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Indonesia

Transmigration Program Review

(In Two Volumes)

Volume II: Annexes

April 2, 1981

East Asia and Pacific Regional Office

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CURRENCY EQUIVALENTS

Before November 15, 1978

US\$1.00	=	Rp 415
Rp 1.00	=	US\$0.0024
Rp 1 million	=	US\$2,410

After November 15, 1978

US\$1.00	=	Rp 625
Rp 1.00	=	US\$0.0016
Rp 1 million	=	US\$1,600

WEIGHTS AND MEASURES - METRIC SYSTEM

1 millimeter (mm)	=	0.039 inches
1 meter (m)	=	39.37 inches
1 kilometer (km)	=	0.62 miles
1 square kilometer (sq km)	=	0.386 square miles
1 hectare (ha)	=	2.47 acres
1 cubic meter (cu m)	=	35.31 cubic feet
1 million cubic meters (MCM)	=	811 acre feet
1 liter (l)	=	0.264 gallons (USA)
1 liter/second (l/s)	=	0.035 cubic feet per second
1 kilogram (kg)	=	2.2 pounds
1 metric ton (ton)	=	2,205 pounds

INDONESIAN FISCAL YEAR

April 1 - March 31

ABBREVIATIONS

ATT	-	Agricultural Technical Team
BAKOPTRANS	-	<u>Badan Koordinasi Penyelenggaraan Transmigrasi</u> - Coordinating Body for Executing Transmigration
BAPPEDA	-	<u>Badan Perencanaan Pembangunan Daerah</u> - Regional Planning Board
CRIA	-	Central Research Institute for Agriculture
DGA	-	Directorate General of Agraria
DGE	-	Directorate General of Estates
DGFCA	-	Directorate General of Food Crops Agriculture
DGT	-	Directorate General of Transmigration
DOA	-	Department of Agriculture
GAMA	-	Gadjah Mada University
GOI	-	Government of Indonesia
IGGI	-	Inter-Governmental Group on Indonesia
IPB	-	<u>Institut Pertanian Bogor</u> - Bogor Agricultural Institute
IPEDA	-	<u>Iuran Pembangunan Daerah</u> - Land Tax
ITB	-	<u>Institut Teknologi Bandung</u> - Bandung Institute of Technology
JMT	-	Junior Minister for Transmigration
NES	-	Nucleus Estate and Smallholder
NPV	-	Net Present Value
O&M	-	Operation and Maintenance
PAS	-	<u>Proyek Pembukaan Persawahan Pasang Surut</u> - Project Unit for the Development of Tidal Swamps
PMSU	-	Planting Materials Supply Unit
PMU	-	Project Management Unit
PNP	-	<u>Perusahaan Negara Perkebunan</u> - State-owned Estate Enterprise
PTP	-	<u>Perseroan Terbatas Perkebunan</u> - State-owned Estate Corporation operating under the commercial code
PTPT	-	<u>Penyapatan Tanah Pemukiman Transmigrasi</u> - Directorate of Land Preparation for Transmigration Settlement
Repelita	-	<u>Rencana Pembangunan Lima Tahun</u> - Five-Year Development Plan
REC	-	Rural Extension Center
SATDAL	-	<u>Satuan Pengendali Transmigrasi</u> Control Unit for Transmigration
SKP	-	<u>Satuan Kawasan Pengembangan</u> - Development Unit for 2,000 Families
TKTD	-	<u>Tata Kota Tata Daerah</u> - Directorate of City and Regional Planning
TSP	-	Triple Superphosphate

GLOSSARY

Alang-alang	-	A coarse grass (<u>Imperata cylindrica</u>)
Ani-ani	-	Rice knife
Bawon	-	Compensation of rice harvesters with share of harvest
Gelam	-	Swamp forest consisting principally of <u>Melaleuca leucadendron</u>
Jawi-jawi	-	A tree found in coastal swamps (<u>Ficus rhododendrifolia</u>)
Lebak	-	Freshwater swamp
Nibong	-	A palm found in coastal swamps (<u>Oncosperma filamentosum</u>)
Padi gabah	-	Threshed unhusked rice
Pasang surut	-	Coastal swamp influenced by tidal action
Pra-Trans	-	A program to establish new migrants on tree-crop smallholdings
Rawa	-	Freshwater swamp
Tatah	-	Canal used for fish farming

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TRANSMIGRATION PROGRAM REVIEW

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- Annex 3 - Tree Crops for Transmigrants
- Annex 4 - Moving with the Flow: Spontaneous Transmigration in the Indonesian Transmigration Program

Working Papers for the Upland Program Review /a

- I Maps
- II Project Components, Transmigration II
- III Working Papers on Agriculture
 - III/1 Soils - I. Maude
 - III/2 Cropping Systems for Red-Yellow Podzolic Soils - CRIA
 - III/3 Migrant Welfare in Five Transmigrant Communities - G. Davis
 - III/4 Upland Cropping Systems - A. MacMillan
- IV Working Papers on Physical Planning and Land Development
 - IV/1 Resource Inventories for Transmigration - J.P. Malingreau
 - IV/2 Standards for Physical Planning - A. MacMillan
 - IV/3 Forestry Aspects of the Transmigration Program - L.G. Blomkvist
 - IV/4 Additional Tables on the Implementation of Swamp Development -
P. Momal
 - IV/5 Additional Tables on the Economic Evaluation of Swamp Development -
P. Momal
 - IV/6 Swamp Program Accomplishments and Plans - P. Momal
 - IV/7 Design of Government Canal Systems in Coastal Swamps - P. Momal
- V Working Papers on Organization and Manpower
 - V/1 Organization and Functions of TKTD and Organization and
Functions of PTPT - A. MacMillan
 - V/2 Organization and Functions of DGT and Organization and
Functions of Other Agencies - H. Thias
 - V/3 Organization Charts for Swamp Development
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/a Available on file in the East Asia Projects Department.

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INDONESIA

TRANSMIGRATION PROGRAM REVIEW

Key Constraints to the Implementation of Upland Transmigration

SUMMARY AND CONCLUSIONS

Background

1. Programs to weld the surplus labor of Indonesia's inner islands with the surplus land of her outer islands have figured in Government planning for the past seventy-five years. During this time over one million poor and landless farmers have been moved, mainly from Java, and at least two million Javanese now reside in the outer islands as a direct result of transmigration and associated population growth.
2. In recent years, transmigration has come to be seen as an increasingly important tool for addressing a number of national objectives: providing opportunity to the landless, protecting critical lands, increasing food production and promoting regional development. For this reason, in 1978 the Government proposed a massively expanded transmigration program for its third five year plan (Repelita III) and called for the movement of 500,000 families between 1979 and 1984. In support of this program, the Bank funded a second transmigration project to resettle some 30,000 families and tentatively committed itself to finance additional projects as they were prepared.
3. Following a slow start-up in both Government and Bank-assisted projects, the World Bank sent a Transmigration Program Review mission to Indonesia in October 1979 to define the key constraints to an expanded transmigration program, to address general issues of program conceptualization and to make recommendations on the form of future Bank participation within the transmigration program. At the same time, a separate team investigated the special issues associated with swampland development for transmigration. This annex is a summary of the mission's observations and recommendations on the major constraints facing the upland or rainfed transmigration program.

Key Constraints

4. Four major constraints to the expansion of the transmigration program in areas dependent on rainfed agriculture were identified: (a) the absence of agricultural packages suited to varying agroclimatic settings, management systems and input possibilities; (b) weaknesses in the newly established mechanisms of program coordination; (c) an overemphasis on uniform procedures for physical planning, land development and timber disposal; and (d) problems in the effective use of resources allocated for

transmigration. Steps have already been taken by GOI to alleviate a fifth constraint noted by the mission, the absence of a pipeline of projects suitable for GOI or foreign financing.

5. The Agricultural Package. The low productivity of migrants dependent upon the cultivation of foodcrops in rainfed areas has cast doubt upon their ability to purchase the inputs required to sustain production once free supplies have ceased. Therefore to avoid the proliferation of very marginal transmigrant communities, the Review recommends that the GOI should: (a) explore a wide variety of farm models and management systems to promote income diversification and reduce risk; (b) strengthen agricultural support services in major receiving provinces; and (c) ensure that the strategy for developing the entire farm holding is determined at settlement so that farmers can maximize the use of their land.

6. Program Coordination. Under Presidential Decree 26/78, responsibility for the implementation of transmigration has devolved from a single implementing agency, the Directorate General of Transmigration and broadened to include all the line agencies ordinarily responsible for activities in each sector. Under this new arrangement, a large number of Directorates General are involved in the program and their coordination has already become a major block to effective project implementation. In the short-run, therefore, it will be necessary to strengthen coordinating mechanisms at every major level of operation - the Junior Minister's Office, Project Coordinator's and Deputy Project Coordinator's offices and at the level of the various departmental technical teams. Additional institution-building and manpower training will also be required within the involved Directorates. To this end, the report recommends: reorganization of TKTD and technical assistance in support of its data collection, screening and mapping functions; assistance to PTPT for training of land clearing supervisors and soil conservation teams; reorganization within DGT, plus full and immediate support of training programs for DGT staff and transmigrants. It also recommends strengthening the agricultural technical team in Jakarta and the provincial offices in main receiving provinces, formalizing and institutionalizing procedures for land alienation and compensation, and improving the ability of the Directorate General of Forestry to manage forest inventories and timber disposal.

7. Physical Planning, Land Development and Timber Disposal. At the present time, GOI has adopted uniform procedures for physical planning, land development and timber disposal. However, the wide divergence of opinion on these topics reflects the fact that there is more than one answer to each of these problems. To ease constraints to physical planning, for example, attention can be given to: (a) developing farm models which are less slope specific and reduce preplanning requirements; (b) adopting different procedures for different types of terrain; and (c) experimenting with procedures which limit preplanning and increase the authority of on-site staff. A wide variety of land clearing operations using both contractors

and migrants is also required to permit results in terms of speed and agricultural impact to be compared. Similarly, various methods of timber disposal should be attempted. Given the desire for uniform models and procedures to simplify implementation, the Review recommends that the GOI attempt innovative components in demonstration projects and explore alternative models for development primarily where special managerial resources exist.

8. Resource Use. The amount of money available for transmigration is for the moment a lesser constraint to program development than its appropriate use. Not surprisingly, the proposed transmigration program has a more dramatic effect on the budgets and priorities of underpopulated provinces than on food production or population redistribution in the nation as a whole. For this reason, efforts must be made to achieve high cost effectiveness in the transfer of benefits to transmigrants and to assure that these resources benefit local people as well as those who move. Cost effectiveness can be realized by improving quality control; by modifying project components; by increasing the emphasis on spontaneous migration as an adjunct to sponsored settlement; and by reducing the speed and scale of program implementation. Increasing benefits to local people can be accomplished by fully involving local and provincial authorities in decision-making, by regionalization of offices, by paying strict attention to the legal aspects of land alienation and compensation and by making project benefits available to local people. Without attention to these aspects of the program, transmigration could lose the provincial support on which its viability depends.

Main Findings

9. The main conclusions of the Transmigration Review are as follows:
- (a) A number of persistent problems are associated with the overall transmigration program. These center on technical problems resulting from the chosen farm model and method of land development, and include problems of coordination and questions of cost and scale.
 - (b) In spite of these problems, however, the review concludes that the significance of the national objectives to which the transmigration program is addressed, the very strong commitment of Government to the program, and the improvement transmigrants experience in their own lives, justifies continued Bank support for the Repelita III transmigration program.
 - (c) At the same, the Review recommends that the Bank shift its focus from regionally specific projects to projects including resettlement and assistance for circumventing key constraints to program implementation.

- (d) It is further recommended that this shift occur in the context of broad mutual agreement, particularly on the need for flexibility and experimentation on early projects, on the scale of the program, and on the general procedures for circumventing significant program constraints.

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INDONESIA

TRANSMIGRATION PROGRAM REVIEW

Key Constraints to the Implementation of Upland Transmigration

1. BACKGROUND

Past Program Performance

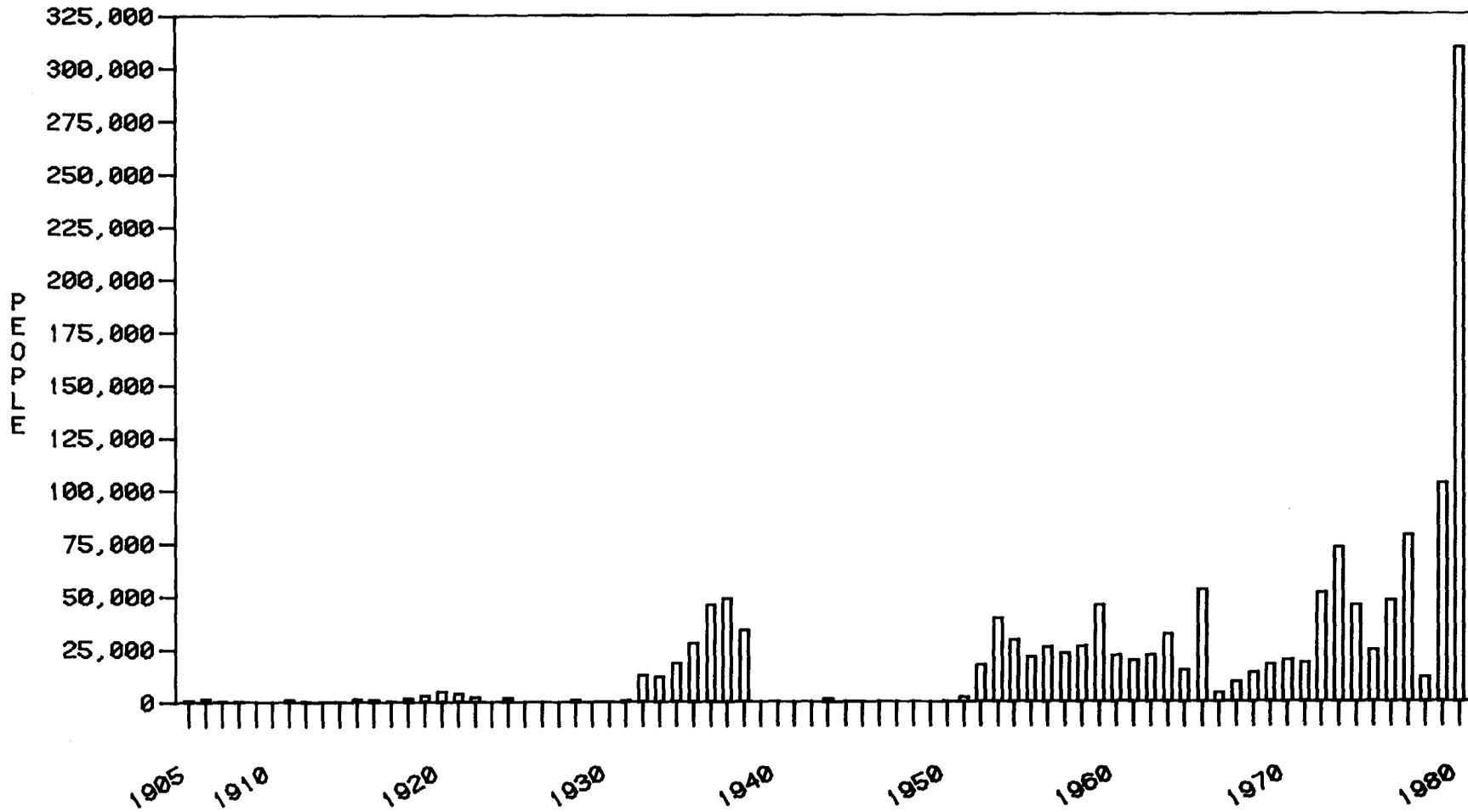
1.01 Indonesia, the fifth largest nation in the world, contains 142 million people, 92 million of whom reside in Java, an island with about 7% of the nation's land. Seventy percent of Java's total area is cultivated and population densities in irrigated areas rise to 2,000 people/sq km. At the same time, vast areas of low fertility soil lie uncultivated in the outer islands and low population densities in some of these areas impede regional development and economic growth. These facts have been so striking for so long that programs to wed the underutilized labor of Java with the underutilized land of the outer islands have figured in the programs of Indonesian Governments for three-quarters of a century. Together these programs have resulted in the movement of more than one million poor and landless farmers and it is estimated that more than two million people are now in the outer islands as a direct result of transmigration programs and associated population growth.

Recent Program Developments

1.02 In recent years transmigration has come to be seen as an increasingly important tool for providing relief to a number of critical problems.

- (a) Providing Opportunity to the Landless. Over 80% of Java's people live in rural areas. Of these, perhaps 40% are landless and another one-third live on less than subsistence-sized plots. The hunger for land and opportunity among Java's poor is so strong that 500,000 families have applied for the transmigration program and this has become a major element in the importance attached to transmigration in Repelita III.
- (b) Protecting Critical Lands. With increased pressure on the land poor farmers in densely populated provinces have begun to cultivate increasingly steep slopes in upper watersheds causing erosion and flooding. Transmigration is therefore seen as a part answer to the resettlement of farmers from such critical lands and to the relocation of people displaced by disasters and development projects such as dams and roads.
- (c) Increasing Food Production. Transmigration can potentially address the problem of food production in two ways: (i) by providing the opportunity for food self-sufficiency to those previously dependent on the lands of others, and (ii) by making surplus food production possible in some areas which have food deficits.

GOVERNMENT SPONSORED MIGRANTS
TO THE OUTER ISLANDS
1905-1981



NUMBER OF TRANSMIGRANTS BY YEARS 1905-1980/1981

- (d) Promoting Regional Development. There remain in the outer islands regions with population densities so low that area development is economically unfeasible. In some of these cases transmigrants can provide the critical mass to attract infrastructure, services (such as extension, and clinics), labor and markets. For this reason transmigration has been given a growing role in regional development and in some sparsely populated provinces it now provides a major part of development funds.

Formulation of the Repelita III Program

1.03 In response to these developments the Third Five-Year Plan (Repelita III) proposed the settlement of 500,000 transmigrant families between 1979 and 1984. These families would be moved to 250 settlements located mainly in Sumatra, Sulawesi, and Kalimantan. Table 1 gives a breakdown of these figures, shows the type of settlements proposed and gives an indication of the extent of Bank participation originally anticipated by the GOI. It is noteworthy that, in the initial stages of program formulation, Bank assistance was projected for 48% of proposed resettlement. To meet the cost of transmigration the indicative budget for Repelita III allocated Rp 1,240.7 billion (US\$2.0 billion) for manpower and transmigration (of which approximately 88% was for transmigration alone), and the program was expected to absorb 5.7% of projected development funds. In support of this program the World Bank has assisted a second transmigration project based on food crop production and intended to resettle 30,000 families and rehabilitate 4,000 others, and it has indicated its willingness to finance of future transmigration projects as they were prepared./1

Table 1: TARGETS FOR REPELITA III
(Settler Families)

	1979/80	1980/81	1981/82	1982/83	1983/84	Total
Tidal reclamation	24,000	16,000	16,000	16,000	16,000	88,000
Rainfed food cropping	26,000	34,000	34,000	39,000	40,000	172,000
<u>Total GOI projects</u>	<u>50,000</u>	<u>50,000</u>	<u>50,000</u>	<u>55,000</u>	<u>56,000</u>	<u>260,000</u>
Bank-assisted projects (rainfed and tidal)	-	25,000	50,000	70,000	94,000	240,000
<u>Total projects</u>	<u>50,000</u>	<u>75,000</u>	<u>100,000</u>	<u>125,000</u>	<u>150,000</u>	<u>500,000</u>

/1 The first transmigration project was approved in 1976 and involved the rehabilitation of one community of 12,000 families and the establishment of a community for 4,500 others. Project components differed from Transmigration II in the provision one hectare of block planted rubber.

1.04 Shortly after the beginning of Repelita III major problems in the start-up of the Transmigration Program became evident and it became apparent that the mechanism for producing a pipeline of projects suitable for Bank financing did not yet exist. For these reasons the World Bank sent a Program Review mission to Indonesia to define key constraints to an expanded transmigration effort, to evaluate ways to circumvent these constraints, and to make recommendations on the form of future Bank participation within the transmigration program.

Main Findings

1.05 Status of the GOI Program. Between April 1, 1979 when Repelita III began and October 1, 1979 when the team visited Indonesia, Government had moved about 8,000 families virtually all of whom were counted against Repelita II targets.^{/1} Only 100 of the 50,000 families targeted for movement in 1979/80 had been resettled. A list of areas for development during the third five-year plan had been approved by the interministerial policy making body (the BAKOPTRANS) but the precise designation of actual sites had not yet occurred. Given the short preparation period available to the Directorates involved in planning, all sites for the 1979/80 GOI program were being developed on a plan-as-you-proceed basis^{/2} and the first GOI projects to be fully mapped were not expected to be implemented until 1981/82. PTPT, the agency within Public Works responsible for land clearing for transmigration, had cleared 34,000 ha in 13 sites by September 1979 and appeared confident of meeting its target of 79,000 ha before the end of the fiscal year (March 31, 1980). Field observations suggested, however, that land clearing was in many cases causing serious soil disturbance and that due to a lack of coordination between agencies only a portion of cleared land was likely to be settled in the first year of Repelita III.

1.06 Key Constraints. Four key constraints to an expanded transmigration program were identified for discussion with Government:^{/3}

-
- /1 Repelita II targets must be met before Repelita III targets are addressed as funds allocated for this purpose have already been released to the line agencies.
- /2 In plan-as-you-proceed projects, land clearing is done and then mapping occurs. Public works officials view this as a transitional procedure necessitated by the need to settle migrants before standard physical planning can be completed.
- /3 The absence of a pipeline of projects suitable for foreign financing was also defined as a major constraint to program expansion. Work has now been initiated on project preparation and its implications will be discussed in the final section of this report.

- (i) the absence of agricultural packages suited to varying agroclimatic settings, management systems and input possibilities;
- (ii) weaknesses in the newly organized mechanisms of program coordination; and
- (iii) procedures for physical planning, land development and timber disposal;
- (iv) problems associated with effective use of resources allocated for transmigration.

Discussion of these constraints forms the major part of the following report.

1.07 Preliminary Conclusions. Based on mission findings, the Transmigration Program Review team concluded that the start-up period for the new Repelita III Transmigration Program was likely to be a protracted one, and one entailing frustrations for both Bank and GOI; but the team felt that the significance of the national objectives to which the program was addressed, Government's strong commitment to the program as reflected in the massive reorganization of its administrative structure and the commitment of manpower and funds, and the satisfaction expressed by settlers in most transmigrant communities all appeared to justify significant Bank role in the Repelita III transmigration effort.

1.08 At the same time the team concluded that there appeared to be little justification for Bank involvement in the transmigration program on a site by site basis. The reasons are several: the success of Bank-assisted projects depends on the same institution-building activities required by GOI-financed projects; an emphasis on Bank projects takes personnel and attention from GOI efforts; and the success of Bank participation in the program is even now measured by the achievements of the program as a whole.

1.09 Based on these findings, the Transmigration Program Review team recommended that the Bank shift its focus from regionally specific projects to more encompassing efforts including resettlement components and assistance to GOI to: (a) circumvent key constraints to program implementation; (b) to promote institution-building; and (c) to support the innovative work upon which future program growth depends. It also recommended that this shift occur in the context of broad mutual agreement on such matters as flexibility and experimentation in early projects, program scale, and procedures to circumvent key constraints. The ensuing chapters give more detail on these key constraints and give recommendations on options to overcome them. Chapter 6 makes recommendations for an expanded Bank role within the transmigration program.

2. KEY CONSTRAINTS: THE AGRICULTURAL PACKAGEThe Problem

2.01 In general, those Indonesian soils with good agricultural potential are already cultivated. Remaining areas with more modest development potential include tidal and freshwater swamps and upland areas with soils of low natural fertility. These areas, consisting mainly of red-yellow podzolics and latosols, are widespread in Sumatra, Kalimantan and Irian Jaya, and the sheer volume of such land suggests the urgency attached to programs intended to bring some of these areas into agricultural production (Table 2).

Table 2: DISTRIBUTION OF AREAS OF RED-YELLOW
PODZOLIC SOILS

	million ha	% of region
Sumatra	20.6	43.5
Kalimantan	16.1	29.9
Sulawesi	2.0	10.3
Irian Jaya	9.6	23.0
<u>Total</u>	<u>48.3</u>	<u>29.8</u>

2.02 Traditional food crop production on red-yellow podzolic soils produces low income levels, but research by CRIA (Central Research Institute for Agriculture) has suggested that improved cropping systems, fertilizer use and pest control in these areas can significantly increase food crop yields and incomes. Income on selected fields in Way Abung, a transmigrant community in Sumatra earmarked for rehabilitation under Transmigration I, were increased from Rp 210,000 (US\$336) with farmers practices to Rp 600,000 (US\$960) with unrestricted inputs and CRIA management (see Table 3); and in Baturaja, a new community in a nearby area they were increased even more dramatically.^{/1} Whether these results can be obtained on a large-scale and whether they are applicable throughout Indonesia are matters which are still subject to discussion, nevertheless, this work together with national priorities stressing food crop production led directly to the adoption of a food crop model for all upland transmigration sites proposed for Repelita III.^{/2}

^{/1} For details see the Working Paper: Cropping Systems for Red-Yellow Podzolic Soils - CRIA.

^{/2} This model involves an 0.25 ha houselot, 1.00 ha of clean cleared land for food crop production, and an additional 2.25 ha of land allotted for future agricultural development.

Table 3: YIELD OF CROPS, TOTAL VALUE, CALORIES AND PROTEIN PRODUCTION IN YEAR-ROUND CROPPING SYSTEM STUDIES, WAY ABUNG, 1977-78

Cropping Pattern	Yield kg/ha	Value /a Rp/ha	Calorie K cal/ha	Protein kg/ha
A. Introduced Cropping Pattern A				
Corn +	2,553	102,120	9,063	235
Upland rice /	3,688	211,280	8,829	250
Cassava /	19,888	119,328	23,866	139
Peanut -	580	203,000	2,622	148
Rice bean	280	63,000	1,266	70
<u>Total</u>		<u>708,728</u>	<u>45,646</u>	<u>842</u>
B. Introduced Cropping Pattern B				
Corn +	1,815	72,600	6,443	167
Mungbean I	320	80,000	1,104	71
Upland rice /	3,456	207,360	8,274	235
Cassava I /	28,725	172,350	34,470	201
Mungbean II +	280	70,000	966	62
Cassava II	2,373	14,238	2,848	17
<u>Total</u>		<u>616,548</u>	<u>54,105</u>	<u>753</u>
C. Introduced Cropping Pattern C				
Corn +	1,040	41,600	3,692	96
Soybean -	1,408	316,800	4,460	491
Corn +	1,504	60,160	5,339	138
Sweet potato -	5,628	84,420	6,922	101
Cowpea	571	128,475	1,955	131
<u>Total</u>		<u>631,455</u>	<u>22,567</u>	<u>957</u>
D. Farmer's Cropping Pattern and Management				
Corn+	634	23,360	2,251	58
Upland rice /	2,432	145,920	5,822	165
Cassava	10,906	65,536	13,087	76
<u>Total</u>		<u>236,716</u>	<u>21,160</u>	<u>300</u>
E. Farmer's Cropping Pattern, CRIA Management				
Corn +	1,341	53,640	4,761	123
Upland rice /	2,648	158,880	6,339	180
Cassava	12,553	75,818	15,064	88
<u>Total</u>		<u>287,838</u>	<u>26,164</u>	<u>391</u>
F. Farmer's Cropping Pattern and Management				
Corn +	924	36,960	3,280	85
Upland rice /	1,905	14,3000	4,561	130
Cassava	9,788	58,728	11,746	69
<u>Total</u>		<u>209,988</u>	<u>19,587</u>	<u>284</u>

/a Gross values, inputs not subtracted.

2.03 Recent work by Bank staff suggests, however, that the early promise of CRIA research may be difficult to realize in farmers' fields. Reports by farmers and crop cuttings in Baturaja and Way Abung suggest that actual yields are both low and extremely variable. Of 592 farmers interviewed in communities dependent on rainfed agriculture, only 9% reported obtaining more than one ton of paddy per family per year (about subsistence for a family of five). Nearly two-thirds reported less than half this amount (Table 4). This was true even where free inputs were still being provided by the project. Low yields were due to some factors beyond human control - for example, erratic climate and poor soils, and to some amenable to influence - unreliable fertilizer supplies, manpower shortages, and problems of pest and weed control. Taken together, however, these data have cast doubt upon the ability of migrants to invest in the inputs upon which sustained food crop production depends, and they have raised questions about the appropriateness of a single farm model based on food crop production for all transmigrant communities.

Options

2.04 To avoid serious risk to farmers moved through the transmigration program, the following options merit attention: (a) increasing the range of farm models available and in particular developing farming systems less sensitive to the timely and sustained use of inputs; (b) improving the quality and coordination of agricultural support services in transmigration areas; and (c) ensuring that the strategy for farm development is determined at settlement so that farmers can maximize the use of their land.

2.05 Principles of Farm Development. In pursuing these options it is necessary that the following principles be taken into account in planning for agricultural development in transmigration areas.

- (a) Land should be developed according to its capability.
- (b) The maximum amount of land with an economic potential for any type of agriculture should be developed within an area opened up for settlement and commanded by infrastructure.
- (c) Given severe managerial shortages in Indonesia, farming systems must assume farmer management, particularly in the early years of settlement.
- (d) Farming systems should be designed to ensure a supply of food crops to meet the subsistence needs of the settler family at least during the establishment period and preferably longer.
- (e) The individual farm should be developed to take fullest advantage of the allocated land and of the particular aptitudes of the settlers.
- (f) Farming systems, for application at the individual farm and community level, should involve diversified income opportunities as a means of reducing risks.

Table 4: YIELDS REPORTED IN FIVE TRANSMIGRANT COMMUNITIES /a

Community	Number of years on site	Rice yield per family per year (kg)	Hectares under cultivation	Yield per hectare /b (kg)	% farmers using inputs	% families reporting			Sample size
						No rice yield	500 kg or under	1,000 kg or under	
Rainfed									
Sitiung II	1	314	0.60	526	100/c	20	89	100	(35)
Sitiung I	2	221	1.19	262	100	46	96	98	(45)
Baturaja I	1.5	623	0.93	669	85	6	72	81	(32)
Rimbobujang II-V	1.5	441	1.87	235/d	98	18	75	96	(178)
Rimbobujang I	2.5	992	1.66	597	71	4	26	72	(114)
Way Abung 9-12	4-5	504	1.05	484	29	16	68	96	(70)
Way Abung 7-8	5-6	757	1.47	514	22	6	50	92	(36)
Way Abung 4-6	7-8	585	1.39	420	9	7	59	91	(44)
Way Abung 1-3	9+	462	1.02	452	26	0	76	97	(38)
Tidal /e									
Upang-Purwoharjo	2	2,248	1.19	1,893	0	0	3	11	(37)
Upang-Tirtakencana	4-5	2,371	1.80	1,312	0	0	0	3	(37)
Upang-Tirtamulia	5-7	2,747	1.90	1,443	0	0	2	5	(41)
Upang-Purwosari	7-8	1,865	1.85	1,006	0	0	11	12	(63)
Upang-Makarti	9	2,664	2.30	978	0	0	2	29	(41)

/a Farmer reports are typically lower than agricultural department statistics. This is due in part to the fact that agricultural department statistics are extrapolated from measured 5 meter-square plots on harvested fields, fields which fail are not measured and for this reason the statistics overstate aggregate yields. Harvests in the year of most of these surveys were also rather poor.

/b Farmers cannot judge the percent of a field which is cultivated, particularly in primary forest areas which have residual logs and stumps. For this reason, this statistic which represents the farmer's reported yield divided by the total area he reported cultivating is not comparable between villages.

/c In Sitiung, Baturaja and Rimbobujang, fertilizer is provided by the project. In many cases, however, poor timing has made it less effective than it might otherwise be.

/d Field area is overstated in this community. These fields are newly felled by migrants and have perhaps 0.50-0.60 ha of plantable land, thus distorting productivity on a per hectare basis.

/e Wet field padi. Upang Delta is one of the most successful of the tidal developments and may not be representative of all communities of this type.

- (g) Settlements should be established at relatively low cost to promote GOI's equity objectives.

Within these criteria, however, a wide range of farming systems may be viable and experimentation to explore alternatives should be strongly encouraged.

2.06 Developing Alternative Farming Systems. A single farm model based on 1.0 ha of food crops and 2.25 ha allotted for future farm development does not make good use of very poor soils or undulating land, nor does it ensure adequate income or risk avoidance in marginal or remote areas. For this reason, the development of alternative farming systems suited to different agroclimatic conditions and different management and input possibilities must be given the highest priority by GOI and the Bank. These farming systems might be based on food crops, food crops followed by or intercropped with tree crops or possibly on tree crops or cash crops alone. Where food crop production is to be emphasized, increased attention to income diversification and risk reduction through the introduction of large and small livestock, fuel and firewood components, subsidiary income earning activities and off-farm employment in the dry season, should be encouraged and such components should be treated as an integral part of project design. Furthermore, in the majority of settlements where soils are poor, the land is undulating, climate is erratic and services remote, farming systems must be developed which minimize dependence on the timely delivery of and renewed investment in inputs. These farming systems are likely to be based on food crops in the establishment period followed by tree crops as soil fertility declines.

2.07 These two approaches are not the only ones suited to transmigration, and one of the most important conclusions of the Program Review is that farm models for large-scale transmigration will require more experimentation, more flexibility and more regional specificity than presently assumed.

2.08 Strengthening Agricultural Supporting Services. Extension workers in Baturaja, a Bank-assisted project, have reported seed with a germination rate of 13%, and the timely provision of fertilizer remains a constraint to agricultural development, in this area. This, in one of the most accessible and closely monitored communities in the transmigration program, leads to concern about the ability of the GOI to provide appropriate and timely inputs in the large number of dispersed sites proposed for Repelita III. Therefore, regardless of farm model, strengthening agricultural supporting services both in Jakarta and the provinces will be critical to program success. To do this the following activities should be given high priority.

- (a) The Agricultural Technical Team for transmigration (in the Department of Agriculture) should be strengthened in order to plan and monitor the provision of agricultural inputs, and to assist in the coordination of the preparation of agricultural components. This should be done by the provision of additional space, staff, and, if required, consultant services to assist in the definition and design of appropriate components and to evaluate their delivery and impact.

- (b) Agroclimatic conditions and research priorities for the areas to be developed should be defined and research should be initiated by the AARD which is regionally specific and focused on total farming systems. To the extent that this research strains the capacity of existing agencies, technical assistance should be provided to initiate studies and train counterparts.
- (c) When major receiving areas are identified, seed farms and seedling nurseries should be established as early as possible in the settlement process. These facilities should serve sponsored migrants, spontaneous settlers and locals, under various types of cash and credit arrangements.
- (d) Supplementary training of agricultural personnel for transmigration such as agricultural site managers and extension workers should be given very high priority. Training areas in the outer islands should be identified, facilities expanded, courses begun in extension for transmigration, and transmigration training materials developed./1
- (e) The agricultural staff in the main settlement provinces should be strengthened. To this end, consideration might be given to the formation of separate divisions within the appropriate agencies to deal exclusively with transmigration problems.
- (f) The delivery of agricultural inputs should be carefully monitored, possibly by the Agricultural Technical Team, and if substantial shortfalls occur under present national programs /2 consideration should be given to providing strong agricultural project management units located in the regions to coordinate the provision of agricultural services for transmigration.

2.09 Early Definition of Projected Farm Development. In the tidal areas the productivity of 2.0 ha of land is sufficiently high that the Swamp Development report has recommended a two-stage development: a low-cost, low-input first stage and later improvements to introduce water control or tree crops.

/1 In pursuing these objectives maximum use should be made of the materials already produced by the UNDP/FAO project INS/72/005.

/2 At present it is assumed that agricultural support services for transmigration will be provided through national programs such as research, extension, seed production and the like. Since transmigrants require far more intensive and timely attention in the establishment period than cultivators engaged in ongoing cultivation and yet are located in areas where these services are least likely to be provided, one of the central issues facing the transmigration program is whether the diverse agencies charged with these large national programs will be able to provide appropriate and effective components for transmigration.

