBC has the divisions of draft cattle, beef cattle, dairy cattle and veterinary. The first three divisions have sub-divisions of breeding and extension. The breeding sub-division is to identify and reproduce the best suited breeds and cross-breds for distribution, while the extension sub-division sends extension agents to the villages. It also arranges the distribution of calves properly and watches the procedures of payment in kind, profit sharing and credit. The Veterinary division looks after the insemination and health of the distributed animals through an improved network of veterinary service (see Figure 7.2).

Figure 7.2 Organization Chart of the Project



Locations are selected with consideration of the distance to the markets, scope of expansion of farming activity, availability of feed and so on.

Locations: For the beef cattle program, Blitar (6 kecamatans in the south), Tulungagung (5 kecamatans in the south) and Trenggalek (7 kecamatans and Malang (5 kecamatans in west Malang). For the draft cattle program, Pacitan (5 kecamatans in the west), Blitar (4 kecamatans in the center),

Tulungagung (7 kecamatans in the center), Trenggalek (4 kecamatans in the center) and Malang (5 kecamatans in southwest Malang). For the dairy cattle program Blitar (Kota Blitar and vicinity), Tulungagung (Kota Tulungagung and vicinity), Trenggalek (Kota Trenggalek and vicinity), Malang (Sumberputjung, West Malang) and Kediri (Kota Kediri and vicinity).

Project duration: 5 years from 1980 to 1985.

Costs: US$453,000.

7.4.4 Sericulture Pilot Project

To identify the best suited method of sericulture in the limestone area, the project whose organization is illustrated in Figure 7.3 will set up pilot sericulture farms.

Locations: Kecamatan Surwadang in KB Blitar.

Project duration: 5 years from 1980 to 1985.

Costs: US$1,000,000.

7.4.5 Irrigated Agriculture Development Project

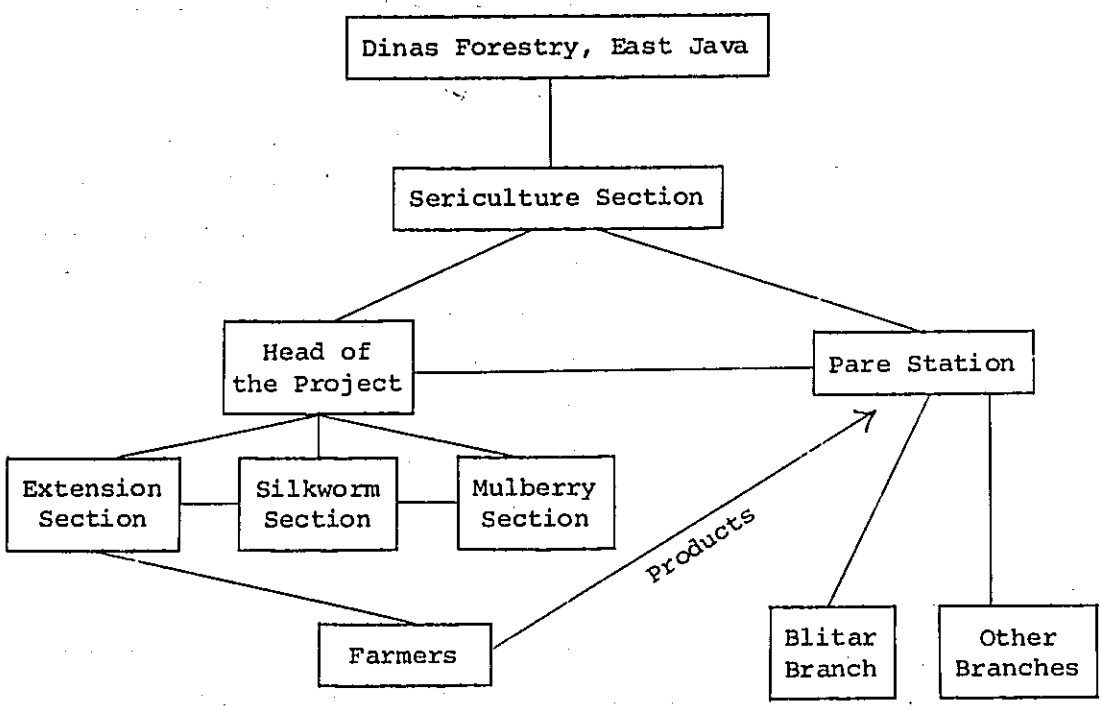
This is to set up two centers for experiment and extension of the best suited irrigated farming system including water management in the areas where the intensity is rapidly increasing through construction of modern irrigation and/or drainage facilities. The centers are also to start several farmers cooperatives for processing and marketing of paddy. The organization of the project is identical with the Cropping System Development Project (see 7.4.1).

Locations: Ponorogo, Ngadiluwih (KB Kediri) and Tulungagung.

Project duration: 5 years

Costs: US$,000,000.

Figure 7.3 Organization Chart of Pilot Project



The above five projects are our recommendations for implementation during Repelita III and if they are successful, the next steps for the wide application of know-how should be taken. Other programs and projects stated in 7.3 should not be overlooked and be implemented as soon as the financial situation allows them to be realized.

CHAPTER VIII

FISHERY

8.1 Introduction

Water is shallow along the northern coast of Java, and the sea fishery is conducted for bottom fish and shrimps with many types of equipment. The southern coast of Java generally is rough rocky shores with some small bays, and in quite different manner from the northern coast, the sea bottom abruptly increases in depth. Large swells come from the Indian Ocean all the year round, but are particularly strong during the rainy season. However, upwelling areas in which fishing is highly productive exist here and form fishing fields for tuna. Shrimp fishing is carried out in the vicinity of Cilacap.

There are several fishing harbors in the small bays in the Study Area. These harbors are separated from each other by cliffs or rough shores. Each harbor is linked to inland villages, towns or cities by roads, but there are scarcely and connections between neighboring harbors. Due to several constraints, most of the fish landed at the fishing harbors are used for processing and only a small portion is supplied to local markets as fresh fish.

8.2 Fish Production and Consumption

As shown in the following table, the sea fish catch in the Study Area increased by almost five times in a recent four-year period. Although the figures in the table include small quantities of inland fish, the growth

was mainly due to a steady increase in the sea fish catch. Several causes of this rapid growth of the fish catch can be enumerated. The most important one is an introduction of new technology. In recent years, fishermen in Prigi and Popoh areas have adopted the purse seine fishing method, using motorized vessels, and have thereby increased their catch. This increase in the fish catch implies that potential markets have been expanding partly due to improved transportation systems including kabupaten and provincial roads, and partly due to increase in per capita income.

(unit: ton)

Kabupaten	1974	1975	1976	1977
Tulungagung	132	240	552	1,455
Trenggalek	478	1,679	1,190	2,746
Pacitan	441	493	936	826
Total	1,051	2,412	2,678	5,027

In 1977 average per capita fish consumption in Indonesia was 10 to 11 kg a year, while that in East Java was 6,8 kg. In the Study Area, consumption was 5.1 kg in Trenggalek; it was 2.1 and 0.6 kg in Tulungagung and Blitar, respectively, all in the same year. Thus, the consumption in the Study Area is far below the average for East Java.

By interviewing residents in the Study Area, the team found out that the preference for fresh fish is very high among consumers in the Area.

8.3 Constraints to Development

First, due to lack of facilities for cold storage, and the decomposition of fish at other than cold temperature, most fish landed at harbors in the Study Area are processed to make traditional salted, dried and smoked fish foods which then are transported to market.

From the rest of fish landed some is provided as fresh fish for local markets.

Second, the mountains along the coast line hamper transportation of sea products to inland areas. The people who live inland do not receive a sufficient fish supply, even though they have a strong preference for fresh fish as a protein source. Thus, lack of an appropriate distribution system for fresh fish is one of the major constraints to fishery development.

Another major constraint is lack of knowledge of the extent and nature of fishery resources in the sea along the Study area. To plan orderly development of the fishery sector, general information, at least, about fishery resources including types of fish and prospective fishing areas has to be obtained.

In order to develop the sea fishery sector in this Area, there are several constraints which should be removed or lessened. Such measures are not competitive; rather, they are complementary and should be undertaken simultaneously.

8.4 Development Perspectives

8.4.1 Demand and Supply

As stated in Section 8.2, the fish consumption in the Study Area is highest in Trenggalek. In the near future, however, other kabupatens could attain the present level of Trenggalek if new fishing methods and appropriate distribution systems for landed fish are introduced. The annual per capita income in the Study Area was RP.66,000 according to the Team estimate for 1977. If the people there spend the same proportion of their income as the people in East Java do on fish, they would spend around Rp.2,500 per capita for fish a year. The present fish

price is roughly calculated at Rp.370 per kilogram because the average fish consumption in East Java is 6.8 kg per capita. If we assume that in the Study Area the income elasticity of fish demand is elastic, demand for fish will increase significantly in the future. In 1983, it is projected, per capita gross regional product will be Rp.89,574 a year and expenditure on fish will increase Rp.3,000. Assuming that the fish price per kilogram stays at the present level of 1983, consumption will be 20.7 kg in the year 2000 as shown in the following table.

	1983	1985	1990	2000
Total Demand (ton)	44,899	50,787	81,210	127,243
Per Capita Consumption (kg)	8.4	9.5	14.2	20.7

At present fishing area used is mainly restricted to the waters near the shore in the Study Area. With motorized large boats, however, the fishermen can use bigger nets and also can go further offshore to seek better fishing grounds. The present total fishing area is about 200 km^2 in the Study Area, showing sea production of about 5,000 tons a year. The motorization of fishing boats of larger size will expand the fishing area to 6,000 km^2 and enables the fishermen to go fishing during the rainy season --- i.e., all the year round. Assuming that the fish density is homogeneous in this area, production is expected to exceed 150,000 tons a year in the future.

8.4.2 Development Strategies

Our investigation of the market shows that the fishery sector has a big potential demand. Also, if the fish price is lowered due to an increase in productivity, the potential market will expand even more.

However, there are still several constraints such as lack of an adequate transportation system for fresh fish, lack of appropriate processing methods in the Area, lack of use of suitable technology for fishing, and lack of knowledge about fish resources in the Study Area. Even though large markets are there, we can not expect development of fishery sector without removal of those constraints. To remove some of the problems mentioned above, four main strategies have been identified in this study.

(1) The first one is construction of fishing ports at Prigi, Popoh, Pacitan, and other to-be-identified places, and modernization of fishing equipment, even though the priority and size of the undertaking at each port is different. The construction of a fishing port enables fishermen to use larger fishing boats and more sophisticated equipment, which help increase productivity. Also, introduction of large fishing vessels and advanced equipment enables the fishermen to fish even in the rainy season and to some extent reduce the seasonal fluctuation in catch. The reduction of seasonal fluctuation will stabilize the fishermen's income and also their investment becomes more efficient. In addition, construction of port facilities will also be necessary. The most important facilities are likely to be cold storage and processing plants. To supply landed fishes more efficiently to the hinterlands, a cold storage system is required. Cold storage facilities must be located at the fishing ports and wholesale markets.

(2) To utilize landed fish more efficiently, the development of new processing methods, which will prolong product life without lowering product quality, is needed. At this moment, no appropriate processing method can be identified. But either by improving traditional methods or introducing new processing methods, the provincial and kabupaten governments should plan to develop methods which yield products which are better than existing processed products. If better processing methods are developed, the size of the market for fish will expand enormously. Then the expanded markets enable individual fishermen and processing plants to attain economies of scale and productivity of the entire fishery sector will go up significantly.

(3) The third approach is research, to determine what equipment is suitable for the fishermen to use, and what measures are needed to enable them to acquire that equipment. Research is also needed on the status and outlook for fish resources, in order that information may be made available for planning so that depletion of such resources may be prevented. Further, research is needed for such areas of concern as processing methods, markets, and subjects related to estension services and training which comprise the forth approach.

(4) Fourth, extension services and training demand attention. Use of larger boats and new equipment will be effective only if used properly and this requires extension services and all that provision of such services entails.

8.5 Recommended Projects and Priorities

8.5.1 Construction of Fishing Ports

Among the several measures required for promotion of fishing activities in the Study Area, the construction of fishing ports is the most important one. Fishing port construction was started at Prigi Bay in 1976, but the size and facilities of the planned port are not sufficient to accommodate the present growth trend. Details of the port size and facilities recommended are stated in Chapter XIII in this Report.

If a new port is constructed at Prigi and fish landed there increases, it will be necessary, in advance of such a development, to arrange facilities for cold storage there and in wholesale markets, too. At present, it is thought that the most appropriate locations of cold storage facilities are Tulungagung and Trenggalek. The investment for the cold storage facilities in these two locations is estimated as follows:

Cold storage (300 tons capacity) Rp.90,000,000

In addition, for transport there is the following requirement: Two insulated trucks (4 tons capacity)

Rp.18,000 x 2 = Rp.36,000,000

At Pacitan Bay, the construction of some facilities the fishing port was completed in 1978. However, there are no breakwater and stair landing facilities. At Popoh and other fishing harbors, work on the fishing port does not start yet. To reduce time for departing and landing of fishing boats and to shelter them from the rough sea, breakwater and stair landing facilities are required. The increase of the catch will increase the need for a cold storage facility and ice plants in order to preserve the quality of fresh fish and to expand the market for fresh fish.
The costs for establishment of these facilities are as follows:

Quick freezing facility (5 tons/day)	Rp.57,000,000
Refrigerating storage (100 tons capacity)	Rp.39,000,000
Ice making facility (20 tons/day)	Rp.200,000,000
Ice storage (300 tons capacity)	Rp.60,000,000
Insulated truck (4 tons capacity)	Rp.18,000,000

Construction of fishing port and other accompanying facilities will reduce the losses of landed fish, and reduce seasonal catch fluctuations, so that benefits are increased and extended not only to fishermen but also to people in the Study Area.

8.5.2 Modernization of Fishing Vessel and Equipment

In order to utilize offshore fishery resources more efficiently, fishing vessels have to be larger in size than those in use at present, and should be motorized. With motorized, larger vessels, fishermen can catch large-school fishes such as anchovies and Indian oil saldinella in large quantities. Required investments for a set of the present purse seine fishery method requiring a twelve man crew are as follows:

Two vessels (5 GT, 12 m long)	Rp.600,000 x 2 =	Rp.1,200,000
Two engines (10 HP each)	Rp.400,000 x 2 =	Rp.800,000
One engine (40 HP)		Rp.1,200,000
Purse seine		Rp.3,000,000
Total		Rp.6,200,000

The annual cost of operating these vessels and equipment is estimated as follows:

Diesel fuel 12 liters x Rp.35 x 365 days =	Rp.153,300
Gasoline 40 liters x Rp.80 x 365 days =	Rp.1,168,000
Maintenance	Rp.720,000
Capital depreciation	Rp.620,000
Total	Rp.2,661,300

To illustrate, in the most general terms, the order of magnitude of the potential benefits of this investment, the following calculation is worthy of attention.
The average fish catch per purse seine is 66.7' tons a year at present. If the fish price is Rp.100 a kilogram, the gross revenues of a purse seine unit amount to Rp.6,670,000. Given the above costs, the revenue per fisherman is Rp.334,058 which is more than three times higher than the present level.

