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**PROJECT PERFORMANCE AUDIT REPORT**

**INDONESIA - TRANSMIGRATION I PROJECT  
(LOAN 1318-IND)**

June 25, 1984

Operations Evaluation Department

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### ABBREVIATIONS

BIMAS	-	Credit System for Agricultural Inputs
BRI	-	Bank Rakyat Indonesia
CRIA	-	Central Research Institute for Agriculture
DGT	-	Directorate General of Transmigration
FAO/CP	-	FAO/World Bank Cooperative Program
GOI	-	Government of Indonesia
KUD	-	Village Cooperative
PCR	-	Project Completion Report
PMU	-	Project Management Unit
PTP X	-	Para Statal Enterprise for Rubber Plantation
REPELITA	-	Five-Year Development Plan
RSI	-	Bank Resident Staff in Indonesia
SAR	-	Staff Appraisal Report

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(LOAN 1318-IND)TABLE OF CONTENTS

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PROJECT PERFORMANCE AUDIT REPORT

INDONESIA - TRANSMIGRATION I PROJECT  
(LOAN 1318-IND)

PREFACE

This is a performance audit of the Transmigration I Project in Indonesia, for which Loan 1318-IND in the amount of US\$30.0 million was approved in July 1976. The loan was closed, 17 months behind schedule, and an undisbursed balance of US\$23,039 cancelled on April 13, 1983.

The audit report consists of an audit memorandum prepared by the Operations Evaluation Department (OED) and a project completion report (PCR) dated January 4, 1984. The PCR was prepared by the Bank's East Asia and Pacific Regional Office.

An OED mission visited Indonesia in November/December 1983. The mission held discussions with officials of the Department of Transmigration and with evaluation staff of the Bogor Agricultural Institute (IPB). The project area was visited and project officials and farmer settlers interviewed. The information obtained during the mission was used to test the validity of the analysis and conclusions of the PCR.

The audit memorandum is based on these discussions, on interviews with Bank staff associated with the project, and on a review of the PCR, the Staff Appraisal Report (No. 1119b-IND) dated June 10, 1976, the President's Report (No. P-1885-IND) dated June 25, 1976, the Loan Agreement of July 21, 1976, correspondence with the Borrower, and internal Bank memoranda on project issues as contained in relevant Bank files.

A copy of the draft report was sent to the Borrower on March 5, 1984. Comments received from the Minister of Transmigration and from the Director General of Livestock Services are attached as Annexes I and II and have been taken into account in the preparation of the final report.

The audit finds the PCR comprehensive and accurate with respect to the project's principal achievements and shortcomings and has no reason to question its conclusions. The audit memorandum deals with problems and constraints related to project design, contractor performance, monitoring and evaluation, agricultural development, settler welfare and the post-settlement transition, and raises the issue of the suitability of the transmigration settlement model.

The valuable assistance provided by the Government of Indonesia and by local officials and the farmers visited is gratefully acknowledged.

**PROJECT PERFORMANCE AUDIT REPORT**  
**INDONESIA - TRANSLOCATION I PROJECT**  
**(LOAN 1318-IND)**

**BASIC DATA SHEET**

**KEY PROJECT DATA**

<u>Item</u>	<u>Appraisal Estimate</u>	<u>Actual or Estimated Actual</u>	<u>Actual as % of Appraisal Estimate</u>
Total Project Costs (US\$ million)	56.8	57.3	101
Loan Amount (US\$ million)	30.0	30.0	100
Disbursed	30.0	30.0 /a	-
Cancelled	-	/a	-
Date Board Approval	-	07/15/76	-
Loan Agreement Date	-	07/21/76	-
Date Effectiveness	10/19/76	02/28/77	233 /b
Date Physical Components Completed	07/81	10/82	125 /b
Proportion Then Completed	100	100	-
Closing Date	11/30/81	04/13/83	127 /b
Economic Rate of Return (%)	12-19 /c	17-22 /c	129
Institutional Performance	-	Fair	-
Agronomic Performance	-	Encouraging	-
Number of Direct Beneficiaries (1983)	14,500	14,500	100

**CUMULATIVE DISBURSEMENTS**

	<u>FY76</u>	<u>FY77</u>	<u>FY78</u>	<u>FY79</u>	<u>FY80</u>	<u>FY81</u>	<u>FY82</u>	<u>FY83</u>
Appraisal estimate (US\$ million)	1.0	6.5	16.0	23.0	28.5	30.0	-	-
Actual (US\$ million)	-	1.6	6.4	10.6	16.2	22.5	27.4	30.0
Actual as % of estimate	0	25	40	46	57	75	91	100
Date of final disbursement	April 13, 1983							

**MISSION DATA**

<u>Mission</u>	<u>Date (mo/yr)</u>	<u>No. of Persons</u>	<u>Handdays in Field</u>	<u>Specializations Represented /d</u>	<u>Performance Rating /e</u>	<u>Trend /f</u>	<u>Types of Problems /g</u>
Identification	06/73	2					
Preparation	01/74	-					
Appraisal	11/74	8					
Appraisal Follow-up	03/75	1					
Appraisal Follow-up	09/75	5					
Appraisal Follow-up	05/76	5					
Supervision 1	09/76	4	20	A,B,D	1	1	M,T
Supervision 2	08/77	2	4	A,B	2	1	M
Supervision 3	02/78	4	24	A,B,D,F	3	2	M
Supervision 4	06/78	3	9	A,B,D	3	1	M
Supervision 5	09/78	5	25	A,B,D,C	3	2	M,F
Supervision 6	04/79	5	40	A,C,D	2	2	M,F
Supervision 7	01/80	4	16	A,C,D	2	2	M,F
Supervision 8	07/80	5	25	A,C,D,E	2	1	M,F
Supervision 9	05/81	4	24	A,C,D	2	1	M,F
Supervision 10	02/82	6	30	A,C,D	2	1	M,F
<b>Total Supervision</b>			<b>217</b>				

**OTHER PROJECT DATA**

Borrower	Republic of Indonesia
Executing Agency	Directorate General of Transmigration
Fiscal Year	April 1 to March 31
Name of Currency (abbreviation)	Rupiah (Rp.)
Currency Exchange Rate:	
Appraisal Year Average	US\$1.00 = Rp. 415
Intervening Years Average	US\$1.00 = Rp. 627
Completion Year Average	US\$1.00 = Rp. 650
Follow-on Project:	
Name	Transmigration II      Transmigration III      Transmigration IV
Loan/Credit Number	Ln. 1707/Cr. 919-IND      Ln. 2248-IND      Ln. 2288-IND
Loan/Credit Amount (US\$ m)	90.0/67.0      101.0      63.5
Date Board Approval	05/29/79      03/22/83      05/24/83

/a Actual disbursement was US\$29,976,961; the balance of US\$23,039 was cancelled.

/b Calculated in terms of months from the date of Board approval.

/c For Batunraja and Way Abung subareas, respectively.

/d A = Agronomist; B = Agricultural Economist; C = Financial Analyst; D = Civil Engineer; E = Health Specialist; F = Procurement Specialist.

/e 1 = Problem-free or minor problems; 2 = Moderate problems; and 3 = Major problems.

/f 1 = Improving; 2 = Stationary; and 3 = Deteriorating.

/g F = Financial; M = Managerial; and T = Technical.

PROJECT PERFORMANCE AUDIT REPORT  
INDONESIA - TRANSMIGRATION I PROJECT  
(LOAN 1318-IND)

HIGHLIGHTS

The project was the first Bank support for the transmigration program in Indonesia and comprised subprojects in South Sumatra and Lampung. One subproject assisted the settlement of 4,500 transmigrant families at Baturaja, while the second aimed at the rehabilitation of an existing settlement involving 10,000 families at Way Abung. The project's main objective was to test strategies for the agricultural, social and economic development of upland transmigration settlements based on an integrated rural development approach.

Project start up was delayed by seven months and the closing date was extended by one year because of weak management and procurement problems during the first three years. Thereafter the project gained momentum and met most of its targets at no additional cost. Targets for road construction, water supply, and agricultural production were exceeded. However, a minor shortfall was noted in the distribution of cattle, and difficulties were encountered with the monitoring and evaluation program.

The project can generally be considered as having been successful in spite of some initial doubts. The Baturaja settlement showed that good agricultural results can be achieved on red/yellow podsollic soils provided farmers apply an adequate package of inputs and soil management techniques; some 27% additional spontaneous transmigrant families were attracted to the area. Marketable food surpluses were produced. The resulting incomes, together with future revenues to be generated by settlers' rubber plots, are expected to greatly exceed transmigrants' incomes at their places of origin. The development of cassava industries at Way Abung is a promising sign of the effect on secondary economic activities. Among the contributing factors to the favorable outcome were the project's rural development approach, its implementation through a Project Management Unit, the semi nucleated village design, the high quality of rubber plantations, and the health, educational and marketing infrastructure being established in the project area. The economic rates of return of 17% and 22% for Baturaja and Way Abung, respectively, exceeded appraisal estimates.

Other points of interest are:

- a project specific management unit (PMU) has proven effective for the coordination of project activities. However this concept requires groups of settlements totalling 15,000 to 20,000 families to be cost effective (PPAM, para. 10; PCR, paras. 5.02-5.04, 7.02-7.03, and 8.01);

- the provision, free of charge, of agricultural inputs during the initial three years, as well as applied research and the agricultural extension services proved to be important factors during the start-up phase of the new settlement (PPAM, paras. 13, 19 and 22; PCR, paras. 5.18-5.23, and 8.01);
- the provision of one head of cattle per family has helped to alleviate labor constraints and increase crop production, although difficulties were encountered in the cattle distribution program (PPAM, para. 21; PCR, paras. 5.26-5.29);
- a single mixed farming model per settlement scheme has been insufficient to take account of the variable transmigrant attitudes and land conditions (PPAM, para. 19; PCR, para. 8.01);
- the results have shown that monitoring and evaluation should not be over ambitious to be implemented and used efficiently (PPAM, paras. 17-18; PCR, paras. 5.15-5.17);
- the construction of small earth dams surrounded by shallow wells has yielded an adequate water supply for settlements with inadequate groundwater resources (PPAM, para. 14; PCR, paras. 5.09-5.11);
- poor contractor performance contributed to cost increases and implementation delays (PPAM, para. 16; PCR, paras. 5.07 and 5.10-5.11);
- the development of village cooperatives has been disappointing and requires more extensive technical and financial assistance than has been provided (PPAM, para. 22; PCR, paras. 5.35 and 8.01); and
- the Baturaja settlement, due to its pilot nature, is not representative of Government's overall settlement program. Its above-average agricultural and economical results, especially regarding cultivation of red/yellow podzolic soils, should be considered as potential levels achievable under intensive investment and technical assistance conditions (PPAM, paras. 20 and 30; PCR, paras. 5.22 and 8.01).

PROJECT PERFORMANCE AUDIT MEMORANDUM

INDONESIA - TRANSMIGRATION I PROJECT  
(LOAN 1318-IND)

I. PROJECT SUMMARY <sup>1/</sup>

1. Although transmigration has been taking place for decades in Indonesia, it has received priority Government support only since the early 1970s. Growing inter-island disparities, i.e., overpopulation in Java and Bali and lagging economic development in the Outer Islands, have increased the urgency of transmigration. Unfavorable conditions for food production on the Outer Islands have been a major impediment to rapid settlement.

2. FAO was invited to assist in overcoming technical production constraints in transmigration areas, and later, during 1972-74, the FAO/IBRD Cooperative Program undertook the preparation of this project. The project followed the rural development approach and was kept small in scale as it was intended to develop and demonstrate a viable pattern to be replicated elsewhere.<sup>2/</sup> It was estimated to cost US\$56.8 million. Appraisal took place during 1974-75, and a Loan (1318-IND) in the amount of US\$30.0 million was approved in July 1976. The loan became effective in February 1977, four months behind schedule, and was closed in April 1983, about 17 months later than expected. A small undisbursed balance of US\$23,039 was cancelled.