However, the yields from 1.25 ha under upland cultivation do not appear to justify appraisal based on 1.0 ha of food crops and an unspecified plan for future farm development. Migrants who are given one hectare of cleared land and are uncertain about the status or location of additional land will be unable to diversify their farms in the early period of development, and tree crops established at later stages will take years to mature. If field fertility declines in the meantime, there will be a hiatus in which subsistence on 1.0 ha may be precarious. For this reason, the development model for transmigration must specify projected farm development at the time of settlement. If reasonable evaluation indicates that the management capacity of the estate sector will not permit block-planted tree crops at a specifiable future date, alternate models must be proposed. Furthermore, if GOI intervention at a second stage of development cannot be ensured, all land should be turned over to migrants as early as possible to promote rapid development by the farmer himself.

2.10 Table 5 indicates the rapid land clearing and commitment to perennials among farmers with large plots of land adjacent to their house plots. This farm diversification has been accomplished without additional money and managerial inputs and reflects primarily a sound land allocation arrangement and clear knowledge on the part of the farmers about the location of their land.

Table 5: COMPARISON OF FARMING STRATEGIES
IN FOUR TRANSMIGRANT COMMUNITIES

Community	Years on site	Land initially provided	Land cleared	Trees planted	Spontaneous mig/family
<u>Communities with 2.0 ha or Less at Settlement</u>					
Sitiung II	1	1.0	0.60	34	2.21
Sitiung I	2	1.0	0.96	27	0.03
Baturaja I	1.5	1-2	0.93	78	1.22
Way Abung 9-12	4-5	2.0	1.05	69	0.93
Way Abung 7-8	5-6	2.0	1.47	54	0.41
Way Abung 4-6	7-8	2.0	1.39	46	1.26
Way Abung 1-3	9+	2.0	1.02	61	0.64
<u>Communities with 5.0 ha of Land Available at Settlement</u>					
Rimbobujang 1	2.5	5.0	1.88	930	2.94
Rimbobujang 2	1.5	5.0	1.97	89	1.72
Rimbobujang 3	1.5	5.0	1.83	578	2.75
Rimbobujang 4	1.0	5.0	1.91	236	0.94
Rimbobujang 5	1.0	5.0	1.77	514	0.94

Implications

2.11 There are not yet sufficient data to say with confidence that the technical package and organizational arrangements proposed for food crop production in the outer islands will work on the scale proposed. For this reason it is urgent that a wide variety of regionally adapted farm models and management systems be tried in the early years of Repelita III and that from these the most applicable be distilled. To this end the Program Review recommends that GOI undertake the preparation and implementation of projects with innovative features possibly in conjunction with the FAO/IBRD Cooperative Program, and where strong management possibilities exist (as in East Kalimantan where a German technical assistance is available) GOI encourage experimentation with alternative agricultural systems which assume farmer establishment, initial food crop production and the early introduction of cash crops. At the same time, very high priority should be given to defining the areas to be settled and strengthening agricultural support services in these areas, preferably before settlement begins.

3. KEY CONSTRAINTS: PROGRAM COORDINATION AND INSTITUTIONAL CAPACITY

Program Coordination

3.01 To address earlier shortcomings in the implementation of the transmigration program, a Presidential Decree was issued on August 31, 1978. Under this decree, responsibility for transmigration implementation was moved from a single agency, the Directorate General for Transmigration, and given to the line agencies ordinarily responsible for each sector. All told, 7 Departments and 53 Directorates General were involved in the transmigration program. To provide the required integration of these agencies a Junior Minister for Transmigration was appointed by the President to oversee the coordination of implementation./1

3.02 These organizational arrangements are still in their infancy and are difficult to evaluate. Two problems are already evident, however. First, there are serious difficulties in identifying appropriately skilled mid-level managers to fill coordinating positions on Bank-financed projects and coordinators are not yet being appointed for GOI projects. Second, advanced planning and coordination of implementation is particularly poor between Directorates General. For example, at the present time, some 117,000 ha of land has been opened by Public Works Directorates under the swamp reclamation program but has yet to be settled by DGT; and a similar problem in the upland program has led to a directive from the President urging closer cooperation between agencies.

3.03 Provision of Appropriate Personnel. Part solutions to the problem of personnel recruitment will have to be in the form of increased incentives, secondment, early training and increased use of the private sector.

- (a) Incentives. Very few people with the qualifications needed to manage a large and complex transmigration project are motivated to live in the remote areas where transmigrants settle. To

/1 The Decree also provides for several other levels of coordination. First is a Governing Board (BAKOPTRANS) consisting of involved Ministers and reporting directly to the President. This Board sets the policy guidelines under which the program operates and is chaired by the Minister of Manpower and Transmigration. Directly under the BAKOPTRANS is a body consisting of all the Directors General of the main implementing agencies (SATDAL). This Board is responsible for coordinating day-to-day implementation and is headed by the Junior Minister for Transmigration. Within each implementing agency the Decree also provided for a technical team responsible for the design and implementation of appropriate components for transmigration. Finally, to promote the integration of line agencies in the regions, the Governor and Provincial Committee for Transmigration are charged with the coordination of participating agencies in the provinces.

address this problem, incentives in terms of salaries and benefits must be improved. In the case of mid to high level managers, some may have to be hired as consultants rather than at GOI pay scales, or alternatively site management might be contracted to the private sector. Permanent on-site personnel (teachers, nurses, extension workers) could be provided with an agricultural package similar to that of migrants in order to increase incentives and commitment.

- (b) Secondment of Personnel. In the short run, the effectiveness of personnel such as Project Coordinators, may depend upon the secondment of middle-level staff from developed Directorates. At the present time this is virtually impossible, as officials who leave their home agencies have their ranks and salaries frozen until they return. Provisions for secondment which recognize the experience gained in other agencies and which provide compensation upon return, would open one avenue of recruitment which does not now exist.
- (c) Early Training. The likelihood that Project Coordinators and Deputy Project Coordinators could move easily into their administrative roles would be greatly increased by systematic on-site and Jakarta-based training and to this end a comprehensive manpower training institute for transmigration should be given very high priority by the GOI and full support by the Bank.

3.04 Between-Agency Coordination. This aspect of the program can be improved with better preplanning and coordination of budget requests and attention is now being given to these matters through the office of the Junior Minister. In addition, coordination can be improved by increased reliance on the private sector. For example, contractors doing land clearing could, at the same time, build houses and village infrastructure. The DGT would continue to design, supervise and pay for these components but they would be linked to land development activities in a single contract. Where contractors could be prequalified to do so, they might also be made responsible for the provision of agricultural inputs and possibly early on-site management. This is not too dissimilar from arrangements used successfully by FELDA in Malaysia and would be especially useful in sites remote from existing agricultural services. In any case, as with other components, the early years of Repelita III should be the time for a wide variety of experiments intended to clarify the advantages of alternative organizational arrangements.

3.05 Overall Coordination. The Junior Minister is handicapped by the fact that he stands outside the normal structure of the line agencies, which restricts both his scope of influence in areas such as staffing and budgeting and his authority over agencies with divergent aims and goals. In recent months the JMT staff has been increased and has assumed new coordinating functions. The office has also been relocated to the DGT complex which should improve an exchange of staff between these two groups. A management assistance team financed by UNDP and the Bank is now in place and is expected to make recommendations on further support. Should the scale of the

program and the resources of the Junior Minister prove incompatible, however, consideration must be given to drawing the Junior Minister's Office under the umbrella of the Ministry of Transmigration or to re-establishing a strong land development authority for transmigration such as the Tennessee Valley Authority or FELDA. In either case, the agency should be given control over the project formulation and funding as a means of promoting coordination.

Institutional Capacity /1

Public Works

3.06 TKTD. TKTD, the Directorate for Urban and Regional Planning, has only recently been charged with the responsibility for physical planning for transmigration and for the preparation of feasibility studies for all projects - whether proposed for foreign or GOI funding. The response of its staff to this challenge has been little short of heroic; but much remains to be done. No structural changes have been made to facilitate the work of TKTD and no senior staff work exclusively on transmigration despite the fact that this program accounts for more than 60% of TKTD's budget and occupies about two-thirds of staff time. To circumvent constraints introduced by organizational factors, the Review team recommends that activities in support of transmigration be separated from other TKTD tasks and that division for transmigration be established with special teams for screening, mapping and village design. It is further recommended that teams working on these tasks be assigned work on a provincial basis in order to maximize the cooperation between provincial authorities and agencies in Jakarta.

3.07 PTPT. In spite of its newness as an organization, PTPT has demonstrated an impressive ability to meet targets and to manage very large land development programs in remote areas. Its organizational structure, particularly the emphasis given to the appointment of on-site project managers appears to be appropriate for the type of program undertaken. PTPT has also been able to meet its staffing requirements thus far and to secure budget allocations commensurate with its projected program. The biggest problems faced by PTPT are in the areas of quality control and the development of soil conservation standards. The Transmigration II loan provides assistance to PTPT to supervise land clearing in both Bank and GOI projects and the immediate deployment of these consultants in Government projects should be given high priority by the GOI. The loan also provides for experts to assist in the implementation of soil conservation measures for Transmigration II, an activity which should be extended to the entire GOI program.

/1 Recommendations were made by the Program Review on institution building within two of the major agencies associated with transmigration: Public Works and the Directorate General of Transmigration. At the time this Annex was written, the Review had not yet examined organizational or manpower issues in the third major agency, the Department of Agriculture.

Directorate General of Transmigration

3.08 The massive reorganization of the transmigration program has resulted in significant changes in the role of the Directorate General of Transmigration. Therefore, among the most critical tasks of the GOI in the near future will be (a) stimulating agency reorganization to bring Directorate and Subdirector tasks in line with new agency responsibilities; and (b) increasing the numbers, qualifications and competence of DGT staff. These activities are so important that future program expansion cannot be envisioned without immediate and significant plans for strengthening the DGT.

3.09 In terms of organization, new Subdirectorates should be formed along functional lines. For example, a new Subdirector should be established to deal with housing and village infrastructure. Increased attention should also be given within the agency to the selection of highly motivated migrants and to determining the areas from which they will come. A proposed Directorate for spontaneous migration should be strongly supported. Monitoring migrant welfare and agency coordination on behalf of the Junior Minister is likely to be done by the DGT and if so the capacity to undertake this task should be improved.

3.10 In view of planned program expansion, one of the most important tasks facing GOI will be to improve the training of both Jakarta-based and on-site staff, and of transmigrants. At present DGT training is the responsibility of an in-house training institute which in 1979/80 trained 4,250 transmigrants and 200 staff. Apart from some outdated facilities in Pasar Minggu (Jakarta) and a training center in Lampung Province, DGT does not have its own training facilities but uses existing centers run by other agencies, mostly Vocational Training Centers operated by the Directorate General of Manpower Development in the same Department. Instructors are also seconded from other Government agencies. This is insufficient and an increased and broadened training program is required. This should include the development of new courses and teaching materials, the provision of instructor training, and a permanent physical basis in the form of a national training institute for transmigration with regional subcenters. Total trainee numbers will be large enough to permit training courses to be undertaken throughout the year, hence justifying the expenses of specialized facilities and full-time staff. The proposed strengthening of the training institute could also include related research and development, data compilation and analysis, and monitoring and evaluation work. Proposals for such training have been made to FAO and the mission urges close cooperation between agencies in the identification of appropriate components and arrangements for their implementation.

3.11 Other Agencies. Most other agencies, Agraria, Health, Education, Forestry, for example, do not report major institutional or manpower constraints in meeting transmigration demands because, in most cases, they are expanding services which make up their normal program. However, all agencies placing on-site staff (Health, Education, Agriculture) face problems of appropriate incentives for personnel in remote areas. For this reason it

may be advisable to provide permanent on-site personnel with the land and support packages provided to the migrants. This would aid recruitment, supplement income, and help improve ties between support personnel and the communities they serve.

Implications

3.12 Poor interagency coordination is defined by Indonesians at all levels of Government as the single largest constraint to program implementation, and managerial shortages and institutional limitations were viewed by the Program Review as the major constraint to program expansion. In the short-run, these constraints can be partially overcome by the use of consulting firms to aid in the preparation, implementation and coordination of projects. But even these tasks must be organized and supervised by agencies responsible for specific functions. It is recommended, therefore, that institution building be given as high priority as resettlement itself in the early years of the program. This will slow program development initially but it is one solution to a sustained transmigration effort which minimizes cost and is not heavily dependent on expatriate assistance for its continuance.

4. KEY CONSTRAINTS: PROCEDURES FOR PHYSICAL PLANNING,
LAND DEVELOPMENT AND TIMBER UTILIZATION

Physical Planning

4.01 At the time of the Program Review, GOI projects were being done without feasibility studies and preliminary physical planning, and no mapping was underway which would lead to a pipeline of projects suitable for Bank financing. In addition, poor topographic mapping for Transmigration II had become an obstacle to project implementation. Therefore, to ease bottlenecks in this area, the Program Review team recommended that Government explore: (a) better use of consultant assistance in the physical planning process; (b) farm models which are less slope specific; and (c) procedures which could simplify preplanning.

4.02 Consultant Assistance. Since the October 1979 mission, TKTD has prepared terms of reference for consulting firms which will lead to the screening of 144 sites in 13 provinces and to the preparation of feasibility studies on those suitable for development. This will greatly increase the knowledge of potential areas for settlement and facilitate the identification and ranking of projects, and for this reason this activity has been strongly supported by the Bank. At the same time, however, the fact that the responsibility for project preparation is now lodged in a single agency within the Public Works Department points to the need to strengthen TKTD's ability to coordinate planning in areas where it has limited expertise (agriculture, forestry, sociology) and to involve other agencies in the definition of appropriate components.

4.03 Farm Model. The importance of the interrelationship between farm models and physical planning cannot be overstated. The original farm model for Repelita III transmigration projects required the identification of 2.0 ha land under 8% slope for food crop production. There had to be (i) sufficient land of this slope class within walking distance of each area of settlement and (ii) sufficient amounts of this land to allow several development units of 2,000 families (SKP) in each region in order to justify the requisite infrastructure. To circumvent constraints introduced by these criteria, the requirement has now been reduced to 1.0 ha of land suitable for food production. If the land is flat and visible (as in some grassland areas) these criteria will not strain the planning process, but if the land is undulating and forested (as in Jambi Province) both topographic mapping and village design will still be time consuming and difficult. One answer to this problem involves the development of some farm models particularly for use in undulating areas which are less slope specific than the present food crop model and are, therefore, more tolerant of error in the planning and implementation process. Such models might involve flexible farm models with food crops on land found to be flat, or on farm models which call for annuals replaced by perennials after the early years of cultivation.

4.04 Procedures for Physical Planning. Since October, a number of steps have been taken to reduce the manpower requirements for physical planning but procedures still call for detailed topographic mapping and village design to permit tendering for land clearing and houselot allocation. In the past much of this activity has been done on site and there may be merit in closely monitoring the present plan-as-you-proceed projects to see whether some compromise might be appropriate. It is also recommended that mapping techniques vary with land cover and terrain. This might involve:

- (a) substituting photogrammetric interpretation for topographic surveys in grassland areas;
- (b) concentrating detailed topographic surveys along proposed road alignments, village sites and service centers only in forested areas; and
- (c) adopting land clearing methods for which less detailed advance specifications are required and using on-site management to allocate farm land.

Land Development

4.05 The type of land clearing required for transmigration has been one of the most controversial issues associated with the program. This is not surprising as questions on proper land clearing methods are both technically and organizationally complex and evidence on methods, equivocal. For example, land clearing trials under controlled conditions have demonstrated the utility of mechanical methods when properly executed, but field observations suggest a number of disadvantages in the following areas:

- (a) Soil Conservation. The greatest liability of mechanical land clearing is that as presently practiced it is causing serious damage to the agricultural potential of the areas cleared. This is of particular concern as the food crop farm model requires minimal disturbance to the soil.
- (b) Labor Utilization. Large-scale mechanical land clearing is also inconsistent with the main thrust of Repelita III - employment generation./1 Where labor is short, and migrants are deployed for land clearing, manual clearing has the advantage of providing income diversification in early years of settlement.

/1 It is commonly held that mechanical land clearing is required because labor is not available in the remote areas where sites are located. Review findings do not confirm this impression. Land in tidal swamps which is equally remote and inhospitable is cleared by chainsaw gangs as are areas now being cleared for Nucleus Estates. In many areas, in fact, contractors with machines are "forced" to use manual methods to speed clearing because of downtime on machines and poor weather.

- (c) Tendering. Mobilization of heavy equipment confines bidding to large companies; requires the commitment of large tracts of land for long periods to a few contractors, thereby reducing the leverage for quality control; it also increases the amount of preplanning which is required for bidding and entails long mobilization periods.

4.06 For all these reasons the Review argues that manual clearing with chainsaws is to be preferred to mechanical methods. Generally this means that settlers would assist skilled chainsaw gangs provided by the land development contractor. Alternative labor arrangements may be feasible but are at present less common. Government, however, maintains a strong commitment to mechanical clearing, assuming that this is necessary to obtain land development with the speed and scale proposed. Under these circumstances, the Review has recommended that the mechanical land clearing done in the next six months in Transmigration II be carefully monitored for both speed and impact and that this evidence be used to determine future land clearing methods. It further recommended that alternate methods of land clearing be attempted in other sites and the results monitored, perhaps by FAO, in order that the best mix of efficiency and agricultural viability can be determined.

Site Identification and Timber Utilization

4.07 As sites have been selected for low population densities, a large number of potential Repelita III sites are to be located in areas of primary forest. There are, however, a number of reasons why these areas should be given lower priority for development than grasslands and forest regrowth:

- (a) forestry regulations prohibit the conversion of forest with more than 50 cubic meters of standing timber/ha;
- (b) the value of timber, which has risen three-fold in the past year, is in some areas conservatively estimated at US\$2,000/ha with tax;
- (c) mapping and surveying are more difficult in primary forest;
- (d) land clearing is ten times as costly in forest areas as grasslands; and
- (e) grassland rehabilitation appears to be more ecologically sound than forest removal.

For these reasons it is strongly recommended that less forested areas be given higher priority for transmigration development.

4.08 Where national priorities and regional development interests do result in land clearing in forested areas, appropriate methods of timber utilization must be ensured. Present plans for timber disposal call for the land clearing contractor to stack all useable timber and for the Directorate

General of Forestry to arrange for its use. The incentives for efficient utilization under these arrangements are not yet certain. Should they result in limited timber disposal, however, there are alternatives to these procedures which could potentially reduce both land clearing costs and timber waste. These involve either contractors or the migrants themselves.

4.09 Contractor Clearing. To reduce land clearing costs and promote the effective use of timber, land clearing contractors can be given the right to dispose of all useable timber. Under these circumstances, the GOI should:

- (a) give high priority to soliciting land development proposals from companies which have demonstrated capacity to market timber - particularly lesser known species;
- (b) reinforce this preference, by imposing a tax on standing volume of timber rather than on timber utilized. (This would discourage bids from contractors who could not market timber and, in fact, reflect the loss to Government in the contract price if timber utilization were low); and
- (c) undertake further activities to facilitate marketing, particularly of lesser known species.

The Program Review concludes that if timber were given to the contractor in Transmigration II and III there would appear to be no reason for GOI to pay for mechanical clearing, rather it should get paid by the contractor for timber sold (this should not be less than the royalties and taxes mentioned above).

4.10 Migrant Clearing. Alternatively, appropriate timber utilization can profit the migrants themselves. In this case, migrants would have to be given the right to fell that timber remaining after logging. (This would be subject to Government tax.) To assist migrants in felling and processing timber it would be necessary that:

- (a) migrants be clearly told where their reserve land is, so they could exploit timber or control its use;
- (b) migrants be trained in chainsaw use and arrangements made for chainsaw rent or purchase;^{/1}
- (c) sawmills be established in appropriate migrant villages; and
- (d) assistance be provided through sawmills or cooperatives for the marketing of forest products (shakes, fuelwood, fitches etc.).

^{/1} It was felt unwise to provide chainsaws free to migrants as it would result in their distribution to people who would not maintain them and might be unskilled in their use.

4.11 In conclusion, the value of timber is now so high that effective timber use must be a condition of the expansion of the transmigration program. There is probably no one way to assure this and the Directorate General of Forestry together with the land clearing Directorate within Public Works should undertake to experiment with different methods of timber disposal including stacking and sale, land clearing through contractors with marketing skills and use of the migrants themselves before a uniform system is adopted.

Implications

4.12 Diversity of opinion on procedures for physical planning, land development and timber utilization is to be expected in a program that encompasses projects with highly diverse terrain, land cover, and degree of remoteness from markets and roads. For this reason the transmigration program requires a variety of models for these activities which can be applied to these diverse situations, and agreement on this principle should be seen as a necessary condition for increased Bank participation in the transmigration program.

5. KEY CONSTRAINTS: RESOURCE USE

Allocation of Resources to Transmigration

5.01 Since the early years of Repelita I, transmigration has developed from an activity of modest financial scale to a major recipient of Government development funds. It ranked eighth among 18 sectors in the 1979/80 development budget and absorbed 5.7% of the development budget proposed for Repelita III. In terms of attracting foreign aid, the share of transmigration was insignificant until 1977/78 (covering mostly technical assistance activities) when it increased to about 1% of the foreign aid budget.^{/1} The recurrent budget has not markedly expanded in relation to the other sectors and transmigration activities now absorb a negligible proportion (0.1%) of these funds.

5.02 Cost. The rise in the development budgets for transmigration over the period 1969/70 to 1980/81 - from Rp 850 million to Rp 434 billion was matched by an increase in settlement targets from less than 5,000 families to 75,000 p.a. During this period, costs per family increased from about Rp 200,000 to Rp 5.8 million, an absolute increase of nearly thirty fold or an annual increase of almost 36%. This escalation is due in part to inflation. Expressed in constant prices (basis 1971), transmigration costs per family increased from Rp 240,000 in 1969/70 to Rp 1,250,000 in 1980/81, a real increase of fivefold and an annual increase of about 16% (see Table 6). Much of this increase is attributed to the present design of transmigration projects which contains many elements that were not part of the package in earlier years, such as roads, public buildings, or agro-inputs, and other components are now included on a larger scale. A comparison of specific items on a constant price basis suggests that a third factor contributing to cost escalation may have been the increasing size and complexity of the transmigration program and diminishing cost control.

5.03 Impact. While the share of transmigration in the total (domestic and foreign financed) development budget (about 5% in 1979/80) ranks well behind sectors such as communications/tourism (15%), agriculture/irrigation (12%), industry and mining/energy (11-11.5% each); the concentration of development funds on Java (63%) and the focus of transmigration activities in provinces without other large-scale investment possibilities means that the transmigration development budget plays a central role in the development planning of most of the settlement provinces. In fact, for 11 out of 18

^{/1} With the implementation of Transmigration I and II and Asian Development Bank's Southeast Sulawesi project, however, the relative importance of the transmigration program as a recipient of external assistance will increase.

Table 6: TRANSMIGRATION DEVELOPMENT BUDGETS, RESETTLEMENT
AND UNIT COSTS, 1969/70-1978/79
(Rp million - October 1979)

Year	Development budget	Disbursements	Resettlement		Cost per family /b	
			Targets	Actual	Rp '000	US\$/c
1969/70	850	800	4,489	3,933	203	538
1970/71	1,040	1,006	3,865	4,438	227	600
1971/72	1,362	1,346	4,600	4,171	323	854
1972/73	2,317	2,306	11,200	11,314	204	519
1973/74	3,659	3,654	22,412	22,412	163	393
1974/75	6,652	6,634	11,000	11,000	603	1,453
1975/76	15,076	14,892	8,100	8,100	1,839	4,430
1976/77	27,298	25,379	13,910	13,910	1,825	4,396
1977/78	50,930	36,303/a	21,090	22,949	2,415	5,819
1978/79	104,502	12,607/a	27,000	7,306	3,870	7,835

/a Disbursement figures incomplete: for DGT through 10/11/79, for other agencies through 03/31/78.

/b Unit costs for 1977/78 and 1978/79 based on budget figures.

/c Rates of exchange used:

1969/70-1971/72: Rp 378 = US\$1

1972/73: Rp 393 = US\$1 (weighted average)

1973/74-1977/78: Rp 415 = US\$1

1978/79: Rp 494 = US\$ 1 (weighted average)

Note that the average rate of exchange used refers to the relevant budget year and not to the year of actual implementation.

Source: DGT.

provinces receiving transmigrants, the transmigration development budget is the largest single sectoral component (see Table 7). In five provinces - Jambi, Southeast Sulawesi, Central Sulawesi, East and South Kalimantan - transmigration absorbed from 40% to over 50% of Central Government development expenditures and was thus the principal vehicle of regional economic development.

5.04 The relative impact of the settler movements matching the flows of budget resources also varies greatly among provinces. For the group of 18 settlement provinces, the share of transmigrants during Repelita II was an insignificant 1% of the estimated population at the beginning of the plan (1974). For Repelita III, the high transmigration targets imply an addition of about 1% p.a. to the 1979 population of the recipient provinces. However, for a few provinces the increments are much higher: in the case of Jambi, Bungkulu and Central Sulawesi the addition to the population came to about 1% during Repelita II but would amount to 4-7% p.a. during Repelita III if proposed targets were met.

Assessment and Recommendations

5.05 Cost. Transmigration projects originally projected for Repelita III would involve 5.7% of the total development budget, and if proposed targets were reached, would directly benefit some 2,500,000 transmigrants or about 1.7% of the nation's population. For this reason, efforts must be made to achieve high cost effectiveness in the transfer of benefits to transmigrants and to ensure that these resources benefit local people as well as those who move. Recent figures make it clear, however, that individual components are becoming increasingly costly as each implementing agency acts to deliver better quality components requiring higher investments. It is therefore important that GOI explore ways to increase the cost effectiveness in the transmigration program. There are four main ways in which this can be done: (a) by improved quality control; (b) by modifying project components; (c) by increasing emphasis on spontaneous transmigration as an adjunct to fully sponsored settlement; and (d) by reducing the speed and scale of program implementation.

5.06 Quality Control. Increasing attention is needed in most agencies to quality control. This can be accomplished through (a) more precise specification of standards in contracts, (b) increased incentives for quality performance, (c) increased incentives for high quality supervision, and (d) sanctions against firms operating to low standards. To improve contracting and supervision, steps should be taken to strengthen those units dealing with tendering for large cost items such as physical planning, land development, road construction and housing. This support would probably be in the form of technical assistance (local or expatriate) to both evaluate contracts and make recommendations for controlling costs.

5.07 Modifying Project Components. A reduction of standards in some components plus increased use of migrant labor in the establishment period could also lead to an increase in cost effectiveness. For example:

Table 7: DISTRIBUTION OF CENTRAL GOVERNMENT DEVELOPMENT
EXPENDITURE BY SECTOR FOR EACH PROVINCE
1978/79 /a (in percentages)

Province	Agri. and irrigation	Transmi- gration /b	Elec- tricity	Communi- cations /c	Social /d	Other /e	Total
<u>Java</u>	22.3	2.1	6.1	9.4	31.3	28.8	100.0
Jakarta	15.2	2.4	2.9	6.4	36.6	36.5	100.0
West Java	40.0	1.0	8.4	19.0	15.5	16.1	100.0
Central Java	44.5	0.5	20.2	12.8	17.6	4.4	100.0
Yogyakarta	25.2	1.7	-	16.1	44.1	12.9	100.0
East Java	36.6	2.9	20.0	16.1	19.7	4.7	100.0
<u>Sumatera</u>	24.0	23.3	6.4	28.9	11.3	6.1	100.0
Aceh	15.8	16.8	7.9	41.2	12.6	5.7	100.0
N. Sumatera	24.2	4.0	14.3	39.6	11.0	6.9	100.0
W. Sumatera	21.3	14.5	10.5	29.7	17.2	6.8	100.0
Riau	27.7	29.1	-	23.3	11.7	8.2	100.0
Jambi	17.5	51.7	-	17.5	8.9	4.4	100.0
Bengkulu	29.8	30.1	-	26.3	10.0	3.8	100.0
Lampung	36.8	34.4	-	16.0	7.5	5.3	100.0
S. Sumatera	23.1	32.6	4.8	23.8	10.6	5.1	100.0
<u>Kalimantan</u>	16.9	34.4	2.5	21.9	14.9	9.4	100.0
W. Kalimantan	21.2	26.7	2.9	25.9	14.4	8.9	100.0
E. Kalimantan	9.6	39.7	-	27.5	13.1	10.1	100.0
C. Kalimantan	16.1	26.8	-	18.6	22.3	16.2	100.0
S. Kalimantan	19.6	39.1	5.2	14.8	14.4	6.9	100.0
<u>Sulawesi</u>	21.7	24.9	4.8	22.6	17.7	8.3	100.0
N. Sulawesi	30.7	5.3	12.3	28.4	16.9	6.4	100.0
C. Sulawesi	26.5	40.1	-	15.5	12.8	5.1	100.0
S.E. Sulawesi	27.8	41.0	-	11.8	13.5	5.9	100.0
S. Sulawesi	8.9	21.7	-	4.7	28.2	23.6	100.0
<u>Eastern Provinces</u>	22.4	8.0	5.5	14.2	26.6	22.9	100.0
Maluku	11.2	26.5	10.7	24.4	18.0	9.2	100.0
Bali	20.3	3.3	11.1	32.2	22.9	10.2	100.0
West Nusatenggara	47.9	2.3	-	25.1	16.7	8.0	100.0
East Nusatenggara	22.5	1.0	-	40.4	21.3	14.8	100.0
Irian Jaya /f	-	88.4	-	-	4.6	7.0	100.0
East Timor /f	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	100.0
<u>Indonesia</u>							
For comparison:							
Java excluding Jakarta	39.4	1.4	13.9	16.5	18.8	10.0	100.0

/a Figures refer to the rupiah Development Budget excluding externally financed expenditures. Transfers to local Government Development Budgets are also excluded.

/b Includes manpower.

/c Includes tourism.

/d Education (68%), health and family planning (18%), housing and water supply (11%), and religious affairs (3%).

/e Industry and mining (14%), trade and cooperatives (3%), judiciary (5%), defence (21%) and miscellaneous (57%).

/f For historical reasons, most expenditure on Irian Jaya and East Timor does not pass through departmental budgets but are reflected in special programs handled by the Department of Home Affairs. Any items in the departmental budgets represent only small residual amounts.

- (a) Housing. Suggestions for improved cost effectiveness include: constructing a larger high quality frame with less costly walls and roofs which migrants can modify as their resources increase; using migrant labor to construct houses and using locally available resources; giving funds for house construction to migrants who could then monitor the quality of construction themselves.
- (b) Land Clearing. Migrant involvement in land clearing has numerous advantages in heavily forested areas where a slower rate of land clearing can improve timber utilization and increase cash flow to migrants. Migrant labor may also turn out to be cheaper and more dependable than mechanical clearing although trade-offs will exist to labor availability and agricultural production.
- (c) Physical Planning. These costs can be reduced if different procedures for physical planning were used for different types of terrain and if easily planned sites (i.e., those in grassland areas) were given priority. Costs could be further reduced if the tasks of consulting firms were staged in such a way as to maximize the effective use of labor rather than the speed of project execution.
- (d) Spontaneous Migration. Sponsored settlement used as the nucleus for further spontaneous development could significantly decrease the per family cost of resettlement.^{/1} Even a sites-and-services approach in which physical planning, roads, houselot clearing, and subsequent agricultural, health and educational services were provided, but in which charges were eliminated for house construction, field clearing and resettlement, would reduce the cost per family by up to one-third.
- (e) Scale. Reducing the scale of the program would reduce costs by improving the ability of agencies to supervise quality control, reducing dependence on expatriate assistance to meet manpower shortages, and allowing a gradual evolution of competence under the new organization arrangements which would avoid costly mistakes.

Impact

5.08 The proposed transmigration program would have a more dramatic impact on development in under-populated provinces than on any other objective to which it is addressed (food production, alleviation of poverty or

^{/1} It is important to emphasize that spontaneous migrants would have to be recruited by families already in the nucleus settlements and they would have to be located sufficiently close to their relatives to be able to turn to them when they needed support.

population pressures on critical lands). For this reason, it is imperative that transmigration benefit local people as well as transmigrants. This can be facilitated by (a) fully involving local and provincial authorities in transmigration planning and by institutional arrangements which foster clear working relationships between planning teams and specific provinces; (b) by strict attention to land tenure and land compensation questions; and (c) by directly transferring project benefits to local populations.

- (a) Provincial Involvement. To whatever extent possible, planning and implementing teams should be regionalized in order to promote close working relationships with provincial officials. In the short run this may mean no more than establishing teams in Jakarta with the responsibility for working with specific provinces but in the long run the objective should be to decentralize planning and decision making to the provincial level.
- (b) Land Alienation and Land Compensation. At present, arrangements for land alienation and compensation are being made with local authorities on a relatively ad hoc basis. These procedures must be formalized and land compensation activities given a sound institutional and financial base. The manner in which this is to be done deserves the earliest possible consideration by Government.
- (c) Project Benefits. At present local people may occupy 10% of the spaces in transmigrant communities. If local demand increases, this may not be enough. One of the easiest solutions to this dilemma is to increase emphasis on components for spontaneous migrants which either locals or transmigrants could obtain. In addition, more attention could be given to components which would directly benefit local people within the transmigration area. In particular, care should be taken to extending the benefits of schools, clinics and education services to the local population and to increasing their involvement in the definition of components which would benefit them.

Implications

5.09 During Repelita III transmigration projects are projected to involve 5.7% of the development budget and directly benefit 1.7% of the population. At the same time transmigration has a more significant impact on underpopulated provinces than any other sector to which it is addressed. For equity reasons it will therefore be necessary to keep the cost of benefits transferred directly to migrants low and to pay increasing attention to the regional impact of transmigration and the benefits to local populations. Extending the program in this area presumes contractions elsewhere, but to avoid the implications of these figures is to risk losing the provincial support upon which the viability of the transmigration program now rests.

6. THE BANK'S ROLE IN TRANSMIGRATION

Main Conclusions

6.01 The main conclusions of the Program Review on the future Bank role in transmigration are as follows:

- (a) That Bank participation in the transmigration program should be shifted from localized projects to broad support for resettlement and program development.
- (b) That this support should be expanded in context of broad agreement between Bank and GOI (i) on a de-emphasis on uniform models and increase in experimentation (particularly in farm models, land clearing methods and management systems); (ii) on the type of institution-building to be undertaken; and (iii) on the scale of the program to be pursued.
- (c) That this can best be accomplished in discussions with Government on the type of project pipeline envisioned in Repelita III and IV.

6.02 Uniformity. Although the pressures leading to the adoption of food crop farm models and uniform settlement patterns, land clearing methods and management systems are fully understandable and this idea once had wide acceptance within the Bank; recent experience indicates that efforts to apply a uniform development pattern to the diverse conditions of the outer islands will make a difficult task even harder. For this reason the Program Review urges that Government explore alternatives in farm models, the use of migrant labor in house construction and land development, methods of land clearing, timber disposal and the like. This can be done by encouraging planning consultants in TKTD to recommend options which do not significantly increase managerial requirements or costs; by using existing resources such as the German Technical Assistance team in East Kalimantan to manage experimental efforts, for example, in farmer-established tree crops; and by using agencies such as the FAO/IBRD Cooperative Program to plan demonstration projects with innovative features. While this will increase the supervisory tasks of both GOI and Bank it is only from this range of efforts the best of the options can be found.

6.03 Institution-Building. Some institution-building activities have such high priority that the development of suitable components to advance them should be seen as a prerequisite of future project work. Among these are the following:

(a) Agriculture

- (i) support to the Agricultural Technical Team for management and monitoring the delivery of agricultural components in the overall program;
- (ii) establishment of agricultural training centers to train extension workers for upland transmigration; and
- (iii) initiation of start-up agricultural services in key receiving provinces: seed farms, nurseries, supply depots, etc.;

(b) Transmigration

- (i) technical assistance, if requested, for management support;
- (ii) the development of an institute for training migrants and DGT staff;

(c) Public Works

- (i) assistance to TKTD to supervise mapping, village design and the preparation of feasibility studies;
- (ii) technical assistance to PTPT to supervise land clearing and soil conservation measures throughout the transmigration program;
- (iii) monitoring of land clearing techniques and agricultural impact (possibly under FAO auspices);

(d) Agraria

- (i) support for the development of policies and institutional arrangements to handle land alienation and compensation.