Since introduction of more efficient methods seems to be financially justifiable, the provincial and kabupaten governments should increase credit services especially for fishermen who adopt new fishing methods. Also, in relation to expansion of the credit services, an extension service program at the kabupaten level should be considered.

For this project, the following locations should be considered as prospective sites: Pacitan, Luruh, Panggul, Prigi, Popoh, Burumbun, Serang and Sang. In the Study Area the motorization of fishing vessels at Pacitan is behind the level attained in Tulungagung and Trenggalek and the volume of the landed catch there is less than at Tulungogung and Trenggalek. As task of the highest priority, the modernization of fishing vessels and equipment in use at Pacitan is recommended, to increase the fish catch there.

8.5.3 Establishment of an Fishery Experiment Station

Establishment of a fishery experiment station is strongly recommended, to improve fishing technology, to increase fish resources and to utilize fish resources more efficiently. It is proposed that the organization and activities of the station as follows:

(1) A fishing technology section, to provide technical guidance related to fishing equipment and methods and to carry out experiments on new fishing methods.

(2) A fish resource section, to survey fish resources and fish ecology, and to develop methods for fish culture.

(3) A fish resource utilization section, to provide technical guidance on fish processing and to develop new processing methods.

The station should consist of the three sections mentioned above, should be staffed by nine experts. The initial cost for establishing such a station will amount to around Rp.15 million.

In the Study Area, there are many swah tambaks where fresh water fishes are cultivated together with shrimps (Macrobrachium spp.). The construction of a shrimp hatchery was started at Prigi in 1978 in order to supply shrimp larvae. The fishery experiment station, in cooperation with the hatchery, should carry out the introduction of new fish, development of culture grounds, and diffusion of techniques for fresh water fish culture. As to marine fish culture, its potential is unknown at this moment. A biological survey is desired, to find out if any fish suitable for culture now exist and the abundance of its larvae if any.

Since Prigi is the most advanced place in the Study Area regarding place fishery activites, and possesses the best infrastructure for research and development activities, Prigi is recommended as the ideal site for establishment of the station.

8.5.4 Establishment of Fishery Cooperatives

Since some of the weak aspects which fishermen face in the Study Area are marketing and finance, the establishment of fishermen's cooperatives which deal with such problem areas is strongly recommended. Successful functioning of such cooperatives will greatly contribute to success of the above proposed projects. Because the size

and the characteristics of a cooperative depend on fishermen's desires, their financial situation, social constraints and other factors, the Study Team declines to specify details at this moment. The provincial government should undertake a study which will investigate possibilities of fishermen's cooperatives and establish pilot cooperatives in the Study Area. As prospective sites, the Study recommends Pacitan and Prigi for promotion of cooperative activities, and the allocation of Rp.23 million for each site during the Repelita III period.

CHAPTER IX

MINING RESOURCES

9.1 Introduction

The study of this sector was carried out to identify potential mineral resources and development projects in the southern coastal area of East Java. Specifically, the study was done for marble at Popoh in KB Tulungagung, manganese ore in KB Trenggalek, limestone at Prigi and Pacitan Bays, and iron sand in KB Pacitan and KB Trenggalek. Except Pacitan area, the locations of the study are shown in Figure 9.1.

The study area belongs to "Sunda Orogen" of Indonesian metallogenic provinces. Rocks in the area consist of intermediate to basic volcanic rocks of Oligocene to Miocene age (so-called "Old Andesites") and overlying sedimentary rocks, such as limestone, sandstone and shale, of the upper Miocene age. Moreover younger volcanic activities took place in the post-Miocene age and also many volcanoes are still active in the area.

9.2 Manganese Deposits

9.2.1 General Description

Manganese deposits are in two locations, Jajar and Gebang, at about 9 km south of Trenggalek. The deposits are located in the northwestern and northern flank of the hill which is 300 to 350 m in height. They were discovered in the 19th century. Exploitation had been continued until quite

FIGURE 9.1

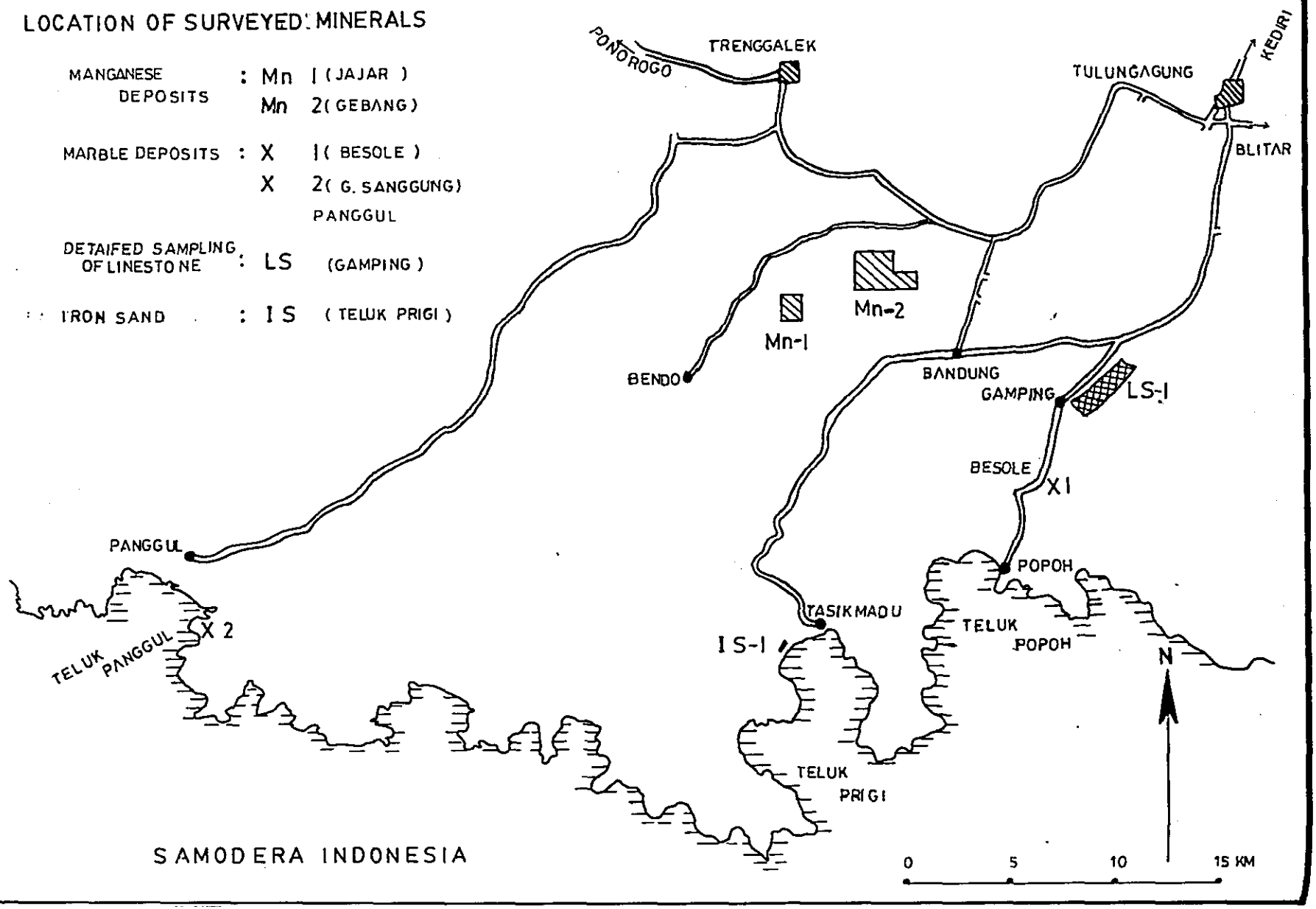
LOCATION OF SURVEYED MINERALS

MANGANESE DEPOSITS : Mn 1 (JAJAR)
Mn 2 (GEBANG)

MARBLE DEPOSITS : X 1 (BESOLE)
X 2 (G. SANGGUNG PANGGUL)

DETAIFED SAMPLING OF LINESTONE : LS (GAMPING)

IRON SAND : IS (TELUK PRIGI)



recently by a labor intensive method on a very small scale. At present two private mining companies have concessions in the two locations, but they are not doing any mining.

Manganese mineralization seems to be originally syngenetic sedimentary, the same as other deposits elsewhere in Java. Usually a deposit consists of chemical grade and metallurgical grade ores, but only the deposits of high chemical grade ores in the area have been mined. Dimensions and mining conditions of the deposits are shown in Table 9.1.

As shown in the Table, manganese deposits in the Study Area are a group of small scale ore bodies and reserves are estimated to be about 8,000 tons of concentrate as a whole. Moreover, most high grade ore has been mined out.

9.2.2 Potential for Exploitation

At present, there are two approaches to exploit these manganese ore deposits:

(1) To further exploit already known deposits, and

(2) To search for new deposits, using analysis of geological structure.

For profitable development, mining of a reserve of more than several ten thousand tons required since the ore grade is low. The first approach is not at all promising because dimensions of already known deposits are not large enough. The possibility of success by means of the second approach is small, because exploitation has been carried out since the 19th century. Even if ore bodies are discovered, they should be very small. In conclusion, the possibility of large scale manganese exploitation in the future is small.

Table 9.1 Manganese Deposits in KB Trenggalek

Location	Deposit	Form of Deposit	Dimension of Mined out Ore (m)			Estimated Tonnages of Concentrate				Total (t)
						Mined Out		To be Mined		
			Width	Length	Depth	Ton	Grade	Ton	Grade	
Jajar	1. Dandau	layer	2	30	20	2,400	chemical	0		
	2. "	vein	1	50	5	500	"	0		
	2. Chontong	vein	1	20	8	320	"	480	chemical	
	3. Belik	vein	1	15	25	750	"	n.a.		
Gebang	4. Kunchong	vein	1	20	6	240	chemical	0		
	5. Gumawang	vein	1	50	5	500	"	n.a.		
	6. Gebang	vein	1.5	10	25	750	"	2,100	metallurgical	
	7. Gua Kamplok	vein	1	15	2	60	"	0		
	"	vein	1	5	2	20	"	0		
	"	vein	1	5	2	20	"	0		
	Total					5,560	chemical	480	chemical	6,040
								2,100	metallurgical	2,100
										8,140

Source: All figures are estimated by the Team members.

Notes: 1/ Specific gravity of crude ore is 4 and recovery ratio is 50%.

2/ Concentrated ore stock at Gebang, about 100 tons of metallurgical grade, is not included in this Table.

3/ n.a. indicates that data are not available.

9.3 Marble

9.3.1 General Description

Marble deposits in the Study Area are located in two places, Besole about 20 km south of Kota Tulungagung, and G. Sanggung at Panggul about 38 km southwest of Kota Trenggalek. Their exploitation permits are owned by P.T. Industri Marmer Indonesia.

Marble at Besole is formed by thermal metamorphism of andesitic intrusion to the upper Miocene limestone. The deposit is on a small ridge rising 60 to 80 m above the ground and forms an almost horizontal structure. As far as 50 m below the top of the ridge, the continuity of the deposit has been confirmed by 3 drilling holes, though some parts are without ore and overburden seems to be only 0.5 m. At present, cutting and polishing of ore blocks of maximum dimensions of 2.5 x 1.5 x 3 m are processed at the quarry before being shipped to market by trucks.

Ore genesis at G. Sanggung, Panggul seems to have been under the same conditions as at Besole, but the quality such as in terms of tone of color and pattern seems to be better. Although quarrying started in 1971, the owner had to stop the mining activity soon thereafter because of environmental issues raised by the Department of Forestry (Dinas Kehutanan). However, limited mining activity was resumed in October, 1978, under special permit. Crude ore blocks are 1.2 x 0.6 x 0.6 m in size and are transported to Besole for processing.

9.3.2 Future Production

Besole is the only marble quarry which is exploited at present in this area. Production has been steadily increased since the beginning of exploitation in 1961 (see Table 9.2). Before 1974, the rate of production had increased at about 5% a year. However, the rate of growth of production for the three-year period 1975-1977 was around 30% a year.

The main market in 1977 was in Jakarta which took about 95% of total shipments. Since the recent rapid increase in production seems to have been created by the stimulus of strong short-term demand in Jakarta, it is not certain whether such a high level of demand can be expected to continue in future.

Table 9.2 Production of Marble at Besole

Year	Production (m^2)	Reported Tonnages	
		Processed (t1)	Mined (t2)
1964	5,338	824	2,745
1965	7,668	1,184	3,944
1966	6,708	1,035	3,450
1967	5,594	864	2,877
1968	13,243	2,044	6,811
1969	9,214	1,422	4,739
1970	11,034	1,703	5,675
1971	11,965	1,847	6,153
1972	9,718	1,500	4,998
1973	12,233	1,888	6,292
1974	13,520	2,086	6,954
1975	19,829	3,060	10,198
1976	25,945	4,003	13,344
1977	35,217	5,434	18,112
Total	187,226	28,894	96,292

Source: The Department of Mines.

Notes: Thickness of slab: 4 cm
Specific gravity: 2.7
Processing loss: 30%
Mining rate: 30%

$$t1 = \frac{m^2 \times 0.04 \times 2.7}{(1 - 0.30)}$$

$$t2 = t1/0.30$$

9.3.3 Potentiality and Problems

The present ore reserves at Besole are estimated to be about 1,000,000 tons or 370,000 m^3. Therefore, the quantitative potential seems to be high but the quality of the marble is open to question due to its somewhat low metamorphic grade. Consequently the future potential can be best realized through the development of new processed products combined with market research whereby production of low-grade marble can be made profitable. Marble quality at Panggul seems to be better than that at Besole, and marble reserves at Panggul is estimated to be about 1,500,000 m^3. However, this estimate was made 50 years ago and no adequate new investigation of dimensions and quality of the marble reserves has been carried out.

To start exploration and exploitation at Panggul, it is necessary to resolve the environmental issues through discussions with the authorities concerned, and to ascertain the extent and quality of the reserves. Further, an access road to the existing factory has to be upgraded.