3. The objective of the project was to devise and implement two test schemes, one for the establishment of a new settlement at Baturaja, South Sumatra, and the other for upgrading an existing settlement at Way Abung, Lampung. The main features of the proposed Baturaja scheme were the construction of 10 village centers with about 4,500 settler houses and adequate health and school facilities; the construction of roads and tracks; block-planting of 4,500 ha of rubber and maintenance for six years; distribution of about 4,500 head of cattle and of farm inputs; the establishment of agricultural credit, extension and cooperative services; and the provision for one year of food and other essential commodities. The proposed Way Abung scheme comprised the construction of roads and tracks; block-planting of 2,500 ha of rubber and maintenance for six years, benefitting about 5,000 settlers; distribution of 5,000 head of cattle, benefitting another 5,000 settlers; construction of health and educational facilities; and expansion of agricultural support services. Technical assistance was to be provided for both schemes, and various studies were to be undertaken. General program support was also included.

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<sup>1/</sup> Adapted from the PCR.

<sup>2/</sup> The original and official title of this project was "Transmigration and Rural Development Project". In view of the follow-on projects, this project became subsequently known as "Transmigration I".

4. Implementation of the project was in large measure successful, although, as in most projects of this nature, there were considerable difficulties, and more time was required than expected. Project start up was very slow due to delays in establishing project authorities, concluding agreements with cooperating Government agencies, and recruiting a consulting firm. After further slow progress during a learning period for project staff, the pace of implementation became satisfactory. In Baturaja, 4,500 families were settled in 11 village units. In both schemes together, 840 km of roads were constructed or improved, exceeding the original target by 50% and the revised target (1981) by 10%. The provision of domestic water supply at Baturaja was successful only after the original proposal, i.e., collecting rain water, was found inadequate and well construction problems related to unfavorable groundwater conditions and inexperienced contractors had been resolved. Eventually, a combination of small earth dams and shallow wells yielded ample water, though of low quality for household purposes. At Way Abung, the construction of 2,170 shallow wells exceeded the target by 10%. The combined total of 51 established health facilities and schools was exactly on target. The planting of rubber trees proceeded as planned at Baturaja, with 4,500 settlers receiving 1 ha each. At Way Abung, difficulties were encountered with land availability, and instead of 5,000 farmers receiving 0.5 ha each, about 2,700 farmers were allocated nearly 1 ha each. Although the 9,300 cattle distributed represented a shortfall of only 2% compared with appraisal estimates, this program had suffered from inadequate holding grounds and excessive losses of animals in transit. Despite the delays in implementation, the total project costs of US\$57.3 million were practically identical to appraisal estimates.

5. The achievements to date are encouraging. Adaptive research work produced cropping systems which incorporate adequate soil conservation measures and are financially rewarding. However, the high levels of cropping and labor intensity have in some cases exceeded settlers' managerial capability and family labor supply. The development of the residual area within the 5 ha allocated to each settler for crop production has therefore been slow, although the total of over 5,800 ha brought under food crop cultivation exceeded original estimates. The experience with cattle has been mixed, mostly because of settlers' unfamiliarity with cattle. However, availability of animal draft power is reported to be essential for the cultivation of the whole of farmers' tillable area as well as for the maintenance of soil fertility. Rubber development, under the country's parastatal enterprise for rubber plantation, has shown excellent results, and the expected yields exceed original estimates by about 20%. The health and educational facilities established under the project are operational. The achievements to date with cooperative development have been less than satisfactory, and agricultural support services have been inadequate. Marketing, credit and agricultural extension all require improvement if the full agricultural potential of the project area is to be realized. Another weakness concerns road maintenance, which has been highly inadequate.

6. Institutionally, the project had some innovative features. The Project Management Unit (PMU), although initially plagued by staffing deficiencies, eventually performed well and has been credited with successfully

overcoming the often intractable coordination problems inherent in Indonesia's public sector. The required transfer of responsibility from the transmigration authorities to regular, mostly local government, agencies had only started, but there are indications that this change-over will not be accomplished without difficulties. Financial and staffing resources available in the future are likely to be inadequate, and the future use of general project facilities, e.g. offices and staff housing, is as yet undetermined.

7. The project's benefits include increased incomes for 10,000 farm families in Way Abung and the 4,500 settlers in Baturaja. In addition, about 1,200 spontaneous transmigrant families have settled at Baturaja and are contributing to the local economy. As a result of the project, additional insight has been gained into the complexities associated with the agricultural utilization of the unstable, low-fertility soils of the project area. Project cost, as expected, was relatively high, amounting to an average of about US\$8,000 per family at Baturaja, and US\$2,200 at Way Abung. However, these high costs were more than offset by project-generated benefits, leading to reestimated economic rates of return of 17% at Baturaja and 22% at Way Abung, exceeding combined appraisal estimates by 29%.

## II. AUDIT FINDINGS

### General

8. This project marks the outcome of Bank's first involvement in transmigration, which began with an attitude somewhere between excessive hesitancy and prudent caution. This attitude was justified, however, in view of the multiple objectives of transmigration programs - economic development is only one, and perhaps not even the predominant, goal - and the absence of proven and viable technical, economic and sociological models. Although transmigration had been ongoing for a long time in Indonesia, the determinants of success and failure had not been sufficiently understood. This project made a contribution towards an improved understanding of settlement problems. However, that this contribution was modest is reflected in the fact that the three follow-on transmigration projects supported by the Bank (Credit 919-IND/Loan 1707-IND, Loan 2248-IND and Loan 2288-IND) are all designed differently in an effort to address different problems or search for new solutions, and have made very uneven progress.

9. While the scope for generalizing from this experience is limited, within its own set of circumstances the project successfully capitalized on its innovative character. As problems arose, anticipated or otherwise, these were eventually dealt with, and the project gradually became known for its interim achievements. The key ingredients for this success were the flexibility and coordinative talent exhibited by project authorities. Whether it concerned such obstacles as unfavorable topography for locating village centers, lack of accessible groundwater and of experienced contractors for providing water for the villages, or an underestimation of the difficulties of acquiring suitable blocks of land for rubber plantings, as was the case in

Way Abung, imaginative solutions were found and good results obtained. Without effective coordination of the many agencies involved in this project, however, such results would not have been possible.

10. A successful feature of the project was its implementation through a Project Management Unit (PMU). The PMU was established especially for this project and actually encountered serious problems at the beginning which required substantial supervision input. For about two years, staffing as well as operating procedures were inadequate, and the project progressed disappointingly (paras. 5.02-5.04 and 7.02-7.03). But with effective personnel in place and procedures streamlined, performance began to improve after 1978. The PMU was particularly suitable for coordinating the activities of participating agencies. However, despite these encouraging results, the Ministry of Transmigration has indicated that it is inclined to abandon the PMU concept in future transmigration projects, as not being in line with Government policy. As such a move would eliminate a proven success factor, the PCR suggestion (para. 8.01 (a)) to retain the PMU concept at least for large schemes - the features of the present PMU may be difficult to replicate widely - seems worthy of consideration.

11. The project's chance for sustainable success was greatly enhanced by the very positive experience with its rubber component. Operationally, the involvement in the establishment and maintenance for six years of the block rubber plantings of the experienced estate company (PTP X) produced rubber tree stands with very good yield prospects. Conceptually, the existence of the rubber trees is likely to be extremely beneficial in the medium term for the settlers financially. Income from rubber trees should begin to flow at the critical time when off-farm employment opportunities created by the project itself are ceasing, and farm production and permanent off-farm work are far from fully developed. While there are still existing problems requiring solutions (para. 23) and equity considerations give rise to arguments (para. 37), individual settlers and the project as a whole stand to gain from the rubber component as it was conceived and implemented.

#### Problems and Constraints

12. Project Design. Several design features of the project proved inadequate or inappropriate. Among the most important of these was the size of holdings established under the project which was 5 ha. In most cases this area exceeds present requirements per family (para. 8.01 (g)). Effective manpower availability generally does not allow adequate cultivation of the whole area, either because the family work force is too small, or partial off-farm engagement of the work force leaves an insufficient residual to operate the farm. There are also indications that intensive cultivation of 5 ha in Baturaja, i.e., with 2 ha under rubber and nearly 3 ha under food crops, will generate a potential family income far in excess of national standards. One advantage of providing more land to the settlers is that it can easily be divided up among settlers' children in the future. In fact, the potential carrying capacity of this land has already attracted immigration of additional settlers ("in-fix migrants" - mostly relatives of project settlers), who are sharing the land. In view of the growing pressure on land

use, however, an extension to this project, financed under Loan 2248-IND, provides only 3.5 ha per settler. This allocation is still generous compared with traditional settler lots of about 2.5 ha, and the maximum of 1 ha permitted for spontaneous settlers.

13. The original project concept provided for the distribution of fertilizers, seeds and implements to participating farmers in the first year of settlement. This provision proved inadequate in the course of implementation, and farmers were actually given support for three years. Officials associated with the project consider this an effective way of demonstrating to settlers that it pays to apply modern inputs and to get them accustomed to their use. However, there are open questions in this connection. First, it is possible that this subsidy could have been reduced had the farmers' support services been more adequate (para. 22). Second, it is open to conjecture to what extent the favorable agronomic results and optimistic conclusions in the PCR (para. 8.01 (f)) are the result of the three-year input grant. But regardless of what the answers to these questions are, the project has demonstrated the three-year grant to be effective in promoting food crop production under the prevailing circumstances.

14. Incomplete information on topography and other environmental conditions in the project area had several design implications. It was thus not possible to locate ten large enough sites which would have accommodated about 450 settler families each. Instead, the project had to establish 11 village centers averaging a smaller number of families. For this reason, and also because of general underestimation at appraisal, the proposed road network had to be expanded by over 50% during implementation. Another - one of the biggest - design-related problems concerned the water supply component for Baturaja (paras. 5.09-5.12). While a groundwater resource constraint was recognized at appraisal, the suggested alternative, i.e., roof water collection, proved inadequate. Avoidance of a potentially disastrous situation required nothing less from project management than to come up with a technically ground-breaking innovation. This innovation, a combination of small earth dams and shallow wells, deserves careful scrutiny for possible replication where similar hydrological and climatic conditions exist.<sup>3/</sup>

15. Another project proposal that ran into difficulties was the rubber component at Way Abung. It was assumed at appraisal that sufficient land would be available within settlers' aggregate entitlements for block-planting of 2,500 ha of rubber trees (para. 5.31). For various reasons, however, including a partial misreading of the situation at appraisal, implementation delays, and a lack of agency coordination and forward planning, it was difficult to acquire blocks of land in suitable locations. Consequently, the allocation of rubber plantings had to be changed. Instead of 5,000 farmers receiving 0.5 ha each, only about 2,700 farmers were given on average nearly 1.0 ha of rubber trees; the target area of 2,500 ha was thus met. Project authorities attempted to compensate farmers not benefitting from the rubber scheme through preferential allocation of cattle and farm inputs.

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<sup>3/</sup> This scheme is already being adopted in Nucleus Estates and Smallholder (NES) projects.

16. Contractor Performance. As has been the case in other projects<sup>4/</sup> poor contractor performance has contributed to cost increases and implementation delays. Specifically, inexperienced contractors, by not using casings, caused 140 shallow wells to collapse. Twenty earth dams were washed away as a result of faulty construction (paras. 5.10-5.11). Contractors were also used for road maintenance, and the experience was unfavorable (para. 5.07). Although inadequate supplies of construction materials and financial difficulties adversely affected the contractors' performance, inexperience and ineffective supervision by project staff were the prime causes. Aspects of contractor involvement have been shown by this project to require increased attention in future projects.