A series of other activities of secondary importance are detailed throughout this report.

6.04 Scale. The need to reduce and focus the program cannot be over-emphasized. Present high targets make it difficult for most participating agencies to accurately plan for their future involvement in the transmigration program. High targets also emphasize speed over quality and result in poor work. Furthermore, a real danger exists that without realistic planning the Public Works Directorates will outstrip the capacity of the other implementing agencies to follow-up. The existence of 117,000 ha of cleared but unsettled tidal land is evidence of the problems entailed by lack of coordination in the planning, implementing and budgeting processes. On the other hand, focusing the program, would provide the opportunity to improve quality without further

increasing costs, to increase the probability of adequate agricultural inputs, to coordinate agency efforts and to place more emphasis on innovation, regional specificity and components to benefit local populations.

6.05 Increased Program Focus. Although site selection and physical planning have been initiated in 13 provinces and 51 sites, the original projections for Repelita III suggest that there are only eight provinces in which large-scale settlement will occur. In addition to Jambi and East Kalimantan, where the World Bank is already involved in settlement, and Southeast Sulawesi where an Asian Development Bank Project is underway, only Riau, South Sumatra, West, Central and South Kalimantan are likely to be able to absorb large numbers of transmigrants (see Table 8). Several other provinces have settlement potential but will take smaller numbers of families. GOI will no doubt wish to settle migrants in more than eight provinces but the task of planning and coordination could be simplified if major settlement and institution building efforts were concentrated in these areas during Repelita III.

Table 8: RAINFED AGRICULTURE AREAS PROJECTED FOR SETTLEMENT DURING REPELITA III

Province	SKP	No. of families	People
Aceh	6	12,000	55,200
Riau	19	38,000	174,800
Jambi	16	32,000	147,200
West Sumatra	4	8,000	36,800
Bengkulu	6	12,000	55,200
South Sumatra	22	44,000	202,400
<u>Total Sumatra</u>	<u>73</u>	<u>146,000</u>	<u>671,600</u>
West Kalimantan	15	30,000	138,000
South Kalimantan	12	24,000	110,400
East Kalimantan	16	32,000	147,200
Central Kalimantan	25	50,000	230,000
<u>Total Kalimantan</u>		<u>136,000</u>	<u>625,600</u>
<u>Total Sulawesi</u>	<u>37</u>	<u>74,000</u>	<u>340,400</u>
<u>Total Other</u>	<u>28</u>	<u>56,000</u>	<u>257,600</u>
		<u>412,000</u>	<u>1,895,200</u>

Bank Participation in the Transmigration Program

6.06 The World Bank has already committed itself to two activities in support of the overall transmigration program (a) a joint project with UNDP to improve the capacity to the Junior Minister for Transmigration to manage and monitor program coordination; and (b) financing for mapping and data collection activities in 51 areas in 13 provinces. This general support should now be expanded. Key activities will include institution building, support for start-up agricultural services and demonstration projects.

6.07 Institutional Support. Institution building activities of utmost urgency have been outlined in para 6.03. To speed such development, the Transmigration Program Review recommends that appropriate components be designed and prepared to increase institutional capacity and that these be funded in the proposed Bank assisted Transmigration project in East Kalimantan.

6.08 Support to Key Start-up Sites. In addition, the Program Review strongly recommends that the Bank support the start-up of key agricultural activities in major receiving provinces. These could benefit existing, incoming and future settlers whether financed by GOI or Bank. These components would include such things as seed farms and nurseries, agricultural experiment stations, link roads and institution building activities in support of the regular GOI program. Since these start-up activities would cut across regions and affect all consulting firms engaged in physical planning, they might be most expeditiously prepared in a single project.

6.09 Demonstration Projects. Should Government find it difficult to include innovative components in a large number of projects, it might wish to confine itself to experimental efforts on selected sites. In Mamuju, South Sulawesi, for example, a project could be prepared which allocated one-half the sites to sponsored migrants and devised suitable components to accommodate spontaneous Buginese and Balinese settlers on the other half. Tree crop components could be expanded on demonstration projects in East or West Kalimantan, and grassland rehabilitation attempted in Sumatra. Such projects could be prepared by the consultants developing feasibility studies in TKTD and supplemented by experts from the IBRD/FAO Cooperative Program. In any case, the Bank should be prepared to support innovative efforts in support of future program development.

6.10 Unrestricted lending for a time-slice of the transmigration program appears premature. Seldom has the Bank undertaken a lending program with such promise or difficulties; and therefore in the short-run the dialogue between Government and Bank on the course of the program and its impact on the lives of the migrants may be one of the most important aspects of Bank support. It must be clear within the Bank, however, that support to institution building and innovative approaches will be much harder than preparation of resettlement projects and that both manpower and funding from the Bank must be appropriate to the task.

INDONESIA

TRANSMIGRATION PROGRAM REVIEW

ANNEX 2: The Swamp Development Program

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INDONESIA

TRANSMIGRATION PROGRAM REVIEW

The Swamp Development Program

SUMMARY AND CONCLUSIONS

1. Swamps are big in Indonesia. Recent estimates indicate some 20% of Indonesia to be under swampy conditions; around 39 million ha about equally divided between Sumatra, Kalimantan and Irian Jaya. Such large resources have not been neglected. The Government program has covered some 300,000 ha and it is estimated that by 1976 another 300,000 ha had been developed and settled spontaneously. There is some debate as to the potential of swampy lands but there is no doubt that the swamps of Indonesia constitute an important resource which could be developed more systematically.
2. Since they cover such a large area, it is no surprise that swamps exhibit very different features throughout Indonesia. A main distinction between fresh water swamps (lebak, rawa) and tidal swamps (pasang surut) is widely used. This is based on whether or not the swamp is subject to tidal influence for a significant part of the year; it is not identical with the coastal/inland distinction or with the occurrence of salt water intrusions, though the three are often confused.
3. What is typical of all swamps is the omnipresence and importance of water. Unlike Javanese villages where the road and the canal or river provide two distinct poles of activity, villages in the swamp areas are on the canals; and the main piers are foci of activity. Transportation is mainly by water and everyone is familiar with the operation of boats. Water is also very much a key to agricultural success. Fishing is widespread and a variety of methods are used by all residents. Ironically, though, drinking water is often a problem. Daily life is more or less marked by the tides, and the vagaries of season bring their toll of water related problems: floods in the wet season, lack of drinking water and related diseases in dry periods.
4. This Annex is based on the findings of a mission composed of Messrs. Momal, Dwyer, Ting, Coulter (Bank) and Rachman (Consultant) who visited Indonesia in October-November 1979. It is part of a general program of studies on Indonesian agriculture. The more closely related studies are the Irrigation Program Review (IBRD Report No. 2027a-IND of October 1978) and Supply Prospects for Food Crops (IBRD Report No. 2374-IND). It was written four years after the first Bank interest in swamp development projects in Indonesia and at the same time as the appraisal of the first swamp development project.
5. The report describes a program of low-input swamp reclamation projects which has significantly contributed to transmigration both in quantity - some 20% total transmigration - and in quality; and it concludes that a low-input strategy is appropriate, at least as a first stage, and should

be supported by the Bank. It notes, however, that many improvements could and should be brought about and that Bank-financed projects could provide a suitable vehicle for these improvements. For this reason the report recommends second stage investments aimed at upgrading agricultural production in established projects to optimize the use of existing infrastructure.

6. Swamp development is not a new activity in Indonesia but until 1950 it was virtually all spontaneous development by Buginese and Banjarese settlers. Between 1950 and 1968, Government involvement was limited. A first group of Government projects was initiated during the first five-year plan (1968-1973) and received some 7,800 transmigrant families. A vast majority of these settlers are satisfied with their new locations and have experienced improvements in their incomes and life styles. P4S, the Government's swamp reclamation agency in the Department of Public Works, intends to monitor these projects and possibly provide them with infrastructure improvements.

7. A second generation of projects was started during the second five-year plan (1974-1979). Targets were set at one million ha and a substantial amount of equipment was purchased. Consequently for the last five years, nearly all canal infrastructure has been constructed under force account. The targets proved overly ambitious, however, and only 200,000 ha gross were served by drainage canals by the end of the second five-year plan (March 1979). Of this, about 60% is in projects which have received no settlers and in some cases quality may have been low because of hastened project preparation. During the second five-year plan, 9,350 transmigrant families were settled, only 25% of the potential, in areas provided with drainage infrastructure.

8. In Government schemes, the farming system is based on one crop of long maturing, photosensitive rice. Rice is well adapted to the soil and water conditions and does not require sophisticated infrastructure. Soils are characterized by acid sulphate clays overlain by varying thicknesses of peat; they should not be left to dry out and oxidize or long lasting toxicity will develop. Shallow, open field canals (tertiaries and quaternaries) usually provide acceptable water regimes on the fields, but simple structures allow better water control and improved cultivation. Present practices use minimum inputs, usually no fertilizer. Support, including extension services are generally minimal. The main problems are pest damage and weed competition. Based on established projects, long-term average yields of 2 ton/ha appear a reasonable estimate for low-input cultivation. Apart from their rice fields, transmigrants intensively cultivate their homeyards. Other productive activities include logging, fishing, animal husbandry and trading.

9. Although variable, transmigrant incomes are satisfactory by Indonesian standards, and they are about the same as those of traditional Buginese or Banjarese settlers. Living conditions in the swamps of Indonesia (health, education, communication, etc.) are not markedly different than in other areas of the country except where dry season drinking water supply is

short. Markets and transportation services are very active. Settlers appear to adapt well to their environment; many build new houses or extensions to the houses originally provided by DGT. Relations with local populations are generally good, but some community problems arise with the Buginese.

10. While the contribution of swamps projects to transmigration has been significant, their contribution to national rice production has been modest. This state of affairs is likely to continue and it is argued that Government insistence on rice-based projects could be relaxed. Economic analysis reveals, however, that there is no alternative which would be clearly and undisputedly superior to rice. It is suggested that further experiments be conducted, especially on coconuts, to determine the income potential of swamp projects.

11. To improve inter- and intra-agency coordination, increase cost effectiveness and maximize benefits, the swamp development program should be carefully planned. Plans should pay attention to cost-benefit criteria; emphasize projects providing year-round employment to settlers and projects with high multiplier effects. The report discourages attempts to vest planning responsibilities with one of the implementing agencies and recommends the institution of an office under the Junior Minister for Transmigration to be in charge of program planning and project coordination for swamp development. Each agency's internal planning should be strengthened.

12. The report's recommendations for Bank lending in the swamp development sector are summarized in Chapter 7.

1. GENERAL OVERVIEW

Introduction

1.01 This introduction deals mainly with the Government-sponsored swamp development program; information concerning swamp resources and spontaneous settlement are not treated in detail because of lack of data. Four historical periods are described:

- (a) the Dutch period which covers the history of swamp development up to 1950;
- (b) the period extending from 1950 to 1973 when a few projects were cautiously initiated in spite of pessimistic assessments in the scientific community;
- (c) the Repelita II period (1974-1978) which marks the beginning of large-scale Government efforts; and
- (d) the Repelita III period (1979-1983) in which Government has intensified its activities in swamp development.

Dutch Times

1.02 The oldest form of swamp reclamation in Indonesia is that of the Buginese people from Sulawesi and the Banjarese people from Kalimantan. While the Banjarese have opened swampland mainly in their area of origin, the Buginese have a tradition of migrating and reclaiming land on other islands. Important Buginese migrations in the 1930s resulted in the clearing of jungle forest on the coastal areas of Jambi and Riau Provinces in Sumatra and the West Coast of Peninsular Malaysia. The hydraulic infrastructure of both groups consists of simple open canals and ditches, but the agricultural style differs between Banjarese and Buginese; the latter prefer more extensive exploitation relying more heavily on coconuts while the Banjarese are more sedentary, relying more on rice and fish production. Many of these spontaneous settlements are successful and demonstrate the potential of swamplands for food crop and tree crop production.

1.03 Apart from the spontaneous settlements in Jambi and Riau, Government sponsored swamp development before World War II was concentrated around Banjarmasin in South and Central Kalimantan. Canals were dug between the Barito, Murung and Kahayan Rivers mainly for improved communications. These navigation canals provided access to unclaimed lands and served as outlets for simple drainage channels dug perpendicularly to the navigation canals by the settlers. One particularly successful Javanese settlement, at Purwosari on the Tamban canal, was started in 1935 and had a population of 5,400 people in 1979. After the war, a plan for the development of Kalimantan was prepared under the direction of Schophuys, with emphasis on polder schemes. Two pilot projects, the Mentaren and Alabio polders, were conceived in this period although not approved by Government until 1951. In general, the Dutch colonization policy did not lead to sizeable developments in the swamps and up to 1950 most of the development was spontaneous.

Pioneering Times

1.04 Very little swamp development took place between 1950 and 1965 although additional navigation canals were dug in the Banjarmasin region and the Alabio and Mentaren polders were developed at a slow pace. In 1957, the Department of Public Works had announced a large-scale program (1.5 million ha in five years) with emphasis on low cost open canals; but practically no construction ensued. A new tidal irrigation project was announced in 1967 to open 5.25 million ha in 15 years and exploratory work was initiated by foreign consultants and FAO. Considerable emphasis was placed upon tidal areas in South Sumatra and South and Central Kalimantan, however, implementation proved impossible because project preparation required much more time than anticipated. For this reason, transmigration to tidal swamps was postponed until 1971 and more realistic targets were set for the 1969-74 period.

1.05 The year 1968-69 represents the seed period for the ensuing Government program. At that time the Minister of Public Works, encouraged by successful developments under the Buginese and Banjarese, accelerated work on tidal swamp reclamation, and P4S was created as a special unit within Public Works. The help of the Universities was also enlisted and five pilot projects were started in Sumatra and Kalimantan. The Sumatra projects (Delta Upang and Cinta Manis in South Sumatra, Rantau Rasau in Jambi) were designed by a team from the Bandung Institute of Technology (ITB) while the Kalimantan projects (Barambai and Tamban Luar) were designed by Gadjah Mada University, thus initiating the regional separation between universities, which continues to the present.

1.06 By the end of Repelita I, P4S had opened some 33,000 ha of tidal swamps and some 6,850 families had been settled by DGT (Appendix 1). About 75% of the families were placed on the five pilot projects and the remainder on six smaller sites. Of the five pilot projects, one (Cinta Manis) was partial failure, but the four others attracted additional settlers and provided reasonable settler incomes. Tidal swamp projects during Repelita I represented 15-20% of all transmigration settlements.

REPELITA II (April 1974-March 1979)

1.07 The Second Five-Year Plan (Repelita II) was prepared amid the enthusiasm of the Pertamina development period. High oil revenues had created a favorable foreign exchange position and development policies were oriented toward capital-intensive projects. A very ambitious target of one million ha was adopted for tidal swamp development. Because most of the construction work was to be accomplished using Government personnel and equipment, heavy equipment was purchased under suppliers' credit arrangements in 1975 and 1976. Investigations and project preparation were increased and three universities were provided with facilities and equipment. After the Pertamina crisis in December 1975, targets were scaled down to 250,000 ha.

1.08 General features of P4S budgets during Repelita II reflect the pre-Pertamina optimism and subsequent retrenchment. The annual P4S budget was Rp 3.89 billion in 1974/75, Rp 14.99 billion in 1975/76 and Rp 10.11 billion in 1978/79. Except for 1975/76, the budget growth expressed in real terms occurred at an annual rate of about 5%. The total Repelita II P4S budget was Rp 45.55 billion and, exclusive of the nontypical year 1975/76, consisted of 20% for project preparation, 67% for implementation and 13% for administration. About 25% was allocated to central operations and 75% to provincial operations.

1.09 During Repelita II, P4S constructed navigation canals opening up a total of 208,000 ha of which 76% were in Sumatran provinces (Riau, Jambi and South Sumatra) and 24% in West, Central and South Kalimantan. Only 5,200 ha were brought under the command of infrastructure in 1974/75 but the rate increased to nearly 49,000 ha in 1975/76, 57,000 ha in 1977/78 and then receded somewhat to about 46,000 ha in 1978/79. The number of transmigrant families settled by DGT totalled about 9,350.

1.10 Repelita II projects containing over 117,000 ha of "opened" land had received no settlers at the end of the five-year period and less than 60% of the remaining 91,000 ha was occupied by transmigrant families. This performance record was partially due to the time lag between opening and settlement required for land clearing and provision of housing and other facilities but problems relating to synchronization of activities and coordination between agencies also contributed. The Repelita II synchronization and coordination problems were greater than in Repelita I due principally to enlargement of the swamp development and transmigration programs, lack of consensus between implementing agencies, introduction of new agencies into the programs and significant reorganization of transmigration in 1978. Enlargement of the program also resulted in limited planning due to establishment of targets in excess of immediate capabilities.

1.11 Besides acknowledged delays and synchronization problems in the transmigration program, the following factors account for some of the difference between the average farm size and the Repelita II gross area opened per family:

- (a) areas are considered open by P4S when basic hydraulic infrastructure (canals) have been provided although land clearing, housing and other facilities may not be available;
- (b) gross areas as used by P4S are those reserved for transmigration by the Department of Home Affairs and include land occupied by canals, drains, green belts, villages, and other facilities as well as land that is agriculturally unsuitable or under dispute; and
- (c) portions of the agricultural areas (usually 30%) are reserved for spontaneous and local settlement.

1.12 The P4S construction programs in both Repelita I and II were accomplished without foreign aid. However, in 1976, the BTA-60 hydrometric program was initiated with Dutch support. This program included technical assistance, equipment and training for establishing a system for obtaining hydrological and meteorological data in tidal swamp areas. Bank involvement in the swamp development program also started in 1976 when an appraisal mission visited project sites and test farms in Jambi and South Sumatra. The recommendations of the mission resulted in the inclusion of funds for feasibility studies in Karang Agung (200,000 ha gross) and Lagan (100,000 ha gross) in Irrigation Project VII (Loan 1268-IND of April 1976).^{/1} The Karang Agung area was later found suitable for development, but much of the Lagan area was found to have been settled by spontaneous Buginese migrants. In 1978 further funds were allocated for studies under Irrigation Project XII (Loan 1645-IND of December 1978) for surveys and investigations in the Lalang (180,000 ha), Mesuji (80,000 ha) and Sebangau (120,000 ha) areas in Sumatra. Appraisal of a first stage development in Karang Agung took place in June and October 1979.

REPELITA III (April 1979-March 1984)

1.13 Repelita III objectives that apply to tidal swamp development include accelerated transmigration from Java and increased rice production aimed at national rice self-sufficiency. Due to difficulties in locating suitable unsettled project areas in Jambi, Riau and West Kalimantan provinces and to the recommendations of the universities, swamp development activities are to be concentrated near Palembang in South Sumatra Province and near Banjarmasin in South and Central Kalimantan provinces.

1.14 As part of a long range planning effort, swamp resources will be inventoried during the five-year period and a program will be formulated for improvement of existing swamp settlements. Detailed planning information for Repelita III is not available because a pipeline of projects has not yet been prepared; but the area to be reclaimed has been targeted at 400,000 ha, considerably above past performance. It is not certain whether P4S will be able to achieve the 80,000 ha annual target during the first years of Repelita III, however, as available designs are limited.

1.15 Table 1.1 summarizes the most recent overall data available on areas of swamps and reflects a substantial reduction compared with the estimates of the Agricultural Sector Survey of 1972 (43.5 million ha, not including Irian Jaya). In that survey potential agricultural swampland was estimated at 10.5 million ha, while a 1976 P4S estimate was 2.2 million ha

^{/1} Investigation included: topographic surveys, soil surveys, hydrographic surveys, agroeconomic surveys and settlement studies and planning and design. Difficulties were encountered in the area of topographic surveys which caused some delay.

(both figures excluding Irian Jaya). Differences between such figures point to the need for more reliable swamp resource data.

Table 1.1: SWAMP AREAS IN INDONESIA /a
(¹000 ha)

Region	Swamp Area	Total Area	Swamp as % of total
Sumatra	13,211	47,360	28
Kalimantan	12,764	53,946	24
Irian Jaya	12,780	42,195	30
Sulawesi	469	18,204	3
<u>Total</u>	<u>39,224</u>	<u>161,705</u>	<u>24</u>

/a These swamp areas include about 120,000 ha opened by the Government and an estimated 300,000 ha opened by spontaneous migrants.

Source: Muljadi D., see Appendix 2 reference 41.

2. POLICIES, ORGANIZATION AND PROCEDURES

Policy

2.01 The policy for swamp development is very clearly stated: to open remote swamp areas for transmigration and rice cultivation. This has been the policy since 1968, and is reflected in the name of the main implementing agency, P4S, which is translated as the Project for the Opening of Tidal Swamps for Rice Production. Other tasks envisaged for P4S staff during Repelita III are to initiate an infrastructure improvement program for existing Government and non-Government settlements in tidal areas and to develop Indonesia's fresh water swamps. However, these tasks have a secondary priority for the Government.

2.02 Application of this basic policy has exhibited only minor deviations over the years. A few areas have been developed entirely for existing local populations and there is a concentration of efforts in the Palembang and Banjarmasin areas which can hardly be termed remote. But overall, swamps are for rice and for transmigrants. Consistent with this orientation, swamp development is basically conceived as an operation to be handled by P4S and DGT. A special agency for land clearing and settlement design, PTPT, was only introduced in 1975 and was hardly operational before 1977.

Overall Organization

2.03 Site Selection. In the past, P4S selected and prepared tidal swamp projects.^{/1} This was not by design, but was due to the fact that in pioneering times, leaders of the Ministry of Public Works and P4S staff were virtually alone in their effort to demonstrate the potential of swamp areas. Later on, when P4S was faced with high targets, sites were selected on the basis of preparedness. The same situation continues today: preliminary surveys and investigations involve specialized technical knowledge and are performed by P4S and its consultants.

2.04 Segmentation of Activities in Swamp Projects. Typically, once a project site is selected, design and construction of canals is a P4S responsibility. Design of the settlement, including the designation of areas to be cleared, and clearing of the land are the responsibility of PTPT. Construction of houses and buildings, transportation, settlement and general support of transmigrants fall to the DGT. Specialized support services such as extension, credit, cooperatives, and education are the responsibility of the corresponding departments. To date, little integration of these agencies has occurred. Indeed, a segmented, linear pattern of activities has taken place whereby one agency completes its task before turning the work over to

^{/1} The regional planning boards, BAPPEDAs, and the provincial authorities have been nominally involved.

the next agency. Specifically, P4S completes the canals then PTPT comes in, draws plans and does the land clearing; and only then does DGT start to build the houses and settle the transmigrants. This kind of assembly line approach requires little coordination and interaction between agencies, but it also reduces cooperation, slows implementation, and causes inefficiencies and waste.

Organization and Procedures in P4S and the Directorate of Swamps

2.05 General. P4S was established in 1968, as a special project unit formed mainly from personnel of the Directorate of Rivers and Swamps within the Directorate General of Water Resources Development (DGWRD). In contrast, the Directorate of Swamps was created in 1975 as a structural part of DGWRD. Project units enjoy privileges which structural units do not, most importantly they are not subject to strict control of their personnel; on the other hand, they are not considered a permanent part of the civil service and the tenure of their personnel may be insecure.

2.06 In many ways P4S is a unique agency in Government. Since its establishment it has been dealing with delicate and novel land development problems and has therefore been closely associated with the universities. It has been more innovative and forward looking than many other Government agencies. It also manages a considerable amount of equipment and actually undertakes construction which is unusual among Indonesian Government agencies.

2.07 Organization. The General Manager of P4S has authority over the Jakarta central office and 5 provincial offices. The Jakarta staff numbers around 110, excluding support staff (drivers, office workers, etc.); each of the assistants in Jakarta has a staff of 8-10, except the assistant for technical planning who has a staff of 25 plus 15 draftsmen. To date, the World Bank has been mainly involved in project preparation and appraisal and has therefore mainly dealt with this assistant.

2.08 The head of the provincial office is the provincial head of Public Works, except in the Banjarmasin office which serves two provinces. The assistant manager is the actual leader of P4S operations. Equipment is operated by the provincial offices. As mentioned earlier, P4S intends to concentrate its efforts and equipment in Palembang and Banjarmasin and these offices can be expected to grow relative to the others.

2.09 Training. P4S managers have been concerned about the numbers and experience of their staff. A major challenge was presented when targets were stepped up and a significant amount of equipment was purchased in 1976. Equipment operators had to be recruited and trained; this was accomplished in Jakarta with some help from equipment suppliers. At the engineer level, P4S has the ambition to develop substantial in-house capacity. To this end, a program was initiated to recruit a few college graduates by offering them

stipends to complete engineering studies. Such a recruitment procedure is not common in the Ministry of Public Works, however, and P4S's efforts have not been wholeheartedly supported. The general policy of the Government is to leave technical expertise to outside consultants and assign only administration work to Government officials. However, in the case of relatively simple technical matters such as tertiary development or simple swamp drainage, technical expertise can be established in the agencies relatively easily and quickly and the Bank should therefore support P4S's recruitment and training efforts.

2.10 Accounting and Administration. P4S has no cost-accounting system and most of its accounting is limited to bookkeeping. This prevents accurate estimation of most of P4S's actual operation costs. Because of limited experience of Bank-financed operations, support should be extended to cells responsible for procurement and processing of disbursement claims if a substantial lending program is to be pursued by the Bank in the sector.

2.11 Procedures. To determine the suitability of prospective sites, climate, hydrology, topography, soils, environmental factors and existing socioeconomic conditions are studied. Most of the surveys and investigations are conducted under contract by the universities with some help from the provincial offices. Topographic mapping is contracted to local private firms. Designs are also carried out by the universities with Gadjah Mada University designing development in Kalimantan and IPB and ITB in Sumatra.

2.12 The boundaries of projects are determined when the Provincial Government declares the land reserved for transmigration and a map reflecting this decision is produced by Agraria. Forest concessionaires in transmigration areas then are given one year to log the forest. They are generally only interested in prime meranti and prefer to operate after P4S has started opening the main canals because of easier access and log transport.

Organization and Procedures in PTPT

2.13 PTPT is a new project unit in the Ministry of Public Works. It was created in 1975 and became operational in 1977. Prior to 1978 DGT was expected to do village planning, land clearing, construction of houses and other village infrastructure. Under present organizational arrangements, however, village planning and land clearing is the responsibility of PTPT; construction of houses and village infrastructure is carried out by DGT. In 1979 the responsibility for village planning in upland transmigration projects was shifted to TKTD, the Directorate of City and Regional Planning in Cipta Karya, the Directorate General of Housing and Planning in Public Works.

2.14 PTPT's organization has a section for upland projects, one for lowland (swamp) projects and a section for procurement and other administrative matters. In addition, there are offices in the provinces.

All land clearing is done by local contractors which are prequalified, supervised and paid by the provincial offices; procurement and award of contracts is done by the Jakarta office.

Organization and Procedures in DGT

2.15 The Directorate General of Transmigration consists of Directorates, for Program Formulation, Settler Relocation, Transmigration Area Development and Spontaneous Migration. Recent growth which has doubled staff in receiving areas and increased personnel by one-third in sending areas has been of appropriate dimensions but the formal qualification of these staff has remained low (80% of PTPT staff are college educated compared to 33% of the staff of the DGT). This is of particular concern in the case of on-site project managers, most of whom have very limited experience with community development and come from a wide variety of previous administrative positions. This suggests that it will be critical both to improve selection and incentives in the DGT and to upgrade staff who are already there.

Other Agencies Involved

2.16 Agraria establishes project boundaries and gives the transmigrants titles to their lands. The other main agencies involved in supporting the settlers are: Agriculture, Cooperatives, Health and Education. Most of these agencies are geared to national programs, operate with nationwide standards, and experience constraints of funds and personnel. In some cases their approach to transmigration, although sympathetic, must be limited. This state of affairs is a reflection of trade-offs and political decisions at the national level and is unlikely to be reversed in the near future.

Coordination

2.17 Coordination of the transmigration program has become increasingly difficult since it became a multi-agency effort in 1978. The subject is treated in detail in the Transmigration II appraisal report and elsewhere in this Review. Suffice it to say here, that the efforts spent to coordinate the transmigration program have been mainly directed at the upland transmigration projects to the exclusion of swamp projects. This is partly due to more pressing problems experienced by transmigrants in the upland sites. When synchronization shortcomings become apparent in swamps, similar attention can be expected. In the absence of formalized, systematic and effective coordination, the various implementing agencies will continue acting under virtually independent budgets, entertaining somewhat different versions of the program's objectives, and finding themselves hindered in providing optimal project implementation.

3. PROJECT PREPARATION AND IMPLEMENTATION

Introduction

3.01 This chapter describes the technical procedures and standards presently employed by Government agencies in the development of tidal swamps. Agricultural, social and economic aspects that are discussed in Chapter 4. Evaluations are made and suggestions for improvement are proposed. Information is also presented concerning cost data obtained from Government agencies.

Investigations and Surveys

3.02 After the identification and selection of sites, investigations and surveys are made to obtain data concerning rainfall, stream flow, tidal action, topography, soils and vegetation. Some effort is also spent to gather information in the project area on land ownership, income levels, health conditions, forest and fishery resources, the cultural background of local people and their social structure. Limited hydrological and meteorological data is usually available at or near the sites and some information concerning land status, population, and social conditions is available at local and provincial government offices. For some sites, preliminary information is available concerning topography, soils, forestry, fishery and income but additional, more detailed information is usually needed for planning, design and evaluation of projects.

3.03 Aerial Photography. P4S has contracted 2.8 million ha of aerial photography and controlled mosaic and 1.4 million ha of photo maps during Repelita II. More detailed photographs are generally required for investigations and surveys, particularly in conjunction with topographic mapping. These photographs can also provide information on hydrology, drainage, soils, vegetation, topography, settlement, land use, population, and salinity. To date little use has been made of advanced photographic interpretative techniques. The inventory of swamps proposed under Swamp Reclamation Project I will utilize satellite imagery and other available aerial photography.

3.04 Hydrological and Meteorological Data. Records of rainfall and temperatures have been collected at numerous locations in Indonesia for many years, although there are gaps of variable length during which no data is available at most of the recording stations. Other meteorological data (humidity, winds and cloud cover) have also been collected at some locations during recent years. Hydrologic data coverage of coastal swamp areas is not as extensive and periods of record are usually shorter than for the meteorological data. Additional recording stations have been recently installed and are being operated to provide information on stream and tidal flows, flood and tidal levels (saltwater intrusion) and, at some locations, sediment content and chemical properties of stream flows. Where considered necessary for project evaluations, additional meteorological and hydrological data are collected during surveys and investigations, although the additional data are

often of limited value because of the short duration of the supplemental records.

3.05 Topographic Surveys. Small-scale topographic maps are available for many parts of Indonesia but the scales and contour intervals are inadequate for the maps to be of other than general use in swamp development projects. Topographic and/or alignment surveys are usually performed prior to project construction. Inaccuracies of topographic surveys are reported to be one of the major problems and reasons for delays. Mapping of swampy areas is difficult because of poor access, heavy vegetation and unstable soils. Problems have also resulted in areas where systems were designed without topography or accurate surveys because of lack of reliable data concerning elevations, water levels and tidal effects.

3.06 Soil Surveys. General information concerning the soils of the Indonesian swamps is available and some detailed information has been collected during project identification and selection procedures. However the information needed to locate areas for agricultural development, i.e. those areas with little or no peat and without potential toxicity problems, is still very limited. Preliminary screening can be done using remote sensing techniques. Both aerial photographs and satellite imagery can be used and recent advances in both make such screening more sensitive. Ground surveys to confirm the quality of the soils in promising areas are essential. The IPB and the Soil Survey Institute in Bogor are adequately equipped for this work and can deal with large numbers of samples, provided the work is confined to these measurements. Gajah Mada University is less well equipped and some of the existing equipment needs repair.

3.07 Environmental Surveys. The good relationship between P4S and the universities is reflected in the field of environment and ecology. Government documents show 836,000 ha of ecological surveys undertaken during Repelita II. The South Sumatra swamp development area has been particularly closely studied by the team and care has been taken to translate specialized findings into simple guidelines. The on-going cooperation between the two groups should be continued, additional project-oriented recommendations should be encouraged and the geographical coverage of studies should be expanded. There is also a need for studies to monitor and evaluate changes in evolution of ecologically significant regions. Such studies and monitoring would be aimed at practical results in the form of recommendations for improvements in overall resource use, and they would serve as a basis for project oriented studies and a systematic involvement of environmental specialists in the swamp reclamation program.

3.08 Socioeconomic Surveys. A Bank-assisted socioeconomic survey was undertaken by the Agro-economic Survey in connection with the Karang Agung development. Other project related surveys appear to be rare. Such surveys could, however, be useful, if action-oriented, and could serve to minimize right-of-way problems and foster good acceptance of the transmigrants by the local population. Data relating to the labor situation and to marketing could

also be used as background material for the economic justification of the project.

Waterway Designs

3.09 All Government projects (except for two polder projects in Kalimantan) have been built at a low-input level, and feature open canals for gravity drainage. Design concepts of the hydraulic systems for Sumatra projects have been developed by the Institute of Technology at Bandung and those for Kalimantan by the University of Gajah Mada (GAMA) in Yogyakarta. Differences in the two concepts are partially attributable to differences in tidal action and soils but also vary in the assumptions used. There is a significant difference in tidal characteristics between the areas with the maximum tidal range being about 3.5 meters in Southeastern Sumatra and about 1.5 meters in Southern Kalimantan. Potential acid sulfate soils are reported to be more prevalent in the swamps of Kalimantan than those of Sumatra.

3.10 ITB Design Methods. ITB canal systems include navigation, primary, secondary and tertiary canals and may or may not include water control structures. In the absence of pronounced gradients the systems are generally laid out rectangularly with the main canals extending to one or two rivers. The lengths and sizes of the different classes of canals vary between systems. All canals have drainage functions; some have additional purposes, including navigation and irrigation. The navigation canals and many of the primary canals allow passage of shallow draft boats during low tide and because of the tidal variation they are fairly deep. Where land elevations, tidal levels and water salinity conditions permit, irrigation water is supplied during high tide. In some areas, separate drainage and irrigation systems have been provided but, in most areas, both functions are accomplished in the same system. Most of the ITB systems are unregulated; however, water control structures have been constructed in portions of some of the systems to provide and retain irrigation water, prevent overdrainage, reduce salt water intrusion or store water for domestic use.

3.11 GAMA Design Methods. GAMA canal systems are uncontrolled. Generally a single primary canal is connected to a river. In many GAMA systems the primary canal is relatively short, but then forks into two or more lengthy secondary canals. Tertiary canals are generally shallow, fairly long (1,500 to 2,000 meters), and usually spaced 200 to 400 meters apart. Because accurate land elevations are usually not known during design stages, it is the general GAMA practice to assume that the land within the systems can be tidally irrigated and to size the canals accordingly. In addition to relatively wide and shallow primary and secondary canals that are designed and used for navigation, GAMA systems are characterized by reservoirs provided at the upper ends of secondary canals. The reservoirs are built to assist in storing toxic drainage water to prevent the water from canals to prevent water being displaced onto agricultural land during tidal inflow. They also furnish additional water for flushing toxic water through the canal systems during

tidal outflow. Although the primary and secondary canals are required to have capacity for drain the maximum rainfall occurring within five years, the canal sizes are generally determined by the assumption that all land can be tidally irrigated. In estimating irrigation requirements, it is the GAMA practice to assume that volumes of water equal to a depth of 20 mm over the cropped area of each system would be required during a six-hour period. This may be excessive.