9.4 Limestone

9.4.1 General Description

Limestone is present mainly on coastal areas of Java Island. In the area studied, limestone is mainly present adjacent to the western part of Pacitan Bay area and the area from eastern Popoh as far as Malang. A survey including F.C. test was carried out as part of the Study's work, to investigate the succession of limestone layers near the western part of Pacitan Bay and at Gamping, Tulungagung. Limestone, colored light brown, is present in large quantities and contains small fossils such as mollusca. The thickness of a limestone deposit near the western part of Pacitan Bay is more than 20 m and increases towards the southern coast. The deposit consists of several layers including sandy and

dolomitic ones. But limestone deposits at Gamping contain a more than 100 m thick homogeneous limestone layer, although they have sandy layer at the bottom.

9.4.2 Potentiality

Limestone deposits in the Area are located mainly between Popoh and the southern part of Malang and are more than 100 m thick. Therefore, the potential reserves seems to be large in quantity. At present the deposits are being used only as a source of lime for local use at small processing units.

The Ministry of Industry considers four areas of the nation are to be suitable locations for constructing cement factories in the future; they are North Sumatra (near Aceh), West Java, Timor and North Sulawesi. Future development of the cement industry will follow the patterns of infrastructure, industrial and urban development, which all but rule out the possibility of building a cement factory in the Study Area. Another common use of limestone is for production of iron and steel, but no plan exists for such production in the area. Consequently at present there is no possibility to exploit limestone in a large scale in the Study Area.

In conclusion, the limestone in the Study Area ought to be considered as potential resources for the 21st century. For instance, now the Australian steel industry imports limestone from Japan; it is conceivable that when the future export capacity of limestone in Japan decreases limestone in Indonesia will come to play an important role in the Australia market.

9.5 Iron Sand

Seashore type iron sand is found in the southern coastal area of Java Island. Although the existence of many

iron sand deposits has been identified in the coastal area of the Study Area, none are being exploited. A survey was carried out in Pacitan and Prigi Bays by the Team members. Iron sand is only showing, but does not form any deposit at Pacitan Bay area. An iron sand deposit 100 to 200 m wide and 4 km long is present along the western coast of Pacitan Bay. Pits at two points shows that thickness of iron sand measures 0.35 m and 0.55 m, respectively, and the average thickness is to 0.45 m. As a result of a magnetic separation test using a hand magnet of 600 gauss for dried samples from these pits, the magnetic degree (M.D.) was found to be 16% and 44%. Consequently the ore reserve at Prigi Bay is calculated as follows:

Width Length Thickness M.D. S.G.[1/]

50 m x 1,000 m x 0.5 m x 0.3 x 1.8

= 13,500 tons of concentrate

This quantity is too small to exploit economically.

9.6 Future Mining Projects

The Team surveys were carried out mainly for manganese ore, marble, limestone and iron sand. As a result of the surveys, conceivable future projects would be feasibility studies of marble exploitation at G. Sanggung, Panggul and limestone exploitation in the coastal area. In relation to potentialities of each mineral and market demand, studies should be scheduled as follows:

	Repelita III					Repelita IV	Cost (US$1,000)
	1979	1980	1981	1982	1983		
1. Feasibility Study for Marble Exploitation	←----------				----------→		100
2. Feasibility Study for Limestone Exploitation						←-------→	300

1/ S.G. is short for specific gravity.

The feasibility study for marble at G. Sanggung, Panggul may be made to have the following scope, and should be done after resolving the problem of a conflict of interests with natural conservation and forestry authorities. That is, it should assess size of the deposit, required infrastructure for exploitation, market conditions and the amount of investment required for profitable exploitation. Costs would be US$100,000 (including drilling costs). The study should comprise a geological survey including drilling (3 holes) to evaluate the deposit; investigation of infrastructure; investigation of the possibilties of a processing plant; and a market survey.

CHAPTER X

MANUFACTURING INDUSTRY

10.1 Introduction

Statistics of 1976 recorded 10,644 large- and medium-scale industries in East Java, which are broken down into the following categories; basic industries[1/] 62, chemical industries 13, textile industries 393 and various light industries 10,176. Most of these industries are located in Surabaya and surrounding industrial areas. This means that most of the rural areas rarely have large- and medium-scale industries.

The present state of industrial development can also be observed in terms of historical development stages of production system. It is generally observed that industrial production has increased with the development of various production systems accompanied by technical progress as follows:

1. Household manufacturing,
2. Village handicraft manufacturing,
3. Artisan's workshop manufacturing,
4. Simple modern factory manufacturing,
5. Assembly line manufacturing, and
6. Semi-automatic and automatic factory manufacturing.

1/ The basic industries include the metal and machine industries such as automobiles, ship-building, electrical goods and machinery, and other metal industries.

At any stage of industrial development, there exists a particular combination of all these production systems. Although it is an awfully difficult task to determine an optimal combination of the above systems at any stage of industrial development, the present industries of the Study Area are polarized to a large group of small-scale and home production units (household manufacture, village handicrafts and artisan's workshops) on the one side and to an extremely small group of simple modern production units (simple modern factories) on the other side. No production systems of "assembly line manufacturing" and "semi-automatic and automatic factory manufacturing" exist in the Study Area. Thus, the very crucial production system, the simple modern factory manufacturing, which must play a decisive role in the industrial development of the Study Area, is seriously lacked.

The first group of industries is usually found in every kabupaten, while the second group is mainly located in and around KDY Kediri. At present, the most dynamic parts of the industrial sector of East Java are spreading from Surabaya, Mojokerto, Kediri and Madium in the west, Malang to the south, and to Pasuruan, Probolinggo, Jember and Banuwangi to the east.

Kediri, as a center of the upper Brantas Basin area, functions as a commercial and industrial center of the Area, and has attracted the many modern medium-scale manufacturing industries since 1968. However, those manufacturing industries are mainly agro-based industries which produce sugar, cigarette, wooden boxes, gunny sacks, furnitures and cassava starch. Still East Java's the leading industries which are skill-oriented and labor intensive have not reached Kediri yet.

The small-scale and home industries mainly consist of the crop based industries. But there are a fairly large number of other industries, too. Some of them are forestry product-based industries including saw mills, wooden box making and tree oil processing industries. The metal based-industries are mostly workshops which produce fences, chairs, tables and

hinges and which provide repair services. In this Area, the livestock based-industries are mainly leather product industries.

Even though the future leading industries are skill-oriented and labor intensive ones, the large recent investments in Kediri are still resource-oriented industries such as sugar, cigarette and gunny sack industries. The small-scale and home industries are biased to resource-oriented ones. This fact indicates that the Area still has a comparative advantage in resource-oriented industries.

10.2 Constraints for Development

The share of the industrial output in gross regional domestic production is around 10% and the industrial output in the Study Area is growing at an annual rate of 5% in real terms according to the Team members' estimates. This growth rate is relatively slow compared with that of the industrial sector in other areas. The relatively slow growth of industrial development in the Study Area may be attributed to several factors.

As for the Study Area itself, the following characteristics and constraints exist in the industrial sector. Firstly, almost all the existing units are small-scale manufacturing industries and need to upgrade their managerial and technical levels. Secondly, production methods employed by those units are traditional and relatively old fashioned. This factor is not a real problem by itself; however, products from those units are not mostly quality controlled and not suitable for big markets. Thirdly, the diversification of industrial products is very limited and this tendency is particularly clear in the field of skill-oriented industries. Fourthly, even though the most of the Areas' industries are resource-oriented, some of resources such as marble and agricultural produce are not fully exploited. Finally, industrial products produced in the Area are mostly consumed within the Study Area. Only limited number of products are exported to the outside.

In sum, the industries in the Area are mainly processing locally available raw materials and marketing their products within the Area. Since the industries do not pay much attention to markets outside of the Area, they are not very serious about their product quality, marketing their products and technological changes. Due to small markets, the industries cannot attain economy of scale for their production.

As above, the existing industries in the Study Area are quite limited in their number and variety. This, in turn, implies that non-existing industrial activities cover quite vast fields such as beverages, textile, paper and pulp products, chemicals, rubber products, plastic products, glass and glass products, machinery and equipment, electric machinery and appliances, and transport equipment.

In order to introduce these potential industrial activities into the Study Area where developmental conditions for the industrial sector are relatively poor compared to the already industrially developed areas in the Province, several pre-requisites have to be satisfied; namely, (1) improvement of technical levels, (2) up-grading of managerial skills, (3) better transportation facilities for raw materials as well as intermediate and finished products, (4) up-grading of physical infrastructural facilities such as electricity, roads and water, and (5) governmental supporting policy particularly directed to the rural (minus) areas, such as industrial allocation policies including easier accessibility to investment licenses, tax benefits, advantageous credits and loan arrangements and so on. Thus, the introduction of modern industrial units from the suggested industrial fields to the Study Area should be implemented upon careful long-run planning and studies.

10.3 Development Approaches

The above observation does not imply that the Area does not have potentials for industrial development. Rather,

they would suggest that industrial development should be promoted by fully exploiting local resource-oriented industries in the short-run and introducing a variety of skill-oriented industries, which are spreading from Surabaya, to the Study Area in the long-run. This approach is completely consistent with our two main approaches "pulling from the top" and "pushing from the bottom." To materialize the above approach for industrial development, more specific tactics are as follows:

(1) Maximum utilization of locally available resources

The Study Area has various natural resources, including limestone, marble, commercial crops like vegetables and fruits, forestry resources and livestock. The industrial development should make the most use of these resources which are readily available in the Area.

(2) Introduction of the industries which have linkages with other sectors

If medium- and small-scale industries in Kediri and Ponorogo develop both forward and backward linkages with other sectors, they will affect significant impacts on local economies.

(3) Introduction of basic industries

The basic industries should be encouraged since they have the biggest strategic role and the largest overall effect on the development of skill-oriented industries. Since it is not easy for the Area to introduce basic industries such as metal and chemical industries at the present stage of industrial development, the Area should prepare for laying foundations for basic industries by introducing and improving such industries as foundries, forging, metal processing and mechanical engineering industries.

(4) Improvement of the technical level

If technology is not suited to a particular situation, it is of little use. Appropriate

technology is, therefore, often quite important and it can be developed by both modernizing traditional technology and introducing technology from abroad. To introduce and to develop the appropriate new technology, new institutional systems such as a research and development center, an intermediate technology center and a hire-purchase scheme should be additionally introduced.

In addition, the industrial sector of the Study Area regardless of its developmental time span, should also be developed by reorganizing existing small-scale and home industries systematically. Most of these existing industries are operated by family workers and are often additional income sources to farmers. Therefore, the industrial operation frequently fluctuates seasonally. Those industries, thus, can be characterized as part-time business.

To attain full industrialization, the industry should be developed towards the full time utilization of existing facilities. Once an independent and specialized industrial organization is established, it can produce goods of better quality on the full-time basis with a more productive manner. Therefore, it should be recommended to reorganize the existing small-scale and home industries in such a manner that several small units are grouped into one larger unit at Desa and/or kecamatan levels which may be run by collective and cooperative efforts of villagers. This would lead to up-grading and modernization of production methods and management, and eventually bring up the entrepreneurship of villagers.

Another possibility in reorganizing several production units is to introduce a sub-contracting system to a group of home and/or small-scale manufacturers. One of the simplest forms of this system is that the middleman, being a wholesale merchant or manufacturer with an excessive market and modern entreprenuership, distributes his orders of particular products from them. The market of small-scale and home industrialist is,

then, guaranteed by the middleman. If necessary, they are often provided with raw materials, working capital, and tools and equipment, while the middleman takes care of marketing and product designing, and sets a strict quality standard. It is, thus, envisaged that this sub-contracting system contributes to the industrial modernization and development when it is successfully introduced.

10.4 Identified Programs and Projects

Through the observation and consideration above, the Study recommends the following programs and projects:

(1) Metal/engineering workshop programs

This program consists of two kinds of workshop projects:

1) Metal workshop project
2) Engineering workshop project

(2) Hire-purchase schemes for agro-processing industries

(3) Limestone processing project

(4) Marble tile and artistic marble product projects

(5) Ceramic research center project

(6) Ready-made garment project

(7) Bamboo crafts sub-contracting project

10.5 Programs for Projet Implementation

The identified projects in section 10.4 can be implemented in the following sizes and investments. Since all of them do not take a large amount of governmental funds, all projects recommended should be implemented during Repelita III.

10.5.1 Metal and Engineering Workshop Program

(a) Location of Metal and Engineering Workshops

This program consists of one engineering workshop and five metal workshops. The engineering workshop is planned

to be established at KDY Kediri, and the metal workshops are planned to be located at KB Tulungagung, KB Trenggalek, KB Blitar, KB Ponorogo and KB Pacitan.

(b) Costs and Benefits of the Program

The engineering workshop will be equipped with the tools, machines and equipment which include lathe machines, milling machines, welders, drills and measuring equipment. Costs for machinery, equipment, buildings and land are summarized as follows:

	Engineering Workshop	Metal Workshop
Machinery and Equipment	Rp.80,000,000	Rp.10,000,000
Buildings	Rp.12,000,000	Rp. 7,200,000
Land	Rp. 2,000,000	Rp. 1,300,000
Total	Rp.94,000,000	Rp.18,500,000

Benefits in terms of gross output would be estimated on an assumption that the engineering workshop produces Rp.50,000 per month per person and the metal workshop Rp.30,000 per month per person. Further, the total numbers of employees are assumed to be 40 for engineering workshop and 15 for the metal workshop. Then, annual gross output for the engineering workshop is Rp.24,000,000 and that for the metal workshop is Rp.5,400,000.

10.5.2 Hire-purchase Scheme for Agro-processing Industries

(a) Its Scope of Activities

The program consists of eight kinds of agro-processing industries whose locations are also already identified as follows:

(1) Coconut oil project in KB Tulungagung, KB Trenggalek, and KB Pacitan;
(2) Rice mill project in KB Pacitan and KB Trenggalek;
(3) Cassava mill project in KB Ponorogo and KB Pacitan;

(4) Maize mill project in KB Kediri, KB Tulungagung and KB Blitar;
(5) Peanut threshing project in KB Kediri, KB Tulungagung and KB Blitar;
(6) Charcoal making project in KB Trenggalek and KB Kediri;
(7) Saw mill project in KB Trenggalek and KB Kediri; and
(8) Fruits processing project in KDY Kediri.

The program aims at providing small agricultural processing units for the farmers who have entrepreneur ability. Beneficiaries of the programs are required to pay back the costs of the units once production commences. The pay back period may range from 5 to 10 years at a certain interest rate.

(b) Costs and Benefits of the Programs

Investment costs of machinery and equipment for (1), (2), (3), (4), (5) and (7) may amount to Rp.1,850,000, while those for (6) to Rp.20,000,000. Investment costs for factory buildings and land should not be entered into this program since they will be financed by the beneficiaries.

As for benefits in terms of gross revenue, the projects except the charcoal making project are assumed to receive only processing charges as sales revenue when raw materials are handed in and taken out by their owners. The charcoal making project is different from the above projects. They buy raw materials, process them and sell their final products.

