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STAFF APPRAISAL REPORT

MALAYSIA

SECOND RUBBER INDUSTRY SMALLHOLDERS DEVELOPMENT
AUTHORITY (RISDA) PROJECT

DECEMBER 23, 1993

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Country Department I
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CURRENCY EQUIVALENTS

(As of June 1993)

Currency Unit	=	Ringgit (M\$)
US\$1.00	=	M\$2.55
M\$1.00	=	US\$0.39

WEIGHTS AND MEASURES

1 meter (m)	=	3.28 feet (ft)
1 kilometer (km)	=	0.62 mile
1 hectare (ha)	=	2.47 acre (ac)
1 kilogram (kg)	=	2.2 pound (lb)
1 metric ton (ton)	=	1,000 kg = 2,200 lb

ABBREVIATIONS AND ACRONYMS

CPO	-	Crude Palm Oil
ERR	-	Economic Rate of Return
ESPEK	-	Estet Pekebun Kecil Sdn Bhd
FELCRA	-	Federal Land Consolidation and Rehabilitation Authority
FELDA	-	Federal Land Development Authority
ffb	-	Fresh Fruit Bunches of Oil Palm
GOM	-	Government of Malaysia
LITS	-	Low-Intensity Tapping Systems
MAMPU	-	Malaysian Administration Modernization Planning Unit
MARDEC	-	Malaysian Rubber Development Corporation
MIS	-	Management Information System
MRELB	-	Malaysian Rubber Exchange and Licensing Board
NARSCO	-	National Rubber Smallholders Cooperative
PK	-	Palm Kernel
PORIM	-	Palm Oil Research Institute of Malaysia
PORLA	-	Palm Oil Registration and Licensing Authority
RISDA	-	Rubber Industry Smallholders Development Authority
RRIM	-	Rubber Research Institute of Malaysia

GOVERNMENT OF MALAYSIA

FISCAL YEAR

January 1 - December 31

MALAYSIA
SECOND RUBBER INDUSTRY SMALLHOLDERS DEVELOPMENT AUTHORITY (RISDA) PROJECT

Loan and Project Summary

Borrower: Malaysia

Beneficiary: RISDA

Loan Amount: US\$70.0 Million

Terms: Repayable in 15 years, including five years of grace at the Bank's standard variable interest rate.

Onlending Terms: From the Borrower to RISDA: US\$69.0 million equivalent as grants and US\$1.0 million equivalent onlent at 4% p.a. interest rate, repayable in 25 years, including a 10-year interest-free grace period.

Project Objective: The project would build on the overall positive results of RISDA I Project (Ln. 3139-MA) and continue to pursue the objectives of increasing the productivity and efficiency of the rubber smallholder subsector, improving RISDA's institutional effectiveness, and helping develop human resources and the private sector in rural areas.

Project Description: The three-year project (1994-96) would support: (i) replanting of 90,000 ha of old rubber; maintenance during immaturity of this area and an additional 200,000 ha replanted prior to the project; and rehabilitation of 5,000 ha; (ii) upgrading and maintenance of about 1000 km of agricultural access roads; (iii) extension and smallholder training; (iv) applied research by RRIM; (v) mini-estate development and improvement, mainly through the introduction of low-intensity tapping systems (LITS); (vi) strengthening and restructuring of cooperatives; and (vii) institutional strengthening through further development of computerized MIS; human resource development; and improved monitoring and evaluation.

Benefits and Risks: The project would increase the productivity and incomes of about 150,000 rubber smallholders who constitute Malaysia's biggest poverty group. The project would also help raise export earnings, primarily from rubber; broaden popular participation and help develop the rural private sector through strengthening of cooperatives; improve public sector management by increasing RISDA's operational efficiency; and enhance income-earning opportunities of women smallholders and workers through training. The main project risk relates to effective introduction of LITS. This labor-saving technology is critical to the long-term viability of the rubber subsector in Malaysia but is new to RISDA and the smallholders. Its successful introduction would, therefore, require closely-supervised and phased implementation.

Estimated Cost

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
	----- (US\$ million) -----		
Replanting and Maintenance	150.0	80.8	230.8
Rehabilitation	2.3	1.2	3.5
Infrastructure Dev. and Maintenance	4.0	1.9	5.9
Extension and Smallholder Training	5.3	0.6	5.9
Applied Research (RRIM)	0.8	0.2	1.0
Mini-Estate Development & Improvement	3.0	0.5	3.5
Strengthening of Cooperatives	0.5	-	0.5
Computerized MIS	0.3	1.0	1.3
Human Resource Development	0.2	0.2	0.4
Monitoring and Evaluation	0.1	-	0.1
<u>Base Costs</u>	<u>166.5</u>	<u>86.4</u>	<u>252.9</u>
Physical Contingencies	-	0.1	0.1
Price Contingencies	0.1	0.1	0.2
<u>Total Project Costs 1/</u>	<u>166.6</u>	<u>86.6</u>	<u>253.2</u>

Financing Plan

IBRD	-	70.0	70.0
Government of Malaysia	84.6	16.6	101.2
Rubber Smallholders 2/	82.0	-	82.0
<u>Total</u>	<u>166.6</u>	<u>86.6</u>	<u>253.2</u>

Estimated Disbursements

<u>Bank FY</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>
	----- (US\$ million) -----				
Annual	0.3	11.7	21.0	32.0	5.0
Cumulative	0.3	12.0	33.0	65.0	70.0

Economic Rate of Return: 14%

Poverty Category:

The project belongs to the Program of Targeted Interventions since the incidence of poverty among the project beneficiaries (42%) is substantially higher than the poverty incidence in all of peninsular Malaysia (14%).

Map IBRD 25169

1/ Including taxes and duties of US\$0.4 million equivalent.

2/ Through replanting cess payments.

MALAYSIA

SECOND RUBBER INDUSTRY SMALLHOLDERS DEVELOPMENT
AUTHORITY (RISDA) PROJECT

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This report is based on the findings of a Bank appraisal mission to Malaysia in June 1993. The mission comprised Messrs. S. Z. Husain (Economist), K. Templeton (Tree Crops Specialist), P. Boyer (Tree Crops Specialist), C. Maguire (Training Specialist), V. Raswant (Consultant -- Financial Analyst) and J. M. Eschbach (Consultant -- Tree Crops Specialist). Ms. Yun Sun provided the statistical analysis for the report. Peer reviewers were Messrs. D. Meadows (Tree Crops Specialist), A. Byrne (Financial Analyst) and C. Rees (Ecologist). Mr. C. Madavo (Director, EA1) and Ms. Pamela Cox (Chief, EA1AN) also endorsed the project. Mmes. Brenda Phillips and Sandra Ginyard provided secretarial support.

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MALAYSIA
SECOND RUBBER INDUSTRY SMALLHOLDERS DEVELOPMENT
AUTHORITY (RISDA) PROJECT

I. SECTORAL CONTEXT

Agriculture in the Malaysian Economy

1.1 Malaysia's agricultural sector continues to play a key role in the economy, although its relative importance is naturally declining as the country proceeds towards industrialization. In 1992, agriculture's share of GDP was 15%, down from 24% in 1980. However, the sector still employs 25% of the workforce and contributes 10% to direct export income, while also providing raw materials to other export industries. Malaysia's long-run agricultural growth rate has been high by international standards. During the 1960s and most of the 1970s, the growth in sectoral output at constant prices averaged 7%. This declined to a lower, but still very respectable, 5% during the 1980s as expansion of the land frontier slowed. The sector (including forestry and fisheries) has slowed further in the early 1990s, growing at about 2.6% in 1992.

1.2 About one-third of Peninsular Malaysia and 5% of East Malaysia (5 million ha) are under cultivation, with the remaining area under forest or scrub regrowth. About 86% of the cultivated area is planted with tree crops, mainly rubber and oil palm. About 1.8 million ha were estimated to be under rubber in 1992. Rubber's share of cropped area has thus declined from 66% in 1960 to about 36% in 1992. Oil palm has overtaken rubber as the largest crop because of its greater profitability in the last two decades and relative ease of management (though its price prospects are now much less attractive than for rubber). Cocoa has also expanded rapidly from only 2,000 ha in 1960 to 370,000 ha in 1992. Most of the balance of the area under cultivation is devoted to rice, Malaysia's main food crop. Food production jumped as a result of the spread of irrigation and high yield varieties of rice during the 1970s, but has since stabilized.

1.3 The 1990 Household Expenditure Survey estimates the number employed in agriculture to be about 1.84 million. Of the approximately 850,000 households involved, the largest number are rubber smallholders (155,000), followed by paddy farmers (116,000), oil palm growers (100,000) and estate workers (81,000), with the rest divided among mixed farming and fishing. There are also large numbers of undocumented immigrant laborers, particularly in the tree crops estate sector.

The Tree Crop Sector

1.4 Present Performance. Malaysia's climate and soil conditions provide a strong natural comparative advantage for tree crops. The country has long been the world's largest producer and exporter of oil palm, and, until recently, of rubber, and is one of the major producers of cocoa. In 1992, Malaysia provided 1.22 million tons of the world output of 5.2 million tons of rubber and 6.4 million tons of the total world output of 12.5 million tons of palm oil. Malaysia remains the industry leader for palm oil in terms of area, yields, production, technology and downstream processing. For rubber, this position has

changed over the past decade, as decreasing world prices and increasing real labor costs have begun to erode relative profitability. Although Malaysian rubber production has been on a gradual long-term decline, high prices in some years evoke a strong output and a resurgence of interest in replanting. Far from being a sunset industry, indications are that a firming of long run prices, improvements in production and processing technology, and maintenance of high and consistent quality will ensure that Malaysia remains a major force in the world rubber market.

1.5 Malaysian tree crop yields are high, both on total planted and mature areas. Overall, yield of rubber is about 760 kg/ha compared with 400-500 kg/ha for Malaysia's two neighbors. By planted areas, the overall yield of oil palm fresh fruit bunches (ffb) averages 18 tons/ha, compared with 9.5 tons/ha for Indonesia and 11.9 tons/ha for Thailand. However, these average figures do not reflect the higher yields of mature plantings: in Malaysia, average yields for mature estate oil palm are about 25 tons ffb/ha, for estate rubber about 1,400 kg/ha, and for smallholder rubber about 1,000 kg/ha. Malaysia's yield superiority reflects the good institutional performance of research, extension and marketing based on individual commodity specialization.

1.6 Tree Crop Strategy. Government sector policy aims to ensure the supply of food and agricultural commodities for industry and export, while eradicating rural poverty. The tree crop subsector is seen as the principal vehicle for achieving the non-food objectives. The development strategy has been to provide high quality support services, replanting programs and settlement schemes, as well as to set and regulate product quality standards. The results of strong Government support to institutions serving the tree crop sector have been recognized internationally. Of note is the Rubber Research Institute of Malaysia (RRIM), which has a long history as a world leader in advancing rubber production technology. The Rubber Industry Smallholders Development Authority (RISDA), through a replanting program of 30,000-40,000 ha per annum, has ensured the availability of advanced clones in the smallholder subsector. The Federal Land Development Authority (FELDA) has resettled over 100,000 smallholder families in estate-type schemes planted to rubber, oil palm and other crops to close the gap between smallholder and estate performance levels. As the supply of new land for FELDA schemes has diminished, Government policy has emphasized intensive rehabilitation of existing smallholdings through a group development approach by the Federal Land Consolidation and Rehabilitation Authority (FELCRA), which had developed some 240,300 ha (of tree crops) by the end of 1990. The Second Outline Perspective Plan (1991-2000) confirms that the policy emphasis for the future will continue to be on consolidation and rehabilitation of existing smallholdings, rather than on the settlement of new lands.

1.7 Diversification. Both the private and public sectors are actively involved in crop and product diversification. Rubber is increasingly manufactured into final products before export. Little palm oil is now exported in crude form, and even refined oil is increasingly exported as manufactured products. Government agencies are also involved in the expansion of pepper, pineapple, fruits and vegetables among smallholders, as well as the increase of small animal production. Strong private sector investment has resulted in high growth rates for poultry, pork, mutton and beef. The Malaysian Agricultural Research and Development Institute (MARDI) concentrates on widening the range of

crops adapted to the local environment and on improving crop processing technology.

Bank Sector Experience and Strategy

1.8 The Bank has consistently supported the Government's growth and income objectives and strategies in the agricultural sector in Malaysia. For the future, the Bank will continue to assist smallholder programs aimed at eliminating pockets of poverty and productivity improvements to help maintain Malaysia's international competitiveness. This assistance will emphasize institutional development and support for the devolution of management activities to farmer beneficiaries, and the privatization of activities which no longer need to be carried out by the public sector.

1.9 To date, the Bank has made 33 loans for agriculture and rural development, amounting to US\$1,050.6 million, or nearly 40% of total lending to Malaysia. Within the food crop sector, the most successful was the MUDA I Irrigation Project (Ln. 434-MA) which led to a doubling of cropping intensity, increased yields and strong institutional development. Within the tree crop sector, seven loans have been made to FELDA to assist implementation of its land settlement schemes. Six of these have been completed, and five Project Performance Audit Reports (PPARS) and an Impact Evaluation Report (IER) by the Operations Evaluation Department (OED) concluded that all these FELDA projects were quite successful in meeting their objectives. Achievements in land development, crop yields, income and economic returns were satisfactory. The Bank has also made four loans for FELCRA-led development, of which three achieved or exceeded targets and were considered successful and sustainable, and the fourth is under implementation. The Bank made one loan to RISDA under the RISDA Project (Ln. 3139-MA), which was satisfactorily completed in 1992 (para. 2.17).

Rubber Smallholder Sub-sector

1.10 Characteristics. Rubber production in Malaysia grew rapidly in the sixties and through the mid-seventies. Thereafter, from 1977 to 1985, both production and exports stagnated at about 1.5 million tons annually. However, because of the upturn in world rubber prices, Malaysia's rubber production increased to 1.58 and 1.65 million tons in 1987 and 1988, respectively. Since then the production has declined and was about 1.22 million tons in 1992. Over the past 25 years, there has been a significant change in the relative importance of the large private rubber estate sector vis-a-vis rubber smallholders. The estates' contribution to national rubber production fell from about 60% in 1965 to about 29% in 1992, while the contribution of the rubber smallholder sector increased from 40% to about 71% over the same period.

1.11 The rubber smallholder sector is defined to include all holdings up to 40 ha. However, about 61% of smallholders applying to RISDA for replanting grants have farms of less than 2 ha, with the majority having holdings of less than 1.2 ha, and own 34% of total land devoted to smallholder rubber; 29% have farms between 2 and 4 ha and own 37% of total land; and only 10% have farms over 4 ha and own 29% of total land. The total number of smallholder households which derive their living primarily from rubber is 155,000 (para. i.3), thus making rubber smallholders the largest group in agriculture. They are also the biggest

poverty group in the country, accounting for about one-third of the rural poor. The total area under smallholder rubber in 1992 was about 1.2 million ha in peninsular Malaysia and about 0.3 million ha in Sabah and Sarawak. The majority of rubber smallholders operate their own farms; however, part-time, seasonal off-farm jobs and sharecropping are common.

1.12 Institutional Framework. The Ministry of Primary Industries is the main Federal policy-making body for rubber, oil palm, cocoa and some other exported primary commodities. It also controls technical and regulatory institutions such as the Malaysian Rubber Research and Development Board (MRRDB), Rubber Research Institute of Malaysia (RRIM), Malaysian Rubber Exchange and Licensing Board (MRELB), Palm Oil Research Institute of Malaysia (PORIM) and Palm Oil Registration and Licensing Authority (PORLA). However, the principal implementing institutions in the primary commodities sector viz. RISDA, FELDA and FELCRA are under the Ministry of Rural Development (MRD).

1.13 RRIM. The RRIM, established in 1975, is the largest research institute in the world devoted to a single crop. The RRIM conducts research and development on all aspects of natural rubber cultivation, production, processing and product manufacturing. In more recent years, it has given special attention to adaptive agricultural research for the rubber smallholder sector. It has a staff of about 190 research officers and 1,780 support staff, and comprises 17 research, development and advisory divisions, two experiment stations in Selangor and Johore with a total area of 3,041 ha, and a field station in Pahang of 1,039 ha run as a commercial rubber mini-estate. Funding for the RRIM is provided by a research cess on rubber exports which currently accounts for about 50% of total budgetary requirements of M\$50 million, the shortfall being met by an annual allocation from the Government. With the recent decline in Malaysian rubber production and exports, and the consequent decline in research cess collections, the RRIM is facing financial problems. The RRIM is represented on the RISDA Board of Directors and takes a lead role in RISDA's Transfer of Technology Committee, which reviews and selects promising innovative technology for adoption by small farmers or group farming systems and arranges for its testing and demonstration by RISDA under RRIM guidance.

1.14 Future Prospects. Given the present and projected relative prices of rubber and palm oil, the rate of conversion from rubber to oil palm in the estate sector may be slower. Rubber is generally the crop choice for areas of broken terrain and less fertile soils, and, therefore, is the most appropriate crop for replanting in the northern areas of the Peninsula. It also has the advantages of familiarity for many smallholders and less price volatility than palm oil. Finally, rubber is also more suitable for smallholder marketing than is oil palm, which is a plantation-type crop requiring nearby processing facilities. Malaysia's comparative advantage in rubber is expected to continue: costs of production are estimated at US\$700-750/ton (for RSS 1), compared to the average 1992 world price of US\$1,000/ton and projected year 2000 and 2005 prices of US\$1,231 and 1,220/ton, respectively, in 1993 constant dollars. Labor costs, which account for 60-70% of rubber production costs (compared with about 30% of crude palm oil production costs), would be the major issue for rubber in Malaysia over time. To avoid the possibility that real wage increases may erode Malaysia's competitive edge in rubber in the foreseeable future, utmost emphasis has to be placed on capturing potentially important cost reductions which can be

realized (e.g. through the adoption of low-intensity tapping systems with stimulation). Government strategy for the rubber subsector, particularly the smallholder subsector served by RISDA, now fully supports this efficiency thrust.

II. RUBBER INDUSTRY SMALLHOLDERS DEVELOPMENT AUTHORITY (RISDA)

RISDA's Mandate and Organization

2.1 Concerned about the relatively large number of poor rubber smallholders, the Government initiated efforts to improve their socioeconomic status by establishing the Rubber Industry Replanting Board (RIRB) in 1952. RIRB assisted rubber producers to replant their low yielding and debilitated trees with higher yielding materials, and through 1972, about 600,000 ha of old rubber had been replanted. Efforts to alleviate poverty among rubber smallholders were intensified by the establishment of RISDA in 1972, which took over the duties and functions of RIRB beginning January 1, 1973.

2.2 RISDA's mandate is exceptionally broad and it has undertaken a wide range of activities, which inter alia, have included developmental activities (assistance for replanting, development of mini-estates, extension, infrastructure construction, provision of smallholder credit and administration of input supply schemes); commercial activities (marketing of rubber, rubber processing, and product factories, rubber smokehouses, palm oil processing, and refining mills, planting material nurseries, and oil palm and rubber production on estates); and social activities (cooperative development, scholarships for smallholders' children, nursery schools, hostels, education loans, insurance schemes, etc.). The organizational structure to handle these diverse tasks is complex, including not only RISDA itself, but also subsidiaries and cooperatives. Under the RISDA I Project (Ln. 3139-MA), RISDA's commercial activities were hived off to subsidiaries, its developmental and social activities narrowed down and focussed on rubber and rubber-related activities, and its credit activities stopped (except for mini-estate loans).

2.3 Head Office and Field Organization and Staffing. Management of RISDA is vested in a Board of Directors appointed by the Minister of Rural Development. The Director General (DG) reports to the Board and has the overall responsibility for implementing policy and for the day-to-day administration. He is supported by two Deputy Director Generals (DDGs) for Operations and Planning and Corporate Services, and 11 State Directors (Annex 1). The responsibility for planning, monitoring, and supervision of RISDA's field programs rests with the State Directors (SDs). Under the RISDA Project, implementation responsibility was transferred to the District Offices, which became Responsibility Centers (currently 60 in number). District Officers reporting to the State Directors are responsible for coordination of field activities through Station Officers, each of whom supervises on average seven to eight Extension Officers. There is thus a four-tier field structure involving 11 State Offices, 60 District Offices, 179 Stations (or one District Office supervising every two Stations), and 1,300 extension staff. As of June 1993, RISDA's total staff strength stood at 4,865, of which 677 (14%) were located in the Head Office and the balance 4,086 in the field and 102 in the subsidiaries.

2.4 Subsidiaries. RISDA has three subsidiaries, the most important being Estet Pekebun Kecil Sdn Bhd (ESPEK). ESPEK is a management company, managing plantations and planting material production on RISDA's behalf. The plantations generate about M\$40 million in profits annually.

2.5 Cooperatives. Having initiated 64 smallholder District level cooperatives, RISDA maintains very close operational linkages with the apex body to the cooperatives - the National Rubber Smallholders Cooperative (NARSCO), which reports to the Department of Cooperatives under the Ministry of Land and Cooperative Development. NARSCO, though technically not a subsidiary of RISDA, is very closely aligned with it: RISDA is a shareholder of NARSCO; the Director General of RISDA is the Chairman of NARSCO's Board of Directors; and the Deputy Director General, Planning and Corporate Services, of RISDA is NARSCO's Managing Director. NARSCO's activities are diverse. While NARSCO is engaged in input supply and marketing, its subsidiaries are engaged in real estate development, insurance and travel, and rubber glove manufacturing. RISDA's rubber purchasing activities and operation of rubber smokehouses were transferred to NARSCO in 1990.

Financing

2.6 RISDA's sources of funds include a rubber replanting cess, accounting for about 50% of all replanting expenditures, and direct government budgetary allocations. The cess of M\$99/ton (and also a research cess of M\$38.50/ton) is levied on all rubber exports. In 1992, replanting cess collections were about M\$89 million. Of these, about M\$20 million were to be refunded to the estate sector, leaving about M\$70 million for replanting by smallholders. Government grants covered the remaining 50% of replanting grants and the full cost of RISDA's agricultural inputs program, rehabilitation, smallholder development center, infrastructure development, extension, vehicles and equipment and RISDA's administrative costs. Government loans to RISDA, at 4% p.a. interest for 25 years including a 10-year interest-free grace period, cover supplementary mini-estate development costs and mini-estate housing schemes. Government budgetary allocation for RISDA's development program was about M\$162 million in 1993 (excluding expected cess collection) and for the operating budget about M\$80 million. RISDA's financial condition is discussed in detail at Annex 2 and the financing of RISDA's operating budget in para. 3.25.

2.7 Since the present value of the replanting cess paid over the productive life of trees exceeds the present value of the replanting grant (Annex 3), theoretically there should be no need for Government contributions and the cess fund should be self-financing. However, the cess fund was established in 1952 when significant rubber areas already needed replanting, although no cess had previously been paid. Therefore, initial funds were contributed by the Government. By 1977, RISDA had achieved a highly liquid position: 80% more was collected from the replanting cess than was paid to rubber producers for replanting. But RISDA's subsequent investments in a variety of undertakings and loans to smallholders (which were mostly not repaid) in late 1970s and early 1980s resulted in deficits which had to be covered by Treasury subventions. At about the same time, the Government decided to increase the replanting rate to eliminate the backlog of areas never replanted, and this also increased the extent of RISDA's operating deficit. The annual replanting rate increased from

an average 20,000 ha in the late 1970s to about 31,000 ha over 1981-88 and further to 40,000 ha p.a. over 1990-92.

2.8 As of end-1992, there were about 355,000 ha of registered smallholder rubber which had never been replanted. In addition, 255,000 ha were ready for second and third-round replanting. An acceleration of the replanting rate to about 40,000 ha p.a., with provision for up to 30,000 ha p.a. for first-round replanting and the balance for second and third-round replanting, should enable the backlog of never replanted areas, for which the owners may still maintain an interest in rubber production, to be cleared by year 2009 (Annex 4). However, since rubber exports are projected to grow to only about 1.5 million tons by year 2000 (compared with 1.1 million tons in 1991) and assuming that the replanting cess rate remains at its present level, the replanting cess collections would be inadequate to cover 40,000 ha p.a., or even the lower 30,000 ha p.a. assumed for the RISDA II Project (para. 3.4(a)). The current replanting program would, therefore, necessitate continued Government contributions early into the next century.

Replanting Grant

2.9 The system of replanting grants, funded by a replanting cess levied on all exported rubber (para. 2.6), was established to ensure replanting of old and low yielding rubber and thereby the continual rejuvenation of the industry. Smallholder areas are eligible for the grant at a frequency of not less than 20 years, provided they are registered as rubber growing areas. The grant may be utilized for replanting old rubber, either with rubber or any of 18 other crops (Annex 5), among which oil palm is the most popular alternative. As they no longer pay cesses, farmers choosing crops other than rubber lose the right to future replanting grants and RISDA services three to four years after planting when grant payments for those crops are completed.

2.10 The grant is paid in installments of both cash and kind over the development period of the crop (7-8 years for rubber, 4 years for oil palm and 4-5 years for other crops). The grant finances the average estimated costs of the standard agricultural inputs over the immature period of the crop and a part of the imputed labor costs. Currently the value of the grant for replants up to 4 ha is M\$6,178/ha for rubber and M\$4,448/ha for oil palm and other crops, reflecting the considerably shorter immaturity period of the latter. Details are given at Annex 5. There are 17 defined processing steps prior to the first grant payment. A flow chart is given at Annex 6. Installment payments depend initially on the stage reached in land preparation and planting, and later on the stage of growth of the crop, each stage being subject to confirmation by RISDA field inspectors and their report of a satisfactory standard of field conditions, particularly in respect to the maintenance of the crop.

2.11 The replanting cess/grants system has worked well in Malaysia over the years compared to other countries, which have relied on alternative approaches to financing of replanting programs from general Government revenues or by credit. It has played a significant role in ensuring replanting of large areas of old rubber (para. 2.14), in improving smallholder productivity (para. 2.15) and in alleviating poverty in the smallholder sector. A significant feature of the Malaysian system is the choice available to farmers to replant old rubber

with any of the 19 eligible crops, subject to agro-climatic suitability. The resulting crop mix has, therefore, been responsive to market signals (para. 2.14 and Annex 4). Another important point to note is that the system results in full cost recovery over the productive life of trees (about 25 years) since the present value of payments of replanting cess and rubber export duties exceeds the present value of the replanting "grant" (Annex 3).

Systems of Replanting

2.12 RISDA's smallholder replanting program for old and low yielding rubber is implemented through several different systems of land development, which are distinguished by the degree of RISDA's involvement in implementation and management at the development and production stages: (a) individual replanting; (b) simultaneous replanting; (c) group replanting; and (d) mini-estates. Individual replanting was the only system operating until 1973, but has accounted for about 50% of RISDA's annual replanting in recent years. Individual owners approved by RISDA for a replanting grant take full responsibility for implementation of their replanting. The simultaneous replanting system was introduced in 1986 and was about 15% of total RISDA replantings in 1992. The system was developed by RISDA to increase the efficiency of replanting operations through better programming of RISDA field staff. Simultaneous replanting involves organizing farmers on scattered holdings into groups which follow the same replanting schedule under RISDA guidance. RISDA arranges the contracting of all land preparation and the schedules and implementation of subsequent works covering the initial six months of maintenance after planting, as well as the delivery of inputs, as an integrated operation for all participating farmers in the scheme, thereby achieving benefits of scale for them. Once the planting contract has been completed, including the first six months of field maintenance after planting, the group participants assume responsibility for all further maintenance and other work in their holdings throughout the crop immaturity period. Group replanting was the first type of group operation introduced (in 1973) by RISDA into the smallholder sector. This system accounted for about 35% of total replantings in 1992. This replanting is by a group of farmers on contiguous land of at least 20 ha with RISDA taking responsibility for implementation of the first two years of land development through contractual arrangements on behalf of farmers. (For replanting by FELDA and FELCRA, which is included in the group replanting category, RISDA only makes the grants available and has no implementation role). Afterwards, RISDA withdraws from further direct management of the field works and encourages members to continue functioning as a group. RISDA, however, closely supervises the standards and timing of work for the remainder of the immaturity period. Like simultaneous replanting, this system facilitates more concentrated RISDA extension services.

2.13 Mini-estates. Mini-estates, the most organized of the RISDA group farming systems, were developed to bring the benefits of estate-type technology and management to smallholders through the formation of large centrally-managed units of production. Mini-estates were initiated by RISDA in 1979, and some 391 units with an area of about 41,800 ha (33,000 ha of rubber and 8,800 ha of oil palm) had been developed through 1992. Of these, 269 (30,240 ha) were in production. In this system, farmers agree to combine, for operational purposes, contiguous or near contiguous lots of land, scheduled for replanting, into a single and integrated estate unit under direct RISDA management. The minimum

size of estate at formation is 20 ha - the average size of existing mini-estates is about 107 ha. RISDA organizes and assures the operation of each mini-estate entity through the transfer in trust of the individual land titles to RISDA (title caveats) for the period of land development and for such further period as necessary for recovery of development expenditures over and above the replanting grant entitlement of the participants. Unlike participants of other replanting systems, mini-estate participants are given loans by RISDA for supplementary development costs to cover terracing, drainage, development of vacant pocket areas, internal roads and perimeter fencing. Recognizing some of the problems in mini-estate development and operation (para. 2.15), RISDA decided in February 1989 that its main emphasis will be on group and simultaneous replanting and only in areas where these replanting systems are not feasible will the mini-estate approach be adopted. As a result, no new mini-estates have been developed over the last two years. Improvement of the viability of existing mini-estates would be a major thrust of the project (para. 3.14).

Replanting Performance

2.14 Since the inception of the cess-funded rubber replanting program in 1952, some 1.16 million ha of old smallholder rubber have been replanted (Annex 4), of which about 934,000 ha was first time replanting, representing about 70% of the total registered smallholder rubber area in the Peninsula. Most of the balance is second round replanting. The annual replanting rate has varied from 10,000 ha to 46,000 ha, subject mainly to rubber price fluctuations. Rubber has accounted for about 77% of all replantings since the inception of the program compared to about 12% for oil palm and 11% for other crops, mostly fruits (non-citrus). Annual proportions have varied considerably in response to market signals (Annex 4).

2.15 Replanting of old low-yielding rubber with improved clones and better production technology has helped raise the average yields in the smallholder sector (in peninsular Malaysia) to about 1,000 kg/ha in 1992, compared to the 400-500 kg/ha for unimproved smallholder rubber. However, there is little systematic data on the relative efficiency of RISDA's various replanting systems. Available information about mini-estates suggests that their performance has been rather mixed. Some mini-estates show yield averages for both rubber and oil palm much below expectations. On the other hand, there are individual mini-estates with good yield performance more in line with estate-organized production. Although a number of possible factors related to management could help explain the cases of unsatisfactory mini-estates, the most serious problem is that of incomplete and protracted establishment of the crop at planting, leading to a low percentage of producing trees in the early production years. The development cost of mini-estates is high, averaging M\$10,000/ha for rubber and M\$7,000/ha for oil palm for those rubber and oil palm mini-estates which entered into production by the end of 1992. These costs are significantly above those estimated for the other replanting systems and above replanting grants of M\$6,178/ha for rubber and M\$4,448/ha for oil palm. High costs are partly the result of intensive inputs including terracing, fencing and roads, and partly that of above average planting losses requiring repeated supply plantings. In view of the above factors, RISDA decided to de-emphasize mini-estates (para. 2.13).

Performance of Bank-Financed RISDA Operations

2.16 In addition to the free-standing RISDA Project (Ln. 3139-MA), the Bank has financed RISDA components under four area agricultural development projects coordinated by other Government agencies (starting from 1980 and expected to continue through 1994): Kelantan Land Schemes Rehabilitation (Ln. 1899-MA), Malacca Agricultural Development (Ln. 2147-MA), Kedah Valley Agricultural Development (Ln. 2220-MA) and Second Western Johor Agricultural Development (Ln. 2740-MA). Project completion reports (PCRs) have been issued for three of the above projects with RISDA components: Kelantan, Malacca and Kedah Valley. The PCRs point to satisfactory performance of RISDA.

Lessons Learned From RISDA I Project

2.17 The RISDA I project, for which a Bank loan of US\$71 million was approved on December 12, 1989, was satisfactorily completed in December 1992. The replanting target of about 40,000 ha p.a. was met. Marketing and processing activities of RISDA were divested and institutional development initiated. A significant achievement of the project with respect to the women-in-development (WID) component was the development of a gender-specific database and an almost doubling of the number of women smallholders trained from about 19% of the total trainees in the pre-project year (1989) to about 32% in 1992. The only project component which could not be implemented successfully was that for transforming the 64 district cooperatives formed by RISDA into self-financing entities. Only 36 cooperatives had become self-financing by end 1992. The economic rate of return of the project is provisionally estimated at about 12%. The following important lessons learned from the project have been incorporated in the design of the Phase II project: (a) development of cooperatives is a complicated process and needs more focussed attention; and (b) RISDA needs more intensive support for the improvement of mini-estate management and the development of the computerized MIS.