3.12 Design Recommendations. Design procedures of both ITB and GAMA should be reviewed and revised. Some variations in design standards and procedures applicable to Southeastern Sumatra and Southern Kalimantan are justifiable because of differences in tidal characteristics. The need and justification for differences due to other factors such as soil properties and toxicity are, however, questionable. Items to be reviewed would include, among others: (a) the ITB practice of designing drains for two-year frequency rainfall and flood runoff; (b) the five-year frequency drainage design criteria as used by GAMA; (c) the irrigation criteria used by GAMA and (d) the need for constructing reservoirs to prevent or reduce toxicity. Canal maintenance requirements and problems should also be reviewed to determine if design changes are desirable and justifiable to reduce future maintenance. Work could be initiated and supported by the Bank as part of the suggested rehabilitation program and of a proposed Study on Project Preparation.

Canal Construction

3.13 Construction Procedures. Canal alignment surveys are performed by contractors. The navigation, primary and secondary canals are excavated by P4S using dredges, track-mounted and pontoon-mounted excavators, and hand labor. The hand labor is associated principally with the removal of tree stumps and roots. Excavation of the tertiary canals is usually accomplished by hand, before or after clearing of the agricultural land. The work is performed in relatively remote areas where access is limited; transportation is mostly by water; and housing, food and other supplies are not readily available. For these reasons, base camps are established near the work area where crew housing, supplies, transportation equipment, and other support equipment, materials, spare parts and services are provided. Crews travel by boat between the base camps and work sites.

3.14 Equipment operation and maintenance personnel are P4S employees. Procedures and types of equipment used in canal excavation vary with canal sizes, topography and the types of vegetation and roots. Track-mounted or floating excavators are used in excavating small- and medium-sized canals and in the upper zone of large canals. Dredges are used only in the lower portions of large canals following excavation through the root zone by other equipment or manual means. The excavating equipment is generally used one shift per day for five to six days per week. Average annual usage of the equipment averages about 1,000 hours. Some of the equipment is reported to be idle for fairly frequent, short periods due to mechanical problems, lack of spare parts or temporary unavailability of work sites.

3.15 Observations indicate that the canal earthwork conforms only approximately to design alignment, grade and dimensions. This lack of construction accuracy is typical of "force account" work where performance and supervisory personnel are under the same organizational structure and enforcement of accuracy standards is not required to meet contractual arrangements.

3.16 Cost Estimates. P4S does not record unit prices, or total costs of canal earthworks. Unit prices and costs are established for canal construction surveys and those portions of the clearing for canals that are accomplished by contract. Without allowance for equipment acquisition or depreciation and before rupiah devaluation, costs were reported to average about Rp 100,000/ha (US\$160/ha) for ITB canal systems on Sumatra and about Rp 128,000/ha (US\$205/ha) for GAMA canal systems on Kalimantan. Canal earthwork costs for 1979-80 are estimated by P4S to average Rp 160 to Rp 190 per cu m without consideration of initial costs or depreciation of equipment or base camps, and without inclusion of costs for administration, investigations and surveys. These estimates are based on annual equipment usage of 1,750 hours. Since the P4S annual equipment usage is about 1,000 hours, actual costs probably are considerably higher.

3.17 Recommendations. Means should be investigated of obtaining fuller and more efficient use of excavating equipment by use of more overtime work and/or use of more than one shift of operating personnel. If this cannot be accomplished within restrictions on Government personnel and wage policies and schedules, consideration should be given to: (a) utilizing contractor personnel in performance and supervision of the work; or (b) accomplishing construction work by contract and finding other productive uses for the P4S equipment not required for operation and maintenance. Closer adherence of canal excavation to design specifications should be enforced. Construction work should recognize future maintenance requirements particularly during and after an initial adjustment period of erosion and deposition of materials along canal sides and bottoms. Areas for disposal of earth materials should be selected so as to not interfere with transportation, canal maintenance and land use.

Land Clearing

3.18 Clearing is performed under contracts awarded and supervised by PTPT. Clearing of the fields does not include removal of stumps. The settlers are generally required to clear portions of the land and to remove tree stumps which usually requires a period of about five years. For some projects, there has been a lengthy period between completion of land clearing and arrival of settlers which has resulted in secondary growth of vegetation.

3.19 Usually timber is reserved for construction of houses and some is used by the settlers. Essentially all of the small branches and usually most of the logs are piled and burned. Burning is usually successful

only during the dry season (June through September); even then, logs are only partially burned and may remain for several years until cut up or successfully burned by the settlers. In the interim period, the logs are difficult to move and often restrict farming operations. Generally only a small portion of the timber resources are utilized even though many of the species may be valuable and available in commercial quantity.

3.20 Contractors are prequalified by local PTPT offices according to sizes of contracts depending on past work performance and availability of financial resources. Tender documents for land clearing are prepared in Jakarta. The documents do not prescribe the clearing methods but labor intensive methods are usually adopted. Chain saws are generally used in areas containing significant numbers of large trees. It is impractical to use tractors because of the low bearing capacity of swamp soils. Contract periods vary with the size of area, type of vegetation, and season of contract award, but are usually in the range of 6 to 12 months.

3.21 Clearing Costs. Clearing costs vary widely with types of vegetation and accessibility. General cost ranges for the various components of the clearing operations are shown in the following tabulation.

Table 3.1: RANGE OF LAND CLEARING COSTS (Rp/ha)

Item	Cost - Rp
Labor	
Felling and cutting	20,000 - 70,000
Clearing	10,000 - 160,000
Equipment	2,000 - 80,000
Management, supervision and overhead	14,000 - 42,000
<u>Total</u>	<u>46,000 - 352,000</u>
(US\$)	(\$74)- (\$563)

3.22 Recommendations. Primary forests should not be cleared for agricultural development of swamps unless the forest products can be properly utilized. Forest concessionaires should be required to complete their operations prior to project implementation and their activities should be more closely regulated. Coordination should be improved to avoid lengthy intervals between clearing and initial land preparation for agricultural use. Consideration should be given to stockpiling and utilizing logs and poles from the clearing operations for use as mats for supporting trackmounted excavating equipment and as fences, barriers or other wave suppression devices along canals.

Housing and Village Infrastructure

3.23 Village design is considerably easier in the swamp areas than upland areas because the topography is flat. Villages are located along canals that permit navigation at least of small canoes. Houses, markets, schools and other community facilities are constructed to DGT standards under contracts administered by that agency. Because of soil and tide conditions, houses are built on piles or posts and the floors are elevated above ground level. Except for metal or tile roofs, the houses are of wood construction and are 30 to 35 sq m in area. House roofs are used for collection of rain water for household use, particularly during the dry season. Successful settlers usually add to the houses when they are financially able. Present construction costs are quoted between Rp 350,000 to 400,000 per house, but contracts recently let under Bank financed projects have shown costs up to Rp 500,000-600,000 per house. Instances of design deficiencies, poor materials and inferior workmanship have been reported. The piling or other types of foundations are often inadequate, resulting in settling of the houses. There is a need for closer supervision of house construction.

Project Cost Estimates

3.24 Costs are variable from project to project but it is useful to determine an average unit cost for the program. This has been done based on data gathered during appraisal of Swamp Reclamation Project I and on additional data furnished by implementing agencies. The figures presented below are in early 1980 prices and rely on contractor excavation costs rather than actual P4S force account costs.

Table 3.2: ESTIMATED AVERAGE COST OF GOVERNMENT'S SWAMP DEVELOPMENT PROJECTS /a
(Early 1980 prices)

	Rp '000	US\$/ha
Land clearing	269	430
Earthworks	413	660
Structures	119	190
Base camp	34	55
Equipment	34	55
Housing	300	480
Settlement	256	410
Administration	141	225
Base cost	<u>1,566</u>	<u>2,505</u>
Contingencies (18%)	234	375
<u>Total cost</u>	<u>1,800</u>	<u>2,880</u>

/a Based on contractors' rates for canal excavation.

Operation and Maintenance of Canals

3.25 P4S has responsibility for operation and maintenance but has neither an ongoing operation and maintenance (O&M) program nor equipment or field personnel specifically for O&M use. However, procedures and responsibilities for O&M work are now being formulated. P4S plans that their field organizations will have O&M responsibilities for two years following completion of construction. Subsequently, O&M of the main canals will become a provincial function and maintenance of the tertiary canals will be done by the farmers. This arrangement is similar to that for Indonesian irrigation systems nationwide.

3.26 Main Canal Maintenance. Since provincial organizations for the operation and maintenance of swamp systems do not presently exist, P4S intends to provide training for provincial O&M personnel. It is anticipated that the provincial O&M organizations would include permanent employees stationed in the project areas to perform routine surveillance, minor maintenance work, and make plans for necessary repairs or desirable improvements. One man would cover canal systems serving 2,000 to 5,000 ha. After the initial period, portions of the canals may need to be cleaned about every 5 years; equipment would be required for cleaning and occasionally for other types of maintenance work on the large canals. No equipment is presently allocated for O&M use and there are no specific plans for provision of such equipment. It may be cost effective to transfer some of the present P4S equipment from construction to O&M use, particularly if major portions of future construction are accomplished by contract.

3.27 The principal maintenance problems are due to sediment deposition in canal bottoms and erosion along canal banks. The problems are greatest immediately after construction. Bank erosion is most severe along canals used for water transportation, caused principally by wave action created by motor boat traffic. In some areas it becomes necessary to provide bank protection to control or reduce erosion. Along existing canals, such protection consists principally of various types of wooden structures and there is an on-going need to periodically replace the structures. On many existing navigation canals, cleaning operations using large equipment are difficult because of private structures located in and adjacent to the canals.

3.28 Tertiary Canal Maintenance. Farmer groups generally perform maintenance work on tertiary canals but often operate informally. P4S plans that farmer organizations will be established for each tertiary canal or system. Principal maintenance problems of tertiary canals are sediment deposition in the upper portion of the canals and/or erosion in the lower portions at or near junctions with secondary canals. Farmers have built structures in some tertiary canals, usually in the lower portions, to control erosion and/or water levels in the canals.

3.29 Recommendations. Maintenance plans proposed by P4S appear workable and should be implemented rapidly. There is an immediate need for additional maintenance work along many of the canals and the need will become greater with delays in execution. Use of canal banks and types of construction along the banks should be controlled to conform with maintenance procedures and requirements. Assistance and advice concerning tertiary canal maintenance should be provided to responsible farmer organizations.

Coordination of Activities

3.30 Both the problem of synchronization of canal construction and farmer settlement in Repelita II and the Government's approach to the overall coordination problem have been mentioned previously. Specific, project-related coordination problems which need to be corrected include:

- (a) allowing sufficient time for mapping to be completed before the start of design work;
- (b) providing necessary budget allocations for mapping, preconstruction surveys and, when applicable, canal alignment clearing contracts;
- (c) providing proper funds and personnel for operating and servicing the equipment;
- (d) better staging of canal excavation and village infrastructure construction (including village design and village area clearing and destumping);
- (e) better coordination of field clearing and transmigrant settlement to avoid regrowth and loss of clearing benefits; and
- (f) providing agricultural information to transmigrants before they plant their fields.

In addition, P4S and DGT each need to plan and coordinate their regional operations, e.g. P4S regional offices should plan their operations to make the best use of their equipment.

3.31 The first step to improve project coordination is to enable each agency to plan and monitor its own operations. It is also necessary that managers and professionals in each agency be kept aware of the implementation status of each and every project. For this reason it is strongly suggested that a position for Project Coordination and Monitoring be created in the P4S central office. The Project Coordinator should be attached to the Secretariat of the General Manager. He should maintain a file for each project under

implementation and would therefore be able to answer any query related to project history, status or planning. He should alert particular agencies when they are falling behind schedule and, in case delays cannot be made up for, reschedule the operations and inform other interested agencies of the change. He would be a natural counterpart in P4S for an inter-agency coordinator. Project coordination and monitoring should also be performed in PTPT and in DGT. However, it may not necessarily require new positions. The establishment of interagency coordination mechanisms is treated in Chapter 6.

4. AGRICULTURAL DEVELOPMENT

Introduction

4.01 This chapter provides a survey of agricultural conditions, practices and problems in the swamps as well as prospects for agricultural development. Traditional farming systems of the Buginese and Banjarese people are described first; the all important soil conditions and problems are then reviewed followed by present practices and problems. Finally future development prospects are examined including research prospects, prospects in rice growing and alternatives to rice. The main conclusion is that while much can and should be done in the area of agricultural development and while it is recognized that soil conditions are difficult, avoiding the most difficult areas and providing a reasonable standard of water control should permit agricultural development.

Traditional Development Methods

4.02 The success of traditional settlement methods is a relative one. While spontaneous settlers using traditional methods can enjoy a relatively good life, this is the fruit of considerable effort and cannot be construed as true affluence. Under traditional methods, only the better areas are settled, farming is not intensive and requires relatively large areas of land per settler family. Areas commonly selected are close to the rivers, mostly on alluvial soils; peats are avoided as well as primary forest. The parameters set for Government programs are significantly different as a large-scale, organized effort must deal with the more difficult soils lying inland from the rivers and can never provide the flexibility of individual settlement.

4.03 The Buginese method of land development has recently received attention from researchers. The following description draws on that of William Collier and refers to South Sumatra where most of this type of development is occurring at present.

4.04 Spontaneous swamp development is generally initiated by a pioneer group of a few families; only when their efforts can be seen to be successful will they be joined by other settlers. Prospective areas are screened on the basis of soil and vegetation; typically, only river banks are settled; deep peats are avoided as well as heavy primary forest and areas where vegetation is not healthy. Once a suitable area has been located, the group leader proceeds to get permission to open the land from the local authorities. The main canal is dug perpendicularly to the river, approximately 3 m wide and 2.5 m deep. Typically, half time is spent on digging canals, the rest on logging, which provides subsistence income and, where needed, contributes to land clearing. At this rate, it takes about five months to dig a 200-250 m long main canal. The "secondary" canal is dug perpendicularly to the main, about 1 m wide. Fields are located on both sides of the secondary canal. After the first fields have been established, new families (relatives,

friends) usually ask permission to join along the same secondary canal, or to extend the main canal and dig their own secondary canal parallel to the first one. In this system, forest clearing is largely completed before the canals are in operation and the area is simply burned before planting.

4.05 Crops are adapted to soil potential. If peat is less than one hand deep, rice is planted, especially if vegetation displays green leaves and the jawi-jawi tree and the nibong palm are growing; if peat is 50 cm deep, sweet potatoes, soybeans, and other field crops are preferred. In thicker peats, tree crops are thought suitable, especially coconuts. In Buginese developments, farm operations are often performed by hired labor (or exchange labor). The harvest is shared in varying ratios depending on circumstances.

4.06 After a field is opened, paddy yields typically increase for 2-3 years and reach a plateau. Weed problems tend to increase until unmanageable, around the seventh year, but by that time, the settlers generally have switched to other crops, especially coconuts, or they may have moved to new fields. Coconut seedlings are intercropped with rice in the early years and by the time the coconut trees are mature and their shade renders rice cultivation impossible, the Buginese have moved to new fields where they repeat the cultivation process. In this extensive type of development, large farms are relatively easily established.

4.07 The Banjarese system is a more intensive one, at least around the Banjarmasin area. These are formerly opened areas and the forest is usually secondary, gelam forest (Melaleuca leucadendron). Rice cropping is universal and a stable yield level seems to have been attained. Healthy groves of coconuts and other fruit trees offer sign of prosperity. Finally, fish raising is systematically practiced in reserved canals (tatahs) and is claimed to be a substantial source of revenue.

Soils

4.08 The soils of the swamps can be broadly divided into peats, river alluvium, and marine and brackish water alluvium.

- (a) Peats. Peats are mostly formed under fresh water conditions, occupying the back swamps of inland and coastal areas. Depending on age, they vary in depth; the deepest may exceed 9 m and be 3-4,000 years old. The actual depth beyond which cropping is not economic depends on the type of crop but the generally accepted maximum is 1.5 m in the undrained and unconsolidated condition. Uncontrolled drainage of peats leads to consolidation and then gradual loss by oxidation. Cultivation on peat soils may also result in severe nutrient deficiency problems as many crops need minor elements not present in peat soils.

- (b) River Alluvium. At some distance from the coast, the rivers build up levees which are normally narrow strips about 1/4-1/2 km wide along the existing and former river systems. They present few problems for agricultural development other than occasional flooding.
- (c) Marine and Brackish Water Alluvium. These soils appear to be widespread in swamps along the coast and inland. They have a moderate capability to produce food crop and rice crops. Where pyrites are present, these soils have to be kept moist to prevent oxidation and increased acidity.

4.09 The chemistry of these soils has been well studied. Pyrite is formed when the soil material is inundated with brackish water and when the sulphates in the water are reduced to sulphides by the organic matter in conjunction with bacterial action, the sulphide reacts with the iron in the soil to form pyrite. The pyrite does not render the soil toxic and the pH of such soils is nearly neutral. However, if such soils are drained, the pyrite oxidizes, sulphates are formed, and very high acidity develops, so high, in fact, that most agricultural crops will not grow. Some of these sulphates are soluble and can be flushed out of the soil by leaching. However, deliberate leaching in swamps is difficult due to shallow gradients and high groundwater tables.

Soils and Engineering Design for Water Control

4.10 Most of the areas so far opened up for agriculture are near tidal rivers. The amount of inundation varies with area and with season. Since these areas generally receive between 2,000 mm-2500 mm of rainfall, drainage is required to reduce inundation and prevent excessive flooding during heavy rain. Relatively low areas can be innundated by fresh water back-up from rivers affected by tides and this permits better rice yields and higher cropping intensities.

Present Cropping Practices and Patterns

4.11 Most of the areas are planted with local paddy in the wet season from October to May/June in Sumatra and from November to August/September in Kalimantan. Some farmers prepare compost from previous season's straw together with the slashed weeds during land preparation and distribute it over the field before transplanting. Apart from zinc phosphide for rat control, very few other chemical inputs are used by farmers. Paddy yields average about 1.5 ton/ha. No crops are planted in the dry season. Homeyards are intensively cultivated. Crops commonly planted by farmers include coconut, banana, jack fruit and cassava.

4.12 In the Banjarmasin area, farmers use a two- to three-stage nursery system, primarily to overcome the problem of flooding. Seedling age prior to planting in the field is between 60-80 days. A multistage nursery hardens the

plants and enables them to attain sufficient height to tolerate deep water conditions. Farmers are also able to utilize the time between stages for other on- or off-farm activities, and the quantity of seeds is about half (5-10 kg/ha) that used in the conventional system.

4.13 Due to labor shortages during land preparation and transplanting, farmers may resort to staggered planting. This may lead to increased pest and disease problems. Additional labor is also needed during harvesting. Harvest is typically by ani-ani (hand-held knife). Farmers practice the bawon system, of shared harvesting with usual shares of one-sixth to one-half when labor is extremely short.

4.14 Damage from pests, especially rats, remains one of the major constraints faced by farmers. Prevalent insects include stemborers, stink bugs and planthoppers which also serve as vectors for rice viruses. In some areas crabs have been reported to cause severe damage to nursery seedlings and new transplants. There is a serious weed problem as the fields lie fallow in the dry-season. The vigorous weed growth not only poses a problem during land preparation but may have a depressing effect on the subsequent rice crop.

4.15 The first few years present problems as well as advantages to the farmers. Logs and stumps obviously reduce the area available for cropping, cultivation by mechanical means is impossible and the construction of bunds and drains is difficult. On the other hand, newly cleared land has few weed problems and some additional fertility. Stumps and debris left standing in the field provide ideal habitats for rats, thereby contributing to the heavy losses in rice yield. Only after clearing contiguous areas and burning is a lower rat population secured. Most of the timber remaining disappears after five to seven years and farmers have a reasonably clean field after ten years.

Agricultural Support Services

4.16 Research. The major test farms located in the tidal swamp areas are the following:

- (a) in South Sumatra, the Upang test farm operated by IPB;
- (b) in Kalimantan, the Barambai and Tamban Luar (5 ha) test farms operated by GAMA;^{/1} and
- (c) in Kalimantan, the Handil Manarap (20 ha) and Belandean (25 ha) test farms operated by the Agency for Agricultural Research and Development (AARD).

^{/1} The Barambai test farm has been recently turned over to the Provincial Department of Agriculture.

Some research relevant to tidal swamps is also conducted by AARD at Bogor and Maros. Research on fresh water swamps is conducted at Kandangan test farm (49 ha) in South Kalimantan. The main objectives of the test farms are to undertake studies on water, peat and cat clay management and crop testing. The crops tested include rice, secondary crops, coconuts, coffee and cloves. Some work is also carried out on pest control. Cropping system trials are being undertaken by CRIA at Barambai in cooperation with IRRI.

4.17 Stations managers at the test farms are recent graduates and usually lack experience. They only carry out instructions of the project leaders. The project leaders visit the farms periodically, up to four times a year, but important developments in the experiments/trials can often escape their attention. In view of the shortage of experienced researchers and their reluctance to work in "frontier" areas, it is unlikely that the situation can be improved in the near future, although more frequent visits and supervision by project teams would be useful.

4.18 In South Kalimantan good linkages exist between different agencies involved in the development of tidal swamp areas. Representatives from Gajah Mada University, AARD and the provincial department of agriculture meet twice a year to exchange information, discuss results from test farms, stations and trials undertaken at farmers' fields, and activities planned for the following year. In addition, verification teams headed by the provincial extension service, and consisting of staff of AARD, the University of Lambung Mangkurat and of advanced level extension agents meet quarterly to plan joint trials in farmers' fields. In South Sumatra, however, linkages are mainly from the Upang test farm back to Bogor and to P4S with no systematic transfer of information to the extension service and the farmers, and few exchanges with AARD.

4.19 Extension and Other Services. Extension services are generally very minimal in tidal swamps. Extension workers are not systematically provided and when they are, support and training are inadequate. The vast majority of farmers grow local rice varieties and use practically no inputs.

Agricultural Prospects

4.20 The Malaysian Experience. Some insight can be gained on the prospects for agricultural development in the swamps of Indonesia by examining the Malaysian experience. There are several typical swampy areas on the west coast of Peninsular Malaysia and different cropping patterns and types of development can be observed. In Perak, the main crop is oil palm with yields that make it very profitable. The Tanjong Karang area in the State of Selangor - the first swamp area developed by the Department of Irrigation and Drainage - is mainly a rice growing area. Farmers continuously reduce the area of peat by annual burning; in addition to paddy, they grow high value vegetables. Further south, in the State of Johore, the West Johore project area is now being developed, with Bank assistance. The dominant crop cultivated on peat is pineapple which is exported mainly to neighboring Singapore. Other tree crops

include coconut and oil palm; and the most profitable combination is coconut intercropped with cocoa, followed by coconut intercropped with coffee; these combinations are best where peats are not deep and soil acidity is not a major problem.

4.21 Research Prospects. When interviewed as to their feelings about rice cropping development in swampy areas, experts at IRRI were confident that much could be achieved in terms of varietal improvement. Varieties tolerant to salt and to acidic conditions have been and can be further developed. Therefore, it is not necessary in their view to provide future project areas with ideal growing conditions by the construction of sophisticated and costly infrastructure. This research should not be confined to varietal improvement, instead research on cropping and farming systems may turn out to provide more increases in income at the farm level. Research aimed at developing light machinery would help circumvent peak season labor shortages, especially at the time of land preparation, and promote higher yields and possibly permit double cropping of rice.

4.22 Efforts should continue in developing rice varieties adapted to different conditions in tidal areas. Apart from other inherent desirable traits, improved varieties for long season rice crop should also be photo sensitive, have good seedling and early vegetative vigor, moderate elongation ability, and tolerance to adverse soil conditions. Suitable early maturing varieties are also required for double cropping in areas with favorable water regimes. Available agro-climatic data indicate that some of the areas may be suitable for tree crops like coconut and oil palm. Therefore, in the development of cropping strategies for tidal areas, consideration should be given to the possibility of fitting in tree crops and other on-farm and off-farm activities.

4.23 Use of Modern Varieties. In flood-prone, deep water conditions, farmers will continue to grow long season, locally adapted varieties. With sufficient water control, however, modern, early maturing varieties can be grown. This is the case in Upang, for example, where Javanese transmigrants have succeeded in harvesting modern varieties before the peak harvest in the area thus overcoming the problem of labor shortages and providing a good price. In Barambai, 200 farmers participated in a double cropping experiment under the direction of the test farm and GAMA staff (1976/77); an early maturing rice crop was planted in September and harvested in February, followed by a local variety crop. This experiment was not particularly successful, only 73 ha were doubled cropped the first year and even less the subsequent year, mainly because of labor shortages accentuated by the fact that modern varieties require more land preparation and leave less flexibility at the nursery period. Isolated attempts at growing modern varieties imply a new cropping calendar which varies from older patterns and may therefore lead to severe pest attacks (rats and birds). Possibilities for double cropping are also present when water is available in the dry season either from pure tidal irrigation or by using low-lift pumps. Structures will generally be

needed at the tertiary level to retain the water on the fields. P4S's upcoming study to improve existing systems will examine ways to promote "intensification" along these lines.

4.24 Alternatives to Rice. Alternatives to a system relying on homeyard cultivation and one crop of local variety rice include, in addition to the rice alternatives mentioned above, secondary crops, tree crops, fruit trees, fisheries and livestock. Secondary crops are infrequently grown except in homeyards. They should be restricted as much as possible to areas without potential acid sulphate soils. Secondary crops would provide the advantage of reducing weed growth during the dry season fallow period and simplifying subsequent land preparation./1

4.25 The two most promising tree crops under coastal swamp conditions are coconut and oil palm, though oil palm is not presently grown due to lack of processing, transport and marketing facilities. Coconuts abound in settled areas and can provide a substantial part of a community's income. Local varieties of coconuts are usually grown. The quality of husbandry is extremely variable but very good stands exist with yields of 80 nuts/tree/year up to 120 nuts/ tree/year. The spacing of trees generally gives a density of 125 trees/ha. As is usually the case in Indonesia, trees are not fertilized; weeding is performed 2-3 times a year. For large scale coconut development, experiments should be conducted to determine the most suitable varieties and explore rooting problems in peat soils. The potential for oil palm is demonstrated in Malaysia where depending on soil type, water quality and water control, yields may vary between 12 and 18 tons fresh fruit bunches at full development. The type of infrastructure theoretically provided in Government schemes (open ditches) is basically adequate, provided topography is taken into account. The minimum size of an oil palm plantation is around 5,000 ha with a processing plant capacity of 30 t ffb/hour (depending on average yields).

4.26 Overall Indonesian and international conditions argue for substantial increases in production of both coconuts and oil palm. Coconuts have been almost the only source of vegetable oils for the domestic market. They were also a major source of export revenue but the situation has deteriorated badly in the past four decades and, since 1977, Indonesia has imported coconut oil and copra to meet its rising domestic demand. Palm and palm kernel oil are virtually the only other edible oils which can materially contribute to alleviating a deficit of some 200,000 tons of coconut oil in 1979, estimated to increase to some 560,000 tons in 1990.

4.27 The Government program for increasing coconut production is based on rehabilitation: upgrading the standards of husbandry and planting and replanting. This strategy is implemented through coconut working centers

/1 This advantage is minimal, however, when land preparation is very shallow as in the prevailing traditional practices.

which mainly provide selected planting materials and credit. During Repelita III some 25% of new plantings are planned to be high yielding hybrids. The Bank is supporting the Government's efforts by a loan for a smallholder coconut development project covering Sulawesi, Maluku, Lampung and Aceh.

4.28 In contrast, oil palm is an estate crop in Indonesia with only 2% of the area under smallholders. Its production is rapidly expanding and the Government has taken regulatory measures to ensure partial substitution for coconut oil on the domestic market. Given their investment capacity and the present availability of more suitable areas, private and public estate developers are unlikely to be attracted by swampy areas. However, the Nucleus Estates and Smallholders approach could be followed whereby Government estates plant and maintain the trees during the first three years using the settlers as employees and subsequently providing inputs, extension and processing facilities.

4.29 Fruit trees can be successfully grown on drained swamp soils, as attested by test farms and settlers' gardens. This provides for productive homeyards rather than for a real alternative to rice, however. Cloves have been successfully grown and may in the future provide substantial cash income to some settlers. Spice crops such as ginger and turmeric could be introduced; planting of bamboo, and pandanus could be encouraged for production of baskets, furniture items, etc. Perspectives are good for small livestock and the results of on-going pilot fattening programs should be carefully evaluated. For this, use can be made of productive leguminous trees. The habitat is particularly suited for raising ducks.

4.30 Substantial income can be derived from the exploitation of aquatic life in the form of (a) fishing (mud fish, river fish, sea fish); (b) aquaculture of valuable species in the canals, provided limited amounts of chemicals are used in the fields; and (c) shrimp of various species, especially the large Macrobrachium species, which is much appreciated in Japan and can yield handsome returns if a marketing system is established.

Conclusion

4.31 The traditional methods of agricultural development used by the Buginese and Banjarese demonstrate the possibility of successful development in the better parts of the swamps based on either rice or coconuts. Together with an examination of soil conditions, they suggest that the apparently more difficult areas the Government plans to develop should have good potential if both (a) deep peats and (b) overdrainage are avoided. During the first years of development, problems related to virgin forest may appear and it is advisable, from an agricultural point of view, to avoid, as far as possible, the areas under heavy primary forest and to raise the standards of clearing. Provided the above conditions are met, agriculture can develop based on either rice or tree crops, and help achieve Indonesia's transmigration and other objectives. Higher standards of living in the swampy areas can be achieved

by addressing the problem of pests and promoting double cropping of rice; this, in turn, would imply some infrastructural improvements. The introduction of aquaculture is a promising way to increase farmers' income, together with small livestock, secondary crops, and fruit trees. Research on cropping/ intercropping systems needs to be supported. Finally, pilot operations of the NES type could be envisaged, based on oil palm.

5. SOCIOECONOMIC ASPECTS

Introduction

5.01 The construction of canals and other infrastructure is but the prelude to any swamp development effort. The ultimate objective is the establishment of stable, self-supporting communities. It is important, therefore, to examine swamp development projects from the point of view of generally prevailing living conditions, productive activities and economic status. In this chapter, living conditions are briefly described to show both the uniqueness of swampy areas and their similarities with other rural areas in Indonesia.

Living in the Swamps

5.02 Health. Life in the swamps revolves around water. So does health in the swamps. The most common diseases are diarrhea and malaria. The incidence of diarrhea is particularly acute where drinking water quality is poor. In the South Sumatra development area, salt water intrusions commonly extend far inland during the dry season and many residents use such water for cooking and drinking; some do not tolerate it well and suffer severe, even fatal effects. Malaria is common in most swampy areas especially during the wet season - but it is also common in many other areas in Indonesia. In most areas visited there was a rural health center within reasonable traveling time, usually at the major market place. However, the staffing of health centers often leaves something to be desired in numbers, qualifications and attendance. While many officials and observers are aware of this state of affairs, few remedies have been suggested. Offering special honoraria for hardship locations could somewhat alleviate the problem but is not without difficult implications at the national level in terms of budgets and more generally of civil service management.

5.03 Education. Education is very important in the eyes of the people. In the past, in transmigration areas, schools were provided by the project (DGT). There also were schools built and run by the settlers themselves, often because the official schools were too distant. The Department of Education is now expanding its activities in swampy areas and intends to take over DGT established schools when projects are turned over to local authorities. No information has been collected on comparative quality standards of Government and private schools.

5.04 Communications. In general, there is a significant amount of activity in swampy areas. Transportation is relatively easy by waterways and the transportation "sector" is usually booming. This assures movement of bulk goods (i.e., grains) and various merchandise (to markets or on "floating stores") and provides several types of passenger transportation, at varying fares. Typically, there is a main market town which functions during the entire week. There is one main market day, however, although other villages may have different weekly markets. Apart from the selling of agricultural

goods and the purchasing of manufactured items, the market hosts various craftsmen such as tailors, hairdressers, etc. Relatively cheap transport exists from many swamp development areas to Java and successful transmigrants and spontaneous settlers do avail themselves of those services.

5.05 Drinking Water. Access to good drinking water is the main problem for new settlers. In the case of shortages, buying and selling of water is frequent in the settlements most affected. In the South Sumatra development area, water is collected from the Musi River close to Palembang and sold downstream; in the Banjarmasin area, some city water is shipped to settlements. The cost of drinking water depends on the distance carried but was in the range of Rp 2,500-4,000/cu m (US\$4.0-6.5) in 1979. Ordinarily, water is collected from the river, from wells and from roofs. River water is muddy, contains suspended particles and must be allowed sufficient time to settle; it should then be boiled. Well water must be boiled and has a bad taste (presumably acidic). Rainwater is best; but it is often collected rather inefficiently: either only one side of the roof is equipped with a gutter, the collection system is leaky, or the storage containers are too small. This apparent inefficiency is somewhat surprising given the importance of water and may indicate the presence of more complex problems. More attention should be paid to this subject.

5.06 First Years of Settlement. Understandably, the most difficult period for a settlers is the first two to three years. They have to face a new environment, a new social situation and cope with difficult agricultural conditions for which they are often poorly prepared. The average transmigrant will spend much of his first year's labor in his "cleared" field (1 ha) removing or burning all but the largest logs and stumps in preparation for rice cultivation. Yields will be low because the area cultivated is covered with logs and stumps; work will be more difficult because little will be known about soils, the water regime, climate, cropping sequences, pests, etc. The farmer will, therefore, be mainly dependent on the support provided by transmigration authorities. Many will invest substantial time developing their homestead which can provide rice, corn, cassava, beans, vegetables, coconuts and fruits. The social situation will be new and unstable at the beginning, even if the transmigrants are from the same region. Some will gain authority, others will be discouraged. Also, the presence of different ethnic groups may create difficulties. Spontaneous settlers arrive better prepared physically and mentally. A majority will associate with an established group; get work as laborers for two to three years while getting on-the-job training, and only then start opening their own land. This is the Buginese system, but it has been adopted by Javanese and Madurese who start working for Buginese (Sumatra) or Banjarese (Central Kalimantan).

5.07 Settlers' success. Overall settlers' success is rather good, meaning that most transmigrants have stayed and say that they would not return

to Java. Spontaneous settlers seem, on average, to be somewhat more prosperous than transmigrants (Annex A); only a few cases of abandoned settlements are reported.^{/1} An important factor in determining settlers' success is motivation and enterprise. A successful transmigrant is usually eager to develop and experiment and does not dwell upon difficulties encountered with both nature and the administration. A successful settlement group is usually headed by a strong personality and discipline is well maintained. By contrast, unsuccessful transmigrants have an attitude of deceived expectations - "we were told it would all be easier" and of continuing expectations "maybe the administration will finally help us, as it should have." The kind of discipline needed for a settlement effort is usually present in Buginese settlements, under the authority of the "canal leader" who is usually the head of the group which first opened the area. Later in the development process the qualities of motivation and enterprise may be less critical. Older established settlements (e.g., in Kalimantan) appear stable and prosperous. A large degree of success seems to accrue to spontaneous settlers who join transmigration villages with some capital and open small shops. After a few years they are generally able to buy land and start progressive methods of cultivation. It seems, therefore, that impetus can be given to development by systematically fostering enthusiasm and motivation among the transmigrants.

5.08 Community Relations. Inside transmigration villages, tension occasionally arises between Javanese and Balinese because of the difference of religion and customs. The relationship between transmigrants and the local populations, however, is generally good. The indigenous people view the arrival of both a good labor force and of increased business favorably. Mixed marriages are common. Most inter-ethnic problems involve the Buginese who are a proud and violent people. Their cultural propensity for conflict is usually resolved peacefully among themselves but pacifying methods do not appear to work as well with other ethnic groups (Javanese, local Malays). Apart from the above, the Buginese are involved in many conflicts over land. While the situation is by no means serious, awareness by the DGT can help avoid potential problems. For example, it may be advisable when Buginese are allowed to settle in transmigration areas to insist that their fields be separated from other transmigrants' fields by canals or other natural boundaries.