Under these assumptions annual gross product per project is estimated as follows;

	Gross Output per Project
The Projects Except the Charcoal Making Project	Rp. 700,000
The Charcoal Making Project	Rp.9,500,000

10.5.3 Limestone Processing Project

(a) Location of the Project

The project locations are proposed at two sites, Gamping in KB Tulungagung and Kanigoro in KB Blitar. The Gamping project is more advantageous than the Kanigoro project since Tulungagung has already the national marble project and its well-developed physical facilities and human resources.

(b) Costs and Benefits of the Project

Benefits that the project produces can be calculated on the following two assumptions:

(1) One ton of active lime is Rp.20,000; and
(2) Production continues, without any break, 365 days a year.

The gross revenues are Rp.73,000,000 and Rp.219,000,000 for a 10-ton capacity plant and a 30-ton capacity plant, respectively, while total investment costs are Rp.500 million for a 10-ton project and Rp.880 million for a 30-ton project.

10.5.4 Marble Tile and Artistic Marble Product Project

(a) Location of the Project

The artistic marble product project is proposed either at Besole in KB Tulungagung or at Panggul in KB Trenggalek, while the marble tile project can only be proposed at Panggul.

(b) Costs and Benefits of the Project

The artistic marble product project requires relatively a small amount on investment costs since the project requires small machinery and equipment to cut and polish marble. Total investment costs for 100 tool tests, 5 cutting machines, 5 polishing machines, and other machinery and equipment are estimated at Rp.30,000,000. As the project may not require substantial costs for land and buildings, this figure may be regarded as the grand total investment costs.

As for the marble tile project, costs for machinery and equipment for a capacity of 2,000 per day are estimated at Rp.218,750,000. The total costs of the project, which include costs of machinery, equipment, buildings and land, would be approximately Rp.440,000,000. Benefits in terms of gross production per year for the artistic marble project are approximately Rp.22,500,000, which are produced by 100 workers at the site. Benefits for the marble tile project are Rp.200,000,000.

10.5.5 Ceramic Research Center Project

(a) Location of the Project

From viewpoints of the future developmental potentials, geographical convenience and advantages, it is appropriate to locate this center in and around Kota Tulungagung.

(b) Costs of the Project

Investment costs for machinery and equipment, buildings and land are tentatively estimated as follows:

Machinery and equipment	Rp.62,500,000
Building (400 m^2)	Rp. 7,200,000
Land (800 m^2)	Rp. 1,600,000
Total	Rp.71,300,000

(c) Size of the Center

The center would have approximately 20 staff members, of which 7 skilled members are for the raw materials research and development section. Another 7 members are for the ceramic product research and development section, and the remaining 5 staff members are for the general affairs and planning section.

10.5.6 Ready-Made Garment Project

(a) Location of the Project

This project intends to reorganize several one-man type tailors, who become the initiators of the project, into one larger more efficient tailor shop in Kota Ponorogo, Kota

Trenggalek and Kota Tulungagung. The new shop will primarily produce such items as school uniforms and public uniforms for public procurement.

(b) Costs and Benefits of the Project

Investment costs for machinery and equipment, building and land are estimated as follows:

20 sewing machines, and other machinery equipment	Rp.2,500,000
Building (200 m^2)	Rp.3,600,000
Land (300 m^2)	Rp. 600,000
Total	Rp.6,700,000

The project creates at least 20 new employment opportunities in addition to the initiators, of which 15 are skilled tailors. The annual gross revenue of ready-made garments would be Rp.8.5 million, of which 70% is deducted as costs of raw materials.

10.5.7 Bamboo Crafts Sub-contracting Project

This project organizes village home industrialists systematically as sub-contractees. The middleman's role is played by a newly formed producer cooperative headed by a selected bamboo industrialist who manages a bamboo processing industrial unit to be constructed at the community center of a village, with the direct help of a technical staff of Dinas Perindustrian at the kabupaten level who takes care of technical aspects as well as marketing aspects. The bamboo processing unit processes bamboo to a stage of intermediate products, which is, then, distributed to village households for finished products.

(a) Location of the Project

Three pilot projects are planned to be implemented at the nearest villages with abundant bamboo resource to Kota Pacitan, Kota Trenggalek and Kota Blitar.

(b) Costs and Benefits of the Project

The construction of a bamboo processing unit at the village community center use up most of the investment budget of the project. Since bamboo products are usually produced by villagers with simple hand tools, costs for new hand tools are almost negligible. The breakdown of the investment costs is as follows:

Machinery and equipment, and two motorcycles	Rp.2,500,000
Building (50 m^2)	Rp. 900,000
Land (75 m^2)	Rp. 150,000
Total	Rp.3,550,000

The bamboo processing unit requires a couple of new permanent employees; one skilled and the other semi-skilled. The project would also involve 20 to 30 households of a village. The annual gross output of various kinds of bamboo products is estimated at Rp.5.0 million, of which 50 to 60% goes to purchasing of raw materials.

CHAPTER XI

WATER RESOURCES DEVELOPMENT

11.1 Development Effort in the Past

Major activities of water resources development in the Study Area are categorized into five types: new irrigation projects, flood control works including river dredging and embankment, rehabilitation of irrigation systems, debris control works and hydropower development. Through Repelita I and II, considerable efforts were made for expansion of newly irrigated areas and rehabilitation of irrigation systems. Flood control works were implemented by constructing several dams, but still they are not enough for preventing notorious flood damage in the Brantas Basin. Debris control works of Mt. Kelut are also short of the desirable requirement. After the eruption in 1966, it is reportedly said that only about 60% of the lahar was controlled so far and the remaining 40% is expected to be controlled in the immediate future. Hydropower development in the Study Area dominates mainly in the upper Brantas Basin, i.e., Karangkates and Wlingi. As to drinking water supply, a supply system in Malang City is now being planned. And several rural water supply projects were implemented by the joint budgets of APBN and INPRES.

The actual budget allocation by sector and by region during Repelita II indicates that the budget share of water resource development in the Study Area is relatively getting smaller in comparison to other sectors and regions.

11.2 On-going Projects

11.2.1 Brantas River Development Project

Major activities in the upper Brantas Basin are construction of flood control works, irrigation systems and hydropower plants. The beneficiary of flood control and irrigation lies in the alluvial area of Brantas River and electricity is mostly transmitted to the urban and industrial area of Surabaya. In the Study Area, there are three on-going projects as shown below:

(1) Middle reached improvement (1978-1990)

Specifications: 93 km from Kediri to New Lengkong Dam;
total quantity of dredging, 16.6 million m^3; and
total quantity of embankment, 1.6 million m^3

Costs: Rp.60 billion for eleven years.

Benefits: preventing the average annual damage of Rp.9.4 billion.

(2) Lodoyo Dam (afterbay) (1978-1980)

Specifications: live storage of 5 million m^3 with nine movable gates of 121 m length.

Costs: Rp.3,300 million plus a foreign loan of ¥900 million.

Benefits: 4,500 kW.

(3) Tulungagung area flood and drainage control project (1979-1983)

The project is under a feasibility study financed by the Asian Development Bank for a purpose of drainage and flood controls in the swamp area between Tulungagung and Neyama Tunnel. The following figures are crude and tentative ones:

Costs: ±US$60 x 10^6

Benefits: ±3,000 ha newly irrigated area.

11.2.2 Mt. Kelut Project

The project which includes construction of sand-pockets, sobo-dame and checkdams is confined within northern Blitar and eastern Kediri on the slope between Mt. Kelut and Brantas River. Being consistent with Brantas River development plan (improvement of middle reaches), the debris control works in this project are expected to deal with about 150 to 200 million m^3 of lahars by constructing sandpockets and other structures.

11.2.3 Lodoyo Irrigation Project

The water (11 m^3/s) from Wlingi Reservoir irrigates total area of 15,000 ha, of which 13,000 ha are located in KB Tulungagung and the rest in KB Blitar. The project is planned to be completed in 1982 and at the end of 1978, about 2,600 ha are bestowed by the project.

11.2.4 PROSIDA Madiun Project

The project covers five kabupatens except Pacitan in Madiun River alluvial basin. The project which is financed by the International Development Association (the World Bank) aims at rehabilitating the irrigation system for the area of 140,000 ha, of which 38,000 ha belong to KB Ponorogo. The construction includes rural roads, main canals and tertiary canal systems. The project started in 1977 and will end in 1983. The total project costs including consultant fees, salaries and operating expenses amount to Rp.35 billion.

As to development activities of this basin, the planning and implementation of irrigation are done by PROSIDA Office, and some dam projects in the basin are planned by the Office of Bengawan Solo Project. Furthermore, the ground water exploitation is being undertaken by the ground water section of Dinas Pengairan. It is strongly recommended for these development institutions to coordinate and integrate their activities for overall integrated development of this area.

11.2.5 Kediri-Nganjuk Ground Water Development Project

The project area is located in KB Kediri, KB Nganjuk, a small part of KB Tulungagung, KB Blitar and KB Jombang. About 90% of the project area belongs to the Study Area. The project started in 1969 with aims of supplying groundwater for irrigation in both wet and dry seasons. The project includes agricultural extension services, i.e., water management and cropping pattern guidance. So far, the beneficiaries of the project are about 7,000 village farmers in the Study Area.

The ultimate scale of development in this project will reach to approximately 37,000 ha in next 5 to 10 years. According to the data obtained, the project will be very profitable as shown below:

Benefits: the range of incremental farm earnings from Rp.176,000 to Rp.235,000/ha/year at 1977 prices.

Costs: Rp.39,000/ha/year plus canal maintenance and lobor input.

Table 11.1 APBN On-Going Project Program in the Study Area (79/80-83/84)

(Unit: Rp.10^9)

	78/79	79/80	80/81	81/82	82/83	83/84	Remarks
Lodoyo Irrigation Project 15,000 ha	Construction →				Operation/maintenance →		
	1.7	3.3	3.8	3.3			Plus foreign loan, but the amount not available
Kediri-Nganjuk G.W. Development. Phase 1±2: 3,300 ha, IRR 20% Phase 3 : 30,000 ha 90% of the project area belongs to the Study Area.	Phase 1 & 2	Restudy of water balance		Full scale development phase 3 →			
		0.8	0.8	2.8	2.8	2.8	Plus foreign loan of £.11.7 million
Mt. Kelut Debris Control The benefit increases continously in proportion to the capital investment given to the influential area of Mt. Kelut eruption.	Continues investigation, design and construction →						
	0.6	0.9	0.9	1.0	1.0	1.2	
PROSIDA Madiun Rehabilitation of 140,000 ha, 30% of the project area belongs to the Study Area.	Rehabilitation of main & tertiary cannals →				Operation/maintenance →		
	6.0	8.0	9.0	7.6	6.3		
K. Brantas Multipurposes Development	Planning & implementation of several projects →						
	15.9	24.1	26.0	38.9	24.7	17.3	
a. Middle Reaches Dredging & Embankment: dredging, 15.6 Mm^3 embankment, 1.6 Mm^3	0.2	0.3	1.7	2.9	4.2	5.5	Plus foreign loan of ± ¥.9.4 billion
b. Lodoyo After Bay: 9 gates, L=121 m; effective storage volume, 5 Mm^3	(n.a.)						
c. Tulungagung Area Flood Control & Dreinaga				← ±30 →			Plus foreign loan of ±US$60 million
d. Hydropower Development Sengguruh and Kasamben Projects				← ±11 →			Plus foreign loan of ±US$45 million

Source: BAPPENAS, BAPEDA, Project Offices.

11.3 Development Perspectives and Strategies

11.3.1 Brantas Basin

Since the present development efforts are mainly focused upon the economically high potential parts of the Brantas Basin in the Study Area, the investment for anti-disaster such as Mt. Kelut debris control works and middle reaches improvement projects should be promoted extensively as it is planned during Repelita III to protect the past and present investments. After the completion of the middle reaches dredging and embankment project in 1990, Brantas River will be able to stand against a probable flood of the fifty year return period provided that Mt. Kelut debris control works can prevent additional inflow of the lahar into Brantas River from the next possible eruption.

Groundwater development in the alluvial area in the middle reaches seems to be vital and feasible. It will be expanded to supply water to about 40,000 ha in the coming five to eight years. The lessons from this project can be extended to other potential areas of groundwater in tributary basins or the southern coastal basins.

In the field of hydropower development, there are still possible sites in the upper Brantas River area. They are Sengguruh (10 km upstream of Karangkates Dam) and Kasamben (11 km downstream of Karangkates Dam), whose generating capacities are estimated to be 29,000 kW and 15,000 kW, respectively.

11.3.2 Tributary Basins

There still exist potential tributary basins which require further development, namely, Ngasinan (Ngrowo) River in Brantas River Basin, and Madiun River in Solo River Basin. The future development of Ngasinan River, if it is done on a large scale, would play a key role to develop the swampy area of Tulungagung. The Tulungagung flood control and

drainage project shall be coordinated with an overall development concept of Ngasinan River.

In Madiun River Basin, there are two prospective big dam sites which are conceived in the Master Plan of Bengawan Solo (OTCA, 1974). They are Bendo Dam and Badegan Dam. As to Bendo Dam, a crude feasibility study was undertaken by PROSIDA and the study indicates that its IRR is estimated to be 9% with construction costs of $40 million. Bendo Dam project was also given a high priority in the Master Plan. In addition to Bendo and Badegan, there may be other possible dam sites for the purposes of flood control, irrigation, and hydropower development in Madiun River Basin. For these reasons, it is recommended that an overall review of Madiun River Basin development should be carried out in order to plan a sequence of dam construction in the basin as a whole.

Groundwater development is now underway in the certain alluvial area in KB Ponorogo. A success of the Kediri-Nganjuk groundwater project shall be applied in this area. In addition, technical guidance of tertiary canal maintenance and cropping pattern should be strengthened and also know-how of water management should be developed in this area.

11.3.3 Southern Coastal Basins

The southern coastal basins consist of many small comb-shaped rivers flowing into the Indonesian Ocean. Among these, major rivers are, from west to east, Grindle, Lorog, Panggul, Wringin, and Penguluran whose catchment areas vary from 100 km^2 to 300 km^2 approximately. It was thought that the areas were poor from an economic point of view. But the investment in several small scale water projects in these areas shows that they will be economically profitable. For example, Tinatar Dam in Pacitan which is now under construction indicates that the annual incremental benefits are

almost same as the initial construction costs. Another example is Pakis Baru Project in the highland area of Pacitan and our investigation shows that integrated efforts of reforestation, dam construction, and canal improvement seems successful.

If an integrated approach, in other words, good watershed management is applied to this southern coastal area, the projects can expect a high rate of economic returns, and they also upgrade indirectly the facilities which provide basic human needs to the local people in these areas.