III. THE PROJECT

Project Origin

3.1 The Government and the Bank began discussions on the Phase II project in 1992, the last year of the RISDA I Project (Ln. 3139-MA). RISDA prepared a draft project proposal which was briefly reviewed by a Bank mission in May 1992. The first Bank preparation mission visited Malaysia in September/October 1992. Appraisal took place in June 1993.

Rationale for Bank Involvement

3.2 The project would be consistent with the Bank's agricultural sector lending strategy for Malaysia which emphasizes reduction in rural poverty by raising smallholder productivity and incomes, institutional improvements, development of human resources and the private sector in rural areas, and progressive privatization of schemes and activities handled by agricultural parastatals. There is a need for continued Bank involvement with RISDA to address some of the problems in the rubber smallholder subsector, including shortage and high cost of labor, availability of high-quality planting materials,

development of cooperatives, and improvement of mini-estate management. A follow-on project can help address the above problems and continue the institutional development process initiated under RISDA I. For the first time since the Bank started lending for the agricultural sector in Malaysia, the Bank can help implement a reorientation of rubber research in the country through the proposed Rubber Research Institute of Malaysia (RRIM) component for clonal reevaluation (para. 3.13). Moreover, after having introduced low-intensity rubber tapping technology on FELCRA schemes (para. 3.15), the Bank is in a unique position to widen this technological change through RISDA and benefit hundreds of thousands of rubber smallholders in the long term.

Project Objectives

3.3 Building on the overall positive results of RISDA I Project (Ln. 3139-MA), the Phase II project would continue to pursue the objectives of increasing the productivity and efficiency of the rubber smallholder subsector, improving RISDA's institutional effectiveness, and helping develop human resources and the private sector in rural areas.

Detailed Project Description

3.4 The three-year project (1994-1996) would cover the entire peninsular Malaysia and would have the following components:

- (a) crop development (93% of project costs): replanting of about 90,000 ha of old rubber with rubber and other crops, and improvements in rubber nursery operations; maintenance during immaturity of areas to be replanted under the project and an additional 200,000 ha replanted prior to the project; and rehabilitation of about 5,000 ha of young replanted areas;
- (b) infrastructure development (2% of project costs); upgrading and maintenance of about 1000 km of agricultural access roads;
- (c) extension and smallholder training (2% of project costs): reorientation and strengthening of extension and smallholder training programs, with continued emphasis on training of women smallholders and workers;
- (d) applied research (0.4% of project costs): mainly a clonal reevaluation by the RRIM to test the responsiveness of its various clones to stimulation with low-intensity tapping systems (LITS);
- (e) mini-estate development and improvement (1.4% of project costs): increased viability of mini-estates through the introduction of LITS, transfer of management mainly to cooperatives, expanded tappers' training, and improvement of data base and the monitoring system for mini-estates;
- (f) strengthening and restructuring of RISDA cooperatives (0.2% of project costs): implementation of a rationalization/restructuring plan for

cooperatives and provision of technical assistance and training for plan implementation; and

- (g) institutional development (1% of project costs): further development of RISDA's computerized MIS; a reoriented human resource development program for RISDA; and support for monitoring and evaluation (M&E) activities.

Crop Development

3.5 Replanting. The project would support replanting of about 90,000 ha of old rubber over the project period. This target includes cess-financed replantings by FELDA and FELCRA (about 15,000-18,000 ha). This target is considered feasible on the basis of demand for replanting from farmers as well as RISDA's implementation capacity. Based on recent experience, replanting is expected to be approximately 80% with rubber, 12% with oil palm and 8% with other crops. Crop choice would continue to be the prerogative of the replanters, except in cases where such choices are agroclimatically unsuitable, and RISDA would recommend alternative choices in these cases. Assurances to this effect were obtained at negotiations. In line with current Bank policy, development costs of any cocoa planting chosen by smallholders would not be eligible for reimbursement. However, cocoa plantings have been virtually nil in the last two years (Annex 4, Table 5) and are expected to remain so during the project period due to unfavorable price prospects.

3.6 Rubber Nursery Improvement. To ensure provision of quality planting material to the smallholder replanters, the project would provide for the supervision and training costs of rubber nursery improvement. The current arrangement whereby planting material is produced on cooperative nurseries scattered throughout the country has made it extremely difficult to ensure high quality (quality being defined not only in terms of clonal integrity but also vigor and uniformity of the plants ensured through culling of slower-growing and other undesirable plants at each stage of preparation). RISDA management subsidiary, ESPEK, is currently responsible for the quantitative and qualitative aspects of planting material supply but has faced problems in ensuring proper supervision and quality control of nurseries not located on its 7 existing central sites (approximately 60% of rubber planting material production is currently outside the 7 central nurseries). Quality nursery production requires high-level technical skills and management, which are more easily provided on large production units. The project would initiate a program for rubber nursery improvement (details are at Annex 7) including, inter alia, refresher training courses in planting material production and management to be conducted by RRIM for ESPEK, RISDA and cooperatives nursery staff. Training of a cadre of seed inspectors would also be provided. The following agreements were obtained at negotiations:

- (a) The rubber planting material production by RISDA or its subsidiary ESPEK would be confined to about 15 sites. Cooperatives would still get contracts from ESPEK for planting material production but the nurseries would be under ESPEK supervision and control. Since nursery contracts to 28 cooperatives have already been given for the 1994 planting season in line with normal practice, the reduction in nursery

sites to about 15 would be implemented for the 1995 planting season, that is, from 1994. Thereafter, the number of nursery sites would be agreed with the Bank.

- (b) To ensure the highest-quality planting material production on about 15 nursery sites, RRIM (or another institution acceptable to the Bank) would agree with RISDA under a contractual arrangement to carry out an assessment of performance at each critical stage of planting material preparation. The reports produced by the RRIM (or another institution) after each visit to the nurseries would be sent to ESPEK and RISDA, with copies to the Bank, Ministry of Rural Development and any other interested Government agencies. The contractual arrangements between RISDA and RRIM (or another institution) would incorporate the guidelines shown at Annex 7.
- (c) Since ESPEK has the responsibility for planting material production, it would have the authority to take appropriate action should the cooperatives fail to comply with ESPEK's standards for nursery management. ESPEK's incremental costs for enhanced supervision would be met by increasing its own share of planting material production to about 20% (cooperatives getting 80% of the contracts).
- (d) Since the improved nursery arrangements, particularly more rigorous culling of low-quality material, may lead to increased cost of production, the cost-price relationship for rubber planting material would be kept under review by the Government and RISDA and price adjustments would be made, if and when required.

3.7 Clonal Composition. The clonal composition of RISDA's replanting program would be reoriented under the project. First, RISDA's regular replanting program would be with Class I and II clones only, with the percentage of Class II clones not more than that recommended by RRIM from time to time (currently 50%). Class III clones would be recommended by RISDA for use by smallholders only under RRIM and RISDA supervision and control, as these clones are still in the experimental and observation stage. Second, since the need for the introduction of LITS (see para. 3.15 for details) as a means to overcome the growing shortage of tappers has already been recognized by RISDA, RISDA would reorient its replanting program beginning with the 1996 plantings and increasingly use clones which are known to be responsive to stimulation with LITS, as determined by RRIM and satisfactory to the Bank. Only nine clones are at present in this category (details are at Annex 8) while further information on clonal responses to stimulation with LITS would be generated over the next few years through the tapping trials included in the research component (para. 3.13). It is possible that some smallholders will choose clones which are not or not yet known to be responsive to stimulation with LITS. In this case, RISDA would explain to the smallholders the risk that these clones may be unhelpful to them in case of labor shortage. RISDA would attempt to keep the use of these clones not yet tested for responsiveness to stimulation with LITS to less than 20% of its replanting of rubber with rubber. Agreements on the above clonal policy were obtained at negotiations.

3.8 Crop Maintenance. The project would support crop maintenance of all existing smallholder replant areas (excluding cocoa) on which grant installments would be paid during the project period. Total area under maintenance would change yearly as the earlier planted areas mature and would range from 202,280 ha in 1994 to 198,800 ha in 1996.

3.9 Rehabilitation. The project would provide rehabilitation assistance for failed replantings or those with unsatisfactory field conditions due to events outside the control of farmers (e.g., natural disasters like fire, floods, wind damage, etc.), and for which grant payments are deferred within the first two years after planting. The cost of assisted rehabilitation may not exceed the amount of grant paid up to the time of deferment. It is estimated that some 5,000 ha would be rehabilitated during the project period.

Infrastructure Development

3.10 The project would provide for upgrading and maintenance of minor agricultural access roads, estimated at about 1000 km, including bridges and drainage works, in support of the replanting program. Under the RISDA I Project, the very low level specifications which were earlier being used for access roads and which often resulted in the roads being unusable after a single rainy season, were generally upgraded to those for agricultural roads (such as those constructed by FELDA). The same specifications would be generally followed under the RISDA II project. Agricultural access roads would be constructed to minimum geometric standards following contour lines. Gravel pavement would be 4.2 m wide and 15 cm thick, for an average of 630 m³ compacted material per km. The road sub-base and gravel surface would be rolled over 3 to 4 times by passing a 6-ton roller. Bridges would be built mostly of timber and cement pipe culverts would also be provided where needed. 30 cm wide ditches would be cut alongside the roads as required. As the condition of existing roads varies, the extent of upgrading required and the costs also vary. However, average cost of upgrading under the RISDA I project ranged from M\$10,000 to 13,000/km and is expected to remain at that level under the RISDA II project. For reasons of construction standards, RISDA access roads are not accepted as part of the State network and, therefore, do not qualify for State maintenance funding. To ensure that the access roads remain in operative condition, a specific allocation of about M\$1.0 million was added to RISDA's development budget under the RISDA I project for maintenance of roads and other infrastructure constructed by RISDA. This arrangement would continue under the RISDA II project.

Extension and Smallholder Training

3.11 The project would help reorient and intensify RISDA's extension program for rubber smallholders. The key feature of this extension intensification program is that it devotes about two-thirds of the extension time and budget to mature rubber and thus orients RISDA's extension services for the first time towards increases in productivity of mature rubber (details are at Annex 9). The other notable feature of the program is that for the first time it lays down a target number of rubber farm operators (defined to include active smallholders and/or hired tappers) in mature rubber areas to be reached every year by RISDA's extension program. The initial target is 20,000 operators every year. This target is based on an assessment of RISDA's current capability in the

field. The target will be adjusted upwards in future as experience with the initial target accumulates and as field extension time and capability increase. If the conservative target of 20,000 operators a year is met, RISDA should be able to extend interalia LITS technology to 40-50% of smallholder mature rubber areas by the turn of the century. Agreement was obtained at negotiations that RISDA would reorient its extension services as described above. The extension component would finance equipment and materials for demonstration plots and pilot projects, and expenditures incurred in organizing field workshops, demonstrations and meetings for smallholders.

3.12 Both formal and in-situ training programs for smallholders would be restructured to correspond to the priority extension topics included in the extension intensification program (Annex 9, Tables 1 and 2). The project would also provide agricultural training for women smallholders and workers. Women as a group make an important input into rubber production in the smallholder sector and up to 40% of tappers in certain States are women. Under the RISDA I Project (Ln. 3139-MA), RISDA began to record number of trainees by gender at its Training Institutes as well as in the field and met the project target of increasing the number of women trainees to about 30% of the total smallholder trainees in formal and in-situ training courses by the end of 1992. Assurances were obtained at negotiations that this proportion of women trainees would be generally maintained under the project, with fine-tuning of the target according to women's role in rubber in different States and women's needs for different types of training.

Applied Research

3.13 The project would provide for materials, equipment and incremental operating costs for clonal reevaluation by RRIM to test the responsiveness of its various clones to stimulation with LITS; development of physiological/biochemical parameters as early warning indicators of stress in rubber trees under stimulation; a study of nutritional aspects in relation to low-frequency tapping systems; a survey of the performance of Class II clones on progressive smallholdings; and research on mixed cropping systems using rubber with fruit trees (details are at Annex 10).

Mini-Estate Development and Improvement

3.14 The project would provide for supplementary development costs of mini-estates initiated prior to the project and not yet in production (averaging 4,000 ha p.a. over the project period), and initiate a program to improve the performance of mini-estates in production (about 30,000 ha). The supplementary development costs are over and above the participating smallholders' replanting grant entitlement (para. 2.13). They would be charged to participating smallholders as loans (para. 2.6), which would be repaid to RISDA as the estates come into production. The major initiative to improve the performance of mini-estates in production would be LITS, which is expected to have a significant impact on the financial viability of mini-estates through reduced labor costs and by bringing currently untapped areas into production. Other initiatives include transfer of management of an increasing number of mini-estates mainly to cooperatives, increased tappers' training, database improvement and implementation of an improved monitoring system.

3.15 Low-Intensity Tapping Systems (LITS). The project would introduce LITS on all mini-estates facing tapper shortages and reorient RISDA's extension program for introduction of LITS to smallholdings in the post-project period (para. 3.11). Compared to the current labor-intensive alternate day tapping (d/2), LITS can reduce labor requirement by 33% with third day tapping (d/3), by 50% with fourth day tapping (d/4), or even more with lower intensities of tapping. The feasibility and benefits of LITS have been demonstrated by the results of the pilot program launched by FELCRA in 1991 and supported by the Bank under the Second and Third FELCRA projects (Loans 2917-MA and 3484-MA). The technique has been successfully used in West Africa for about 20 years.

3.16 Experience with LITS in other countries and in Malaysia points inexorably to the need to start carefully with LITS under very controlled conditions. Although the technology is simple in principle, its successful application requires high management inputs, close coordination and monitoring, and high tapping quality. Replication of LITS on a wider scale would, therefore, be done only after experience has been gained in a pilot program on seven selected mini-estates in the first year. LITS is considered critical for the future viability of the rubber smallholder subsector in Malaysia and, as such, utmost care has to be taken to ensure successful introduction of the system. Annex 11 provides a detailed description of LITS, an action plan for its introduction, names of mini-estates to be included in the pilot phase, and coordination and monitoring requirements. More intensive training is also required for the introduction of LITS and a proposal has been included in the training program for the project. The following agreements were obtained at negotiations:

- (a) The coordinator for LITS already appointed at RISDA headquarters would be full-time, with full authority on the technical aspects of the program, assisted in every State by a full-time field officer, responsible for the coordination and monitoring of the program in the State. Since the introduction of LITS is now part of RISDA's long-term extension program, the Extension Division would continue to have the overall responsibility for this program, even while it was being implemented only on mini-estates;
- (b) A phased program satisfactory to the Bank would be followed for the introduction of LITS (Annex 11, para. 2); and
- (c) Appropriate allocations in RISDA's operating budget would be made for the operating expenses of the LITS program and for LITS training.

3.17 Transfer of Mini-Estate Management. The project would help transfer mini-estate management, mainly to cooperatives, by assisting development of the management capability of cooperatives (para 3.19). Two mini-estates have so far been transferred to ESPEK and one to a cooperative for management. About 50 mini-estates are expected to pay off their debts by 1996, the end of the project period. This group and some other mini-estates would be considered prime candidates for transfer of management from RISDA, particularly to cooperatives.

3.18 Other Initiatives. Other initiatives to improve the performance of mini-estates would include increased tappers' training (para. 3.21), database improvement and implementation of an enhanced monitoring system. The database improvement is particularly required since many mini-estates are shown to have huge operating losses and it is not clear why such huge operating losses are being incurred (Annex 12). Agreement was obtained at negotiations that by the end of 1994 RISDA would develop a consistent, reliable set of data on mini-estates and implement an improved monitoring system for mini-estate performance with respect to production, dividend payments, debts and debt repayment, etc.

Strengthening and Rationalization of Cooperatives

3.19 The project would strengthen cooperatives by helping implement a rationalization/restructuring plan, and by providing training for cooperative staff and Board members and technical assistance (details are at Annex 13). The rationalization plan is based on the principle of specialization: about 15 cooperatives would specialize in nursery management, 11 in input supply and 38 in infrastructure works (including land development contracts for group replantings) to generate a minimum of M\$50,000 in net profits per cooperative annually. Assurances were obtained at negotiations that the draft plan (Annex 13) would be refined and discussed further by RISDA and NARSCO with the cooperatives and implementation of a firm action plan would commence by July 31, 1994. Technical assistance (about 24 person-months) and training has been included in the project in support of the rationalization plan. Draft terms of reference for technical assistance are at Annex 13, Appendix 1.

Institutional Development

3.20 Computerized MIS. The project would support further development of RISDA's computerized MIS initiated under RISDA I project by providing hardware and software, training and consultancy. A phased program for the development and implementation of various modules has already been drawn up by the Information Technology Unit (ITU) of RISDA. Most modules would be operational by early 1994 (Annex 14) and would provide the basis for a significant improvement in RISDA's institutional efficiency. Consultant services (about 12 person-months) would be employed for specific tasks from time to time, as the need arises. It is anticipated that the following applications would require consultant support: (a) smallholders information systems on personal computers with local area network (4 person-months); (b) financial application for cost centers (4 person-months); (c) communications (1 person-month); (d) graphical interface programming (1 person-month); and (e) geographic information system (2 person-months). Specific terms of reference would be drafted by the ITU for Bank review before consultants are hired.

3.21 Human Resource Development. The project would support three major new thrusts in training: (i) training of ESPEK, RISDA and cooperative staff in improved nursery techniques and management, to be done in collaboration with RRIM (para. 3.6(c)); (ii) training of a large number of staff in LITS (para. 3.16); and (iii) a comprehensive training program for cooperative staff and Board members (para. 3.19). In addition, the training in infrastructure upgrading and maintenance, improved communication skills of extension staff, and improved training management at the State level, initiated under RISDA I project, would

be continued; computer training would remain a high priority; and tapping training would be increased. The women-in-development (WID) component initiated under RISDA I Project would be maintained under RISDA II (para. 3.12). The project would also provide equipment and materials and technical assistance (about 18 person-months locally hired) to develop and institutionalize a human resource management system in RISDA and to strengthen the graphics capability of its communication unit. Draft terms of reference for consultants are at Annex 15, para. 26. The management of training in RISDA would be improved by the provision of a modular in-house Training Management course for six Training Unit staff and four Directors of Training Institutes. In addition to the technical assistance, overseas training for staff, smallholder training, and training equipment and materials included in project costs (Annex 15), the incremental costs of local training for staff amounting to about M\$1.5 million over 1994-96 (including training for nursery staff, LITS, infrastructure, communications skills, etc.) would be met from RISDA's operating budget.

3.22 Monitoring and Evaluation. The project would provide for 8 person-months of consultancy (locally hired) for monitoring and evaluation (M&E), specifically for a study of the agricultural performance of RISDA's replanting and extension programs in immature rubber areas in terms of tree girdling rate, tree survival rate for the first two years after planting, time elapsed from planting to first harvesting, etc. under different replanting systems (individual, simultaneous, group and mini-estates). This study will be based on the data generated from the computerized modules currently being developed (see further para. 4.6) and will include all responsibility centers. Assurances were obtained at negotiations that detailed terms of reference for the study would be drafted by RISDA for Bank review by end-September 1994 taking into account the quality of data and coverage of the computerized modules and that the study would be completed by July 31, 1995.

Project Costs

3.23 Total project costs over 1994-96 amount to M\$645.9 million (US\$253.2 million), including a foreign exchange component of M\$221.1 million (US\$86.6 million) equivalent to about 34% of total costs. Identifiable taxes and duties amount to M\$1.1 million (US\$0.4 million). Base costs were estimated using 1993 prices. Physical contingencies of 10% were included for equipment only. Price contingencies at 2.8% p.a. for foreign costs and 4.5% p.a. for local costs were included for equipment, applied research and technical assistance. Contingencies for other items were not included since, in the case of replanting and maintenance, grant rates are fixed and not expected to change during the project period, and in other cases, expenditures are small, will be undertaken only when needed, and will be limited by the budget. Project costs exclude RISDA's annual operating budget, which covers salaries, supplies, travel, local training for staff, etc. (para. 3.25 and Annex 2, Table 4). Project costs are detailed at Annex 16 and summarized in Table 3.1 below:

Table 3.1: PROJECT COST SUMMARY

Component	Local ----- (M\$ million) -----	Foreign	Total	Local ----- (US\$ million) -----	Foreign	Total	% Foreign	% Base
Replanting & Maintenance	382.7	206.1	588.8	150.0	80.8	230.8	35	91.3
Rehabilitation	5.8	3.2	9.0	2.3	1.2	3.5	35	1.4
Infrastructure	10.0	5.0	15.0	4.0	1.9	5.9	33	2.3
Ext. & Smallholder Training	13.5	1.5	15.0	5.3	0.6	5.9	10	2.3
Applied Research	2.1	0.5	2.6	0.8	0.2	1.0	20	0.4
Mini-Estate Development and Improvement	7.6	1.4	9.0	3.0	0.5	3.5	15	1.4
Strengthening of Cooperatives	1.2	-	1.2	0.5	-	0.5	3	0.2
Computerized MIS	0.8	2.4	3.2	0.3	1.0	1.3	74	0.5
Human Resource Development	0.5	0.5	1.0	0.2	0.2	0.4	51	0.2
Monitoring and Evaluation	0.2	-	0.2	0.1	-	0.1	-	-
Total Base Costs	424.4	220.6	645.0	166.5	86.4	252.9	34	100
Physical Contingencies	0.1	0.3	0.4	-	0.1	0.1	80	
Price Contingencies	0.3	0.2	0.5	0.1	0.1	0.2	30	
Total Project Costs /a	424.8	221.1	645.9	166.6	86.6	253.2	34	

/a Includes taxes and duties estimated at US\$0.4 million equivalent.

Financing

3.24 The proposed Bank loan of US\$70.0 million to the Government of Malaysia (GOM) would finance 81% of the estimated foreign exchange component and about 28% of total project costs, exclusive of taxes and duties. The Bank loan amount was determined on the basis of the Government request. The GOM would contribute US\$101.2 million equivalent through annual development budget allocations to RISDA. The contribution of rubber smallholders through replanting cess payments would be US\$82.0 million equivalent. The financing plan is shown at Annex 17, Table 1. Transfer of Bank loan proceeds to RISDA would be on the same terms and conditions as currently followed by the Government (para. 2.6) and consistent with arrangements under the RISDA I Project (Ln. 3139-MA).

3.25 The current Government policy of increasing self-financing of parastatals has resulted in severe cuts in the budgets of agricultural parastatals, including RISDA, for which the earlier approved 1993 operating budget of M\$80 million was about 20% less than the 1992 budget of M\$102 million (Annex 2, Table 4). This budget would not have covered even RISDA's personnel costs. RISDA has been drawing on sources other than Government grants to meet its operating expenses (Annex 2, paras. 8-9). However, this is not a satisfactory situation since, on the one hand, it has eroded budgetary control and, on the other, it has reduced funds available for replanting. RISDA's 1993 operating budget was subsequently increased to M\$101.8 million. Since problems with the operating budget could seriously affect RISDA's ability to carry out its development activities during the project period, assurances were obtained at negotiations that, beginning with the 1994 budget, the Government would provide adequate financing of RISDA's operating budget.

Procurement

3.26 Works. Works for replanting, maintenance, and rehabilitation, amounting to some US\$163.4 million equivalent would be undertaken by the beneficiaries themselves. RISDA has established procedures for selection of beneficiaries, processing of grant payments, and monitoring of work performed (para. 2.10, and Annexes 6.1 and 6.2). Works for agricultural roads, bridges and drains, at an estimated US\$2.0 million equivalent, would be procured through local competitive bidding (LCB) procedures which have been reviewed by the Bank and are considered acceptable. These contracts, all relatively small, geographically widely dispersed and scattered in time over the project period, would be of little interest to foreign bidders who would, however, be eligible to compete. Agricultural works for min-estates (non-major maintenance works during crop immaturity costing less than US\$20,000) totalling about US\$3.5 million equivalent and non-major works (costing less than US\$20,000) for agricultural roads, bridges and drains totalling about US\$3.9 million equivalent would be procured by limited tendering involving bid invitations from at least five contractors of good standing.

3.27 Goods and Services. Computer equipment (US\$1.3 million) would be procured through international competitive bidding (ICB) procedures in accordance with Bank Guidelines. A margin of preference equal to 15% of the c.i.f. bid price of imported goods, or the amount of customs duties and taxes, whichever is less, would be allowed for domestic manufacturers for bid evaluation purposes. Fertilizers (US\$49.0 million) and chemicals (US\$3.5 million) will not be financed by the Bank since the Government may continue with the current sole-source procurement arrangements for these items. Planting materials valued at about US\$17.0 million would be procured from ESPEK and cooperatives through direct contracting, and other inputs and training equipment would be procured through LCB in which foreign suppliers would be eligible to participate. Small tools, inputs and materials costing less than US\$20,000 each and totalling not more than US\$1.0 million would be purchased under the prevailing procedures of limited tendering involving quotations from at least five suppliers. All goods procurement would be grouped to the extent practicable. Consultant services (US\$1.0 million) would be procured according to Bank Guidelines for the Use of Consultants, with terms of reference, qualifications, and contract terms and conditions satisfactory to the Bank.

3.28 Procurement Review. All ICB and single-source consultant contracts, other consultant contracts above US\$100,000 equivalent per contract, any other contract exceeding US\$2 million, and all overseas training proposals, would be subject to prior Bank review. Other contracts would be subject to selective post-award review. Procurement arrangements are summarized in Table 3.2.

Table 3.2: PROCUREMENT ARRANGEMENTS
(US\$ Million) /f

<u>Item</u>	ICB	LCB	Other	N.B.F./b	Total
1. Works					
1.1 Replanting, Maintenance and Rehabilitation	-	-	163.4/c (56.3)	-	163.4 (56.3)
1.2 Mini-Estate Development and Improvement	-	-	3.5/d (1.2)	-	3.5 (1.2)
1.3 Agricultural Roads, Bridges, etc.	-	2.0 (0.7)	3.9/d (1.3)	-	5.9 (2.0)
2. Goods					
2.1 Computer and Training Equipment	1.3 (1.1)	0.2 (0.1)	-	-	1.5 (1.2)
2.2 Fertilizers and Other Inputs	-	-	18.0/e (6.2)	52.5/f	70.5 (6.2)
3. Consultancies					
	-	-	1.0 (0.9)	-	1.0 (0.9)
4. Miscellaneous					
4.1 <u>Extension and Training</u>	-	-	6.3 (2.2)	-	6.3 (2.2)
4.2 <u>Research</u>	-	-	-	1.1	1.1
Total	1.3 (1.1)	2.2 (0.8)	196.1 (68.1)	53.6	253.2 (70.0)
Percentage of Procurement	0.5	0.9	77.4	21.2	100.0

/a Includes physical and price contingencies. Figures in parentheses show Bank financing.

/b Not Bank-financed.

/c Undertaken by rubber smallholder beneficiaries.

/d Limited tendering procedures (equivalent to "shopping").

/e Includes limited tendering (shopping) of US\$1.0 million for small tools and materials and direct contracting of about US\$17.0 million for planting material from nurseries.

/f Reserve procurement of fertilizers and chemicals.

Disbursement

3.29 Disbursement of the proposed loan would be as follows: (a) 27% of expenditures on works, goods and services for crop replanting and maintenance through maturity, rehabilitation of replantings, infrastructure, extension and smallholder training, and supplementary costs of mini-estate development; (b) for computer and training equipment, 100% of the foreign exchange cost of directly imported items, 100% of the ex-factory cost of locally-manufactured items net of taxes and 80% of the cost of items procured locally; and (c) 90% of the cost of overseas training and consultants (Annex 17, Table 2).

3.30 Disbursements for (a) all expenditures on crop replanting and maintenance through maturity, rehabilitation of replantings, and extension and smallholder training; and (b) expenditures under contracts valued less than US\$200,000 equivalent for mini-estate development, infrastructure, and equipment would be made on the basis of Statement of Expenditures (SOEs); documentation

supporting these withdrawal applications would be retained by RISDA for review by Bank supervision missions. All other disbursements would be made against full documentation.

3.31 The loan is expected to be disbursed over four years in accordance with the schedule of disbursements shown at Annex 17, Table 3. Since the project is an expenditure time-slice of an ongoing development program, disbursements are projected to be significantly faster than the standard profile of Malaysian agricultural projects. This is borne out by the experience under the RISDA I Project (Loan 3139-MA), also a time-slice operation, where the entire loan has been disbursed within three and a half years of loan effectiveness. Loan closing date would be December 31, 1997.

IV. PROJECT IMPLEMENTATION

Status of Preparation and Implementation Arrangements

4.1 Since the project covers a time-slice of RISDA's ongoing development program, no significant pre-project implementation arrangements are required. RISDA has over 20 years' experience in the implementation of its programs and is fully geared up for the planned 1994-96 program.

4.2 For the replanting program of 30,000 ha in 1994, implementation arrangements were reviewed at the time of appraisal and were found to be satisfactory. Preparation and processing of 1995 and 1996 programs would be initiated up to one year before field implementation. All maintenance work on immature areas established prior to the project would continue on a routine basis, using contracts or smallholder family labor. The physical implementation targets for the remaining two years of the project would be set by budget allocations for those years. Assurances were obtained at negotiations that, by September 30 of each year, the Government and the Bank would review and agree to RISDA's annual work program, including training program, and its funding for each following year of the project. The processing steps involved in the implementation of the replanting and maintenance component and the rehabilitation component are shown at Annex 6.

Project Coordination and Organization

4.3 The Ministry of Rural Development would be responsible for overall project performance and the Director General, RISDA, would have implementation responsibility. Specifically, RISDA's Replanting Division would be responsible for implementing the replanting and maintenance, rehabilitation, and mini-estate components; Extension Division for the extension, training, and infrastructure components; and Supplies and Procurement Division for the procurement of equipment (in consultation with the Computer Steering Committee for office technology equipment) and agricultural inputs. The Planning and Development Division would assist in the supervision of consultants. The Finance Division would be responsible for preparing withdrawal applications for loan disbursements and would maintain all documentation supporting withdrawal applications.

Accounts and Audit

4.4 Accounts. RISDA's financial accounts are in the process of being computerized. Project disbursement categories are designed to coincide with RISDA accounts, which eliminates the need for separate project accounting. RISDA will, however, maintain records on the uses of project funds which would trace and relate project expenditures to its overall financial accounts.

4.5 Audit. The Office of the Auditor General is responsible for the annual auditing of RISDA's accounts through 1992. However, auditing is considerably behind schedule because of serious management problems in the early 1980s. RISDA has submitted its accounts through 1992 and accounts through 1991 have so far been audited. Starting with the 1993 audits, auditing will be done by a leading private international auditing firm, which will be expected to follow the normal official schedule of completing the audit within nine months of the close of the fiscal year. Assurances were obtained at negotiations that audited accounts for 1992 would be available to the Bank by June 30, 1994 and, thereafter, audited financial statements would be available to the Bank within nine months of the close of the fiscal year. The audit reports of 1994 and later years would include a separate opinion as to whether funds disbursed against SOEs were used for the purpose for which they were provided. The audit reports on SOEs under the RISDA I project were timely and unqualified.

Monitoring, Evaluation and Reporting

4.6 Monitoring and Evaluation (M&E). While monitoring of the physical and financial implementation of RISDA's development programs is generally satisfactory, monitoring of field performance in terms of planting and maintenance standards achieved, yields of rubber and other crops, relative efficiency of different replanting systems, effectiveness of different RISDA programs, etc., is very weak. The project, by supporting further development of a computerized MIS (para. 3.20), would improve monitoring of development programs. The computerized replanting modules 1, 2, and 3 (Annex 14) will generate the necessary data for improved monitoring. In addition, the M&E module, based on the M&E study completed under RISDA I Project, would provide the framework for qualitative monitoring of RISDA's programs. Under the project, physical monitoring at the headquarters would continue to be performed by RISDA's various implementing Divisions and the financial monitoring by the Finance Division. However, the Planning and Development Division (PDD) would assist the other Divisions in improved physical and financial monitoring and, in addition, concentrate on qualitative monitoring using the M&E module. In this connection, the PDD will be responsible for the study of the agricultural performance of RISDA's programs in immature rubber areas (para. 3.22).

4.7 Reporting. RISDA would prepare and submit to the Bank semi-annual progress reports on project implementation using the same general format as under the RISDA I Project (with some adjustments for the new project components). The reports would be submitted by March 1 and September 1 in each year. The Bank's Supervision Plan is shown at Annex 18.

V. AGRICULTURAL PRODUCTION, MARKETING AND PRICES

Crop Production, Processing and Marketing

5.1 Rubber. Production from the replantings under the project would peak at about 112,000 tons around year 2009. This is based on the crop yield profiles at Annex 19. This production would be about 7% of Malaysia's projected rubber production at that time. Rubber latex would be sold in the liquid form, as cup lump or processed into sheets for air or smoke drying, the choice depending on the market facilities available to the producer and the prices of the different forms of the commodity.