17. Monitoring and Evaluation. Careful provision was made under the project, including the employment of consultants, for monitoring and evaluation (part II.A of Schedule 2, and Section 3.03 (b) of the Loan Agreement). The objective was to follow the socio-economic development of the settlement areas and to identify project alternatives conducive to enhancing the participation of the settlers in the establishment of viable farming communities. Unfortunately, implementation of this component was not satisfactory, and the PCR correctly portrays it as the weakest (paras. 5.15-5.17). Project management was not able to arrange for the required studies to be carried out in a timely fashion. Initially, this component was delayed, together with the rest of the project, as a result of the PMU start-up problems (para. 10). Subsequently, there was a shortage of funds for this purpose, and it took a long time to approve the consultants' contract. Complete agreement on the nature of the monitoring and evaluation exercise actually was never reached with the consultants - a team from the Institut Pertanian Bogor (IPB). Consequently, the consultants' work was of limited value as it covered only one year (1980/81), publication of the results was delayed, and the focus did not meet expectations with regard to, for example, identifying alternatives for reducing costs in future replications of upland settlements. Bank supervisors, being preoccupied with the implementation of the settlement component, were surprisingly ineffective in resolving conceptual matters for these studies and in expediting contractual arrangements, although the problem was reported as early as February 1978. Indications are that the supervision task was not made any easier by Government's reluctance to undertake the studies. In the audit's view, this is an area where the Bank's input, decisively delivered, could have changed the situation. However, despite these shortcomings, progress of the project is relatively well documented in the records of the PMU and some participating agencies.

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<sup>4/</sup> See PPAR for the Agricultural Research and Extension Project (Loan 1179-IND) and the National Food Crops Extension Project (Loan 1267-IND), OED (forthcoming).

18. The IPB team produced a series of quarterly reports, and a final report was issued in 1983.<sup>5/</sup> The latter offers a picture of the project which, in some respects, is in contrast with other available information. It basically underlines the heterogeneity of the settlers' economic achievements and argues for more comprehensive and effective support to be accorded the settlers by the project. A major contribution of the project was to provide an opportunity for both the Indonesian transmigration authorities and the participating IPB staff to gain on-hand experience with outside evaluation of transmigration activities. While it is necessary to improve the focus and timely execution, the Bank should continue to encourage involvement of local agencies in monitoring and evaluation activities of projects in Indonesia.

19. Farming Aspects. The project generated impressive insights into the agricultural complexities facing newcomers to the area. The Central Research Institute for Agriculture (CRIA) conducted an adaptive research program over a six-year period and issued practical recommendations which are currently being field-tested for long-term adoption by farmers (paras. 5.18-5.25). While an encouraging beginning has been made, the audit agrees with the PCR's argument that a single, predominant farm model is inadequate for meeting settlers' diverse requirements (para. 8.01 (d)). Farming systems will have to continue to be tested for their suitability to overcome farm families' labor constraints, to meet market requirements, and to be consistent with the need to preserve soil fertility.

20. The audit is advising caution, however, on the conclusion reached in the PCR that under certain conditions sustained food crop production on red/yellow podsollic soils has been shown to be feasible under this project (para. 8.01 (f)). First, a six-year test period is relatively short for assessing the long-term effects of continuous, high-intensity cropping. The results are still test results and not actual achievement levels of unsupervised farmers. The adequacy of cropping patterns, soil management systems and input levels - not too clear to begin with - is liable to change given the unstable soils in the project area, and economic limits may eventually be exceeded if, for example, rising input levels are required to maintain constant yields and soil fertility. Second, even if the above PCR conclusion is correct in principle, there is insufficient evidence that settlers will actually adopt and continue to apply adequate husbandry methods. As Government policies (i.e., price interventions, input subsidies) and market conditions change, recommended practices may not remain attractive to farmers and suboptimal practices may be substituted. Once podsollic soils are eroded it takes many years for the top soils to form again. The valuable lesson conveyed by this project, however, is that even if the long-term farming systems were to be based on perennials, transmigrants can become self-sufficient in food crops during the establishment period of the settlement and continue raising food crops at least as a subsidiary activity.

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<sup>5/</sup> IPB, Study on Evaluation of Long-term Monitoring of Baturaja and Way Abung Transmigration and Rural Development Project, Final Report 1980-1982, July 1983.

21. Experience with the project also shows that ownership of draft animals is beneficial in a farming system based on food crops. However, the results of the project's cattle distribution component were not entirely satisfactory, partly because of insufficient cooperation between the PMU and the Provincial Livestock Services Office.<sup>6/</sup> Initial losses were high due to transport deficiencies and lack of holding grounds (paras. 5.26-5.29). Farmers were largely inexperienced in the care and use of draft cattle; shortcomings in extension were especially felt in this area. The calf return program has been seriously behind schedule, partly due to poor breeding results. The utilization pattern of draft cattle raises the question of timing of cattle distribution. Utilization during the initial seasons was low due to the as yet small land area available for cultivation, lack of training, and farmers' off-farm employment. Moreover, a significant portion of the original recipients no longer own any cattle on account of misfortune or mismanagement. This experience suggests that the viability of settlements like Baturaja could possibly be improved by phasing the allocation of draft cattle in relation to an agreed expansion in cultivated land, making it conditional on a minimum cultivated area, or requiring several families to share an animal for some time. In contrast to cattle, small animals could be more easily cared for by the settlers and generated ready cash income. Increased ownership of small animals should therefore have been promoted more strongly. Aspects of trade-off or complementarity between draft cattle and small animals should be thoroughly reviewed. Such a review should also aim at determining the suitability, on a selective basis, of dual-purpose cattle instead of the draft breeds presently being distributed to new settlers.

22. Support Services. The development of support services was disappointing under this project. Agricultural extension, especially in animal husbandry, was deficient, greatly slowing the process of acquainting settlers with unfamiliar practices or improved methods. CRIA encountered problems in conveying its recommendations to the farmers. A major reason for these shortcomings lies in extension organization, which militates against an adequate concentration of extension coverage and effective coordination of participating agencies in the newly settled areas. Furthermore, the transfer of responsibility upon project completion from the transmigration to local authorities is prone to disrupt, rather than improve, extension activities. The development and operation of cooperatives has been most disappointing, and their contribution to date to settlers' economic activities has been minimal. Under the circumstances, the future role of cooperatives in transmigration projects needs to be reviewed.

23. The marketing function was assumed almost entirely by the private sector, and performance, while imperfect, has been encouraging. Farmgate as well as central market sales of farm produce have been commonplace, and marketing activities have been conducted regularly and frequently. The supply of goods to farmers, especially farm inputs, has been more limited, however. There is obviously much room for increasing marketing efficiency, and the

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<sup>6/</sup> Comments received from the Director General of Livestock Services are in Annex II.

best chance to accomplish this is through improved competition among traders and provision of better infrastructure. As long as transportation is difficult and costly and institutional farm credit remains underutilized, large trade margins and seasonal price fluctuations will adversely affect farm incomes. A particular weakness exists with respect to the marketing of rubber. Although tapping is about to start, effective control of tapping standards is lacking, and arrangements for the collection and processing of latex have yet to be put into effect.

24. The promotion of agricultural credit has not been very successful. One explanation for this is that the high level of subsidies (i.e., inputs, food, capital grants in the form of settler and farming infrastructure) and some non-credit project features (i.e., calf return program), as well as the low initial level of commercial farm production and continued use of traditional trade credit adversely affected demand for institutional credit. Active promotion of institutional credit at an early stage most likely would have generated cost savings for the transmigration program and eased the transition from the sheltered construction phase of settlement to the normal operations following thereafter.

25. Settler Welfare. Overall, farmers in both Baturaja and Way Abung are relatively prosperous. Signs of material well-being are abundant, and the state of health and education is reported to be satisfactory. However, available data picture a diverse income situation. The PCR (para. 5.25) estimates that family income from food crops alone will eventually reach about US\$1,500 per year. If two hectares of rubber were cultivated this would add another US\$2,600 annually. The future income prospects for a Baturaja settler thus appear bright. However, incomes to date have been far more modest. According to the PCR, an average cropped area of 1.30 ha in 1983, under favorable conditions, produced a net family farm income of US\$614, or US\$472/ha. The IPB survey (132 farmers) showed an average total family income in 1980/81 of US\$524, of which 52% was from farm production and 48% from off-farm sources. The farm income component, with an average area of 0.87 ha cultivated, was thus US\$270, or US\$310/ha. With adjustment for inflation, the IPB results (US\$375) for on-farm incomes were thus about US\$100 lower on a per-hectare basis than the PCR estimates, partially reflecting the latter's assumption of enhanced productivity through CRIA-assistance.

26. While it is rather certain that average incomes of project farmers currently exceed subsistence levels, there exists considerable variation among farmers. This variation is in part due to differential adoption by farmers of improved practices on account of weak extension services. Total family income group averages in the IPB study ranged from US\$398 to US\$720. A sizeable number of families must thus be assumed to be at or below subsistence income levels. This result is especially significant as the average daily calorie intake (1980/81) was found to be 1882, i.e., about 8% below estimated (standard) requirements; protein intake was 6% above recommended levels. There is a strong likelihood, therefore, that a portion of the settler population was inadequately fed at the time of project completion, while another portion was very well off.

27. It is interesting that the IPB sample farmers reported almost one-half of their family income to have been derived from off-farm sources. Moreover, returns to labor were higher for off-farm employment than for farm work. There was thus a strong tendency to seek off-farm employment, with the result that land clearing and agricultural development were relatively slow. This outcome reflects a rational short-term reaction on the part of farmers, but with the heavy public investments in an agro-based settlement any aspect that adversely affects the utilization of agricultural resources, especially land, must be carefully watched. Whether there actually was an imbalance between off-farm employment and on-farm development is difficult to say, however, without further in-depth studies.

28. Aspects of Transition. It is Government policy that, as settlement units are established and the mandate of the transmigration authorities expires, public sector responsibilities are transferred to local authorities. This process has started for project entities, although the planned expansion financed under the Transmigration III Project requires continued use of some project infrastructure at Baturaja. The main questions arising, aside from the continuity of services to be provided to the settlement communities, concern the future use of project-specific facilities and the maintenance of roads. There are office buildings, guest houses, storage facilities, generators, vehicles, and a seed farm and tree nursery which will be partially or completely vacated with the departure of project staff. The future use, particularly of buildings, is likely to create problems for design and locational reasons, and because the upkeep is costly. Unless a suitable use can be found - and that had not been the case with the facilities at Way Abung at the time of the audit mission - valuable assets created under the project will be wasted.

29. Potentially more serious, however, is the maintenance of roads constructed or rehabilitated with project funds. For major roads, provincial authorities' maintenance responsibility started at the time of completion of work on those roads. However, the only maintenance undertaken to date was by the project, and that was highly inadequate. Consequently, rapid deterioration is making some stretches impassable. The economic cost, as a result of worsened transport conditions and the need to eventually rebuild rather than merely maintain the roads, is offsetting a growing portion of project benefits. It is reasonable to conclude from this experience that transmigration project roads should be designed to standards which most closely conform to the conditions prevailing in the Province where the project is located, and, with respect to buildings, the facilities provided should be useful beyond the implementation phase of the project.

#### Main Issue

30. The Transmigration Settlement Model. The project was a test case with organizational features and levels of investment which differed from the country's overall transmigration program (para. 8.01 (k)). As such, at issue is whether this model has been successful and can be recommended for replication elsewhere in Indonesia. There is no question that implementation has been on the whole satisfactory and the majority of settlers are reaping

sizeable benefits. However, the cost of the project, at nearly US\$8,000 per family in Baturaja, has been high for dryland farming development, and the crucial question is whether similar benefits could be achieved at a lower cost to the Government.

31. It has been estimated that 1,200 spontaneous transmigrant families settled in the project area. These families are either relatives of sponsored settlers with the same socio-economic background, or specially motivated independent transmigrants. The latter tend to be part-time farmers who possess some non-farm skills, have more financial resources of their own, and are economically especially active. These characteristics are desirable in a settlement community and should be promoted. If a project could be designed in such a way as to increase the number of spontaneous settlers in relation to sponsored transmigrants, then the cost to the Government of settling a given area could be reduced, even if some of the project services were extended to cover spontaneous settlers. One possibility would be to plan phased development around core communities or facilities, similar to the regional growth pole concept promoted by the Ministry of Public Works.

32. Relatively little analysis is available on the implication of settler composition with respect to place of origin, kinship, motivation to migrate, previous occupation, educational background and own financial resources. However, there are clear indications that these factors are crucial determinants of individual settlers' ability to adjust and progress, and of the dynamism of the settlers as a group. The greater the heterogeneity the more difficult it is to match project services with individual requirements and the greater is the disparity in the levels of achievement. The better educated and financed transmigrants tend to become dominant groups. While the intrinsic advantage of the existence of such groups for the settlement community, i.e., entrepreneurial leadership and effective communication with authorities, needs to be preserved, exploitative tendencies have to be discouraged in order for a balanced community to evolve.

