funds can cover the costs of the first 19 projects. In the non-priority area, the available funds can cover the first 9 projects. If the tenth 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 the Bendo Dam Project, a component of East Ponorogo Agricultural and Water Resource Development Project Package. A part of the project implementation would have to be postponed to the next planning period.

5.3 Project Proposal

After the project packages and projects with high priority have been 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.[4/] The detailed descriptions of packaged and individual projects are listed at the end of this section. We strongly recommend that the packaged projects be implemented as a single project through the development administration described in Chapter VII in this report. However, in case of delay for establishing it, we indicate desirable financial sources for each project taking into consideration know-how, costs and the amount of investment required for project implementation. They are indicated as follows: a double asterisk (**) shows a project to be financed through Central Government and foreign currency funds; a single asterisk (*) shows a project to be financed only through Central Government funds; and no-mark

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4/ 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.

shows a project to be financed through local government funds including Provincial Government funds. The total amounts of funds by source are summarized in Table 5.5.

Table 5.5 Total Amount of Funds by Source

(Unit: Rp.Million)

Project Code	Local Government Funds	Central Government Funds	Central Government Funds & Foreign Currency Funds	Total
PP I	2,494	3,845	4,800	11,139
PP II	611	393	185	1,189
PP III	1,360	1,663	-	3,023
PP IV	1,354	1,795	1,615	4,764
PP V	909	2,982	4,305	8,196
PP VI	3,856	1,890	1,000	6,746
PP VII	266	166	-	432
PP VIII	789	185	18,077	19,051
PP IX	558	845	-	1,403
W06	-	-	200	200
W03	400	-	-	400
A18	600	-	-	600
Total	13,197	13,764	30,182	57,143

Source: Project lists of PP I, PP II, PP III, PP IV, PP V, PP VI, PP VII, PP VIII, PP IX, W 06, W 03 and A 18 in this section.

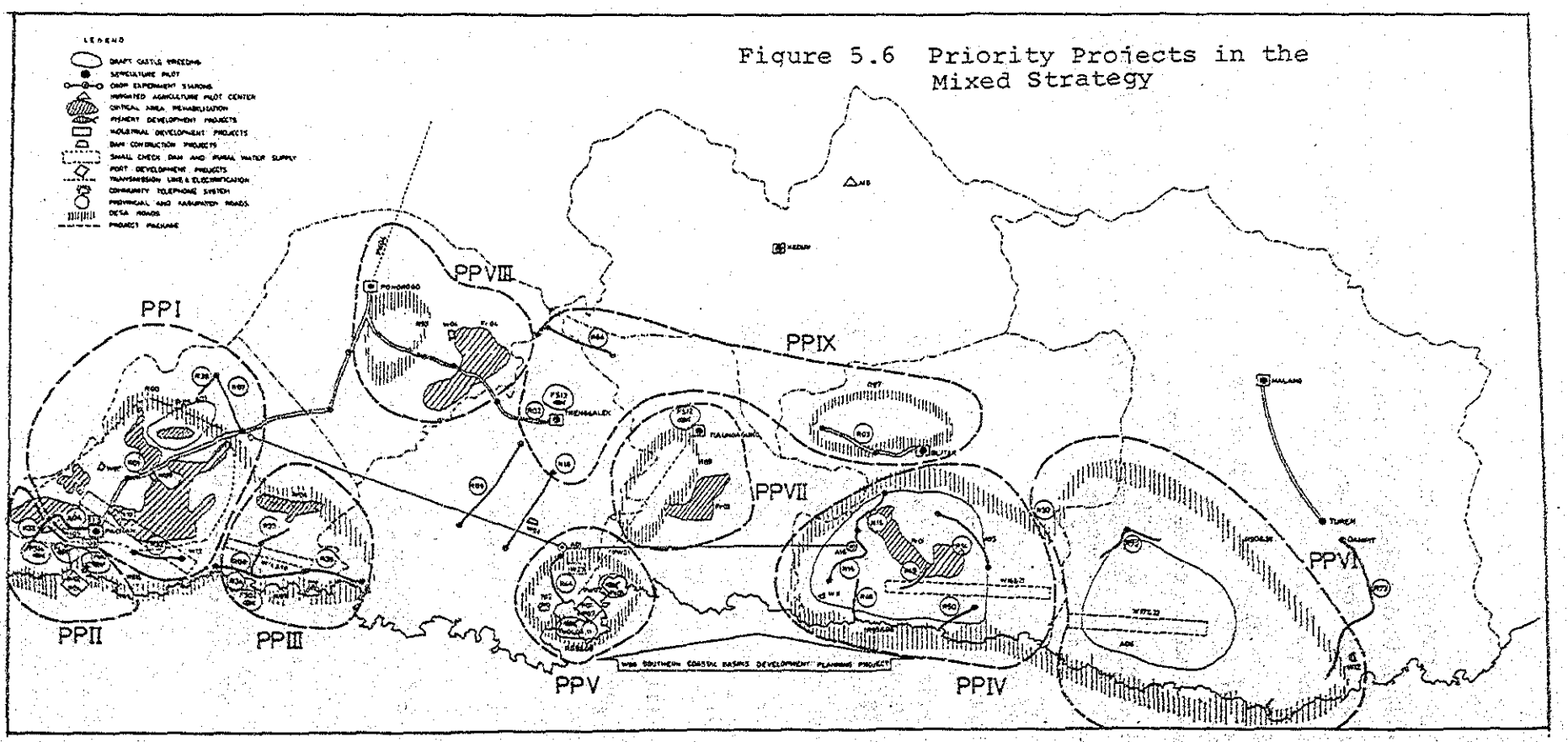


Figure 5.6 Priority Projects in the Mixed Strategy

PP. I: Western Pacitan Rural Development Project Package

A. Location: Western part of Kabupaten Pacitan

B. Duration: 1979-1983[5/]

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 Agro-industry (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 Small 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.

5/ 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) development 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*	Pacitan Cold Storage 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	1,189

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[6/]

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.

6/ 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[7/]

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	18,077
R93	Eastern Ponorogo DRD	789
	Total Costs	19,051

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

7/ 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 Area Development Planning Project

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

B. Duration: 1979-1983

C. Score: 30

D. Objectives: (1) Establishment a framework of rational and effective water resource development for agriculture and drinking water supply in the whole southern coastal area, including KB Pacitan, southern KB Trenggalek, southern KB Tulungagung, southern KB Blitar and southeastern KB Malang, 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 KB Trenggalek

B. Duration: 1979-1983

C. Score: 30

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

E. Total Cost: Rp.400 million.

A18: Kediri Irrigated Agriculture Development Pilot Center Project

A. Location: Wonokerto, KB 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.

CHAPTER VI

SOCIO-ECONOMIC EVALUATION

6.1 Economic Evaluation of the Proposed Projects

Fast-growing sectors of East Java economy are the manufacturing sector, banking and financing sector, construction sector, and transportation and communication sector, and their shares of GRDP of Central Belt are larger than those in the Study Area. As a result, it is expected that the GRDP of Central Belt has been growing faster than that of the Study Area. But the difference in population growth between the two areas might not have really offset the difference in GRDP growth.

For this reason, although Repelita II put empahsis on achieving more equal distribution of the fruits of development, the disparity of income between the Study Area and Central Belt might have been widening. In this chapter, consequences of the implementation of the proposed projects will be predicted and contribution of the projects to goal attainment will be estimated.

Before evaluating the economic effects of the mixed 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 6.1. For the projects and programs of the proposed strategy, there are two sets of investment schedules, RA I and II. The amount of RA II is 50% larger than that of RA I.

(5) Population and per capita income by kabupaten and kotamadya in 1978 are estimated by the Team members as shown in Table 6.2.

(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.

First 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 in rows (1) and (2) in Table 6.1. For five years during the Repelita III period, the total public and private investments will amount to Rp.331.8 and Rp.219.9 billion, respectively. Per capita income produced by this type of investment is estimated in Table 6.3. Average per capita income in the Area will increase by Rp.14,030, from Rp.75,258 to Rp.89,288, but the sizes of increase are not even. The largest increase is in KDY Kediri followed by KDY Blitar, 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 6.1 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	55.62	60.30	65.88	71.79	78.21	331.79
	(2) Private Investment Induced by (1)	36.88	39.98	43.68	47.60	51.85	219.99
RA I	(3) Investment in the Proposed Projects	10.00	10.80	11.35	12.03	12.96	57.14
	(4) Private Investment Induced by (3)	6.63	7.16	7.53	7.98	8.59	37.89
	(5) (1)+(2)+(3)+(4)	109.13	118.24	128.44	139.40	151.61	646.82
RA II	(6) Investment in the Proposed Projects	15.02	16.28	16.91	18.00	19.50	85.71
	(7) Private Investment Induced by (6)	9.95	10.79	11.21	11.93	12.93	56.83
	(8) (1)+(2)+(6)+(7)	117.47	127.35	137.68	149.32	162.49	694.31

Sources: 1. Figures for public investment are from Table 4.4 and Table 5.3.