5.2 Palm Oil. Production from the replantings under the project would peak at about 205,000 tons of ffb, which would yield some 41,000 tons of crude palm oil (CPO) at an average extraction rate of 20%, and 9,200 tons of palm kernels (PK) at 4.5% recovery rate, around year 2007. This production would be less than 0.5% of Malaysia's CPO and PK projected production at that time. Fresh fruit bunches would be sold individually or under contract to local processing mills either of the private or parastatal sector. Mill facilities are generally adequate throughout the country.

International and Domestic Market Prospects

5.3 World consumption of natural rubber is expected to rise from 5.2 million tons in 1992 to about 7.6 million tons by year 2005, with supplies coming mainly from established producers. Increased demand for natural rubber, particularly in developing economies, relative to that for synthetic rubber, comes from recent technological developments and availability of more types and grades of natural rubber of stringent specifications. Much will depend on the economic performance of Asian and East European countries with high income elasticity for rubber products. Malaysia's production is expected to regain recent levels of 1.5 million tons through technology innovations, including low-intensity tapping and replanting with high performance clones, and its market share will remain at about 25%. World demand for palm oil is expected to grow at about 4% per annum through the year 2005. Malaysia's share of world production is expected to decrease from about 50% in 1992 to 47% in year 2005, and exports from 56% to 50% during the same period. In absolute terms, Malaysia's national production and gross exports of palm oil are expected to reach 11.0 million tons and 8.6 million tons, respectively, in year 2005 compared to the actual 6.4 million tons and 5.8 million tons, respectively, in 1992. The above projections for rubber and palm oil by the Bank's International Economics Department (IEC) include incremental production from RISDA's replanting programs.

5.4 Domestic absorption of rubber was only about 150,000 tons in 1992. The Government is assessing the prospects of making Malaysia a major exporter of tires which will help achieve the objective of reaching local consumption of 300,000 tons of rubber by the year 2000. Domestic market prospects for Malaysia's palm oil are bright due to a quickly expanding local downstream processing and considerable ongoing research, principally at PORIM, in new uses of palm oil. The most promising development of the industry is in the area of oleo-chemicals. Since 1984, Malaysian palm oil processing has moved downstream and an estimated 200,000 tons of oleochemicals (fatty acids, methyl esters and

glycerines) were produced in 1992. The projection for the end-1990s is 600,000 - 700,000 tons a year.

Commodity Prices

5.5 As projected by the Bank, rubber prices would be about 17% higher in real terms in year 2000 compared to 1993, palm oil prices about 20% lower and palm kernel prices about 15% higher. For economic analysis, the Bank's projected prices, converted to 1993 constant terms on the basis of the MUV index, were used. Rubber, palm oil and kernel are exportables and economic farmgate prices were, therefore, estimated from f.o.b. prices (Annexes 20.1 and 20.2).

5.6 Domestic rubber prices follow the MRELB daily quotations with appropriate deductions for transport, processing charges and duties and cesses. The financial farmgate prices for rubber are lower than economic farmgate prices due to exclusion of export duties and replanting cess from the latter. Financial farmgate prices for oil palm ffb also diverge, though to a much lesser extent, from economic farmgate prices due to export duties on CPO, with graduated duty exemption on processed palm oil according to the stage of processing. Domestic ffb prices are based on PORLA gazetted price,^{1/} less processing. CPO and PK transport cost and other incidental costs.

VI. PROJECT BENEFITS AND JUSTIFICATION

Benefits

6.1 The main project benefits would be: (a) improved productivity and farm incomes for rubber smallholders, who are the biggest poverty group in the country and many of whom are at present earning less than the poverty income of M\$380 (US\$150) per month per family of five; (b) increased export earnings, primarily from rubber, and increased production of diversified crops; and (c) increased institutional efficiency of RISDA in delivery of services to the rubber smallholder subsector. Some 150,000 rubber smallholders are expected to benefit from the project, including new replanters and those who replanted prior to the project, but whose farms would receive early maintenance support from the project. At full development around the year 2009, net foreign exchange earnings and savings from project incremental production (including production only from new replantings under the project and using projected world market prices for the year 2009 in 1993 constant dollars) would be about US\$110 million per year. The improvement in RISDA's effectiveness as an institution would be an important contribution to the government's poverty alleviation program and would improve the productivity of government expenditures. The project would also directly benefit women smallholders and workers in the rubber subsector, and broaden popular participation and help develop the rural private sector through strengthening of cooperatives.

^{1/} POLA gazetted price is published monthly based on the industry-wide average price of traded CPO in the preceding month.

Financial Analysis

6.2 Smallholder Incomes. Since replantings would be overwhelmingly for rubber and, to some extent, for oil palm, farm income analysis has been done for these two crops only. The farm model, based on individual and simultaneous replanting, assumes that about two ha would be replanted and labor during the production phase would be provided by the family. Net monthly farm incomes from rubber would peak at M\$542 in the 16th year after planting and from oil palm at M\$183 in the 14th year after planting. These incomes from replanting, compared to the alternative of abandoning the old rubber areas, would provide incentive to smallholders to participate in the replanting program. Net farm incomes would be lower if hired labor is used, as is common on group replantings. It should be stressed that household incomes, as distinct from the above farm incomes, could be higher depending on the availability of additional farm land and off-farm employment opportunities.

Table 6.1: FARM INCOME
(M\$)

	<u>Average Annual</u>			<u>Average Monthly</u>		
	<u>Year of Development</u>			<u>Year of Development</u>		
	10	11-20	21-30	10	11-20	21-30
Rubber	3,082	5,657	3,708	257	471	309
Oil Palm	2,128	2,075	1,718	177	173	143

6.3 Cost Recovery. As discussed in para. 2.17 and Annex 3, the export duty and replanting and research cesses on rubber, compared to the replanting grant, imply full cost recovery over the life of the rubber trees. Supplementary mini-estate development costs (para. 3.14) are to be fully recovered from participants after mini-estates reach the production stage.

Economic Analysis

6.4 Economic Rate of Return (ERR). The ERR for the project is estimated at about 14% (Annex 21) with the following methodology: (a) only replantings from 1994 onwards are included. If prior plantings to be maintained under the project were included, the ERR would increase to about 25%, assuming costs before 1994 as sunk costs; (b) the economic costs and benefits of diversified crops were not included since together they would be less than 10% of the project replantings; (c) sale of rubber wood has been added to the benefit in the first year; (d) the benefits of LITS introduction on mini-estates in terms of reduced tapper costs and an assumed 15% increase in yields due to improved tapping and reduced bark consumption have been added to the benefit stream; (e) the adoption of LITS and consequent reduction in tapper costs on smallholdings (mainly group replantings) is conservatively assumed to reach 100,000 ha or 10% of mature smallholder rubber areas in Malaysia by the year 2002; (f) costs are estimated in 1993 constant Malaysian ringgits and benefits from rubber and oil palm are calculated on the basis of economic farm-gate prices (Annexes 20.1 and 20.2)

derived from the Bank's price projections of May 1993, adjusted to 1993 constant US dollars using the MUV index, and converted to ringgits at the official exchange rate; and (g) market wage rates have been used as no significant distortions in the labor market are evident.

6.5 Sensitivity Analysis. The results of a sensitivity analysis show that the project remains viable across a range of assumptions on costs and benefits. The switching value test shows that costs would have to increase by 21% or benefits decrease by 18% to lower the project ERK from 14% to 10%, the estimated opportunity cost of capital in Malaysia. While the probability of cost increases is low, a decline in benefits, particularly if prices turn out to be lower than projected, cannot be ruled out. However, a price level 18% lower than projected for both rubber and palm oil, while possible in some years (particularly for palm oil, given its high price volatility), appears unlikely over the entire 30-year period of analysis. The project can also withstand a three-year delay in the benefit stream without the ERR going below 10%. If there is no adoption of LITS, the project ERR would still be about 11%. On the positive side, if the adoption rate of LITS on smallholdings reaches 20% of mature rubber areas by the year 2002, the ERR would be over 16%.

Environmental Effects

6.6 The project poses no major environmental risks. Since the project provides for replanting of existing cultivated areas, no deforestation is involved. The small access roads component of the project includes only upgrading and maintenance, which would not have any adverse environmental impact. Indeed, the project would have a positive environmental benefit in that the timber from the felling of old rubber trees could be utilized by the wood industry, thus taking some of the pressure off the natural forests. Moreover, the development of tree crops is basically protective of soils in equatorial climates due to the standard practice of establishing legume cover crops immediately after land clearing, which rapidly cover the soil surface with a thick protective mat of vegetation, and due to the protection of fully closed tree canopies within a few years after planting. Areas planted to crops other than rubber, and especially oil palm, will almost always be on gentler terrain with a low risk of erosion. However, under the project, RISDA would put greater emphasis on conservation-related activities. In hilly areas in particular, RISDA would promote the establishment of vetiver hedges, which are effective in controlling surface erosion on steep slopes. Vetiver grass would also be promoted to protect road cuttings. Though maintenance of rubber and oil palm, particularly in their immature years, routinely involves the use of herbicides, Malaysia has strict and effectively-implemented regulations on the use of agricultural chemicals and, therefore, risks from the use of herbicides under the project are considered minimal.^{2/} For farmers receiving chemicals, RISDA arranges training sessions on the safe application of chemicals. The project will not construct any crop processing facilities; production will be channeled

^{2/} Malaysian law bans the use of harmful chemicals and pesticides, and none of those currently used by RISDA is included in the Bank's Checklist of Pesticides not Recommended for Use in Agriculture or Suitable only for Restricted Use (OPN 11.10).

to existing public and private sector factories which are subject to stringent and well-enforced pollution control laws.

Risks

6.7 The main project risk relates to effective introduction of LITS (para. 3.16). This labor-saving technology is critical to the long-term viability of the rubber subsector in Malaysia but is new to RISDA and the smallholders. Its successful introduction would, therefore, require closely supervised and phased implementation, placing considerable demands on RISDA and Bank supervision resources.

VII. AGREEMENTS REACHED AND RECOMMENDATION

7.1 The execution of a Subsidiary Loan Agreement between the Government and RISDA and the Project Agreement between RISDA and the Bank would be conditions of effectiveness.

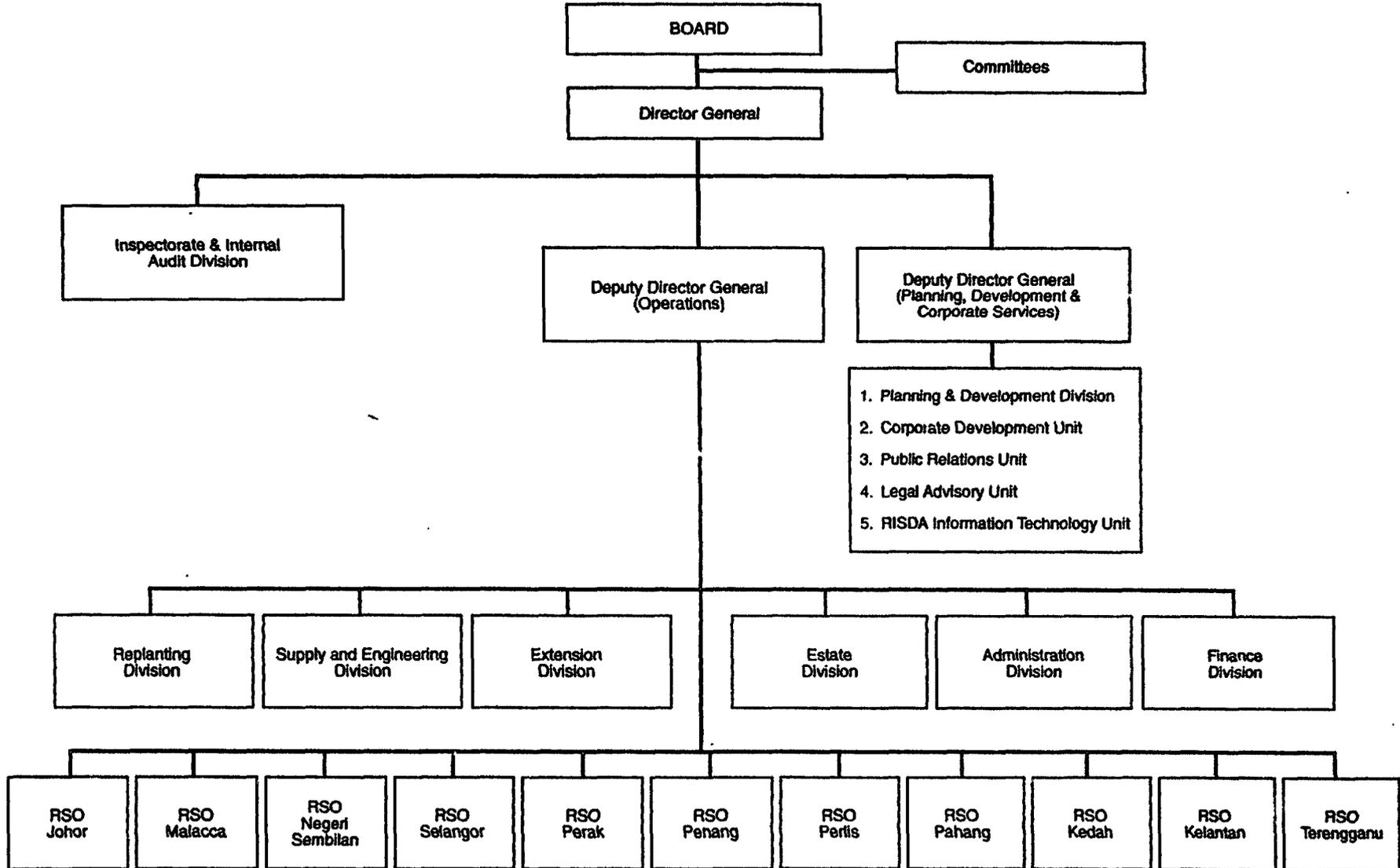
7.2 During negotiations, agreement was obtained on the following:

- (a) crop choice will continue to be the prerogative of replanters (para. 3.5);
- (b) rubber planting material production by RISDA or its subsidiary ESPEK would be confined to no more than 15 sites; RRIM (or another institution acceptable to the Bank) would regularly assess the performance of these nurseries and the contractual arrangements between RISDA and RRIM (or another institution) for this assessment would be satisfactory to the Bank; ESPEK would have the authority to take appropriate action should the subcontracting cooperatives fail to comply with ESPEK's standards for nursery management; ESPEK's incremental costs for improved nursery management would be met by increasing its own share of rubber planting material production to about 20%; and the Government and RISDA would keep under review the cost-price relationship for rubber planting material and make price adjustments, if and when required (para. 3.6);
- (c) RISDA's rubber planting would be with Class I and II clones only, with the percentage of Class II clones not more than that recommended by RRIM from time to time; Class III clones would be recommended for use only under RRIM and RISDA supervision and control; and beginning with the 1996 plantings, RISDA would increasingly use clones which are known to be responsive to stimulation with low-intensity tapping systems (LITS) (para. 3.7);
- (d) RISDA would reorient its extension services towards increases in productivity of mature rubber (para. 3.11);
- (e) RISDA would maintain the present overall proportion (30%) of women trainees (para. 3.12);

- (f) the coordinator for LITS already appointed at RISDA headquarters would be full-time, with full authority on the technical aspects of the program, assisted in every State by a full-time field officer; a phased program would be followed by RISDA for the introduction of LITS; and appropriate operating funds would be allocated by RISDA for the expenses of the LITS program and for LITS training (para. 3.16);
- (g) by the end of 1994, RISDA would develop a consistent, reliable set of data on mini-estates and implement an improved monitoring system for mini-estate performance with respect to actual production, dividend payments, debt repaid, debts outstanding, etc. (para. 3.18);
- (h) implementation of a plan for strengthening and rationalization of cooperatives would commence by July 31, 1994 (para. 3.19);
- (i) RISDA would draft detailed terms of reference for a study of the qualitative results of RISDA's programs in immature rubber areas for Bank review by end-September 1994 and have the study completed by July 31, 1995 (paras. 3.22 and 4.6);
- (j) beginning with the 1994 budget, the Government would ensure adequate financing for RISDA's operating budget (para. 3.25);
- (k) the qualifications, terms of reference and conditions of employment of consultants would be satisfactory to the Bank (para. 3.27);
- (l) by September 30 of each year, the Government and the Bank would review and agree to RISDA's annual work program and its funding for each following year of the project (para. 4.2);
- (m) RISDA's audited accounts for 1992 would be available to the Bank by June 30, 1994 (para. 4.5); and
- (n) RISDA would prepare and submit to the Bank a semi-annual progress report on project implementation (para. 4.7).

7.3 With the above assurances, the proposed project would be suitable for a Bank loan of US\$70.0 million to Malaysia. The loan would have a repayment period of 15 years, including a grace period of five years, at the Bank's standard variable interest rate.

**MALAYSIA
RISDA II PROJECT
RISDA ORGANIZATION CHART**



Note: RSO = RISDA State Office

MALAYSIA

RISDA II PROJECT

RISDA'S FINANCIAL CONDITION

1. RISDA's audited accounts for fiscal years ending December 31, 1991 and 1992 are not available for the following analysis although the 1991 accounts have now been audited (December 1993). The following analysis is, therefore, preliminary but nevertheless indicative of RISDA's financial condition.
2. As of December 31, 1992, based on provisional accounts, RISDA's total assets amounted to M\$1156.9 million (Table 1). Of this, fixed assets (M\$215.3 million) and investments in plantations (M\$210.3 million) accounted for about 19% and 18% respectively; smallholder and staff loans (M\$315.7 million) for 27%; and bank deposits (M\$308.9 million) for 27%. About M\$297 million of the bank accounts were in fixed deposits. The remaining M\$106.7 million (9% of total assets) is accounted for by other net current assets. The accounts indicate that RISDA continues to remain reasonably liquid.
3. Of the M\$315.7 million in loans, approximately M\$220 million was granted in long-term loans to smallholders (of which approximately M\$140 million was lent to smallholders under the mini-estate program and M\$80 million under income maintenance loans called SEPENTAS), while the balance represents loans to staff.
4. RISDA's assets have been largely financed through subventions from the cess fund, which is recorded under two subheadings, namely the smallholder cess account and the estate cess account. These two accounts represented some 38% (M\$444 million) and 7% (M\$77 million) respectively of the total resources as of end 1992. The staff housing loan revolving fund (M\$100 million) and loans from the Government (M\$204.2 million) accounted for 26% of the total resources.
5. As of December 31, 1992, Government had committed a total of M\$258 million in loans to be made available under the various loan schemes outlined above. As of the same date, RISDA had drawn down M\$204 million of this amount. The terms and conditions of the loans are given in Table 2.
6. The total payments for amortizing the debt on the amounts drawn down so far and for which the loan repayment terms have been fixed do not exceed M\$7.5 million in any year between 1993 and 2000. In previous years this would not have proved problematic as RISDA earned over M\$40 million on its plantation investments. However, since 1991, RISDA has faced occasional difficulties in securing an adequate operating budget. The shortfall between the allocated budget and operating expenditures is being met from the cess account to which the plantation profits are credited. As long as plantation profits were large enough to offset occasional charges, RISDA was in a reasonably safe financial condition. However, the charges are now getting large enough and RISDA may actually begin to dip into cess funds to meet its expenses -- a situation that will begin to adversely affect the replanting program.

7. The annual allocations for the development expenditure, inclusive of cess, have varied between M\$290 million and M\$330 million (Table 3). The sources of funds have been the cess, Government grants for replanting and other smallholder schemes, and Government loans. In recent years the proportion financed through the various sources has altered. In 1989, for example, cess accounted for 56% of resources, grants for 36%, and loans for the balance 8%. In 1993, cess funds will finance 45% of the development budget, grants 53%, and loans the remaining 2%.

8. The annual operating budget has risen sharply between 1991 and 1992 from M\$90.3 million to M\$107.4 million. As already mentioned, the allocation from the Government is usually below this amount and RISDA has financed the shortfall from the cess account. In 1990 RISDA charged M\$10.8 million to the cess account. In 1991, RISDA received M\$87.0 million in budgetary allocations while the expenses were M\$95.4 million. Similarly, there was a budget deficit of M\$4.5 million in 1992. These shortfalls do not include expenditures that are recurrent in nature but are separately charged to the cess account (staff medical expenses, allowances to farmers, and interest on loans). If adjustments are made for these expenditures, RISDA's operating expenses would have risen by an additional M\$2.8 million in 1992.

9. For 1993, the picture was worrying. RISDA's recurrent expenses, inclusive of interest payments on loans, were projected to be M\$122.5 million. Against this the Government had originally allocated M\$80.0 million, leaving a shortfall of M\$42.5 million which RISDA would have met from the profits on plantations (cess account). The budget allocation was later increased to M\$101.8 million.

Issues

10. The various financial and accounting issues are:

- (a) delays in accounting and auditing;
- (b) under/overstated assets;
- (c) improper matching of liabilities and assets;
- (d) repayment of Government loans; and
- (e) weak operating controls.

11. (a) Delays in Accounts and Audit: As of December 1993, accounts through December 1991 had been finalized and audited. RISDA had also completed and submitted the 1992 accounts to the auditors. Accounting problems arose because of uncleared backlog of accounts since the early 1980s. The auditors also found it difficult to complete the audits because it was not easy to reconcile the control and subsidiary ledgers due to lack of supporting documents dating from the early 1980s.

12. In 1986, following the audit of RISDA's 1979 accounts, the Government established two committees: (a) the Jawatankuasa Harta Tetap (Assets Committee) and (b) the Jawatankuasa Hapuskira Wang RISDA (the Write-Off Committee). These committees were to help reflect the proper value of RISDA's assets and to reconcile the accounts and write off the difference in assets that could not be reconciled. Substantial work has been done and a more reasonable picture of RISDA's balance sheets is expected to be reflected in future accounts.

13. The number of qualifications in the auditors' reports has been reduced. It is expected that the backlog of audits will be cleared by December 1993. Realizing the problem of delayed audits, the Government has appointed a private auditing firm to audit RISDA's accounts for 1992 and later which is expected to result in more timely audits in the future.

14. (b) Under/Overstated Assets. The discrepancies have arisen because of (i) changes in accounting procedures; (ii) lack of reconciliation between control and subsidiary ledger accounts; and (iii) inadequate provisions for losses either for loans granted to smallholders or accounts receivable.

15. With respect to (i) above, prior to 1984, RISDA, in compliance with Government regulations, followed the practice of charging all capital assets regardless of size as an expense in the year of purchase. The only exceptions to this accounting procedure were land and factories purchased for marketing or the properties managed by ESPEK. These procedures were modified in 1984. Under new accounting practices, RISDA is to expense all purchases below M\$5,000 while capitalizing all the assets above this amount. The Assets Committee (para. 12), comprising the Accountant General, the Auditor General, an Audit Company and the Inspectorate Division of RISDA was established to look into the recording of all assets. The Committee concluded its investigation in 1988 and recommended that some M\$136 million in assets should be written back into RISDA's books. However, audited accounts do not yet reflect this asset write-up.

16. With respect to para. 14 (ii), due to problems in the early 1980s, it has been difficult to reconcile control and subsidiary accounts resulting in the qualification of opinion in auditors' statements. The auditors could not verify the accuracy of balances amounting to about M\$260 million for the year ended 1990, which involved differences in balance of about M\$26.7 million between the control record and the 35 subsidiary records. The Write-Off Committee (para. 12) was established to examine these accounts and recommend either adjustments to the stated values or write off the assets as deemed necessary. The Committee has concluded its deliberations and adjustments to the various accounts are expected to be reflected in the future audited accounts.

17. With respect to para. 14 (iii), little, if anything, has been done to reflect losses on loans granted to smallholders under SEPENTAS scheme, on loans granted to subsidiaries, or on goods sold on credit which may now be non-recoverable. The Write-Off Committee remains active to make periodic adjustments to RISDA's accounts, but it must now seriously look into making provisions for non-performing loans so that RISDA's balance sheet reflects its true financial condition.

18. (c) Improper Matching of Liabilities with Assets. RISDA has occasionally drawn down funds earmarked for specific purposes for different uses. In particular, the Estate cess collections are used for RISDA's expenditures. Similarly, smallholder cess funds were used to provide housing loans to staff. In future, RISDA should attempt to match its assets with liabilities to avoid a potentially problematic situation of having to settle claims in excess of the assets.

19. (d) Repayment of Loans to the Government. RISDA has considerable non-performing assets on its books. These include some M\$80 million in SEPENTAS loans and other smaller loans to subsidiaries or in accounts receivable that may now be non-recoverable. In particular, the SEPENTAS loans have been financed by loans from the Government. It is not clear how RISDA will repay these loans. As mentioned earlier, theoretically RISDA could easily repay the loans out of earnings from estates but in practice this may prove difficult as RISDA increasingly relies on these funds to meet operating expenses. In all probability, the Government will have to write off some of the non-performing assets. The auditors recommended that a provision for doubtful debt of M\$81 million should be made on the loan balances as of December 31, 1990.

20. (e) Weak Operating Controls. There are a number of areas where RISDA's operating controls could be improved. In particular, budgetary control and stock control procedures need to be streamlined. However, prior to considering any of these aspects seriously, it would be necessary to bring the accounts up to date and develop a suitable computerized management information system. The operationalization of the latter, in particular, would be necessary prior to developing a meaningful control system.

MALAYSIA
RISDA II PROJECT

RISDA's Financial Condition
December 31, 1989-1992
(M\$ million)

	-----Audited-----		-----Unaudited-----	
	1989	1990	1991	1992
Rubber Industry Funds:				
Smallholders Cess Account	448.9	386.6	448.6	444.6
Estate Cess Account	135.7	140.9	76.8	77.3
Unexpended Development Fund	17.5	12.1	20.6	15.8
Unexpended Operating Fund	0.5	(10.8)	-	-
Smallholders Credit Scheme (Revolving Fund)	15.0	15.0	15.0	21.3
Housing Loan Revolving Fund	100.0	100.0	100.0	100.0
Vehicle Loan Revolving Fund	5.9	5.9	5.9	5.9
Staff Loans and Store Not Allocated	19.0	19.0	21.0	21.0
Mini-Estate Loans	4.8	6.5	-	-
RISDA Printing Facility and Training Institute	-	0.7	0.2	0.7
Rubber Marketing Fund	37.1	26.2	24.3	24.3
Government Loans for Mini-Estate and Sepantas	167.8	192.6	196.4	200.0
Committed Funds	-	138.5	157.0	215.3
Replanting Funds -- RISDA Estates	12.3	18.1	24.5	30.7
TOTAL FUNDS	964.5	1,051.3	1,090.3	1,156.9
Represented by:				
Fixed Assets - Net	112.5	138.5	157.1	215.3
Plantation Development - ESPEK	195.3	208.1	208.7	210.3
Investment in Subsidiaries	6.3	7.2	8.4	8.8
Long-Term Loans: Smallholders	216.2	221.2	223.0	220.4
: Staff	75.2	81.9	89.3	95.3
Trust Funds	-	-	-	8.8
Current Assets:				
Sundry Debtors, Deposits and Accrual	119.9	167.7	229.1	130.2
Stocks	13.5	8.6	11.1	9.9
Bank fixed deposits	245.3	259.7	200.9	297.0
Bank current accounts	26.7	11.9	18.3	11.9
Current Liabilities	(44.4)	(53.6)	(55.6)	(51.0)
TOTAL ASSETS	964.5	1,051.3	1,090.3	1,156.9

MALAYSIA
RISDA II PROJECT
RISDA's Long-term Loans

Purpose	Amount (RMmillion)		Interest Rate (%)	Repayment Period (Years)	Grace Period (Years)	Annual Installment	Repayment Period
	Committed	Drawn					
Marketing ^{1/}	11.3	11.3	4.0	15	3	12	1987-1998
	3.0	1.9	4.0	15	3	12	1990-2001
Subtotal	14.3	13.2					
Mini-Estates	6.6	6.6	0.0	25	10	15	1994-2008
	3.1	3.0	0.0	25	10	15	1995-2009
	4.1	3.8	4.0	25	10	15	1997-2011
	3.9	3.9	4.0	25	10	15	1997-2011
	11.6	11.6	4.0	25	10	15	1997-2011
	20.8	9.0	4.0	25	10	15	1998-2012
	30.0	29.4	4.0	25	10	15	1998-2012
	4.9	4.9	4.0	25	10	15	2004-2014
	27.6	27.0	4.0	25	10	15	not fixed ^{2/}
	3.3	-	4.0	25	10	15	not fixed ^{2/}
	30.0	5.2	4.0	25	10	15	not fixed ^{2/}
Subtotal	145.9	104.4					
Sepentas ^{3/}	43.4	43.4	0.0	25	10	15	1994-2008
	33.1	33.1	0.0	25	10	15	1995-2009
	12.8	5.4	0.0	25	10	15	1997-2011
	2.7	-	0.0	25	10	15	not fixed ^{2/}
Subtotal	92.0	81.9					
Kg. Tersusun ^{4/}	1.7	0.8	4.0	25	2	23	1991-2013
Purchase of KTENGAH Equity ^{4/}	3.9	3.9	4.0	10		10	1992-2003
Total	257.8	204.2					

^{1/} The marketing loan was used to purchase plant and equipment, mostly rubber smokehouses, to market smallholder produce. The smokehouses were transferred to NARSCO in 1990.

^{2/} The Government generally follows the procedure of fixing loan repayment annuities only when the funds have been fully drawn down.

^{3/} Sepentas means income maintenance loan to smallholders during the immaturity phase of the replanted crop.

^{4/} Represents purchase of the equity share of the partner in a palm oil mill, which was jointly owned by RISDA and the State of Terengganu.

MALAYSIA

RISDA II PROJECT

RISDA's DEVELOPMENT BUDGET
1989-1993

(MS'000)

	1989			1990				1991				
	Cess	Gov. Grant	Gov. Loan	Total	Cess	Gov. Grant	Gov. Loan	Total	Cess	Gov. Grant	Gov. Loan	Total
Replanting-Smallholders	104253	72000		176253	112075	68658		180733	69303	103051		172354
Replanting-Private Estates (cess refund)	55000			55000	50000			50000	50000			50000
Rehabilitation		3000		3000		3000		3000		4851		4851
Infrastructure		3000		3000		12750		12750		10077		10077
Extension Services	253	2500		2753	217	4150		4367	108	3754		3862
Production Incentives (Agricultural Inputs)		15000		15000		17000		17000		17823		17823
Smallholder Service Center		3200		3200		5147		5147		2000		2000
Mini-Estate (M.E.)-Supplementary Dev. Cost			27800	27800			27589	27589			14345	14345
M.E.-Workers' Housing			2100	2100			146	146		200		200
M.E.-Privatization Cost				0				0	376			376
M.E.-Perimeter Survey				0				0		1200		1200
Management Facilities		7584		7584		25188		25188		23915		23915
Overseas Staff Training				0				0		308		308
Studies & Consultancies				0		800		800		2800		2800
Poverty Eradication				0		1440		1440		400		400
Allowance for Key Farmers (PMPK)	880			880	881			881	1800			1800
Land Premium Credit	58			58	1950			1950				0
Income Guarantee Scheme	1000			1000	415			415	212			212
Smallholders Training				0				0		3100		3100
Administrative Program	72			72	92			92	700			700
TOTAL	161516	106284	29900	297700	165630	138133	27755	331498	122499	173479	14345	310323

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RISDA II PROJECT

RISDA's DEVELOPMENT BUDGET
1989-1993

(MS'000)

	<u>1992</u>				<u>1993</u>			
	<u>Cess</u>	<u>Gov. Grant</u>	<u>Gov. Loan</u>	<u>Total</u>	<u>Cess</u>	<u>Gov. Grant</u>	<u>Gov. Loan</u>	<u>Total</u>
Replanting-Smallholders	65925	113592		179517	76600	118328		194928
Replanting-Private Estates (cess refund)	49500			49500	38000			38000
Rehabilitation		4500		4500		4639		4639
Infrastructure		8077		8077		7919		7919
Extension Services	108	4600		4708		3580		3580
Production Incentives (Agricultural Inputs)		16123		16123		6226		6226
Smallholder Service Center		924		924		300		300
Mini-Estate Supplementary Development Cost			5152	5152			7489	7489
M.E.-Workers' Housing		200		200		600		600
M.E.-Privatization Cost	176			176	370			370
M.E.-Perimeter Survey		990		990		639		639
Management Facilities		10637		10637		11169		11169
Overseas Staff Training		777		777				0
Studies & Consultancies		7153		7153		111		111
Poverty Eradication		400		400		400		400
Allowance for Key Farmers (PMPK)	1800			1800	1800			1800
Land Premium Credit				0				0
Income Guarantee Scheme				0				0
Smallholders Training		300		300		600		600
Administrative Program	700			700	15000			15000
Total	118209	168273	5152	291634	131770	154511	7489	293770

MALAYSIA

RISDA II PROJECT

RISDA's OPERATING BUDGET (1990-1993)

(M\$'000)

	<u>1990</u>		<u>1991</u>		<u>1992</u>		<u>1993</u>
	Budget	Actual	Budget	Actual	Budget	Actual	Budget
Salaries	50000	50000	54124	52795	64200	63795	54356
Fixed Allowances	5564	5564	5568	5550	6200	5642	5100
Employees Provident Fund	7639	7639	8070	8113	10550	10834	8500
Overtime Allowance	729	729	725	673	400	740	350
Other Benefits	27	27	44	27	30	31	30
Travel Allowance	6345	6345	7029	7137	4800	6554	1800
Transportation Allowance	259	259	300	172	150	373	63
Utilities and Communications	3030	3030	3211	3227	2800	3432	1000
Repair and Maintenance Materials	1339	1339	1576	1519	1300	1414	500
Other Supplies	1270	1270	1429	1379	1200	1760	600
Repairs and Maintenance Costs	3947	3947	3799	4580	2900	3506	1320
Professional and Other Services	4831	4831	5326	5174	3700	5281	2000
Rental	1558	1558	1660	1488	1300	1557	1858
Other Expenses	3729	3729	4179	3531	2505	2453	2523
Total	90267	90267	97040	95365	102035	107372	80000

Note: Actual expenditures shown above exclude annual interest payments to the Government (M\$0.5 million) and staff medical expenses (M\$15.0 million in 1992 shown under Administrative Program in Annex 2, Table 3) charged to the cess account.