11.4 Proposed Projects

11.4.1 Conceivable Projects

After assessment of the on-going projects and the strategy of water resourse development planned with identification of the prevailing problems and constraints, and the national and regional development objectives, the following planning actions and projects are formulated for next 5 to 10 years. The justification of the projects are mentioned in Section 11.3. Since it is difficult to give them a quantitative evaluation at the present stage of the study, a further discussion and a detailed study through master planning of the respective basins are required for all the following projects.

(a) Tributary Development

There are two works for master planning and five conceivable dam projects as shown in Table 11.2. The development priorities can be given of reviewing the overall development concepts derived in each master plan and detailed feasibility analyses. However, Bagong and Bondo projects are already well formulated so that they can be implemented earlier than others. The estimated sizes and costs given in Table 11.2 are based on very crude calculations.

Table 11.2 List of Proposed Projects in Tributaries

	79/80	80/81	81/82	82/83	83/84
Ngashinan River Basin					
1. Master Plan for the Ngashinan River Basin Costs : Rp. 200 mill.	⊢———				
2. Bagong Dam (Trenggalek) Scale : H=40 m, L=300 m Costs : Rp. 4,000 mill. Benefits: 1,500 ha irrigation & flood controls	⊢———	D/D.	S/T	Const.	
3. Tugu Dam (Trenggalek) Scale : H=5 m, L=1,200 m Costs : Rp. 500 mill.		⊢---	F/S	D/D S/T	Const.
4. Kampak Dam (Trenggalek) Scale : H=5 m, L=800 m Costs : Rp. 400 mill.	⊢----	F/S	D/D	S/T	Const.
Madiun River Basin					
5. Master Plan for the Madiun River Basin Costs : Rp. 300 mill.	⊢———				
6. Bendo Dam (Ponorogo) Scale : H=80.5 m, L=420 m, rockfill Costs : Rp. 24,000 mill. Benefits: 3,000 ha irrigation and 3,500 kW hydropower		⊢———	D/D, S/T	———	Const.
7. Badegan Dam (Ponorogo) Scale : H=60.5 m, L=1,700 m, rockfill Costs : Rp. 48,000 mill. Benefits: 4,800 ha irrigation 6,000 kW hydropower		⊢—	F/S	D/D S/T	Const.

Note: Abbreviations are as follows: H=Height, L=Length, F/S=Feasibility Study, D/D=Detailed Design, S/T=Specification & Tender, Const.=Construction

(b) Southern Coastal Basins

In Section 11.3.3, an integrated approach is recommended for the economic and social stability in this area. As shown in Table 11.3, our field inspection have produced an impression that there would be possible project sites for multipurpose development and that they seemed to be economically feasible as well as socially desirable. The Study proposes a new institutional set-up that aims at integrated or multipurpose development of the southern coastal areas. It may be called "Master Plan for Small Scale Integrated Development Project in Southern Coastal Basins" which deals with:

(1) An overall survey of watersheds which will indicate present and future land use pattern, and identify the potential areas and depressed areas where immediate development is needed. Also a aero-photo survey if it is required.

(2) A master plan of the area which shows possible development locations and sizes, and which outlines time schedules for development.

(3) Investigation of reforestation and free cropping possibility, suitable dry land crops and proper extension service systems.

(4) Design of proper structures including land erosion control works, small scale dams, irrigation systems, mini-hydro electric plants and their distribution systems, drinking water supply systems and facilities for groundwater exploitation. These structures should be treated in an integrated manner so that a catchment (watershed) area or a rural community can be systematically developed.

(5) Implementation and maintenance of the above mentioned works and the transfer of the operational and maintenance know-how to village officials.

The necessary structures can be constructed by local contractors and unskilled labor through the guidance of skilled engineers provided by the new institution.

11.4.2 Recommendation

Recommended projects in the Study Area are shown in Tables 11.2 and 11.3. In which Bendo Dam project and the small scale integrated development projects in the southern coastal basins are emphasized. This sector study gives a top priority to the latter.

A plan for the small scale integrated development project requires: (1) map preparation (1:25,000-1:3,000), hydrological studies, geological surveys, land-use map preparation, vegetation surveys and socio-economic surveys; (2) site selection for watershed management (checkdams) which includes structure's dimensions, actions needed, estimation of direct costs and benefits, and assessment of intangible benefits for the people concerned; and (3) policy recommendations, budget requirements, and institutional arrangements.

Table 11.3 List of Proposed Projects in Southern Coastal Basins

	79/80	80/81	81/82	82/83	83/84
1. Master Plan for the Small Scale Integrated Development Project in Coastal Area Costs : Rp. 200 mill.	⊢——⊣				
2. Proposed Projects					
- Tinator Dam (Pacitan) Scale : H=20 m, L=250 m Costs : Rp. 3,800 mill. Benefits: 1,400 ha irrigation & flood retention	⊢——⊣	⊢——⊣	⊢——⊣		
	D/D	S/T	Const.		
- Lorog Dam (Pacitan) Scale : H=15 m, L=200 m Costs : Rp. 800 mill. Benefits: 450 ha irrigation & flood retention	⊢——⊣	⊢——⊣			
	D/D	S/T	Const.		
3. The following projects shall be studies in the Master Plan:					
- Grindle Dam (Pacitan)		⊢——⊣	⊢——⊣	⊢——⊣	
		F/S,	D/D,	S/T	Const.
- Panggul Dam (Trenggalek)			⊢——⊣	⊢——⊣	⊢——⊣
			F/S,	D/D	Const.
- Wiringin Dam (Blitar)	⊢——⊣	⊢——⊣			
	F/S				
- Penguluran Dam (Malang)		⊢——⊣	⊢——⊣		
		F/S			

- Small Check Dams for Watershed Management
  - Standard type: scale : H=5-10 m, L=50-150 m Dam Construction
    costs : Rp. 10-50 mill.
    benefits : 10-200 ha of irrigation
    watershed management : reforestation, tree cropping, erosion control, irrigation, groundwater exploitation, domestic water supply, mini-hydropower development.
  - Location : KB Pacitan, KB Trenggalek and KB Blitar.

- Drinking Water Supply Projects
  - Standard type: water source : spring or checkdam reservoirs, 2-5 litres/sec, piping of 2-4 km (diameter 2-5 in.).
    pump-up head : 10
    beneficiary : 3,000-10,000 inhabitants
    costs : Rp. 20-40 mill.
  - Location : KB Blitar : Panggungrejo, Schruhwadang, and Bakung
    KB Trenggalek: Donko
    KB Pacitan : Punnung, Tulkun, Nagawan, Blingkak and Donorojo

Note: Abbreviations are same as Table 11.2.

CHAPTER XII

LAND TRANSPORTATION

12.1 Land Transportation Development Strategy

The following strategies are recommended for development of land transportation systems in the Area.

(1) Road transportation is getting more important, while railroad transportation becomes less important in the Study Area. This trend is expected to continue in the future. Therefore, it is recommended not to invest a large amount of money in railroad.

(2) At the present rate of increase in traffic volumes, the existing two-way provincial highways will be filled up to their capacity within five years. Expansion of the capacity will be required soon.

(3) Kabupaten road networks will be vital for development of the whole area. The development priority be given first to the routes between kecamatan and kabupaten centers which provide the least travelling costs, second to the access roads to provincial highways and kecamatan centers, and third to the routes which lead to agriculture, mining, tourism and industrial potentials areas.

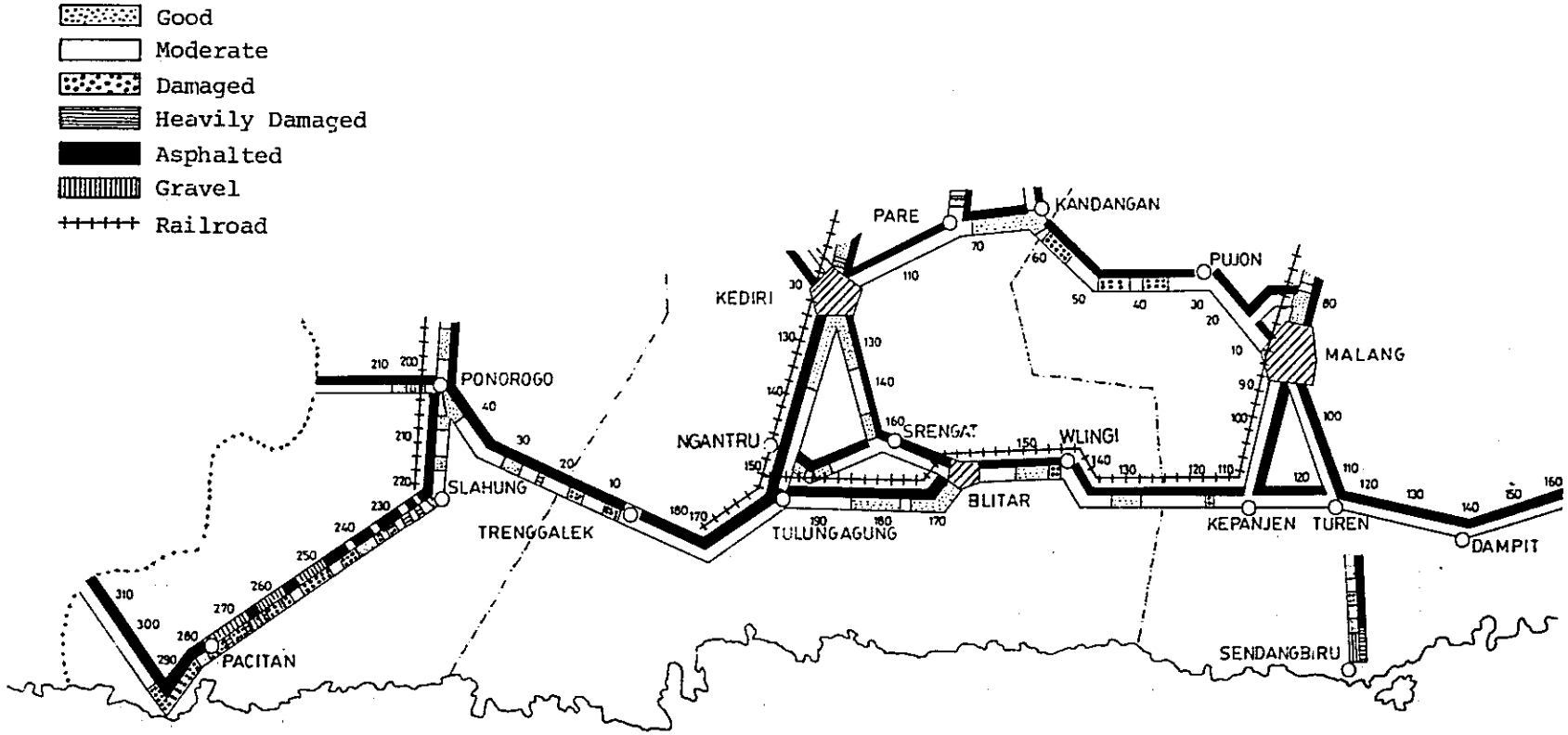
(4) For rural development, construction of access roads to desas are necessary, in addition to upgrading and building desa roads.

12.2 Evaluation of Present Land Transportation

12.2.1 Provincial Highway

The major function of the provincial highway network is to connect all the capital towns of kabupaten and to accommodate inter-city traffic smoothly. The entire provincial highways, major cities and their road conditions are shown in Figure 2.1. The width of carriage way in the rural flat heavy traffic areas is 6.0 m, whereas that in the less traffic areas is 4.0 to 5.5 m. All the roads have been asphalted except some sections between Pacitan and Ponorogo. Most of the highways are paved with penetration macadam. The surface conditions are good in flat area, but not in the hilly areas like Wlingi-Kepanjen and in mountain areas like Ponorogo-Trenggalek and Pacitan-Slahung. Most of the horizontal alignments of the existing highways in the flat terrain are straight, but some parts of the horizontal alignment in the crossing with railroads and in bridge setting parts are S-curve of 60 to 100 m radius, which is not desirable. Both horizontal and vertical alignments in the hilly or mountainous terrain are not good because the lays of land prevent the highways from being constructed with better alignments. Bina Marga divided the provincial highway networks in the Study Area into 18 sections based on traffic flows and volumes. Those sections are shown in Table 12.1.

Figure 12.1 Statistics of Road Condition and Length (in km)
October 1978



Source: Bina Marga East Java Province

Table 12.1 Provincial Highways and Their Sections

	Section	Length (km)
1.	Provincial border--Pacitan	41
2.	Pacitan--Slahung	56
3.	Slahung--Dongek	14
4.	Dongek--Ponorogo	5
5.	Ponorogo--Study Area border	43
6.	Dongek--Trenggalek	47
7.	Trenggalek--Tulungagung	32
8.	Tulungagung--Kediri	29
9.	Tulungagung--Blitar	34
10.	Blitar--Srengat	15
11.	Srengat--Ngantru	20
12.	Srengat--Kediri	35
13.	Blitar--Wlingi	17
14.	Wlingi--Kepanjen	24
15.	Kepanjen--Malang	19
16.	Malang--Turen	26
17.	Kepanjen--Turen	17
18.	Turen--Study Area border	40

Source: East Java Provincial Development of Public Works.

12.2.2 Kabupaten Road

Dinas Public Works of each kabupaten made great efforts to improve kabupaten roads for the last five years with annual investments ranging from Rp.150 to Rp.300 million. But still kabupaten road networks is not good especially in the southern coastal area. The present conditions of the kabupaten roads are shown in Table 12.2.

Table 12.2 Length of Kabupaten Roads and Their Conditions

Kabupaten	Total Length (km)	Normal (%)	Asphalted (%)
Pacitan	221	50	37
Ponorogo	269	41	16
Trenggalek	254	30	33
Tulungagung	272	29	40
Blitar	307	39	70
Kediri	n.a.	n.a.	n.a.
Malang	560	n.a.	n.a.

Source: Dinas Public Works of each kabupaten.

Note: n.a. indicates that data is not available.

12.2.3 Railroad

As shown in Figure 12.1, the railroad in the Area runs parallel with the provincial highway. They are competitive and for the past ten years, demand for railroad transportation has decreased. Especially, volumes of short distance passengers and freight on the railroad have been decreasing, and average distance of their movement has increased. The road has apparently an advantage over railroad for the following reasons in the Area.

(1) Railroad transport cannot offer any good services, partly due to deterioration of rail, sleepers, bridges and rolling stocks, and partly due to operational inefficiency.

(2) There is not much bulk cargo, and the distance for its transportation is short.

(3) Recent improvement in processing technique of sugar, coconut and others resulted in less demand for railroad transportation.

(4) For transportation of passengers, a railroad used to have an advantage over a road. However, minibuses called "colt" are taking over the railroad since they can provide convenient services.