2. Figures for private investment are derived as follows:
Row (4) = 0.663* Row (3), and
Row (7) = 0.663* Row (6).

Table 6.2 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	62,464	0.83
KB Pacitan	476,821	9.5	57,949	0.77
KB Kediri	1,156,795	23.0	85,042	1.13
KB Blitar	1,003,329	20.0	69,990	0.93
KB Tulungagung	806,253	16.0	82,784	1.10
KB Trenggalek	545,514	10.9	73,753	0.98
KDY Blitar	70,153	1.4	88,804	1.18
KDY Kediri	198,499	3.9	105,361	1.40
Total	5,026,192	100.0	75,258	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.

Table 6.3 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	73,216	0.82
KB Pacitan	67,859	0.76
KB Kediri	101,788	1.14
KB Blitar	82,145	0.92
KB Tulungagung	98,217	1.10
KB Trenggalek	87,502	0.98
KDY Blitar	111,610	1.25
KDY Kediri	128,575	1.44
Average	89,288	1.00

Source: All figures are estimated by the Team members.

The public investment based on the proposed strategy will be made as shown on row (3) in Table 6.1. The private investment induced by it is shown in row (4) in the same table. During the next five years, the public investments in the proposed projects amount to Rp.57.14 billion, while the induced private investment amounts to Rp.37.89 billion. Distribution of the public investment among kabupatens and kotamadyas are shown on column (2) in Table 6.4. Figures in column (5) are incremental per capita income produced by the projects and programs in the proposed strategy, while those in column (7) are per capita income produced by the public investments in on-going projects as well as projects in the proposed strategy. Since the proposed 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.

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 6.2 reveals that the proposed strategy closes the income gap between the lowest and the highest per capita incomes significantly. In 1978, the lowest per capita income is Rp.57,949 in KB Pacitan, whereas the highest one is Rp.105,361 in KDY Kediri. The ratio of the lowest per capita income to the highest one is 0.55. If the proposed strategy is taken during the Repelita III period, the lowest per capita income will be Rp.85,435 in KB Blitar, whereas the highest one will be Rp.130,196 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.57,949 to Rp.90,633 and then move up to the second lowest position from the bottom.

Table 6.4 Per Capita Income Created by the Mixed Strategy

KB/KDY	Share of Investment (%)		Population in 1983	Incremental Per Capita Income (Rp)		Per Capita Income in 1983 (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	85,909	95,531	0.90	0.97
KB Pacitan	34.2	21.6	494,380	22,774	24,413	90,633	92,272	0.95	0.93
KB Kediri	1.3	0.7	1,196,920	358	358	102,146	102,146	1.07	1.03
KB Blitar	10.4	5.5	1,040,800	3,290	3,450	85,435	85,595	0.89	0.86
KB Tulungagung	1.8	7.3	832,640	712	4,899	98,929	103,116	1.03	1.04
KB Trenggalek	19.6	31.8	567,236	11,374	31,325	98,876	118,827	1.03	1.20
KDY Blitar	1.0	0.5	72,856	4,516	4,516	116,126	116,126	1.21	1.17
KDY Kediri	1.0	1.3	202,956	1,621	3,579	130,196	132,154	1.36	1.34
Total or Average	100.0	100.0	5,204,000	6,354	9,609	95,642	98,897	1.00	1.00

Source: All figures are estimated by the Team members.

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

The strategy will affect East Java's economy slightly, while its effects on the Indonesian economy will be almost nil. In Table 6.5, estimated gross domestic 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 48% of the national level in 1979, while it will be 50% 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.

If the public investment for the strategy is done on the basis of RA II, effects of the investment on per capita income will be as shown in Table 6.6. 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 on per capita income of Indonesia is nil. 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 RA II investment schedule, respectively.

The relative position of the Study Area will improve anyway either with RA I or II investment schedule. And, also, the economic position of lower income kabupatens in the Study Area improve significantly. However, the slight 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 RA II. It would be better to reduce investable resource allocation to the Study Area to RA 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 6.5 Estimated Gross Product, Population and Per Capita Income Under RA I

	1979	1980	1981	1982	1983	1984	1985	Growth Rate (%)
Gross Product (Rp. Billion)								
Indonesia	23,845	25,395	27,046	28,803	30,676	32,670	34,793	6.50
East Java	3,539	3,780	4,037	4,312	4,606	4,920	5,255	6.81
Study Area	394	418	443	470	498	528	559	6.00
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	164,548 (100)	171,640	179,039	186,747	194,802 (100)	203,197	211,950 (100)	4.31
East Java	126,393 (77)	132,678	139,260	146,189	153,472 (79)	161,116	169,123 (79)	4.97
Study Area	77,850 (48)	82,025	86,321	90,944	95,642 (49)	100,744	105,931 (50)	5.30

Notes: 1. All figures estimated are based on those in Tables 6.1, 6.2, 6.3 and 6.4.

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

Table 6.6 Estimated Per Capita Income Under RA II

(Unit: Rp)

	1979	1980	1981	1982	1983	1984	1985	Growth Rate (%)
Indonesia	164,548 (100)	171,640	179,039	186,747	194,802 (100)	203,197	211,950 (100)	4.31
East Java	126,702 (77)	133,037	139,689	146,673	154,007 (79)	161,707	169,793 (80)	5.00
Study Area	78,336 (48)	83,036	88,018	93,299	98,897 (51)	104,831	111,121 (52)	6.00

Notes: 1. All figures estimated are based on those in Tables 6.1, 6.2, 6.3 and 6.4.

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

6.2 Contribution of Project to Goal Attainment

The proposed projects will directly affect the socio-economic conditions in the Study Area. Each project also indirectly affects the socio-economic conditions through interaction with other projects and this interaction among projects is called the multiplier effect. Due to the multiplier effect, the effects of a certain project will be much greater if other complementary projects are implemented. Considering interaction among projects, we can identify several key projects which are crucial for development of a region, and recommend planning agencies to implement those key projects first if financial resources are limited. In most cases, a project interacts strongly with near-by projects and complementary projects, while it does so weakly or negligibly with far-away projects.

After investigating the closeness and complementarity among the proposed projects, the Team members identified interaction among them and classified its strength into four levels: strong, medium, weak and negligible interaction. The levels of interaction among the projects are shown in Table 6.7. In the table, 3 stars indicate strong interaction; 2 stars medium interaction; a star weak interaction; and a blank cell negligible interaction. PP I, PP II and PP III, for instance, interact with each other strongly, but they do not interact strongly with other projects except with PP IX and W 06. Package projects from PP IV to PP IX and 3 individual projects, W 06, W 03 and A 18, interact with each other at the different levels of strength. The only one exception is PP VIII which has only weak interaction with PP V, PP VII and PP IX. This phenomenon can be understood if the project is scrutinized closely. Since its costs are the largest, the project has large impact by itself on the Study Area. However, its components are critical area rehabilitation, dam and desa road development projects and their effects are limited mainly to the project areas.

Table 6.7 Interaction Among Projects and its Strongness

	PP I	PP II	PP III	PP IV	PP V	PP VI	PP VII	PP VIII	PP IX	W 06	W 03	A 18
PP I	1	+++	+++							+++		
PP II	+++	1	+++							+++		
PP III	+++	+++	1						++	+++		
PP IV				1	+	+++	+++		+++	+++		+++
PP V				+	1		+++	+	+++	++	+	+
PP VI				+++		1	+		++	+++		++
PP VII				+++	+++	+	1	+	+++		+++	+++
PP VIII					+		+	1	+			
PP IX			++	+++	+++	++	+++	+	1		+	+++
W 06	+++	+++	+++	+++	++	+++				1		++
W 03					+		+++		+		1	
A 18				+++	+	++	+++		+++	++		1

Notes: 1. The levels of interaction are classified by the Team members.

2. +++ indicates strong interaction, ++ medium interaction and + weak interaction.

Benefits directly created by a project is the product of a score and an amount of investment for the project.

$$b_i = SCR_i * I_i$$

where b_i is direct benefits created by project i, SCR_i priority score of project i[1/] and I_i the estimated amount of investment for project i[2/]. The entire benefit created by a project can be shown in formula:

$$B_i = b_i + \Sigma c_{ij} b_i b_j \qquad (i \neq j)$$

where B_i is the entire benefits created by project i, b_i direct benefits created by project i, c_{ij} $(0 < c_{ij} < 1)$ coefficient of interaction between project i and project j and b_j direct benefits created by project j. B_i will get larger when it has strong interaction with other projects. Since the real terms of interaction are not known, several terms of interaction coefficient are assumed, and how sensitively the changes in terms of interaction affect total benefits created by a project are compared. The following items are assumed for our estimation.