MALAYSIA

RISDA II PROJECT

Tax/Subsidy Implications of Replanting Cess/Grants
and Export Duties

1. Two-thirds of the applicants to RISDA for replanting assistance own less than 2 ha. More specifically, 61% of smallholders are in the 0-2 ha group, with an average holding size of 1.2 ha. It is perhaps reasonable to assume that the larger the holding, the greater the ability and likelihood of undertaking a replanting program in stages, and the smaller is the problem of the prolonged period (6-7 years) of loss of income which accompanies replanting.¹ Through 1992, a total of 1.16 million ha had been replanted by smallholders. Of this replanted area, approximately 41% and 44% was replanted by smallholders owning less than 2 ha and between 2 to 6 ha respectively, while the rest was by holding of over 6 ha. Because of the large concentration of smallholdings in the smaller size group, it appears that replanting assistance was indeed provided to the smallest of smallholdings, despite the fact that farmers in this group are less able to suffer losses of income over a prolonged period and, therefore, less prone to replant their plots. This is perhaps explained by the fact that off-farm income accounts for a substantial proportion of household income in smallholdings.

2. The welfare issues arising from government assistance schemes need to be examined in relation to the system of replanting cess collections, replanting grants and rubber export duties. The first implication of the replanting cess is that smallholders who do not replant because of individual circumstances relating to loss of income or lack of land titles are perpetually subsidizing those who undertake replanting and avail themselves of the government replanting grant. A more important question that arises is whether the net effect of the replanting cess and "grant" scheme finally represents a tax or subsidy to producers. In the very few cases where the producers had not paid any cess and were newly planting to rubber, the initial planting grant could be thought of as a loan, for which the future payments of the cess could be regarded as ex post amortization. In this uncommon case of an initial planting, the scheme may well imply a subsidy, especially if the productivity of the rubber is low. For the more typical smallholder producers who did not start with a

¹ Note that this is a loss of income from land, but not necessarily from labor, if alternative employment opportunities are available during the crop development period.

planting grant,² the scheme has the character of an (enforced) savings scheme into which payments are made in the form of the cess, and interest accrues until the final withdrawals are made.

3. The calculation of whether the farmer has been taxed or subsidized by the scheme is relatively easy in the above case. It merely requires the comparison of the implicit yield or interest rate of the scheme with the farmer's own time preference rate, or with the interest rates to which he is exposed in rural financial markets. Calculations of this sort (see Table 1) reveal that even for interest rates substantially lower than those typically occurring in rural areas, and even for those producers with relatively low rubber yields (who have thus made far less than average cess payments), the scheme has represented a tax. Using a real interest rate of 5%, the break-even average yields below which a farmer is subsidized and above which he is taxed, is only 600 kg/ha; for yields of above 600 kg/ha, which apply to all but the most inefficient smallholders, a net tax is implied. This analysis assumes that trees have a productive life of 25 years prior to replanting. If the trees have been in production longer, so that the cess has been paid for more than 25 years prior to replanting, the break-even yield is even lower. Since the replanting grant is the same on a per hectare basis, regardless of the size and duration of cess payments, the more productive farmers, and those who delay replanting, are particularly heavily taxed by the scheme. An additional issue that arises in the welfare context is that the estates receive annually the full refund of paid out replanting cess (although without any accrued interest payments), instead of receiving the grant spread out as yearly installments, with a stipulated per hectare maximum, as in the case of smallholders. However, in an analysis of equity considerations of rubber smallholder assistance, it is necessary to give due recognition to the many RISDA schemes which operated in the past or are continuing, such as the interest-free income maintenance loans, the KSA programs which paralleled the above schemes for smallholders who did not have title to the land, and the mini-estate program. All these were at least partly funded from the replanting cess fund, and in some measure contributed to alleviating poverty amongst rubber smallholders on a selective, individual basis. But many of these programs were costly and the number of smallholders benefitting was very small relative to the rubber replanting program. Only the mini-estate management program is still continuing, while the development of new mini-estates has been virtually discontinued.

4. Table 1 takes into account only replanting cess collections (M\$99.20/ton) compared to the replanting grant. When export duty collections are

² From 1953 through 1992, only about 52,229 ha or 4% of the total replanted area of 1.16 million ha were newplanted and eligible for cess assistance. About 935,000 ha or 81% of the total replanted area were first round replantings and 148,000 ha or 13% were second round replantings. An additional 21,200 ha (2% of total) were not eligible for cess assistance but included for replanting as extensions of eligible rubber areas.

taken into account, in addition to replanting cess,³ subsidies even for producers with low rubber yields and at low interest rates may disappear, depending on the amount of export duties. Given the present export duty structure (see Table 2) and world prices of rubber (about M\$2,200/ton average for RSS 3 and SMR 20 in May 1993), rubber producers pay virtually no export duties. However, in years with relatively good world rubber prices, such as in 1988, rubber producers were paying export duties amounting to M\$140-160/ton (4 to 5% of f.o.b. prices). Thus, though export duties can be zero or negligible with low world rubber prices such as in 1985-1987 and 1990-1993, rubber export duty collections were as high as M\$1.1 billion in 1979/1980 and even in relatively unfavorable years (1982-1984) averaged M\$180 million annually compared to average annual replanting cess collections of M\$140 million in the 1980s and M\$110 million in early 1990s. Adding export duties in the years with relatively good world rubber prices to replanting cess collections in Table 1, therefore, would result in a net tax on rubber producers, even those with low yields and at low interest rates. In the case of smallholders, this net tax is lowered through some current RISDA programs such as free inputs for mature rubber, infrastructure construction, construction of central and group processing centers, etc., financed from Government budget.

5. A question arises whether rubber producers are overtaxed in some years and whether export duties on rubber should be removed. Available estimates show that, in absolute terms, rubber export duties in Malaysia are not excessive even in years with relatively good world rubber prices. The optimal export tax that would maximize short-term revenues from rubber exports (based on short-run import demand elasticities) could be as high as 35% of the export price, whereas the optimal export tax based on long-run import demand elasticities has been estimated at about 8% of the export price.⁴ Thus the export duty of 4-5% of f.o.b. prices even in a relatively good year like 1988 did not exceed the estimated optimal level based on long-run elasticities. However, relative to its main competitor at the farm level, oil palm, rubber was taxed significantly in 1988 since export duties on processed palm oil were suspended in August 1986 due to extremely low world prices of palm oil. The issue of relative taxation of rubber and palm oil is non-existent at this time and will remain so unless world rubber prices improve significantly in the near future.

³ Rubber producers also pay a research cess of M\$38.50/ton, which has not been included in the present analysis.

⁴ Mudassar Imran and Ron Duncan, "Optimal Export Taxes for Exporters of Perennial Crops", International Economics Department, The World Bank, WPS 10, June 1988.

ANNEX 3
Table 1

SMALLHOLDER RUBBER - REPLANTING CESS AND GRANT a/

Rate of interest (%) b/	Present value of replanting grant c/	Present value of cess payments (M\$) at alternative rubber yields (kg/ha) d/							
		500	600	700	800	900	1,000	1,100	1,200
3	1171	629	755	881	1,006	1,132	1,258	1,384	1,510
5	684	523	628	732	837	941	1,046	1,151	1,255
8	312	411	493	575	658	740	822	904	986
10	187	356	427	498	570	641	712	783	854

- a/** Combinations to the right of the heavy line represent net taxation of smallholders; to the left net subsidization. The table excludes research cess (M\$38.50/ton) and export duties, which fluctuate from year to year with world prices (see Table 2). If these were included in the analysis, the net taxation will be higher and the net subsidization lower.
- b/** As future payments of both the cess and grant are stated in 1993 ringgits (constant value), this interest rate should be considered to be a "real" rate. In 1993, real deposit rates in financial institutions were 1.5-2%. Lending rates ranged from 9 to 13% (for commercial bank lending). Real lending rates in the informal credit sector (mainly shopkeepers and traders) were estimated to range between 10% and 30% p.a.
- c/** Replanting grant: M\$6,177.62/ha (M\$2,500/acre) for holdings of 4.05 ha (10 acres) or less; M\$4,200.78/ha for smallholding of more than 4.05 ha.
- d/** Replanting cess: M\$99.20/ton (4.5 sen/lb). For the purpose of calculations in this table, it was assumed that while the economic life of a rubber tree is 32 years, the replanting cess is only paid during the years of maturity (25 years). Yields are average yields for the 25 year production cycle.

RUBBER EXPORT DUTY STRUCTURE

<u>Gazetted Price</u>	<u>Rate of Export Duty</u>
On the first M\$2.10/kg	Ad valorem nil
Plus on the next M\$0.40/kg	Ad valorem 10%
Plus on the next M\$0.50/kg	Ad valorem 20%
Plus on the balance	Ad valorem 30%

NOTE: All duty is to be calculated in Malaysian cent (sen) per kg to the nearest 1/8 of a sen according to the formulae shown below (where "P" represents the gazetted price):

<u>Gazetted Price</u> (sen/kg)	<u>Export Duty Formulae</u>
210 and below	-0-
210 1/8 - 250	0.10 P minus 21.00
250 1/8 - 300	0.20 P minus 46.00
300 1/8 and above	0.30 P minus 76.00

The various grades of rubber are classified into one dutiable category. A "Gazetted Price", which is used for the calculation of duty, is gazetted and published in the press. The "Gazetted Price" is derived by averaging the prices of the RSS 3 and SMR 20 grades for the period between the 16th day of the month preceding the previous month, and the 15th day of the previous month. The effectiveness of the "Gazetted Price" commences on the first day of the month for a period of one calendar month.

MALAYSIA

RISDA II PROJECT

RISDA's Replanting Program

Achievements and Targets

1. Replanting of rubber provides for the replacement of areas of old, low yielding trees with trees of modern clones of enhanced growth vigor, higher yield potential and improved disease and pest resistance. It enables the industry to take advantage of the latest results of research in a structured way and particularly of the new clone recommendation which are triennially issued to the industry by the Rubber Research Institute of Malaysia. Old rubber trees continue to yield at low levels for many decades but at that stage their exploitation is not economic. Thus the annual rate of replanting of old rubber is a useful indicator of the vigor and, to some extent, the productivity of the industry. The industry norm for rubber is a crop production cycle of about thirty years, equivalent to an annualized replanting rate of about 3%. Under good field conditions, this 30 year crop cycle comprises some 5 years of immature crop and 25 years of production. In the smallholder sector, however, the average immaturity period is about 7 years and plantings often remain in production, at a low level, for thirty or more years.

Replanting Performance to Date

2. From its inception in 1953 up to the end of 1992, Malaysia's cess-financed rubber replanting program has supported the replanting of a total of 1,156,293 ha of smallholder rubber (this figure includes small areas of new plantings on vacant land within smallholder areas). The replanting performance for each year of the program is given in Table 1. The annual rate has fluctuated quite widely over the years. From a moderate beginning in 1953, it climbed within a few years to more than 20,000 ha/year and remained above 30,000 ha/year during most of sixties. The all-time annual peak of 46,041 ha was in 1965. Through the seventies, annual replanting levels were generally lower but they rose again in the eighties. Since 1987, the annual rate has remained consistently above 35,000 ha. In the RISDA I project period 1989-1992, annual replanting was above 37,000 ha and exceeded 40,000 ha in 1992. By totals, the first half million hectares was replanted by 1973 while the million hectare mark was passed in 1988 (Table 2).

3. Eligibility for Replanting. To be eligible for replanting grants, smallholders must have registered their rubber holdings with RISDA, have ownership title to the holdings, and at registration the areas must be growing a specified, low minimum number of rubber trees per hectare, regardless of condition or whether they are in production. Holders are eligible to replant with rubber or any of 18 other crops but areas planted with the assistance of the replanting grant to other crops become ineligible for future assistance and are eliminated from the register. Areas replanted with rubber are

eligible for repeat replanting grants on a 20 year minimum cycle although longer intervals would be more normal.

4. Categories of Replanting. Each registered rubber area is recorded as a first, second or, to date, third round replanting according to the number of times it has been replanted under the grant program. RISDA has also assisted smallholders with grants or credit for the planting of rubber or other crops in pockets of land on which they also have title; these areas are usually located within or close by the main holding and without replanting assistance, would remain out of production. RISDA's total performance across these various categories, as at end 1992, was as follows:

- total replanted area	1,156,293 ha
- first round replantings	934,761 ha (81%)
- second round replantings	148,112 ha (13%)
- third round replantings	2 ha
- new plantings, eligible for grant	52,229 ha (4%)
- other plantings, not eligible for grant*	21,189 ha (2%)

* program terminated from 1985

5. At the end of 1992, the total area replanted at least once was 934,761 ha. This compares with the 1,289,678 ha of old rubber registered with RISDA up to the end of 1991. Thus it would appear that some 355,000 registered hectares remain to be replanted, or about 27% of the total; however, many of the registrations date back to 1972 and many of the areas may have been converted out of agriculture. Even though the replanting program has been operating for 40 years, first round replanting continues to be a major feature of the annual replanting program. Thus in each year of the RISDA 1 project, there were 24,000 ha or more of first round replantings, about 60% of the total. In 1992, the area of first round replanting reached 30,908 ha, 75% of the total and the largest annual area since 1973. These high levels of first round replanting reflect the focus and emphasis given by RISDA to first round replanters in an effort to clear the substantial backlog of never replanted old rubber on smallholdings, and also indicate the continuing interest of these smallholders to replant. The earliest incidence of second round replanting of rubber, that is of rubber which had been replanted once under the grant in the early years of the program, was in 1974 with 474 ha. This was 21 years after commencing the replanting program in 1953, just over the minimum 20 year period for eligibility. This early replanting indicates that the trees were in a less than satisfactory condition, whether due to poor quality of the original plantings or subsequent poor field maintenance. The annual area of second round replantings increased to around 10,000 ha by 1982, but despite an increasing demand for second grants, RISDA has stabilized the annual rate of second round replanting to the 10-12,000 ha range to ensure adequate funding for the priority first round replanting program. The first occurrence of third round replanting, involving only about 2 ha, was in 1992, just 40 years after launching the replanting program.

6. Replanting by Crop. Replanters have the choice of replanting their old rubber with rubber or any of 18 other eligible crops. The choice is vigorously exercised, largely in response to fluctuating commodity prices and market perceptions, but agroclimatic considerations in certain areas of the country also affect decisions. To date, rubber has been the crop for about 77% of the total replanted area with most of the balance planted in oil palm. The distribution of the total replanted area by principal crops is :

- 893,281 ha (77%) of rubber,
- 144,682 ha (12.5%) of oil palm,
- 54,498 ha (5%) of fruits (non-citrus), and
- 63,832 ha (5.5%) of other crops.

Details are given in Tables 1 and 2. Table 1 reveals that for the years 1953 through 1966, but excepting 1954 for which data does not appear reliable, rubber accounted for about 90% of the total annual area of replanting. In 1967, the combined annual percentage for other crops jumped to 20% and has stayed largely above that mark since that time. The rubber proportion fell to 68% in 1972 when the planting of oil palm started to assume importance. The rubber share then remained in the 60-70% range through to 1985 when it suffered a further major decline. In the three years 1985-87, the rubber share went below 50% of RISDA's replanting program, reaching its lowest point in 1986 at 41%. Since then, however, the rubber replanting percentage has increased to about 80% as a result of erratic palm oil prices and most importantly, RISDA's efforts of encouraging smallholders to stay with rubber, giving highest priority to applications for replanting rubber with rubber and favoring applications from the predominately rubber growing northern and eastern states. Table 2 shows the planting levels of other crops over various years. Oil palm is now well established as the most important alternative crop to rubber but it did not feature in the early years of the program. It has lost significant relative importance in the last 2-3 years. Non-citrus fruits have been fairly consistently favored by smallholders throughout the span of the program and recently have had increasing popularity. The demands for coconut and cocoa have fluctuated widely over the years but these two crops are now almost totally neglected; the period of active replanting with coconut was in the first twenty years of the program while for cocoa the interest was a 1980's phenomenon. The demands on RISDA over the years for crops other than rubber, and particularly oil palm and cocoa, have been largely driven by commodity price differentials with rubber, along with the perception in very recent years as a result of the severe shortages of agricultural labor, that rubber production is a sunset industry. The recent strong demand for replanting with fruits may be an indication of the uncertainty that smallholders have as to the future of agriculture in the country, the direction of crop commodity prices and the longer term viability of rubber.

7. Replanting Performance and Rubber Cropping Cycles. The normal thirty year crop cycle for rubber assumes that the planted stand remains economically productive throughout the period. To ensure this condition, the trees must be of good provenance, remain as a relatively high density stand, be healthy and vigorous, and have a history of careful exploitation so that there is an adequate reserve of good quality renewed bark available for

tapping. These conditions have not generally prevailed over large areas of smallholder replantings, particularly those replanted in the first two decades of the program when there were shortcomings in the provenance of the planted trees and a generally low level use of production technology. From 1953 to 1971, seedlings were used in 165,000 ha or 36% of replantings (Table 3) as they were readily available and easy to distribute and use under smallholder conditions. However, the seedling provenance had only a very moderate yield potential which is unsatisfactory by current standards, and further, it was difficult to assure their provenance because of difficulties of supervising seed collection and distribution. In hindsight, from the generally less than satisfactory production levels of those areas, it is believed that many of the plantings were not true to label, being seeds of unselected stocks. Even yields of areas planted with genuine seed were below those of the clones being distributed and well below the best clones being widely adopted at that time by the estate sector. With low yields and little profitability, smallholders opted for minimal field maintenance and large areas of seedlings were either abandoned or allowed to revert to a rubber jungle. For the purposes of estimating the replanting requirements of these old seedling areas, their productive crop cycle is assumed to be only twenty years after which the areas should be replanted. In 1972, the Replanting Board, anxious to improve the potentials of smallholder production, ceased distribution of seedling rubber for replanting in smallholdings.

8. In the period up to 1971, 295,000 ha were planted with clones. Most of the clones were first generation with a lower yield potential than those of the more modern series which started to replace them from about 1971. Further, as for seedlings, many of the smallholder areas planted with clones in those years were subject to low levels of field technology resulting in trees of generally poor vigor and badly tapped. Their economic life, therefore, was shortened and many areas, if not already replanted, are likely to have gone out of production. It is RISDA's view that farmers should replant these stands as soon as possible. For planning purposes, all these pre-1972 areas are assumed to have a 25 year crop cycle.

9. From 1972, clonal materials of increasingly better quality became available and were distributed to smallholders. Standards of field technology also improved. However, RISDA considers that the production potential of many of the plantings of the seventies is unsatisfactory relative to those with more recently distributed clones and thus many of the areas will almost certainly be in need of replanting after about 25 years. A generalized thirty year economic life for these plantings would not, therefore, be appropriate for planning purposes. In estimating the scope of RISDA's future replanting program, the post-1972 replants are considered as several groups to take account of gradually improving provenances and technology. For the 1972-1976 plantings, it is assumed that 50% should be replanted after 25 years and 50% after 30 years, while for the 1977-1980 plantings, the percentages are 25% and 75% respectively. For all plantings from 1981, the full thirty year replanting cycle is taken as appropriate. On the basis, some areas would be ready for third round replanting from 2003. In practice, there will be many variations as evidenced by the first and tiny area of third round replanting completed in 1992 after a minimum of two 20 year cycles. Based on the above

assumptions, the estimated annual areas falling due for replanting and the cumulative totals by year, for the period 1973-2020 are shown in Table 4. The figures are derived from the annual areas of first round replanted rubber (the very considerable first round areas replanted to other crops are not eligible for further replanting grant assistance). Estimates indicate that half a million hectares will be due for second round replanting by the year 2000; 75,000 ha will be due for third round replanting by 2020.

Future Levels of Replanting

10. First Round Replanting. At the end of 1992, the estimated registered area of old rubber still to be replanted was of the order of 355,000 ha (para 5). However, the agricultural condition and current land use of these areas is not known. Many of the plantings may have been abandoned to urbanization or industrial estates, or other civil works and there may also be significant areas of disputed title. In planning for the replanting program in the years ahead, priority must be accorded to all the unimproved areas which remain in agriculture. Additionally RISDA believes that there may be as many as a further 150,000 ha of old rubber, particularly on lands of disputed or no title, which have not yet been registered. A portion of them may qualify for replanting grant assistance. However, in the absence of data on these latter areas and without any clear action program for bringing non-titled, but settled, areas into the replanting cycle, these unconfirmed 150,000 ha have not been taken into account in estimating the scope of RISDA's future replanting program.

11. Current policy gives replanting grant priority to areas in need of first round replanting and up to 1992, RISDA achieved about 30,000 ha per year, leaving funds available for 10,000 ha of second round replanting. This rate is expected to continue through 1993. For 1994/5 the annual replanting rate is expected to be reduced to about 30,000 ha due to insufficient funds available in the last two years of the Sixth Malaysia Plan, so that first and second round replantings on a proportionate basis would be about 22,000 ha and 8,000 ha respectively. Although the program could continue high annual levels of first round replanting until the backlog of never replanted rubber is cleared, it is likely that the quantum of such areas coming forward each year would diminish as the size of the core area reduces. In estimating future performance, it has been assumed that after 1994-5, total annual replanting will return to 40,000 ha/year but that the levels of first time replanting would ease down to 28,000, 22,000, 15,000 and 10,000 ha per year over the following 13 years. The replanting of about 300,000 ha, 85% of the backlog, by that time should virtually complete that phase of the program. Thus from year 2009, replanting should be able to go over totally to second and third round needs. The scenario would have to be reviewed from time to time in light of replanting performance and evidence on outstanding registered lands remaining in agriculture.

12. Second Round Replanting. Table 4 shows that up to 1992, only 148,115 ha or 37% of the total estimated area of 402,797 ha due for second round replanting had been replanted. The estimated backlog was a little over a quarter of a million hectares. Table 4 indicates the future scope for

second round replanting predicated on the priorities assumed for first round replanting up to year 2009. The backlog for second and third round replantings would continue to increase for a few years, peaking at around 275,000 ha in 1996, and thereafter slowly decline and be finally eliminated in 2016. At that time, the total cumulative area of completed second and third round replanting would be about 772,000 ha, some 624,000 ha more than at present. After 2016, the scope of the annual replanting program would be determined by the annual rubber area falling due for replanting which in turn would reflect the replanting levels of one and two planting cycles earlier. The program could decline to below 30,000 ha/year for a year or two (the low point would be about 21,000 ha in 2017) but would strengthen again because of the higher replanting rates of the late eighties and would soon return to annual levels of about 40,000 ha/year. This fluctuating program could leave RISDA with an excess of staff resources for a few years.

Future Replanting Policy

13. Although Government's replanting policy is to rejuvenate old rubber expeditiously, agreed implementation rates are determined by availability of replanting cess funds and budget and, at the margin, RISDA's operational resources. Cess collections have fallen with declining national rubber production and the rapidly increasing consumption of local manufactured rubber on which cess is not levied; budgets are increasingly constrained by the many competing demands of the industrial sector, while recent replanting rates are considered to be close to RISDA's operational capacity. Under the Sixth Malaysia Plan an annual replanting rate of 40,000 ha has been defined but budget realities indicate that the rate will have to be reduced to about 30,000 ha/year for 1994-1995. The rate for the Seventh Plan has not yet been decided but under current economic conditions in Malaysia it is not likely to be expanded beyond 40,000 ha/year. Thus the impact of the Sixth Plan is likely to be a reduced area awaiting first round replanting but an increased backlog of area requiring second round replanting. It is not clear how policy will be translated into action to rejuvenate the more than 750,000 ha currently in need of second round replanting. Decisions will be taken in the framework of the perceived importance of rubber in the future economic condition of the country, the welfare of the smallholders concerned, and the comparative returns to investments in rubber and industry. Other critical factors that will have to be taken into account include the severe labor shortages in rural areas, particularly in the rubber sector, and declining cess collections. An action plan of accelerated replanting could be considered to reduce the backlog of replanting as quickly as possible so as to rapidly increase the productivity of the industry. Thus if the annual replanting rate were increased to 60,000 ha, the combined backlog of never replanted rubber and overdue second round replanting could be eliminated by the year 2005. Conversely an annual program of just 30,000 ha would prolong the backlog for many years beyond 2020. The formulated policy as it affects the replanting rate and the extent and condition of the smallholder sector, will be in the context of moulding the future rubber industry to suit national objectives.

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Table 1

RISDA II Project

Replanting Performance 1953-1992

Year	Area (ha) Planted with Rubber	Area (ha) Planted Other Crops	Total Area (ha) Planted By Year	Rubber as % Total Planting
1953	11923	55	11978	99.5
1954	9144	3073	12217	74.8
1955	10226	44	10270	99.6
1956	18690	1347	20037	93.3
1957	20163	1278	21441	94.0
1958	24131	1192	25323	95.3
1959	29884	1166	31050	96.2
1960	30896	703	31599	97.8
1961	26930	687	27617	97.5
1962	31337	958	32295	97.0
1963	37729	1756	39485	95.6
1964	36958	2792	39750	93.0
1965	41407	4634	46041	89.9
1966	21263	1694	22957	92.6
1967	32251	8555	40806	79.0
1968	15838	4961	20799	76.1
1969	15147	3434	18581	81.5
1970	21531	3990	25521	84.4
1971	23257	7480	30737	75.7
1972	23383	10919	34302	68.2
1973	28563	12295	40858	69.9
1974	23621	9427	33048	71.5
1975	21099	12559	33658	62.7
1976	14301	5519	19820	72.2
1977	12878	5474	18352	70.2
1978	13315	6038	19353	68.8
1979	14225	8228	22453	63.4
1980	15325	7694	23019	66.6
1981	22207	6867	29074	76.4
1982	23418	7783	31201	75.1
1983	22737	8980	31717	71.7
1984	17398	10959	28357	61.4
1985	10715	12516	23231	46.1
1986	12905	18628	31533	40.9
1987	16809	18418	35227	47.7
1988	22617	14116	36733	61.6
1989	25662	11955	37617	68.2
1990	29064	8659	37723	77.0
1991	31499	7782	39281	80.2
1992	32497	8287	40784	79.7
Total	892943	262902	1155845	
Average	22324	6573	28896	77.8

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Table 2RISDA II ProjectTotal Area (ha) Replanted and New Planted by Crop, 1953-1992

Year	Rubber	Oil Palm	Fruits*	Cocoa	Coconut	Other	Total Non-Rubber	Total All Crops
1953-59	124161	0	1992	0	2238	3925	8155	132316
1960-69	289757	7845	5656	0	5340	11334	30175	319932
1970-79	196173	43597	15985	443	9865	12039	81929	278102
1980-89	189793	77191	22802	14747	1271	1906	117917	307710
1990-92	93397	16049	8063	399	42	283	24836	118233
Total	693281 77%	144682 12.5%	54498 5%	15589 1.5%	18756 1.5%	29487 2.5%	263012 23%	1156293
<u>Details for Years 1986-92</u>								
1986	12905 41%	11635 37%	3219 10%	3591 11%	58	125	18628 59%	31533
1987	16809 48%	10673 30%	3252 9%	4240 12%	53	200	18418 52%	35227
1988	22617 62%	8183 22%	2911 8%	2691 7%	59	273	14117 38%	36734
1989	25662 68%	8131 22%	2667 7%	932 2%	35	190	11955 32%	37617
1990	29064 77%	6130 16%	2205 6%	214 1%	20	90	8659 23%	37723
1991	31499 80%	4959 13%	2549 6%	143	13	118	7782 20%	39281
1992	32834 80%	4960 12%	3309 8%	42	9	75	8395 20%	41229

* Non-citrus

RISDA II Project

Rubber Replanting 1953-1996

Year	Area (ha) Planted with Rubber	Cumulative Area (ha) Planted	Area (ha) by Crop Cycle of Replanted Clones		
			Seedlings 20 Years	Old Clones 25 Years	New Clones 30 Years
1953	11923	11923	3041	8882	
1954	9144	21067	7088	2056	
1955	10226	31293	9866	360	
1956	18690	49983	14232	4458	
1957	20163	70146	13171	6992	
1958	24131	94277	14458	9673	
1959	29884	124161	16949	12935	
1960	30896	155057	9241	21655	
1961	26930	181987	9346	17584	
1962	31337	213324	9748	21589	
1963	37729	251053	11172	26557	
1964	36958	288011	8540	28418	
1965	41407	329418	8450	32957	
1966	21263	350681	6146	15117	
1967	32251	382932	3355	28896	
1968	15838	398770	5276	10562	
1969	15147	413917	4545	10602	
1970	21531	435448	6181	15350	
1971	23257	458705	3862	19395	
1972	23383	482088		11691	11692
1973	28563	510651		11781	11782
1974	23821	534272		11810	11811
1975	21099	555371		10549	10550
1976	14301	569672		7150	7151
1977	12878	582550		3219	9659
1978	13315	595865		3329	9986
1979	14225	610090		3556	10669
1980	15325	625415		3831	11494
1981	22207	647622			22207
1982	23418	671040			23418
1983	22737	693777			22737
1984	17398	711175			17398
1985	10715	721890			10715
1986	12905	734795			12905
1987	16809	751604			16809
1988	22617	774221			22617
1989	25662	799883			25662
1990	29064	828947			29064
1991	31499	860446			31499
1992	32834	893280			32834
1993	32000	925280			32000
1994	24000	949280			24000
1995	24000	973280			24000
1996	32000	1005280			32000

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Table 4

RISDA II Project

2nd/3rd Replanting 1973 - 2020 (all areas in ha)

Year	New Area due for 2nd Replanting	New Area due for 3rd Replanting	Cumulative Area due for 2nd/3rd Replanting	Area replanted 2nd/3rd time	Cumulative Area Replanted 2nd/3rd Time	Area waiting for 2nd/3rd Replanting
1973	3041		3041	0	0	3041
1974	7088		10129	424	424	9705
1975	9866		19995	1820	2244	17751
1976	14232		34227	1699	3943	30284
1977	13171		47398	2671	6614	40784
1978	23340		70738	3603	10217	60521
1979	19006		89744	5175	15392	74352
1980	9601		99345	5914	21306	78039
1981	13804		113149	7617	28923	84226
1982	16740		129889	9226	38149	91740
1983	20845		150734	10098	48247	102487
1984	21475		172209	10081	58328	113861
1985	30105		202314	9086	67414	134900
1986	23730		226044	12141	79555	146489
1987	24944		250988	12070	91625	159363
1988	31833		282821	12345	103970	178851
1989	32963		315784	12899	116869	198915
1990	39138		354922	11022	127891	227031
1991	18979		373901	10039	137930	235971
1992	28896		402797	10185	148115	254882
1993	10562		413359	7885	156000	255359
1994	10802		423961	8000	164000	255961
1995	15350		439311	8000	172000	261311
1996	19395		458706	12000	184000	268706
1997	11691		470397	12000	196000	268397
1998	11781		482178	18000	208000	268178
1999	11810		493988	18000	226000	261988
2000	10549		504537	18000	244000	254537
2001	7150		511687	25000	262000	243687
2002	14911		526598	25000	287000	233598
2003	15111		541709	25000	312000	223709
2004	15637	321	557397	30000	337000	214397
2005	14381	1177	572955	30000	367000	199955
2006	7151	1318	581424	30000	397000	178424
2007	9659	2004	593087	30000	427000	160087
2008	9986	2428	605501	40000	457000	142501
2009	10669	3183	619353	40000	497000	116353
2010	11494	3573	634420	40000	537000	91420
2011	22207	5430	662057	40000	577000	79057
2012	23418	6100	691575	40000	617000	68575
2013	22737	6050	720362	40000	657000	57362
2014	17398	4489	742249	40000	697000	39249
2015	10715	2677	755841	40000	737000	12841
2016	12905	3441	772187	29187	772187	0
2017	16809	4298	793294	21107	793294	0
2018	22617	6179	822090	26796	822090	0
2019	25662	7506	855258	33168	855258	0
2020	29064	6950	891272	36014	891272	0

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Breakdown of Grant Payment by Crop 1/

Crop Type	Installment per Ha (M\$)							TOTAL (M\$)
	First	Second	Third	Fourth	Fifth	Sixth	Seventh	
Rubber (A)	1828.57	1013.13	741.31	741.31	741.31	617.76	494.23	6,177.62
Rubber (B)	1359.07	617.76	555.98	555.98	432.43	432.43	247.13	4,200.78
Oil Palm (A)	1729.73	1359.07	864.86	494.23	-	-	-	4,447.89
Oil Palm (B)	1482.63	988.42	691.89	296.53	-	-	-	3,459.47
Cocoa (A)	2100.39	864.86	741.31	741.33	-	-	-	4,447.89
Cocoa (B)	1729.73	593.05	568.34	568.35	-	-	-	3,459.47
Cloves, Nutmegs, Coffee, and Non-Citrus Fruits (A)	1482.63	741.31	741.31	741.31	741.33	-	-	4,447.89
Cloves, Nutmegs, Coffee, and Non-Citrus Fruits (B)	1235.52	617.76	617.76	494.21	494.22	-	-	3,459.47
Coconuts and Sago (A)	1729.73	741.31	741.31	617.78	617.78	-	-	4,447.89
Coconuts and Sago (B)	1482.63	543.63	543.63	444.78	444.80	-	-	3,459.47
Pepper (A)	1976.84	1482.63	494.21	494.21	-	-	-	4,447.89
Pepper (B)	1729.73	988.42	370.65	370.67	-	-	-	3,459.47
Padi (A)	1482.63	1235.52	864.86	864.88	-	-	-	4,447.89
Padi (B)	1235.52	741.31	741.31	741.33	-	-	-	3,459.47
Citrus Fruits, Tea, Pineapple, and Manile Hemp (Abaca) (A)	2100.39	864.86	741.31	741.33	-	-	-	4,447.89
Citrus Fruits, Tea, Pineapple, and Manile Hemp (Abaca) (B)	1729.73	593.05	568.34	568.35	-	-	-	3,459.47
Sugarcane (A)	1976.84	1235.52	1235.53	-	-	-	-	4,447.89
Sugarcane (B)	1729.73	864.86	864.88	-	-	-	-	3,459.47
Orchid (A)	1976.84	1606.18	864.87	-	-	-	-	4,447.89
Orchid (B)	1729.73	1111.97	617.77	-	-	-	-	3,459.47
Ginger & Fodder Crops (A)	1976.84	1482.63	988.42	-	-	-	-	4,447.89
Ginger & Fodder Crops (B)	1729.73	1111.97	617.77	-	-	-	-	3,459.47

1/ Effective January 1, 1991.