Railroads in the Study Area were constructed around 50 or 60 years ago during the Dutch colonial time. The present railroad is 1,075 mm of gauge with 33 to 38 kg/m of rail and a single track with diesel locomotive. For the past forty years the maintenance has been neglected and it will require a great amount of investment for improvement including the modernization of rolling stocks. The branch lines of the railroad in the Study Area are operated by the Indonesian National Railway (PNKA) as a part of Java railway networks. The PNKA suffers deficit because of low tariffs and a large amount of personnel expenditure.

12.3 Provincial Highway

12.3.1 A Traffic Volume Forecast

Table 12.3 shows the sections where traffic volumes and their changes have been measured accurately. Rates of increase in traffic volume during the period 1972 to 1976 range from 20 to 40% and are higher than the international standards. There are two factors for such high rates of increase in traffic volume. The one is a rapid increase in number of cars and the other is an expansion of economic activities in the Study Area.

Table 12.3 Traffic Volume and Its Rate of Increase

(Unit: Vehicles/day)

	Section	1972	1976	Annual Rate of Increase (%)
1.	Provincial border--Pacitan	72	212	30
3.	Slahung--Dongek	188	666	37
5.	Ponorogo--Border	186	797	44
6.	Dongek--Trenggalek	31	257	70
7.	Trenggalek--Tulungagung	246	915	40
9.	Tulungagung--Blitar	317	1,206	40
12.	Srengat--Kediri	526	1,160	22
13.	Blitar--Wlingi	664	1,634	25
16.	Malang--Turen	1,182	3,995	30
17.	Kepanjen--Turen	151	403	28

Source: Department of Transportation and Communication.

Based on the past trends of increase in traffic volume and number of motorized vehicles both in the Study Area and the whole East Java, the Team members estimated the future growth rates of traffic volume in the Study Area as follows:

	Average Daily Traffic in 1976	
	Less than 300 (%)	300 or more (%)
1976-1978	20	15
1978-1983	15	10
1983-1993	10	8

With these growth rates the traffic volumes for 1983 and 1993 have been estimated as shown in Table 12.4.

Table 12.4 Estimated Traffic Volume by Section[1/]

Section	1976 (1)	1978 (2)	1983 (3)	1993 (4)	Ideal Capacity in 1993 (5)
1.	212	305	614	989	1,700
2.	39	56	113	182	1,500
3.	666	849	1,415	1,982	4,000
4.	1,136	1,500	2,414	3,380	8,000
5.	797	1,052	1,644	2,371	3,400
6.	257	370	744	1,198	1,500
7.	792	1,283	2,066	2,892	4,000
8.	975	1,287	2,072	2,901	8,000
9.	1,206	1,592	2,563	3,588	8,000
10.	2,783	3,674	5,914	8,280	8,000
11.	652	861	1,386	1,940	4,000
12.	1,160	1,531	2,465	3,451	8,000
13.	1,634	2,157	3,473	4,862	8,000
14.	3,069	4,057	7,322	9,131	6,700
15.	3,069	4,051	6,522	9,131	8,000
16.	3,995	5,273	8,490	11,886	8,000
17.	403	532	856	1,199	6,700
18.	619	817	1,315	1,184	6,700

Note: 1/ Motorcycles are not included.

Comparison of figures in columns (4) and (5) in Table 12.4 suggests that the following four sections will not be able to accommodate the traffic volumes in 1993.

Section 10: Blitar--Srengat
Section 14: Malang--Kepanjen
Section 15: Kepanjen--Wlingi
Section 16: Malang--Turen

On top of these sections where traffic volumes are clearly expected to exceed the present road capacities, more attention needs to be paid to some other sections where bad road

conditions discourage potential traffic demands from being realized. Such sections include the following ones:

Section 2: Pacitan--Slahung

Section 6: Trenggalek--Ponorogo

To promote economic and social development in the less developed areas, this Study strongly recommend to upgrade the two sections, even though their capacity is large enough for the 1993 traffic volumes.

12.3.2 Project Proposal

Based on the evaluation of present road conditions and projection of traffic volume, the Team members recommends that road capacities be expanded in the sections where traffic volumes will exceed the present road capacities and that road conditions including alignment, pavement and drainage be improved where such improvement would significantly contribute to realizing potential traffic volumes and accelerating overall socio-economic development of the less developed areas.

Section 10, 14, 15 and 16 where daily traffic volumes exceed 8,000 in 1993 should be upgraded and, in addition, 1.5 to 2 m hard shoulder sidewalks should be constructed since the areas along the sections are densely populated. The sidewalks are for pedestrians, bicycles and animal drawn carts and will raise capacity of the carrigeway up to 15,000 vehicles a day. Fortunately, there are enough spaces which protect pedestrians and bicycles on both side of the carrigeway. The same sidewalks can be constructed along kabupaten roads, too. In line with these recommendations, the projects as shown in Table 12.5 have been identified for the Repelita III period, including a feasibility study on the provincial highway network.

Table 12.5 Recommended Projects for Provincial Highway Betterment

Section	Contents of Project	Length of the Section to be Covered	Estimated Costs (Rp. Million)
Ponorogo-Pacitan	Feasibility Study and Constructoin	50 km	2,280
Ponorogo-Trenggalek	Upgrading of mountainous section	20 km	620 1980/81:210 1981/82:210 1982/83:200
Blitar-Srengat,	Upgrading	15 km	225
Wlingi-Kepanjen-Malang,	Upgrading	43 km	645
Malang-Turen	Upgrading	26 km	390

Notes: The following policies are recommended.

a) Construction of a new by-pass for through traffics near local towns.
b) Upgrading and maintenance.
c) Planning for new routes and restrictions land uses along the planned new routes.

12.4 Kabupaten Road

12.4.1 Identification of High Priority Projects

The Team members have identified the three sets of high priority projects based on three different functions to be performed by kabupaten roads. The major functions of kabupaten road are first to connect kecamatan centers to kabupaten centers which are usually the centers of economic activities of kabupatens, second to connect kecamatans among others and third to link high potential areas, e.g., fishery, tourism and mining development areas, with major road networks.

(a) Ideal Routes

The ideal routes, namely the routes between kecamatan and kabupaten centers providing the least travelling costs, have been sorted out to identify priority projects from the viewpoint of the first function of kabupaten roads, linkages between kabupaten and kecamatan centers.

One kecamatan has many alternative routes connecting it with an economic center of kabupaten. To find the ideal route, the following steps are taken:

(1) Identification of alternative routes and their length;
(2) Classification of topographic conditions along the routes into flat, hilly and mountainous;
(3) Estimation of vehicle operation costs per kilometer for different topographic conditions;
(4) Identification of the route which requires the least vehicle operating costs;
(5) Adjustment of the vehicle operating costs with the magnitude of attractiveness of the seven kabupaten centers in terms of levels of economic activities;
(6) Selection of an ideal route based on the adjusted least vehicle operating costs.

As one example, Table 12.6 demonstrates the selection of an ideal route out of two alternative routes; Route A from Sudimoro to Pacitan and Route B from Sudimoro to Trenggalek. Vehicles Operating Costs (VOC) of Route A and B are Rp.2,383 and Rp.2,641, respectively. Even after discounting VOC of Route B by 2% with the magnitude of attractiveness of Route A is still less than of Route B. Thus Route A is selected as an ideal route. With the method above discribed, thirteen ideal routes have been identified to be upgraded (see Table 12.7).

Table 12.6 Selection of the Ideal Route in Sudimoro, Pacitan

	(1) Roads	(2) Distance (km)	(3) VOC[1/] (Rp.)	(4) Magnitude of Attractiveness[2/] (%)	(5) (3)-(4)
Route A	Sudimoro-Ngadirejo	26	1,174		
	Ngadirejo-Tulakan	12	524	0	
	Tulakan-Pacitan	14	667		
		52	2,383	2,383*0=0	2,383
Route B	Sudimoro-Panggul	11	524		
	Panggul-Dongko	21	948	2	
	Dongko-Kepanjen	20	839		
	Kepanjen-Trenggalek	9	330		
		61	2,641	2,641*0.02=53	2,588

Notes: 1/ Data are obtained from "Comparison of Vehicle Operating Costs for Different Conditions of Pavement for Earth, Gravel and Seal," by Bina Marga, 1978.

2/ Magnitude of attractiveness of kabupaten centers is measured by the share of origin destination of traffics among seven kabupaten centers of the Study Area. Data are derived from "OD Survey Table in 1978," by Directorate General of Transportation.

Table 12.7 Ideal Routes Projects for Upgrading

	Section	Length (km)	Cost (Rp. Million)
1.	Bandar (Pacitan)--Tegalombo (Pacitan)	10	60
2.	Sudimoro (Pacitan)--Ngadirejo (Pacitan)	14	84
3.	Dongko (Trenggalek)--Karangan (Trenggalek)	10	60
4.	Dongko (Trenggalek)--Panggul (Trenggalek)	5	30
5.	Munjungan (Trenggalek)--Kampak/Bendo (Trenggalek)	6	36
6.	Trenggalek--Bendungan (Trenggalek)	10	60
7.	Lodoyo (Blitar)--Binangun (Blitar)	18	108
8.	Margomulyo (Blitar)--Panggungrejo (Blitar)	11	66
9.	Suruhwadung (Blitar)--Kademangan (Blitar)	5	30
10.	Bakung (Blitar)--Lorejo (Blitar)	4	24
11.	Talun (Blitar)--Gandusari (Blitar)	4	24
12.	Kampak/Bendo (Trenggalek)--Gandusari (Trenggalek)	4	24
13.	Kalidawir (Tulungagung)--Pucanglaban (T. Agung)	15	90
14.	Sampung (Ponorogo)--Sumoroto (Ponorogo)	12	72
15.	Tenangan (Ponorogo)--Ngebel (Ponorogo)	13	78
16.	Pulung (Ponorogo)--Soko (Ponorogo)	10	60
17.	Sulaung (Ponorogo)--Ngrayun (Ponorogo)	7	42

(b) Access Roads to Provincial Roads and Kecamatan Centers

At present, access roads from kecamatan centers to kabupaten roads and also from desas to kecamatan centers are fairly in bad conditions at many spots. To promote rural development and to provide basic social services to the people in the rural areas, the local governments have to upgrade the access roads as the basic infrastructure for development. After investigating the road conditions on site, the Team members have identified the following access roads to be upgraded.

Table 12.8 Access Roads Projects for Upgrading

	Section	Length (km)	Cost (Rp. Million)
1.	Pringkuku (Pacitan)--Pacitan	10	60
2.	Mantren (Pacitan)--Provincial border	8	48
3.	Tegalombo (Pacitan)--Tulakan (Pacitan)	16	96
4.	Pogalan (Trenggalek)--Rejowinangun (Trenggalek)	17	42
5.	Gandusari (Trenggalek)--Durenan (Trenggalek)	8	48
6.	Lodoyo (Trenggalek)--Karangan (Trenggalek)	9	54
7.	Kesamben (Blitar)--Binangun (Blitar)	8	48
8.	Sawol (Ponorogo)--Kabupaten border (Ponorogo)	11	77

(c) Potential Roads

The potentials for fishery, tourism and mining development are found in many places in the Study Area. However, due to lack of sufficient investments in infrastructures such as roads, electricity and water supply, some of those potentials have not been exploited yet. Based on the field observations and interviews, those roads which will promote development of specific sectors and areas are identified as shown in Table 12.9.

Table 12.9 Potential Road Products for Upgrading

	Section	Length (km)	Cost (Rp. Million)
1.	Kebonagung (Pacitan)--Worawari (Pacitan)	12	82
2.	Punung (Pacitan)--Kalak (Pacitan)	14	98
3.	Ngadiluwih (Pacitan)--Koripan (Pacitan)	6	36
4.	Tulakan (Pacitan)--Sluang (Pacitan)	25	175
5.	Bandar (Pacitan)--Ngunut (Pacitan)	6	36
6.	Ngadirejo (Pacitan)--Tanggung (Pacitan)	5	35
7.	Sudimoro (Pacitan)--Panggul (Trenggalek)	11	66
8.	Panggul (Trenggalek)--Tangkil (Trenggalek)	12	72
9.	Panggul (Trenggalek)--Banjar (Trenggalek)	6	36
10.	Jombak (Trenggalek)--Sidomulyo (Trenggalek)	18	108
11.	Dongko (Trenggalek)--Kampan (Trenggalek)	17	102
12.	Kampak (Trenggalek)--Watulimo (Trenggalek)	10	90
13.	Watulimo (Trenggalek)--Prigi (Trenggalek)	10	60
14.	Pogalan (Trenggalek)--Cori (Trenggalek)	7	42
15.	Nglongsor (Trenggalek)--Pakel (Trenggalek)	5	30
16.	Lorejo (Trenggalek)--Coast (Trenggalek)	5	30
16'.	Craken (Trenggalek)--Bendoroto (Trenggalek)	9	54
17.	Sumberglagah (Blitar)--Watudor (Blitar)	6	36
18.	Panggung (Blitar)--Coast (Blitar)	6	42
19.	Bendorejo (Blitar)--Udanawu (Blitar)	8	48
20.	Jatilengger (Blitar)--Bendorejo (Blitar)	9	54
21.	Popoh (Tulungagung)--Besole (Tulungagung)	5	30
22.	Besole (Tulungagung)--Teluk Brumbun (A. Agung)	4	28
23.	Tanggunggunung (T. Agung)--Kalimenur (T. Agung)	12	72
24.	Kalimenur (T. Agung)--Teluk Sere (T. Agung)	7	49
25.	Pagerwojo (Trenggalek)--Bendung (Trenggalek)	10	70
26.	Ngadi (Tulungagung)--Doro (Kediri)	10	70
27.	Mojo (Kediri)--Besuki (Kediri)	16	64
28.	Sambirejo (Kediri)--Goliwan (Kediri)	16	74
29.	Tiron (Kediri)--Kalimanis (Kediri)	8	48
30.	Berhek (Kediri)--Blongko (Kediri)	7	42
31.	Berhek (Kediri)--Sawahan (Kediri)	14	98
32.	Pagerwojo (Trenggalek)--Bendungan (Trenggalek)	10	60
33.	Sumoroto (Ponorogo)--Pok (Ponorogo)	7	42
34.	Ponorogo--Kedungbanteng (Ponorogo)	11	44
35.	Jenangan (Ponorogo)--Kasugihan (Ponorogo)	9	45
36.	Ngling (Ponorogo)--Obada (Ponorogo)	9	54
37.	Pulung (Ponorogo)--Banaran (Ponorogo)	10	50
38.	Sambit (Ponorogo)--Hglndcng (Ponorogo)	7	40
39.	Ngrayun (Ponorogo)--G. Tumrang (Ponorogo)	7	42
40.	Pagak (Malang)--Tumpakejo (Malang)	20	100
41.	Dampit (Malang)--Tembakasri (Malang)	30	150
42.	Langurdowo (Malang)--Teluk Sipelot (Malang)	19	105
43.	Tamansari (Malang)--Lebaksat (Malang)	12	60
44.	Pucanglaban (T. Agung)--Coast	7	49
45.	Katjangan (T. Agung)--Puse (T. Agung)	7	42
46.	Karangatatug (T. Agung)--Ngledok (T. Agung)	10	60
47.	Sendang (T. Agung)--Penampean (T. Agung)	9	54

12.5 Desa Road Development Projects

There are 1,700 desas with population size ranging from 3,000 to 5,000. Most of them are located far from any provincial highways as well as their kecamatan centers, without good access roads. The lack of sufficient access roads has been a great obstacle to marketing of agricultural, fishery and forestry products and to provision of productive inputs and social services to desas. For rural development improvement of access roads to desas is an essential requirement. Defficiency in desa roads has been calculated as follows:

A case of KB Trenggalek

Total area:	1,272 km^2
Number of desas:	157
Number of desa per km^2:	0.1234
Road needed per km^2:	$\sqrt{2/0.1234}$ = 4.0250 km
Total road needed:	4.0250 x 1,272 km
	≈ 5,120 km
Existing road length:	1,370 km
New road needed:	5,120 km - 1,370 km
	≈ 3,750 km

The defficiency in feeder roads in each kabupatens is shown in the following:

Kabupaten	Length (km)
Pacitan	3,870
Ponorogo	1,314
Trenggalek	3,759
Tulungagung	615
Kediri	84
Blitar	3,157
Malang (1/2)	3,537
Total	16,336

Though desa roads are essential for rural development, it is still premature to fill out all these defficiencies during the Repelita III period. This Study therefore,

recommends that 50% of the present defficiency be upgraded and the rest during the Repelita IV period. The total costs required for the construction and upgrading are estimated at Rp.32.7 million.