(1) Interaction coefficient decreases as the level of interaction declines as follows:
Coefficient of strong interaction = c_{ij},
Coefficient of medium interaction = $(c_{ij})^2$,
Coefficient of weak interaction = $(c_{ij})^4$.

(2) The interaction coefficient takes three different levels as follows:

Case I	$c_{ij} = 0.2$
Case II	$c_{ij} = 0.1$
Case III	$c_{ij} = 0.01$.

1/ Project priority scores are defined in Section 4.3, Chapter IV and calculated in Section 5.3, Chapter V for the proposed projects.

2/ The estimated amount of investment for each project is shown as costs of project on Table 4.7 in Chapter IV and also indicated in Section 5.3, Chapter V for the proposed projects.

Using the above different coefficients, the Team members estimated project contribution to goal attainment and effects of different coefficients on the shares of contribution of projects. When all proposed projects[3/] in Chapter V are implemented, the project contribution to goal attainments is summarized in Table 6.8.

As shown in Table 6.8, Case I differs little from Case II, but Case III differs slightly from Case I and Case II. In Case I and II, PP I has the largest share of contribution to goal attainments followed by PP IV. The shares of contribution of projects in Case I and II are almost alike. The project standings according to share of contribution in both cases are also similar except PP VII and PP VIII. In Case I, PP VIII comes up to the ninth in the order, while it comes up to the tenth in the Case II.

When an interaction coefficient becomes one-tenth of that of Case II, the shares of contribution and their standings slightly differ from those of Case I and II as shown in Case III on the table. But PP I still ranks first in the order and its share of contribution went up slightly. Also the ranks of W 03 and A 18 which come up to the eleventh and the twelfth respectively are just the same as Case I and II. Big changes emerge only for PP VIII and PP III. The former share of contribution has significantly gone up and now ranks the second, while the latter share decreased and ranks the sixth. Due to these changes, the shares of contribution of most projects decline slightly.

3/ The proposed projects are PP I, PP II, PP III, PP IV, PP V, PP VI, PP VII, PP VIII, PP IX, W 06, W 03 and A 18 as summarized in Section 5.3, Chapter V.

Table 6.8 Share of Contribution When All Proposed Projects are Implemented

(Unit: %)

	Case I $C_{ij} = 0.2$ Share of Contribution	Case II $C_{ij} = 0.1$ Share of Contribution	Case III $C_{ij}=0.01$ Share of Contribution
PP I	20.4	21.0	21.1
PP II	6.8	6.8	4.7
PP III	15.2	15.0	10.5
PP IV	16.6	16.5	12.6
PP V	8.1	8.1	11.8
PP VI	14.0	13.8	13.0
PP VII	2.6	2.5	1.7
PP VIII	2.0	2.9	15.4
PP IX	9.5	8.8	5.8
W 06	3.0	2.9	1.8
W 03	0.2	0.2	0.4
A 18	1.6	1.5	1.2
Total	100.0	100.0	100.0

Note: Estimation of shares of contribution is based on project scores listed in Chapter V.

Based on the above analysis, it can be said that project shares of contribution and their standings are not very sensitive to changes in the interaction coefficient. Even though the real terms of interaction coefficient cannot be identified, they are likely to be less than 0.5 and greater than zero. Within this range, project shares of contribution and their standing are more or less the same as the ones shown in Table 6.8. But as interaction among projects gets smaller, the shares of contribution of PP VIII increase because the direct benefits of each project become important and because PP VIII's direct contribution is the largest among the projects due to its large amount of investment required. If the coefficient is somewhere between 0.1 and 0.2, the six most important projects in terms of shares of contribution are PP I, PP IV, PP III, PP VI, PP IX and PP V and their ranks of contribution are in that order. Their total shares of contribution amount to more than 80%.

If the available budget for implementing the 12 proposed projects is not sufficient, only some of them can be implemented. Let us assume that only 50% of estimated funds for the proposed projects, Rp.28,572 million[4/], is available. Then the projects to be implemented will be selected according to the score of contribution until they use up Rp.28,572 million. The selected projects are PP I (score: 22.90), PP V (score: 23.94), PP VI (score: 22.66), PP IX (score: 23.35), W 03 (score: 30.00) and W 06 (score: 30.00), and their total investment amounts to Rp.28,084 million. Using the same interaction relation and coefficient as the previous case, the Study again estimates how strongly each project contributes to goal attainments and how sensitively the coefficient of interaction changes the shares of contribution of projects. The results are shown in Table 6.9.

4/ Since estimated total funds for the proposed projects in Chapter V are Rp.57,143 million, 50% of the funds amounts to Rp.28,572 million.

Table 6.9 Share of Contribution When Only Six High Score Projects of the Proposed Projects are Implemented

(Unit: %)

	Case I $C_{ij}=0.2$ Share of Contribution	Case II $C_{ij}=0.1$ Share of Contribution	Case III $C_{ij}=0.01$ Share of Contribution
PP I	11.9	15.9	32.4
PP V	32.5	33.4	31.3
PP VI	11.4	11.5	19.4
PP IX	32.3	28.5	11.8
W 06	11.5	10.3	3.6
W 03	0.4	0.4	1.5
Total	100.0	100.0	100.0

Notes:
1. Total investment for six projects amounts to Rp.28,084 million which approximately equals to 50% of the amount of investment for the proposed twelve projects, Rp.57,065 million.
2. Projects in this table are selected in score order of the proposed projects until 50% of Rp.57,065 million is used up.
3. Estimation of shares of contribution is based on the project scores listed in Chapter V.

Since the projects which interact strongly with PP I are not included, its share of contribution declines significantly. On the other hand, the shares of contribution of PP V and PP IX increase, since both interact with each other strongly. As same as in the previous case, Case I differs little from Case II, but Case III differs slightly from Case I and Case II. In Case I and II, PP V has the largest share of contribution to goal attainments followed

by PP IX. When an interaction coefficient becomes smaller, the multiplier effect becomes less significant and the direct benefits created by the project get more important. So that project which has larger direct benefits, such as PP I increases the shares of contribution to goal achievement.

When the goal attainments by the six high score projects is compared with that by the twelve proposed projects, the former projects attain only 18.8%, 20.0% and 35.2% of the goal attainments by the twelve proposed projects in Case I, Case II and Case III, respectively. If there is no multiplier effect among projects, the goal attainments by the six projects amount to more than half of that of the twelve proposed projects. In reality, there is interaction among projects and benefits created by interaction increase more than proportionally as the number of projects increase. In other words, as the number of projects doubles, the benefits created by projects grow more than two times. For this reason, the Study strongly recommends implementation of the twelve proposed projects simultaneously to obtain the largest attainments effectively.

If the available funds are not large enough to implement the twelve proposed projects, the projects which interact strongly with each other should be implemented simultaneously. A group of the projects which interact strongly, for instance, consists of PP I, PP II, PP III and W 06, whereas the other group consists of PP IV, PP V, PP VI, PP VII, PP IX, W 06, W 03 and A 18. Since PP VIII does not interact with other projects, it can be implemented alone. By grouping projects in such a way, the largest benefits can be obtained from the available, investable funds.

CHAPTER VII

RECOMMENDATIONS FOR IMPLEMENTING THE DEVELOPMENT STRATEGIES DURING 1979/80-1983/84

After evaluating the three proposed strategies in Chapter IV, the Study found that the Coastal Hill Development Strategy attains distribution objective the most, followed by the Brantas Basin Development Strategy, while the Brantas Basin Development Strategy is the best to attain the growth objective, followed by the Central Belt Link Strategy. Since Repelita III put emphasis on distribution objective, the Study formulated a mixed strategy by assigning a larger weight on the Coastal Hill Development Strategy. In Chapter V, the mixed strategy has 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 institutional arrangements.

7.1 Towards Project Implementation

7.1.1 Recommended Projects

The main development projects which are proposed by the Team members are summarized in order of their scores in Table 7.1. These development projects should receive immediate and special attention of both the Central and local governments since the projects are addressed to the most

Table 7.1 Priority Projects, Their Follow-up Measures and Major Sectors for Follow-up

	Project/Project Package	Cost (Rp.Mil.)	Score	Implementation with			Steps to be taken for core projects		
				Domestic funds	Commercial funds	Domestic and foreign funds	FS	Study for planning	R/D
W 06	Southern Coastal Area Development Planning	200	30.00			*		Water resource development	
W 03	Kampak Dam Project	400	30.00		*				
PP V	Prigi Bay Area Integrated	8,196	23.94			*	Fishery port improvement		
PP IX	TTB Axis Road Network Development Project Package	1,403	23.35		*				
PP I	Western Pacitan Rural Development Project Package	11,139	22.90			*	Dam & highway projects		
PP VI	Western Malang Rural Development Project Package	6,746	22.66	*					
PP III	East Pacitan Rural Development Package	3,023	21.26	*					
PP II	Pacitan Bay Area Development Project Package	1,189	20.44			*		Fishery port	
PP VII	Southern Tulungagung Rural Development Project Package	432	20.21	*					
A 18	Kediri Irrigated Agriculture Pilot Center Project	600	20.00	*					Agricultural pilot center
PP IV	Southern Blitar Rural Development Project Package	4,764	19.86	*				Water resource development	Sericulture pilot center
PP VIII	East Ponorogo Rural Development Project Package	18,973	19.12			*		Water resource development	

Notes: 1. FS and R/D are abbreviations of feasibility study, and research and development, respectively.