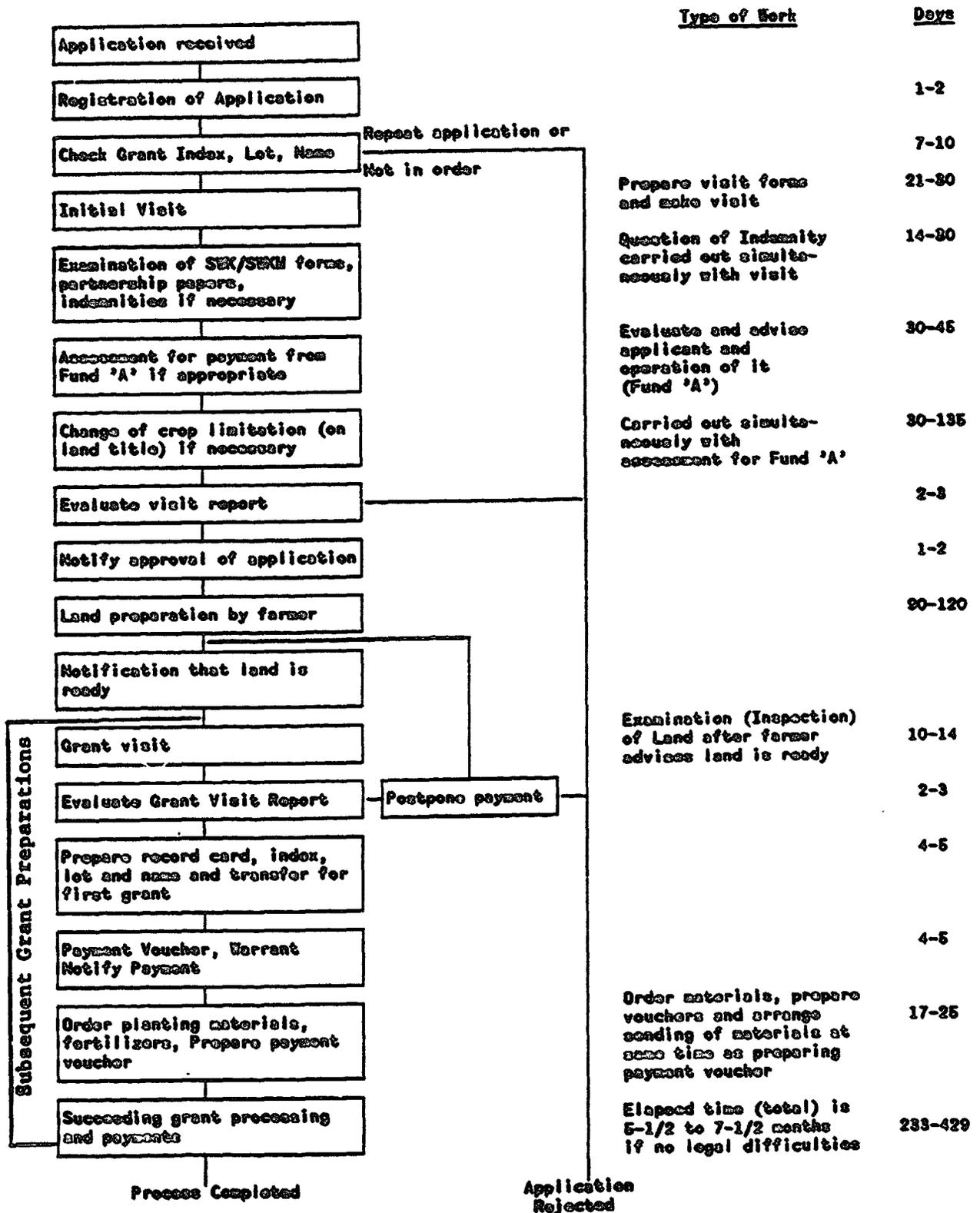
(A) : For owners of 4 ha (10 acres) or less.

(B) : For owners of more than 4 ha (10 acres).

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RISDA II PROJECT

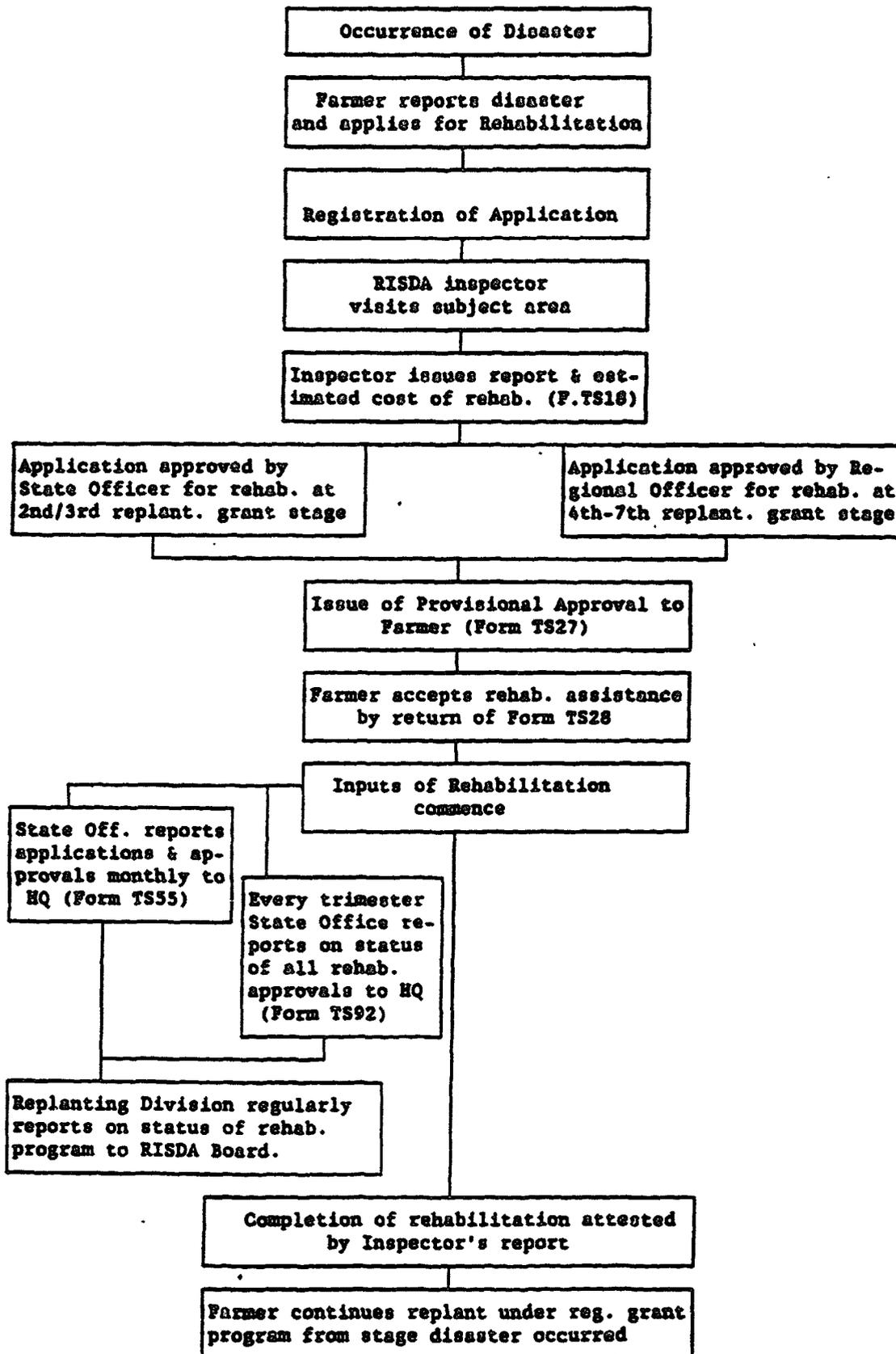
FLOW CHART OF PROCESSING STEPS FOR REPLANTING



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ANNEX 6.2

RISDA II PROJECT
Flow Chart of Rehabilitation Process



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Production of Quality Planting Materials and Rubber Nursery Improvement

The Concept and Achievement of Quality

1. Trees of a good field planting of rubber are vigorous and uniform in size. The key to achieving a good stand is the planting of quality planting material regardless of its type (budded stumps, young buddings etc). Without quality there will be higher planting losses, less uniform tree growth, a longer immaturity period, fewer productive trees and reduced yields.

2. The Characteristics of Quality. Good planting material consists of uniform, healthy, vigorous and desirable plants of the same age. If they are not of the same age, uniformity of vigor of the plants cannot be assured despite being of the same size. To ensure uniformity of vigor of budded rubber, the rootstock and scion components must each be of similar age. Nursery plants are normally supplied at the same stage of scion growth (2-whorl) and so to that extent, appear uniform. Commonly, however, the rootstock section of the plants are very variable in size (thickness of the stem) and thus are of variable vigor. But even if uniform in size, they may not be similar in vigor because of age differences. Big stocks do not necessarily equate with vigorous stocks - they may be older, slower growing plants of low vigor. Quality planting material of uniform vigor is only assured when the rootstocks and scions in a population of budded plants are each of uniform size and of similar ages. To be rigidly avoided is the mixing of populations of stocks or scions of different ages to achieve similarities in sizes particularly in field consignments as these will inherently be of mixed vigor and would become apparent in subsequent unevenness of tree growth.

3. Technology of Quality Production. Nursery operators must know more than the basic techniques of raising budded plants if they are to produce quality materials. They must understand the concept of quality, know the necessary production techniques for it and have the objective (and incentive) to produce it. Achieving quality requires appropriate nursery production technology and management with a strong emphasis on plant selection which must be rigorously applied at all stages of the nursery cycle and particularly at germination, during growth of the seedling, budgrafting and during the growth of the budding. At each of these stages, the plants must be examined and selected for uniformity of vigor and all plants not meeting the criteria must be discarded. A list of critical criteria in the production of quality material is given in Appendix 1.

4. Training for Quality Production. Nursery production is a skilled process. It looks fairly simple but unless properly done, the results, especially after field planting, can be very adverse with important implications for the economic life and productivity of the plantings. Success requires knowledge of appropriate technology and adequate physical resources. These essentials are generally more available in larger nurseries than in small scattered nurseries particularly at the village level but there is a dearth of operators at RISDA nurseries who have been well trained and have the

skills to produce quality plants. It is equally essential that RISDA staff concerned with the program of production and distribution of planting materials understand quality of planting materials and carry out meaningful monitoring for quality during their routine supervisions of nurseries and field deliveries - it is not just a matter of checking plant numbers and plant size (2-whorl plants). To these ends, the project will include a comprehensive training program for all concerned in the production of planting materials. An outline of the proposed training course is given at Appendix 2, while further details of the categories and numbers of trainees and costs are given in Annex 15, Table 2.

Nursery Production in 1992

5. Quantity of Production. Over the past few years, the production of RISDA's planting materials has been decentralized from the Scheme 56/59 nurseries to ESPEK nurseries on RISDA lands and, increasingly, to cooperative nurseries in line with RISDA's policy to support the development of RISDA cooperatives. The cooperative nursery managements, in turn, have contracted out considerable volumes of production to their individual members to be produced on their own holdings under the umbrella nursery concept. The total number of nurseries involved is not precisely known but including the many small umbrella nurseries was probably in excess of 150 in 1992. ESPEK coordinated production from their own and main cooperative nurseries but they were not responsible for ensuring production levels from other cooperative sources. Details of 1992 production are given in Table 1.

Table 1: Supply of Planting Materials 1992
(millions of plants)

	<u>Type of Planting Material</u>					Total	%
	Polybag Budded Stump	Polybag Young Budding	Budded Stump	Core Stump			
<u>Nursery Source</u>							
RISDA/ESPEK nurseries	4.06	0.85			4.95	37	
Cooperative nurseries	5.88	0.64			6.52	50	
Others			1.65	0.05	1.70	13	
Total	<u>9.94</u>	<u>1.49</u>	<u>1.65</u>	<u>0.05</u>	<u>13.13</u>	<u>100</u>	
%	76	11	13	1	100		
<u>Class of Clone Used</u>							
Class I	4.73	0.53	0.80	0.01	6.07	46	
Class II	5.19	0.93	0.83	0.04	6.99	53	
Class III	0.02	0.03	0.02		0.07	1	
Total	<u>9.94</u>	<u>1.49</u>	<u>1.65</u>	<u>0.05</u>	<u>13.13</u>		
%	76	11	13		100		

Cooperative nurseries produced at least half of the requirements. About 76% of the supplies were in the form of budded stumps in polybags with most of the balance going out as polybag young buddings or bare-root budded stumps, often to cooperative nurseries for polybag production. Quantity and quality of the polybag young buddings has been critically inadequate (para 7). By clones, nearly all the production was from Classes I and II with little more than half from Class II.

6. Quality of Production. With the rapid and large increase in the number of nursery sites, RISDA's overall supervision of the program became more difficult, less intensive and less effective. Adequate technical production skills at the nursery level were not assured and the overall quality of plants supplied to smallholders declined significantly. Sample observations on the quality of polybag budded stumps, the standard planting material produced, revealed that it ranged from very good to very bad according to management arrangements. In central nurseries operated and managed by ESPEK, where production techniques and facilities are generally adequate, quality has been decidedly better than in cooperative nurseries. One very serious shortcoming, however, is that there has been very little plant selection and thus it cannot be assured that the plants received by smallholders are of high vigor even though they are otherwise generally healthy and up to size. In the cooperative nurseries and particularly in their umbrella offshoots, the basic production techniques are generally not in place and there is little evidence that there is any significant selection of plants on vigor of growth and overall quality is far from satisfactory. The losers in this system are the smallholder replanters who receive planting material of very variable quality, who are not sensitive to quality issues and who are not aware of the potential production losses from use of such variable materials.

7. The Production of Polybag Young Buddings. In the last 2-3 years, RISDA has promoted pilot programs through the cooperatives for the production of polybag young buddings, a relatively new and more advanced type of planting material. Its production involves new production skills and more stringent physical facilities, especially for watering which, if not in place, generally result in poor quality plants. The unit plant production cost is also higher than for standard materials. The results of RISDA's young budding program, both in the ESPEK and cooperative nurseries, have been unsatisfactory, particularly in the cooperative nurseries and their umbrellas. Plants have been poorly grown and highly variable in vigor and losses have been high. Production levels have severely underrun targets. The problems have arisen from a lack of understanding of the new production system and the skills and physical inputs needed for its successful implementation. These deficiencies can only be rectified through a comprehensive training program. Meanwhile, to protect the interests of the smallholder replanters, young buddings should not be part of RISDA's regular planting material production and distribution program. Further, their production must be centralized and restricted, at this stage, to those few ESPEK nurseries which have the production skills, necessary nursery infrastructure and resources to produce materials of quality.

Production Arrangements Under the Project

8. A move to more centralized production arrangements where appropriate levels of skills, input facilities, management and RISDA supervision could be provided is necessary to ensure that RISDA's nursery production targets will be achieved and, most importantly, to reverse the decline in quality of planting materials going to smallholders. To this end, production will be refocussed on central nurseries under the project.

9. Arrangements for 1993. RISDA has made ESPEK responsible for arranging production of the year's requirements of about 14 million plants. For most of the production, contracts will be awarded to cooperatives to maintain their strong role in the program. Most of the production in the ESPEK nurseries will be undertaken by selected cooperatives or consortia of cooperatives under contract working under the supervision of ESPEK supervisors. There will also be contracts for production at specified cooperative nurseries which will be subject to some ESPEK supervision. The cooperatives will continue to have the facility to subcontract production to umbrella nurseries which will not be supervised by ESPEK. The total number of nurseries for the year will remain large but fewer than in 1992. There will be about seven large central nurseries on RISDA/ESPEK lands, about 19 nurseries on cooperative lands and an undetermined number of umbrella nurseries. The seven nurseries will be in the States of Kedah, Perak, Johore, Pahang, Terengganu and Kelantan. An ESPEK nursery may also be developed in Melaka. These ESPEK managed central nurseries are targeted to produce around 5 million plants or 35% of RISDA's requirements. Production in the 19 cooperative nurseries in various States and in the umbrella nurseries will amount to about 60% of RISDA's requirements (Table 2). All production in Negeri Sembilan will be from umbrella nurseries. The balance of RISDA's requirements will be produced directly by ESPEK who will also produce an additional amount of about 20% of RISDA's total requirements to provide a buffer for supply shortfalls from the cooperative and umbrella nurseries.

Table 2: Planned Type and Source of Planting Materials for 1993
(millions of plants)

Type of Material	RISDA/ESPEK Nurseries	Cooperatives at RISDA/ESPEK Nurseries	Other Cooperative Nurseries	Total
Polybag budded stumps	1.70	0.95	3.61	6.26
Polybag young buddings	0.30	3.57	4.75	8.62
Others	0	0.15	0.87	1.02
Total	2.00	4.67	9.23	15.90

10. Arrangements for 1994 Onwards. The number of nursery sites will be further centralized and decreased to about 15 total. These will consist of 9 or 10 nurseries on ESPEK sites but operated by consortia of cooperatives, and a few cooperative nurseries in areas not well served by the proposed ESPEK/cooperative nurseries. The actual number in these remoter areas will depend on RISDA logistics of being able to distribute plants to smallholders in all parts of the country and particularly in areas of difficult access such as Ulu Kelantan and North Perak (Grik). A list of the proposed sites is given in Appendix 3. ESPEK will be responsible for the production of RISDA's total requirements and will keep all sites under supervision. ESPEK will have management responsibility for performance of the contracted cooperatives on ESPEK sites, the large production areas, and will maintain full time supervisors on site who will be closely involved in day to day operations. In the remoter nurseries on cooperative member lands, ESPEK will supervise periodically but will not be involved in the daily operations. In addition to the buffer supply of planting materials, ESPEK will also get 20% of the regular planting material contract and use the profits from the contract to cover its incremental cost of supervision of improved nursery arrangements.

11. Consultant Assessment of Nursery Operations. In a move to assure quality of planting materials, RISDA will contract with RRIM as consultant to provide an independent assessment of performance of the nurseries. The consultant will regularly monitor nursery operations at each critical stage in the plant production cycle and will report observations and recommendations to RISDA and ESPEK as well as official agencies. There would be about 8 visits to each nursery in the production cycle. The proposed schedule of visits in relation to stages of growth of the nursery materials and the critical criteria for assessing the quality of nursery performance are at Appendix 4.

Choice of Clones

12. RISDA/ESPEK nurseries maintain a total of about 854,000 clone source bushes for use in budgrafting. At a conservative estimated production of 25 buds per bush per year, total production would be about 21 million buds which, after allowances for losses, would be sufficient for program needs. This assumes, however, that virtually all clones represented would be desirable for smallholders. A fairly large but unknown number of source bushes are also available in cooperative nurseries but with general concern over the reliability of their labelling, they will not be used in the ESPEK managed program starting 1994. The ESPEK nursery source bushes comprise all 6 of the Class I RRIM recommended clones and 17 out of the 20 Class II clones. There is a small selection of 16 Class III clones but none of this category is recommended for smallholder use other than for trial purposes under controlled conditions. In light of the RRIM's view that future plantings should be with clones suitable for LITS exploitation systems, it is necessary to evaluate the source bush numbers in respect to suitable clones for the technology. The distribution of source bush numbers by clone classes and suitability categories for LITS are shown in Table 3.

Table 3: Clone Source Bush Numbers in ESPEK Nurseries
(thousands)

Clone Class	Suitable for LITS	Suitable for LITS with Restrictions	Not Classified	Total	%
I	195	90	0	285	33
II	0	290	258	548	64
III	0	0	21	21	3
Total	195	380	279	854	100
%	23	44	33	100	

13. Although 97% of the source bushes comprise Class I and II clones, only 67% of the bushes are of clones suitable for LITS, indicating that there is a potentially serious program supply problem. The potential undersupply is particularly serious for Class I clones. The numbers of source bushes of Class I clones recommended for LITS without limitations (195,000) meets only 23% of total requirements, a very inadequate proportion in relation to the recommendation that smallholders should be planting not less than 50% of their area with Class I clones. For the 50% balance of area, smallholders may use all Class II clones; these should be suitable for LITS but in the case of progressive farmers, 20% could be speculative clones in that they have not been evaluated for LITS. The nursery population of 548,000 source bushes of Class II clones includes 290,000 source bushes of the three Class II clones suitable for LITS with restrictions; these could provide about 33% of total Class II replanting requirements. Therefore, there is a deficit in the Class II category to cater for general smallholders requirements. There would be no difficulty in meeting the additional clone requests from progressive farmers. Clearly ESPEK will need to adjust their source bush nursery clone populations as a matter of priority to meet project requirements. In particular, the numbers of Class I clones without restrictions need to be increased and proportions changed among the Class II clones, particularly stressing those clones which have already been provisionally identified as suitable for LITS. Numbers of other Class II clones should not be expanded without signals from the RRIM as to their performance with LITS. There should be no further expansion of Class III clones.

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Critical Technical Factors in
Production of Quality Rubber Planting Materials

<u>Production Stage</u>	<u>Critical Factors</u>
Seeds	Use seeds of clones GT I, RRIM 605, 623, 712 and 901, PB 5/51, 217 and 235. Avoid seeds of clones RRIM 600 and PB 260. Use fresh viable seed only.
Germination	Transplant seedlings as soon as radicals emerge. Discard all seedlings with twisted roots. Discard all seeds germinating after 15 days.
Young Seedlings	Discard genetic yellows, runts and unhealthy plants.
Seedlings up to budgrafting	Carry out regular selection rounds. Eliminate undesirable seedlings to produce population of uniform and vigorous plants (discarding 30 - 40% at this stage is normal). Use only slow release fertilizer for polybag seedlings and young buddings.
Budgrafting	Bud only well-grown stocks. Discard all unbudded or unsuccessfully budded stocks in ground nursery or polybags after two budding rounds.
Cutback	Cut short snags for green buddings, long snags for young buddings. In green budded stumps, cut back snag to below stem bud clusters (nodes) where practical. Cutback first and second round buddgraftings at the same time for more even growth of buddings.

Production Stage	Critical Factors
	Clear color marking system for all plants of each clone.
Polybags	Avoid re-cycled polythene. Fill bags with quality soil. Do not over-crowd bags in nursery - double rows of bags preferred. Install sprinkler watering system.
Planting of Stumps	Use only stumps with straight taproots. All twisted roots must be discarded. Cut back tap root to about 20cms long. Insert firmly into polybag with wet soil to the full length of the root to ensure lateral root zone covered by soil. Maintain frequent inspection rounds for stock shoots (twice per week) and remove. Eliminate all plants with weak or undesirable scions.
Buddings in bags	Remove plants with weak, abnormal and semi-dieback scions. Maintain selection pressure on population and remove all plants lacking vigor. Firm soil around the plant collar. Have clones verified as appropriate.
Field planting	Trail polybag plants suitable for field planting at least one week before. Transplant only uniform and vigorous plants with two or, at most, three whorls of hardened, healthy leaves, not counting any short first whorl with yellow or fallen leaves.

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Training in Production of Planting Materials

1. Training of key personnel is a first and critical step in the program to upgrade quality of rubber planting materials produced for RISDA's replanting program. All will be required to undergo a broad and intensive 10-day course on the production of rubber planting materials to be provided by the RRIM. They include ESPEK nursery managers and supervisors, cooperative nursery managers and supervisors involved in the production of planting materials under cooperative contracts in central and cooperative nurseries and the few cooperative umbrella nurseries in isolated areas, and selected RISDA staff involved in the overall performance of the program. RISDA staff will include extension staff concerned with monitoring of production and supply of materials in individual nurseries and in the overall program, and for refresher training, the RISDA trainers in planting material production at the RISDA training institutes. The focus of the course will be on understanding the full meaning of quality planting material, particularly in respect to uniformity of vigor, and the technologies required to produce such materials of the types used by RISDA. In this, there will be a strong emphasis on plant selection as the key tool in the process.

2. The outline schedule of the proposed RRIM course is given on the following page. In format, it is a combination of lectures, discussions, and, in most morning sessions, hands-on practicals. A visit to a commercial nursery is also included. The courses will be conducted at Sungai Buloh and for training effectiveness, they will be limited to about 15 participants each. Fees charged cover tuition, lodging and food, and transport.

Outline and Curriculum of Training course

Day	Subject Matter
Day 1	Assemble
Day 2	Course orientation Rubber seed collection and identification Seed selection Seed germination, seedling selection and planting
Day 3	Types of planting materials Principles of selection Preparation and planting of ground nursery
Day 4	Establishment of polybag nurseries Production of budded stumps in polybags
Day 5	Production of young polybag buddings Production of core stumps and other advanced planting materials.
Day 6	Establishment and maintenance of source bush nursery Source bush production Harvesting and packing of budsticks
Day 7	Free
Day 8	Manuring of nurseries and polybags Clones and clone recommendations
Day 9	Visit to commercial nurseries
Day 10	Chemical weed control in nurseries Pest and disease control.
Day 11	Departure

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Proposed Central and Cooperative Nurseries from 1994

No	State	Nursery Location	Management
1.	Kedah	Bukit Perak	ESPEK
2.	Kedah	Baling	Cooperative
3.	Perak	Gunung Tunggal, Sitiawan	ESPEK
4.	Perak	Kg.Changkat Sulaiman	ESPEK
5.	Perak	Grik	Cooperative
6.	Melaka	Kesang Pajak	ESPEK
7.	Johore	Kg. Sekijang	ESPEK
8.	Pahang	Kg. Awak	ESPEK
9.	Pahang	Gambang	ESPEK
10.	Terengganu	Bt.17, K.Berang	ESPEK
11.	Terengganu	Proposed, Kemaman	(Cooperative)
12.	Kelantan	Gading Galoh	ESPEK
13.	Kelantan	Proposed, Ulu Kelantan	(Cooperative)
14.	Kelantan	Proposed, Ulu Kelantan	(Cooperative)
15.	Kelantan	Proposed, Tanah Merah	(Cooperative)
16.	Negeri Sembilan	Proposed, to be determined	(ESPEK)

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PRODUCTION OF PLANTING MATERIALS

Visit Schedule and Assessment Criteria

<u>Visit Sequence</u>	<u>Stage of Nursery Operations</u>	<u>Assessment Criteria</u>
First	Land/polybag preparation	(i) Soil suitability (ii) Irrigation facility and water source (iii) Polybags: plastic material, size, placement, soil quality and filling
Second	Seed germination	(i) Seed freshness and viability, germination tests (ii) Seed planting, days to germination (iii) Budwood nursery: capacity, vigor and health of source bushes, pruning, clone demarcation
Third	Transplanting of germinated seed	(i) Handling techniques for germinated seed (ii) Adequacy of watering polybag nursery (iii) Organization and maintenance of ground nursery, control of weeds (iv) Condition of source bushes
Fourth	1 month after transplanting	(i) Culling program for runts, genetic yellows and undesirable seedlings (ii) Watering of polybag nursery (iii) Condition of ground nursery (iv) Adherence to recommended fertilizer programme
Fifth	Time of budding	(i) Percent seedling buddability (ii) Seedling vigor and uniformity (iii) Status of budwood nursery, quality and quantity of budsticks (iv) Color coding for clone identification (v) Fertilizer program: manuring of ground nurseries and foliar application in polybag nurseries

Visit Sequence	Stage of Nursery Operations		Assessment Criteria
Sixth	Cutback and planting of budded stumps	(i)	Snag length of budded stumps and young buddings
		(ii)	Stem size of budded stumps, length of cut tap root, culling of undesirable tap roots
		(iii)	Discarding of all budding failures and all unbudded smaller plants after two budding rounds
		(iv)	Adequacy of manuring and watering
Seventh	1 - 1½ months after cutback	(i)	Bud sprouting, condition of scion growth
		(ii)	elimination of undesirable buddings
		(iii)	Pruning of stock shoots
		(iv)	Adequacy of manuring and watering
Eighth	Two-whorled polybag plants	(i)	Census of quality two-whorled polybag plants by clones
		(ii)	Color coding of clones
		(iii)	Culling of small and undesirable plants
		(iv)	Tailing of plants ready for dispatch
		(v)	Packaging of plants
		(vi)	Adequate watering of tailed plants

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Clone Choice and LITS

1. Field experience of many years including two years in Malaysia has confirmed that LITS technology (reduced frequency tapping with stimulation) is effective in eliminating problems of severe shortages of tappers, a particularly relevant factor threatening the viability of the rubber industry in Malaysia at this time. It is also a powerful technology for improving the efficiency of crop production and economic returns above the levels normally achieved with standard alternate daily tapping. For these reasons, the RRIM has described LITS technology as the way of the future for the rubber industry.

2. The critical factor in determining the success of a LITS program, apart from the influences of implementation arrangements and agroclimatic conditions, is the suitability of the rubber clones used with the technology. Some clones respond well to stimulation, an integral part of LITS technology, while others do not. Yield responses to stimulation vary according to the inherent physiological characteristics of clones and particularly their levels of metabolic activity. Clones with high activity are easily stressed by stimulation, which by its nature promotes higher metabolic levels, and may develop serious problems of bark dryness. Thus, in introducing LITS, it is imperative to know the suitabilities of the clones to be used. It is equally important for the industry and the farmers that the clones chosen for the planting of rubber areas from now onwards will be suitable for the technology and will be able to sustain long term productivity to ensure the economic viability of the rubber smallholdings. The appropriate clone choice requires a knowledge of the relevant characteristics and suitability of the currently recommended clones for planting by smallholders. It will be 6-7 years before clones planted now will enter into production; at that time LITS is expected to be standard exploitation technology.