33. The degree of settler involvement in site and land development also has an effect on settlers' commitment and the rate of progress. While settlers initially should not be overburdened and left prematurely to their own devices, their early and extensive involvement is desirable. At Baturaja, settlers generally were not involved in the selection of their site, the clearing of the homestead lot or the construction of their house. This is generally the case in sponsored settlements because involvement in these activities, though desirable, creates extra expense in temporary camps where health problems also could develop. Nevertheless, a review of procedures applicable to this early construction stage with a view to advancing the involvement of future settlers could eventually result in an improvement of the overall settlement quality.

34. Experience with this project has reaffirmed the importance of proper site selection. A multitude of variables need to be taken into account in the selection of village sites, and errors made in this selection are likely to be costly and have long-lasting effects. The Baturaja area

turned out to be more difficult than expected on account of adverse topographic features and unfavorable groundwater conditions. Land acquisition became a problem in Way Abung (para. 15). A priori determination of site suitability must thus be standard procedure of any transmigration program. The support provided for this purpose under the Transmigration III Project, which is expected to be continued under the proposed Transmigration V Project, is therefore most appropriate.

35. Concerning the pace and pattern of development of a settlement, experience with this project implies that the chance of success tends to increase with increasing levels of investment. However, it is not possible to draw firm conclusions as to what the optimum level of public investment might be. Equally important to know would be what the minimum critical investment intensity is for a satisfactory take-off of a settlement's socio-economic activities. This is an area where the monitoring/evaluation studies produced very disappointing results. It is difficult to say which project activities could have been curtailed and which others could usefully have been expanded or added. Preliminary indications are, as mentioned earlier (para. 21) that cattle distribution could have been more selective and phased over a longer period of time, while the keeping of small animals should have been promoted earlier. Given the level of maintenance, hard-surfacing of some of the roads was unnecessary. In view of the temporary nature of project management activities, the cost of project management infrastructure must be considered high. Furthermore, as a general notion, in a settlement consisting primarily of families with small children, high school facilities could be provided at a later date. As for underspending, the development of non-farming activities at Baturaja has been slow, and additional expenditures to stimulate such activities would have been appropriate.

36. Post-establishment interventions, or the overall phasing of public transmigration expenditures, are also of key importance. While project support for Baturaja was an expensive first-time effort, the activities in Way Abung represented second-phase investments. Public follow-on investments in previously under-financed transmigration schemes are currently gaining popularity in Indonesia. The question thus arises as to whether initial investments should be such that a settlement becomes immediately viable and sustainable, or whether additional phases should follow a relatively low-level initial investment phase. A comparison of the two project schemes shows that a second phase should not primarily serve to catch up with investments that should have been made initially, but it also demonstrates that some investments can be advantageously deferred. For example, farm input support, improved services, and better roads and health facilities should have been provided much earlier at Way Abung. The planting of rubber trees and the distribution of cattle conceivably can be accomplished at a slower pace than other investments. Phasing of investments has the advantage of flexibility in responding to proven weaknesses and in avoiding public expenditures that are not absolutely needed. The "full-package" Baturaja model promises a more rapid take-off, especially in an area where substantial location-specific problems exist and the settlement is not a replication of a successful operation already being implemented elsewhere under similar conditions. But even in the Baturaja case it is not immediately known whether the

settlement will be self-sustaining without further help, or whether follow-on investments are required. Accumulated experience to date is favoring a multi-phased approach, but with higher initial investments than were provided in traditional transmigration schemes, and with more extensive private sector involvement.

37. A difficult element with socio-economic and political dimensions is cost recovery in a transmigration project. The attractiveness and replicability of high-cost schemes like the ones financed under this project could be increased through improved cost recovery. The levels of recovery presently achieved through the collection of a land tax are minimal. Increased use of the credit mechanism is, of course, an attractive method for reducing public expenditures in the first place. Current inputs are the prime candidate for credit financing, but an essential prerequisite for such financing is the presence of an efficient credit apparatus, of effective extension services, and of adequate input supply and marketing facilities. Capital investments also could be subject, at least in part, to credit financing. The cattle distribution scheme provides for recovery under a quasi revolving fund principle: calves returned by the beneficiaries are immediately allocated to other farmers. The theoretical possibility of eventually recovering public expenditures through the sale of returned calves exists, although actual prospects given past performance are not promising.

38. Cost recovery would normally be expected for capital investments in cash crops like rubber. To establish and maintain for six years one hectare of rubber trees cost US\$2,800-3,000 under this project, i.e., more than one-third of total project cost per family in Baturaja. These investments are expected to generate about US\$1,500 in incomes annually, according to the PCR. Such incomes, combined with substantial expected earnings from food crops production, clearly create a capacity for repayment of investment capital to the public sector. Such repayments would be in addition to public revenues generated, if any, at the processing and final marketing stages for rubber. While the cost of agricultural support services, social infrastructure and roads is not expected to be recovered directly from beneficiaries, investments to create private (e.g. housing) and productive (e.g. land, inputs) assets could be subjected to cost recovery provisions for equity and public financing reasons. The Baturaja model has demonstrated the favorable impact in a settlement scheme of ample grant financing. It has, however, not succeeded in promoting cost-sharing by beneficiaries through an effective credit mechanism. Furthermore, it has not even addressed the question of cost recovery through levies or similar means, despite the fact that preliminary results point to potential income levels on the basis of which direct cost recovery would be justified.

39. It is the conclusion of the audit that this project offers valuable lessons, although inadequate monitoring has hampered thorough evaluation. Transmigration project investments can reasonably be expected to generate attractive benefits. However, opportunities present themselves in future projects for improving settlers' economic incentives, making the investment package more effective, and reducing the overall cost of and the share of the public sector in Indonesia's transmigration program.

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Comments received from the Minister of Transmigration

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M E M O R A N D U M

NOMOR . 160 / M / V / 1984 .-

TO. : MR. SHIR.S. KAPUR  
DIRECTOR , OPERATIONS EVALUATION DEPARTMENT  
THE WORLD BANK , WASHINGTON - DC.

FROM : H A R T O N O  
MINISTER OF TRANSMIGRATION  
THE REPUBLIC OF INDONESIA

RE. : PROJECK PERFORMANCE AUDIT REPORT TRANSMIGRATION I

DATE : MAY 16 , 1984

RE YOUR LETTER OF 5 MARCH 1984 I FULLY CONCUR WITH DRAFT  
PROJECK PERFORMANCE AUDIT REPORT INDONESIA TRANSMIGRATION  
I PROJECK ( LOAN - 1313B - IND ) AND LOOK FORWARD FOR  
RECEIVING COPY OF FINAL REPORT.

SIGNATURE

H A R T O N O  
MINISTER OF TRANSMIGRATION , BOI

CC.

1. MR. RADIUS PRAWIRO,  
MINISTER OF FINANCE.
2. MR. SOEMAS.
3. F I L E .

SEND BY : DJOKO DJATHIKO .W.

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DIREKTORAT JENDERAL PETERNAKAN

JAKARTA

Jl. Salemba Raya 16

( Tromol pos ; 402 )

Telex : 48125

Telepon No : 883935

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Nomor : Comments received from the Director General of Livestock Services  
229/XIV-Um/E Jakarta, 29 March 1984.

Lampiran :

Perihal : Comment on Transmigration I Project Report. Mr. Shiv. S. Kapur  
Director, Operation Evaluation Department  
The World Bank.

Dear Sir,

1. Thank you for your letter dated March. 5 1984 of the Project Performance Audit Report, Indonesia Transmigration I Project ( Loan - 1318 - IND ).

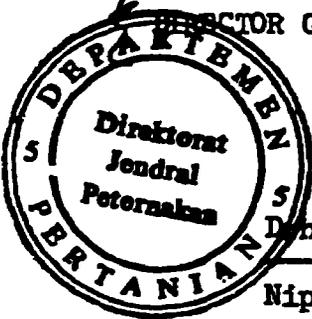
2. Regarding the slowness of cattle development in Transmigration I Project, we would like to forward to you the comments on the project report, hoping it will be useful for cattle distribution and development under Trans III Project.

- a. Since the implementation of the Transmigration I, Project the Provincial Livestock Services Office has not completely been involved by the PMU. To avoid the same situation may happen again in Trans III. Project, the PMU should worked close together with the Provincial Livestock Services Office. In such co-operation, the office will reponsible for the operation of all technical activities of cattle distribution and development within the Transmigration III Project area. For this purpose, one qualified staff from Provincial Livestock Services Office should be a member of the PMU's.
- b. The suggestion on increasing the bull to cow ratio to 10 % is highly appreciated. The bull Units in small size will be set-up in the place relatively close to the cows of the surrounding area. One bull will serve about 10 cows.
- c. DGLS agrees to the program of cattle repayment. The program will operate satisfactorily under Transmigration III Project only by an accurate plan and good field preparation.

d. The problem rising from day-to-day operation should be solved by both the PMU and the Provincial Livestock Services Office.

Kind regards.

DEPARTMENT OF AGRICULTURE  
DIRECTOR GENERAL OF LIVESTOCK SERVICES



Diraktorat  
Jendral  
Peternakan

Dan. DANAN DANUWIDJAJA  
Nip. 480023087 .-

C.C.

Mr. Walden  
The World Bank, Jakarta.

CONFIDENTIAL

THE WORLD BANK

INDONESIA

PROJECT COMPLETION REPORT

TRANSMIGRATION I PROJECT  
(Loan 1318-IND)

January 4, 1984

Projects Department  
East Asia and Pacific Regional Office

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INDONESIA

TRANSMIGRATION I (LOAN 1318-IND)

PROJECT COMPLETION REPORT

I. SUMMARY AND CONCLUSIONS

1.01 Transmigration has become, since 1970, an important part of Indonesia's five year development plans: Under Repelita III (79/80-83/84) the target was to settle 500,000 families in the Outer Islands.

1.02 The Bank loan 1318-IND of US\$30.0 million was the first to support the transmigration program. It became effective on February 2, 1977 and was closed on April 13, 1983 with 16 months delay. After a slow start, due mostly to managerial problems, the Transmigration I project achieved its major objectives which were to test new approaches to upland settlement and to explore ways and means to upgrade ongoing settlement schemes including:

- (a) the settlement of 4,500 families in Baturaja with requisite agricultural, physical and social infrastructure and services;
- (b) the upgrading of infrastructure and services in an existing settlement of 12,000 families in Way Abung; and
- (c) the monitoring of the settlement development.

1.03 The analysis of key indicators shows that most project components were completed as foreseen in the SAR at no additional cost. The targets were exceeded with regard to road construction, water supply and on-farm benefits; however, a shortfall was noted in the distribution of cattle to settlers (4%) and in the monitoring and evaluation of the settlement program.

1.04 The Transmigration I project, and particularly its Baturaja settlement, which is regarded as a "show piece" by GOI, can generally be considered a successful project inspite of the initial doubts. The encouraging results stem from various observations:

- (a) this project has demonstrated the possibility of maintaining agricultural production on red/yellow podsollic soils if farmers apply an adequate package of inputs and soil management techniques. When this package is combined with the intensive cropping pattern developed by CRIA during project implementation and the use of animal draft power the risks are reduced and above average yields can be achieved thus providing attractive benefits to transmigrants;

- (b) after 6 years of project, the transmigrants of both sites have an average family income about 15% above subsistence level. Incomes will increase further in the 7th year (1983/84) when the one hectare rubber plantation granted by the project enters into production. At full development each farmer at Baturaja is expected to have an annual family income of about US\$4,060 with 2 ha food crops and 2 ha rubber under production. Thus the Baturaja transmigrants, chosen from among the poorest inhabitants of Java and Bali, will have achieved, in less than 20 years, an income about 7.7 times above their initial level.
- (c) the inflow of about 1,200 spontaneous transmigrant families into Baturaja, representing about 27% of the official transmigrants, and the development of cassava industries in Way Abung demonstrates the attractiveness of the project and will further contribute to the area's economic development;
- (d) other factors have also contributed to the success of this project among which: the integrated rural development approach, the PMU management, the semi-nucleated village design, the high quality of rubber plantations, the agricultural extension services, the primary and secondary schools, the health centers and the development of a large permanent market by private traders.