5.09 Land disputes. Most of the past swamp development has occurred in sparsely populated areas but there are a few inhabitants in nearly all areas who may not reside in the immediate reclamation areas but utilize the

^{/1} This would seem to be caused by a too small group of pioneer settlers being faced by severe pest attacks, or other complete crop failure.

forestry or fishery resources. In more heavily populated areas it is occasionally necessary to route some canals through strips adjacent to major streams and land acquisition problems may result. In many other instances the residents do not have title to the land, only customary rights, and the property boundaries are disputed or poorly defined. Questions of ownership have arisen over parcels of apparently vacant land which were formerly cleared and farmed by people no longer residing on or using the land. However, land disputes between owners and the Government have only recently emerged as a problem. In some cases informed owners may try and take advantage of the Government's plans. Canals create disturbances and loss of revenue but the problems could be solved by (a) better study of the situation by Government officials and (b) early purchases of right-of-way.

The Economic Situation

5.10 Market activity. Overall economic activity is by no means sluggish in the coastal swamp development areas. Markets confirm this observation by their activity, and the variety of products offered for sale. Prices are reasonable. Other signs of economic success are the arrival of relatives and friends, transmigrants enlarging their homes or building new houses, and rising prices of land.

5.11 Labor Cycles. Labor requirements are usually very seasonal. The major activity is rice growing which shapes the labor pattern. The traditional practice is for one wet season crop followed by a fallow period. Labor is mainly required for land preparation, transplanting and harvest. Total labor requirements are around 190 days/ha, of which 50-60 man-days/ha is for harvest and 70-80 man-days/ha for land preparation and transplanting. The socioeconomic study of the Karang Agung area shows variations between various types of settlers. Excluding harvest labor, successful transmigrants use up to 180 man-days/ha, less successful transmigrants about 120 man-days/ha and Buginese or local Malays 90-110 mandays/ha. The average of 190 days/ha is broken down into 130 man-days and 60 woman-days. The peak seasons are November-December-January and May-June. During slack periods, farmers work in logging and fishing, as laborers on development projects or in the town. Overall, however, there are insufficient labor opportunities in the off season.

5.12 The settlers have approached the labor problem in various ways. Land development work, nonrice farm work and other work is concentrated during the off-peak season. In addition, substantial amounts of migratory labor is employed. Sometimes migratory laborers come from inland areas, sometimes from other swampy areas with different cropping calendars. Transmigrants generally use modern varieties with shorter growing periods and have early harvests, lower wage rates, higher rice prices and, therefore, farm work opportunities during the harvest time of the local people.

5.13 Income levels. The subject of income levels in the swamp development areas is a difficult one. Studies have been conducted to assess and analyze transmigrants' incomes and to compare them with those of spontaneous migrants or local populations. Five major studies were available in 1979 but examination of these studies suggests that a wide variation exists and that no overall pattern can be extracted. This is based on both high intrasample variations in the studies, and the absence of agreement between the results of the various studies.

5.14 The studies mentioned above, nevertheless, indicate certain general features:

- (a) nonrice income is seldom less than 25% of family income; it includes one or several of the following income sources: homeyard cultivation, animal husbandry, logging, fishing, wage employment, trade, collection of nipa palm leaves, etc.;
- (b) on average, transmigrants have not yet done better than local populations or other settlers in terms of income. In many cases, this may be due to start-up difficulties in new developments; and
- (c) year to year variability of incomes appears much larger than, say, for farmers in Java.

The transmigrants, therefore, are struggling with a difficult environment and do not possess of the means and techniques to assure themselves of a stable income higher than that of local people or spontaneous transmigrants.

5.15 Overall, however, transmigrants do not return to Java; some invite their friends and relatives to join them. Several settlements established in the 1970s and using traditional techniques have achieved yield levels of some 2.0-2.5 tons/ha with regularity and this could place their per capita incomes around US\$135 at early 1980 prices. This is the Bank estimated critical consumption level and is certainly higher than most landless family incomes in Java. Except in cases of overwhelmingly adverse circumstances, therefore, transmigration to the swamps is justified from the farmers' point of view.

6. SECTORAL ISSUES

Introduction

6.01 This chapter attempts to clarify sectoral, as opposed to project, issues. First, the actual contribution and expected future contribution of the swamp development program is assessed. As a result of this exercise, a modified understanding of objectives is proposed. The planning aspects of the program are then analyzed to indicate how swamp reclamation can more effectively contribute to objectives set by the decision makers. Third, the Government's programs are examined and specific recommendations are suggested.

Contribution of Swamp Development to National Policy Objectives

6.02 General. National policy calls for swamp development to increase rice production and speed transmigration. The following analysis indicates, however, that swamp development will have limited effects on overall national agricultural production. This has important implications. By contrast the contribution of swamp development to transmigration appear to be quite significant, both in terms of numbers moved and migrant welfare attained.

6.03 Rice Production. Rice is the most important crop produced in most swamp reclamation areas. No reliable data are available on production but orders of magnitude are suggested in Table 6.1. According to these estimates, paddy production in swamp areas would grow from around 1.3% of national production in 1980 (of which 20% from Government projects) to 1.8% in 1985 (of which 40% from Government projects). Between 1980 and 1985 the increase in paddy production due to Government resettlement in Repelita III, would be about 150,000 tons annually or 3% of the national production increase. In terms of marketable surplus, the coastal swamps of Indonesia are estimated to have provided 150,000 tons of rice per year at the end of Repelita II and 220,000 tons of rice per year at the end of Repelita III.^{/1} This represents some 10% of average expected annual rice deficits. In addition, transmigrants settled in the swamps are no longer a burden to the Javanese economy; and had they remained in Java, they would have been among the most difficult to reach through food aid programs.

^{/1} Based on 750 kg of rice per family, per year and a paddy-rice conversion factor of 60%.

Table 6.1: ESTIMATES OF PADDY PRODUCTION FROM SWAMP DEVELOPMENT AREAS

	<u>Families</u>	<u>Paddy areas</u> (ha)	<u>Yields</u> (t/ha)	<u>Production</u> ([^] 000 t)
<u>1980 Paddy Production Estimate</u> (National Production _ 27 million tons)/a				
Government projects	25,000/b	50,000	1.5 (1-2)	75 (50-100)
Others		150-200,000	1.5 (1-2)	275 (150-400)
Total				<u>350 (200-500)</u>
<u>1985 Paddy Production Estimate</u> (National Production _ 32 million tons)/a				
Government projects	75,000 /b	50,000	1.5 (1-2)	225 (150-300)
Others		200-250,000	1.5 (1-2)	350 (200-500)
Total				<u>575 (380-800)</u>

/a From Indonesia - Supply Prospects for Food Crops.

/b Includes transmigrants and spontaneous settlers.

6.04 These estimates suggest that the contribution of swamps to rice production will be limited. Considered from the point of view of national rice production, development projects which would yield more rice per Rupiah invested include: tertiary development, rehabilitation of irrigation systems on Java and, possibly, the Sederhana program (village level irrigation). In the area of support services, investment in agricultural research and extension would be more productive./1

6.05 Other Productive Activities. The other notable crop in the coastal swamps is coconuts. By the end of Repelita II, areas planted to coconuts are estimated in the order of 100,000 ha. Yields in swamps should be higher than the Indonesian average of 0.8 tons copra per ha, because conditions are generally quite favorable and stands are not old. An estimated yield of 1.2 tons copra, equivalent to some 680 kg of coconut oil/ha, would supply a yearly production of 65,000 tons of coconut oil from swamps or 7%-8% of national production; therefore, an order of magnitude of 5%-10% of national production can be assumed. The additional coconut oil potential added during Repelita III under unchanged Government policies should not exceed 25,000 tons, or 5% of the projected 1985 deficit./2 If Government switched its policies

/1 The total annual budget for agricultural research is around Rp 17 billion, growing to some Rp 27 billion by 1985; the total budget for extension is around Rp 9 billion growing to Rp 15 billion in 1985; by comparison P4S budget is around Rp 10 billion indicating that investment in swamp development is in excess of Rp 30 billion.

/2 Indonesia - Review of Supply and Demand Projects for Coconut Oil and Palm Oil - AEP Working Paper, 1979.

completely from rice to coconuts, 200,000 tons of coconut oil could be added by 1985. Other production from the swamp development activities (secondary crops, fruits, fish, annual husbandry) are presently insignificant in national terms.

6.06 Transmigration. Transmigration to coastal swamps has represented some 20% of total transmigration in both Repelita I and II. Repelita III calls for 400,000 ha of swamp land to be opened by P4S, which would roughly correspond to 80,000 transmigrant families. This represents 16% of the national transmigration target of 500,000 families. In addition there is a backlog of projects to be settled which may correspond to some 30,000 families.

6.07 Transmigration, however, is not necessarily an objective in itself. It is also a means to fulfill other objectives: for example, to reduce population pressures in Java and to promote a more balanced settlement of Indonesia; to provide land to the landless; to utilize untapped resources; and to enhance national security by settling uninhabited areas. Except for the security objective, where swamp development would play an important role given the importance of coastal areas in an archipelago, the other cited objectives reflect different ways of increasing the incomes of migrants. Transmigration's contribution to population problems in Java is minor since the national population increase is of the order of 400,000 new families a year. As a result, transmigration's impact on Javanese farmers generally is minor. To increase its effects in Java, transmigration should be specifically focused on difficult areas with pervasive problems such as watershed protection areas. In any case, transmigration should mainly be seen as increasing the incomes of some landless Javanese farmers by allocating them unexploited land. In this light, swamp development can significantly contribute to transmigration by providing good subsistence and an opportunity to continue rice cultivation. Table 6.2 compares typical agricultural incomes on swamp and upland transmigration projects.

Table 6.2: AVERAGE TRANSMIGRANT INCOMES
(Rp'000, 1980 constant terms)

Year	Estimate for swamp projects /a	Transmigration II projection /b	Way Abung /c	Baturaja /d
0	DGT subsistence package	283 /e		
1	80-160	168		200 /g
2	160-240	199		220 /h
3	240-360	221		
4	360-400	249		
5	400		136	
6			136	
7	400	392		

/a See Annex A, Table 1.

/b From Transmigration II appraisal report

/c Progress Report.

/d Progress Report.

/e Includes DGT subsistence package.

/f More than 30% off farm income.

/g 23% off farm income.

/h 30% off farm income.

6.08 Rethinking the Objectives of Swamp Development. In view of the above, a reformulation of swamp development objectives appears to be in order. It is suggested that the following objectives be retained:

- (a) providing as many as possible, poor, landless farmers, from critical rural areas, with land; and
- (b) providing the conditions for these farmers to increase their incomes sufficiently to become economically independent.

More research and innovative thinking is needed to maximize benefits under these two headings and it is suggested that the words "transmigration" and "tidal swamp programs" can only freeze thinking into present patterns. Swamp development should be considered as an activity in its own right. Major policy options would then include:

- (a) emphasizing spontaneous transmigration and other settlement methods perhaps along the lines of NES type projects or Malaysian FELDA type settlements; and
- (b) relaxing the requirement for development to be rice oriented: Although farmers will continue to cultivate rice for security

reasons, they should be encouraged to engage in alternative activities such as growing crops other than rice and engaging in other farming activities and off-farm work.

Once general objectives and the scope of the program are clearly defined planning of investment can be carried out on a firm basis.

Planning Swamps Development

6.09 The Need for Planning. The Swamp Development Program should be carefully planned. The following are the main areas where planning can make a significant difference in both quantity and quality of performance:

- (a) Interagency Coordination. This has been considered earlier in this report. Without forward planning this state of affairs cannot be substantially improved; delays, cost overruns and lowered quality are to be expected.
- (b) Intra-agency Coordination. P4S cannot implement projects in a smooth fashion if, because of lack of program planning, the various operational cells are unable to prepare for their tasks. An example of this is provided by the unrealistic original targets in Repelita II which have resulted in considerable confusion. Lack of intra-agency coordination can be expected to result mainly in lowered quality standards.
- (c) Cost-Effectiveness. Again the lack of forward planning in Repelita II resulted in high unit costs. This must be expected when project operations are hastily put together and/or when cost-effective strategies cannot be followed (e.g., economies of scale by grouping projects geographically).
- (d) Maximization of Benefits. Inadequate planning will result in lowered quality of service provided to transmigrants by all agencies, particularly those providing agricultural and social services.

In addition to these project-related deficiencies, lack of adequate planning impairs the effectiveness of the program to contribute meaningfully to national policy objectives.

6.10 Planning Criteria. The end product of planning is the smooth implementation of projects. Planning criteria should therefore be based on project considerations as well as program objectives. Cost-benefit criteria should be prominent: among projects providing similar benefits, low cost projects should be selected which, in the absence of other constraints, will allow more projects to be undertaken; among similarly costed projects, high benefit projects should have priority (higher benefits would mean higher income for farmers - whatever the source); in coastal swamps, as presently developed, projects providing good employment opportunities year round should be among the high benefit projects. A more subtle criterion is that projects

should be implemented at the time returns are higher, in other words, wherever possible, projects which would have better returns if implemented at a later stage should be postponed.

6.11 In addition to project related criteria, projects should be considered with respect to multiplier effects. In the case of swamp development projects; multiplier effects will be manifested through (a) creating employment; (b) consumption of regionally produced goods and services (groceries, utensils, trade, transportation, etc.); (c) induced downstream economic activity (agricultural processing and trade); and (d) existence of a good labor pool. All of the above will have significantly reduced value when projects are set in truly remote areas. High value multiplier effects will generally mean easier, less costly implementation; willingness of the local authorities and of the public to accept and support the projects; and reduced risk for the transmigrants.

6.12 Steps to Sound Planning. The program has had consistently unrealistic targets: 840,00 ha for the Polder Plan; 1,500,000 ha for the Canalization Project; 500,000 ha in Repelita I; 1,000,000 ha in Repelita II (paras. 1.07-1.12). The modified Repelita II target of 250,000 ha has been 80% completed, but only by P4S, not by the other agencies (PTPT and DGT). This has left a backlog of 150,000 ha "opened" by P4S but not settled. Plans for Repelita III disregard capacity limitations in both PTPT and DGT and may replicate the same situation.

6.13 In a situation where the coordinated involvement of several agencies is vital, it is imperative to have program planning as well as agency planning. This is unlikely to be satisfactorily carried out as long as only one of the involved agencies is responsible for program planning. Among other desirable characteristics, program planning should be realistic, comprehensive; clearly formulated and understood by implementing agencies, carefully monitored, and of high quality in terms of economic efficiency and responsiveness to national policy objectives. Vesting responsibility for program planning with only one of the implementing agencies is likely to result in one or several of the following:

- (a) unrealistic plans, mainly because other agencies' constraints could be overlooked;
- (b) narrow planning where some parts of the implementation process are neglected;
- (c) poor communications and reluctant agreement by other agencies;
- (d) lack of program monitoring, especially of those actions outside the agency's main task both upstream and downstream; and
- (e) poor quality planning conducted by non-specialists who can introduce biased views.

Program coordination in the swamps should therefore ultimately be undertaken by a planning/coordinating agency such as the Office of the Junior Minister for Transmigration even though several constraints may necessitate improving P4S's role as prime mover and de facto planning unit.

6.14 To accomplish this, a unit should be established in the JMT for swamp coordination. It is envisaged that the head of this cell would be a civil servant both respected by his peers and skillful at public relations and negotiating. He would report to the JMT and BAKOPTRANS but have no direct authority over the line agencies. He would be assisted by a Program Planner and a Project Coordinator. The Program Planner would focus on planning and budgeting matters both in the short-term and in the longer run; he would foster communication between agencies in these matters; he would also be in charge of keeping track of all swamp-related studies and of suggesting whatever coordination may be appropriate in this respect. The Project Coordinator would keep files on each project under implementation in order to be able to inform the JMT of the history, status and planning of all swamp projects. He would be responsible for bringing problems to the attention of the various agencies to allow them to modify their operations as needed.

6.15 Planning in each agency also should be upgraded. The following information will focus on P4S because planning in DGT is addressed elsewhere in the Review and PTPT is in close contract with P4S. In its first decade of existence, P4S has shown enterprise and balance and it can be construed as progressive and innovative. Planning in P4S should be upgraded, however, through improved knowledge of swamp resources; and better policies for conducting surveys, investigations and design.

6.16 The main problems concerning geographical knowledge and studies are how much and in what form. There is no doubt that too little information may seriously impair efficient planning, however, the cost of securing information may be relatively high, especially as it gets more detailed. Some cost-benefit improvement can be brought about. First, general geographical knowledge should be broadened to enable long term planning of the program. A simple inventory of all swampland in Indonesia should be conducted to establish a broad classification of areas based on the major relevant parameters such as tidal influence, salt water intrusions, peat depths, vegetation cover etc. The techniques of remote sensing through satellite imagery are believed to offer a fast and efficient way to conduct this task. Funds for a nationwide inventory of swamps are included in Swamp Reclamation Project I./1 Second, a balance should be

/1 The inventory should also include an inventory of existing literature and of studies available in various agencies which have some bearing on swamp development; funds should be provided to set up a library of swamp-related documents.

struck between inadequate and very costly studies. Also a sufficient number of studies should be available ahead of construction to allow choices to be made and planning to be meaningful. It is suggested that the situation be reviewed and policy guidelines be established to apply to all future studies. This policy should specify:

- (a) standards of quality and quantity; this may not necessarily take the form of across-the-board standards but should incorporate some fixed strategy of responding to a range of circumstances;
- (b) criteria to be considered when determining priorities for studies (geographical spread of the program of studies);
- (c) volume of the program of studies in relation to long-term planning targets.

Evaluation of Government's Programs

6.17 The Intensification Program. The P4S planned intensification program is aimed at improving existing tidal schemes. It is a second stage of development for the Repelita I generation of projects and should be considered as an integral part of swamp development. Under this program, P4S plans to examine existing schemes, including nongovernment schemes, to determine their level of development and to suggest investment programs such as improvement of existing canals and construction of water-control structures. These investments would increase yields and promote double cropping of rice thereby:

- (a) increasing food production;
- (b) increasing farmers' incomes;
- (c) providing a systematic and detailed assessment of the first stage low cost swamp development; and
- (d) providing a systematic comparison of spontaneous and Government schemes.

Preliminary studies for this program are included under the Bank assisted project for swamp reclamation.

6.18 To broaden the scope of investigations and take into account agro-socio-economic factors, the Bank is also supporting a review of existing swamp development projects under Swamps I. This study will make recommendations for credit programs and agricultural improvement programs, such as low lift pumps to allow dry season cropping of rice.

6.19 The Tidal Swamps Development Program. The problem of synchronization between the opening/reclamation operation and the actual settlement of transmigrants has been described in Chapter 1. A question of concern with regard to the program is whether the Government can remedy the situation as it stands and avoid it recurring in the future. The problem is not only one of settlement lagging behind reclamation, but also one of difference of capacity and coordination. At this stage it is expected that substantial rehabilitation of canals and/or land clearing are necessary and the opportunity should be taken to better tailor the infrastructure standards and implementation procedures to fit settlement needs.

6.20 The Future Tidal Swamp Program. From the point of view of P4S, the Repelita III program, as it presently stands, could be hindered by lack of swamp and designs. The policy of concentrating efforts in South Sumatra and South Kalimantan was largely triggered by the relative scarcity of attractive project sites in Riau, Jambi and West Kalimantan. However, it may be difficult to find enough projects in an adequate state of preparation in South Sumatra and South Kalimantan, to achieve the original targets. In addition, capacity constraints may be encountered in the regional P4S offices. P4S managers are aware of this problem and hope to bridge the gap with Bank assisted projects in Mesuji, Lalang and Sebangau which are perceived as new development poles for P4S and which will be developed by contractors rather than force account. But the results of preliminary surveys indicate that only the Mesuji area will be attractive enough to warrant implementation in Repelita III. It is likely, then, that the P4S program of opening new areas (as opposed to the intensification program and the rehabilitation program) will be largely concentrated around Palembang and Banjarmasin and may fall somewhat short of quantitative targets.

7. RECOMMENDATIONS

Introduction

7.01 This chapter draws on all parts of the report, collecting viewpoints and recommendations expressed in previous chapters. The order chosen is from the general (program matters) to the particular (project matters). In conclusion, a tentative schedule is proposed for Bank involvement in swamp development.

7.02 The main recommendations of this report are as follows.

- (a) Given the present circumstances, swamp reclamation projects should follow a low input-low output strategy in the first stage. This applies to:
 - (i) infrastructure and, more generally, project design;
 - (ii) management; and
 - (iii) support services.
- (b) Experiments in nonrice swamp development should be undertaken in parallel with the mainstream of rice-based projects.
- (c) Improvements in coordination and planning should be pursued by the Office of the Junior Minister for Transmigration.
- (d) The Bank can usefully support three programs in swamp development:
 - (i) the ongoing program of reclamation;
 - (ii) a program of second stage improvements in established projects; and
 - (iii) a program of rehabilitation and completion on project sites which were opened by P4S but have received no settlers.
- (e) Detailed recommendations include completing an inventory of swamp resources; establishing a policy with respect to surveys, investigations and design; streamlining canal design procedures; improving project implementation schedules; and experimenting with details of project design.

Prospects for the Swamp Development Program

7.03 The evidence examined in this report indicates that swamp development can be conceived of as a staged operation. Most projects in Indonesia are in the first stage of development, while many areas in Malaysia illustrate the potential for further development stages. The first stage is

characterized by low input-low output strategy in hydraulic infrastructure (open canals, social infrastructure (houses, water supply, etc.) and agricultural practices. When properly placed in the Indonesian context this first stage of development is quite acceptable: it is undoubtedly beneficial to the settlers and it is manageable. This first stage of development was firmly established in Malaysia before further improvements were attempted by the people and the Government. The low input-low output strategy, which is the Indonesian Government's policy, has been endorsed by the Bank and it is important that this understanding be carried over into projects. It would be both unrealistic and wasteful to attempt to prepare and implement swamp development projects to excessively high standards of certainty, security, economic profitability, etc.

7.04 The first stage of development must also be understood as low input-low output in the area of management and support services. It is not the policy of the Indonesian Government to establish integrated project authorities. If it were to do so in the area of swamp development, it is by no means certain that these authorities would have sufficient priority and prestige to attract qualified managers. Instead the prevailing procedures involve a multi-agency organization and mostly medium caliber managers. It is therefore natural that coordination problems emerge and they should be expected to remain a continuing feature of the program. In addition, some of the agencies involved only have a marginal interest swamp development. This is particularly true of the Department of Agriculture whose main objective is the production of food crops and whose main focus is, accordingly, in heavy production areas (e.g., the nation's rice bowls, and Java in general). Since the Bank rightly supports the nation-wide objectives of the Department of Agriculture and of other support services agencies, it is necessary that expectations be reasonable with regard to support services in the swamp development areas.

7.05 The preceding comments should not be understood as negative but rather as calling for a balanced view of the sector as part of the nation's overall efforts. In this framework substantial improvement can and should be made. One area which is open for experiment is that of development for crops other than rice - mainly coconuts and oil palm. Such experiments could prove more attractive in economic terms and may cost less to the Government if properly organized. Because of the very modest contribution of swamplands to the nation's food crop harvests, these experiments can be embarked upon without fear of misusing national resources. The Bank should actively pursue a continuing dialogue with the Government on these matters.

7.06 Coordination and planning will also be an area for further dialogue. Because of the many committees and coordination activities required, and because of the difficulty of setting up new departments and procedures, there is a natural tendency for vesting planning responsibilities with one of the implementing agencies. In the case of swamp development it is not recommended that either P4S or DGT take these responsibilities. Both

are acceptable implementing agencies; they can be built up as such; but it would be unnatural and shortsighted to require them to plan and organize the whole program. TKTD is a more logical location for project planning and design, though it is recognized that staffing shortages in TKTD will cause it to look to P4S and the universities for much of the detailed work in the foreseeable future.

7.07 Apart from the freshwater swamp program which is still a minor undertaking, the program can be viewed as consisting of (a) development of new projects, (b) intensification on already developed projects, and (c) rehabilitation and development of projects which were opened but not settled. All three parts should be supported by the Bank.

Improving Swamp Development Projects

7.08 Halfway between program- and project-oriented support is the necessary inventory of swampland resources proposed for financing under Swamp Reclamation Project I. Completing the inventory will provide valuable guidance for long term programming and should also improve project site selection and facilitate further surveys and investigations.

7.09 In the area of preparatory surveys and investigations, two major directions of improvement can be pursued. First, a more formalized policy for surveys, investigations and designs should be established to improve cost-efficiency and ensure that an adequate program of investigations is undertaken, nation-wide. Secondly, quality can be improved, most importantly in the area of topographic surveys and mapping.

7.10 Design criteria for hydraulic infrastructure should be reviewed to assess whether the differences currently encountered can be justified and to establish necessary improvements in design standards and procedures. The Bank should insist that design improvements not be limited to Bank-financed projects but that design procedures themselves be improved and cost savings be brought about in all projects. This will be facilitated if the Bank is involved in a variety of projects and does not confine its portfolio of swamp reclamation projects to one region.

7.11 The timing of all operations involved in project implementation needs to be improved. Coordination in timing is needed between canal excavation, clearing of house lots and villages, construction of houses and other infrastructure, settlement of transmigrants and clearing of the fields.

7.12 Settlers' incomes are affected by uncontrollable factors but can be significantly improved and various models of farm development should be experimented with. Proposals for increasing incomes in the early years of settlement include: allowing farmers to clear their fields for a wage,

providing larger homeyards, clearing the entire fields (2 ha) instead of only 1 ha, and providing wood processing facilities to enable farmers to derive income from the timber in their fields. Much can be done in the area of drinking water where the objective should be to develop technologically adapted systems accessible to all settlers rather than focus solely on transmigrants. Finally, in already established projects, the intensification program should be supported with a view to lift the settlers to satisfactory levels of income.

Proposed Bank Involvement in Swamp Development

7.13 In light of the preceding recommendations, Bank involvement in swamp reclamation up to 1982 would be approximately as follows. The Swamp Reclamation I Project, appraised in October/November 1979; this would consist of the first phase of construction in Karang Agung, of the inventory and of studies for preparation of the Government's programs and of further Bank involvement. The major focus of the project would be in improving project implementation and returns in the swamps. Consistent with the recommendations of this report, Swamp Reclamation II would involve a broader participation of the Bank in swamp development. Actual implementation would cover much larger areas in Karang Agung (tentatively 40,000 ha), implementation of part of the rehabilitation program and implementation of a scheme in South or Central Kalimantan. Studies to improve project implementation and returns would be included to cover the areas of project preparation, P4S equipment use, timber use and drinking water. These studies should be initiated as early as possible and, if appropriate, terms of reference could be shifted to Swamp Reclamation I. The project would also include detailed design for a first stage in Mesuji and a component for regional swamp environment monitoring. Swamp Reclamation III would initiate work in a new area, Mesuji, and would start the intensification program; involvements in the rehabilitation program and in South/Central Kalimantan would be pursued.

7.14 This program would cover the main features of Bank assistance. It would provide a basis for scheduling project preparation and for monitoring and following up on studies. Further dialogue with the Government would revolve around the issues of improving project standards and overall coordination. Reducing the number of activities and locations for Bank involvement, for example, by concentrating on the Karang Agung development, would correspondingly reduce the benefits of technical assistance under Bank financed and supervised projects.

Table 7.1: PROPOSED BANK SUPPORT OF INDONESIA'S SWAMP DEVELOPMENT PROGRAM

Project	Timetable	Contents	Major areas of focus in the project	Dialogue with Government on overall program, covenants
Swamp Reclamation I	Appraisal FY80, 2nd quarter Negotiations FY81, 2nd quarter	(a) Karang Agung Stage I (9,000 ha)	Improving project implementation including quality standards and timing of various operations	Experiments in project related matters
		(b) Inventory		Enhancing interagency coordination
		(c) Study for Intensification Program	Improving project returns by experimenting with several departures from prevailing standards	Covenant: establishing a position for project coordinator in P4S and nominating a coordinator acceptable to the Bank
		(d) Study to initiate Rehabilitation Program		
		(e) Preparation of a scheme in South/Central Kalimantan for Swamp Reclamation II	Improving the knowledge of existing resources including potential from projects opened but not settled	
Swamp Reclamation II	Appraisal FY81, 4th quarter Negotiations FY82, 3rd quarter	(a) Karang Agung Stage II (40,000 ha)	Construction and settlement	Improving design standards
		(b) Rehabilitation program Phase I	Improving designs in South/Central Kalimantan projects	Enhancing interagency coordination and overall program planning
		(c) Unspecified scheme in South Kalimantan	Improving general operations in South/Central Kalimantan	Covenant: establishing a Swamp Development cell in the office of the JMT; establishing a resource management cell for swamps in the Ministry of Environmental Affairs
		(d) Detailed design for Mesuji Stage I	Further improving project implementation	
		(e) Study of timber use		
		(f) Study of drinking water	Improving basic needs of all swamp inhabitants	
		(g) Study of P4S equipment use		
		(h) Regional swamp environment monitoring		
		(i) Study of project preparation strategy		
		Swamp Reclamation III	Appraisal FY82, 4th quarter Negotiations FY83, 3rd quarter	(a) Mesuji Stage I
(b) Rehabilitation Program Phase II				
(c) Unspecified scheme in South/Central Kalimantan	Helping to improve settlers' incomes in existing schemes			
(d) Implementation of intensification program				

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Tables

- 1 Gross Areas Opened by P4S
- 2 Number of Families Settled by DGT
- 3 Implementation Costs per Net Sawah Hectare for Karang Agung,
South Sumatra
- 4 P4S Implementation Costs per Net Sawah Hectare at Selected
Projects in South Kalimantan

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Gross Areas Opened by P4S
(ha)

Fiscal year	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	Total
Riau											
Tel. Kiambang I	-	-	275	475	-	-	-	-	-	-	750
Tel. Kiambang II	-	-	-	-	154	-	-	-	-	-	154
Tel. Kiambang III	-	-	-	-	-	450	-	-	-	-	450
Tel. Kiambang IV	-	-	-	-	-	-	1,746	-	-	-	1,746
Delta Reth	-	-	-	-	-	-	10,120	2,500	-	-	12,620
Siak Kiri	-	-	-	-	-	-	-	13,851	-	-	13,851
Siak Kanan	-	-	-	-	-	-	-	-	2,505	-	2,505
Siak Kecil	-	-	-	-	-	-	-	-	9,843	-	9,843
Siak Muara	-	-	-	-	-	-	-	-	-	-	-
Bukit Batu	-	-	-	-	-	-	-	-	-	-	-
Kuala Cinsaku	-	-	-	-	-	-	-	-	4,878	-	4,878
Tempuling	-	-	-	-	-	-	-	2,500	-	-	2,500
Rokan	-	-	-	-	-	-	-	-	-	10,910	10,910
Subtotal	-	-	275	475	154	450	11,866	18,851	17,226	10,910	60,207
Jambi											
Rantau Rasau	1,135	2,170	2,345	-	1,152	600	-	-	-	-	7,402
Simpang Puding	-	-	-	-	-	-	2,300	-	-	-	2,300
Lambur	-	-	-	-	-	-	2,760	3,680	-	-	6,440
Muara Sabak	-	-	-	-	-	-	2,760	-	-	-	2,760
Pamusiran	-	-	-	-	-	-	-	-	-	-	-
Tanjung Jabung	-	-	-	-	-	-	-	-	8,300	2,000	10,300
Subtotal	1,135	2,170	2,345	-	1,152	600	7,820	3,680	8,300	2,000	29,202
South Sumatra											
Upang	725	1,305	620	1,691	1,036	984	2,062	-	-	-	8,423
Cintamanis	1,270	780	-	-	2,400	1,084	550	-	-	-	6,084
Telang I	-	-	-	-	-	-	12,880	11,960	1,840	-	26,680
Telang II	-	-	-	-	-	-	-	3,680	10,120	-	13,800
Air Saleh	-	-	-	-	-	-	-	-	4,600	17,355	21,955
Subtotal	1,995	2,085	620	1,691	3,436	2,068	15,492	15,640	16,560	17,355	76,942
West Kalimantan											
Sei Rasau I	-	-	950	690	1,090	400	-	-	-	-	3,130
Rasau II	-	-	-	-	-	179	1,743	658	-	-	2,580
Rasau III	-	-	-	-	-	-	1,400	-	-	-	1,400
Delta Kubu	-	-	-	-	-	-	900	1,320	1,050	3,883	7,153
Arus Deras	-	-	-	-	-	-	-	760	-	-	760
Pinang Luar	-	-	-	-	-	-	-	2,224	-	-	2,224
Pinang Dalam	-	-	-	-	-	-	-	1,772	-	-	1,772
Air Putih	-	-	-	-	-	-	-	2,291	-	2,660	4,951
Terentang	-	-	-	-	-	-	-	-	-	2,255	2,255
Kapuas Kecil I	-	-	-	-	-	-	-	-	3,079	-	3,079
Kapuas Kecil II	-	-	-	-	-	-	-	-	3,531	-	3,531
Sei Bulan	-	-	-	-	-	-	-	-	-	800	800
Subtotal	-	-	950	690	1,090	579	4,043	9,025	7,660	9,598	33,635
South & Central Kalimantan											
Barambai	2,400	1,800	-	-	-	-	-	-	-	-	4,200
Tamban Luar	625	900	2,180	-	-	-	-	-	-	-	3,705
Tamban Lupak	-	-	-	459	487	546	-	-	-	-	1,492
Mentaren	-	-	-	-	-	-	-	-	-	-	-
Jelapat	-	-	-	1,390	588	1,260	-	-	-	-	3,238
Jejangkit	-	-	-	-	2,000	-	-	-	-	-	2,000
Belawang	-	-	-	-	-	-	3,770	1,630	-	-	5,400
Tatae	-	-	-	-	-	-	5,800	-	-	-	5,800
Sakalagun I	-	-	-	-	-	-	-	1,508	-	2,427	3,935
Sei Muhur	-	-	-	-	-	-	-	873	-	1,315	2,188
Terusan Tengah	-	-	-	-	-	-	-	-	4,399	253	4,652
Tabung Anen	-	-	-	-	-	-	-	-	2,850	1,957	4,807
Subtotal	3,025	2,700	2,180	1,849	3,075	1,806	9,570	4,011	7,249	5,952	41,417
GRAND TOTAL	6,155	6,955	6,370	4,705	8,907	5,503	48,791	51,207	56,995	45,815	241,403

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Number of Families Settled by Directorate General of Transmigration, 1969/70-1978/79

Project names	1969/70	1970/71	1971/72	1972/73	1973/74	1974/75	1975/76	1976/77	1977/78	1978/79	Total
Riau											
Tel. Kiambang I	-	-	150	-	-	-	-	-	-	-	150
Tel. Kiambang II	-	-	-	-	154	-	-	-	-	-	154
Tel. Kiambang III	-	-	-	-	-	200	-	-	-	-	200
Tel. Kiambang IV	-	-	-	-	-	-	-	-	-	-	-
Delta Reteh	-	-	-	-	-	-	-	-	500	301	801
Siak Kiri	-	-	-	-	-	-	-	-	-	-	-
Siak Kanan	-	-	-	-	-	-	-	-	-	101/a	101/a
Siak Kecil	-	-	-	-	-	-	-	-	-	-	-
Siak Muara	-	-	-	-	-	-	-	-	-	-	-
Bukit Batu	-	-	-	-	-	-	-	-	-	-	-
Kuala Cinaku	-	-	-	-	-	-	-	-	-	-	-
Tempuling	-	-	-	-	-	-	-	-	-	-	-
Roker	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	150	-	154	200	-	-	500	402	1,406
Jambi											
Kantau Raso	362	138	400	-	450	-	-	-	-	-	1,350
	-	(100)	-	-	(250)	-	-	-	-	-	(350)
Simpang Puding	-	500	-	-	-	-	-	-	-	-	500
Lambur	-	-	-	-	-	-	-	-	-	-	-
Muara Sabak	-	-	-	-	-	-	-	-	-	-	-
Pamusiran	-	-	-	-	-	-	-	-	-	-	-
Tanjung Jabung	-	-	-	-	-	-	-	-	-	434	434
Subtotal	362	638 (100)	400	-	450 (250)	-	-	-	-	434	2,284 (350)
South Sumatra											
Upang	150	287	200	500	-	500	-	-	500	-	2,137
Cintamania	-	-	400	-	350	-	-	-	-	-	750
	-	-	-	-	(500)	-	-	-	-	-	(500)
Telang I	-	-	-	-	-	-	-	-	500	3,716	4,216
Telang II	-	-	-	-	-	-	-	-	-	-	-
Air Saleh	-	-	-	-	-	-	-	-	-	-	-
Subtotal	150	287	600	500	350 (500)	500	-	-	1,000	3,716	7,103 (500)
West Kalimantan											
Raso I	-	-	150	300	200	300	-	-	-	-	950
Raso II	-	-	-	-	-	-	300	-	150	-	450
Raso III	-	-	-	-	-	-	-	-	300	-	300
Delta Kubu	-	-	-	-	-	-	-	-	-	-	-
Arus Deras	-	-	-	-	-	-	-	-	200	-	200
Pinang Luar	-	-	-	-	-	-	-	-	350	-	350
Pinang Dalam	-	-	-	-	-	-	-	-	-	-	-
Terentang	-	-	-	-	-	-	-	-	-	-	-
Air Putih	-	-	-	-	-	-	-	-	-	-	-
Kapas Kecil I	-	-	-	-	-	-	-	-	-	-	-
Kapas Kecil II	-	-	-	-	-	-	-	-	-	-	-
Sei Bulan	-	-	-	-	-	-	-	-	-	-	-
Subtotal	-	-	150	300	200	300	300	-	1,000	-	2,250
South & Central Kalimantan											
Barambai	140	150	400	200	-	-	-	-	-	-	890
Tamban Luar	98	105	250	600	-	-	-	-	-	-	1,053
Tamban Lupek	-	-	-	-	-	250	-	-	-	-	250
Mentaren	-	-	50	-	150	-	-	-	-	-	200
Jelapat /b	-	-	-	-	-	-	-	-	-	-	-
Jejangkit	-	-	-	-	-	-	-	-	-	-	-
Belawang	-	-	-	-	-	-	-	-	750	-	750
Tatas	-	-	-	-	-	-	-	-	-	-	-
Sakalagun I	-	-	-	-	-	-	-	-	-	-	-
Sei Muhur	-	-	-	-	-	-	-	-	-	-	-
Terusan Tengah	-	-	-	-	-	-	-	-	-	-	-
Tabung Anen	-	-	-	-	-	-	-	-	-	-	-
Subtotal	238	255	700	800	150	250	-	-	750	-	3,143
GRAND TOTAL	<u>750</u>	<u>1,180</u> (100)	<u>2,000</u>	<u>1,600</u>	<u>1,304</u> (750)	<u>1,250</u>	<u>300</u>	-	<u>3,250</u>	<u>4,552</u>	<u>16,186</u> (850)

() = spontaneous transmigrants.