2. * indicates that the project concerned is implemented with the funds indicated.

critical development needs of the Study Area:

(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 living standard 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.

7.1.2 Proposed Projects and Their Follow-up Measures

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 projects have higher priority among the projects as shown in Table 7.2.

The scores of port, roads, power and community telephone system, and water resource projects are significantly higher than those of agriculture, forestry, fishery and manufacturing. This priority order indicates that the lack of investment in infrastructure has increased higher social demand for it. Taking into account the above three points and the scores of projects by sectors, the Study selected follow-up measures as indicated in Table 7.1.

Table 7.2 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

7.1.3 Projects Needed Special Attention

Among the projects listed in Table 7.1, two project packages need immediate special attention since their amounts of required investment are large and some projects in the packages are already planned for implementation based on a short-run projection. They are the Prigi Bay Integrated Development Package (PP V) and the Western Pacitan Rural Development Project Package (PP I).

Code No.	Title	Major Area Contained
PP V	Prigi Bay Integrated Development Project Package	Southern and Central KB Trenggalek
PP I	Western Pacitan Rural Development Project Package	KB Pacitan

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. 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 7.3. 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 7.3 Development Sectors in Prigi Bay Area Integrated Development Project Package

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

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 such as drinking water and access roads for

isolated scattered settlements. In addition, 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 7.4, there is a core project in it. It is the dam 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 selective core projects and consider other projects as a part of it or supporting projects of it. With the core projects, two concrete follow-up measures emerge from this Project Package, i.e., water resource development and Ponorogo-Pacitan provincial highway betterment feasibility studies.

Table 7.4 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 (five dams) Development Project West Pacitan Rural Water Supply (five dams) Project West Pacitan Critical Area Rehabilitation Project Southern Coastal Area Development Planning Project
Land Transport	Ponorogo-Pacitan Provincial Highway Betterment Project Pringkuku-Pacitan Kabupaten Road Upgrading Project Kebonagung-Walawali Kabupaten Road Upgrading Project West Pacitan Desa Road Development Project Central and Northern Pacitan Desa Road Development Project

7.1.4 Preparation of Feasibility Study

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

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. In the feasibility study, the following subjects should be regarded as core projects:

(1) Prigi fishing port improvement project with the planning of Prigi commercial port, and
(2) Prigi electrification project with Prigi community telephone system project.

The above 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 7.5, and the required cost for it will amount to approximately US$220,000.

In the Western Pacitan Rural Development Project Package, the projects aim at (1) rehabilitating the natural environment for watershed management and higher agricultural production, (2) promoting dry land agriculture, and (3) providing for basic human needs. In the feasibility study, the following core projects should be studied intensively.

(1) Grindulu and Tinatar Dams projects
(2) Provincial highway betterment projects between Pacitan and Slahung
(3) Critical area rehabilitation project in the upper reach of Grindulu River

Table 7.5 Required Man-months for Feasibility Study of Prigi Bay Integrated Development Project Package

(Unit: Man-month)

	Expert	Expatriate Team	Counterpart Team
1.	Project Manager	3	3
2.	Water Resource Planner	1	1
3.	Transport Planner	1	1
4.	Transport Engineer	2	2
5.	Port Planner	3	3
6.	Port Engineer	3	3
7.	Fisher Engineer	2	2
8.	Electric Engineer	2	2
9.	Electronics Engineer	2	2
10.	Economic and Financial Analyst	3	3
11.	Draftsman	1	0
	Total	23	22

The above feasibility study should 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 7.6 and the required cost will amount to approximately US$200,000.

7.2 Proposed Investment Program

The total amount of funds required for the projects proposed in Chapter V is Rp.57,143, of which Rp.40,000 million are domestic funds and Rp.17,143 million are foreign currency funds. Although relative size of the amount is not large in the provincial budget, well-shceduled investments in terms of space and timing will surely increase benefits derived from available funds in the Study Area. To derive benefits as much as possible, the Study takes account of the

multiplier effect of project, data availability for project design and size of required investment for allocating the available funds among the proposed projects.

Table 7.6 Required Man-months for Feasibility Study of Western Pacitan Rural Development Project Package

(Unit: Man-month)

Expert	Expatriate Team	Counterpart Team
1. Project Manager	3	3
2. Water Resource Planner	3	3
3. Water Resource Engineer	3	3
4. Transport Planner	2	2
5. Transport Engineer	1	1
6. Electric Engineer	1	1
7. Soil Engineer	3	3
8. Economic and Financial Analyst	3	3
9. Draftsman	1	0
10. Special Consultant	1	0
Total	21	19

The most likely annually available funds for the proposed projects are Rp.9,576 million in 1979/80, Rp.10,384 million in 1980/81, Rp.11,345 million in 1981/82, Rp.12,366 million in 1982/83 and Rp.13,472 million in 1983/84. Based on the annually available funds, an annual investment programs is worked out for each project package or project as shown in Table 7.7. First of all, the Southern Coastal Area Development Planning Project should be completed within the first three years of the Repelita III period since the project will provide a future perspective of development in the southside of coastal hills and interacts strongly with other proposed projects. In the early stage of the Repelita III

Table 7.7 Annual Investment Program for Project Packages and Projects

(Unit: Rp. Million at 1978 Prices)

		Amount of Investment					
		1979/80	1980/81	1981/82	1982/83	1983/84	Total
PP I	Western Pacitan Rural Development Project Package	809	1,095	2,159	2,976	4,100	11,139
PP II	Pacitan Bay Area Development Project Package	87	117	231	315	439	1,189
PP III	East Pacitan Rural Development Project Package	907	907	605	453	151	3,023
PP IV	Southern Blitar Rural Development Project Package	1,072	1,012	953	893	834	4,764
PP V	Prigi Bay Area Development Project Package	2,459	2,459	1,639	1,229	410	8,196
PP VI	Western Malang Rural Development Project Package	2,024	2,024	1,349	1,012	337	6,746
PP VII	Southern Tulungagung Rural Development Project Package	130	130	86	65	21	432
PP VIII	East Ponorogo Rural Development Project Package	1,382	1,872	3,692	5,100	7,005	19,051
PP IX	Trenggalek-Tulungagung-Blitar Axis Road Network Development Project Project Package	421	421	281	210	70	1,403
W 03	Kampak Dam Project	100	150	150	-	-	400
W 06	Southern Coastal Area Development Planning Project	50	70	80	-	-	200
A 18	Kediri Irrigated Agriculture Pilot Center Project	135	127	120	113	105	600
	Total	9,576	10,384	11,345	12,366	13,472	57,143

period, PP IV, PP V, PP VI, PP VII and PP IX receive large amount of funds partly because most of those projects have technically solid bases and partly because they have strong interaction among themselves. PP I, PP II, and PP VIII should be implemented intensively toward the end of the Repelita III period. Since their technical data is not sufficient for immediate implementation and some of their components require either feasibility study or detail technical designing, a part of their implementation will probably be passed on to Repelita III period with new budget allocation.

7.3 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 attempts have been made for implementing projects as packages, including the Provincial Development Program (PDP) initiated by the Ministry of Interior with assistance from USAID.

PDP started October 20, 1978, with the purpose 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 small in scale. Under PDP, initial project proposals are made by kecamatan or desa and submitted to BAPPEMKA for review and compilation 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 which projects are to be implemented and sends the project proposals to the donor institution (USAID). Then the donor institution provides, on reimbursement basis, the necessary funds straight to the bupati or provincial governor through the

Bank of Indonesia and Bank Rakyat Indonesia. The bupati or provincial governor 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 to each other within project packages. Another difference lies in this a point: in the project packages, physical infrastructures are the dominant components and are packaged mainly from the viewpoint 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.