1.05 At the end of February 1983, the first four villages of the 11 constructed in Baturaja were officially transferred to the Provincial authorities. However, to consolidate the benefits of this project, several issues remain: the maintenance of roads and basic infrastructure; the organization of the rubber tapping and marketing; the allocation of land and the assistance to spontaneous transmigrants; the adjustment of the BIMAS extension and credit program; the availability of medium and long-term credit for rubber planting, cattle and farm implements; and the timely supply of agricultural inputs, mainly fertilizers, chemicals and seeds. Some of these issues will be addressed by the PMU and provincial authorities under the Transmigration III project (Loan 2248-IND) which includes the extension of the Baturaja settlement by another 2,000 families.

## II. BACKGROUND

2.01 Transmigration has been implemented in Indonesia for over 75 years. However, it was not until 1970 that it was accorded priority in the country's five year development plans with 40,000 families settled in Repelita I (69/70-73/74), 83,000 in Repelita II (74/75-78/79), and a target of 500,000

families in Repelita III (79/80-83/84)/1 and possibly 0.75 million in Repelita IV (84/85-88/89). During the same time, the agency responsible for transmigration was strengthened and upgraded from the status of a Directorate General, to a Junior Ministry (1978) and lately (March 1983) to a Ministry.

2.02 The earlier settlement schemes were based on irrigated agriculture and estate plantations. In those days, it was considered that rice and rubber production were the best means of providing a decent living for transmigrants. But the high investments and the scarcity of government resources hampered the transmigration programs. It is roughly estimated that, between 1905 and 1970, about 500,000 families, or 1.5 million people, were settled through government sponsored transmigration programs.

2.03 To meet the targets fixed by the Repelitas since 1970, low cost settlements based on rainfed agriculture in upland red/yellow podsollic soils, known for their low fertility and acidity, had to be developed. In the initial upland settlements, the Government allocated small areas of land to the transmigrants (2 ha) and a minimum package of technical, social and economic assistance. As a result, in a majority of sites, after a few years of production yields declined, some settlers left agricultural production for off-farm employment and other transmigrants reverted to their initial poverty level. As such, in the early 1970s, the achievements of transmigration were not encouraging.

2.04 In view of these limited achievements and of the necessity to help solve the problems of overpopulation and unemployment in the Inner Islands together with the underutilization of land in the Outer Islands, GOI sought technical and financial assistance from various development agencies, including the Bank. GOI's main concern was to elaborate and test, in upland settlements, new development strategies that would ensure a minimum target income to transmigrants. The Bank became involved in the transmigration program in 1976 with the financing of a US\$30.0 million loan (1318-IND) for the Transmigration and Rural Development Project in the Baturaja and Way Abung sites (S. Sumatera), the Transmigration I project.

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/1 In March 1983 the Junior Minister for Transmigration announced in a public speech that 415,568 families had been settled in the first three years of Repelita III.

### III. PROJECT FORMULATION

3.01 Due to FAO's involvement in the Pematang Panggang transmigration project, the identification of the Transmigration I project was carried out with the assistance of the FAO/CP, from January 1972 to February 1974. The strategy for upland settlements, proposed by the FAO/CP identification mission, consisted of a rural development project in which the major agronomic, social and economic activities were addressed. The project was based on the principles of replicability, viability and low cost. Taking into account these aspects, the project was initially designed to develop four schemes in South Sumatra comprising the settlement of 13,000 families and the upgrading of a typical ongoing scheme involving 12,000 families.

3.02 The project preparation and appraisal were carried out jointly by DGT, FAO/CP and the Bank from February 1974 to October 1975. These two steps were time consuming because of delays in the implementation of aerial photography, soil surveys, physical planning and also because of the pioneering nature of this project. Many features were innovative and needed to be thoroughly analyzed and discussed before being accepted by GOI and the Bank. Among these were the minimum income level of transmigrants, the optimal size of holdings, the ratio between food crops and cash crops, the level of food aid and inputs for farm establishment, the level of cost recovery, the project management, the layout of village infrastructure, the health services and health control, the intensity and nature of agricultural support services, the animal husbandry and the number of draft animals.

3.04 During appraisal, the project was scaled down to two test areas comprising the settlement of 4,500 families in Baturaja and the upgrading of 12,000 families in Way Abung.

3.05 Project negotiations took place in June 1976 and 26 agreements, assurances and conditions of effectiveness had to be negotiated between GOI and the Bank. The project was not only innovative in many fields but also difficult to implement because of the involvement of eight government agencies.

3.06 Board presentation took place on July 15, 1976 and a loan of \$30.0 million, to be disbursed in five years, was approved out of a total project cost of \$56.8 million. The development period was estimated at 10 years and the economic rates of return were estimated at 11.5% for Baturaja and 19% for Way Abung.

### IV. THE PROJECT SCOPE

4.01 In Baturaja, each of the 4,500 transmigrants would be given a 5 ha holding, a 35 sq m wooden house, inputs and food aid for farm development during the first year of settlement, one head of cattle and one hectare of

block planted rubber which would be maintained by the project during the first three years. The farm model was designed to allow a net annual income of \$1,000 (1978 value) per family at full development under the assumption that each settler would crop intensively a house garden of 0.2 ha, produce food crops less intensively on 0.5 ha in rotation with 1.5 ha of a leguminous fodder crop and start tapping 1 ha of rubber 6 years after planting. Farmers would have access to short term credit through the BIMAS/BRI program for annual crops from year 2 onwards and to long term credit for planting rubber or perennials on 2.8 ha of undeveloped land. Village cooperatives (KUD) were to be formed before year 6 for supply of inputs and rubber processing.

4.02 In Baturaja, the settlement infrastructure comprised the construction of access and village roads, 10 village centers with public facilities and the construction of settlers' houses with wells for water supply. The services provided in each village included a primary school, a health post, a BRI and KUD office, a village hall, a market, godowns, a place of worship, a project office and staff housing. The villages were designed for 400 to 500 families subdivided in clusters of 25 to 30 houses called "dukuh" which would form the basic social units.

4.03 In Way Abung, about 5,000 families would be granted 0.5 ha of rubber plantation with 3 years maintenance financed by the project and about 5,000 other families were to receive one head of cattle. The BIMAS/BRI credit system was to be strengthened for the supply of agricultural inputs and the village and road infrastructure was to be rehabilitated for better access to markets.

4.04 Extension services at the rate of one village worker (PPL) per village were to be provided to both sites and adaptive research on crops and cropping patterns was to be carried out by CRIA. Two holding grounds and two cattle farms were to be established.

4.05 The project was to be managed by a Project Management Unit (PMU) attached to the DGT. The PMU would comprise local personnel assisted by a multidisciplinary team of consultants. A senior accountant, placed directly under the project manager, would keep the accounts.

## V. IMPLEMENTATION

### A. General

5.01 The loan became effective on February 28, 1977, seven months behind schedule because of delays in meeting conditions of effectiveness. Thereafter the project was implemented in 6 years instead of 5 and disbursements were terminated on April 13, 1983 (loan closing). Altogether, the project was

about 2 years behind schedule, but almost all infrastructure and settlement targets have been met or exceeded. The remaining undisbursed balance of \$23,039.12 was cancelled.

5.02 The project started slowly due mostly to inadequate staffing of the PMU. In June 1978, this problem was solved and project implementation improved steadily. However, these improvements were slow as all staff, including the project manager, were not familiar with the multidisciplinary approach of this project. Despite several managerial draw backs and weaknesses particularly in the cattle, credit, and monitoring components the project achieved better results than expected in the field of roads, water supply, agricultural production and settler income.

5.03 The consultants, SCET, also required a period of adaptation. Thereafter, they performed satisfactorily particularly in village designing and in solving the water supply problem in Baturaja. The supervising missions requested them, on several occasions, to provide additional input to assist the PMU in accounting, monitoring and other subjects.

5.04 A special mention should be made of the project's accounts and disbursements which improved after the recruitment in mid-1979 of a senior accountant. The presence of this senior accountant within the PMU facilitated significantly the work of the Bank's missions.

## B. Project Components

### (a) Villages

5.05 In Baturaja 11 villages were constructed instead of 10 planned at appraisal due to undulating topography and lack of arable land immediately around village centers. The average number of settlers per village was therefore reduced from 450 to about 400. The villages were laid out according to two basic designs: semi nucleated (or semi linear) and nucleated. The seminucleated villages were subdivided into clusters of 25 to 30 houses and each house had direct access to 1 ha of arable land. The nucleated villages were built in one group of contiguous houses and each house had direct access to only 0.20 ha of arable land for home gardens. In both cases the remaining arable land was distributed in 2 or 3 plots located within walking distance from the village centers.

5.06 The nucleated design led to cheaper infrastructure (25 to 30%). It also stimulated the social and economic life and facilitated adult and children education. On the other hand, the semi-nucleated design allowed farmers to tend more closely their first food crop lots particularly during the initial years of settlement when pests and diseases threaten the household income. Though the nucleated design is cheaper, the semi-nucleated layout is better suited to agricultural life in newly developed areas and is

preferred by farmers. Consequently the semi-nucleated design was recommended in the GOI transmigration program and used in subsequent Bank assisted projects.

(b) Roads

5.07 In Baturaja, the lengths of roads were underestimated in the SAR: 15 km instead of 42 km for main access roads, 107 km instead of 140 km for village roads and 286 km instead of 478 km for farm roads. All roads suffered from the lack of maintenance during the disbursement period. The PMU had neither the know how nor the means to carry out adequate maintenance. This problem was partially resolved by hiring contractors for the maintenance of main roads and purchasing road equipment for the maintenance of smaller roads. However, the main roads were still in bad condition at the time of the mission's field visit. This was due to the bad performance of contractors, the inadequacy of road design (asphalt or macadam topping too narrow) and also to the difficulty of maintaining surfaced roads by a non specialized agency. Conversely the smaller village roads were found to be in better condition possibly because of the easier maintenance and less traffic.

5.08 If all roads had been constructed with an all weather compacted aggregated subgrade (AWCAS standard), their cost would have been reduced and their maintenance would have been a lesser problem for both PMU and District authority. The same observations and recommendations apply to Way Abung, where the SAR targets have been met after some minor modifications.

(c) Water Supply

5.09 In Baturaja, the water supply rapidly became a major problem after project inception for lack of ground water. The SAR had acknowledged this problem and had foreseen that the main water supply would be from the collection of roof water and the digging of 900 shallow wells in selected locations. It had also considered the drilling of 10 trial deep tube wells and the construction of some small earth dams to secure an additional source of water.

5.10 The roof water collection failed because of long drought periods and the first 140 shallow wells constructed under the project collapsed because of the lack of casings. Once the problem of casings was remedied the shallow wells became dry during the drought periods. Similarly the deep tube well program ran into problems after striking coal in one well and natural gas in another one./1

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/1 The natural gas was still burning at the time of the mission's field visit despite several attempts to close the well. It was reported that the amount of gas was not sufficient for industrial applications.

5.11 In view of its broken and rolling topography Baturaja was ideal for the construction of small earth dams. However the first 20 dams were washed away due to the lack of experience of contractors in this field.<sup>/1</sup> In spite of these initial drawbacks the small earth dam program turned out to be a success: 209 were constructed and have provided ample water supply during the severe 1982 drought.

5.12 Village water supply is done by shallow wells, equipped with hand pumps, and located around the dams. This supply system is easy to operate and hygienic. However, during project implementation, the Government decided to equip villages with water treatment plants and in 1981/82, 11 units were constructed at great expense (about \$30,000/unit) out of Government resources. During the mission's visit, it was observed that some treatment plants were operating without chlorine thus defeating their purpose. The PMU also explained that the operation and maintenance of these plants was expensive and that some were stopped because of the lack of fuel.