/a Applies to this and the following four projects.

/b Locally settled.

Source: Synchronization of Tidal Swamp Opening and Transmigrant Settlement, P4S, 1978.

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Implementation Costs Per Net Sawah Hectare
for Karang Agung, South Sumatra
(early 1980 prices)

	<u>P4S Cost</u>		<u>DGT Cost</u>		<u>PTPT Cost</u>		<u>Total cost per net ha</u>	
	<u>US\$</u>	<u>%</u>	<u>US\$</u>	<u>%</u>	<u>US\$</u>	<u>%</u>	<u>US\$</u>	<u>%</u>
Land clearing	120	15	-	-	460	89	580	22
Earthworks	405	43	115	9	-	-	520	20
Structures	130	16	125	10	-	-	255	10
Base Camp	55	7	-	-	-	-	55	2
Housing	-	-	480	38	-	-	480	19
Equipment	35	4	15	1	5	1	55	2
Settlement	-	-	410	33	-	-	410	16
Admin. & overhead	75	9	120	9	50	10	245	9
<u>Base Cost</u>	<u>820</u>	<u>100</u>	<u>1,265</u>	<u>100</u>	<u>515</u>	<u>100</u>	<u>2,600</u>	<u>100</u>
Physical contingencies	125	15	200	15	75	15	400	15
<u>Total</u>	<u>945</u>	<u>115</u>	<u>1,460</u>	<u>115</u>	<u>590</u>	<u>115</u>	<u>3,000</u>	<u>115</u>

Source: Swamp Reclamation I SAR.

Note: Shares of total cost P4S = 31%
 PTPT = 20%
 DGT = 49%

This project should be more expensive than an average P4S design project because of tertiary structures and experimental tidal control structures, because house lots are 0.5 ha instead of 0.25 ha and because both hectares of land are cleared by PTPT.

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P4S Implementation Costs Per Net Sawah Ha at Selected
Projects in South Kalimantan
(early 1980 prices)

	<u>Belawang</u>		<u>Jelapat</u>		<u>Tabung Anen II</u>		<u>Average</u>		<u>Karang Agung Model</u>	
	US\$	%	US\$	%	US\$	%	US\$	%	US\$	%
Land clearing	75	9	83	9	80	8	80	8	120	15
Earthworks	585	72	702	74	770	75	685	74	405	49
Other costs	80	10	80	8	80	8	80	9	220	27
Administration	75	9	90	9	95	9	85	9	75	9
<u>Base Cost</u>	<u>815</u>	<u>100</u>	<u>955</u>	<u>100</u>	<u>1,025</u>	<u>100</u>	<u>930</u>	<u>100</u>	<u>820</u>	<u>100</u>
Physical contingencies	125	15	145	15	155	15	140	15	125	15
<u>Total Cost</u>	<u>960</u>	<u>115</u>	<u>1,120</u>	<u>115</u>	<u>1,120</u>	<u>115</u>	<u>1,090</u>	<u>115</u>	<u>945</u>	<u>115</u>

Source: P4S

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INDONESIA

TRANSMIGRATION PROGRAM REIEW

The Swamp Development Program: Ex-post Economic Analysis

1. General. A brief ex-post economic analysis of Government swamp reclamation projects has been conducted to convey some idea of costs and benefits on projects executed according to Government designs and standards. It does not reflect the economics of P4S equipment use because it has not been possible to determine actual unit costs, due to lack of cost accounting. The analysis is presented on Tables 1 and 2 in terms of early 1980 prices for a typical project covering 5,000 ha of sawah area i.e. 2,500 families.
2. Costs. Use was made of cost figures for a suggested development model of Karang Agung, based on the findings of the Swamp Reclamation I appraisal mission. In addition, an analysis was made of excavation volumes and unit prices reported by P4S for its operation in South/Central Kalimantan. A figure of US\$2,900/ha has been retained as the average of a probable cost range of $\pm 15\%$. The phasing of cost is based on Government guidelines and a sequential implementation schedule. No shadow pricing of costs has been introduced: a standard conversion factor of 1.0 has been used, consistent with Bank guidelines and shadow pricing of labor has not been considered relevant because of the remote location of the project areas.
3. Benefits. The main physical assumptions used in deriving project benefits appear in Table 1. Area development rate and yields are considered to reflect a broad average; a low benefit and a high benefit alternative have been described. Only the economic price of paddy carries shadow pricing assumptions.
4. Rates of Return. The rate of return shown in Table 2 is 10.2% which reflects the fact that, on average, Government designs and standards have allowed a reasonable extent of benefits to be derived from investment in swamp development projects. The sensitivity analysis in Table 2 shows the influence of alternative assumptions on the rate of return and indicates that a marginal rate of return of about 10% can be retained as a sufficiently robust estimate.

Table 1: EXPORT ECONOMIC COSTS AND BENEFITS FOR A
MODEL SWAMP DEVELOPMENT
(US\$ million)

Year	Costs	Benefits	Comments
1	2.2		P4S construction, 2,500 ha of sawah
2	2.2		P4S construction, 2,500 ha of sawah
3	2.9		Clearing of villages, houselots and fields
4	4.6		Construction of village unfastructure
5	2.6		Transportation and support of transmigrants
6		0.2	Farm development: area = 0.5 ha yield = 0.75t/ha
7		0.8	" 1.0 ha 1.25t/ha
8		1.5	" 1.4 ha 1.75t/ha
9		2.2	" 1.8 ha 2.0 t/ha
10-30		2.4	" 2.0 ha 2.0 t/ha
Dis- count rate	<u>Present value</u>		<u>Benefit/Cost Ratio</u>
5%	13.0	24.1	1.85
10%	11.8	12.1	1.03
15%	10.8	6.7	0.62
<u>Rate of return:</u> 10.2%			

Table 2: EX-POST SENSITIVITY ANALYSIS FOR MODEL
SWAMP DEVELOPMENT PROJECT

Event	Rate of return
Base cost	10.2%
High costs (+15%)	9.2%
Low costs (-15%)	11.9%
Low benefits	8.5%
High benefits	11.9%
Base case benefits delayed one year	9.6%
High costs and low benefits	7.3%
Low costs and high benefits	14.6%

INDONESIA

TRANSMIGRATION PROGRAM REVIEW

Tree Crop for Transmigrants

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TRANSMIGRATION PROGRAM REVIEW

TREE CROPS FOR TRANSMIGRANTS

Summary and Conclusions

1. The most important conclusions of this Annex are as follows:
 - (a) From the point of view of migrant incomes and improved cost recovery to Government, there are very strong arguments for the introduction of tree crops into existing transmigrant communities. Tree crops should be introduced as early as possible in the settlement process and ideally no later than year 3.
 - (b) The need for tree crops among Repelita II and Repelita III migrants is already very great. The Annex indicates the need to plant nearly 140,000 ha of tree crops within the next five years for those migrants who were moved in Repelita II and in the first year of Repelita III.
 - (c) The Annex contends that the estates are the main managerial resource available to introduce tree crops into existing settlements but that they are fully committed. For this reason, the Annex recommends:
 - (i) that priority for tree crop development be given to existing migrants and to local people in the same areas and that within this category it be given to:
 - a. those in the vicinity of existing or proposed estates;
 - b. those in the areas with the highest concentrations of transmigrants; and
 - c. those who are poorest or who have been settled the longest.
 - (ii) that estate-assisted Project Management Units (PMUs) be developed to reach migrants who are located in scattered and remote sites; and
 - (iii) the private sector (local and foreign) be used to establish tree crops for smallholders.

A proposal for the development of tree crops and detailed recommendations on the development strategy, policy and planning, finance and manpower training required are discussed.

Background

2. In 1973, the Directorate General of Estates (DGE) initiated a first smallholder tree crop project with Bank assistance. This project, the North Sumatra Smallholder Development Project (Credit 358-IND) was intended to plant 9,000 ha of rubber and oil palm for 4,500 families. It was implemented by a Project Management Unit (PMU) established especially for the project. This project started slowly but was highly successful in meeting its goals. During the initial years of the project, the main objections to project design were that it was costly and of limited replicability because of the shortage of managerial staff outside the estate sector.

3. In 1976, with the continuing decline in the growth of rubber and coconut production, the GOI decided to tap the management capacity of the public sector estates (PNP/PTPs) to establish tree crops for smallholders. Under the Nucleus Estate and Smallholder (NES) projects, selected estates were rehabilitated and their capacity increased to handle smallholder planting.^{/1} NES projects were initially designed to resettle poor and landless families already living in the outer islands, but by 1979 it was clear that transmigrant labor would be required in many settlement areas owing to local labor shortages and about 16,000 of 40,000 families in existing Bank-assisted NES projects are now expected to be transmigrated from Java.

4. In early 1979, the NES model for tree crops spread beyond Bank-assisted projects. Recognizing that the NES projects were highly replicable and that only 5 of the 28 PNP/PTPs had been utilized for smallholder tree crops, the GOI sponsored a series of "local NES" projects for about 15,000 smallholders living in the vicinity of several North Sumatra Estates. In 1980, in response to a request for expanded participation in the transmigration program, the DGE initiated plans to develop 150,000 ha of smallholder tree crops by 1986 for 75,000 new transmigrant families with the assistance of six of the PNP/PTPs. This program, known as "Pra-Trans" signified a major expansion of the NES concept but did not address the need to provide tree crops for existing communities of transmigrants settled or to be settled under the GOI's standard program.

5. Simultaneously, the GOI in 1974 began to create PMUs to assist rubber and coconut smallholder replanting. During 1976-1979, some 22,000 ha of rubber were replanted. The GOI hopes to expand this program to 50,000 ha annually beginning in 1980, utilizing three of the more technically capable

^{/1} Relying on the known managerial capacity of the estates GOI and Bank staff defined a pipeline of projects to plant and replant rubber at 60,000 ha p.a. (presently 25,000 ha p.a.) and oil palm at about 20,000 ha p.a. (presently 10,000 ha p.a.). NES developments are detailed in Table 1.

PMUs located in Riau, South Sumatra, and West Kalimantan. In early 1980, the PMU approach was adopted by the DGE for its coconut development program. Fifteen provincial offices were made responsible for about 90 coconut working centers, operating as PMUs, to plant 37,600 ha of hybrid and tall coconuts.

The Food Crop and Tree Crop Alternatives

6. The Standard Transmigration Program. The farm model proposed for Transmigration II in Jambi province is representative of many of the upland schemes in the Repelita III transmigration program. Migrants receive a 3.5 ha farm of which 0.25 ha is for houselot and garden and a 1.0 ha area is for food crops. At least 1.5 ha are to be planted in tree crops at a later stage of development. The Transmigration II project provides for a total investment cost per family of about US\$3,900 (constant 1979) while average annual net income per family without tree crop development would be about US\$530 over the life of the project (25 years).

7. A substantial degree of risk for migrants is associated with this farm plan. Reasonable incomes presume the provision of adequate inputs including urea and TSP and upland paddy yields of 1.7 ton/ha by year 5. Without an adequate fertilizer supply or with paddy yields dropping to 1.4 ton/ha, the average annual income per family would fall to about US\$400, below the absolute poverty line of US\$465 per family (1979) in the outer islands.^{/1} The farm plan for the standard program without tree crops presents an additional problem when one considers that incomes are below the poverty line in each of the first five years after settlement. In years 2 and 3, incomes in Jambi province are projected at US\$320 per family, about 15% of which is derived from timber sales.

8. The Tree Crop Alternative. Tree crop farming systems provide higher incomes for migrants and less risk in the establishment period. Expected annual incomes in NES schemes, for example, are about US\$1,600 p.a. and in PMU-assisted schemes they are US\$1,200, compared with US\$530 in transmigration schemes. The benefits to Government are also significantly higher in tree crop projects due in large measure to cost recovery which is made possible by higher family incomes in tree crop schemes. Of greater importance, the level of risk to migrants is substantially reduced with tree crops. In none of the early years do migrants have incomes below the poverty income level, as the establishment of tree crops provides a secure source of income for families working for the nucleus estate or contractor.

^{/1} This reduction in the paddy yield and its effect on family income may be understated, since present yields on existing schemes, such as Baturaja, in which inputs are erratically supplied, are about 0.7-1.0 ton/ha.

9. Yet tree crops, other than those in house gardens, have not been introduced as an integral part of the standard transmigration schemes, mainly because of the relatively higher initial investment costs and management constraints. The initial investment cost on transmigration schemes in grasslands is US\$3,140/family (1979, no cattle) compared to US\$5,364 for NES schemes under the same conditions. The investment costs in forested areas are US\$3,873 and US\$7,094 respectively. However, as Table 2.2 (Main Text) indicates, cost recovery under NES tree crops schemes alters the picture significantly. Net cost (investment cost minus cost recovered) to GOI for standard transmigration schemes is US\$2,742 in grassland and US\$3,441 in forest. For NES schemes the costs are US\$2,333 and US\$3,986. In other words, with cost recovery, NES schemes with 3 ha under production (2 ha tree crops, 1 ha food crops) cost US\$309/family less on grassland than transmigration schemes with 1.25 ha under cultivation; and in forested areas a 3 ha NES scheme costs only US\$545/family more.

10. The cost and benefit ratio associated with the introduction of tree crops is also affected by the year in which tree crops are introduced. Delaying the establishment of tree crops not only duplicates management costs and necessitates higher outlays for cash grants or subsidies in the absence of wage-paid labor, but it also delays the benefits to the migrants in terms of income and to Government in terms of cost recovery. This point is illustrated in Table 2.3 (Main Text) as shown by declining benefit-cost ratios with later tree crop development. Although benefits are maximized with tree crops introduced as early as possible, even with a six-year delay the cost-benefit ratios indicate that it is still desirable to add tree crops to upland settlements.

11. Of greater concern than declining cost benefit ratios is the fact that tree crop establishment in year six means a full 12 to 13 years before tree crop benefits are realized by the smallholders. If field fertility declines after five years and inputs are not used, this period may be a precarious one for migrants. In other words, on both economic and practical grounds, economic analysis suggests that Government should introduce tree crops either at settlement or as soon thereafter as possible. Ideally, from the point of view of migrant welfare, tree crops should be introduced no later than year 3./1

Demand

12. Government, recognizing the benefits of tree crops has provided that transmigrants in areas of rainfed agriculture should develop at least 1.5 ha of their 3.5 ha plot for tree crops (this was based on earlier assumptions that a full 2.0 ha would be suitable for food crop production). But the capacity to assist migrants who are largely unfamiliar with plantation crops is limited. It is estimated that there are some 36,000 migrant families moved prior to 1979 who should receive tree crops, and another 48,000 who will have been moved by the end of 1980 who will require tree crops within the next five years (Table 2). This means means that Government should be prepared to plant 139,000 ha of tree crops for existing transmigrants by 1986. If second year migrants of Repelita III are included, tree crops would be required on a total of 207,000 ha.

13. There are three systems by which tree crops might be planted for these migrants:

- (a) by the migrants themselves, with minimum external organization and input;
- (b) by PMUs established by the DGE or the estates; or
- (c) by the estates themselves.

14. Efforts to encourage migrants in Pematang Panggang and Rimbojuang to plant rubber largely by themselves have been only minimally successful to date. Javanese are generally unfamiliar with plantation crops and are fully occupied by food cropping and off-farm work for subsistence alone. In addition, problems of obtaining fertilizers and planting materials have

/1 The second World Bank loan for smallholder rubber development has the farmer plant and intercrop one hectare of rubber and three years later he clears and intercrops a second. In transmigration communities this would provide one way to create work and assure food production in the years when trees are immature.

proven virtually insurmountable in remote transmigration areas. For this reason it is likely that only those crops with which migrants are familiar and which require minimal inputs - coconuts, coffee, cloves - can be established by the settlers alone.

15. The PMU system in which farmers are supplied with planting materials and inputs, organized by the PMU and partially compensated for their labor, is an acceptable system for introducing tree crops to smallholders but the likelihood that PMUs could undertake large-scale tree crop planting is questionable. Good PMUs are generally satisfactory for assisting existing smallholders with rubber replanting but they are less satisfactory than the PNP/PTPs for transmigrants who have little familiarity with tree crops and a limited means of support. Whether the PMU system could be expanded beyond present targets is also in doubt.

16. For this reason, it appears that only the estates have the capacity to move immediately to meet the tree crop demand among existing migrants but they are also being asked to meet other commitments such as "local NES" and "Pra-Trans". Given the demand for tree crops within the transmigration program and the existing capacity of the estates, it is therefore recommended that priority for development be given to the provision of tree crops to migrants that have already been settled and to local people in the same vicinity; and that within this category preference be given to:

- (a) the use of existing and newly created nucleus estate operations in geographic areas of the highest transmigrant density;
- (b) introduction of tree crops to the poorest transmigration areas, particularly those upland sites settled and cleared from alang-alang; and
- (c) introduction of tree crops for upland transmigration schemes having been settled the longest, particularly those over three years.

Proposal for Development

17. A full reconnaissance study is required for scattered Repelita II settlements where little is known of migrant welfare and amount of land available. It is assumed, however, that many of these sites are remote and scattered and will have to be assisted by estate-aided PMUs. To determine their condition more precisely, immediate reconnaissance is recommended.

18. There are six critical target areas in four provinces where large numbers of transmigrants are settled in the vicinity of existing or proposed estates. These areas which are detailed in Table 3, include about 63,000

families requiring an estimated 95,000 ha of tree crops (this include Repelita II settlers who have less than 2.0 ha on which tree crops can be planted). These areas should be given first priority for development. Less critical areas including 7 sites in five additional provinces where new estate operations are proposed (Table 4) should also be given immediate attention.

19. Combining the critical areas for tree crops with other areas for which estates are proposed would reach some 100,000 families or about 500,000 people. Assuming 1.5 ha of tree crops for Repelita II families and 2 ha for Repelita III families, total estate plantings would be required on about 170,000 ha for transmigrants and a lesser but still unknown amount for locals within the project areas.

20. To meet this demand, all capable estates would have to be involved. At present, the maximum planting capacity of the eight estates proposed for Pra-Trans is about 4,000 ha p.a. or about 150,000 ha over five years. Assuming the estates own investment programs are curtailed, and no new major NES schemes are launched after NES V, the use of all able PNP/PTPs to plant smallholder rubber, oil palm, and coconuts could raise this to a potential 270,000 ha over a period to 1986. This would be sufficient to assist critical areas of existing migrants and migrant schemes now under development (170,000 ha), local NES (30,000 ha) and the needs of local people near transmigration projects, but it would not be sufficient to also support the proposed Pra-Trans program with an additional 150,000 ha. Some difficult choices will bbe required to delineate the use and scope of individual estates in these alternative programs.

21. Project Management Units. About 41 of the existing and proposed sites for transmigration schemes are not in the vicinity of PNP/PTPs (Table 5). These sites will need to be reached by estate-established PMUs or PMUs operated by the provincial offices for plantation crops. The GOI will need to assess which of these sites presently have competent well-managed provincial offices to undertake this work. It is expected that some of these PMUs will need to be assisted by estate staff for a number of years.

Technical Assistance and Training

22. Under the resource conditions facing the Government, it is clear that the main constraint to expansion of the tree crop sector in Indonesia is management. For this reason, until the management capacity of the DGE and its activities in the provinces are expanded, the most important resource for tree crop development will continue to be the large publicly owned estates. Although this estate capacity can be harnessed for smallholder tree crops, this capacity can be more effectively utilized with a major initiative in technical assistance and training.

23. In the past, technical assistance and training for the tree crop sector has been targeted for specific bottlenecks in the DGE's planning capacity, the estates' production, financing and engineering capacity, and for specialized institution building such as the Estates Training Institute. Most of the assistance to the agencies and estates in tree crops has been based on the provision of technical specialists. Although consultant assistance has improved many operations within the DGE and estates, it is evident that the employment of specialists does not always overcome management deficiencies nor had spread effects on counterpart staff. Therefore, new solutions are required for expanding the management capacity for tree crops development.

24. Management performance and the ability to implement larger tree crop programs is dependent on training of new project managers as well as normal staff training in field-related technology and engineering. This shortage of trained project managers is most noticeable in the Provincial Offices and Assisted Rubber Replanting Centers. The second most critical area of management deficiency is in the planning and overall implementation capacity of the Directorate General Estates. The requirements for planning, budgeting, procurement and financial monitoring within the DGE for its own smallholder replanting program has already stretched the management capacity to its limits. Although the estates can provide staff for both field-related project management positions as well as assist the planning aspects of the DGE work, no policy presently exists to make use of or second estate staff outside of the PNP/PTPs. Proposals covering training to assist the expansion of managerial capacity to implement tree crop smallholder/transmigrant programs are included in the following recommendations.

Summary of Recommendations

25. Development Strategy.

- (a) The provision of tree crops for transmigrants should be rapidly expanded by the DGE utilizing all available public sector estates.
- (b) Given the maximum capacity of the PNP/PTPs to plant tree crops, tree crops should not be utilized solely for new areas of settlement, but should be planted for existing transmigrants settled under Repelita II and the first two years of Repelita III.
- (c) The introduction of tree crops on existing and proposed schemes in Repelita III should ideally be carried out as early as possible and not later than year three. The present policy of tree crop establishment in year six does not maximize benefits to transmigrants and duplicates some of the costs of land clearing and project management.

- (d) Priorities within the existing transmigrant schemes should be assessed and where a nucleus estate is not feasible or adjacent to a transmigrant scheme, a project management unit should be created with staff seconded from the PNP/PTPs and be made responsible for nursery development, the provision of extension services and training to smallholders clearing their own land.
- (e) Private commercial estates should also be harnessed to develop tree crops for transmigrants in the same fashion as PNP/PTPs. The provision of planting material by estates in tree crop development programs should be supplemented and expanded by Government-licensed commercial nursery centers.
- (e) Nucleus estates and PMUs operated by estates should be given primary responsibility for ensuring adequate processing facilities on existing transmigrant schemes and management of such facilities to provide a mechanism for GOI to recover partly the costs of development from the smallholders' production.

26. Policy and Planning.

- (a) GOI targets for the number of families to be transmigrated to upland areas in Repelita III should correspond to the ability of the PNP/PTPs to introduce tree crops on upland schemes not later than three years after settler arrival.
- (b) Although BAKOPTRANS is responsible for overall planning of the various Directorates General now active in transmigration, the planning function for tree crops should be shifted to the Ministry of Agriculture Bureau of Planning to more effectively coordinate the provision of inputs and extension and avoid duplication of activities.

27. Finance.

- (a) State and local bank financing should be encouraged, with loans guaranteed by PNP/PTPs and with interest subsidized from Bank Indonesia to maintain concessionary terms to transmigrants.
- (b) A longer term solution to the problems of financing new tree crops for transmigrants as well as all smallholder replanting and new planting programs may be found in taxation levied on tree crop production (a cess). Future tree crop development schemes

on a grant basis as financed from a self-perpetuating source of tax funds would alleviate the necessity of complicated credit arrangements for the estates and Bank Rakyat Indonesia.

- (c) Financial assistance from existing NES loans should be provided to carry out a reconnaissance study of Repelita II transmigration schemes to identify the priority migrant areas for tree crops. NES loan funds should also be utilized to finance a feasibility study for an estate-assisted tree crops transmigration project. This project has sufficiently high priority that Bank financing is recommended, possibly as NES VI.

28. Manpower Training

- (a) In-house training programs for PNP/PTP staff should be expanded immediately to train younger, less experienced staff in project management.
- (b) The Ministry of Agriculture should develop policies and guidelines for secondment and rotation of estate staff to Government sponsored tree crop programs and transmigration schemes.
- (c) The existing Estates Training Institute in Yogyakarta should be expanded and a new Estates Training Center in Medan created to provide training to staff of the DGE, the provincial level offices, extension staff, field workers, and provincial transmigration officers.
- (d) Programs should be developed within the Estates Training Institutes specifically designed for training estate and non-estate staff to become project managers.
- (e) Training and expansion of the Special Team (the coordinating team for Bank projects in the DGE) should be undertaken to improve its planning and program implementation capacity.
- (f) Technical assistance should be provided to the Ministry of Agriculture's Bureau of Planning to expand its role and coordination of planning of the individual directorates.

Conclusions

29. The proposal to utilize the estate sector for existing transmigration schemes entails some difficult choices. The present preference of Government for food crop development, the necessity for each of the Directorates General to move expeditiously and the commitment to transmigrate large numbers of families in Repelita III, are to some extent in conflict with using the estates or estate managed PMUs for existing transmigrant settlements. Given the capacity of the PNP/PTPs to plant tree crops, however,

it is clear that either existing migrant populations or new migrants to upland areas or a portion of both, will not receive the needed assistance for tree crops. For this reason a strategy for tree crop development including existing and new migrants indigenous people and ongoing NES programs is now urgent.

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TRANSMIGRATION PROGRAM REVIEW

Summary of Nucleus Estate and Smallholder Project Developments

Commodity Project	Smallholder Development			Estate Development				Total	Settler Families		
	New Planting	Replanting	Sub-total	New Planting	Replanting	Rehabilitation	Sub-total		New	Existing	Total
I. <u>Rubber</u>											
NES I	11,500	-	11,500	3,300	6,000 ^{/a}	15,500 ^{/a}	24,800	36,300	5,750	-	5,750
NES II	15,200	7,500	22,700	3,500	-	-	3,500	26,200	7,600	3,750	11,350
NES III	28,000	-	28,000	15,800 ^{/b}	-	2,400	18,200	46,200	6,000	6,000	12,000
NES V	3,700	-	3,700	9,000	-	-	9,000	12,700	2,450	-	2,450
Sub-total	<u>58,400</u>	<u>7,500</u>	<u>65,900</u>	<u>31,600</u>	<u>6,000</u>	<u>17,900</u>	<u>55,500</u>	<u>121,400</u>	<u>21,800</u>	<u>9,750</u>	<u>31,550</u>
II. <u>Oil Palm</u>											
NES I	-	-	-	10,000 ^{/c}	-	-	10,000	10,000	-	-	-
NES III	-	-	-	2,100	-	3,000	5,100	5,100	-	-	-
NES IV	8,000	-	8,000	-	-	-	-	8,000	4,000	-	4,000
NES V	19,000	-	19,000	7,500	-	-	7,500	26,500	9,500	-	9,500
Sub-total	<u>27,000</u>	<u>-</u>	<u>27,000</u>	<u>19,600</u>	<u>-</u>	<u>3,000</u>	<u>22,600</u>	<u>49,600</u>	<u>13,500</u>	<u>-</u>	<u>13,500</u>
III. <u>Coconut</u>											
NES I	-	-	-	4,800 ^{/a}	-	-	4,800	4,800	-	-	-
NES V	9,800	-	9,800	3,700	-	-	3,700	13,500	6,352	-	6,352
Sub-total	<u>9,800</u>	<u>-</u>	<u>9,800</u>	<u>8,500</u>	<u>-</u>	<u>-</u>	<u>8,500</u>	<u>18,300</u>	<u>6,532</u>	<u>-</u>	<u>6,532</u>
IV. <u>Food Crop</u>											
NES I	17,250	-	17,250	-	-	-	-	17,250	-	-	-
NES II	22,800	-	22,800	-	-	-	-	22,800	-	-	-
NES III	22,000 ^{/d}	-	22,000	-	-	-	-	22,000	-	-	-
NES IV	4,000	-	4,000	-	-	-	-	4,000	-	-	-
NES V	12,500	-	12,500	-	-	-	-	12,500	-	-	-
Sub-total	<u>78,500</u>	<u>-</u>	<u>78,500</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>78,500</u>	<u>-</u>	<u>-</u>	<u>-</u>
Total	<u>173,700</u>	<u>7,500</u>	<u>181,200</u>	<u>59,700</u>	<u>6,000</u>	<u>20,900</u>	<u>86,600</u>	<u>267,800</u>	<u>41,332</u>	<u>9,750</u>	<u>51,532</u>

^{/a} Revised program.

^{/b} Includes 5,000 ha PTP VI Nucleus Estate established with own funds.

^{/c} Includes 5,000 ha PNP X established with own funds.

^{/d} Includes 18,000 ha of existing transmigrants in Rimbo Bujang.

INDONESIATRANSMIGRATION PROGRAM REVIEWDemand for Tree Crops in Upland Transmigration Schemes

	Total families	Families needing tree crops	Tree crops required (ha)
Repelita II (prior to 1979)	72,000	36,000	54,000
Repelita II (settled in Repelita III)	27,000	22,000	33,000
Repelita III (1979/80)	26,000	26,000	52,000
Subtotal	<u>125,000</u>	<u>84,000</u>	<u>139,000</u>
<u>New Transmigration Targets</u>			
Repelita III			
1980/81	50,000	34,000	68,000
1981/82	50,000	34,000	68,000
1982/83	55,000	39,000	78,000
1983/84	56,000	40,000	80,000
Subtotal	<u>211,000</u>	<u>147,000</u>	<u>294,000</u>
<u>Total</u>	<u>336,000</u>	<u>231,000</u>	<u>433,000</u>
Proposed Pra-Trans Program	75,000	75,000	150,000
Maximum PNP/PTP Planting Program for Transmigrants (14 PNP/PTPs) (1980-86)	130,000	130,000	260,000

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TRANSMIGRATION PROGRAM REVIEWCritical Target Areas for Transmigration Tree Crops

	No. of existing sites and SKPs under development	Total families	Proposed estates
Riau province			
Teluk Kuantan/Rengat	4	6,300	PTP IV Riau estate
Pasir Pangarayan	6	11,000	New estate of PTP V or VII
Jambi			
Pamenang/Kuamang Kuning (Trans-Sumatra Cluster)	5	10,000	Expansion of PTP VI
South Sumatra			
Betung/Sekayu	8	14,200	PNP X Estate
Pematang Panggang	5	9,550	New estate XII or XIII
South Kalimantan			
Batulicin/Sebamban	6	12,000	Expansion of PTP XVIII
<u>Total</u>	<u>34</u>	<u>63,050</u>	Equivalent to 95,000 ha

Other Existing and Proposed Nucleus Estate Schemes for Transmigration

ANNEX 3
Table 4

Area	Proposed no. of SKPs	Estate
Bengkulu - Bengkulu	1	PTP XXIII
West Kalimantan - Sintang	4	PTP XIII new estate
Central Kalimantan - Buntok and Dusun Timur	5	PTP XVIII new estate
East Kalimantan - Tanggarong	2	PTP VI
Maluku - Halmahera		
- P. Buru	5	PTP VII & PTP XXVIII
	<u>17</u>	Estimated families: <u>36,000</u>

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TRANSMIGRATION PROGRAM REVIEW

Proposed Pra-Trans Program (1980/81)

	<u>Project Area</u>		<u>Location</u>	<u>Estate Group</u>	<u>Smallholder Plantings (ha)</u>
	<u>Province</u>	<u>Kabupaten</u>			
<u>Oil Palm</u>					
	Riau	Kampar	Pasir Pangarayan	PTP V	2,000
	West Kalimantan	Sanggau	Sanggau	PTP VII	2,000
	East Kalimantan	Pasir	Kuaro	PTP VI	<u>2,000</u>
	Sub-Total				<u>6,000</u>
<u>Rubber</u>					
	Aceh	North Aceh	Cok Girek	PTP V	2,000
	Riau	Bengkalis	Siak	PTP V	4,000
	Jambi	Jambi	Singkut	PTP VI	4,000
	South Sumatra	South Sumatra	Pematang Panggang	PNP X	4,000
	Bengkulu	North Bengkulu	Ketahun	PTP XXIII	2,000
	West Kalimantan	Sambas	Sambas	PTP XII	2,000
	West Kalimantan	Sintang	Sintang	PTP XIII	2,000
	Central Kalimantan	-	Buntok	PTP XVIII	2,000
	South Kalimantan	Kota Baru	Batulicin	PTP XVIII	2,000
	East Kalimantan	Kutai	Tenggarong	PTP VI	<u>4,000</u>
	Sub-Total				<u>28,000</u>
<u>Cocoa</u>					
	East Kalimantan	Kutai	Sepaku	PTP VI	1,000
	TOTAL				<u>35,000</u>

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TRANSMIGRATION PROGRAM REVIEW

Areas for Nucleus Estate Managed PMUs

<u>Province</u>	<u>Site</u>	<u>No. of SKPs</u>
Aceh	Padang Mancang	2
West Sumatra	Silaut	3
Riau	Siak	1
Bengkulu	Muko-Muko	2
West Kalimantan	Ketapang	4
	Sukadana	4
	Nangatayap	2
Central Kalimantan	Manga Bukit	2
	Kumai	1
	Sampit	2
	Anjalipan	3
	Jangkit	2
	Muara Tewe	2
East Kalimantan	Tanjung Redeb	4
Sulawesi	Mamuju	3
Irian Jaya	Prafi	2
	Aimas	2
<u>Total</u>		<u>41</u>

INDONESIA

TRANSMIGRATION PROGRAM REVIEW

Moving with the Flow: The Case for
Spontaneous Transmigration in the
Indonesian Transmigration Program

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TRANSMIGRATION PROGRAM REVIEW

Moving With the Flow

The Case for Spontaneous Migration
in the Indonesian Transmigration Program

In July of 1978, the Government of Indonesia (GOI) proposed a new approach to transmigration; one which emphasized the movement of large numbers of migrants at relatively low cost. Until now, however, the full implications of this new approach have yet to be articulated. Only a system which facilitates spontaneous migration can be expected to affect many people, minimize dependency and be accomplished at a modest cost. Yet, although this is widely understood, no systematic program for promoting spontaneous migration has so far been developed.