3. The current RRIM clonal recommendations published in late 1992 recommend only Class I and II clones for smallholder planting. From these groupings, the RRIM's recommendations to RISDA for their replanting program are the Class I clones and 10 out of the 20 clones of Class II. Details are given in Table 1. The recommendations provide no guidelines on clone suitability for LITS. The limited information on clone responses to stimulation is in the context of the use of stimulant to increase yields under standard tapping systems, a concept which is not compatible with LITS technology as the purpose of the stimulation is to compensate for otherwise reduced production as a result of less frequent tapping. RRIM has, however, some limited unpublished information from their own tests on clone responses to stimulation with LITS and, in the case of some clones, documentation of responses from trials and commercial practice in other countries. A broad based review by RRIM senior technical staff of this information for the Class I and Class II clones of the RRIM recommendations enabled the identification of an interim list of clones which could be expected to respond suitably to

stimulation with LITS and which could therefore, be recommended to smallholders for planting at this time.

4. RRIM stresses that the list is interim. During the project they will accelerate efforts to define the suitability of most, if not all, their recommended Class I and 2 clones for use with LITS technology and particularly the clones of Class II, many of which are highly popular for planting. For this purpose, they will mount a series of short term trials to evaluate the responsiveness to stimulation with LITS of the 10 Class II clones especially recommended for RISDA smallholders and also clone PB 260 of Class I, the one clone of that class which may not be suitable for unrestricted use with the technology. Out of this program, RRIM hopes to be able to provide RISDA with more definitive planting guidelines within the next 3 years. Results would be supplemented by researches on physiological aspects of stimulation and a survey to determine the production performance of Class II clones planted by progressive smallholders, that will be undertaken by RRIM under the project in support of the LITS initiative.

Clone Recommendations for LITS

5. The RRIM review of all Class I and II clones identified only 9 clones which, at this time, could be recommended with reasonable confidence for use with LITS. The list includes all 6 current Class I clones and 3 clones from Class II. There are agroclimatic restrictions on the use of LITS with three clones, one clone from Class I and two from Class II, because of concerns of their responses when growing in regions less favorable to vigorous growth and production. The current list of 9 clones recommended for use with LITS is as follows:

<u>Class I</u>	RRIM 600	
	RRIM 712	
	PB 217	
	PR 255	
	PR 261	
	PB 260	(with regional restrictions)
<u>Class II</u>	PB 280	
	RRIM 901	(with regional restrictions)
	PB 235	(with regional restrictions)

6. The three clones subject to agroclimatic restrictions are PB 260, RRIM 901 and PB 235. These restrictions are based on observations of increasing levels of bark dryness when the trees of these clones are growing under more stressful conditions, such as in poor and sandy soils, areas of pronounced and prolonged water deficits and possibly low soil potassium levels. Also, clone PB 235 should not be planted in wind prone areas. The RRIM will prepare an environmax map to delineate the soil type and rainfall areas of the Peninsula where the planting of these three clones for future exploitation under LITS is not recommended.

7. The remaining Class II clones which RRIM recommends to RISDA for smallholder plantings, viz. RRIM 805, 936, 937, 938, PM 10, PB 255, RRIC 100

and BPM 24, are not included in the LITS list despite their good growth vigor and high early yields, because of either insufficient information on their responses to stimulation or concerns over the incidence and levels of tree dryness with stimulation. However, until more definitive data is available on stimulation responsiveness, progressive smallholders could continue to consider these seven clones for planting on a limited basis. These smallholders could be particularly those who do not foresee tapping labor problems, who put a very high value on clone vigor, who believe they are unlikely to adopt LITS, and who are prepared to take the risks of any future problems arising with these clones.

Table 1: RRIM Clone Recommendations for Smallholders

Class	Clone	Response to Stimulation 1/	Resistance to Tree Dryness 1/
I	RRIM 600	5	5
	RRIM 712	3	3
	PB 217	3-4	4
	PB 260	4	2
	PR 255	4	3-4
	PR 261	4	3-4
II	RRIM 623	5	3
	RRIM 701	1-2	3
	RRIM 728	NA	2
	RRIM 729	NA	2
	RRIM 805	NA	3
	RRIM 901	- <u>a/</u>	2
	RRIM 905	NA	2
	RRIM 936	NA	3
	RRIM 937	NA	3
	RRIM 938	NA	2
	PB 28/59	3	1
	PB 235	3	2
	PB 254	NA	3
	PB 255	3	2
	PB 280	- <u>a/</u>	4
	PM 10	3	1
	RRIC 100	NA	3
	RRIC 110	NA	3
	Nab 17	NA	3
	BPM 24	NA	3

Source: RRIM Planters' Bulletin, Second Quarter 1992, No. 211
Scale 1 to 5: 1 poor, 2 below average, 3 average, 4 good, 5 very good

NA = Not available

a/ Results not yet published.

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Extension Intensification Program

1. Based on the prioritization of extension activities in Table 1, it is projected that RISDA's extension activities over the next ten years will cover at least 100,000 smallholders/operators annually, of which about 35,000 smallholders/operators would be new entrants into the extension fold. Of the 100,000 smallholders to be covered, about 80,000 would be under immature rubber and other crops (15,000 new every year) and about 20,000 new smallholders/operators every year under mature rubber. These numbers are based on assumptions and extension policy detailed in the following paragraphs. The term operators has been included to cover hired tappers on mature rubber holdings where smallholder owners may be absentees or unable or unwilling to work.

2. In the last few years, RISDA's annual replanting rate has been about 40,000 ha with all crops. In addition, in 1992 about 150,000 ha were under second and subsequent grant payments. Assuming about 1.73 ha per smallholder (which was the average in 1991), the total smallholders served in 1992 were about 110,000. However, about 15,000 smallholders were estimated to be under FELDA and FELCRA, and they were not given extension by RISDA. In addition, about 15% are assumed to be absentees or non-participating in active work (this figure may be a gross underestimate and needs to be verified later). The RISDA coverage was thus about 80,000 smallholders for immature rubber and other crops, of which about 15,000 were new replanters (40,000 ha of replanting divided by 1.73 and then excluding FELDA/FELCRA). If the replanting rate is 30,000 - 40,000 ha p.a., the number of smallholders covered is expected to be more or less the same as above in future years. However, if the number of absentee or non-active smallholders turns out to be much more than the assumed 15%, as it may, then the number of smallholders reached through RISDA's extension for immature rubber and other crops would be substantially less.

3. Unlike immature rubber and other crops, where the number of smallholders covered is automatically determined by the replanting rate (given the average farm size and barring the cases of absentee or non-active smallholders), it is necessary to set a target for smallholders/operators to be reached through mature rubber extension. An initial target of 20,000 new smallholders/operators every year has been derived from the proportion of extension time expected to be devoted to the extension topics of low intensity tapping and standard tapping system (Table 1). Additional smallholders would be reached every year through other extension topics and these numbers would be known at the end of the year through the new monitoring module being developed for smallholder training, but no targets would be set for these topics since the proportion of extension time and budget allocated to these is small (Table 1).

4. The initial conservative target of 20,000 new smallholders/operators every year for mature rubber is based on the following assumptions:

- (a) It is estimated that about 40 staff weeks for extension staff is available every year (that is, excluding leave, holidays, etc.) for all activities including pre-replanting campaigning, replanting inspection, input supply, infrastructure supervision, mini-estate management and extension.
- (b) There are over 1300 extension staff in RISDA. However, 114 are assigned to cooperatives. They perform management functions and are not available for other RISDA activities. Moreover, about 300 mini-estate supervisors also perform primarily management functions and have a limited extension function for smallholder participants only. Thus it is estimated that only about 1,000 staff are available for RISDA's general activities including extension.
- (c) Since at present about 50% of replanting is on individual holdings, which are scattered and sometimes very isolated, a significant proportion of RISDA staff time is spent on input supply, replanting inspection, and extension for immature rubber and other crops on individual holdings. With increasing TSB and TSS replantings, less time would be required for these activities in future and more would be available for extension for mature rubber. At this stage, it is estimated that non-extension activities of RISDA extension staff consume about 30 staff weeks a year, leaving about 10 staff weeks for extension per extension staff.
- (d) If 50% of extension time is devoted to low intensity tapping and standard tapping system (Table 1), about 5 staff weeks or 25 days per extension staff would be available for these techniques.
- (e) Method demonstration is considered the key communication method for extending technology by the extension staff. It is estimated that about half a day is required for method demonstration but another day or day and a half may be required for pre-demonstration organising activities. Thus it has been assumed that about 12 method demonstrations a year could be organised by an extension staff for low intensity tapping and standard tapping system (assuming separate target groups for each technique).
- (f) For each method demonstration, about 5 smallholders/operators are considered an optimal group. However, method demonstrations need to be repeated to the smallholders/operators at intervals for an effective transfer of technology. Thus, if it is conservatively assumed that the method demonstration needs to be repeated 3 times in the year for the same smallholder/operator group and, say, 6 method demonstrations each for the low intensity tapping technique and standard tapping system were held by each extension staff in a year, 4 groups of 5 smallholders/operators each or 20 smallholders/operators in a year could be effectively reached by an extension staff. This

means that if about 1,000 extension staff are available in RISDA, about 20,000 new smallholders/operators could be reached every year at least for the low intensity tapping technique and the standard tapping system.

- (g) The smallholders/operators reached for the low intensity tapping technique would be different from those reached for the standard tapping system but could be the same as for manuring, disease/pest/weed control, latex processing, polybag collection of latex, cooperative campaigns, PWPK, etc. Additional small numbers of smallholders would be reached through extension for upward control tapping. The coverage of RISDA's extension for mature rubber would, therefore, be actually higher than the target of 20,000, which only indicates the minimum number.
- (h) The target would be distributed among States according to the area under mature rubber and the number of extension staff available in each State.
- (i) The target would be adjusted upwards in later years as more information becomes available through the smallholder training module next year and as extension time and capability increase.

MALAYSIA
RISDA II Project
Extension Intensification Program
Prioritization of Extension Activities for 1994 - 2003

<u>Objective</u>	<u>Percentage of Extension Time & Budget to be Allocated</u>	<u>Extension Topic</u>
(a) <u>Mature Rubber</u>		
i) Increasing productivity	30% a ^j	i) Low Intensity Tapping System (including stimulation, tasking, recovery tapping, bark consumption and tapping quality)
	20% a ^j	ii) Standard Tapping System (including bark consumption, tapping quality, tasking, recovery tapping and stimulation as booster and for panel C/D only)
	10%	{ iii) Upward Control Tapping { iv) Manuring { v) Disease/Pest/Weed Control
ii) Improving processing efficiency	5%	{ i) Latex Processing { ii) Polybag Collection of Latex
(b) <u>Immature rubber and other crops</u>		
i) Decreasing immaturity period & ensuring vigorous development	25%	{ i) Pre-Planting Activities { ii) Land Preparation Technique { iii) Planting Technique { iv) Weed Control { v) Manuring { vi) Disease/Pest Control { vii) Pruning Technique/Branch Induction
(c) <u>Cooperative development and other activities</u>		
i) Supplementary income generation and smallholder entrepreneurship	10%	{ i) Cooperative Membership, Shares, Farm Management, Contract Management, and Nursery Techniques and Management { ii) Cash Cropping { iii) Small Industries { iv) PWPK { v) Hedgerow Planting and any other experimental activities

a^j This is the expected approximate proportion in year 1997. In years 1994-97, low frequency tapping extension will gradually increase from about 5 to 30% as it spreads from mini-estates to TSBs to TSSs and individual holdings (see Table 2). Standard tapping system extension will correspondingly decline from about 45% in 1994 to 20% in 1997 and onwards.

MALAYSIA
RISDA II PROJECT
EXTENSION INTENSIFICATION PROGRAM
PHASING OF THE 10-YEAR EXTENSION PROGRAM

	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997</u>	<u>1998</u>	<u>1999</u>	<u>2000</u>	<u>2001</u>	<u>2002</u>	<u>2003</u>
(a) <u>Mature Rubber</u>										
i) Low Intensity Tapping System (LITS)										
(a) Mini-Estates	* a ¹	* b ¹	* c ¹	*	-	-	-	-	-	-
(b) TSBs (D3 or D4)	-	* d ¹	* e ¹	*	*	*	*	*	*	*
(c) TSSs/Individual Holdings (D3 or D4)	-	-	* e ¹	*	*	*	*	*	*	*
ii) Standard Tapping System	*	*	*	*	*	*	*	*	*	*
iii) Upward Control Tapping	*	*	*	*	*	*	*	*	*	*
iv) Manuring	*	*	*	*	*	*	*	*	*	*
v) Disease/Pest/Weed Control	*	*	*	*	*	*	*	*	*	*
vi) Latex Processing	*	*	*	*	*	*	*	*	*	*
vii) Polybag Collection of Latex	*	*	*	*	*	*	*	*	*	*
(b) <u>Immature Rubber and Other Crops</u>	*	*	*	*	*	*	*	*	*	*
(c) <u>Cooperative Development and Other Activities</u>	*	*	*	*	*	*	*	*	*	*

* means extension program will be undertaken.

- means extension program not undertaken.

a¹ Testing of D3 on selected mini-estates. The program began around mid-1993.

b¹ Adoption of LITS with D3 and D4 tapping frequency on several mini-estates and testing of lower frequencies on a small number of selected mini-estates.

c¹ Adoption of LITS with D3 and D4 on all mini-estates affected by tapper shortages and continued testing of lower tapping frequencies.

d¹ A few large TSBs with tapper shortage to be selected for a pilot program.

e¹ A few TSSs with tapper shortage to be selected for a pilot program.

Note: Only D3 and D4 have been covered above since these technologies can be readily implemented on a large scale. D5 and D6 will only be tested on a pilot scale during the RISDA II project period (1994-1996). Should other new technologies become available in the future, they would also become part of the extension program.

MALAYSIA

RISDA II PROJECT

RRIM Research Component

1. The RRIM will pursue five research studies under the project, including four experimental programs and a survey, all supportive in various ways of project long term objectives of improving the performance of smallholder rubber and the economic condition of the smallholders. Four of the studies are concerned with clone performance particularly in relation to LITS technology; of these, two are concerned with the production performance of Class II clones and should yield significant information within the project period; and two are longer term, more fundamental researches on physiological and biochemical parameters of rubber production linked to yield performance with stimulation. The fifth study is a long term experiment on mixed cropping systems with tree crops involving rubber. Details of the proposed studies follow.

Study 1: The Responses of Class II Clones to LITS Technology

2. Current RRIM clone recommendations do not address the suitability of the clones for LITS with stimulation. Further, RRIM has very few test results on responses of their recommended clones to this type of exploitation, particularly of Class II clones, and thus is not in a position to provide strong guidance in this matter for intending replanters. With LITS identified as the technology of the future for rubber exploitation, it is imperative to provide clone planting guidelines in respect to LITS as a matter of urgency. Low frequency tapping with stimulation trials will be conducted in four different agroclimatic regions, including dry northern and wet eastern regions, on at least 7 of the most promising recommended clones but up to a total of 12 clones if facilities are available. Of the 7 clones, two are from Class I (RRIM 712 and PB 260) and 5 are Class II (RRIM 901 and 937, PB 235 and 280, and PM 10). The additional 5 clones, all Class II, make up the balance of Class II clones that RRIM currently recommends to RISDA for smallholders, namely RRIM 936 and 938, PB 255, RRIC 100 and BPM 24. The clones would be evaluated over three years in replicated treatments of at least 20 trees per treatment. The trials would test the clone responses to third, fourth and sixth daily tapping with 2.5% ethephon stimulation applied 6,8, and 12 times/year respectively, on virgin and renewed bark. The controls would be alternate or third daily tapping without stimulation.

Estimated Cost MR 0.70 million

Study 2: The Production Performance of Class II Clones on Smallholdings

3. Progressive smallholders have been planting Class II clones from the early eighties largely on the basis of their attractive and sometimes precocious yields in RRIM large scale clone trials. Many of these plantings are now in tapping. An extensive survey, based on RISDA replanting records, will be conducted over three years to determine the performance of these

clones under smallholder conditions with a view to determining their current suitability for smallholder planting. The main assessments, based on small farmer information and records where available, will be on yield and incidence of tree dryness in relation to tapping system and agroclimatic conditions.

Estimated Cost MRO.24 million

Study 3: Physiological/Biochemical Parameters of Tree Stress to Stimulation

4. Over stimulated trees go into a yield decline and develop bark dryness. The purpose of this research program is to identify physiological and biochemical parameters indicative of the health of trees in tapping and particularly in conjunction with the use of stimulant that could be used to develop a tree health monitoring system. In particular, it would be used as an early warning indicator of impending stressed physiological functions and tree dryness. The study will involve regular measurements of levels and ratios of various (12 cited) tree physiological factors and biochemical constituents of latex and their changes in trees under fairly intensive tapping with stimulation. The study would be conducted on 50 to 100 trees of one or possibly two clones sensitive to stimulant - induced dryness and exploited intensively, with samplings about every month.

Estimated Cost MRO.44 million

Study 4: Nutritional Aspects of Tree Dryness

5. This study aims to better define clone suitability for low frequency tapping with stimulation with a focus on nutritional factors that have been linked with the occurrence of tree dryness and pre-coagulation of latex on the tapping cut. The study, carried out over three years, will focus on the influence of foliar levels of the macroelement potassium, which is believed to affect latex flow properties, and the microelement copper which at low levels might predispose trees to dryness. It will involve the application of various quantities of potassium and copper nutrients to trees of two clones recommended for LITS, including PB 260 in which latex flow has been observed to be sensitive to potassium levels, with about 12 field trials on the same soil type in two distinctive climatic regions and tapped third daily with stimulation. Observations will be made on yield performance, dry rubber content, tapping cut pre-coagulation and incidence of tree dryness in relation to foliar and latex nutrient levels.

Estimated Cost MRO.23 million

Study 5: Mixed Cropping of Rubber with Fruit Trees

6. The growing of rubber as a monocrop on very small holdings is at best marginally economic, generally generating an income below the poverty level for the holders and leaving them exposed to fluctuations of the commodity markets. The situation is exacerbated by the long gestation period of rubber after planting. The objective of this research program is to identify mixed tree cropping systems based on rubber as the main component with various varieties of fruit trees, which would be sustainable and enhance

the long term economic returns of these smallholders. The systems involve planting the rubber in widely spaced hedge rows at 80% of the normal tree/ha density and filling the interrows with fruit trees, such as durian, chempedak and duku, in various arrangements and combinations. A number of rubber clones would be included to gauge the effect of rubber canopy structure on cropping performance of the systems. The experiments which would be long term and encompassing at least 10 years of rubber production, would be established at six sites in six different agroclimatic regions. Evaluations would include agronomic requirements of the crops, the agro-economic compatibility of the mixtures, crop economic returns and labor requirements.

Estimated Cost MR1.0 million

7. The total estimated cost of the RRIM research component of the project is MR2.61 million.

MALAYSIA

RISDA II PROJECT

Introduction of Low Intensity Tapping Systems (LITS)
for Rubber Exploitation

1. Increasing labor shortage is adversely affecting the rubber plantation sector in Malaysia, causing large areas of mature rubber to remain untapped. It is currently estimated that about 20% of individual rubber smallholdings are abandoned and that as much as 20% of tapping tasks may be lost on RISDA mini-estates due to the lack of tappers. Labor requirements for rubber exploitation, however, can be reduced by using low intensity tapping systems (LITS) which combine a reduction in tapping frequency with chemical yield stimulation. Starting from the time of opening, trees are tapped every third day (d/3), fourth day (d/4) or at even longer intervals (d/5, d/6) in place of the traditional alternate daily (d/2), while Ethrel stimulation is applied at frequent intervals to maintain yields. The adoption of lower tapping frequencies reduces the number of tappers required (by 33% with d/3, 50% with d/4 and more with d/5 or d/6). It also reduces bark consumption, thus extending the economic life of the trees. Labor productivity increases, tapping costs decrease and the overall profitability of rubber exploitation is improved. This labor saving technology is not new. It has been successfully used on a large scale by estates and smallholders for over 20 years in West Africa and has been introduced in Malaysia in 1991 by FELCRA under the Bank financed Second and Third FELCRA projects (Loans 2917-MA and 3484-MA) to overcome increasing labor shortages. Under the proposed RISDA II project, LITS would be evaluated and progressively introduced in RISDA rubber mini-estates.

Program of Introduction of LITS

2. Experience has shown that, although LITS appears simple in principle, its successful implementation requires high management inputs, close coordination and monitoring, and good tapping quality, in view of the risks of damage to the trees through the uncontrolled use of stimulation. LITS therefore is not suitable for individual smallholders without adequate training and close supervision, and it was agreed with RISDA that, under the proposed project, LITS would only be introduced in mini-estates according to the following phased program:

- a. during the first year, RISDA would test LITS (mainly d/3) in a small number of mini-estates selected in different agro-climatic regions;
- b. during the second year, RISDA would introduce LITS (d/3 and d/4) in suitable mini-estates for large scale evaluation, and test the use of lower frequencies (d/5, d/6); and
- c. during the third year, depending on the results of the first two years' evaluation, RISDA would decide on the general introduction of LITS (mainly d/3 and d/4) in all mini-estates facing labor shortage.

Evaluation of LITS

3. Selection of Mini-Estates. Seven mini-estates were selected during appraisal in Kedah, Pahang, Negeri Sembilan and Terengganu for the initial evaluation of LITS, based on the following criteria: labor shortage or possibility to reduce tappers' number without creating social problems, good control of tappers by RISDA supervisor, good tapping quality, absence of severe leaf disease, latex collection for reliable recording of production and easy access to facilitate monitoring. Other pre-selected mini-estates were found to be unsuitable due to no labor shortage and severe leaf disease (Darat Lintang), insufficient control of tappers (Batu Papan), poor tapping quality (Tebak, Kuala Kepis), insufficient girth of trees at opening (Seginyeh), and difficult monitoring of production due to cuplump collection (Bukit Gelugor, Lapang Sawa). The difficulty of identifying suitable mini-estates for the initial evaluation of LITS clearly demonstrates that, in view of the current lack of experience of RISDA staff with the technology, LITS should only be tested in the seven selected mini-estates during the initial evaluation phase.

Table 1: Mini-Estates Selected for the Evaluation of LITS

State	Mini-Estate	Tapping Area (ha)	% Tasks Area Lost *	Tapping Panel	Tapping Quality	Yield in 1992
PAHANG	Bukit Penak	126	27	BO 1 BO 2	Good	Medium
	Bukit Rok	63	37	BO 1 BO 2	Good	High
NEGERI-SEMBILAN	Ampang Tinggi	-	-	BO 1 at opening	-	-
KEDAH	Telaga Batu	148	41	BO 1	Very Good	Not Avail.
	Rimba Teloi I	63	30	BO 1 BO 2	Good	High
	Bukit Paya Merbau	84	65	BO 2	Very Good	Low
TERENGGANU	Pancur Buloh	158	38	BO 1	Good	Medium

* due to rain or lack of tappers (in 1992)

4. Detailed Guidelines. The third daily (d/3) tapping frequency combined with stimulation would be established in six mini-estates and compared to d/2 in three of those, while the fourth daily tapping frequency (d/4) combined with stimulation would be compared to d/2 in one mini-estate (Table 2). Stimulation would be applied using Ethrel at low concentration, with a frequency ranging from four to six times per year with d/3, and eight times with d/4, depending on the age of the trees and the panel exploited (see Table 1 and detailed guidelines in Appendix 1). To monitor the performance of d/3 and d/4 as compared to d/2, the

production of each task (kg of dry rubber) would be recorded for each tapping day. Daily production data would be reported on a monthly form to be sent each month to the LITS Coordinator in HQ.

Table 2: Guidelines for LITS Evaluation

State	Mini-Estate	Total Tasks	Tapping Frequency (6d/7)	Stimulation Frequency	Number of tasks	Number of tappers
PAHANG	Bukit Penak	120	d/2	No stim.	80	40
			d/4	8/year	40	10
	Bukit Rok	48	d/3	6/year	48	16
NEGERI-SEMBILAN	Ampang Tinggi	32	d/2	No stim.	20	10
			d/3	4/year	12	4
KEDAH	Telaga Batu	60	d/3	4/year	60	20
	Rimba Teloi I	40	d/2	No stim.	28	14
			d/3	6/year	12	4
	Bukit Paya Merbau	48	d/3	6/year	48	16
TERENGGANU	Pancur Buloh	84	d/2	No	72	36
			d/3	6/year	12	4

Requirements for Successful Introduction of LITS

5. Adoption of Full Technology Package. The LITS labor saving technology is a package comprising four inter-related components. These should be simultaneously implemented to ensure the successful introduction of LITS:

- a. Use of Stimulation. The use of stimulation with lower tapping frequencies is aimed at maintaining, and not increasing d/2 production levels. The long term adverse effects of excessive stimulation on yield have been well demonstrated and the use of stimulation in Malaysia has been largely restricted to old trees until recently. In the last few years, however, the estate sector has started using stimulation combined with reduced tapping frequency but only on trees already tapped for several years. To avoid possible confusion about the objectives of stimulation with LITS, RISDA should not promote stimulation as a means of increasing production, while simultaneously introducing LITS. In particular, stimulation should not be used on a regular basis to boost yields when combined with high tapping frequencies (more than 10 tappings/month or 100 tappings/year). Guidelines for the amount, method and frequency of stimulation with LITS should be strictly followed, as any deviation would result either in possible long-term damage to the trees or lower production.

- b. Control of Tapping Quality. The use of stimulation requires good tapping quality as the application of Ethrel on tapping wounds would damage the trees and jeopardize their future production potential. Wherever tapping quality is poor, it should be improved before introducing LITS and then systematically monitored. In view of the difficulty of controlling tapping quality under contract tapping, RISDA should not introduce LITS in rubber mini-estates contracted out for tapping.
- c. Appropriate Tappers' Payment System. Under the current RISDA share system, both tappers and owners would benefit from the productivity gains which are expected with LITS and could amount to an increase in production per tapper per day of up to 50% with d/3, as compared to d/2. When introducing LITS, however, RISDA should adjust the crop sharing ratio accordingly to avoid large differences between incomes of tappers with d/2 and d/3 on the same or between neighboring mini-estates, which could cause serious social problems.
- d. Field Monitoring. The intensity of stimulation to be applied with LITS depends on the age, condition and yield level of the trees, as well as on local agro-climatic conditions, which vary and need to be frequently reassessed. Field visits are therefore required before deciding on the implementation of LITS and determining the specific regime of stimulation to be applied. During implementation, field conditions should be closely monitored so that the regime of stimulation can be adjusted to suit changing conditions.

6. Other Technical Aspects of LITS:

- a. Effect of LITS on Rubber Grades. The application of stimulation causes latex to flow for a longer time (late drip). If the time of collection remains unchanged when applying stimulant, a lower proportion of the rubber will be collected as latex and quantities of cuplump will increase as compared to d/2. The late drip will become particularly pronounced with the more intense stimulation regime associated with the lower tapping frequencies (d/4, d/5 and d/6). Collection, processing, and marketing arrangements should therefore be reviewed when implementing LITS to take into account the different proportions in the types of raw rubber produced.
- b. Use of Suitable Clones for LITS. The effects of stimulation on yields vary between the clones depending on their physiological characteristics. Some clones are known to respond well to stimulation and are suitable for LITS (RRIM 600, PB 217). Others do not respond well to stimulation or are prone to bark dryness, and therefore are less suitable for LITS. Specific tapping frequencies and stimulation regimes are required for such clones. It may therefore be difficult, and in some cases impossible, to implement LITS in areas planted with a mixture of clones responding differently to stimulation. To enable smallholders to fully benefit from the technology in the future, RISDA should ensure that, from now, only monoclonal fields are established with suitable clones for LITS.

7. Central Coordination. It was noted at appraisal that, following recent instructions from RISDA Headquarters, field officers were making preparation, and sometimes had already started, to implement LITS in a few mini-estates. There seemed to be some confusion regarding the concept and objectives of LITS and particularly the role of stimulation, the amounts of stimulant to be applied, frequencies and methods of application. Thus, given the current inexperience of RISDA staff with LITS implementation, the introduction of LITS should be progressive after an initial testing phase and strong central coordination would be required. RISDA should appoint a full time coordinator at Headquarters, with clear authority on the technical aspects of LITS, assisted in every State by a field officer responsible for the introduction of LITS in that State. The coordinator should prepare general implementation guidelines, visit every mini-estate before finalizing detailed implementation arrangements based on local conditions, and closely monitor the performance of LITS. To this end, RISDA should make the appropriate budgetary allocations to enable the LITS coordinator to visit each mini-estate selected for the evaluation of LITS every three months. Annual monitoring budget requirements are estimated around M\$5,000 in year 1, and M\$10,000 in years 2 and 3.

8. Training of Staff and Tappers. Experience with LITS in and outside Malaysia has shown that most implementation problems occur due to an incomplete understanding of the technology, with participating managers and staff often implementing part of the package only and failing to realize that all four components are required for successful implementation. RISDA should therefore organize the training of all managers and supervisors of mini-estates concerned before testing and later introducing LITS. Given the critical importance of good tapping quality for LITS, RISDA should also seek to organize the systematic training of tappers to upgrade their tapping skills.

Conclusion

9. The experience gained with the recent successful introduction of LITS by FELCRA in Malaysia and twenty years' overseas experience with the technology, clearly shows that the successful introduction of LITS in RISDA rubber mini-estates over the project period of three years will require the full commitment of RISDA senior management and close coordination and field monitoring by RISDA Headquarters technical staff. It is important that RISDA does not underestimate the difficulties of implementing LITS successfully at the field level. Moreover, given the past negative experience with stimulation in Malaysia, RISDA should at this time only promote the use of stimulation combined with LITS in mini-estates according to a single, well focussed program and not on individual smallholdings.

Guidelines for Application of Stimulant

1. Stimulant. Use only ETHREL ready mix at 2.5% concentration, as Ethrel at 5% concentration is not viscous enough, when diluted to 2.5% concentration with water. Dilution with palm oil is unstable. Other brand names than ETHREL should be avoided until more complete information is available on their suitability.
2. Quantity. Stimulant should be prepared for one task (550 to 600 trees), based on 0.7 to 0.8 gram/tree, on panel BO-1 or BO-2 (about 450 ml/task), and 0.9 to 1 gram/tree on panel BI-1 or BI-2 (about 500 ml/task).
3. Application. Panel application on at least 1 cm of renewing bark just above the tapping cut. No lace removal. Brush should be held horizontally. Stimulant should not be applied on tapping wounds. Stimulant should be applied on all the trees of the task, with large trees receiving more stimulant than small trees. The stimulant should be applied by a specialized team at the rate of 2 tasks or about 1,100 to 1,200 trees per man/day. Each application should be closely controlled by supervisor.
4. Frequency. Should be adapted to clone and year of tapping (panel, position of the cut on the panel and tapping frequency). The frequencies of stimulation shown in Table 1 are recommended for downward tapping with less than 10 tappings per month or 100 per year, clones GT 1 and RRIM 600, trees with a good quality of tapping, ETHREL at 2.5 %, panel application of 0.7 to 1 g/tree on 1 cm.

Table 1: Frequency of stimulation

Year of tapping	Panel	d/3	d/4
1	BO-1	4/y	6/y
2	BO-1	5/y	7/y
3 to 5	BO-1	6/y	8/y
6 to 12	BO-2	6/y	8/y
12 to 24	BI-1, BI-2	8/y	10/y

5. Schedule of Applications. Stimulation should be applied outside the wintering period and, in the East coast (Terengganu), outside the heavy rainy season. The first stimulation should be done as soon as possible after complete refoliation, then every one, one and a half or two months. The application should be done two or three days before the tapping day. If rain comes less than one hour after stimulation, stimulant must be reapplied.

Table 2: Schedule of stimulation

Month	1	2	3	4	5	6	7	8	9	10	11	12
4 stim/y	1					1			1		1	
6 stim/y (Terengganu)	1					1	15		1	15		1
	1					1	1	1	1	1		
8 stim/y	1					1	1	1	1	1	1	1

Note: 1 means beginning of the month and 15 means middle of the month.

MALAYSIA

RISDA II PROJECT

RISDA'S Mini-Estates in Production

Production and Financial Aspects

1. RISDA's mini-estate program, started in 1979 based on the estate system of production which has been so successful for tree crops in Malaysia, aims to bring the benefits of estate-type technology and management systems to smallholders. Each mini-estate is a legal entity formed by RISDA with the consent of the owners of a number, often large and averaging about 50, of contiguous or near contiguous individual small farms which at the time were in need of replanting. With agreement of the farm owners' committees, RISDA undertakes replanting of the mini-estates with modern high yielding varieties of rubber or oil palm, maintains the plantings through immaturity, brings them into production and harvests and sells the crop for the benefit of the owners. Development costs over and above replanting grants, but excluding investments in infrastructure, are charged as loans to the individual farmers in proportion to the land area contributed by each of them to the mini-estate. The loans are to be repaid from net proceeds of production. At full loan repayment, RISDA is expected to return the land titles held under lien to the owners with the assumption that they would retain their mini-estate structure and integrated management system for the economic benefits of scale and better levels of technology. However, apart from the transfer of two mini-estates to ESPEK management and one to a cooperative, no action plan is in place. So far 10 mini-estates are loan free. Government policy for smallholder development is that the integrity of the mini-estates should be maintained as they represent more efficient production units than individual smallholdings. However, many participants of mini-estates in production and particularly those working on them, are confronting the RISDA position by taking over harvesting of the crop on their individual holdings for their own account. Absentee farmers probably generally prefer long term RISDA management and a routine monthly dividend check.