5.13 In Way Abung, the construction of 2,170 shallow wells was implemented without difficulty in view of the flat topography and a shallow ground water table. The major problem stemmed from the lack of spare parts and mechanics to maintain the hand pumps.

(d) Land Clearing

5.14 The land clearing operation was carried out without any major problem. The project developed a method that combined machinery and manual labor by: (a) clearing mechanically the 0.02 ha house lots so that transmigrants could be settled in the project area as early as possible and (b) clearing the food crop lots with a combination of machinery and transmigrant labor force. This method allowed the early settlement of transmigrant provide off-farm income and generated minimal soil disturbance. However, it is applicable only to light secondary forest where small logs and branches can easily be removed by hand such as in Baturaja.

(e) Monitoring and Evaluation

5.15 In spite of the emphasis laid on Monitoring and Evaluation in the SAR, this component has been the weakest in project implementation. The starting of monitoring and evaluation was delayed several years due to problems of budgeting, contracting and mobilising. It was finally implemented by the Bogor Agricultural Institute (IPB) during the last three project years. Data collection took place during one agricultural year (1980/81) only and the final report was not completed at the time of the PCR mission. IPB's

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<sup>/1</sup> The dikes were not properly compacted and spillways were too small.

data analysis was largely descriptive and the figures mentioned in the provisional reports were lacking in accuracy: crop yields and farm income data were erratic and unreliable.

5.16 In general, IPB could not cope with large data collecting and processing and was overwhelmed with a far too ambitious monitoring and evaluation program.

5.17 The PMU and the Central Research Institute for Agriculture (CRIA), through their routine collection of data, were able to compensate partially for IPB's deficiency, particularly in the field of agricultural production.

(f) Agricultural Research and Farm Production

5.18 Adaptive agricultural research was carried out by the Central Research Institute for Agriculture (CRIA) and started on the first year of project implementation. This Institute worked successfully during six years in test farms and with about 1,000 project farmers in Baturaja and Way Abung. The adaptive research program was introduced to maximize food crop production under rainfed conditions while maintaining soil fertility, controlling erosion and limiting labor requirements. Based on these criteria, five cropping patterns were tested together with different levels of fertilizer applications and improved soil management techniques.

5.19 The outcome of the adaptive research work was a cropping system based on three cropping seasons:

- 1st season (October-February), upland paddy, intercropped with maize and cassava;
- 2nd season (March-May), groundnut or soyabeans intercropped with cassava;
- 3rd season (June-August), cowpeas or mungbeans still intercropped with cassava.

5.20 In addition CRIA recommended: (a) to terrace the fields with more than 8% slope; (b) to plant maize and cassava at fixed intervals along contours to control erosion; (c) to mulch with paddy straw and dibble without tillage the groundnut and cowpea crops for soil and water conservation and also to alleviate labor constraints; and (d) to plow the paddy straw mulch into the soil, before the main paddy crop, to increase soil organic matter content.

5.21 The best yield/cost ratio for the full CRIA cropping pattern, was obtained with 200 kg of urea and 200 kg of TSP per hectare and per year. Recent trials suggest additional benefits from the application of 2 tons/ha of lime once every five years but no data was available to quantify the benefits.

5.22 The results achieved by CRIA show that crop yields increased during the first two years and stabilized from the third year onwards. This would demonstrate that, with adequate plant, soil and fertilizer management, the red/yellow podzolic soils are able to sustain rainfed food crops. The yields achieved by CRIA farmers in several locations during the last four project years are compared with the estimated SAR yields at full development and those achieved by average farmers after six years of production in the following table.

AVERAGE YIELDS OF AVERAGE AND CRIA FARMERS COMPARED WITH SAR (t/ha)

	Average farmers (both sites)	Baturaja		Way Abung	
		CRIA	SAR	CRIA	SAR
Upland paddy (C22/Serendah)	1.40 - 1.60	2.2	2.1	2.5	2.0
Maize (HG/Arjuna)	1.00 - 1.10	1.5	-	1.7	-
Cassava (Goding/local)	10.00 - 11.00	14.4	12.0	15.0	15.0
Groundnuts (Gajah/Kidang)	0.50 - 0.55	0.7	1.0	0.8	1.2
Cowpea or Ricebean (NO.191/local)	0.35 - 0.35	0.5	-	0.4/a	-

/a There was a problem of seed germination.

The above CRIA yields were obtained without potassium fertilizer or lime. The introduction of new varieties of blast resistant paddy and improved maize and groundnut together with adequate fertilizers, soil management and pest control are likely to further increase these yields. However these yields represent a potential achieved by advanced farmers rather than an average applicable to the entire project area.

5.23 The main drawback to the CRIA cropping pattern is its high cropping intensity (260%) which generates large labor requirements throughout the year (500-600 mandays/ha) and peak labor requirements between each cropping season. Its full application is therefore limited without resorting to additional labor force or animal draft power. However, the PMU estimated that about 70% of the farmers followed CRIA's recommendations in full for the first cropping season and partly for the second. Generally the areas cropped in the third cropping season were extremely limited for lack of time and labor.

5.24 At Baturaja and Way Abung, after six years of project life, the physical area cropped per transmigrant was about 1.30 ha (Table 5). These transmigrants were therefore able to crop larger areas than in most other GOI settlements because of the cattle allocated by the project (ref. 5.28). The cropping intensity, at both sites, was about 150% and the average yields were about 65% of those obtained by the CRIA assisted

transmigrants. The average income was computed at \$614 i.e. 15% above the poverty line estimated at \$530 for a family of five in rural Java and Bali.

5.25 The PCR mission has estimated that at full development the Baturaja farmers will obtain yields equal to those of the CRIA assisted farmers in year six, will increase the cropping intensity to 180% and will crop 2.0 ha on average. At that stage the family income due to food crops and the home garden will be about \$1,496 or 2.8 times above the poverty level. Presently, the major problems facing the transmigrants for meeting these targets are labor constraints, lack of adequate seeds particularly for the leguminous crops and a reduction of fertilizer use by the farmers indebted with the BIMAS credit system. The breeding of two cows per holding will overcome the labor constraints and the rubber production, starting in the seventh year, will progressively reduce the indebtedness. As for the availability of adequate seeds further selection work is necessary and should be carried out under the Transmigration III project (Baturaja extension).

(g) Livestock

5.26 The project purchased about 15% more cattle than the SAR estimates i.e. 4,661 heads for Baturaja and 4,327 for Way Abung to compensate for delays in the program and losses during the distribution. In one shipment 243 heads died due to the insufficient preparation of the holding grounds. The cattle supply program was suspended for one year and the creation of communal pastures was then decided in Baturaja by the supervision missions. Altogether, about 4,300 farmers in Baturaja and 5,000 in Way Abung received one head of cattle.

5.27 The repayment of the cattle by the transmigrants was to be made through the heifer return program at the rate of two heifers per head of cattle. The heifer return program did not operate satisfactorily and at the time of the PCR mission about 200 farmers in Baturaja still had not received their head of cattle. The heifers were to be inseminated in bull units managed by the PMU, but because of the distance to these bull units, the low number of bulls purchased, and the reluctance of some farmers to return one calf, the calving rate remained below expectations, at about 60%. One of the solutions proposed by the PMU to increase the calving rate, was to increase the bull to cow ratio to 10%, and distribute the bulls to the best farmers.

5.28 The project introduced livestock to improve soil fertility through the application of manure, provide animal draft power and progressively increase nutritional standards of the transmigrants' diet. These improvements, necessary for sustained food crop production and increased farm income, were starting to provide additional benefits at the time of the PCR mission. On that occasion, several farmers reported using manure instead of

inorganic fertilizers in their home gardens. They also indicated that the quantity of manure produced by one head of cattle was insufficient to fertilize the food crop lots. A rapid census showed, on the other hand, that about 60% of the Baturaja farmers shared their cattle with neighbors to plow their fields and that farmers using animal draft power were able to increase the area cropped by about 0.5 ha./1

5.29 During project implementation the lack of animal draft power hampered the extension of cropped areas and the full use of the CRIA cropping pattern. A trial to introduce small scale mechanization did not prove successful. The distribution of two heads of cattle would have allowed a quicker and larger development of cropped areas in Baturaja and Way Abung.

(h) Rubber Development

5.30 The rubber development program met the appraisal targets of 4,600 ha /2 in Baturaja and 2,500 ha in Way Abung. Land clearing, planting and maintenance were contracted to PTP X and provided most of the off-farm employment in Baturaja. The quality of the rubber plantations, in both sites, is of high standard and peak yield projections were revised upwards by 20%, from 1.2 t/ha to 1.45 t/ha. In view of the high quality of the rubber plantations and taking into account the relative inexperience of transmigrants in rubber plantation, the maintenance period, by PTP X, was increased from 3 to 6 years to preserve the potential yields until the first year of tapping.

5.31 In Baturaja, each of the 4,500 transmigrant received, as planned, 1 ha of rubber but, in Way Abung, the availability of contiguous land for block planting encountered serious problems. At appraisal farmers had received only one hectare of their two hectare holdings and few difficulties were foreseen in finding contiguous land for block planting 2,500 hectare of rubber. But, before planting started, all land was allocated to farmers and titles processed. To implement the block planting would have involved repossession, splitting and reallocation of land. Finding contiguous blocks was also further complicated by the progress of the Way Rarem irrigation scheme and its competing demand on land. Consequently of the 5,000 farmers planned to receive 0.5 ha of rubber about 2,700 were allocated nearly 1 ha. The number of beneficiaries was therefore reduced while the area planted remained as planned.

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/1 1.1 ha on average cropped without animal draft against 1.6 ha with animal draft.

/2 Including 100 ha for trials and demonstrations.

5.32 At the time of the PCR mission, the training of farmers for rubber tapping had begun in the oldest villages, but, the two crumb rubber factories, one in Baturaja and one in Way Abung, were still not constructed. As a result the financing of these factories has been included in the Transmigration III project under the Baturaja extension component and PTP X was to construct, own and operate these factories.

(1) Other components

5.33 The health component was carried out beyond the SAR estimates with the construction of two health centers and 12 health posts in Baturaja, and three health centers and 19 health posts in Way Abung. These facilities were staffed by the Government with doctors, midwives, nurses and health extensionists, and sufficient medicine and supplies were also provided. In addition, a malaria control program was carried out by the project. In general, the health condition of settlers is satisfactory in both sites.

5.34 The education component was also carried out beyond the SAR estimates with the construction a senior high school, 2 junior high schools and 12 primary schools in Baturaja, and 4 junior high schools in Way Abung. These facilities were adequately staffed by the PMU with teachers who were granted the same benefits as the transmigrants. The PMU reported that 100% of the children attended school and a demand for college level education had been expressed by the transmigrants.

5.35 The cooperative component was implemented with an uneven success though the project had constructed the village level facilities as planned. Village cooperatives (KUD) were formed in each village but, in Baturaja, the number of participating farmers varied from 0 to 86% per KUD with an overall average of 41%. Most KUDs were not very active because of the lack of funds to acquire processing and transport facilities and also because of the lack of management skill. The marketing of rubber, with the technical assistance of PTP X, may reactivate some of the KUDs.

5.36 Farm inputs do not seem to have encountered special problems with regard to the distribution of fertilizers and insecticides in both areas, but the need for timely availability of seeds, especially peanuts and soybean was not met. The seed farms have been mostly used for field trials by CRIA.

5.37 The BIMAS/BRI agricultural credit program started slowly and never operated on a large scale in both areas. It was reported that 39% of the transmigrants in Way Abung and 50% in Baturaja were using presently the program. Three reasons can be attributed to this rather low performance. First, the BIMAS/BRI loans are made on a per crop basis which does not correspond to the needs of the mixed cropping pattern advocated by CRIA; second, the grant of fertilizers during the initial three years of settlement did not encourage the Baturaja transmigrants to apply for BIMAS/BRI loans; and third, the low repayment record, particularly in Way Abung, progressively reduced the number of loans. However, it should be noted that the use of fertilizers has been well understood by transmigrants, especially in Baturaja, where they are now available in local markets.