The following paper is a step in this direction. It has two parts. The first section presents four brief case studies which provide the data for analysis:

- (a) Parigi - A case of spontaneous migration
- (b) Way Abung - A case of sponsored migration
- (c) Baturaja - The impact of employment diversification
- (d) Rimbobujang - A new area and an example of things to come

This section argues that spontaneous migration contributes to community development as well as being an indicator of its success. It shows that such migration increases in response to employment opportunities and that it occurs along pre-existing chains of economic and social support.

The second section argues that the way to promote spontaneous migration is to remove existing constraints, stimulate employment, and use existing networks to recruit, support and settle new immigrants. A focus on agricultural production alone, has, in the past, produced policies which have hindered spontaneous migration rather than helped it. For this reason, this paper placed land settlement in a wider context and proposes a strategy for moving with, rather than against, the normal migration flow.

1. LEARNING FROM THE PAST

1.01 Although there has been a consistent interest in spontaneous migration over the years, measures to promote it have only occasionally found their way into the transmigration program. One clear reason for this is that the process of spontaneous migration is so poorly understood. The following cases have been chosen to illustrate what actually happens in the migration process. They attempt to show that spontaneous migration is not random and unplanned, but that it involves systematic cooperation between early migrants and those who follow. The cases also illustrate the fact that movement is in response to labor shortages and employment creation and they suggest the degree of spontaneous settlement in a range of migrant communities.

Spontaneous Migration - The Case of Parigi (Central Sulawesi Province)

History

1.02 The Pioneers. Parigi is one of the most important examples of spontaneous migration in Indonesia. In 1950 the Balinese community in Parigi consisted of only 17 households - all descendants of Hindu Balinese families who had been exiled to Sulawesi in the early years of this century for crimes against adat or customary law. In 1957, five families of Christian Balinese were deflected from their original destination in Sumatra and moved to Parigi instead. In spite of their relative experience and sophistication, the first five Christian families found early adjustment difficult. Refusing to settle with the Hindus in the town of Parigi, they initially laid claim to an area of primary forest 15 km to the south. After about two months, however, the enormity of the task, their small numbers and the threat of political disturbances in the area so overwhelmed them that they returned to the town to join another group of Christian refugees. In late 1957, two young Balinese brothers joined this group, and with their arrival, the pattern of future immigration was set. Although there were only thirty Balinese households in Parigi at the time, all future in-migration was to occur through networks which they created to provide information and social support. Virtually every one of the 10,000 people who followed was in some way connected with those who were in Parigi in 1957.

1.03 Labor Shortages in the Migrant Area. In the years between 1957 and 1967, nearly 200 Balinese families were attracted to Parigi. Three-fourths were Christian and most moved there to join kinsmen or friends. In the mid-1960s, however, several events foreshadowed a rapid acceleration of migration:

- (a) the construction of irrigation systems south of Parigi in 1963;
- (b) the introduction of the green revolution rices in the area in 1965;

- (c) the worsening of conditions in Bali, particularly after 1965; and
- (d) the improved capacity of the Government to sponsor and assist migration after 1967.

In 1962, at the instigation of Balinese already in Parigi, the provincial government agreed to settle 100 families from Bali in an official transmigration site just south of Massari. Of these, 52 families arrived. All were recruited in the districts of West Bali from which the first Christians had come; all had prior knowledge of Parigi. Owing in part to the advantages of Government sponsorship and back-up support, within a year of their arrival the condition of the Government-supported migrants nearly approximated that of the community which had come before. By mid-1963, both communities had cleared one-half to one hectare of land per family and were in a position to seek water for sawah (wet rice fields). Because of an advantageous location, the Government-sponsored transmigrants actually had irrigated fields earlier than those who had arrived before them.

1.04 Access to water was not an unmitigated blessing, however. While it increased the probability of surplus, it also increased the amount of work. Whereas the migrants had previously been planting rice in dry fields, with irrigation they had to bund and level their land, construct ditches, and do demanding field preparation. At the same time, they were pressed to open the primary forest which remained, both to bring additional land into production and to reduce widespread damage from pests, particularly pigs.

1.05 In 1965 yet another factor was added to the equation with the introduction of green revolution rice. The significance of the new rices in Parigi was not in their highly touted per hectare yield (which proved unpredictable at best) but in their rapid growth. Whereas traditional Balinese rices ripened in 165 to 180 days, the hybrid varieties matured in 120 days or less. The most common hybrid in the area had a growing period of only 105 days. With these rapidly maturing, nonphotoperiodic rices, with year-round water, Government pressure to increase rice production, and their own proclivity for work, the Balinese began to plant and harvest five times in two years. Surpluses increased and, at the same time, the strain of this effort on two hectares of land led to feelings of acute labor shortage.

1.06 In 1966, knowing of the changing conditions at home and sharply aware of their own labor shortages, the Balinese in Parigi dispatched a delegation of 12 representatives to Bali to recruit new settlers and attempt to find sponsorship for them. Once in Bali, the delegation obtained the approval and assistance of both provincial and national transmigration offices. Two hundred families (1,000 people) were sent to Sulawesi in 1967; all of whom had connections with previous migrants.

1.07 Although their departure was delayed, and the boat trip was long and arduous, this group arrived with an optimistic attitude toward the area. They were settled just to the south of their kinsmen, and although they had been prepared for the worst when they arrived, the Government assisted them in building houses and clearing land. It also provided them with modest health and education facilities and 12 months of provisions. The new immigrants were also entitled by adat to help in the harvest of those who had crops and keep up to one-fourth of the yield. With the arrival of the 1967 migrants, none of the old settlers harvested their own fields again and it was, in part, this symbiotic relationship between the old migrants and new upon which the success of these and future immigrants was to be based.

1.08 The Mass Migrants. With the labor needs of the old migrants satisfied and the new immigrants still in precarious financial condition, immigration temporarily declined. In 1968 and 1969, only about 100 families found their way to Parigi. But this decline was the metaphorical lull before the storm. When the 1967 immigrants were fully settled, producing a surplus and feeling the labor demands entailed in the cultivation of the new rice, immigration again climbed. In 1970, 300 families arrived in Parigi; in 1971, 500 more. In 1972 - five years after the Government-sponsored migrants arrived - 1,500 families (5,000 Balinese) moved to Central Sulawesi: these "mass migrants" doubled the Balinese population in Parigi in a single year.

1.09 Faced with such a startling upturn in immigration, the Government decided to halt recruitment and reserve the remaining land for normal population growth. Despite Government discouragement, however, more than 2,000 immigrants arrived in 1973. Without provincial controls, 8,000 had been expected. Since no land was available, most new immigrants declared themselves "visitors" and settled with family and friends. The fact that they were heartily welcomed attests, in part, to the labor shortages which the previous migrants had felt.

1.10 In many ways, this later phase of mass migration was very different than the first. In the early 1970s, the community reached a threshold which allowed diversification of labor, elaboration of arts and services and the exertion of a Balinese identity. This increase in numbers, arts and ethnicity in turn made Sulawesi increasingly attractive at a time when overpopulation, poverty and communal strife made life in Bali increasingly grim. Under these circumstances, ever increasing numbers of people moved. School teachers, tailors, shopkeepers, and nurses found a ready place in the community and many individuals visited who would never have considered it before. Among the later migrants were people who had money and bought desirable land from those who had done the hard work but were now weary of the effort. Others sold everything to invest in commerce. The market in the most southern community had three coffee shops in 1972 and 35 permanent buildings in 1974.

1.11 Not all of the later migrants who went to Parigi liked what they saw. Most of the earlier migrants were either forced from Bali or too poor to return, while among the later migrants, some looked around and went back. Even visitors contributed to outmigration, however, by carrying back to Bali the information upon which future decisions were based.

1.12 So strong was the migration stream which had been developed in 1972 that even the end of free land in Parigi could not stem the flow. The know-how and knowledge of the long-term settlers was used to seek out new villages where additional Balinese communities might be established. By 1974, 8 satellite communities with about 400 families ringed the Gulf of Tomini (see following map) and the Balinese looked forward to the day when the culture of homeland would be combined with prosperity of Sulawesi and the Gulf of Tomini would have its own Hotel Bali Beach.

1.13 The Conditions of Development. The movement of Balinese to Central Sulawesi cannot be regarded as typical of transmigration movements in Indonesia; it was spontaneous; it was by Balinese; and it was unusually successful. But the ingredients for mass movement are well illustrated by the example. To be successful, migrants require:

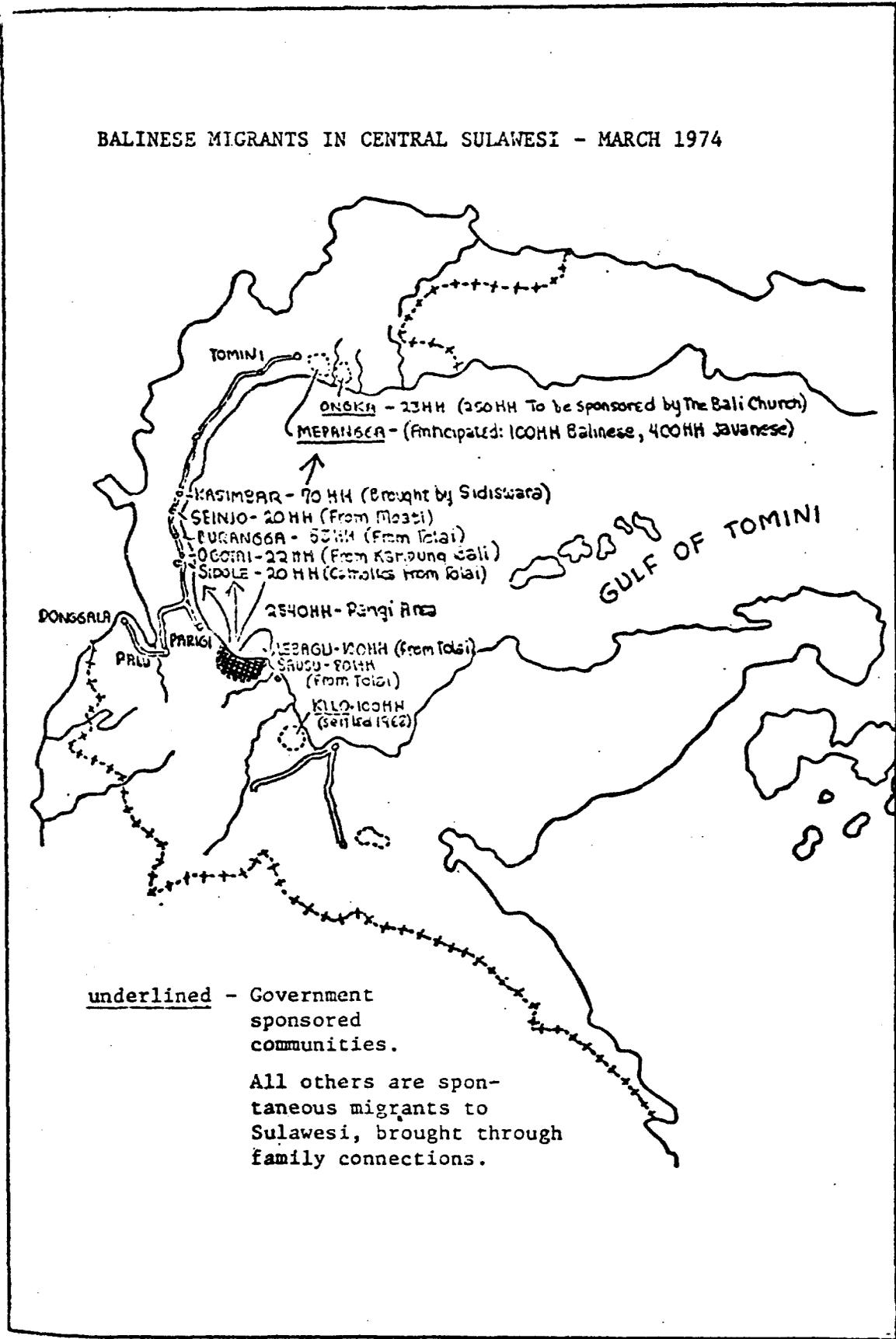
- (a) a means of support until their first crops are harvested; and
- (b) minimal conditions for development: available land, access and critical mass.

1.14 The movement to Sulawesi was facilitated by the fact that all migrants, virtually without exception, had kinsmen or neighbors in the receiving area who could teach them what to do and provide them with back-up support. In addition to having altruistic motives, each group required the help of the other. The early immigrants required labor; the new settlers required cash wages or shares of the harvests until they were established.

1.15 The Balinese were also fortunate to find an area which allowed a continuation and expansion of their traditional cultivation practices. In Central Sulawesi they settled on a narrow alluvial plain which was frequently crossed by small year-round rivers. Although soil in the area was rather poor, the early availability of water, and later availability of fertilizer, enabled the Balinese to sustain low yields of 1.0 to 1.5 tons of rice per hectare per harvest. This was enough to meet subsistence needs and still allow reinvestment and growth.

1.16 The physical circumstances favored the Balinese in yet another way. Until well into the 1970s, all of the communities were within 5 km of the sea. In other words, although as spontaneous migrants they lacked the resources to construct an adequate access road from Parigi (which was 15 to 35 km to the north) most villages were able to open and maintain tracks to the sea. It was along these tracks that surpluses were sent out and needed goods and services received.

BALINESE MIGRANTS IN CENTRAL SULAWESI - MARCH 1974



underlined - Government sponsored communities.

All others are spontaneous migrants to Sulawesi, brought through family connections.

1.17 Other positive features were the availability of land and enthusiastic Government support. The Tana Boa, or empty quarter, into which the Balinese moved, had been depopulated at the end of the 19th century and the only indigenous people to be found there were refugees from the mountains who also had limited claim to the land. Except for the earliest Christian immigrants, few land conflicts were encountered and the Balinese could proceed with the feeling that land they opened would not be jeopardized by the claims of locals. These feelings were enhanced by the very real support for Balinese immigration which was provided by local officials who, for their own reasons, were concerned to see provincial rice production increased. Finally, with about 10,000 resident settlers, the Parigi area attained the critical mass required to begin internal differentiation and growth. In one year, the market increased from 3 shops to 35. School teachers, tailors, petty tradesmen, carpenters and other craftsmen moved deliberately to Sulawesi to practice their skills.

Lessons from Parigi

1.18 The case of Parigi has two main lessons:

- (a) labor shortages lead to increased immigration; and
- (b) this migration occurs through pre-existing chains.

As evidence of the latter claim, a 1974 census of 959 families in Parigi (nearly half the total families) showed that all respondents came from the five districts (kabupaten) already represented among the 30 families present in 1957. Those three kabupaten which had no representatives in 1957 had none in 1974 (see following table). Fully one-third of the sample (324 households) were from four of Bali's presumed 10,000 village clusters. All four of these villages were represented in 1957.

1.19 The household is the basic unit of production and consumption in Indonesia. If households have food surpluses and labor shortages, they recruit help to fill the void. Rural Balinese recruit help within their home villages and urban dwellers draw relatives from the countryside. Migrants, too, recruit relatives and friends, both to provide assistance to them and to obtain assistance from them. These chains of mutual support are what make migration work. In Parigi, the efficacy of these chains was increased by early food surpluses and acute labor shortages; they were enhanced by available land and work opportunities which permitted dependent immigrants to eventually stand on their own. Spontaneous migration is limited if early migrants remain at subsistence levels or if policies prevail which break supporting chains or limit opportunities to those who follow; and as the case of Way Abung illustrates, the latter conditions have often prevailed.

Table 1.1: CHAIN MIGRATION

Districts in Bali	% total Balinese outmigration 1969-73	% Sulawesi sample 1974
<u>Districts Represented in Parigi in 1957</u>		
Bandung	14.1	46.8
Jembrana	17.0	21.4
Tabanan	18.0	16.4
Buleleng	6.5	10.4
Gianyar	5.6	2.9
<u>Districts Not Represented in Parigi in 1957</u>		
Karangasem	26.0	0.0
Klungkung	8.1	0.0
Bangli	4.7	0.0

Sponsored Migration - Way Abung (Lampung Province, Sumatera)

1.20 Way Abung, like Parigi, was largely settled after 1965 and most immigrants in both areas arrived between 1972-74. But whereas Parigi was settled primarily by spontaneous migrants who moved on their own resources, Way Abung consisted of 12,000 families, 60,000 people, virtually all of whom were settled by the regular Government transmigration program with various degrees of sponsorship. And whereas Parigi was a model of spontaneous growth and success in 1974, Way Abung was regarded as a problem area which was economically depressed. The condition of the migrants was believed sufficiently serious, in fact, to have the rehabilitatin of Way Abung included as a component in the first Bank-assisted loan for transmigration. Of interest here, however, is not the strategy of intervention,^{/1} but the way in which the differences between these two communities evolved.

1.21 Way Abung is a vast area of some 30,000 hectares, mainly of alang alang (grasslands) and secondary forest. It is located in Lampung province, 24 km from the nearest major road. The first 600 families arrived in August of 1965 and were given quarter-hectareouselots, houses, and 1.75 hectares of land, usually in alang alang. Settlers were told that the land would one day be irrigated, but until that time they would have to rely on rainfed

^{/1} See "Beyond Subsistence: A Report on the Agricultural Economies of Way Abung and Baturaja", World Bank Working Document, June 1978.

crops. Each settler was also guaranteed 12 months of food and supplies. In September of 1965, however, the Government went through a period of political turmoil which left the Department of Transmigration seriously weakened. The promised supplies ceased and the plans for irrigation were dropped.

1.22 Unlike the migrants to Parigi, the new settlers in Way Abung had neither kinsmen, capital nor experience to fall back upon. Without either money or supplies, they abandoned their farming to seek whatever work they could find. They hoed for locals, made charcoal and engaged in petty trade. After this, there was little time left for the agricultural work upon which their own subsistence was based. Under these circumstances, two thirds of the initial families left. In 1967, two new communities were begun in the area and by 1970/71, a series of good harvests had significantly improved the lot of those who stayed.

1.23 By 1972/73, the Department of Transmigration was sufficiently recovered to begin a crash program to settle the land which remained in Way Abung. During the two ensuing years, approximately 7,500 families were moved, of which about 60% were fully sponsored and received transportation, cleared houselots, houses, and 12 months of supplies. Most of the others were semi-sponsored migrants who received land, transport and three to eight months of supplies. What is striking about the second wave of migrants to Way Abung is that like the migrants to Parigi, the later arrivals managed to rapidly equal and in many cases surpass the condition of those who had arrived before. In a sample of 20 migrants in each of 12 villages, it was found that those who arrived after 1970 had an average of 1.33 hectares of land under cultivation while those who arrived before 1970 has only 1.03 hectares which they tilled.

Table 1.2: HECTARES UNDER CULTIVATION BY DATE OF ARRIVAL

Date of arrival	Ha land opened	Ha land cultivated	
1965-69	1.03	1.02	n = (39)
1970/71	1.43	1.38	(57)
1972	1.44	1.39	(43)
1973	1.15	1.17	(69)
1974	1.14	1.10	(24)
1975 +	0.96	1.00	(7)
Average	1.24	1.21	n = 239

1.24 The reasons for this are complex. After 1970, regular transmigrants received their first twelve months of support and therefore had time to invest the first year in clearing and cultivating their fields. They also received limited but improved agricultural inputs and advice. Village infrastructure and health and education facilities improved, as did opportunities for off-farm work. The type of migrant also appears to have some bearing on success. For example, social welfare (indigent) migrants were less successful than regular migrants while semi-sponsored migrants appear to be slightly more successful, at least in terms of land under cultivation at the end of five years.

1.25 Differences by Migrant Type. In July of 1973, the Social Welfare Department moved 800 families from the cities of Java to a village in the most northern area in Way Abung. Few of these families were from farms and at the time of recruitment most were a part of the population of urban unemployed. For this reason, most were unaccustomed to the hard work of land clearing and cultivation and the constant effort of farm life. Some lasted only three months, others six. When their year of provisions ceased, nearly 80% moved out of the community to find work elsewhere in Lampung. Those remaining had an average of only 0.56 hectares of land under cultivation and in a brief survey 19 of 20 were found to have opened 0.75 hectares - less than a subsistence-sized plot. Yields per family were also the lowest in the survey. Interestingly, however, with the maturation of Way Abung and the growth of opportunity for off-farm work, many have begun to return to their plots. In 1978, 446 of the original 800 families were on site. Not all families, then, thrive on agricultural life.

1.26 Approximately 40% of the families moved to Way Abung after 1970, on programs that provided only partial support. Both anecdotal evidence and survey data suggest, however, that in contrast to the social welfare migrants, semi-sponsored migrants did as well or better than the fully sponsored migrants in Way Abung. This, in spite of the fact that they arrived later and received less.

Table 1.3: SPONSORED AND SEMI-SPONSORED MIGRANTS IN WAY ABUNG

	Regular migrants	Semi-sponsored or spontaneous
Percent of sample arriving after 1972	52%	66%
Percent with more than 1.0 ha of land under cultivation	45.9%	65.4%
Mean hectares under cultivation	1.20	1.36
Mean family rice production/year	680 kg	1,000 kg
Percent families with major household possessions	51%	74%
Mean number of possessions	0.8	1.4

1.27 The major difference between sponsored migrants and those moving on their own or with partial support is that semi-sponsored migrants were generally, but not always, individuals who elected a smaller Government package in order to move to an area they preferred. Those who signed up for full sponsorship seldom had a choice of destination. This means that in Way Abung, as in Parigi, the semi-sponsored migrants in general, and spontaneous migrants in particular:

- (a) had previous knowledge of the area (usually from kinsmen or fellow villagers who were already there); and
- (b) were sufficiently motivated to move that they spent their own resources to do so.

In other words, they both had resources of their own upon arrival and they had kinsmen to fall back upon in times of difficulty.

1.28 Because semi-sponsored and spontaneous migrants must have money to move, it is easy to hypothesize that they were wealthier in Java, brought more money with them, and therefore had a head start. Survey data indicate, however, that this is not true; both groups appear to come from roughly the same status of Javanese society and if anything, the semi-sponsored migrants were poorer.

Table 1.4: CONDITIONS IN JAVA BY TYPE OF MIGRANT

	Regular migrants	Semi-sponsored/ spontaneous
Mean land owned in Java (all migrants)	0.28 ha	0.30 ha
Mean farm size for those with land in Java	0.55 ha	0.42 ha
Percent living in bamboo houses	43.0%	55.0%
Number of major possessions	25.5%	24.8%
Mean number of goods	0.47	0.42
Average amount brought from Java - Rps (\$1.00 = Rp 415)	15,000 (\$36)	61,000 (\$146)

Of these variables, only the amount brought from Java distinguishes fully sponsored and semi-sponsored migrants and this is, of course, necessitated by the fact that partially supported migrants must be self-sufficient even before their first harvest.

1.29 In discussing the adaptation of semi-sponsored migrants in Way Abung, one additional point bears mentioning. Ordinarily it takes several harvests before early immigrants are ready to assist in the support of incoming relatives and friends. In Parigi, in fact, a clear five-year cycle is evident. Settling semi-sponsored migrants at precisely the same time as sponsored migrants means in effect that the semi-sponsored have the worst of both possible worlds - they have the disadvantage of less support without the advantage of supportive social networks at the new site. This suggests that planned immigration, like truly spontaneous movement, should be phased.

1.30 In taking all these points into consideration, it is surprising that semi-sponsored migrants did as well as they have. In searching for an explanation, one additional distinguishing feature was found. Although the families of semi-sponsored and spontaneous migrants are smaller, they have more workers per family. This, in turn, is consistent with the fact that they appear to have recruited more laborers from Java.

Table 1.5: AVAILABLE LABOR AMONG MIGRANTS IN WAY ABUNG

	Regular migrants	Semi-sponsored/spontaneous
Mean family size	6.3	6.07
Mean number of workers per family	2.05	2.34
Mean number of people recruited from Java/family	0.67	1.10

In other words, not only do successful migrants import laborers as in Parigi, but the presence of additional laborers appears to contribute to migrant success. Unfortunately, the early data on Way Abung is incomplete and it is therefore difficult to disaggregate cause and effect. The second Bank-assisted community, Baturaja, has been closely monitored from its inception, however, and it therefore provides a better laboratory for the study of labor shortages, in-migration and the migration process - topics to which this paper will return.

1.31 Conditions for Development. Although conditions were difficult for migrants in Parigi, there can be no question that the Way Abung settlers were disadvantaged by comparison. In the first place, their means of support was insecure: Way Abung has soils of low fertility and erratic rainfall. These are not insurmountable obstacles if a farmer has enough land under cultivation, diversified crops, appropriate cropping patterns and/or agricultural

inputs, but the Way Abung migrants - particularly the early Way Abung migrants - had none of the above. Only one-fourth hectare was felled upon arrival and their families were labor short. They had too little land and capital to diversify crops. Appropriate cropping patterns for annuals were unknown, and agricultural inputs were largely unavailable, i.e. their subsistence base was precarious at best.

1.32 The migrants were also handicapped by difficult access. The closest town to the first village was 24 km away, over what was frequently an impassable track. Between the first and last of Way Abung's 20 villages was an additional 50 km road which could be travelled in something between eight hours and a week. Poor infrastructure hampered both the sale of products and hindered access to essential goods and services. In addition, the early community also suffered from substandard facilities for health, education, administration and the like.

1.33 The one thing Way Abung did have was critical mass. The density of settlement (200 people per sq km) was justified on the grounds of economy in providing future irrigation and initially it was of little importance as labor shortages prevented the cultivation of even the full two hectares migrants were given. Poor infrastructure and the sorry state of the migrants themselves also prevented much internal growth and differentiation. In recent years, however, it appears that Way Abung may have too many people, too densely settled. In many of the central areas, land is no longer available even to married children and in one of the older villages (Purbasakti), this has already led to a fragmentation of houselots. In a second village, the desire to obtain land for kinsmen has led to a program to "eliminate" locals through land purchase and social exclusion. At the same time, the impetus for spontaneous movement has been reduced by the absence of available land within communities which are just now improving.

Lessons of Way Abung

1.34 Among the lessons from Way Abung, the following three relate to the general argument which is being made:

- (a) as in Parigi, first migrants had the most difficult time;
- (b) semi-sponsored migrants were as successful as fully sponsored migrants, at least when they arrived in the second wave; and
- (c) areas which were fully settled have little potential for future growth and diversification.

Taken together, these three premises appear to argue for providing different support at different stages. Early communities require the most assistance, but once migrants are in an area, additional immigrants can be attracted

with fewer incentives, no doubt because they have other avenues of social and economic support. Conversely, if all land is settled at a single time, a maturing community will be unable to attract spontaneous settlers, even though it has the resources to do so. Finally, there is some evidence in Way Abung that spontaneous migrants contribute to the welfare of settler families, but it is left to the Baturaja example to explain how.

Labor Diversification - Baturaja (South Sumatera Province)

1.35 Baturaja, which is located in South Sumatera province, is the second of two communities in the Transmigration I Project (Loan 1318-IND) - the first Bank-assisted transmigration program in Indonesia. Unlike Way Abung, however, it is a new community; the first 406 families arrived in November of 1976, the second in October 1977. By September of 1978, 1,100 of the 4,500 anticipated families had been settled. Because of their newness, only the first block of 406 families are discussed here; at the time of this study, they had been in place for 16 months.

1.36 Although from the point of view of the Bank, the Baturaja project has encountered numerous financial and organizational problems, from the point of view of the migrants it has been an early success. Prior to the arrival of the first migrants, roads were constructed, land cleared and village infrastructure, including provision for health care, education and extension, was established. Upon arrival, each migrant family received a house and two hectares of land, one-half hectare of which had been clean-cleared. Migrants in Units II and III were later provided with one hectare of cleared land. An additional four hectares were promised to them, presumably for perennial crops and one of these was planted in immature rubber by the time the migrants arrived. Settlers were provided with subsistence supplies for 12 months and they also received agricultural inputs - tools, seeds and fertilizers, as well as extension advice. Cattle were to be provided, although they were not on site at the time of this study. In the early years of the Project, migrants found ample off-farm employment in the construction of subsequent villages and rubber planting; and under these circumstances, after 16 months, 11 people in Unit I had departed (mostly single men) while 440 spontaneous immigrants had arrived.

1.37 Conditions of Development. In Baturaja, land rights have not been a problem and access is good. The community is adjacent to the southern part of the Trans-Sumatera Highway and the wide project road moves large numbers of vehicles for construction and labor recruitment. Many of these vehicles also take passengers and for Rp 135 (30¢), migrants can obtain public transportation to the town of Baturaja which is 17 km away. Of most interest in the new program, however, is the apparent improvement in agriculture which only modest inputs from the Government have produced.

1.38 For example, the clean clearing of one-half hectare of land in Unit I seems to have given the migrants a favorable start. After 16 months, settlers had an average of 0.96 hectares in production; 28% had already begun to cultivate their second hectare; 16% had opened more than 1.50 hectares and five of 68 informants claimed they had opened their full 2 hectares of land. **These statistics compare well with cultivation figures for migrants who have been in Way Abung as long as five years.**

Table 1.6: LAND UNDER CULTIVATION FEBRUARY 1978

Place/date of arrival	(N)	Hectares under cultivation (%)			
		>0.75	0.76-1.00	1.01-1.99	2.00+
Way Abung, 1973	(69)	24	38	26	10
Way Abung, 1974/75	(31)	32	32	26	10
Baturaja I, 1976	(68)	22	47	21	7
Baturaja II, 1977 /a	(43)	83	9	2	-

/a Migrants in Baturaja II who arrived in the beginning of the planting season have cleaned and cultivated only 0.56 ha of land. This is approximately the same amount which the farmers cultivated in Village I in 1976/77.

1.39 Furthermore, even though the migrants in Unit I planted on relatively infertile soils which had been abandoned to alang alang, their yields were higher than in Way Abung. A DGT study listed the following per hectare yields in Unit I: 1,119 kg padi (unhulled rice), 988 kg maize, 1,725 kg soybeans and 11,692 kg of cassava. Not only was this an improvement in absolute yields when compared to Way Abung, it also showed a variety of crops and cropping strategies unheard of in Way Abung until recent years. Diversification of perennial crops was also increasingly common. The migrants in Unit I had planted more trees after 16 months than the migrants in Way Abung had planted over all of the preceding years - 82 per family in Baturaja, 58 in Way Abung. (This does not include the full hectare of rubber which had been planted for the Baturaja migrants.)

1.40 This is not to imply that there have not been problems in Baturaja. From the point of view of the farmers, the worst problems have been poor seed and the difficulties of selling their produce - particularly cassava. Animal and insect pests have also taken a serious toll. Nevertheless, even early

income figures show total family incomes of US\$500, a substantial improvement when compared to US\$212, which was the estimated annual income of families in areas from which migrants come./1

Table 1.7: INCOME IN BATURAJA AFTER 12 MONTHS ON-SITE
(In Rp)

Baturaja (Dec. 1977)	On-farm	Off-farm	Total
Best farmers /a	203,734	74,875	278,609
Average farmers	98,421	100,133	198,554
Poor farmers	73,453	98,889	172,342
<u>Mean</u>	<u>125,202</u>	<u>91,299</u>	<u>216,501</u>

/a Determined by the amount of land under cultivation.

Source: Subroto, Income Levels in Baturaja. Unpublished figures.

Further indication of their early progress is the fact that migrants are investing in their own farm production. The Subroto study suggests that the best farmers (n = 16) have invested an average of Rp 15,000 in planting materials and supplies, even when fertilizer is provided by the project.

1.41 The income figures for Baturaja and Way Abung have been gathered by different sources, and are therefore not comparable. But a survey of household possessions such as pressure lamps, sewing machines, radios and the like suggests the relative prosperity of Baturaja settlers when compared to those in Way Abung. Whereas 48% of the migrants in Baturaja own pressure lamps and 47% have radios or tapes, the number in Way Abung is only about one-third. In fact, as the following figures suggest, Baturaja migrants are more likely to have major household possessions than any but the longest term residents of Way Abung.

/1 A later study by SCET (April 1978) gives Rp 120,951 (US\$295) as the income for the wet season alone (November-April).

Table 1.8: COMPARISON OF POSSESSIONS IN WAY ABUNG AND BATURAJA

Date of arrival	Way Abung				Baturaja	
	1965-69	1970/71	1972	1973	1976	1977
Percent with possessions in Sumatera	75	70	56	54	69	67
Mean number of items	1.25	1.36	0.93	1.02	1.12	1.10

1.42 The Cycle of Development. Although the Unit I migrants have been in place less than two years, the fact that they (a) have access to five hectares of land; and (b) have access to off-farm work, has dramatically hastened community diversification and growth. Because of the amount of off-farm work available in the vicinity, several employment strategies have begun to emerge. Some subvillages or blocks appear to be emphasizing off-farm work; others stress bringing land into production, while others still have brought additional laborers into the family to provide a consistent, if small, cash flow while the household head works on-farm.

1.43 Of the four blocks with the highest off-farm income (A1, M, S and Q), three have 0.60 hectares or less under cultivation (recall that 0.50 hectares were open upon arrival). Farmers in these units earn an average of Rp 78,575/year off-farm and cultivates an average of 0.63 hectares. In the three blocks in which farmers make more than Rp 100,000 on annual food crops, an average of Rp 48,000 is earned off-farm and an average of 0.91 hectares is under cultivation./1

1.44 In a study intended to determine whether doing wage work for the PNP (estate group) planting rubber interfered with farming, a difference in these subsistence strategies was also confirmed.

/1 Interestingly, both the first quartile who have little under cultivation and have relatively large off-farm incomes and those in the third quartile which have emphasized bringing land under cultivation have the same average wet-season incomes - Rp 118,000/year.

IMPACT OF PNP WORK ON LAND UNDER CULTIVATION - UNIT I

If household head does not work for PNP, and:

no one else in family does	0.99 ha
someone else in family does	1.08 ha
Average	<u>1.01 ha</u>

If household head does work for PNP, and:

no one else in family does	0.66 ha
someone else in family does	0.88 ha
Average	<u>0.81 ha</u>

If the head of the household remains on the land, the average hectares under cultivation after 16 months is about 1.00. Presumably, the increase in land under cultivation if someone else works is due to the ability to pay occasional help or the simple presence of two workers in the family. If, however, the head of the household does work for PNP, the average amount of land under cultivation is only 0.66 hectares, unless someone else is also working, in which case it is again likely that enough capital is available to invest in clearing land.

1.45 In the past, migrant families have not had enough labor available to do both off-farm work and bring land into production. The reasons are simple: their families are small and young and the main agricultural laborer is generally the husband; extended family members are not available to do child care and this deprives the husband of even the help of his wife. Yet there are advantages to having additional labor; not only does it allow one to open more land and thereby increase production, but off-farm laborers can, under the proper circumstances, supply a steady income even when agricultural periods are slack. They can also ease labor constraints during peak periods of on-farm work.

1.46 Apparently the migrants in Baturaja recognize this potential and are recruiting additional laborers as rapidly as they can be supported. A census of spontaneous immigrants at the beginning of the second planting season found 44 families (262 individuals) among the 400 households in Baturaja I, while a census after the April harvest found 117 families (440 people) there. As additional evidence of either their prosperity or optimism, Unit I migrants appear to be as likely to return to Java to visit as their predecessors in Way Abung and they appear to recruit more people. This, in spite of the fact that those in Way Abung have been in place longer and are considerably (200 km) closer to home.

Table 1.9: LABOR RECRUITMENT AND DEPLOYMENT

Unit I	Way Abung				Baturaja	
	1965-69	1970/71	1972	1973	1976	1977
Percent of families with one member working off-farm	30.7	22.8	20.0	45.0	54.4	81.0
Average number of days worked	9.3	8.3	5.8	10.2	19.78	23.25
Mean household size	5.35	6.50	5.90	6.11	5.38	5.34
Mean number of workers	2.07	2.22	1.95	2.11	2.4	3.0
Percent visiting Java	40	53	52	33	47	16
Mean number who followed	0.66	1.12	0.48	0.71	1.22	0.60

Baturaja II suggests a somewhat different pattern of labor recruitment. There, small family size, a small number of return visits but a large number of workers per family (3.0, highest in the sample) suggests that these migrants know enough about the area to bring additional workers with them when they come. Additional research is required, however, before this can be confirmed.