2. In the early years of the mini-estate program, the development phase was perceived as a relatively straightforward operation for RISDA and there had been little concern for the management of harvesting. At preparation of the RISDA I project in 1987, it was clear that major problems had been experienced in the development phase as evidenced by high land development costs which would compromise future benefits of the program. Therefore, under the institutional strengthening activities of that project, a recommendation was made for the curtailment of the mini-estate program. In early 1989, RISDA decided to de-emphasize mini-estate formation in favor of group (TSB) and simultaneous individual (TSS) replanting arrangements. The last mini-estate was established in 1990.

3. Working Paper No. 2 of the Appraisal Report for RISDA I project (Loan 3139-MA) analyzed the achievements of the mini-estate program up to the end of 1987. Details were provided on the physical progress of the program (number, area, distribution by State, crop, number of participants), production performance, and the status of development loans. At that time,

there were 340 mini-estates covering 37,265 ha with 77% of the area planted with rubber and the balance with oil palm. A total of 101 mini-estates were in production but yield levels, especially of rubber, were low. Total development costs were M\$197 million and RISDA carried a portfolio of M\$146.6 million of development loans.

4. This Annex briefly updates the overall status of the mini-estate program and then proceeds to analyze the performance of mini-estates in production, as at the end of 1992, focussing particularly on crop yields and financial aspects. The impact of changing management arrangements are also discussed and there are some comments on the quality of RISDA's data base.

Total Program Performance

5. Number and Area of Mini-estates. For the period 1979-1990, RISDA developed about 390 mini-estates with a total area of about 41,800 ha. Details given in Table 1 are best estimates of achievements. There are many inconsistencies in RISDA's data bank and even the actual total size of the program is not clear. There are also difficulties with the figures on the number of mini-estates in development and in production.

Table 1: Mini-Estates: Number, Area and Participants (As of End-1992)

	Rubber	Oil Palm	Total
No. of ME	312	78	390
Area (ha)	33,000	8,800	41,800
Ha/ME	106	113	107
No. of Participants	17,500	4,500	22,000
Ha/Participant	1.89	1.96	1.90
No. of ME in development	102	5	107
Area (ha)	8,980	260	9,240
% of Total ME Area	26%	3%	22%
Apparent Area (ha) in Production	24,020	8,540	32,560

About 33,000 ha (79% of the total mini-estate area) is planted with rubber and the balance of 8,800 ha (21%) planted with oil palm. Most mini-estates are monocrop but there are about 5 planted with both crops to take better advantage of soil types. The program has about 22,000 participants, each contributing on average 1.9 ha of land. By States, Pahang has the largest mini-estate area in rubber (7770 ha, 24% of the national total), with Terengganu and Kedah accounting for a further 12,500 ha (39%). Johor has the largest area of oil palm (2,870 ha, 33%) with Terengganu and Perak having a further 2,590 ha, 30%). At the end of 1992, RISDA reported that 107 mini-estates totalling 9,240 ha were in the development stage, 26% of the total

mini-estate area in rubber and 3% in oil palm. The balance area of 32,560 ha should therefore be in production but this figure does not match that provided by RISDA for the analyses of this paper. Discrepancies may arise from confusion over mini-estate names, development failures or the elimination from production records of some mini-estates which are no longer under RISDA management.

6. Costs and Loan Balances. Total development costs of mini-estates include the costs of land preparation, planting and crop maintenance during immaturity, and where provided, the costs of income support programs of the early to mid-eighties for participants and their families. Grant expenditures used for mini-estate infrastructure are not included. Loans to cover the development costs were provided net of replanting grants which were M\$3,735 per ha for rubber and M\$2,988 for oil palm in 1979-80 and M\$5,436 per ha for rubber and M\$3,707 per ha for oil palm until 1991. Total development costs and loan balances as at the end of 1992 are given in Table 2. For mini-estates in development, the costs are interim in that full costs and loan requirements are only determined when crops are ready to come into production and the development accounts closed. Development costs shown for mini-estates in production, on the other hand, are full costs; loan balances are net of the M\$15.85 million of repayments from production revenue (para 9).

Table 2: Mini-Estates - Development Costs and Loan Balances at End 1992
(M\$ million)

	<u>Development Costs</u>		<u>Loan Balances</u>	
	Total	Per Ha	Total	Per Ha
<u>ME in Development</u>				
Rubber	49.8	5,550	17.1	1,900
Oil Palm	0.8	2,910	0.2	920
Sub-Total	50.6	5,470	17.3	1,870
<u>ME in Production</u>				
Rubber	230.0	10,400	106.1	4,800
Oil Palm	67.0	8,200	31.0	3,810
Sub-Total	297.0	9,800	137.1	4,530
Total	347.6		154.4	

The estimated total cost to date of mini-estate land development, including the discontinued family income support program, approaches M\$350 million, while the total loan amount assumed by the smallholders is M\$154.4 million, equivalent to M\$7,013 per participant. Of this loan amount, 89% (M\$137.1 million) is attributable to mini-estates in production. It was earlier estimated that a further M\$50 million of loan could be required to complete the mini-estates still in the process of development. Loan levels would, however, be lowered by the recently announced 13-14% increases in replanting grants to be paid retroactively from the beginning of 1991.

Performance of Mini-estates in Production

7. The analysis is based on RISDA data which gives details for 269 individual mini-estates for crop type, area, number of participants, original development loan, family income support payments, net operating costs, dividends paid, loan repayments, loan balance and crop production for each year of harvest.

8. Number and Area of Mini-estates. At the end of 1992, 269 mini-estates were in production, 69% of all mini-estates. Their total area was 30,240 ha, 74% of the total mini-estate area. There were 198 mini-estates planted with rubber and 71 planted with oil palm, and there was a total of 15,226 participants (Table 3).

Table 3: Mini-Estates in Production at End 1992 a/

	Rubber	Oil Palm	Total
Number of ME	198	71	269
Total area (ha)	22,094	8,146	30,240
No. of Participants	10,896	4,330	15,226
Ha/ME	112	115	112
Ha/participant	2.03	1.88	1.99

a/ As explained in para. 5, there are inconsistencies of data in this Table and Table 1.

9. Development Costs and Loans. Table 4 shows the original totals of development and income benefit loans provided by crop to the 269 mini-estates in production and the current total outstanding amounts. All mini-estates except four in oil palm started out with development loans while about 138 (52%) of these 265 estates also incurred loans for family income support. Loans for income support totalled about 6% of the land development loans in rubber but 22% in oil palm. Estimated total development cost of all mini-estates in production was M\$297 million, made up of M\$10,400 per ha for rubber and M\$8,200 per ha for oil palm, against which there was a replanting grant credit of M\$145 million. The M\$15.85 million of repayments has reduced the outstanding total loan to M\$137.1 million with the average loan amount now M\$4,850 per ha for rubber and M\$4,072 for oil palm. One rubber estate and five oil palm estates have repaid their loans in full, making a total of 10 mini-estates now loan free. The better repayment performance of the oil palm estates, 20.9% of the original loan amount, as against 6.7% for rubber, reflects their shorter immaturity period and relatively better production performance as measured against appraisal yield profiles (para. 16).

**Table 4: RISDA Loans to Mini-Estates in Production at End 1992
(M\$ million)**

	Rubber	Oil Palm	Total
No. of ME originally with loans	198	67 ^{a/}	265
Total Area (ha)	22,094	7,840	29,934
Total No. of participants	10,896	4,185	15,081
Original Total Development Loan (M\$ mil)	107.039	32.038	139.077
Income Benefit Loans (M\$ mil)	6.654	7.179	13.833
Original Total Loan Amount (M\$ mil)	113.693	39.217	152.910
Total Loan/ha (M\$)	5,146	5,002	5,108
Loan Repayments (M\$ mil)	7.643	8.207	15.850
% Repaid	6.7%	20.9%	10.4%
Total Loan Balance (M\$ mil)	106.050	31.010	137.061
No. of ME with Loan Balance	197	62	259
Total Area (ha)	21,866	7,615	29,661
Total Participants	10,876	3,949	14,825
Loan Balance/ha (M\$)	4,850	4,072	4,621
Loan Balance/participant (M\$)	9,751	7,853	9,245

^{a/} Four oil palm mini estates did not take development loans.

10. Loan Amounts. Table 5 reports on the distribution of loans by amount per hectare. Mini-estates with the highest levels of loan are identified. Although the average loan level per hectare is not dissimilar for the two crops (Table 4), there is a bigger number of smaller loans for oil palm than for rubber (69% of less than M\$5,000 per ha as against 50% respectively). More than a third of all loans to rubber is M\$5,000-7,500 per ha which is a high debt load. There is a small but similar number of loans for rubber and oil palm which is even in excess of M\$10,000 per ha. Overall, the loans assumed by many mini-estates are excessive in view of the fact that they are net costs after replanting grant credits which assume total development costs of not more than M\$5,000-6,000 per ha for oil palm and M\$6,500-M\$7,500 per ha for rubber. High costs could be the result of many factors but do suggest inter alia development of marginal lands and some rather low developmental efficiency. The loan burdens are going to greatly compromise the potential crop profits of many smallholders.

Table 5: Mini-Estates: Distribution by Loan Size (M\$/ha)

Loan (M\$/ha)	No. of ME	Area (ha)	% by Area
<u>Rubber Mini-Estates</u>			
0	1	48	0
1-999	14	936	4
1000-2999	54	5,202	23
3000-4999	42	5,062	23
5000-7499	60	7,947	37
7500-9999	21	2585	11
10000 and above	7	541	2
Total ME	198	22,094	
<u>Oil Palm Mini-Estates</u>			
0	9	531	7
1-999	16	1,420	18
1000-2999	28	2,839	36
3000-4999	6	617	8
5000-7499	5	1,552	20
7500-9999	1	102	1
10000 and above	5	821	10
Total ME	71	8,146	
<u>Highest Loans per ha for Rubber ME</u>			
M\$15,182 Bukit Perah, N.S.			
M\$12,845 Kg. Makam Mahsuri, Langkawi, Kedah			
M\$12,659 Pasir Kemudi, Pahang			
<u>Highest loans per ha for Oil Palm ME</u>			
M\$12,121 Lamir 1, Pahang			
M\$11,739 Cermin Kanan II, Trengganu			
M\$10,916 Cermin Kanan 1, Trengganu			

11. Cumulative Operating Losses. An analysis of the net balances of the mini-estate operating accounts revealed a high incidence of net operating losses for both rubber and oil palm estates. No less than 74 rubber and 24 oil palm mini-estates, 39% and 49% of their respective total numbers, were burdened with such losses at the end of 1992. The magnitude of the losses and some other relevant analyses are shown in Table 6. In both cases, data for the mini-estates with a positive net operating balance are included for comparison.

12. Cumulative operating losses for mini-estates in this category are high, having reached a total of M\$26.3 million (M\$18.6 million for rubber and M\$7.7 million for oil palm), and average about M\$2,000 per ha. Many of the

Table 6: Financial Condition of Mini-Estates at end 1992

	ME with Cumulative Operating Profits	ME with Cumulative Operating Losses
<u>Rubber Mini-estates</u>		
No. of ME	124	74
Area (ha)	13,474	8,620
% by area	61%	39%
No. of Participants	6,886	4,010
Ha/participant	1.96	2.15
Cumulative Net Operating Profit (Loss) (M\$ million)	10.351	(18.599)
Profit (Loss) per ha (M\$)	768	(2,158)
Total Dividends Paid (M\$ million)	5.426	1.787
Dividend/ha (M\$)	403	207
Total Loan Repaid (M\$ million)	5.442	2.200
Loan/ha (M\$)	404	255
Loan Balance (M\$ million)	59.105	46.944
Add Net Operating Loss (M\$ million)	0	18.599
Total Debt (M\$ million)	59.105	65.543
Loan Balance/ha (all MEs) (M\$)	4,387	5,446
Loan Balance/ha (MEs with Loans) (M\$)	4,399	5,446
Total Debt/ha (M\$)	4,399	7,604
Total Debt/participant (with loans) (M\$)	8,622	16,345
<u>Oil Palm Mini-estates</u>		
No. of ME	47	24
Total Area (ha)	4,160	3,986
% by area	51%	49%
No. of Participants	2,536	1,794
Ha/participant	1.64	2.22
Total Net Operating Profit (Loss) (M\$ million)	7.960	(7.667)
Profit (Loss) per ha (M\$)	1,913	(1,923)
Total Dividends Paid (M\$ million)	8.122	0.527
Dividend/ha (M\$)	1,952	132
Total Loan Repaid (M\$ million)	6.182	2.025
Loan Repaid/ha (M\$)	1,486	508
Loan Balance (M\$ million)	9.154	21.859
Add Operating Loss (M\$ million)	0	7.667
Total Debt (M\$ million)	9.154	29.526
Loan Balance/ha (all MEs) (M\$)	2,200	5,484
Loan Balance/ha (MEs with loans)	2,522	5,484
Total Debt/ha (M\$)	2,522	7,407
Total Debt/participant (with loans) (M\$)	4,248	16,458

estates are running losses far in excess of this average figure. Modest annual operating losses are a normal feature of the early production years of both crops and cumulatively may persist for a further two years or so. But the level of the reported losses raise some serious questions on mini-estate performance, or alternatively, the validity of the data. The magnitude of some of the losses has prompted RISDA to first look into the accuracy of its data base and whether mini-estate managers have mixed development and operating costs in their data submissions. The matter has yet to be resolved. Despite production losses, participants of loss-making mini-estates have received dividends amounting to some M\$2.3 million. This arises from RISDA's practice of assessing monthly dividends on the individual monthly returns, not taking into account prior net operating losses. The practice, unfortunately, sends false signals to participants on the financial condition of their enterprises. Loss making estates have managed to repay M\$4.225 million of their loans, these payments being handled on the same monthly basis as dividends. Table 6 indicates that the average participant holding is higher in loss-making estates of both rubber and oil palm, and that the average per hectare loan balance for these estates is considerably higher than for the profit making units. Adding operating deficit to the development loan amounts raises the average debt load for both crops to over M\$7,000 per ha and to over M\$16,000 per participant.

13. Table 7 provides information on mini-estates with a cumulative net operating loss of more than M\$1,000 per ha. The 32 rubber and 10 oil palm mini-estates concerned have accumulated average operating losses of M\$5,872 and M\$3,010 per ha respectively. These amounts, added to development loans, raise total debt to a very high level with the prospect that the debt will never be paid off.

Table 7: Mini-Estates with Cumulative Net Operating Losses Above M\$1,000/ha

	Rubber	Oil Palm
No. of ME	32	10
Total Area (ha)	2,794	2,183
Net Operating Loss/ha	M\$5,872	M\$3,010
Add Loans/ha	M\$5,428	M\$6,283
Total Debt/ha	M\$11,300	M\$9,293
Worst Cases (Total Debt/ha)	Kg. Makam Mahsuri, Langkawi, Kedah M\$26,052/ha	Bukit Betong, Pahang M\$13,889/ha

Owner Management Take-overs

14. Under the mini-estate agreements, RISDA would manage the mini-estates until the development loan has been fully repaid. In practice a very different situation is emerging with an increasing number of owners, individually or as groups, assuming the management of their lands in place of RISDA. Essentially, they take over crop harvesting and sell the product for their own account. As of end 1992, the managements of 46 of the 269 mini-estates in production had reverted to participants even though in all cases, there is an outstanding loan balance. Of this total, 45 mini-estates are in rubber (23% of rubber mini-estates in production) and one in oil palm, the disparity reflecting the ease of transporting and selling rubber to private traders as compared to oil palm fresh fruit bunches. It is reported that the situation is worsening as more owner groups see the opportunity for control in face of RISDA's apparent inaction. RISDA, however, is seeking legal redress.

15. Loan Status and Management Arrangements. The quality of RISDA's loan portfolio could be seriously compromised by owner harvesting as it denies the agency its mechanism for receiving regular loan repayments. Tables 8 (rubber) and 9 (oil palm) compare the loan status of mini-estates under owner and RISDA management. For rubber, the total loan balance at risk is M\$23.8 million and debt on a per hectare as well as participant basis is high though it is less than for mini-estates with RISDA management. Although there is no apparent link between loan size and the takeover of crop management, total apparent debt of the owner managed groups of M\$27.5 million is very significant in that it represents some 22% of total apparent debt of rubber mini-estates. The one oil palm mini-estate under owner management has almost fully repaid its loan and so does not present any risk to RISDA.

Table 8: Loan Status of Rubber Mini-Estates by Management Arrangements

	RISDA Management	Owner Management
No. of ME	153	45
Area (ha)	16,424	5,670
% by area	75%	25%
No. of Participants	8,063	2,833
No. of ME with Loan Balance	152	45
Total Loan Balance (M\$ million)	82.214	23.835
Loan Balance/ha (M\$)	5,006	4,204
Loan Balance/participant (M\$)	10,010	8,413

	<u>Operating Account</u>		<u>Operating Account</u>	
	Net Profit	Net Loss	Net Profit	Net Loss
No. of ME	99	53	24	21
Area (ha)	10,593	5,783	2,833	2,837
Total Loan Balance (M\$ million)	47.180	35.034	11.827	12.008
Loan Balance/ha (M\$)	4,454	6,058	4,175	4,233
Cumulative Operating Profit/Loss (M\$ million)	8.515	14.944	1.671	3.672
Operating Profit/Loss per ha(M\$)	804	2,584	590	1,294
Total Debt (M\$ million)	47.180	49.978	11.827	15.680
Debt/ha (M\$)	804	8,642	4,175	5,527

MEs with Loan Fully Paid

No. 1
 Area (ha) 48
 Participants 42
 Cumulative Operating Profit M\$0.165 million or M\$3,438/ha.

Table 9: Loan Status of Oil Palm Mini-Estates by Management Arrangements

	RISDA Management		Owner Management	
No. of ME	70		1	
Area (ha)	8,125		21	
No. of Participants	4,314		16	
No. of ME with Loan Balance	61		1	
Total Loan Balance (M\$ million)	31.008		0.007	
Loan Balance/ha (M\$)	3,816		357	
Loan balance/participant (M\$)	7,188		468	
	<u>Operating Account</u>		<u>Operating Account</u>	
	Net Profit	Net Loss	Net Profit	Net Loss
No. of ME	37	24	1	0
Area (ha)	3,610	3,984	21	0
Total Loan Balance (M\$ million)	9.152	21.859	0.007	
Loan Balance/ha (M\$)	2,535	5,487	357	
Cumulative Operating Profit/ Loss (M\$ million)	5.250	7.667	0.032	
Profit/Loss per ha (M\$)	1,454	1,924	1,524	
Total Debt (M\$ million)	9.152	29.526	0.007	
Debt/ha (M\$)	2,535	7,411	357	
<u>MEs with Loan Fully Paid</u>				
No.	5			
Area (ha)	531			
Participants	381			
Cumulative Operating Profit	M\$2.678 million or M\$5,043/ha.			

Production of Mini-estates

16. Table 10 reports the average yield of mini-estates by year of production and compares crop performance with yield profiles. The mean yields are derived from RISDA data after eliminating a number of irregular figures and others suggesting crop leakage from RISDA's account. Also excluded are yields for outer production years when there are less than 5 reporting mini-estates, because of likely distortionary effects. Overall, the emerging picture is one of rubber yields below expectations and oil palm yields which are satisfactory.

Table 10: Mini-Estate Yields - Actuals and Profile

Production Year	<u>Rubber Mini-Estates (kg/ha)</u>			<u>Oil Palm Mini-Estates (ton ffb/ha)</u>		
	Profile	Actual	No. ME	Profile	Actual	No. ME
1	250	245	145	4	2.2	51
2	600	540	148	8	7.3	56
3	950	641	118	12	10.9	46
4	1,100	824	96	15	14.7	31
5	1,200	1,018	51	17	16.1	26
6	1,250	1,037	11	19	19.2	16
7	1,450	1,153	7	20	21.6	14
8				20	22.3	9
9				20	21.4	5
Total	6,800	5,458		135	135.7	
% of Profile		80			100.5	

17. Rubber Yields. Over the first 7 years of production, rubber yields have been consistently below profile and increasing slowly. They appear to be levelling off prematurely and are little better than the estimated average performance of individual smallholders as a group. At year 7, yield is some 300 kg/ha, 20% below profile. Total yield per hectare is also 20% below expectations. This poor performance could be the result of any number of factors during the periods of crop establishment, maintenance in immaturity and production management. Field observations indicate major problems of incomplete and uneven stands of trees, delayed tapping due to labor shortages and poor tapping quality resulting in high levels of bark wounding and bark consumption. Disappointing production is likely to continue as owners and tappers try to compensate low yields by tapping more deeply and with thicker bark shavings, both being practices which seriously shorten the productive life of the trees.

18. Oil Palm Yields. The overall performance of the oil palm mini-estates is satisfactory with total production to date at 100% of expectations. Average yields of fresh fruit bunch follow the yield profile closely for the first few years and then in years 7-9, at peak production, exceed it by 1-2

tons/ha. It can be anticipated that crop performance will continue to be better than profile provided good field conditions, including adequate use of fertilizer, are maintained.

Income Prospects of Mini-Estates

19. To determine the potential of the mini-estates to generate adequate family income, estimates were made of the average incomes per hectare of the rubber and oil palm mini-estates that could be generated over the next 20 years of production from 1993, using yield profiles, crop production costs from the farm budgets and projected commodity prices. Year of production in 1993 was derived as a mean of the dates of first harvest of all mini-estates of each crop. These were mid-1989 for rubber and mid-1988 for oil palm. Net total mini-estate income per hectare was determined after deducting current average loan balances per hectare. The resulting total income was assumed to be available for distribution as equal monthly dividends to participants over the full 20 year (240 month) period, although in practice, RISDA apportions net monthly income equally between loan repayment and dividends until loans are repaid so that monthly amounts are variable. The results of the analysis are given in Table 11 showing mini-estates with operating profits and losses separately.

Table 11: Mini-Estates: Projected Monthly Dividends over 20 Years (M\$)

	ME with Cumulative Operating Profits	ME with Cumulative Operating Losses
<u>Rubber</u>		
Total Production Revenue	58,715/ha	58,715/ha
Total Production Costs	22,730/ha	22,730/ha
Total Net Income	35,985/ha	35,985/ha
Average Total Debt Balance for Dividends	4,387/ha 31,598/ha	7,604/ha 28,381/ha
Average Monthly Dividend per ha	132	118
Average Monthly Dividend per participant	259	254
<u>Oil Palm</u>		
Total Production Revenue	39,395/ha	39,395/ha
Total Production Costs	20,715/ha	20,715/ha
Total Net Income	18,680/ha	18,680/ha
Average Total Debt Balance for Dividends	2,200/ha 16,480/ha	7,407/ha 11,273/ha
Average Monthly Dividend per ha	69	47
Average Monthly Dividend per participant	113	104

20. Overall, the income generating prospects of all mini-estates are not good. In those with cumulative operating profits, participants can look forward to dividends of only \$259 per month from rubber and \$113 per month from oil palm, levels which are eroded for estates with cumulative operating losses to because of their higher average land holding per participant. These monthly returns fall much below Government's poverty benchmark income of \$380 per month per family. Clearly, therefore, the average mini-estate will not lift poor participant smallholders out of poverty, although individually, the better mini-estates should achieve that objective. The prospect of the average mini-estate providing income which would have to be supplemented from other sources to meet family needs is not in accord with the original objective of mini-estates, but in more recent years, the rationale for Government investment in smallholder tree crop rehabilitation has been more towards raising national crop production levels while significantly supplementing smallholder incomes. The disappointing results of mini-estates, despite a higher commodity price projected over the next decade, can be attributed to high development costs and less than satisfactory yields. The low returns to oil palm, despite satisfactory yields, are a combination of very high average per hectare development costs and a forecast marked decline in the oil market price over the next decade.

Years to Full Loan Repayment

21. From individual development loan balances and average yield and production cost data, a projection has been made of the number of years required for each mini-estate fully repay its existing development loan. Net returns were determined on the basis of production costs for group replantings in the RISDA II project and for rubber, yields under LITS technology. Mini-estates under owner management were excluded. Also excluded from the calculations were cumulative operating losses because of the uncertainty surrounding their validity. Thus to this extent, the findings could be optimistic for many mini-estates. The results for the years 1993-97 are given in Table 12. The mini-estates are identified by name and State in Table 13, the information being of relevance to the project component for strengthening the income generating opportunities of cooperatives through mini-estate management contracts. In the years 1993-96, 56 mini-estates covering 5,114 ha and almost equally directed between rubber and oil palm, are projected to complete repayment of their development loans. These are in addition to the 10 mini-estates which were free of loans at the end of 1992. The number may be augmented in 1996 by some of the 24 mini-estates covering 2,404 ha projected to complete loan repayment in 1997.

Table 12: Mini-Estates: Number and Area Expected to Repay Development Loans Over 1993-97

	<u>Rubber</u>		<u>Oil Palm</u>		<u>Total</u>	
	No.	Ha	No.	Ha	No.	Ha
1993	2	66	6	655	8	721
1994	2	129	9	797	11	926
1995	15	1187	6	686	21	1873
1996	10	1011	6	583	16	1594
Total	29	2393	27	2721	56	5114
1997	19	1990	5	414	24	2404

Improving RISDA's Mini-estate Data Base

22. During the course of the RISDA I project, RISDA made very significant progress in developing its mini-estate data base. However, there is still much scope for improvement. In the course of this analysis, many data shortcomings and inconsistencies came to light which preclude a full and clear picture of the status and achievements of the program. Some of the data were clearly errors of input; other discrepancies, such as in the size of the mini-estate program, could be the result of confused data bases, mis-identification of mini-estates, development failures or the elimination from records of areas no longer under RISDA management. The RISDA II project will provide the opportunity to more accurately define and revise the data base so that it can function as a powerful management tool for the benefit of the mini-estate program. Recommended actions include:

- maintain data base listings in a fixed sequence by name of mini-estate so as to facilitate easier working of data;
- compile a complete list of mini-estates by crop and State;
- check all inputted data of mini-estate performance for errors and ensure consistency of entries between files;
- reconfirm yield records by year of production;
- determine the validity of cumulative operating costs for every mini-estate and, as necessary, provide clearer instructions to field offices on data submissions; and
- institute a system of on-going data analyses and result summaries as a means to better understand mini-estate performance, to more quickly capture changing performance, and as a tool to identify critical areas for management attention and action.

Table 13: Mini-Estates Expected to Fully Repay Development Loans in 1993-97

Year	State	Rubber		State	Oil Palm	
		ME Name	Ha		ME Name	Ha
1993	Kedah	Lubok Legong II	43	Selangor	Gesir Tengah I	87
	N.S.	Rembang Panas I	23	Johor	Maju Jaya	91
					Pt. Hj.Abd.Rahman	66
					Pt. Selangor	119
					Permas Ulu	55
				Teck Wah Heng	119	
1994	N.S.	Air Rawa	94	Perak	Ketior Dalam	133
		Penajis	35	Selangor	Sg. Gumut	119
				Melaka	Bukit Lanchang	66
					Bukit Perah	57
					Bukit Tembakau	80
					Tj. Rimau Dalam	165
				Johor	Kg. Sehari	62
					Tongkang Pecah	58
				Trengganu	Pelajat II	57
	1995	Perlis	Kg. Bilai Udoh	58	Kedah	Kg. Dingin II
		Kg. Bukit Gerengga	81	Perak	Kg. Rasa.	259
Kedah		Rimba Teloi I	66		Sg. Jambu II	176
Perak		Kg. Balun	42	Johor	Kg. Chokoh	74
		Kg. Beng Lenggong	123		Pt. Marjunit	31
Selangor		Bukit Ibol	71		Pt. Pemuda	121
		Cangkat Bintang	43			
N.S.		Air Melintang	120			
Melaka		Lubok Kepong I	28			
Pahang		Batu Papan	42			
		Bukit Kenau	44			
		Salong	69			
		Ulu Sempalit	127			
Trengganu		Taylor I	59			
		Tok Fakir	214			
1996	Kedah	Kg. Changhai	256	Kedah	Kg. Dingin I	82
	Selangor	Sg. Hijau	124	P. Pinang	Keluarga Pertama	65
	N.S.	Mentaus	83	Johor	Pt. Seraya I	125
	Melaka	Brisu	97		Pt. Sialang	58
		Lubok Keong II	27	Trengganu	Bukit Nangka	210
		Padang Sebang I	33		Cerang Sepulau	43
	Pahang	Darat Lantang	154			
		Machang Gelap	51			
	Trengganu	Batu Hampar	114			
	Kelantan	Sg. Sok	72			
	1997		No.			No.
Melaka		1	48	Kedah	1	41
Johor		1	195	Perak	2	262
Pahang		12	1220	Melaka	1	82
Trengganu		4	414	Johor	1	29
Kelantan		1	113			

MALAYSIA

RISDA II Project

Strengthening/Rationalization of Cooperatives

I. Background

1. The Rubber Smallholders Cooperatives (RSCs) were established in 1979 to support the operation of the Group Processing Centers which were formed to assist smallholders to jointly process and market rubber. Since then, the mandate and the types of the activities undertaken by these cooperatives have expanded. At present there are 64 RSCs, undertaking a wide range of activities including: (a) management of mini-estates; (b) storage and distribution of inputs; (c) transport, processing and marketing of rubber; (d) supply of planting material; (e) the development of infrastructure on a contractual basis; and (f) other social activities.

2. Most of these activities are being undertaken with considerable managerial and financial support from RISDA, which is keen to develop these cooperatives further to achieve the following objectives:

- (a) generate financial resources to enable the cooperatives to provide social services to its members;
- (b) assist in implementing some of RISDA's activities as a part of the privatization policies pursued by the Government. In this context, it is intended that the RSCs should ultimately implement all land related development programs leaving RISDA to concentrate on monitoring, evaluation, extension, training and other services; and
- (c) support the Government's objective of promoting the cooperatives as a major economic force in Malaysia.

II. Institutional Responsibilities

3. There are three institutions directly or indirectly involved in the development of the cooperatives: (a) the Registrar of Cooperatives; (b) RISDA; and (c) National Rubber Smallholders Cooperatives (NARSCO), an apex body of the RSCs.

4. Registrar of Cooperatives. Under the revised Cooperative Societies Act (1993), the Registrar General (RG) is inter alia responsible for registering (or revoking) societies, encouraging and promoting cooperatives and improving their efficiency. While the RG has undertaken these functions with respect to other

cooperative societies in Malaysia, the development of the 64 RSCs has been largely left to RISDA. With respect to the RSCs, the RG has played a passive role, confining its intervention to registering RSCs and approving their audited accounts. More often than not, the clearance of the audited accounts has been delayed, in part because the RG has been unable to approve the accounts on time - a procedure that has often delayed the annual general meeting (AGM) of the members. The latter, albeit a formality, nevertheless interferes with the operations of the RSCs as up-to-date accounts cannot be presented to the members and neither can the new Board members be elected. Although this is a relatively minor inconvenience in terms of day-to-day operations of the RSCs, attempts need to be made to present the accounts to the members on time to ensure greater participation. Under the revised Cooperatives Act, the RG is no longer required to approve the audited accounts -- a step which is expected to improve the time lag between the annual audit of the accounts and their presentation to the members.

5. RISDA. RISDA continues to play a direct role in developing the RSCs, providing contracts for various activities as well as the staffing for running them. As of December 31, 1991, of the 435 staff working with the 62 older RSCs, 176 were on RISDA's payroll. In fact, until very recently, RISDA staff, who were assigned to the RSCs, were responsible for the day-to-day management of the RSCs. The 176 staff included Contract Executives, personnel who are eventually expected to replace the RISDA General Managers as they are withdrawn from the RSCs in an effort to make the RSCs self-financing.

6. Until recently, the overall policy guidance for the development of the RSCs was established by a Cooperatives Unit (CU) located in the Extension Division in RISDA. However, the CU has now been transferred to NARSCO to monitor the progress of the cooperatives and assist them in becoming self-managing autonomous entities. The CU has a total of seven positions of which two, both clerical, are vacant. The remaining five positions comprise the Unit Head, a Budget Officer (responsible for Training, Administration, and assisting the RSCs to operate the welfare schemes), a Projects Officer (responsible for assisting the RSCs to handle various projects) and two other supporting staff who are responsible for preparation of reports and analyses of data.

7. NARSCO. NARSCO, which is largely owned by the 64 RSCs (or share is nominally held by RISDA), is the apex body of the RSCs. Although NARSCO is meant to be closely affiliated with the RSCs, providing financial support and advice, this role has been played by RISDA. As a key player in the development of the RSCs, RISDA has directed the operation of NARSCO on the one hand and formulated the policies of RSCs on the other. However, there is very little coordination between NARSCO and the RSCs. NARSCO undertakes many activities, but only one, input supplies, complements the various income generating activities undertaken by RSCs.