## VI. ECONOMIC EVALUATION

### A. Yields and Production

6.01 The principal economic benefit of the project would be increased rubber production. The appraisal target plantations of 4,500 ha in Baturaja and 2,500 ha in Way Abung have been well established, and the peak yield is now reestimated at 1,450 kg/ha compared to 1,200 kg/ha at appraisal. The other quantified economic benefits are increased food and garden crops and livestock production. A survey carried out by the PCR mission indicated that there was a surplus production of about 850 t of paddy in Baturaja and about 20,700 t of cassava in Way Abung where four cassava processing plants have been constructed in recent years. Areas under food crops production are about as estimated at appraisal i.e. 5,850 ha against 5,625 ha in Baturaja but for the economic evaluation SAR yield projections have been revised downwards, for rice to 0.9 t/ha in Baturaja <sup>/1</sup> and 1.2 t/ha in Way Abung and for groundnuts to 0.7 t/ha in Baturaja and 0.9 t/ha in Way Abung.

6.02 Other modifications have been made on the farm models. For Baturaja, it has now been assumed that during the 30-year project life only two instead of three hectares of rubber would be established by each farmer.<sup>/2</sup> In Way Abung, one instead of one-half hectare of rubber has already been planted and this has decreased the number of farmers participating in the project's rubber program to 2,700 instead of 5,000. It has further been assumed that all increases in food crops production in Way Abung would occur on the farms benefitting from cattle under the project's distribution program valued at the net output of one-half hectare. In Baturaja, the food crop production of 1,200 spontaneous transmigrants has been included in the project's output on the basis of one-half hectare each.

### B. Pricing

6.03 Costs and benefits are expressed in constant mid-1982 prices. Actual costs from 1976-1982 have been adjusted to mid-1982 level on the basis of the GDP deflator. The appraisal shadow-priced foreign exchange 25% above the official exchange rate (Rp 415 = US\$1). Following two devaluations of the rupiah (November 1978 to Rp 625, and March 1983 to Rp 970), however, a standard conversion factor of 1.0 has been assumed for the reevaluation of the rate of return.

6.04 The appraisal shadow-priced farm labor at the minimum wage rate (Rp 210/day), estimated to provide 50% of the minimum subsistence requirements. For the economic reevaluation farm labor has been shadow-priced at Rp 500 per working day (half the existing market wage rate in Baturaja) considering the over-abundant labor supplies and low productivity employment in Java and Bali.

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<sup>/1</sup> The appraisal projected a gradual increase of rice yields from 1.2 t/ha to 2.1 t/ha, and of groundnut yields from 0.6 t/ha to 1.2 t/ha.

<sup>/2</sup> Transmigrants who have started tapping, have opened savings accounts with BRI for reinvesting in the second hectare of rubber.

6.05 In addition to including all costs along the appraisal's methodology in the economic reevaluation, the overhead costs of the Project Management Unit and the Project Surveys and Studies (mainly CRIA and IPB) have been apportioned to Baturaja and Way Abung at a ratio of 2:1.

C. Economic Rate of Return

6.06 Using the foregoing assumptions and discounting costs and benefits over 30 years, the economic rate of return for Baturaja is 16.6% /1 (appraisal: 11.5%) and 22% (appraisal: 19%) for Way Abung. The higher rate of return of Way Abung reflects the level of sunk investment in settlement. In both project areas, cost overruns are expected to be offset by higher rubber yields than estimated at appraisal and higher rupiah values of the world market price forecasts.

D. Other Benefits

6.07 The major indirect benefit of the project was the settlement of about 1,200 spontaneous transmigrant families in Baturaja (27% of the project settlers) who contributed to the project economy by the supply of incremental production. Another indirect benefit refers to the road rehabilitation program in Way Abung which reduced the cost of transportation for the subproject area, contributed to the development of cassava factories and generated off-farm labor employment. Lack of data, unfortunately, prevented the valuation of this latter benefit. It has also not been possible to quantify the benefits from improved health and nutritional status of the settlers.

VII. PROCUREMENT, DISBURSEMENTS AND PROJECT COSTS

A. Procurement

7.01 The weak management and the inexperienced staff during the first three years of the Project caused many procurement problems. The PMU was not yet effectively established and recognized as the central management and coordination unit of the Project. The Provincial Transmigration Director and the site managers often let contracts without reference to the PMU. Purchases of necessary materials and equipment were inadequately planned; specifications of civil work contracts were lacking or of poor quality. Contract approval procedures were complicated and time consuming because they involved numerous agencies (BAPPENAS, Ministry of Finance, Bank of Indonesia); contractors for local competitive bidding were not prequalified, and subsequently work standards were often poor and quality of materials often unsatisfactory. For example, road construction was of poor standard and soon required upgrading; 140 wells collapsed and were unusable.

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/1 11.8% in the unlikely event that farmers would not plant the second hectare of rubber assumed in para. 6.02.

7.02 The Bank's supervision missions played an important role in strengthening the PMU.<sup>/1</sup> They took the position that the Bank would no longer disburse unless contracts were cleared and work completion certified by the PMU staff, including its consultant advisers. As from late 1979 onwards until project completion, the effectiveness of the Project Director and his Financial Advisor speeded up and improved procurement to a satisfactory level. However, the contracting for rubber development still remained a problem until 1981. Because of disagreement on PTP X's (formally PNP X) contract prices, the signing of the contract with DGT was long delayed. As a consequence, as little as 255 ha rubber were planted in Baturaja in 1980/81.

7.03 The decisive factor in improving procurement was the improved staffing of the PMU. Besides channelling all procurement through the PMU - which was certainly important enough by itself, no procedure was changed. Many of the Bank's new projects in Indonesia still face in their early years the same procurement problems as Transmigration I did because of the unfamiliarity of staff with local procurement procedures, agencies, and personnel involved.

#### B. Disbursement

7.04 The delayed implementation of the Project during the first three years, mainly due to weak management, slowed down disbursement substantially. For about two years, total disbursements remained at 30% or less of appraisal estimate. Only since late 1979, in the fourth project year, did disbursements gain momentum, helped by the decision to disburse 65% instead of the original 30% of total costs of rubber development. The first reallocation of funds in 1981, in fact, was necessary to meet the higher financing requirements of rubber.

7.05 The flow of disbursements was also hampered by the slow processing of disbursement applications - again due to the weak management/coordination factor - and the lack of supporting data/documents after submission of applications. Again, with the improved staffing of the PMU the problems were overcome.

7.06 The Closing Date of the Loan was extended once, from December 31, 1981, to December 31, 1982 and on an exceptional basis withdrawal applications were accepted up to April 13, 1983, the date of the last payment. As per May 31, 1983, the Loan had an undisbursed balance of \$23,039.12.

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<sup>/1</sup> The total number of staff weeks provided over six years amounted to 200 or an average of about 33 staff weeks annually.

7.07 The Bank's funds share of total project cost was as estimated at appraisal (53%). The increase in total rupiah project cost by 38.6% was off-set by the dollar appreciation against the rupiah since late 1978. As compared to the original allocation by expenditure category, Category IV - Rubber Development had a particularly large increase (para. 7.04) in disbursements, while Category VII (Village Development) used less funds than estimated at appraisal. For continued rubber maintenance until six years after planting, the Bank has included funds in the Transmigration III Project.

### C. Project Costs

7.08 Total project cost up to December 31, 1983 amounted to Rp 32,700 million (\$57 million) against an appraisal estimated of Rp 23,580 million (\$57 million). The increase in local currency costs was mainly due to the delay in implementation and higher than anticipated inflation rates. To cover part of the increase in local cost, the Bank increased the disbursement percentage for rubber development (para. 7.04). Government provided the budget funds to finance other cost increases.

7.09 The cost per family was US\$7,923 (Mid 1982 value) against \$6,787 at appraisal in Baturaja and \$2,160 against \$1,990 in Way Abung based on 4,500 and 10,000 beneficiaries respectively. However, the cost per family would be reduced to about \$6,263 in Baturaja if the 1,200 spontaneous transmigrants were considered as project beneficiaries.

7.10 Shortages of funds were occasionally caused by budgeting procedures - as they occur still nowadays - and resulted sometimes in implementation delays. If items were budgeted in previous DIPs but current costs exceeded the budgeted amount, lengthy revisions were required, involving several agencies.

## VIII. LESSONS LEARNED

8.01 The lessons learned from the Transmigration I project are manifold and some have already been applied to subsequent GOI and Bank assisted transmigration projects.

- (a) The PMU proved to be an efficient management tool when it is given the authority to control and coordinate all project activities including those not falling directly under the jurisdiction of the Ministry of Transmigration. However to be cost effective this concept should be applied to groups of settlements totalling 15,000 to 20,000 families.
- (b) The PMU manager's position requires a broad knowledge of technical and administrative matters. Experienced managers are scarce in Indonesia and due consideration should be given in future projects to the training of adequate high level staff before entrusting them with the responsibilities of PMU managers.

- (c) The success of a transmigration settlement project depends not only on good management during the first five project years before it is transferred from the Ministry of Transmigration to the Provincial Authorities but also on the levels of assistance and training provided to the transmigrants during that period. One year of inputs granted to new settlers proved to be insufficient. The extension to three years of granted inputs appeared adequate to allow time for the transmigrants to produce marketable surpluses, for the BIMAS/BRI credit structures to become operational and for traders to establish new links and develop markets in the project area. Applied research and intensive agricultural extension work during the initial five years are also two prerequisites for sustained agricultural development.
- (d) The mixed farming system based on garden crops, fruit trees, food crops, livestock and rubber used in the Transmigration I Project, though providing the best insurance against risk, has put excessive strain on transmigrants. Not only each transmigrant had to learn in a short time a multiplicity of agricultural tasks but also had to cope with problems of soil erosion, animal and insect attacks, low soil fertility and erratic rainfall which are intensified in newly opened settlements. The mixed farming system led to lower initial food crop yields and longer rubber maintenance period by the PMU than estimated in the SAR. Rather than to grant the same amount of land and the same agricultural package to all transmigrants it is the PCR mission's belief that higher returns per family and per project could be achieved in future projects by considering several farming systems according to individual preferences of transmigrants and land suitability. Food crop, tree crop and livestock farm models could be considered in each upland settlement.
- (e) The provision of cattle in Baturaja enabled transmigrants to crop, on average, larger areas (1.3 ha) than other GOI sponsored settlements without cattle. The provision of one or more heads of cattle through credit operations alleviates labor constraints, intensifies crop production and reduces risk.
- (f) Sustained food crop production is feasible on red/yellow podsollic soils when adequate cropping patterns, soil management systems and input levels are applied. Under these conditions and under the provision that enough animal draft power (2 cows) and land (3 to 4 ha) is granted to transmigrants, a food crop farm model yielding a family net income over \$1,500/year appears feasible without additional off-farm or tree crop cash income.

- (g) The initial allocation of 5 ha holdings to each transmigrant in Baturaja was excessive. Areas of 3-4 ha depending on the farm model (food crops, tree crops or livestock) would be more in line with the labor capacity usually expected from standard transmigrant families. However, larger holdings of 3 ha or above induce more spontaneous transmigration than smaller holdings of 2 ha or below.
- (h) The monitoring and evaluation failed in the Transmigration I project. It was too comprehensive and complex to be carried out in remote transmigration sites. Future projects should limit the scope and number of indicators to increase the efficiency of monitoring and evaluation.
- (i) In rolling topography where groundwater is unevenly distributed, the construction of small earth dams surrounded by shallow wells proved to be an excellent water supply system.
- (j) Technical and financial assistance to the KUDs is necessary for their proper operation. The technical assistance could be in form of training courses for the managers and accountants. The financial assistance would be for the purchase of processing and transport facilities and also for the creation of revolving funds.
- (k) The Baturaja settlement achieved in general better agricultural and economical results than most other Government settlements developed during Repelita III. These results were made possible because of higher levels of investments and technical assistance per transmigrant than in the rest of the program. The Baturaja settlement is therefore not representative of the Repelita III transmigration program but should rather be considered as a pilot settlement established to test mixed farming on red/yellow podzolic soils and to determine potential levels of production under given conditions.