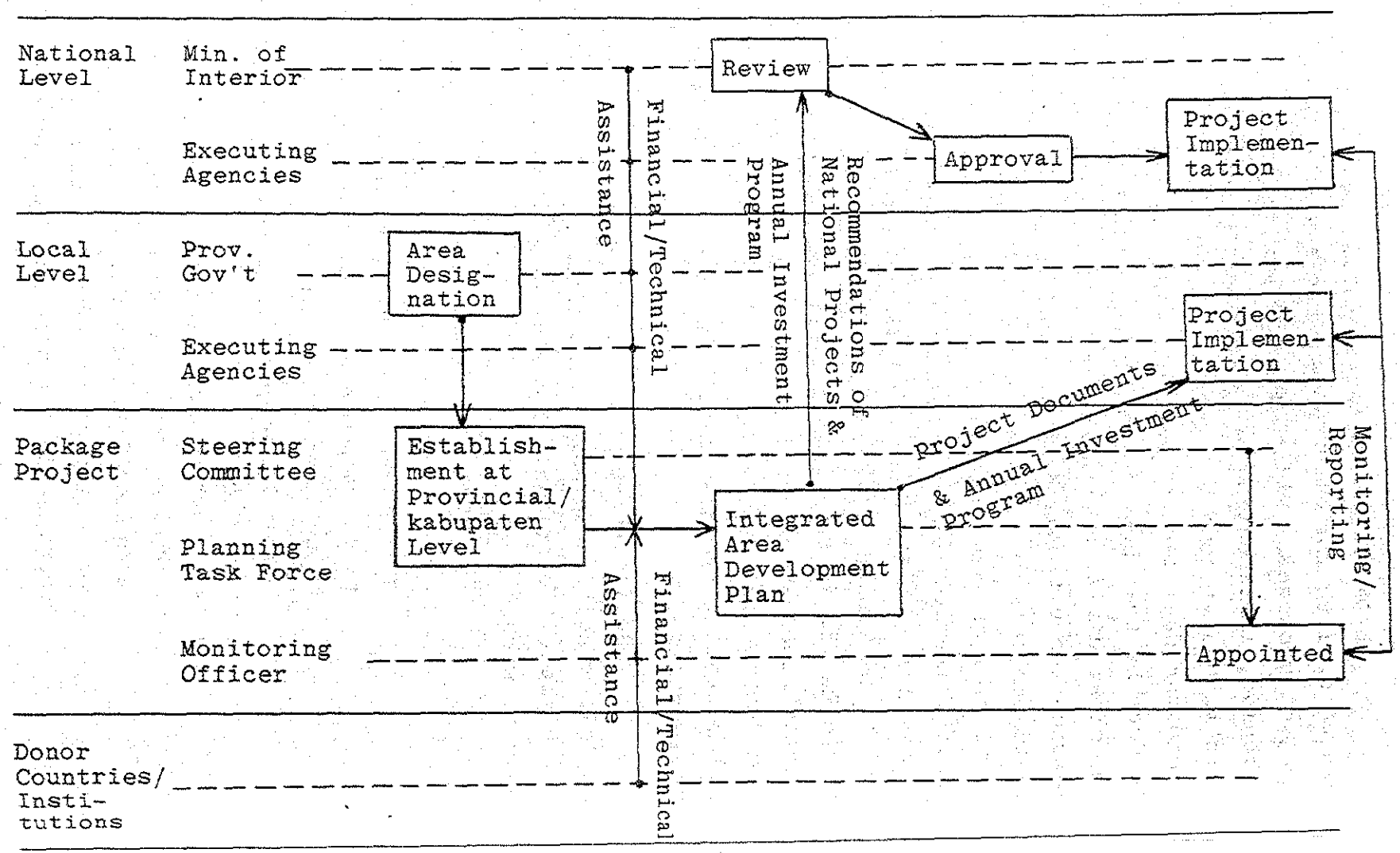
From the above examinations, several basic principles can be derived for the framework relevant to implementation of project packages. First, for one project package, a strong planning, implementing and coordinating body needs to be established at some intermediate level between national and kecamatan/desa 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 in charge of large-scale projects of national or regional importance and the provincial or some lower-level executing bodies 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, an 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-scales.

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 7.1.

(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 after consulting with the governmental agencies and people concerned.

(2) For each designated area, a steering committee should be set up at either provincial or kabupaten level depending on magnitude and complexity of the project packages. It is responsible for planning and post-evaluation

Figure 7.1 Flows of Procedures for Project Package Implementation



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 include 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.

(4) A steering committee should first prepare the plan for integrated development of the designated area, and then 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 whether as the national or other level. The steering committee should first prepare annual investment program with breakdown of the expenditures to be borne 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 send the annual investment program to respective executing agencies in charge. The actual disbursement is subject to the decisions made by executing agencies in the 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.

PART II

SECTOR ANALYSIS

CHAPTER VIII

AGRICULTURE

8.1 Introduction

In the Study Area, agricultural land per agricultural household is slightly larger than the provincial average despite its mountainousness. Favorable rainfall is an advantage in growing dry land crops (polowijo) extensively, even on steep slopes. From land use pattern (see Table 8.1), 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 explained according to the classification as follows.

8.1.1 Lowland Paddy Zone

This zone, which roughly consists of DZ TTB Axis[1/] and DZ[2/] Ponorogo, is the highly productive paddy area; but in addition, 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 levels, (4) occasional floods, and (5) the resistance of the poorer farmers to technological changes.

1/ Development Zone of Trenggalek, Tulungagung and Blitar Axis (see Chapter I).

2/ DZ stands for Development Zone.

Table 8.1 Land Use of Southern Belt, 1977

(Unit of land: ha)

	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 of the most fertile alluvial type, there is still a good potential for paddy production through adoption of 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 likely possible in most areas of this zone.

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

Potential can be also found in the geographical characteristics of the zone, whose draw of population from surrounding hilly areas for industrialization provides good markets for vegetables, fruits and livestock products.

8.1.2 Coastal Hill Dry Crop Zone

This zone is almost the same as DZ S. Coast.[3/] It is a relatively thinly-populated limestone area where soil is poor and includes vast land called "critical land". Land fertility is being lost by continuous mono-cropping. Moreover, the top soil is being washed away by the heavy rain. A soil conservation method with multiple cropping is being introduced through government programs but extension workers as well as their facilities are not sufficient and the majority of farmers have been left untouched. However, the potential is not absent since the zone has vast land and the farmers' land holdings are larger than their counterparts in 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 certain kinds of trees, teak for instance, can grow very well in limestone areas. Since a

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3/ Development Zone of Southern Coast (see Chapter I).

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 the rural under-employed, 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 extension and experimentation activities,
(4) Small irrigation scheme, and
(5) Sericulture.

8.1.3 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 8.1.2, even though its soil and topography differ from the coastal hilly dry crop zone. In addition, there is a problem of marketing 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, in addition to the five points stated in 8.1.2, are as follows:

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

8.1.4 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 those in other zones.

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

8.2 Development Strategies and Instruments

8.2.1 Development of Growth Potentials

As mentioned above, the Study Area has many potentials in agriculture to serve as driving forces for regional development. Assuming economic growth of the present maintains its pace into the future, huge demand for superior foods (which may presently appear unlikely) may appear while the traditional rice mainstay remains ever important. Development planning will have to prepare to meet the changing demands and thus lead the farmers gradually to specialize in more profitable crops to increase their income. Several measures for such development are identified as follows:

(1) Intensification of paddy cultivation in wet land through the measures described in 8.1.1,

(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 beneficial for attaining the equity objective, since unintensive paddy areas (such as single crop paddy area and dry crop area) are less productive and the farmers there are poorer. Measures (3), (4) and (5) can serve in attaining the equity objective when the poorer farmers are given priority during implementation of the measures.

8.2.2 Improvement of Equity

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

(1) Distribution of cattle to the farmers near markets so as to provide them with extra income earning opportunities from beef 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 beneficial 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 sorts of rehabilitation measures of the critical land.
(2) Small irrigation schemes.
(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 are generally less productive and the farmers are poorer than those of the lowland. Moreover, an 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.

8.2.3 Conservation of Environment

Eighty percent of East Java's total critical land, which totals 136,000 ha, needs some land conservation measures. Above all, Pacitan has the largest 71,000 ha and the critical land area is increasing despite regreening efforts by the government. This barren steep land does not hold rain water at all, and keeps eroding 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 for soil conservation. While trees are still small, dry land crops should be planted between the trees.

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

8.3 Development Programs and Projects

8.3.1 Intensification of Paddy Production

The following measures 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 Chapter XII: 12.2 and 12.4).

(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 land owners in the lowland paddy zone where single crop paddy fields can be converted into double crop paddy fields (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.

8.3.2 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.

8.3.3 Critical Land Rehabilitation

Since it is considered difficult for land owners to invest in reforestation, the government should take some measures to encourage such reforestation by land owners. One of the measures for the government is to plant trees on private and desa lands next to 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 a 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 speed 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 activity, and

(3) Experimental works to study the kinds of trees and the method of planting in relation to each of the 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 to the hardworking small holders of the critical land in least privileged area.

8.3.4 Horticulture Development

There is a growing demand for vegetables, fruits and a certain kind of tree crops, and there exists 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 subsidized prices,
(2) Subsidies for planting trees, and
(3) Credits for establishing processing units of fruit juice, jam and other fruit-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.