12.6 Railroad Development Project

There are three branch lines of railroad networks in the Study Area; Madiun to Ponorogo, Jumbang to Blitar, and Bangil to Blitar through Malang. At present, the volume of freight by railroad is less than that by trucks. Since the railroad takes longer time to transport cargo, it transports only limited kinds of item such as fertilizer and cement. This trend of railroad transportation is found not only in Indonesia but also all over the world. As road facilities improve and the number of vehicles increases, railroad is losing its role as a means of local transport and serves only for long distance transport. In relation to this declining demand for railroad transportation, a feasibility study is required for deciding what amount of money should be invested in improvement of the railroad system in the Area. The costs of this feasibility study is estimated to be Rp.200 million.

CHAPTER XIII

PORTS

13.1 General

Despite the enormous significance of coastal and inter-insular transportation for Indonesia, there is no regular liner service along the southern coast of East Java. This is a natural consequence partly of sea transportation technology which tends to favor concentration and bulk handling, which are not suitable for much if not most of the potential demand along the East Java coast, and partly of unfavorable natural conditions such as the rough sea and shallow water along the most parts of the coast. However, it is also due to insufficient attention given to the development of local ports.

With increased economic activities which will be expected to be generated in coming years in accordance with the implementation of development plans, the demand for commercial ports will substantially increase. In addition, intensified fishery activities along the coast have already increased demand for fishing ports and their services.

13.2 Existing Conditions

Within the Study Area, one fishing port exists at Pacitan and another is under construction at Prigi. Patican fishing port consists of a newly constructed piling pier, a 40 m causeway, a fish market (20 m x 10 m) and a warehouse. Beside this newly constructed pier, there are same old piles

from a wrecked jetty, but they are no obstacle to use of the fishing port (see Figure 13.1). However, for the fishing boats currently using Pacitan, the elevation of the pier, 3 m above mean sea level, is too high.

In addition, there are differences between the elevation of this pier and that of the causeway, and between the causeway and the market ground; these differences make transportation of goods from the pier to the market difficult. As a result, the Pacitan fishing port is not used much by fishermen who prefer to use the natural beach to the north of this fishing port for landing their catch and mooring their boats.

The warehouse behind the fish market was used infrequently to store salt or fertilizer. But it is not known whether salt and fertilizer was transported by vessels or trucks.

To sum up, the port of Pacitan is not now adequate either as a fishing port nor as a commercial port but to improve it would help to develop fishery activities and, to some extent, commercial port activities.

On the Bay of Prigi, the construction of a fishing port started in 1976 and Rp.12.5 million and Rp.110 million were spent for its construction in 1976/1977 and 1977/1978, respectively, by the Central Government. The fish market with office was completed at the end of 1978 and an access road which connects the existing road to the fishing port is under construction.

This fishing port had been planned with the intention of establishing one fishing port which includes basic port facilities such as mooring and preparation quay and functional facilities. The functional facilities are an ice plant, cold storage, electricity, a fish market, a water supply system, a workshop with slipway, and an administration office with official residences (see Figure 13.2).

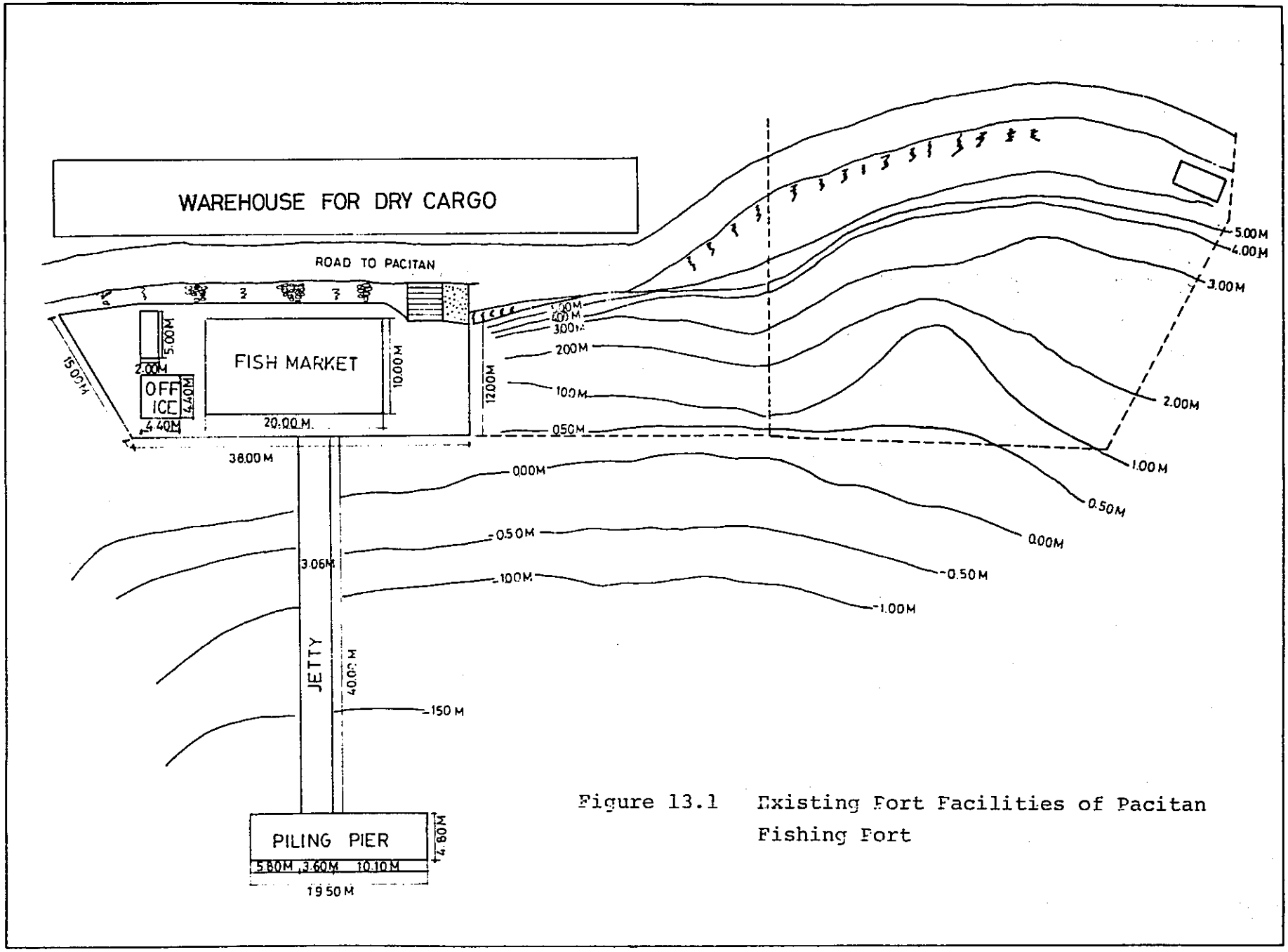
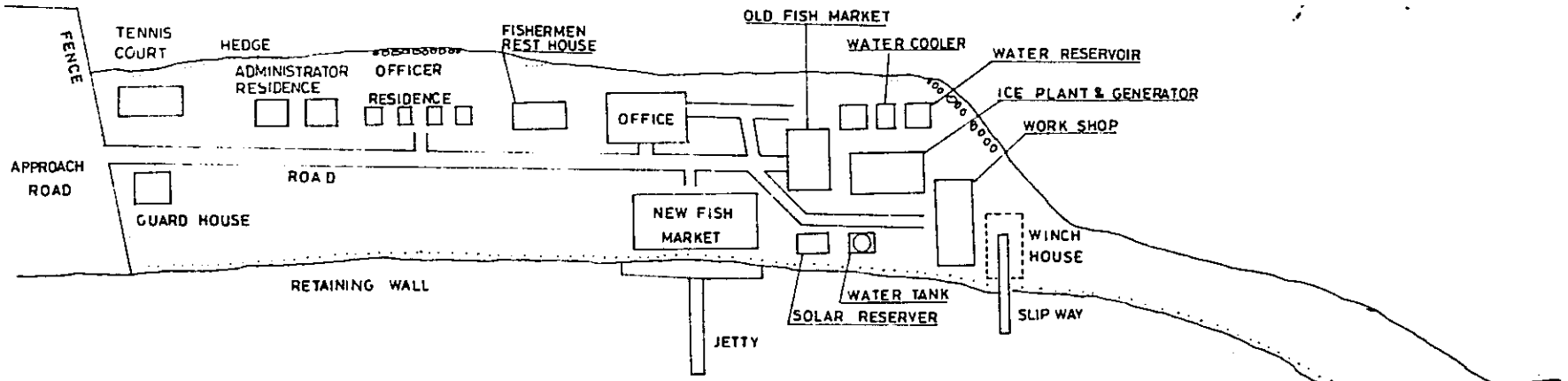


Figure 13.1 Existing Port Facilities of Pacitan Fishing Port

Figure 13.2 Arrangement of Facilities of Prigi Fishing Port 1976-1978, Prepared by Bupati



The port is well located and its planning has proved to be timely in view of the increase in the catch by Prigi fishermen. However, the plan appears to be based on a short-run projection of fishery activities in the area, and fishery activities in this area will soon outgrow the facilities currently planned.

Since a large investment is required to establish port facilities, and it is rather difficult to expand their capacity several years later through improvement of facilities or revision of the original plan, a master plan of a fishing port must be based on a long range perspective and all improvement and development works should be implemented in the framework of this master plan.

13.3 An Approach for Port Development

There are coastal boats, inter-insular vessels and sailing vessels serving Surabaya Port and other ports on the coast of Java Sea, but, on the southern coast of East Java, there is no coastal boat nor inter-insular vessel in local service. This lack of service is partly because port facilities are not in working order and partly because there is not a large enough volume of cargo demand for ships to be profitably operated. Since roads are relatively well developed in East Java and have greater capacity than the present demand for transportation, land transport by trucks is easy and there is little demand for shipping cargo by sea.

At present, economic activities in the Study Area are still at a low level, but in order to pave the way for future economic development, port facilities for domestic trade definitely will be necessary for the southern coast of East Java, in contrast to the prevailing situation. As economic activities in the hinterland increase, sea transportation will prove to be the most efficient and economical for bulk cargo such as fertilizer and cement.

It is also possible to transport general cargo including sundry goods in domestic trade more efficiently if and when the regular shipping services are opened between Surabaya Port, Cilacap Port and prospective ports in the Study Area. Therefore, it is necessary to build in several phases, port facilities for domestic trade, to promote regional development on the southern coast of East Java.

The sites suitable for port construction are mostly limited to three bay areas, Pacitan, Prigi and Popoh. But these bays do not possess any lagoon or swampy area that could be readily used as inlet for construction of ports. In view of topographical and hinterland conditions, large scale port development is not likely in the Area.

Based on the above considerations, development strategy for ports and harbors with the underlying objective to promote regional development has been defined as follows.

(1) First phase: To improve port facilities in phases in view of the level of utilization of facilities, amounts of catch and demand, in the framework of the master plan for improvement of fishing ports.

(2) Second phase: To make fishing port facilities available for trade shipping as required

(3) Third phase: To build commercial port facilities to function independently from those for fishing as shipping demand increases. The facilities of commercial port should be separate from those of existing fishing ports and the function of commercial ports will be promoted in accordance with growth and development of demand for sea transportation.

13.4 Recommended Projects and Priorities

Among the three potential locations for fishing ports (Prigi, Pacitan and Popoh), Prigi deserves the highest priority for development. This is based on the follwoing reasons:

(1) Geographic and topogarphic conditions are most favorable for construction of a port;
(2) Hydraulic conditions (wave, swell, current and others) are also favorable;
(3) Fishery technology is more advanced here than elsewhere and fishermen are most progressive minded;
(4) Access to the market is equally good as at Popoh; and
(5) Construction of a port has already started.

As to the last point, the Directorate General of Sea Communication sent to the Directorate General of Fishery and official letter indicating its acceptance of the request from the latter for establishment of a fishing port, dated October 4, 1978.