When compared to Baturaja, most other transmigration settlements can be considered underdeveloped. As the success of settlements depends largely on the provision of a sound economic base, it would therefore be recommended to:

- (i) increase the levels of investment and technical assistance in the future settlements to be developed under Repelita IV; and
- (ii) implement a second stage settlement development program to improve the agricultural output and living conditions of the settlements developed under Repelita III.

INDONESIA  
TRANSMIGRATION I (LOAN 1318-IND)  
PROJECT COMPLETION REPORT

Key Indicators

	Unit	Appraisal total	Revised target FY81/82	Achievement	Percent of SAR	Percent of Revised target
<u>Settlement at Baturaja</u>						
Number settled	No.	4,500	4,500	4,500	100	100
Houses constructed	No.	4,500	4,500	4,500	100	100
Village centers constructed	No.	10	11	11	110	100
<u>Road Construction</u>						
<u>Baturaja</u>						
Main access roads	km	15	15	42	280	280
Secondary roads	km	107	118	140	130	120
Farm roads	km	286	449	478	170	106
<u>Way Abung</u>						
Main access roads	km	50	50	50	100	100
Secondary roads	km	50	30	30	50	100
Road improvements	km	50	100	100	200	100
<u>Water Supply</u>						
<u>Baturaja</u>						
Shallow wells	No.	900	1,665/a	1,525	170	100
Earth dams	No.	-	229/b	209	-	100
Water treatment units	No.	-	11	11	-	100
<u>Way Abung</u>						
Shallow wells	No.	2,000	2,000	2,170	110	110
<u>Baturaja Health and Schools</u>						
Health centers	No.	1	1	2	200	100
Health posts	No.	12	12	12	100	100
Schools	No.	10	11	11	110	100
<u>Way Abung</u>						
Health centers	No.	2	3	3	150	100
Health posts	No.	22	19	19	85	100
Schools	No.	4	4	4	100	100
<u>Rubber Planting</u>						
Baturaja	ha	4,600	4,600	4,600	100	100
Way Abung	ha	2,500	2,500	2,500	100	100
<u>Cattle Distribution</u>						
<u>Program</u>						
Baturaja	No.	4,500	4,500/c	4,300	96	96
Way Abung	No.	5,000	5,000	5,000	100	100
<u>Seed Garden Development</u>						
Baturaja	ha	200	200	200	100	100
<u>Area under Food Crops</u>						
Baturaja	ha	N/A	5,625	5,850	-	104
<u>Distribution of inputs</u>						
Baturaja	No.	4,500	4,500	4,500	100	100
<u>Studies</u>						
Program support	ha	200,000	0	0 /d	0	-
Way Abung irrigation	No.	1	0	0 /e	0	-
Monitoring	No.	1	1	0 /f	0	0
Applied Agri. Res.	No.	1	1	1	100	100
Health control	No.	1	1	1	100	100

/a 140 collapsed during construction.

/b 20 collapsed during construction.

/c 243 died after the arrival of one shipment.

/d was carried out under the Transmigration II Project (Loan 1707-IND).

/e was carried out under Japanese Technical Assistance.

/f the final report was not ready at the time of the PCR mission.

INDONESIATRANSMIGRATION I (LOAN 1318-IND)PROJECT COMPLETION REPORTProject Cost Summary /a

	Appraisal estimate		Actual (up to Dec. 31, 1982)	
	Rp M	US\$M	Rp M	US\$M
<b>A. <u>Investment Cost</u></b>				
Baturaja	6,313	15.20	15,256	26.50
Way Abung	3,863	9.30	8,585	14.90
Project Management Unit	58	0.10	1,467	2.50
Other	1,814	4.50	2,406	5.00
Subtotal	<u>12,048</u>	<u>29.10</u>	<u>27,714</u>	<u>48.90</u>
<b>B. <u>Operating Costs</u></b>				
Baturaja	1,389	3.30	2,739	4.70
Way Abung	249	0.60	1,393	2.20
Project Management Unit	643	1.50	789	1.50
Studies (program support)	2,477	6.00	48	0.01
Cattle distribution - central facilities	208	0.50	-	-
Subtotal	<u>4,966</u>	<u>11.90</u>	<u>4,969</u>	<u>8.40</u>
Contingencies	6,565	15.80	-	-
<b>Total Project Cost</b>	<u>23,579</u>	<u>56.80</u>	<u>32,683</u>	<u>57.30</u>
<b>C. Investment cost per family including contingencies</b>				
Baturaja		5,393		6,722
<b>D. Operating cost per family including contingencies</b>				
Baturaja		1,324		1,211
<b>E. Total cost per family including contingencies</b>		<u>6,787</u>		<u>7,923</u>

/a 1976-1978 US\$ 1.00 = Rp 415, 1979-1982 US\$ 1.00 = Rp 625.

INDONESIATRANSMIGRATION I (LOAN 1318-IND)PROJECT COMPLETION REPORTAllocation of Loan Proceeds (US\$ Million)

(As of February 28, 1982 /a)

Category	Original allocation		Actual use	
	\$	%	\$	%
I. Civil works	7.5	25.0	8.0	27.1
II. Vehicles & equipment	2.8	9.3	2.0	6.8
III. Agrochemicals	1.2	4.0	1.9	6.4
IV. Rubber development	2.7	9.0	5.3	17.9
V. Cattle	1.4	4.7	2.2	7.4
VI. Consultants' services & surveys	6.4	21.3	6.7	22.7
VII. Village completion	4.5	15.0	3.4	11.5
VIII. Unallocated	3.5	11.7	-	-
	<u>30.0</u>	<u>100.0</u>	<u>29.5</u>	<u>100.0</u>

/a Excluding five outstanding withdrawal applications totalling US\$568,529.

INDONESIATRANSMIGRATION I (LOAN 1318-IND)PROJECT COMPLETION REPORTDisbursement Schedule (US\$ Million)

Calendar year	Appraisal estimate			Actual		
	Annual	Cumulative	% of total loan	Annual	Cumulative	% of total loan
1976	1.0	1.0	3	-	-	-
1977	5.5	6.5	22	1.64	1.64	5.5
1978	9.5	16.0	53	4.74	6.38	21.2
1979	7.0	23.0	77	4.24	10.62	35.4
1980	5.5	28.5	95	5.54	16.16	53.9
1981	1.5	30.0	100	6.31	22.47	74.9
1982	-	-	-	4.90	27.37	91.2
1983	-	-	-	2.63	29.98 <sup>/a</sup>	100.0

<sup>/a</sup> There is an undisbursed balance of US\$23,039.12.

INDONESIATRANSMIGRATION I (LOAN 1318-IND)PROJECT COMPLETION REPORTCropping Pattern and Farm Budget at Baturaja

Crops	Unit	Year 6	Full development/ <u>c</u>
<u>Yields (Pure Crops)</u>			
Paddy	ton/ha	1,400	2,200
Maize	ton/ha	1,000	1,600
Groundnuts	ton/ha	500	800
Cassava	ton/ha	10,000	15,000
Cowpeas	ton/ha	350	500
<u>Harvested Area</u>			
Physical area cropped	ha	1.30	2.00/ <u>a</u>
<u>First Season</u>			
Paddy	ha	1.00	1.30
Maize	ha	0.25	0.40
<u>Second Season</u>			
Groundnuts	ha	0.55	1.20
<u>Third Season</u>			
Cassava	ha	0.05	0.30
Cowpeas	ha	0.10	0.40
Cropping intensity	%	150	180
<u>Crop Production</u>			
Paddy	kg	1,400	2,860
Maize	kg	250	640
Groundnuts	kg	275	960
Cassava	kg	500	4,500
Cowpeas	kg	35	200
<u>Net Farm Income (Excluding Family Labor)</u>			
Food crops	Rp	280,000	847,000
Home gardens	Rp	150,000	200,000
<u>Rubber</u>			
First hectare	Rp	-	1,052,000
Second hectare <u>/b</u>	Rp	-	744,000
<u>Total</u>	Rp	<u>430,000</u>	<u>2,843,000</u>
	US\$	<u>614</u>	<u>4,061</u>

/a With two cows.

/b Second hectare rubber financed by transmigrants through long-term credit.

/c The Baturaja yields and income will be substantially higher than those of the Government settlements developed during Repelita III.

INDONESIATRANSMIGRATION I (LOAN 1318-IND)PROJECT COMPLETION REPORTEconomic Rate of Return Calculation - Baturaja  
Constant Mid-1982 (Rupiah Million)

Year	Costs				Benefits			
	Investment	O&M	Farm production costs	Total	Rubber	Foodcrops including garden	Livestock	Total
1976/77	793	713	41	1,547	-	23	-	23
1977/78	1,281	826	68	2,175	-	75	8	83
1978/79	2,313	747	135	3,195	-	150	26	176
1979/80	3,515	738	286	4,539	-	364	55	419
1980/81	3,093	772	1,190	5,055	-	838	86	924
1981/82	3,486	836	1,310	5,632	189	1,478	88	1,755
1982/83	2,388	917	1,414	4,719	494	1,591	254	2,339
1983/84	1,623	281	1,681	3,585	876	2,217	254	3,347
1984/85	1,315	281	1,839	3,435	1,626	2,260	260	4,146
1985/86	2,307/a	281	1,956	4,544	2,297	2,284	260	4,841
1986/87	3,432/a	281	2,129	5,842	3,307	2,288	280	5,875
1987/88	2,363	281	2,285	4,929	4,309	2,313	320	6,942
1988/89	1,965	281	2,315	4,561	5,305	2,313	363	7,981
1989/90	1,799	281	2,315	4,395	5,347	2,313	410	8,070
1990/91	1,622	281	2,544	4,447	9,291	2,790	414	12,495
1991/92	788	281	2,846	3,915	11,993	2,790	432	15,215
1992/93	-	281	2,944	3,225	13,663	2,790	455	16,908
1993/94	-	281	2,944	3,225	14,327	2,790	480	17,597
1994/95	-	281	2,944	3,225	15,210	2,790	499	18,499
1995/96	-	281	2,944	3,225	16,094	2,790	529	19,413
1996/97	-	281	2,944	3,225	16,978	2,790	529	20,297
1997/98	-	281	2,944	3,225	17,862	2,790	529	21,181
....	...	...	...	...	...	...	...	...
2005/06	-	281	2,944	3,225	17,862	2,790	529	21,181

ECONOMIC RATE OF RETURN = 16.6%

/a Planting of second hectare of rubber on farms: 2.250 ha each 1985/86 and 1986/87.

INDONESIATRANSMIGRATION I (LOAN 1318-IND)PROJECT COMPLETION REPORTEconomic Rate of Return Calculation - Way Abung  
Constant Mid-1982 (Rupiah Million)

Year	Costs				Benefits			
	Investment	O&M	Farm production costs	Total	Rubber	Foodcrops including garden	Livestock	Total
1976/77	345	54	-	399	-	-	-	-
1977/78	905	169	-	1,074	-	-	-	-
1978/79	1,603	289	133	2,025	-	218	-	218
1979/80	1,286	446	163	1,895	-	293	-	293
1980/81	1,738	362	237	2,337	-	621	-	621
1981/82	1,744	142	373	2,259	89	1,120	184	1,393
1982/83	515	212	416	1,143	190	1,665	184	2,039
1983/84	499	50	432	981	408	1,684	184	2,276
1984/85	418	50	503	971	921	1,698	184	2,803
1985/86	264	50	640	954	1,718	1,710	206	2,634
1986/87	-	50	917	967	2,210	1,754	234	4,198
1987/88	-	50	894	944	2,502	1,828	256	4,586
1988/89	-	50	918	968	2,802	1,924	289	5,015
1989/90	-	50	949	999	3,133	2,054	300	5,487
1990/91	-	50	980	1,030	4,546	2,649	316	7,511
1991/92	-	50	1,012	1,062	4,745	2,811	338	7,894
1992/93	-	50	1,046	1,096	4,745	2,981	358	8,084
1993/94	-	50	1,083	1,133	4,745	3,166	382	8,293
1994/95	-	50	1,122	1,172	4,745	3,359	399	8,503
1995/96	-	50	1,163	1,213	4,745	3,562	426	8,733

ECONOMIC RATE OF RETURN = 22%