1.47 The influx of spontaneous migrants in Baturaja has so far been wholly unplanned. Existing migrants, aware of labor opportunities, have apparently recruited their relatives and friends. Employers report increasing numbers of immigrants available to work with limited recruitment on their part. While this response to employment creation is heartening, it has also exposed a clear flaw in the system. At present, no mechanism exists for integrating spontaneous migrants into the communities they serve. Welders, blacksmiths, furniture makers and housebuilders camp in lean-tos on relatives' houses. Agriculturalists in Baturaja for a season pack up their families and return to the villages in Java to register for transmigration. In spite of the fact that in Baturaja they already have ways to support themselves, they also want land. In other words, the Government policy of settling only sponsored migrants in transmigration projects is moving against the flow; it hinders rather than helps the ultimate goal.

Lessons from Baturaja

1.48 Although the community is new, the lessons from Baturaja are pronounced:

- (a) Initial investment in the agricultural sector has given the migrants a rapid start, promoted surplus production and contributed to the influx of spontaneous migrants;

- (b) Off-farm work has hastened spontaneous immigration and increased overall settler welfare; and
- (c) Failure to consider manpower arrangements has prevented the integration of spontaneous migrants into communities to which they have moved.

Foreshadowing Issues to Come - Rimbobujang
(Jambi Province, Sumatera)

1.49 Rimbobujang is the first of the regular transmigrant communities to be settled within the project area designated for Transmigration II and as such, it is of special interest to the Bank.^{/1} In many ways, the project resembles Baturaja. Both projects have been established in areas of low fertility soils - latosols and podsolics with a pH of 4.5-5.0. Both provide the migrant with five hectares of land, one hectare of which is now clean cleared for food crops when migrants arrive. All migrants are provided with a house, tools, planting materials, agricultural inputs and 12 months of subsistence supplies. Village, health, education and administrative services are much the same and roads within both projects are good.

1.50 There are some differences between the two communities. Five hundred families were settled in Rimbobujang in the wet season 1975/76, a year before Baturaja was settled. The second phase of Rimbobujang (RB II) which consisted of 2,000 families corresponds to the settlement of 400 families in Unit I-Baturaja, and Phase III-Rimbobujang (1,500 families) was settled about the same time as Baturaja Unit II (400 families). In September of 1978, there were a total of 1,100 families in Baturaja and 4,550 families (21,000 people) in Rimbobujang.

1.51 Several other important differences exist between the communities, not the least of which is proximity to Java. It takes five or six hours by train or bus to go from Baturaja to the harbor on the southern tip of Sumatera and from there it is an overnight ride on the ferry to Java. It also takes five or six hours along the newly constructed Trans-Sumatera Highway to move from Rimbobujang to Padang (the nearest port). From Padang, transport by freighter is costly, irregular and subject to frequent delays. For migrants with little money and no lodging, this seriously constrains the amount of communication which can occur.

^{/1} Sitiung, a sister community on the Rimbobujang border was opened by the Public Works Department and settled by Javanese displaced from the catchment area of the Wonogiri dam. For this reason, both its physical development and social circumstances are somewhat different than in communities in the regular transmigration program.

1.52 The physical environment also varies somewhat. Whereas the early Baturaja migrants were settled in areas of old alang alang, the migrants in Rimbobujang are in the midst of primary forest. This is important because land preparation and the differences in these ecological settings affect the agricultural strategies of the migrants themselves. In Baturaja, the first hectare has generally been clean cleared and plowed. Under these circumstances, the Javanese do intensive field preparation in order to control alang alang, and they plant the area in food crops. In so doing, they have brought an average of 0.96 hectares into production at the end of 16 months. In Rimbobujang, however, much of the land has simply been felled and burned. Weeds are not a serious problem in areas of primary forest for the first two to three years, so the migrants in Rimbobujang have elected to dibble rice and clear new land. In many cases when soil fertility decreases, they plant perennials, particularly coffee (which is both profitable and easy to plant) and fell new areas for rice. Under less intensive cultivation, migrants in Rimbobujang typically report nearly two hectares in production.

1.53 But perhaps the most important difference between Baturaja and Rimbobujang is in the availability of off-farm work. The small number of migrants in Baturaja has provided those who are there easy access to construction opportunities. The care and planting of the block-planted rubber is also done by the migrants themselves. Rimbobujang migrants are disadvantaged in two respects: household heads are forbidden to work in construction, and no rubber planting has yet been undertaken.

1.54 Migrants do not necessarily have to work off-farm if they have markets for their goods or can earn petty cash. But the Rimbobujang migrants have had several problems in this respect. Given their large numbers and the tendency for all to produce the same things, and given their isolation even from domestic markets,^{/1} migrants in Rimbobujang find absolutely no buyers for the two commodities which they have in excess - cassava and timber. Cassava requires processing, timber requires markets and timber concessionaires prefer to use lumber which they themselves provide in ongoing construction. In other words, in some ways, the Rimbobujang settlers are more like those in Way Abung than Baturaja. In their early years, they have little internal differentiation, no markets and limited access to off-farm employment. Under these circumstances, two questions arise:

- (a) Are spontaneous migrants still attracted to the community?; and
- (b) If so, under what circumstances?

^{/1} Although the infrastructure exists, the marketing networks have yet to evolve which link villagers to local and regional markets.

Unfortunately, Rimbobujang is a new community which is less well monitored than communities within the Bank-assisted areas, and the answers to these questions must rest primarily on a labor survey of 500 families which was concluded in September, 1978.

Early Labor Recruitment

1.55 The evidence for the potential of spontaneous immigration comes in part from anecdotal information on Unit I. Among the 500 families settled in Unit I, there were initially 400 regular immigrants and 100 families from the Social Welfare Department. Like the social welfare migrants to Way Abung, these people were the indigent of Javanese cities and like the Way Abung migrants, they proved ill suited to the migrant life. During the second year, when their supplies ceased, 78 of these families fled. Within a year, however, these 78 homesteads had been occupied by the fissioning of extended households already in the area, and by inclusion of 15 spontaneous immigrants living with relatives in Unit I.

1.56 The presence of this number of available families is one line of evidence for spontaneous immigration. The labor survey also gives indication that the now familiar process of growth and diversification must already be taking place. For example, if we look at the ratio of laborers to families in Rimbobujang, we find that recent arrivals have only slightly more adult males per household (1.18:1.00) and females (1.16:1.00) than would be expected by the normal husband and wife and occasional adult child of either sex. For families which have already had a harvest, however, the ratio for males climbs to 1.58 per household and females 1.32. Apparently the number of laborers in households has been increased.

Table 1.10: RATIO OF ADULT MALES AND FEMALS TO NUMBER OF HOUSEHOLDS

	Males over 15	Females over 15
Phase I (1975/76)	1.42	1.21
Phase II (1976/77)	1.58	1.32
Phase III (1977/78)	1.18	1.16

Auxiliary evidence suggests that the lower ratio in Phase I than Phase II is an artifact of the early fissioning of Unit I families.^{/1} The larger ratio of females than males per family is, no doubt, also a factor of selective in-migration.

^{/1} If 78 adults are added to the 422 families which remained, the ratio is at least 1.61 males per household head.

1.57 A more detailed breakdown between units reveals additional differences within the phases.

Table 1.11: RATIO OF ADULT MALES AND FEMALES TO HOUSEHOLDS IN RIMBOBUJANG (EXCLUDING THE HOUSEHOLD HEAD AND SPOUSE)

	Unit	Male		Female		Sample size
		>15 years	12-14 years	>15 years	12-14 years	
Dec 1975	I	0.42	0.21	0.21	0.15	
Dec 1976	II	0.44	0.23	0.33	0.14	
Dec 1976	III	0.49	0.32	0.27	0.16	
Mar 1977	IV	0.42	0.20	0.20	0.20	
Mar 1977	V	0.92	0.24	0.51	0.18	
Dec 1977	VI	0.18	0.21	0.15	0.18	
Dec 1977	VII	0.31	0.27	0.19	0.12	
Mar 1978	VIII	0.26	0.17	0.24	0.17	
May 1978	IX	0.09	0.20	0.14	0.11	
May 1978	X	0.13	0.10	0.13	0.25	
<u>Total</u>	RB	<u>0.39</u>	<u>0.21</u>	<u>0.24</u>	<u>0.17</u>	

1.58 Two points are particularly noteworthy. The first is the steady increase in the ratio of adult males to households over time. Migrants in Units IX and X who arrived after the last harvest season (January-March) have the lowest number of auxiliary males and are presumably representative of all populations just shortly after arrival. For those arriving after planting but before harvest was finished, there is an appreciable increase in all age groups, particularly among adult males. Among those groups which have been in place through one planting season or more, the number of additional males is doubled. The second striking point in the above chart is that Unit V has nearly twice the number of adult males and females of any other group. This appears due to the presence of retired military personnel who have both older families, and pensions to support help.

Meeting Future Labor Requirements

1.59 Because Jambi has low population densities, because migrants are required to work on their own land, and because the transmigrant areas are far from Java, labor shortages in the area are already acute. Although construction companies estimate a casual labor force of about 1,000 males within the migrant population (excluding household heads), this is not enough. Timber concessionaires send foremen (mandors) to Lampung (South Sumatera) to recruit itinerant Javanese laborers (it is easier to recruit there than in Java, they say, because Javanese there have already made the decision to leave their homes) and to obtain laborers for a seed farm. The transmigration office has allowed migrants in Unit VI to work one week in four.

1.60 The situation is made increasingly acute by preparations for Transmigration II, which proposes to settle 42,000 families in the region, and by the decision of Government to request Bank assistance in developing a 5,000-hectare rubber estate adjacent to Rimbobujang while block planting two hectares of rubber for 6,000 migrant families and 2,000 local smallholders. The question is a simple one: where will the required labor come from?

1.61 The labor requirements for developing the estate and smallholder rubber are, taken by themselves, staggering enough. Assuming semi-mechanical land clearing requirements for unskilled labor alone may be summarized as follows:

Table 1.12: UNSKILLED LABORERS REQUIRED FOR NES III - RIMBOBUJANG
(Man-years)

Year	Estate	Smallholder	Total
1 (1979)	1,747	0	1,747
2 (1980)			
3 (1981)	1,848	2,736	4,594
4 (1982)	1,724	4,787	6,511
5 (1983)	2,006	5,272	7,278
6 (1984)	1,547	6,139	7,686
7 (1985)	807	5,839	6,646
8 (1986)	383	2,669	3,052
9 (1987)	256	1,534	1,790
10 (1988)	151	1,030	1,181
11 (1989)	49	685	733
12 (1990)	0	294	294
<u>Total</u>	<u>10,518</u>	<u>30,884</u>	<u>41,272</u>

Source: Staff Appraisal Nucleus Estates III.

1.62 Since these figures represent virtually full-time work, it is unlikely that much of the labor will be provided by migrant household heads (although Baturaja figures do show nearly one-third of household heads engaged in such work). Instead, most laborers will have to be recruited. This can be done in one of two ways: either the estate can recruit unskilled laborers in Java, house them temporarily and return them when the work lessens; or it can attempt to recruit through pre-existing chains. It is to the credit of PNP VI that they are willing to explore recruitment procedures which will allow laborers to be recruited through on-site families and that they have begun to explore ways in which those who wish to do so can be integrated into the community in a permanent and productive way (for example, some of the laborers will no doubt elect to become part of the population working on the nucleus estate).

1.63 Providing for these laborers is only the tip of the iceberg, however. With this number of people on site, provisions must be made not only for their accommodation and their use of community resources, but arrangements must be made for the service sector which will follow as well. Add to this, the influx of laborers to be involved in the clearing of 100,000 hectares of land, the creation of seven new settlement areas, construction of 42,000 houses, village infrastructure and those involved in the other components of Transmigration II and the magnitude of the problem becomes clear. Assessment of the manpower requirements of developing communities must now be made in order to promote spontaneous outmigration in a way which is consistent both with national interests and the welfare of those who move.

2. PLANNING FOR THE FUTURE

2.01 As the cases in the preceding chapter indicate, transmigrant communities consist of more than autonomous, self-sufficient farmers. Their growth and development is predicated on employment creation, spontaneous immigration and community diversification. Thus far, however, the emphasis on agricultural production as an indicator of migrant - as opposed to community - success has tended to divert attention from other efforts which are required to stimulate economic development and promote migrant flow. This chapter considers two of the many ways which might be proposed to channel spontaneous migration:

- (a) removing existing constraints; and
- (b) providing incentives through employment creation.

Implicit in the argument is the notion that viable communities which attract and incorporate spontaneous migrants are not only less costly but are, in many ways, less risky and certainly more natural than communities which consist of sponsored migrants alone. It does not follow, however, that these

communities can flourish unsupported and unplanned. It is an essential premise of this paper that greater support to early immigrants and sound planning for those who come behind will greatly improve migrant welfare and facilitate the settlement process.

Removing the Constraints to Outmigration

2.02 Since the data suggest that most migrants are better off in the outer islands than they were in Java, why don't more people move spontaneously? On one hand, the answer to this question is that they do. Between 1905 and 1978, the Government moved approximately one million people to the outer islands, primarily to Sumatra, where natural population increase and subsequent outmigration has resulted in what is conservatively estimated as a population of some five million Javanese in the outer islands.

2.03 Yet most observers agree that inequity of population and maldistribution of the labor force continue to be major problems in Indonesia and the question remains why don't more move? Constraints on agricultural production are a part of the picture, but as the previous cases have indicated, Javanese are also prevented from moving by problems related to constraint on:

- (a) land availability;
- (b) access to project sites;
- (c) initial support; and
- (d) employment opportunities.

The following section argues, therefore, that spontaneous migration can be significantly increased by removing existing constraints to movement and by providing incentives through employment creation both in standard transmigration projects and other sectors of the economy.

Removing the Constraints to Movement

2.04 Land Alienation. One of the critical issues in settling people on the outer islands is the problem of land transfer. Most indigenous smallholders do not have land title but are given the right to cultivate by the traditions subsumed under customary law (adat). In many parts of Indonesia, adat, sanctioned by statutory law, places authority over land use in the hands of extended families or local territorial groups. Under these circumstances, indigenous smallholders are seldom in a position to legally transfer the ownership of their land. If a spontaneous immigrant wants to use the

land of a local cultivator, he does what is called ganti-rugi - compensate for loss. Compensation may be for the loss of the right to use the land or the loss of productive trees, but it is not generally for the land itself. Therefore, if the land improves in value - as it does with increased immigration or the planting of perennial crops - migrants may be requested to pay additional money or return the land. They may even be subject to counter-claims that the person who received the initial payment was not the person who had the right to do so. If the immigrants are politically weak - and most are - they are extremely vulnerable to such manipulation. For these reasons, many Javanese are unwilling or unable to move without Government assistance in obtaining land.

2.05 One of the main reasons to move into a transmigrant community is that there - at least in theory - the Government has already obtained the right to the land and is able to transfer legal title to the migrant. In the past, this right was acquired by negotiations with elders or officials, and indigenous farmers were often overlooked. This situation improved with the basic Transmigration Act of 1972 which provided mechanisms for compensating displaced smallholders, but problems remain. For example, the Government is not always able to compensate in a way which is regarded as equitable by the locals. On the other hand, indigenous people may come along after the community is established and assert ownership in the interest of obtaining compensation.

2.06 The policy now in effect of filling all alienated land with sponsored migrants further inhibits spontaneous growth. At this time, spontaneous migrants to Baturaja, a community established in the first Bank-assisted transmigration project, must return to Java to register for transmigration as the land outside the Baturaja project is marga land of uncertain ownership which makes ganti-rugi difficult. Spontaneous migrants in the second Bank-assisted project will face an even more serious problem since sites are located within areas now assigned to timber concessionaires. This will make ordinary procedures for ganti-rugi almost impossible and will literally prevent homesteading and spontaneous movement unless plans are made to incorporate semi-sponsored and spontaneous migrants into the area in a systematic way.

2.07 A large step toward the smooth outflow of migrants could be taken:

- (a) if mechanisms were available for the legal transfer of land between local cultivators and immigrants;
- (b) if land within transmigration sites was reserved for spontaneous immigrants; and
- (c) if spontaneous migrants were allowed to register for settlement in the project area once they were there.

Access

2.08 Access to the project area is now recognized as a precondition of success. Most of the projects proposed for future assistance are in areas being opened either by new agricultural strategies or new communications networks and most are relatively accessible from new or existing roads. But access to new areas is not limited by poor infrastructure alone. Javanese are also limited, by their own poverty and lack of knowledge about accommodation and transport, to move freely.

2.09 Naivety and financial vulnerability are major impediments to movement. For example, spontaneous Balinese migrants to Sulawesi faced tremendous difficulties in traversing the oceans to Parigi, in organizing their own accommodation, in finding cheap food and lodging, and in predicting and arranging transport. For this reason, virtually every new group of immigrants was accompanied by people who had made the trip before. Today, transits or hostels exist in many towns where bona fide migrants can lay down their mats and cook their own food, but visitors, and others who are a bit irregular, are often reluctant to avail themselves of these services.

2.10 These problems can be addressed by:

- (a) systematically disseminating information on work opportunities, means of travel, costs and living arrangements enroute to migrant areas. This can be done by:
 - (i) providing existing migrants with such information so that they can send it to interested relatives and friends; and
 - (ii) giving out such information in target communities in sending areas.
- (b) Constructing transits for transmigrants in major cities and erecting barracks for them in settlement areas will also facilitate movement.

Community Diversification and Immigration

2.11 Agriculturalists who are able to feed themselves still require cash to supplement their own subsistence crops. They may obtain this by selling their surpluses or by working off-farm. Assuming that surpluses can be produced, their sale entails a market and this market must be based on either internal differentiation or networks linking homogenous transmigrant communities with a more diverse market.

2.12 On the other hand, a limited market is not an insurmountable handicap if migrants, and early migrants in particular, have access to off-farm work for cash. However, if the household head himself works off-farm, less land is brought into production. Migrants can circumvent this problem by adding laborers to their families. In such cases, one member of the family produces a small but steady cash flow while the others bring land into production. It is a corollary of this point that the more workers there are in nonagricultural occupations, the greater the domestic market for food crops becomes. At present, however, there are a number of constraints to income and community diversification which impede spontaneous immigration:

- (a) official transmigrants are forbidden to work off-farm;
- (b) off-farm work frequently requires a full-time commitment which precludes participation by family heads;
- (c) regular transmigrants are moved in nuclear families, so only two adult laborers are available and both are required on-farm;
- (d) spontaneous immigration is allowed but not systematically encouraged; and
- (e) no planning or preparation exists for the incorporation or settlement of nonagricultural immigrants.

Removing these constraints is relatively straightforward:

- (a) authorities should acknowledge the need to work off-farm, and its role in creating labor shortages and immigration, and they should assist in arranging work opportunities which do not interfere with agricultural production. For example:
 - (i) migrants in Unit VI - Rimbobujang rotate employment on a seed farm, each family sending a laborer to work one week in four; and
 - (ii) in Baturaja, intervention by DGT has caused the hours in rubber planting to be reduced from 7-3 pm to 7-1 pm. This has created more part-time employment while leaving half days for on-farm work;
- (b) families should be allowed or encouraged to move with additional adult laborers; and
- (c) arrangements should be made to encourage immigration to fill temporary and permanent labor shortages:

- (i) manpower centers could be established in core villages;
- (ii) employment information could be prepared and distributed through existing migrant families;
- (iii) land could be made available in quarter hectare houselots for nonagricultural immigrants; and
- (v) land could be reserved within villages for spontaneous growth.

2.13 Labor shortages and spontaneous movement go hand in hand; but before promoting labor shortages, an easy but essential first step in facilitating spontaneous movement is to address those constraints to movement which already exist.

Creating Employment

Establishing the Foundation

2.14 Agriculture will no doubt continue to be the core around which transmigrant communities are built because only an agricultural strategy weds the surplus labor of the inner islands and surplus land of the outer islands on a low-cost and practical way. It is also desirable to have agricultural surpluses available before encouraging labor diversification both to support the nonagricultural population and to prevent a drain on the country's food resources. Nonagriculturalists in turn stimulate production and marketing, lead to labor shortages on-farm, and therefore promote further immigration. The first priority, therefore, should be to establish core communities which can very rapidly produce food crops and create employment.

Increasing Agricultural Employment

2.15 There are also ways to increase the amount of employment generated within the agricultural sector and therefore increase either the number of people or the overall income level which this sector supports. One is to build labor shortages into the development plan. Two hectares of clean-cleared land, for example, would not only produce surpluses, but also is the maximum a family can till. If they wish to do any other work - clear land for perennial crops, seek wage income, do complex cropping - they are forced to recruit and support additional laborers. The advantage in such a system is that labor recruitment of this type is done largely without cost to the Government and it serves in effect as a training program for those who will eventually settle on their own. It also offers new immigrants back-up economic and social support.

2.16 A second strategy for increasing employment in the agricultural sector is to diversify farm employment itself. Weitz, Pelley and Applebaum /1 state the problem very well:

The prevailing type of agriculture in the countries under study is subsistence farming. The crop pattern of a subsistence farm is generally dominated by a single staple crop, and consequently the annual work schedule of the farm is uneven, with a peak demand for labor at the harvest season. If the farm family utilizes its total labor potential at that time, it is usually underemployed during the rest of the year. This feature renders the subsistence farm inadequate for the purpose of alleviating unemployment, since by its very nature this type of farm perpetuates a state of underemployment (p. 3).

2.17 Weitz, et al., then argue that the only means of circumventing this problem is to diversify production at the farm level (ibid). This means, in part, that agricultural production itself must be diversified by introducing crops and cropping strategies which spread the labor of the farm family over as much of the year as possible. Appropriate cropping patterns also assure that labor constraints in the production of one crop do not set the limit on overall productivity. Finally, monitoring of transmigration suggests that nonagricultural employment increases agricultural productivity by absorbing surplus labor in slack agricultural periods and freeing it for agricultural work when required.

Assisting the Service and Industrial Sectors

2.18 Surplus production not only provides opportunities for community differentiation, but also surplus production requires community differentiation. Yet the role of the service sector is frequently overlooked both in planning agricultural settlement and in counting its beneficiaries. As the chart on the next page indicates, communities of 30,000 people with family incomes of \$750 (the condition most closely resembling transmigration projects) generate nearly 70.2 service positions per 1,000 settlers. Assuming only one laborer per family, this would mean that 70 families, more than 350 people, would be required to service an agricultural sector, consisting of 200 farm families. According to this model, a settlement with 30,000 agriculturalists would attract and support 10,500 people in the service sector alone.

/1 Weitz, Raanan, David Pelley and Levia Applebaum, New Settlement and Employment, Settlement Study Center, Rehobot, 1976.

Table 1.14: EMPLOYMENT GENERATED IN SERVICES PER 1,000 SETTLERS AT DIFFERENT PROJECT SIZES AND LEVELS OF INCOME

Level of income Population	\$750 /a		\$1,800 /b		\$3,000 /c	
	3,000	30,000	3,000	30,000	2,750	27,500
<u>Education</u>						
Kindergarten	-	-	2.0	2.3	3.6	4.0
Primary school	5.6	5.6	5.3	6.1	6.5	7.0
Secondary school	1.0	1.2	1.3	1.5	2.5	2.9
Vocational school	1.0	1.2	1.3	1.7	1.8	2.3
<u>Health</u>						
Village clinic	1.7	1.8	1.7	1.8	1.8	2.2
Rural clinic	2.0	2.2	2.0	2.1	2.1	2.5
Hospital	-	5.3	-	5.3	-	7.2
<u>Public Service</u>						
Registration	-	0.2	-	0.2	0.4	0.2
Police	2.0	2.0	2.0	1.8	2.2	2.0
Post and telegraph	0.7	0.8	0.7	1.0	0.7	0.8
Municipal administration	5.0	6.3	5.0	7.0	8.7	9.0
Rural cooperatives	2.3	2.3	2.3	3.3	2.9	4.3
<u>Technical Rural Assistance</u>						
Regional office	0.3	0.5	0.3	0.7	0.7	1.1
Rural office	2.3	2.3	2.3	2.7	2.9	3.6
<u>Commerce</u>						
Retail	6.3	11.0	8.3	11.3	17.5	18.0
Wholesale	0.6	1.3	0.7	1.6	0.7	2.5
Banks	1.6	2.7	1.7	2.8	1.8	3.3
Hotels	0.7	1.3	0.6	2.0	4.3	3.6
Petrol stations	0.3	0.3	0.3	0.5	1.0	1.5
<u>Various Services</u>						
Culture and sport	2.0	2.0	2.0	2.3	2.9	3.5
Personal services	-	1.6	2.7	2.8	3.6	4.4
Domestic services	-	-	5.6	4.8	9.0	11.8
<u>Construction</u>						
	10.0	11.6	12.0	13.3	20.0	18.0
<u>Transportation</u>						
	5.0	6.7	7.0	8.3	11.0	11.0

/a Based on: I. Prion, Region ACU Apodi Brazil, 1974 (not published).

/b Calculated on the basis of I. Prion, Regional Meridionale de Centandina (a hypothetical study region).

/c Calculated on the basis of: O. Schulz, D. Bruhis and E. Prion, Estudio y Diagnostico del Desarrollo Urban-Rural Integrado por Etapas para la Costa Atlantica de Colombia, 1975-1990, OAS, Programa de Desarrollo Rural, Washington, Abril 1975 (mimeo).

Source: Weitz, Pelley and Applebaum, 1976, p. 45.

2.19 The growth of services and industries can be facilitated if anticipated and planned:

- (a) Spatial needs and infrastructure requirements of diversified communities must be anticipated:^{/1}
 - (i) major processing facilities can be included in the development plan;
 - (ii) service industries, health, education, administration, seed farms, cattle stations and their labor requirements must be calculated, adequate housing and infrastructure provided;
 - (iii) substantial territory can be reserved for nonagricultural immigrants; and
 - (iv) towns as rural service centers can be anticipated and their development facilitated.
- (b) Small-scale services and industries can be fostered in the private sector. For example:
 - (i) raw materials for tools can be brought into the community, forged and assembled there;
 - (ii) skills such as surveying and typing should be sought among migrants themselves. If absent, they can be taught;
 - (iii) credit can be provided for small businesses like bicycle and vehicle repair;
 - (iv) small processing equipment like tempe and tofu makers (soya-bean processors run by women entrepreneurs) can be made available for purchase or credit; and
 - (v) extension can be provided to teach community members to define needs, recruit those they need to help them and arrange their support (imams, teachers, cooperative managers, etc.).

^{/1} Weitz makes the point that the most important thing about land allocation is flexibility. He advocates providing agricultural land largely as needed. After initial parcels are distributed, he claims that in many cases, additional lands should be available to more successful farmers on lease. Similarly, small industries could pay to rent rather than buy additional land from the communities they were in. Such land holdings within the community itself could, in fact, serve as an impetus to community solidarity and development.

(c) Larger-scale labor-intensive industries can be established:

- (i) cassava processing which uses migrant women;
- (ii) milling which uses migrant lumber, migrant labor;
- (iii) rubber or oil palm processing which requires local and migrant labor; and
- (iv) transportation systems using local entrepreneurs.

2.20 Most important, a social environment must be established in which these activities are facilitated by Government and impediments to flexibility and growth are systematically removed.

Toward a Strategy of Employment Creation and Regional Growth

2.21 In a review of Joan Harjono's book, Transmigration in Indonesia, A. W. Arndt and R. M. Sundrum /1 argue that the focus on agricultural small holdings as an incentive to outmigration is misguided:

... a more realistic alternative approach is needed than a fond belief that transmigration conceived purely as a land settlement program can trigger either broad-based regional development in the other islands or the large-scale migration needed to supply the labor for such development. Such an alternative would not preclude cultivation of the land settlement type on a modest scale, but it would drastically change the thrust of transmigration policy (p. 7).

Basically, Arndt and Sundrum argue for a shift in investment to the outer islands, particularly in public works, which would draw labor into the outer islands from Java. Such a program, they argue, would be consistent with the goals of regional development, would facilitate the integration of local people and transmigrants and would be the only possible way to promote large-scale outmigration from Java.

2.22 In spite of the authors' misgivings, however, employment creation is in no way inconsistent with a large-scale land development program; and it may, in fact, be stimulated by it. For example, estimates for land clearing now vary between 30-50 man-days per hectare, depending on the amount of

/1 Arndt, A.W. and R. Sundrum, "Transmigration: Land Settlement or Regional Development?", a paper prepared for a work-in-progress seminar, October 11, 1977, Australian National University (mimeo).

equipment used. If anywhere near correct, this suggests that 3 to 5 million days of labor - 12,000 to 20,000 man-years - simply open the land needed for the 42,000 families in the second loan proposed for Bank support. This does not include the number of people involved in logging, planning, land surveys and land transfer, road construction, house construction and related transport.

2.23 To capitalize on the employment created as a necessary part of transmigration projects and to use this employment to promote community diversification and outmigration is one of the most important tasks in the transmigration program. Several of the steps required are:

- (a) a comprehensive manpower plan;
- (b) manpower coordination on site;
- (c) measures for integrating laborers into the community; and
- (d) phased community development.

Manpower Planning

2.24 As previous sections have indicated, such things as village design require overall estimates of the laborers required in the community. In a highly centralized country such as Indonesia, these estimates are also a pre-condition to planning for building transitos, enlarging transportation networks, providing barracks and even assuring the proper distribution of food and supplies. As a first step towards a comprehensive manpower plan, estimates are required for the number of laborers each sector will require and consideration must be given to their support.

On-Site Coordination

2.25 As the Rimbobujang smallholder rubber scheme indicates, facilitating the movement of such a vast number of people requires comprehensive manpower plan for the recruitment, dissemination and support of the laborers required. In initial stages, agencies responsible for logging, construction and the like will probably have to recruit either from adjacent areas or directly from Java, but in later periods, much of the manpower required can be recruited through pre-existing chains. This has the advantage of assuring laborers of supportive networks, permitting flexibility, facilitating transition into the area, and assuring assistance to farm families in peak labor periods. General procedures for recruiting labor could be used, but, once again, they would have to be organized, supported and planned.

2.26 For example, ordinarily the main village would have a labor recruitment center as part of its administrative apparatus and through this center, most recruitment would occur. Village heads and individuals would notify the manpower office of the number of available workers in an area and contractors would approach the manpower office for information on villages where they might recruit. Ideally, contractors would estimate manpower requirements three to six months in advance. The manpower office, together with the contractor, would then inform the villagers of the number of workers needed and the time work would begin, and migrants would be encouraged to recruit relatives or friends. When the work began, the contractor would arrange pick-ups in the specific villages. Alternately, where Government work was to be organized or individuals widely recruited for short periods, community vehicles could be used to transport people to a central depot where they would collect for transfer to a new site. This is important, as transportation arrangements determine employment possibilities in diffusely settled transmigration sites.

2.27 Centralizing manpower coordination has a number of advantages to the community:

- (a) it brings together recruiters and workers;
- (b) it provides employment opportunities even for those in remote areas;
- (c) it allows advanced planning and information dissemination to migrants and locals; and
- (d) it permits flexibility in filling jobs. When one job ends, for example, priority can be given to reemploying people already in the area rather than recruiting anew.

However, individuals - both migrants and locals - should be allowed either to register for employment or seek work on their own, as overcentralization leads to favoritism and inflexibility.

2.28 Several additional caveats are also required. Throughout the world, foremen (called mandors in this area) are frequently responsible for organizing blocks of unsophisticated laborers and reporting their availability or finding them employment. This expedites the work of the manpower office and can be encouraged if safeguards are taken to prevent the exploitation of workers. Finally, since both men and women are productively employed in Indonesia, work opportunities - where appropriate - should be available to both. Not only is this important by way of preserving the traditional access which Javanese women have to remunerative employment, it also encourages the immigration of couples, fosters a more balanced sex ratio and thereby reduces the tensions which are universally associated with a large male labor force in small rural towns.

Stabilizing the Work Force

2.29 Both as an incentive to immigration and a means of stabilizing the work force as labor opportunities move on, spontaneous migrants should be given the opportunity to register for land upon arrival in the community. After one year on site, they should be allowed to settle on the cleared houselots within existing communities with the understanding that they would build their own houses and clear their own land. Alternately, they would be eligible to move into the next available settlement, preferably within the same general area with full Government support. Every effort should be made to settle people from the same sending area together, within a general policy of first come, first served.

Phasing Community Development

2.30 If the focus is shifted from agricultural production to the process of creating new communities, both project beneficiaries and the task of planning are significantly altered. Different kinds and degrees of support, as well as different work arrangements are required at different stages of development.

2.31 Initial Construction. In early stages of community development when few laborers are in the vicinity, direct recruitment from Java may be required and heavy capital-intensive machinery is more appropriate than in later stages. In this period, infrastructure such as roads would be carved out of the forest and nucleus villages established on each of the sites. Nucleus villages ultimately servicing 5,000 farm families initially would contain barracks and service facilities, seed farms, cattle holding grounds and administrative services such as clinics and schools. They might also have lumber mills and processing plants. It should be assumed that such a community would ultimately have a substantial proportion of its population engaged in nonagricultural work and provisions for land allocation should be made accordingly.

2.32 The Agricultural Core. Once nucleus communities are established, administrative services in place, and houses constructed, the first wave of agriculturalists should be settled. These farmers need land which is cleared and developed to get rapidly established and to begin to produce the surpluses upon which future growth is to be based. Careful planning for early immigrants is extremely important, however. As the evidence of Parigi and Way Abung indicates, the first migrants know the least and have the most limited social networks in the receiving area, and for this reason, they require more support than later immigrants. Since the initial community is small, however, early planning can assure this increased support.

- (a) Most of the total complement of extension workers and trainers can be on site when the earliest migrants arrive. This would increase both the time of their training and the intensity of services to early immigrants.
- (b) The proper provision of seeds, fertilizers and pesticides can establish new behavioral patterns among the first migrants and which would then be diffused by the migrants to those who come later.
- (c) Contacts between farmers and research stations, health workers, etc. can be intensified in the early period and normalized later on when new migrants would also have existing settlers to provide information and support.

2.33 Later Development. After a core community of 2,000 families or 10,000 people is established within a site, every effort should be made to promote labor-intensive strategies and use existing migrants to recruit additional workers to meet labor shortages. If these spontaneous immigrants are given the option of settling with full benefits in newly opened sites, presumably the pressure to settle reserve areas within the old communities would not be serious until these older communities were sufficiently stable and labor short to welcome the immigrants homesteading would attract.

2.34 Homesteading. In the fifth year after settlement, transmigration communities are usually turned over to provincial authorities. It is also the time when perennials begin to yield, early immigrants begin to feel labor shortages and spontaneous immigration begins to occur. For this reason, transfer of transmigration sites to the provinces should be accompanied by the opening of reserve land within the sites for homesteading. Land settlement through homesteading is facilitated by the fact that relatives and friends can settle within the communities of those who must support them. They can also receive the benefits of administrative services, health and education facilities which are already in operation. Government, for its part, however, must arrange for the orderly transfer of land to homesteaders, smallholders and entrepreneurs, and it must be committed to increasing local-level services as villages expand. After transfer to provincial authorities, most growth should be expected to occur spontaneously. A doubling of village size within five years of transfer and a quadrupling of the population within 20 years of settlement are modest estimates of rate of growth, estimates which nevertheless illustrate the importance of early planning.

The Stages of Settlement

2.35 The overall strategy implied in the preceding pages assumes that the GOI wishes to facilitate migration and that it wishes to do so as efficiently and economically as possible. It argues:

- (a) that infusions of capital and machinery (for road clearing and land development) are most important in the early communities and their importance then decreases over time;
- (b) that the need for support, supplies and services is also most critical in the earliest communities and lessens over time; and
- (c) that conversely, spontaneous migrants should make up a growing proportion of each community as time goes on and that their arrival, employment and incorporation into new communities should be planned.

2.36 This model assumes both that it will take a relatively large amount of money to settle relatively few migrants in the first few years, and that successive waves of migrants can be settled at decreasing expense, thus greatly reducing the perceived per capita cost of settlement. It also argues that only a system which facilitates the use of existing support systems to promote spontaneous migration is harnessing the potential of the normal migration flow.