The recommended features for the fishing port at Prigi are based on the current plant and its modification in view of substantial expansion of fishery activities in the long-run. The planned capacity of the port is handling of 190 tons a day of fish catch, which is the expected livel in year 2000. This figure has been derived from the target consumption of fish in Java and the expected market area of Prigi. From the past growth of fish catch at Prigi, the fish catch is projected to increase as follows:

1979	10 tons a day	
1980	18	"
1981	15	"
1982	20	"
1983	40	" (New Port Phase I in full use)
1985	50	"
1990	100	"
2000	190	"

The target year of completion and start of use of the basic facilities, functional facilities and land shown in Figure 13.3 is set at 2000 A.D. On the basis of the above, the recommended port will have the following characteristics when fully completed in the year 2000 (see Figure 13.3):

(1) Area of fishing port complex 5.7 ha

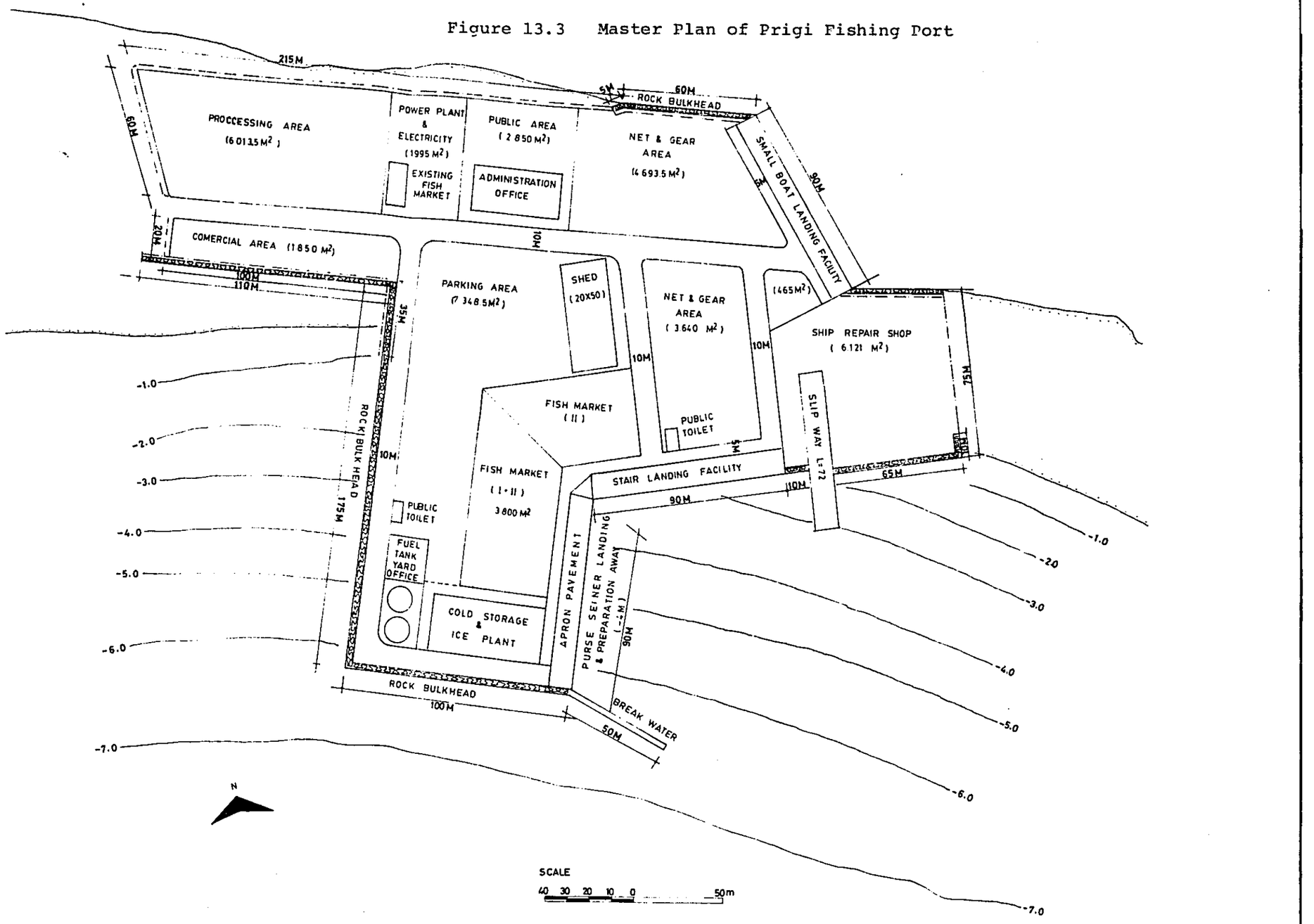
(2) Number of fishing boats in target year
- Purse seiners (medium size) 55 boats
- Purse seiners (small size) 132 boats
- Small fishing boats 90 boats

(3) Catch per day and number of fishing boats
- Purse seiner (medium size) 56 tons (7 boats)
- Purse seiner (small size) 132 tons (22 boats)
- Small fishing boats 1.08 tons (72 boats)

(4) Quantity of fish landed 190 tons/day
approx. 70,000 tons/year

(5) Basic port facilities
- Purse seiner landing & preparation quay 90 m
- Stair landing facility 90 m
- Small boat landing facility 90 m
- Breakwater (rubble mound sloping type) 50 m
- Rock Bulkhead 575 m
- Dredging works (-4 m) 196,700 m^3

Figure 13.3 Master Plan of Prigi Fishing Port



(6) Principal functional facilities

- Fish market	3,800 m^2
- Shed	1,000 m^2
- Fuel supply system	1 set
- Parking area	7,348.5 m^2
- Processing area	6,013.5 m^2
- Net & gear area	8,333.5 m^2
- Ship yard area	6,121.0 m^2
- Shipway of workshop	72.0 m
- Dock road	8,645.0 m^2
- Commercial area	1,850 m
- Administration office area	2,850 m^2

(7) Total costs of investment (includes consultant fees, contingency of 25% and sales tax of 7%)

- Local currency portion	US$3.7 million
- Foreign currency portion	US$5.9 million
- Total costs	US$9.6 million

This project will have the following development impacts:

(1) To reduce time for fishing boats for departing and unloading catch, thereby increasing the utilization of fishing boats and increasing the productivity of fishermen and their equipment;

(2) To enable the introduction of larger and motorized fishing boats, thereby expanding the fishing areas and increasing productivity;

(3) To enable preservation of the quality of fish through refrigeration and freezing, thereby expanding the market area and stabilizing the supply and price of fish;

(4) To reduce the price of fish, thereby contributing to the improvement of nutrition in the market area; and

(5) To increase the income of fishermen at Prigi and indirectly to stimulate the development of the area around it.

In sum, this port will have a significant impact on the regional development of the market area comprising KB Trenggalek, KB Tulungagung, KB Blitar and KB and KDY Kediri not only through supply of fresh fish in large quantity but also through improvement of health and inducement of supplementary activities such as ship repair, mechanical industry and food processing industry. In addition, the development of this port will justify the generation of a large quantity of power and provision of a public water supply system at Prigi, to the general benefit of the people there.

After the fishing port of Prigi, the next priority is the development of Pacitan fishing port. The present fishing port facilities are quite inadequate for existing fishing boats due to lack of small boat landing facilities and shortage of functional facilities such as a cold storage and ice plant. The size of investment should be half of that at Prigi Port. Port facilities should be added at Pacitan within a few years after the development of the Prigi fishing port are as follows:

(1) Small fishing boat landing facility
(2) Stair landing facility
(3) Ice plant and cold storage
(4) Water supply system
(5) Electricity
(6) Net and gear area
(7) Parking area

Another fishing port construction possibility which should be considered is to build one at Popoh Bay. Because of the overlapping market area with Prigi Port and topographical conditions, a large-scale fishing port should not be considered. But, to help improve the productivity of

fishermen at Popoh and to stabilize fish supply, a small-scale fishing port which includes a small boat landing facility or a stair landing facility should be constructed toward the end of Repelita III. The investment costs would be less than $1 million. The last two fishing ports should, however, be planned after the completion of the Phase I part of the Prigi fishing port so that the lessons learned from the first case may be incorporated into their plans.

Aside from fishing ports, the development of a commercial port should be considered for Prigi during Repelita III, for possible construction during Repelita IV. The development of the proposed fishery port at Prigi will stimulate the growth of this village and its hinterland and this port itself can be used by smaller coastal vessels. Thus, the prospect of developing a commercial port at Prigi would be materially different by the middle of the Repelita III period from now.

The location for a commercial port in future at Prigi Bay is indicated in Figure 13.4. This location recommended is excellent from several points of view listed as follows:

(1) The site is sheltered well by a peninsula and an island against swells and waves from the Indonesian Ocean;
(2) The site will be connected easily to the existing road by an access road;
(3) The site is expected to be reclaimed easily for construction of a port terminal by using sand and gravel from the hill located behind the site; and
(4) The site is close to deep sea water.

The capacity of the planned commercial port of Prigi and arrangement of facilities will be listed as follows;

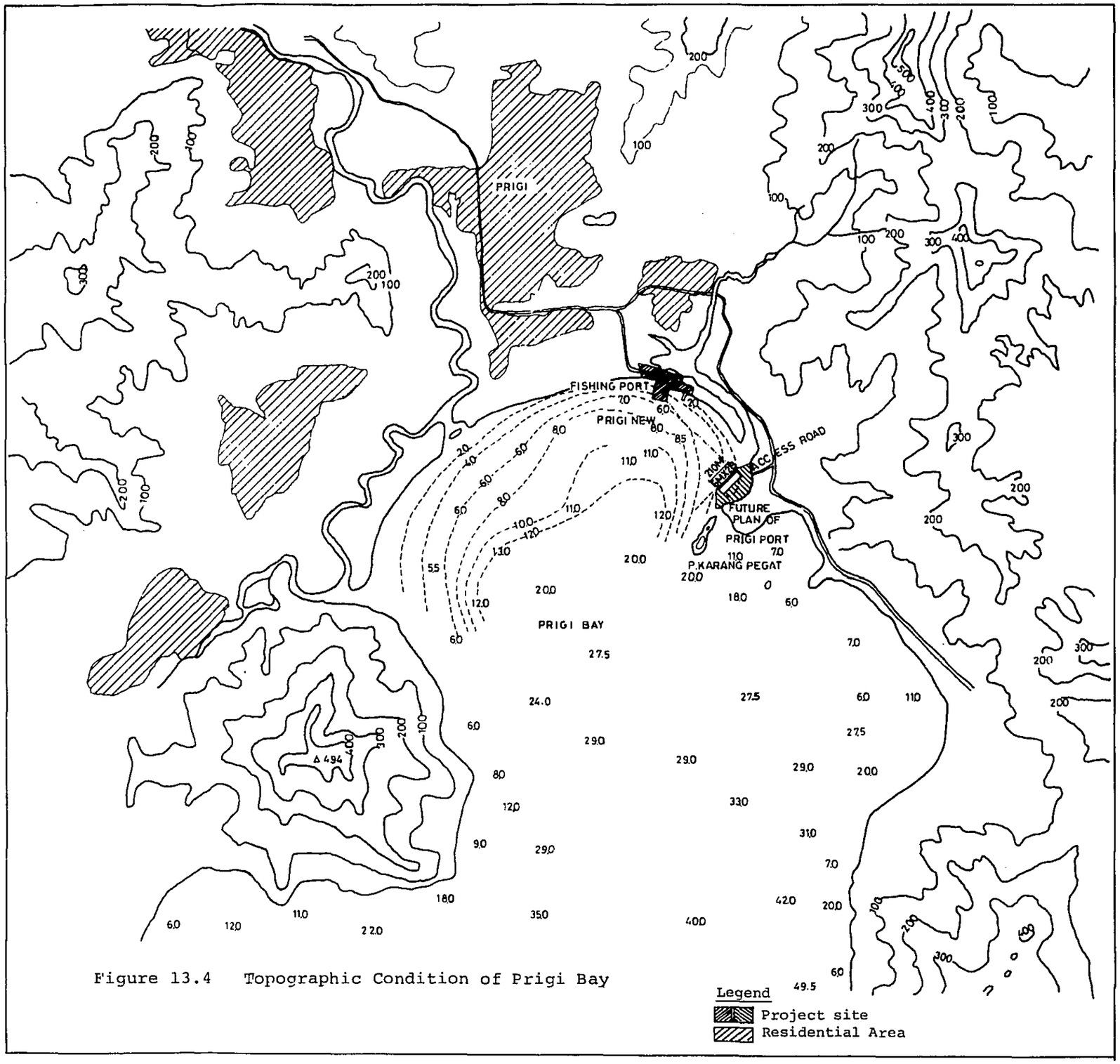


Figure 13.4 Topographic Condition of Prigi Bay

(1) Commercial port facilities planned at Prigi Bay
- Pilling pier with -6 m depth
  Pier length = 210 m (3,000 D/W x 2 berths)
- Port terminal 5.0 ha
- One transit shed and one warehouse
- Access road about 1,000 m
- One administration office

(2) Capacity of Pier
- 900 tons/m/year in 2000
- Average annual capacity estimated 189,000 tons/year

(3) Total costs of investment (includes consultant fees and contingency of 25%)
- Local currency portion US$2.1 million
- Foreign currency portion US$3.9 million
- Total costs US$6.0 million

At that time, the possibility of improving the existing port at Pacitan for use as commercial port should be examined also. With intensified rural development activities and improved access to neighboring kabupatens, the need for having a commercial port at Pacitan will be intensified within the Repelita III period.

13.5 Recommended Investment and Study Schedule

	Repelita III 1979	1980	1981	1982	1983	Repelita IV	Cost in US$1,000
1. Fishing Port, Prigi							
a. Phase I		├	─	─	─	┤	6,500
b. Phase II						├ ─ ┤	3,100
c. Feasibility Study	├ ─ ┤						300
2. Fishing Port, Pacitan							
a. Feasibility Study				├ ─ ┤			100
b. Construction						├ ─ ┤	3,500
3. Fishing Port, Popoh							
a. Feasibility Study				├ ─ ┤			80
b. Construction						├ ─ ┤	600
4. Commercial Port, Prigi							
a. Feasibility Study	├ ─ ┤						200
b. Construction						├ ─ ─ ┤	6,000
5. Commercial Port, Pacitan							
a. Feasibility Study				├ ─ ┤			200
b. Construction						├ ─ ┤	6,000
Total		7,380				19,200	26,580

The study was conducted by a team of experts organized by the International Development Center of Japan. The height of the Study was the period of intensive and extensive field survey which all the team experts participated in an extended from November 19, 1978 to January 31, 1979. The team experts were:

Jiro Kano	Team Leader
Koichi Mera	Team Advisor, Regional Economist
Kazuhiro Koshiro	Port Project Planner
Masamitsu Toriyama	Transportation Planner
Dairoku Tsurumaki	Agronomist
Jinichiro Yabuta	Regional Planner
Naoaki Tomizawa	Mining Development Expert
Koji Fujimoto	Industrial Project Planner
Tsuneaki Yoshida	Water Resource Planner
Akira Zama	Fishery Development Expert
Masakazu Hasebe	Transportation Expert
Susumu Hondai	Team Coordinator, Economic Planner

The team was helped in the field and at the study headquarter in Surabaya during the course of the Study by an Indonesian counterpart team comprising:

A. Sabur	Counterpart Team Coordinator, Transportation Planner, DTKD, Jakarta
Suharisman	Economic Planner, BAPPEDA, JATIM
Djaelani	Regional Planner, BAPPEDA, JATIM
Kusnaeni	Port Project Planner, Kanwil Hubungan Laut
Wasis Subiyanto	Port Project Planner, Direktorat Jenderal Perhubungan Laut, Jakarta
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Sarjono Sudibjo	Water Resource Development Planner, Cipta Karya, JATIM
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Djoko Suryanto	Fishery Development Expert, Dinas Perikanan, JATIM