8.3.5 Livestock Promotion

It seems essential from a long-term view point to narrow the existing gap between demand and supply in most of livestock products. 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 through 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 to relatively rich farmers who have better access to know-how, credit and institutional assistance to start raising animals. Cattle fattening, however, 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 draft capability and compost production:

(7) Distribution of draft cattle among cattle-less 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 resources more fully.

8.4 Recommended Projects

8.4.1 Cropping System Development Project

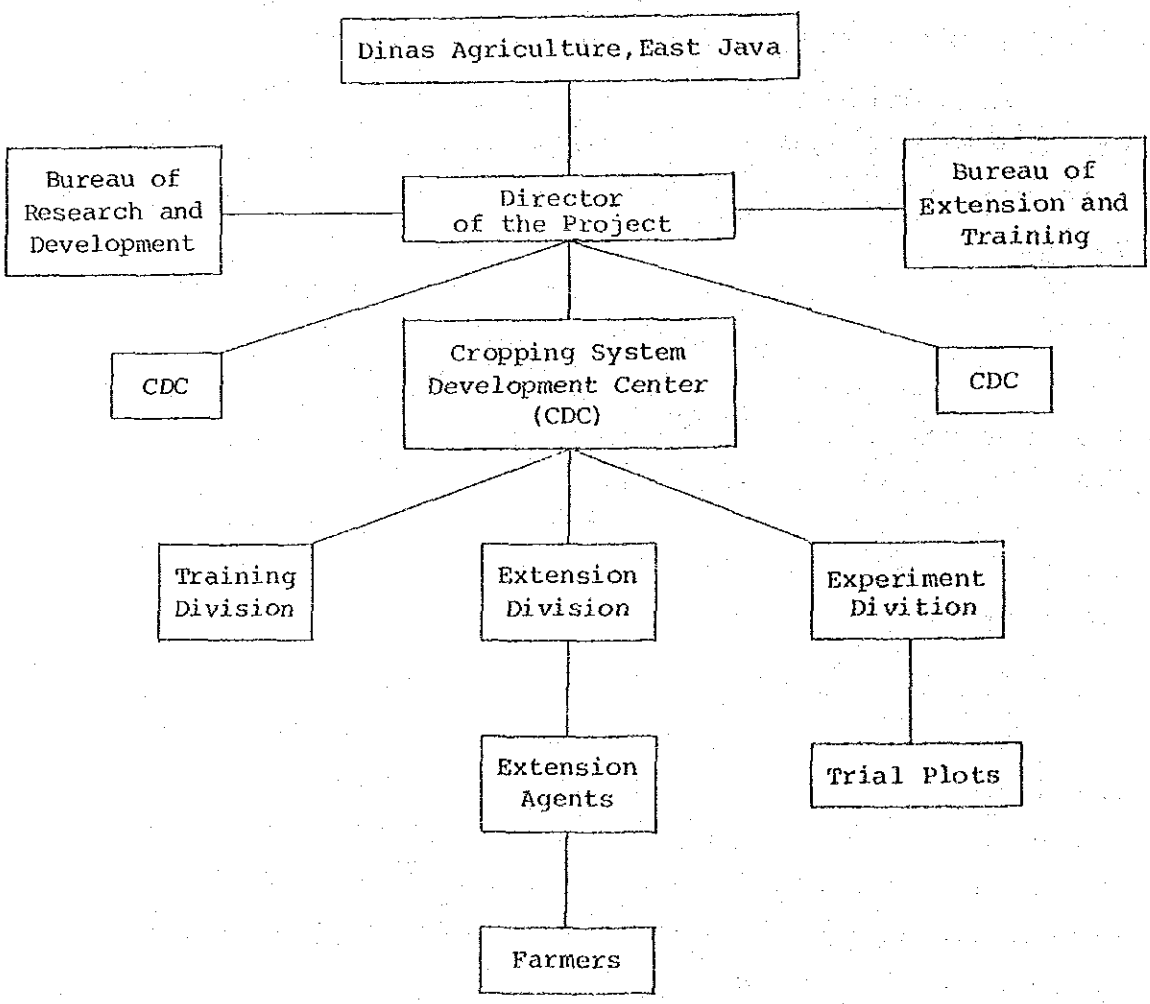
To study and identify the best suited cropping systems in each of the major agro-climatic areas in the dry crop zones, cropping system development centers are set up. They will have the divisions of experiment, extension and training and will function as cores for modernization of agriculture in the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

Provincial Dinas Agriculture shall be the executing agency of the project. The project director 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 8.1.

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

Figure 8.1 Organization Chart of the Cropping System Development Project



8.4.2 Critical Land Rehabilitation Project

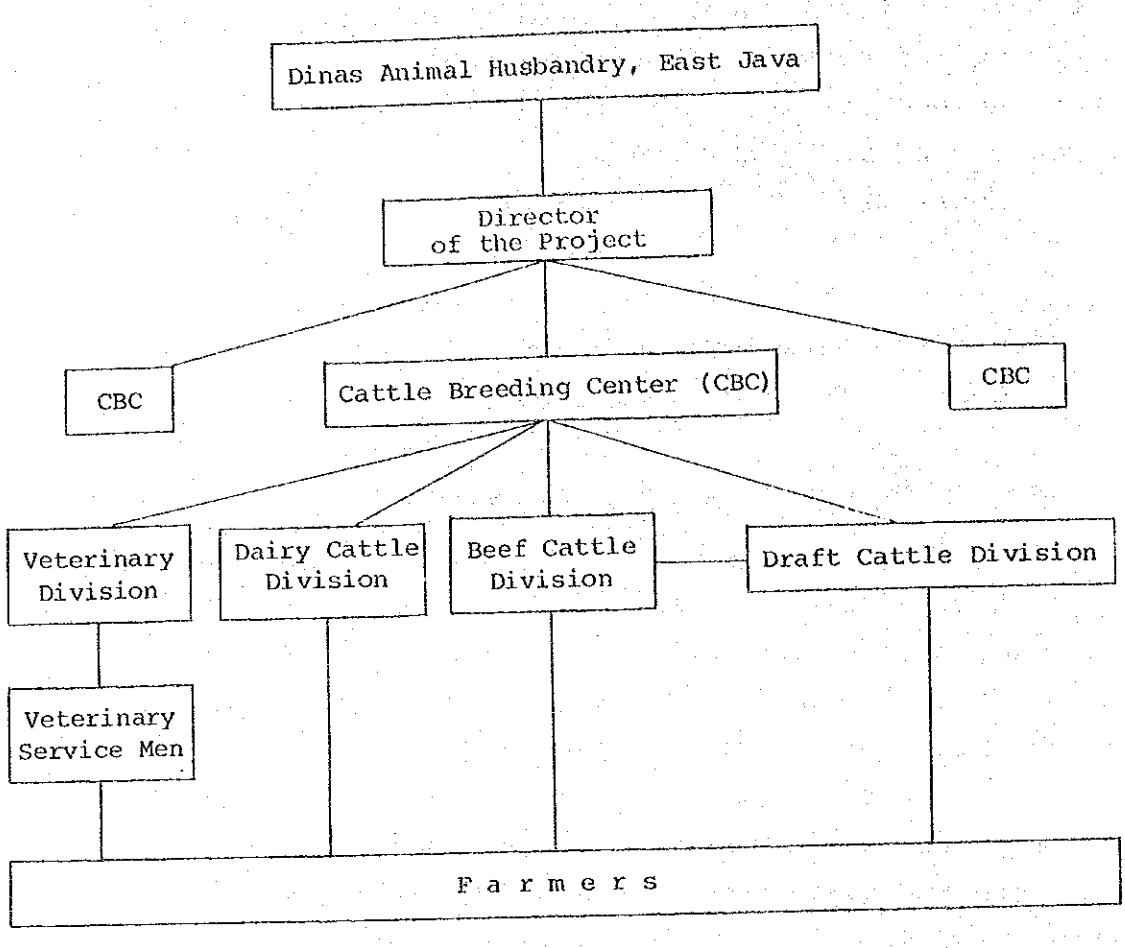
To decrease flood damages and soil erosion and to rehabilitate critical land, the project will strengthen the on-going regreening and reforestation programs. Regreening measures include horticultural development through planting fruit, spice and medicinal trees.

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

8.4.3 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 respectively. Provincial Dinas Animal Husbandry executes the project. The director of the project is assigned to supervise all the activities which are handled by three cattle breeding centers (CBC). Each CBC is divided into draft cattle, beef cattle, dairy cattle and veterinary divisions. The first three divisions have sub-divisions of breeding and extension. The breeding sub-division aims 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 8.2). Locations are selected in consideration of the distance to the markets, scope of expansion of farming activity, availability of feed and so on.

Figure 8.2 Organization Chart of the Cattle Breeding Promotion Project



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 1984.
Costs:	US$453,000.

8.4.4 Sericulture Pilot Project

To identify the best suited method of sericulture in the limestone area, the project whose organization is illustrated in Figure 8.3 will set up pilot sericulture farms.

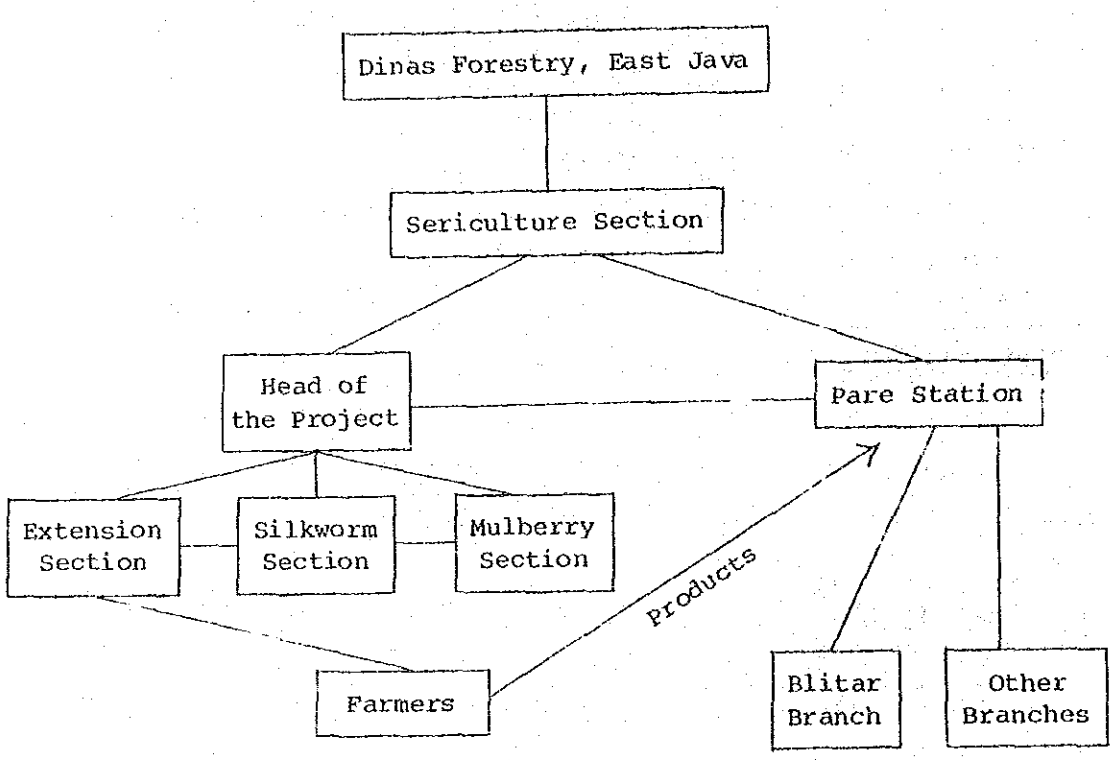
Locations:	Kecamatan Surwadang in KB Blitar.
Project duration:	5 years from 1980 to 1984.
Costs:	US$1,000,000.

8.4.5 Irrigated Agriculture Development Project

This project will establish 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 8.4.1).

Locations:	Ponorogo, Ngadiluwih (KB Kediri) and Tulungagung.
Project duration:	5 years.
Costs:	US$3,000,000.

Figure 8.3 Organization Chart of Sericulture 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 8.3 should not be overlooked and be implemented as soon as the financial situation allows.

CHAPTER IX

FISHERY

9.1 Introduction

Water is shallow along the northern coast of Java, and the sea fishery is conducted for bottom fish and shrimps with various types of equipment. The southern coast of Java is quite different from the northern coast, characterized by rough rocky shore with some small bays, and with the sea bottom abruptly increasing in depth. Large swells come from the Indonesian Sea all the year round, but are particularly strong during the rainy season. However, upswelling 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 one another by cliffs or rough shores. Each harbor is linked to inland villages, towns or cities by roads, but there are scarcely any 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.

9.2 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)

Kaupaten	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 per 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 that the preference for fresh fish is very high among consumers in the Area.

9.3 Constraints to Development

First, due to lack of cold storage facilities, 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 market.

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 appropriate distribution systems 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, those major constraints referred to should be removed or lessened. Such measures are not competitive; rather, they are complementary and should be undertaken simultaneously.

9.4 Development Perspectives

9.4.1 Demand and Supply

As stated in Section 9.2, 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 that per capita income of the Study Area will be Rp.98,897 and per capita expenditure on fish will go up to Rp.3,000. Assuming that the fish price per kilogram stays at the present level, per capita 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, the 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 can go further offshore to seek better fishing grounds. The present total fishing area is about 200 km^2 in the Study Area, with 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, enabling the fishermen to go fishing during the rainy season --- i.e., all 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.

9.4.2 Development Strategies

Our investigation of the market shows that the fishery sector has big potential demand. Also, if 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 adequate transportation systems 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 cannot 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 yet 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 reduces the seasonal fluctuation in catch. The reduction of seasonal fluctuation will stabilize the fishermen's income, and make investment 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

better than existing processed products. If better processing methods are developed, the size of the market for fish will expand enormously. The expanded markets will then 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 extension services and training which comprise the fourth approach.

(4) Fourth, extension services and training facilities are required. Use of larger boats and new equipment will be effective only if used properly, and this requires extension services and all that provides technical know-how on newly introduced devices.

9.5 Recommended Projects and Priorities

9.5.1 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 started at Prigi Bay in 1976, but the size and facilities of this port are not sufficient to handle the

present growth trend. Details of the port size and facilities recommended by the Study are stated in Chapter XIV in this Report.

If a new port is constructed at Prigi and the tonnage of fish landed there increases, it will be necessary, in advance of such development, to arrange facilities for cold storage, both there and in wholesale markets. 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 ton capacity)	Rp.90,000,000
In addition, for transport there is the following requirement: Two insulated trucks (4 ton capacity) Rp.18,000,000 x 2 =	Rp.36,000,000

At Pacitan Bay, the construction of some fishing port facilities was completed in 1978. However, there are no breakwater and stair landing facilities. At Popoh and other fising harbors, construction work on the fishing port has not started 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 ton capacity)	Rp.39,000,000
Ice making facility (20 tons/day)	Rp.200,000,000
Ice storage (300 ton capacity)	Rp.60,000,000
Insulated truck (4 ton 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.

9.5.2 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 and 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 proposed purse seine fishery method which requires about fifteen crews are as follows:

Two vessels (5 GT, 12 m long)	Rp.1,200,000 x 2 =	Rp.2,400,000
Two engines (10 HP each)	Rp.700,000 x 2 =	Rp.1,400,000
One engine (40 HP)		Rp.2,200,000
Purse seine		Rp.4,000,000
Total		Rp.10,000,000

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

Diesel fuel	
15 liters x Rp.50 x 365 days =	Rp.270,000
Gasoline	
50 liters x Rp.95 x 365 days =	Rp.1,730,000
Maintenance (15% of capital cost)	Rp.1,500,000
Capital depreciation (7 years, 15%)	Rp.2,400,000
Total	Rp.5,900,000

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 60 tons a year at present. If the fish price is Rp.200 a kilogram, the gross revenues of a purse seine unit amount to Rp.6,100,000. Given the above

costs, the revenue per fisherman is about Rp.400,000 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 KB Pacitan is below the level attained in KB Tulungagung and KB Trenggalek. And the volume of the landed catch at KB Pacitan is less than those at KB Tulungagung and KB Trenggalek. As a task of the highest priority, the modernization of fishing vessels and equipment in use at Pacitan is recommended to increase the fish catch there.

9.5.3 Establishment of a 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. The organization and activities of the station are proposed 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, which consists of the three sections listed 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 sawah tambaks where fresh water fishes are cultivated together with shrimps (Macrobrachium spp.). The construction of a shrimp hatchery 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 needed 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 activities, and possesses the best infrastructure for research and development activities, Prigi is recommended as the ideal site for establishment of the station.

9.5.4 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 experiment with a few 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 X

MINING

10.1 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 in 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 10.1.

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.

10.2 Manganese Deposits

10.2.1 General Description

Manganese deposits are in two locations, Jajar and Gebang, about 9 km south of Trenggalek. The deposits are located in the northwestern and northern flank of the hill

FIGURE 10.1

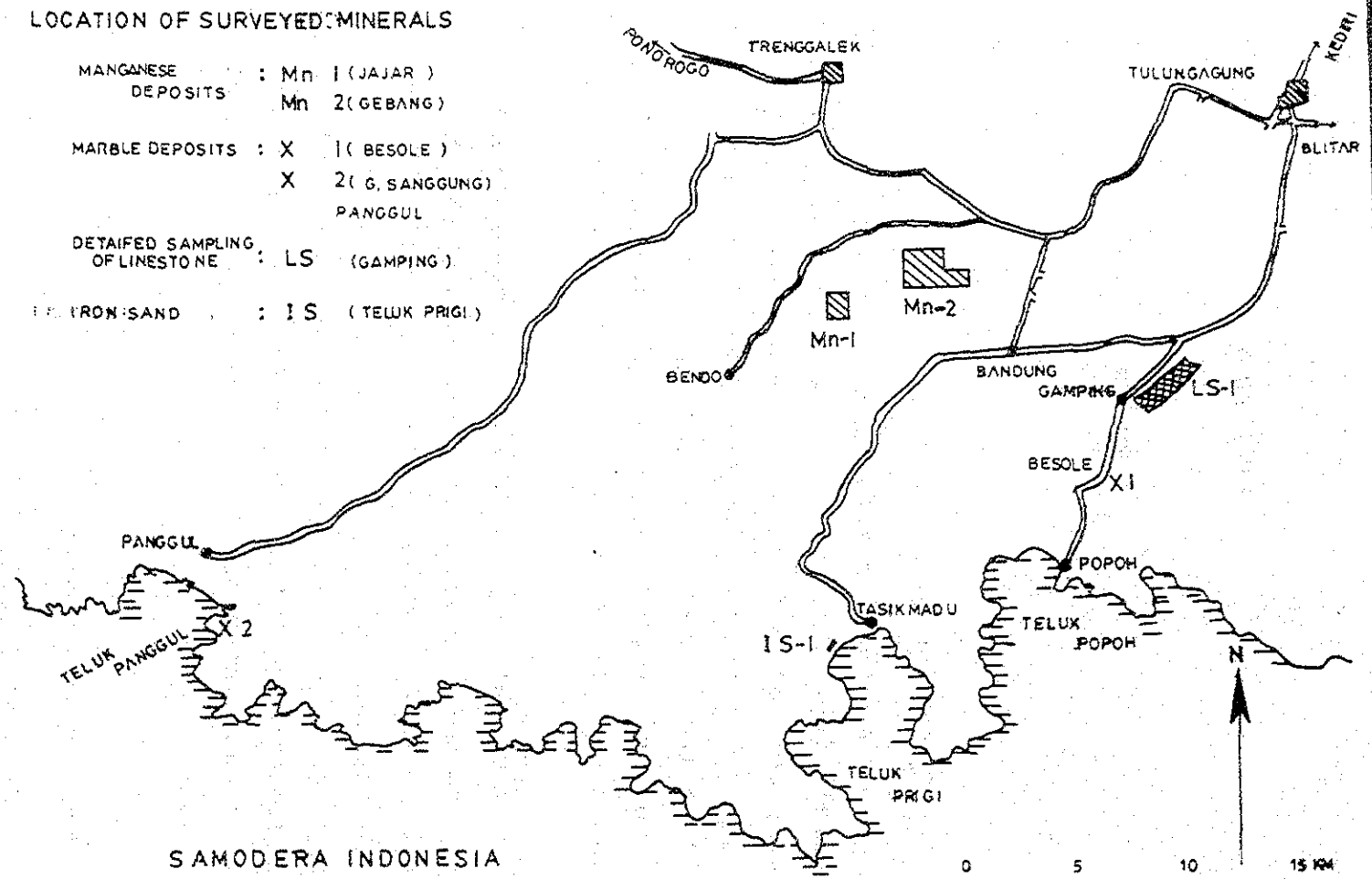
LOCATION OF SURVEYED MINERALS

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)



SAMODERA INDONESIA

which is 300 to 350 m in height. They were discovered in the 19th century. Exploitation had been continued until quite 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 10.1.

As shown in the lower case, 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.

10.2.2 Potential for Exploitation

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

(1) Further exploitation of already known deposits, and

(2) Search for new deposits by analyzing geological structure.

For profitable development, mining of a reserve of more than several 10,000 tons is 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 would be very small. In conclusion, the possibility of large scale manganese exploitation in the future is small.

Table 10.1 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.

10.3 Marble

10.3.1 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 the 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 in the same conditions as at Besole, but the quality such as 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, with a special permission. Crude ore blocks have dimensions of 1.2 x 0.6 x 0.6 m and are transported to Besole for processing.

10.3.2 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 10.2). Before 1974, the rate of production had increased at about 5% a year. However, the growth rate of

production for the three-year period between 1975 and 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 10.2 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%

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

$$t2 = t1/0.30$$

10.3.3 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 are 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.

10.4 Limestone

10.4.1 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 an F.C. test, was carried out as a 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 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.

10.4.2 Potential

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 seem 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 which possess 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 require easy access to raw materials, energy and transportation to demand area, which seems to 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 for large-scale exploitation of limestone 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, at present the Australian steel industry imports limestone from Japan; conceivably, when the future limestone export capacity of Japan decreases, Indonesian limestone will come to play an important role in the Australian market.

10.5 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 is being exploited. A survey was carried out in Pacitan and Prigi Bays by the Team members. An iron sand deposit of 100 to 200 m wide and 4.5 km long is present along the western coast of Pacitan Bay. Also iron sand at Prigi Bay which is 100 m to 200 m wide and 4 km long along the coast is found at the western part of shore line. Pits at two points show that thickness of iron sand measures 0.35 m and 0.55 m, respectively, and the avearge thickness is 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/]
150 m	x	4,000 m	x	0.45 m	x	0.3	x	1.8

= 145,800 tons of concentrate

This quantity is too small to be exploited economically.

10.6 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. Studies of the potential for each mineral and its market demand should be scheduled as follows:

	Repelita III					Repelita	Cost
	1979	1980	1981	1982	1983	IV	(US$1000)
1. Feasibility Study for Marble Exploitation	├────	────	────	────	────┤		100
2. Feasibility Study for Limestone Exploiration						├────	────┤ 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 include: a geological survey, including drilling (3 holes), to evaluate the deposit; investigation of infrastructure; investigation of the possibilities of a processing plant; and a market survey.

CHAPTER XI

MANUFACTURING INDUSTRY

11.1 Introduction

1976 statistics recorded 10,644 large and medium-scale industries in East Java, 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 the production system. It is generally observed that industrial production has increased with the development of various production systems accompanied with technical progress listed 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 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. It is an awfully difficult task to determine an optimal combination of the above systems at any stage of industrial development. Yet, the present industries of the Study Area are polarized into, on the one side, a large group of small-scale home production units (household manufacture, village handicrafts and artisan's workshops) and, on the other, an extremely small group of simple yet modern production units (simple modern factories). No production systems of "assembly line manufacturing" and "semi-automatic and automatic factory manufacturing" exist in the Study Area. Thus, a 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 lacking.

The first group of industries is 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 Madiun in the west, Malang to the south, and to Pasuruan, Probolinggo, Jember and Banuwangi to the east.

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

The small-scale home industries consist mainly of the crop-based industries. But there are a fairly large number of other industries, too. Among 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, providing related repair services as well. In this Area, the livestock-based industries are mainly leather-product industries.

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

11.2 Constraints on 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 that 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 mostly not 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 kinds 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 a 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 much concerned about their product quality, marketing, and technological changes. Due to the smallness of the markets, the industries are unable to attain sufficient economies of scale.

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 should 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 with 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) supporting government policy, particularly directed to the rural (minus) areas (e.g., 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 deliberate long-run planning and study.

11.3 Development Approaches

The above observation does not imply that the Area has little potential for industrial development. Rather, it would suggest that industrial development 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". More specific tactics to materialize the above approach for industrial development 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 would effect 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 advanced 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 also be introduced.

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

To attain economic efficiency in the sector, 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 in a more productive manner. Therefore, reorganization of existing small-scale

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 is recommended. This would lead to up-grading and modernization of production methods and management, and eventually raise 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 entrepreneurship, distributes his orders of particular products from them. The market of small-scale home industrialists 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 design, and sets a strict quality standard. It is thus envisaged that this sub-contracting system will contribute to the industrial modernization and development when successfully introduced.

11.4 Identified Programs and Projects

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

(1) Metal/engineering workshop program

This program consists of 2 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.

11.5 Programs for Project Implementation

The identified projects in section 11.4 can be implemented in the following sizes and investments. Since all of them do not require a large amount of government funds, all of the recommended projects should be implemented during Repelita III.

11.5.1 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 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 the assumption that the engineering workshop produces Rp.50,000 per month per person and the metal workshop Rp.30,000

per month per person. Furthermore, the total number of employees are assumed to be 40 for engineering workshop and 15 for the metal workshop. The annual gross output, therefore, is Rp.24,000,000 for the engineering workshop and Rp.5,400,000 for the metal workshop.

11.5.2 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) Fruit processing project in KDY Kediri.

The program aims at providing small agricultural processing units for farmers who have entrepreneurial 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.