8. NARSCO is organized in the form of two separate companies, NARSCO and NARSCO Holdings. The NARSCO Board directly supervises the recently transferred CU (para 6) and operations of NARSCO Holdings, which, in turn, oversees the operations of six separate subsidiaries. These include: NARSCO Trading Sdn. Bhd. (input supply on behalf of RISDA); NARSCO Commodities Sdn. Bhd. (smallholder

rubber marketing); NARSCO Plantations and Services Sdn. Bhd (provision of services on ESPEK plantations); NARSCO Transport Sdn. Bhd. (trucking services for distribution of inputs); NARSCO Management and Travel Services Sdn. Bhd. (travel agency); and NARSPRO Sdn. Bhd. (manufacturing of rubber gloves).

9. In concept the profits from NARSCO subsidiaries are supposed to be ploughed back to the RSCs in the form of dividends or soft loans, but in practice the profits are, at present, too low for NARSCO to fulfill this objective. In fact if the profits and losses from all subsidiaries are taken into account, NARSCO is expected to lose money in 1992. The preliminary sales, net profits and margins for each of the subsidiaries and NARSCO Holdings (excluding NARSPRO and NARSCO Travel) for fiscal year (FY) ending December 31, 1992 are as follows:

Table 1: Profit and Loss of NARSCO and Subsidiaries
(M\$ million)

	Trad- ing	Commod- ities	Plant- ation	Trans- port	NARSCOHo ld.	NARS- PRO*	Travel
Sales	30.7	24.6	5.7	1.0	62.0	0.16	0.02
Net Profit	0.06	0.06	0.06	-	0.28	(0.6)	(0.3)
Gross margin (%)	6.8	9.3	14.0	18.2	8.7	NMF	NMF
Net Margin (%)	0.2	0.2	1.0	-	0.5	NMF	NMF

* Results for 1991

NMF: Not a meaningful Figure

10. Although NARSCO is meant to operate as an apex body of the RSCs, in reality it operates under RISDA's supervision and as one of its subsidiaries. Of the 15 members in NARSCO's Board, three are from RISDA. RISDA's Director General is the Chairman of NARSCO, the Deputy Director General (DDG), Operations, is the Vice Chairman and the third member is the Director of Extension. NARSCO's Managing Director is seconded from RISDA, as are 12 other senior staff. In fact, the staff seconded from RISDA account for 12% of the 103 staff in NARSCO. These figures do not include the participation of other RISDA staff in NARSCO's operations. The Chairmen of the Boards of all NARSCO's subsidiaries, for example, are all senior RISDA staff.

III. Progress to Date

11. The audited accounts of the RSCs are generally in arrears, which impedes a comprehensive analysis of their performance. However, a study of Smallholder

Cooperatives and NARSCO, financed by the Bank under RISDA I, concluded that the average assets per RSC had increased both in real and nominal terms. In nominal terms, the average total assets per RSC had increased from M\$ 214,000 in 1983 to M\$ 443,000 in 1989, representing a growth rate of 13% p.a. during this period, and 11% p.a in real terms.

12. The growth in assets has been financed by increase in capital (paid-up, retained and reserves) as well as increase in payables. Between 1983 and 1989 the average total paid-up capital per RSC had risen from M\$ 43,000 to M\$ 93,000, while the average accumulated profit had increased from M\$ 25,000 to M\$ 54,000 and the statutory reserves from M\$ 11,000 to M\$ 40,000. The remaining growth in assets was largely financed by increase in current liabilities, but not to unmanageable levels. Overall, the average current ratio (current assets: current liabilities) remained healthy, between 1.6 and 2.0 during this period.

13. There has been a similar increase in reported gross profits, which, on average, rose from M\$ 36,000 to M\$ 93,000 between 1983 and 1989, while the average net profits rose from M\$ 22,000 to M\$ 51,000 over the same period. However, it should be emphasized that the profits are overstated. The figures do not include: (a) salaries of staff paid by RISDA; (b) the rent for offices and stores, both of which are borne by RISDA; and (c) inventory losses or deficits arising from sales extended on credit.

14. These average figures also mask significant variation in performance. In 1989, five of the 37 reporting RSCs had assets below M\$ 100,000, 22 had assets between M\$ 100,000 and M\$ 500,000 while 10 reported assets in excess of M\$ 500,000. In 1988, 14 of the 56 reporting RSCs in the aforementioned study had accumulated losses, while 14% of the 37 reporting RSCs reported a similar picture in 1989. Overall, the study concluded that 13 RSCs had accumulated sufficient losses to erode the paid-up capital of the members.

15. The variation in performance arises from differences in contracts given by RISDA, which provides over 50% of their business (the balance being in marketing, which generates little or no profits). Thus RSCs perform better in areas in which RISDA has a strong replanting program. This is evident from the sales levels of the various cooperatives. Of the 62 older RSCs, seven had recorded business in excess of M\$ 4.0 million in 1991, while another 17 had reported business in excess of M\$ 1.0 million in the same period. However, the remaining 38 older cooperatives were less fortunate as 19 had recorded sales of between M\$ 0.5 million and M\$ 1.0 million, while the remaining 19 had conducted an even lower volume of business, between M\$ 0.25 and M\$ 0.5 million.

16. The aforementioned study concluded that 32 RSCs would face financial difficulties. Of these 8 would never be able to generate adequate profits to pay the salaries of RISDA staff assigned to the cooperatives (about M\$ 30,000 per annum), another 24 would barely manage to pay the salaries but not generate any surplus. The remaining 30 would generate profits to varying degrees to cover the staff salaries, provide statutory reserves, and in some cases (16 RSCs), in addition to meeting all operating expenses, also manage to pay the 10% dividend and accumulate some reserves.

IV. Issues

17. In formulating any strategy to make the RSCs viable, it is essential to recognize that: (a) regardless of their individual performance, all RSCs are substantially dependent on RISDA ; (b) despite the fact that RISDA is the major source of the contracts, the performance of the individual RSCs varies considerably; and (c) although the total volume of business generated by the cooperatives is substantial (M\$ 69.2 million in 1991), which would normally be adequate to make them viable, most RSCs do not generate adequate profits to cover their costs. Even the larger and more profitable RSCs continue to be dependent on RISDA.

18. Even using the very narrow definition of viability -- adequate profits to cover costs of RISDA staff assigned -- only half of the RSCs would be considered viable. If one used the broader definition of whether the RSCs' managements are sufficiently competent to run their businesses without supervision, very few would qualify. In fact, the attitude survey of the members confirms this observation. Despite the fact that over 85% of the members indicated that they were satisfied with the services provided both with respect to the quality of the services and their prices, almost 70% of the members felt that the RSCs would not be able to stand on their own without continued support from RISDA. Some 85% of the same sample felt that it would take the RSCs up to ten years to become fully independent.

19. After 14 years in existence, the RSCs continue to face operating difficulties arising from a number of factors. These inter alia are:

- (a) Lack of Clear Policy and Direction. In this context two issues are evident. First, the institutional responsibilities between RISDA and NARSCO are not clear. RISDA has continued to provide policy guidance and contracts to the RSCs and NARSCO, but the apex body and the RSCs have few direct operational linkages. As a consequence, the RSCs do not view NARSCO as their own organization, but perceive RISDA as the prime source of their assistance. The recent decision to allocate all responsibilities for the development of RSCs to NARSCO is a step in the right direction. However, NARSCO, as already noted, is operating at a loss and would be unable to bear the educational cost of supporting these cooperatives. Second, hitherto the emphasis has been on making the RSCs viable by providing contracts and staff support rather than approaching the problem within the framework of a well conceived strategy. As a consequence, despite considerable financial support, the RSCs remain dependent on RISDA. Although RISDA has withdrawn the General Managers in 48 RSCs, even now most of these staff continue to supervise the RSCs from the nearest RISDA District Office.
- (b) Disproportionate Allocation of Contracts. Although some RSCs are performing better than the others financially, barring few exceptions, the difference arises more from apportionment of contracts between the RSCs rather than better management. Except for marketing, which is a non-profitable activity (see (d)), even the

better managed RSCs depend on RISDA for contracts for over 99% of their other business, just like the poorer performing RSCs. The tendency is to confine business activities within a particular district to the district cooperatives, which naturally places cooperatives in areas where RISDA has limited development activities at a disadvantage;

- (c) Too Many Unrelated Activities Undertaken by RSCs. As all contracts within a District are given to the nearest cooperatives, the RSCs undertake a wide range of activities. In fact some 17 different types of activities are listed and it is common for each RSC to undertake eight to ten activities, although over 80% of the total sales of the RSCs are generated from five activities: marketing (49% of sales), infrastructure contracts (17%), input supply (5%) and nurseries (10%). The staffing is too limited (each RSC operates with six to eight staff) and most of the staff lack the experience to effectively handle such a diverse range of activities. The general tendency, therefore, is to take the job offered by RISDA and sub-contract it. As a consequence, the margins realized are even lower. Moreover, the management's attention is diverted to too many activities resulting in lower profits.
- (d) Low Operating Margins. Margins usually vary between 15 and 20%, resulting in occasional losses in activities undertaken. Such low margins require very good management to squeeze a profit. However, as already noted, this cannot be provided for reasons mentioned in (c), and, as a consequence, the actual gross margins realized by the RSCs vary considerably, from activity to activity, and even within the same activity, from year-to-year. A comparison of the margins, expected versus realized, for various economic activities commonly undertaken by the RSCs illustrates this point. As can be seen from Table 2 below, although the amount of margins provided by RISDA and NARSCO is more or less the same to each RSC, the gross margins realized by the RSCs vary considerably.

Table 2: Gross Margins Realized by Selected RSCs

Activity	Expected Gros Margin (%)	Actual Margin Realized Min. (%)	Actual Margin Realized Max. (%)
Rubber Marketing	n/a	0.0	1.3
Nurseries	17.0	1.9	17.0
Agric. Inputs	6.0	4.4	6.0
Stockists	n/a	(30.0)	80.0
Infra. Contracts	15.0 or more	(25.0)	40.0

- (e) Lack of Management Expertise in cooperatives, both at the Board and the management level;
- (f) Lack of Relevant Support from RISDA or NARSCO, neither of which have the staff with the right qualifications to provide such back-up. As is evident, the CU is severely understaffed to play an effective role in monitoring and assisting the RSCs;
- (g) Undertaking Activities Without Experience. The general tendency of the cooperative managers/boards is to diversify without taking into account their ability or experience to handle the business. In some cases, the RSCs have taken contracts to construct/rehabilitate apartment complexes, while others have started taxi and transport services or even insurance operations -- more often than not with adverse financial consequences;
- (h) Lack of Distinction Between Profit and Social Motives. The RSCs' involvement in marketing illustrates this point. Marketing, as noted earlier, is not profitable. However, most cooperatives undertake this activity, in the belief that their involvement leads to better prices for their members; and
- (i) Delays in Preparation of Accounts which hinder proper analysis of the data.

V. Prospects

20. Projections indicate that RISDA can provide adequate business to all 64 cooperatives to generate some M\$ 50,000 - 60,000 per annum in profits for each RSC after meeting all operating expenses (Table 3), provided the cooperatives can manage the business effectively. Of the 17 activities undertaken by the RSCs, three, namely, nurseries to supply planting materials, input supply and infrastructure development can provide the necessary margins and volumes to generate the level of profits indicated above. The fourth major activity, marketing, is not lucrative and the cooperative should undertake this activity only if it is demanded by the members.

21. With a potential sales volume of M\$ 12.6 million and a gross margin of M\$ 0.15 per plant, nurseries could support 15 RSCs (Table 4). Similarly input supply and trading (chemicals, fertilizers and a new product line of canned foods) could support 11 RSCs (Table 5) with the present margins (M\$ 1.0/bag for stocking fertilizers, 6% on chemicals and 10% on canned food). Infrastructure contracts (land development under group replanting and other infrastructure) have adequate margins (15%) to meet all operating costs and provide the level of income indicated above to support the remaining 38 RSCs (Table 6). Specialization in a particular activity would have other advantages as well. As the RSCs become more efficient managers of their chosen enterprise, they could solicit other business leaving them less dependent on RISDA. RSCs specializing in nurseries could, for example, diversify into producing other plants. Similarly, the RSCs involved in

infrastructure development could expand into other land development activities, while those specializing in input distribution could diversify into general trading.

22. It is, however, essential to recognize that all three above mentioned activities have relatively small margins and require intensive management to realize their profit potential. It is important, therefore, that each RSC concentrate on one potentially profitable activity, generating income from it to finance its social programs. If the members demand that the cooperative undertakes other functions as well, such as mini-estate management (see para 32) or marketing, the RSC may undertake these activities, but it should confine its efforts to only two additional activities to ensure effective management.

23. The development of the concept outlined above, however, would require some support. This would be provided under the proposed component.

VI. The Proposed Component

24. The principal objective of the component is to strengthen the RSCs to make them autonomous, self-financing institutions, capable of effectively managing their business and undertaking selected activities on behalf of RISDA profitably. The project would develop and implement a comprehensive rationalization plan, and finance two related activities to achieve this objective, namely technical assistance and training. Technical assistance would be required to provide back-up and support from NARSCO to assist the cooperatives to understand the business aspects of activities undertaken.

Proposed Rationalization Plan

25. As analyzed in Table 3, given RISDA's requirements and development budget, no more than 15 cooperatives could specialize in nursery management, 11 in input supply and 38 in infrastructure development to generate a relatively equitable M\$ 50,000 - 60,000 in profits annually. It would be advisable, therefore, to allocate these core profitable activities among the various cooperatives, taking into account their experience, asset base and the need to ensure an even spread between the various activities in each State. Based on the recommended plan, the CU has allocated an activity to each RSC (Table 7). The proposed list is tentative and cannot be finalized as the approval of the Boards is required to ratify the plan. As proposed by the CU, 15 RSCs would specialize in nurseries, 13 in input supply and 36 in infrastructure development: a slight, but not significant, departure from the numbers recommended in para 21. The difference has arisen as CU feels that 13 RSCs would be required to handle input distribution, rather than 11. As already noted, the list is preliminary and no final conclusions can be made at present. It is recommended, however, that as the list is finalized, the number of RSCs specializing in any activity should be close to the numbers suggested to ensure equal profitability for all RSCs. It is expected that the approval of the Boards of the RSCs would be obtained and the list finalized no later than July 31, 1994.

26. With respect to the stores involved in input supply and food distribution, it is a requirement from RISDA that each District office work in close cooperation with a store. The 11 cooperatives specializing in this activity would, therefore, need to operate, on average, 5.8 stores each. In order to maintain their profit levels, the RSCs in input supplies would need to expand their product lines. NARSCO is already planning to enter into canned food distribution and could assist the RSCs in this respect.

27. The implementation of the plan would require considerable backing from NARSCO staff, not only in revising the business strategy of each cooperative, but also in familiarizing the cooperative staff in all aspects (technical, managerial, financial) of managing their respective businesses. Because of budgetary limitations, the expertise would have to be developed from internal resources. In this context, NARSCO would be provided with suitable back-up support and training. Moreover, of the 62 staff assigned by RISDA to work with the cooperatives as General Managers, 18 would be given training (para 33) and support and re-oriented to supervise and direct the operations of the RSCs. Nine of these staff would be required to improve the business of the RSCs and the other nine to assist the RSCs with accounts and audits. All these staff would report to the CU and be located at RISDA State offices. They would supervise each cooperative visiting it quarterly, assessing its operations and preparing detailed reports on the operations or accounts. The reports would identify areas of weakness and recommend appropriate measures to address them. These staff would, in addition, help the cooperatives prepare an annual budget and work plan and monitor the performance after the work plan has been approved by the Boards of the RSCs.

28. As NARSCO does not have the financial resources to pay the salaries of these 18 staff, it is recommended that RISDA second these staff to NARSCO for a period of three years, after which NARSCO should pay their salaries and related expenses.

29. In order to ensure proper management of the RSCs, it is essential that they have up-to-date accounts as this would facilitate monitoring as well as preparation of annual plans. It would be a condition of further assistance from RISDA that all RSCs bring their accounts up-to-date, paying the auditors from their own sources. Nine of the staff assigned from RISDA (para 27) would help the RSCs in accounts preparation.

Technical Assistance

30. As there is little or no expertise in RISDA or NARSCO to guide the RSCs in managing the business and improving the profits, the project would finance two years of technical assistance (TA), to be located with the CU, to direct the activities of the staff that would work closely with the RSCs (para 27). The TA would review the work of the 18 staff and guide them in preparing regular supervision and annual work plan reports for each RSC. The terms of reference of the TA are given in Appendix 1.

Training¹

31. The project would finance the training of selected NARSCO and RSC staff and Board members to strengthen their capacity to manage the RSCs. Generalized training in cooperative and business management would be provided to all Board members. In addition, two board members that serve on the internal audit committees of each RSC would be given training in internal audit procedures. Moreover, all RSC managers would receive training in general business management while the accounts clerks would be given refresher courses in bookkeeping. Most of this training would be initiated in Year 1 and some of it, particularly the training for the Board members, would continue in Years two and three as some 768 members need to be trained. The training of staff and the members of the cooperatives' Boards would follow standard courses prepared by the Cooperative Training Institute, Angkasa.

32. After the cooperatives have selected their core profitable activity that they wish to undertake, the RSC staff would be given intensive one to two week courses in technical and business aspects of their respective activities. Thus, the managers of RSCs specializing in nursery management would be given specific training in managing the nursery and cost control. Similarly, the managers of RSCs specializing in store management would be given courses in inventory control, stock taking, product pricing and sales techniques, while the staff of RSCs involved in infrastructure management would be given training in job costing, bidding for new contracts, supervision of jobs and cost control. The managerial and supervisory staff of all cooperatives would also be trained in management and maintenance of mini-estates as this could be a potential area of expansion for all cooperatives.

33. The selected 18 staff that would operate at the State level would be given specialized courses in accounts and business management. Nine staff specializing in accounting would be given intensive training in accounting, bookkeeping, and auditing, while the other staff would be given training in business management, cost control, financial management and business planning. It is anticipated that these 18 staff would be given intensive training for a period of one month each, which would be repeated in Years 2 and 3.

VII. Component Costs

34. The costs of the component mainly include those for training and TA. The costs of training would be about M\$ 0.5 million (Annex 15, Table 3). The cost of TA would be about US\$ 0.1 million per annum for two years or a total of M\$ 0.5 million over the project period. Incremental costs of travel for NARSCO and CU staff assigned by RISDA would be negligible and would be borne by NARSCO.

¹ Also see Annex 15, Table 3 and para. 13.

VIII. Phasing of Activities

35. The phasing of the various activities is given in the chart below:

Activity	PY1	PY2	PY3
Selection of 18 staff	--		
Provision of TA	-----	-----	--
Finalization of Plan	-----		
Training - NARSCO staff (Business Mgmt).	--	--	
Training - NARSCO staff (Accts & Audit)	--	--	
Training - RSC (Business Mgmt for Managers)	--	--	
Training - RSC (Bookkeeping)	--	--	
Training - RSC: Nursery Mgmt (Managers & Supervisors)		--	
Training - RSC: Store Mgmt (Managers)		--	
Training -RSC: Contract Pricing and Mgmt.		--	
Training -RSC: Mini-Estate Mgmt.		--	
Training - RSC: Land Dev & Group Replanting		--	
Training - Board Members (Internal Audit)	--	--	
Training - Board Members (General)	--	--	--

Table 3: Profit and Loss
Projections for Cooperatives
(M\$ 000)

	Nurseries	Trading	Infrastructure
Income			
Total sales	12600.00	53000.00	36000.00
Gross Profit			
Nurseries 1/	2100.00		
input Supplies			
Fertilizers 2/		1600.00	
Chemicals 3/		474.00	
Food 4/		300.00	
Infrastructure 5/			
TSB			4200.00
Others			1200.00
Total gross margin	2100.00	2374.00	5400.00
No of cooperatives	15.00	11.00	38.00
Gross margin/coop	<u>140.00</u>	<u>215.82</u>	<u>142.11</u>
Less: expenses			
Salaries			
Manager	13.50	13.50	13.50
Supervisors 6/	7.50	0.00	15.00
Storekeepers 7/	0.00	34.80	0.00
Drivers	0.00	4.00	0.00
Accounts Clerks	4.00	12.00	4.00
Guards	4.00	23.20	8.00
Sub-total	29.00	87.50	40.50
Utilities	1.00	1.00	1.00
Stationery	5.50	10.00	5.50
Travel allowances	5.00	5.00	5.00
Telephone	2.50	5.00	2.50
Postage	0.50	1.50	0.50
Operation & main.	1.00	11.00 /8	1.00
Audits	1.20	1.20	1.20
Annual Gen. Meeting	10.00	10.00	10.00
Depreciation	5.00	15.00 /9	5.00
Licenses	0.50	0.50	0.50
External audit	1.20	1.20	1.20
Miscellaneous	6.50	6.50	6.50
Training	1.00	1.00	1.00
Insurance	2.00	5.00	2.00
sub-total	42.90	47.90	42.90
Total expenses	<u>71.90</u>	<u>135.40</u>	<u>83.40</u>
Net profit	<u>68.10</u>	<u>80.42</u>	<u>58.71</u>

1/ @ M\$0.15/plant at peak profit

2/ @ M\$1.00/bag

3/ @ 6% of annual sales of M\$ 7.9 million.

4/ New line of food products. Projected sales M\$3.0 million annually with a gross margin of 10%.

5/ 15% of contract value.

6/ Assumed that the cooperatives working on infrastructure handle two contracts at a time.

7/ 5.8 outlets per cooperative.

8/ Cooperative handling inputs has one 1.5 ton truck at a cost of M\$50,000. O&M costs are estimated at 20% of the investment cost.

9/ @ 20% of the investment cost for the truck.

**Table 4: Profit and Loss
Projections for Cooperatives Engaged in Nurseries
(M\$ 000)**

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
<u>Income</u>			
Total sales	12600.00	12600.00	12600.00
Total gross margin 1/	1400.00	1750.00	2100.00
No of cooperatives	15.00	15.00	15.00
<u>Gross margin per coop.</u>	<u>93.33</u>	<u>116.67</u>	<u>140.00</u>
Less: expenses			
Salaries			
Manager	13.50	13.50	13.50
Supervisors	7.50	7.50	7.50
Storekeepers	0.00	0.00	0.00
Drivers	0.00	0.00	0.00
Accounts Clerks	4.00	4.00	4.00
Guard's	4.00	4.00	4.00
Sub-total	29.00	29.00	29.00
Utilities	1.00	1.00	1.00
Stationery	5.50	5.50	5.50
Travel allowances	5.00	5.00	5.00
Telephone	2.50	2.50	2.50
Postage	0.50	0.50	0.50
Operation & main.	1.00	1.00	1.00
Audits	1.20	1.20	1.20
Annual Gen. Meeting	10.00	10.00	10.00
Depreciation	5.00	5.00	5.00
Licenses	0.50	0.50	0.50
External audit	1.20	1.20	1.20
Miscellaneous	6.50	6.50	6.50
Training	1.00	1.00	1.00
Insurance	2.00	2.00	2.00
sub-total	42.90	42.90	42.90
<u>Total expenses</u>	<u>71.90</u>	<u>71.90</u>	<u>71.90</u>
Net profit	21.43	44.77	68.10

1/ @ M\$0.10/plant in year 1, M\$0.125/plant in year 2
and a peak profit of M\$0.15 per plant in year 3

Table 5: Profit and Loss
Projections for Cooperatives Engaged in Trading
(M\$ 000)

	Year 1	Year 2	Year 3
<u>Income</u>			
Total sales	51000.00	52000.00	53000.00
Gross Profit			
Input Supplies			
Fertilizers 1/	1600.00	1600.00	1600.00
Chemicals 2/	474.00	474.00	474.00
Food 3/	100.00	200.00	300.00
Total gross margin	2174.00	2274.00	2374.00
No of cooperatives	11.00	11.00	11.00
<u>Gross margin/coop</u>	<u>197.64</u>	<u>206.73</u>	<u>215.82</u>
Less: expenses			
Salaries			
Manager	13.50	13.50	13.50
Storekeepers 4/	34.80	34.80	34.80
Drivers	4.00	4.00	4.00
Accounts Clerks	12.00	12.00	12.00
Guards	23.20	23.20	23.20
Sub-total	87.50	87.50	87.50
Utilities	1.00	1.00	1.00
Stationery	10.00	10.00	10.00
Travel allowances	5.00	5.00	5.00
Telephone	5.00	5.00	5.00
Postage	1.50	1.50	1.50
Operation & main. 5/	11.00	11.00	11.00
Audits	1.20	1.20	1.20
Annual Gen. Meeting	10.00	10.00	10.00
Depreciation 6/	15.00	15.00	15.00
Licenses	0.50	0.50	0.50
External audit	1.20	1.20	1.20
Miscellaneous	6.50	6.50	6.50
Training	1.00	1.00	1.00
Insurance	5.00	5.00	5.00
sub-total	73.90	73.90	73.90
<u>Total expenses</u>	<u>161.40</u>	<u>161.40</u>	<u>161.40</u>
<u>Net profit</u>	<u>36.24</u>	<u>45.33</u>	<u>54.42</u>

1/ @ M\$1.00/bag

2/ @ 6% of annual sales of M\$ 7.9 million

3/ New line of food products. Projected sales M\$1.0 million in 64 outlets in Year 1, increasing to M\$3.0 million annually by year 3. The gross margin is 10%.

4/ Costs are based on 5.8 outlets per cooperative.

5/ Each cooperative has one 1.5 ton truck at a cost of M\$50,000.

The O&M expenses are estimated at 20% of the investment cost.

6/ @ 20% of the investment cost of the truck.

Table 6: Profit and Loss
Projections for Cooperatives Engaged in Infrastructure
(M\$ 000)

	<u>Year 1</u>	<u>Year 2</u>	<u>Year 3</u>
Income			
Total sales	36000.00	36000.00	36000.00
Gross Profit			
Infrastructure 1/ TSB	2800.00	3500.00	4200.00
Others	800.00	1000.00	1200.00
Total gross margin	3600.00	4500.00	5400.00
No of cooperatives	38.00	38.00	38.00
<u>Gross margin/coop</u>	<u>94.74</u>	<u>118.42</u>	<u>142.11</u>
Less: expenses			
Salaries			
Manager	13.50	13.50	13.50
Supervisors 2/ Storekeepers	15.00	15.00	15.00
Drivers	0.00	0.00	0.00
Accounts Clerks	4.00	4.00	4.00
Guards	8.00	8.00	8.00
Sub-total	40.50	40.50	40.50
Utilities	1.00	1.00	1.00
Stationery	5.50	5.50	5.50
Travel allowances	5.00	5.00	5.00
Telephone	2.50	2.50	2.50
Postage	0.50	0.50	0.50
Operation & main.	1.00	1.00	1.00
Audits	1.20	1.20	1.20
Annual Gen. Meeting	10.00	10.00	10.00
Depreciation	5.00	5.00	5.00
Licenses	0.50	0.50	0.50
External audit	1.20	1.20	1.20
Miscellaneous	6.50	6.50	6.50
Training	1.00	1.00	1.00
Insurance	2.00	2.00	2.00
sub-total	42.90	42.90	42.90
<u>Total expenses</u>	<u>83.40</u>	<u>83.40</u>	<u>83.40</u>
<u>Net profit</u>	<u>11.34</u>	<u>35.02</u>	<u>58.71</u>

1/ 10% of contract value in Year 1; 12.5% in Year 2; and 15% in Year 3.

2/ Assumed that the cooperative handles two contracts at a time.

Table 7. Specialized Activity Tentatively Assigned to Cooperatives

<u>Nurseries</u>	<u>Input Supply</u>	<u>Infrastructure Dev.</u>
1. Pendang	1. Kubang Pasu	1. Neg. Perlis
2. Padang Terap	2. Sik	2. Langkawi
3. Lenggong	3. Penang	3. Kota Setar
4. Dinding	4. Larut Matang	4. Baling
5. Big. Padang (U)	5. Kelang	5. Kuala Muda/Yan
6. Ulu Selangor	6. Sepang	6. Bandar Bahru
7. Negri Sembilan	7. Kluang	7. Kinta
8. Segamat	8. Johore Selatan	8. Selama/Kerian
9. Batu Pahat	9. Kauntan	9. Grik
10. Temerloh	10. Bentong	10. Parit
11. Jerantut	11. K. Terengganu	11. Big. Padang (S)
12. Raub	12. Machang	12. Hilir Perak
13. Besut	13. Pasir Mas	13. Kg. Gajah
14. K. Baru/Bachok/Tumpat		14. Sg. Siput
15. Kelantan Selatan		15. Neg. Perak
		16. Hulu Langat
		17. Kuala Langat
		18. Petaling
		19. K. Selangor
		20. Gombak
		21. Neg. Malaka
		22. Muar
		23. Pontian
		24. Pekan
		25. Kuala Lipis
		26. Rompin
		27. Hulu Terengganu
		28. Marang
		29. Dungun
		30. Kemaman
		31. Pasir Puteh
		32. Tanah Merah
		33. Kulim
		34. Selama/Kerian
		35. Mersing
		36. Kota Tinggi

Terms of Reference of the Technical Assistance

Qualifications and Experience

The Consultant would have at least a Bachelor level degree in Business Administration and a minimum of 10 years' experience in managing a business enterprise or in financial analysis and management. Experience in assisting cooperatives would be an advantage.

Responsibilities

The Consultant would be responsible for:

- (a) advising the RSCs and NARSCO staff involved with RSCs in all financial, accounting and business management matters;
- (b) assisting the RSCs and NARSCO staff in planning and implementing the measures required for the RSCs to become self-financing, autonomous entities. To this end, the Consultant would assist in the implementation of the Rationalization Plan;
- (c) supervising, together with NARSCO staff, all RSCs, ensuring that their annual work plans are prepared on time and that they perform according to plan;
- (d) assisting the RSCs in preparation of annual accounts and ensuring a timely audit of all RSC accounts;
- (e) preparing a monitoring format and training the NARSCO staff to prepare supervision reports based on the format;
- (f) training a counterpart staff to undertake his/her responsibilities when the tenure expires; and
- (g) undertaking any other relevant job that the Head of the Cooperative Unit may request from time-to-time for strengthening the RSCs.

MALAYSIA

RISDA II PROJECT

Computerization of RISDA's Management Information System (MIS)

1. The operationalization and improvement of the computerized MIS at RISDA, supported under the RISDA I Project, would be given special emphasis under the Phase II project. RISDA's computerized MIS was initiated in 1979, when a mainframe was installed. The major work was on general accounting besides processing of the Smallholders Survey of 1977. The payroll system was also implemented. In 1981 RISDA purchased an additional mini computer. By the end of 1986, it was found that the maintenance cost of the mainframe was high and the system had become obsolete. RISDA decided to write off the hardware and then bought a direct data entry machine in August 1986. In 1988, RISDA decided to upgrade its mainframe computer at its headquarters and introduce mini-computers for the State offices. For this purpose, a Steering Committee was established and the requirements of the operational units were considered. A proposal was submitted to the Government for computerizing information on finance and accounts, stock control and store management, mini-estates operations, and smallholders. The proposal also called for computerization at the State level over about four years. The proposal was approved in principle by the Malaysian Administration Modernization Planning Unit (MAMPU) in early 1989. The approved proposal envisaged a step-by-step implementation beginning in late 1989 with a one-year pilot project involving a new mainframe computer at RISDA headquarters and a terminal in Malacca State.

2. The RISDA I Project provided financing for the computerized MIS program as detailed above. The financing was for a mainframe computer, 11 mini-computers at States, and 70 personal computers (PCs) for the head office, Training Institutes and the new responsibility centers to emerge from RISDA's field level reorganization. In addition, the project provided for training of the computer unit staff and training of RISDA staff in the computerized MIS and a technical review of the pilot smallholder information system which had been in development at the Muar Regional Office since 1987.

3. During project implementation, some significant changes in the computerized MIS program took place. The 11 mini-computers at States were no longer considered necessary; instead, the number of PCs to be procured was increased. This was done in view of the field level reorganization of RISDA, whereby the States retained only a planning, monitoring and supervision role and all significant operational responsibilities were transferred to the new 60 responsibility centers which, consequently, had a greater need for computer facilities. The technical study of the Muar pilot project was dropped, since the system was considered outdated and no longer replicable in other areas of the country.

4. Substantial hardware and software have been purchased under the RISDA I Project, including a mainframe computer, procured through international competitive bidding and installed in 1992, and 421 PCs. Tables 1-3 show the costs of hardware and software purchased, type of software procured, and distribution of PCs by State and Headquarters, respectively.

5. The RISDA II Project will continue support for the computerized MIS. Additional hardware and software to be financed under the project for the computerized MIS is shown in Table 4. The training requirements for the computer unit staff are summarized in Table 5. Most of the training requirements will be met locally. However, some provision would be made under the project for overseas training of computer unit staff in selected subjects (see Annex 15, Table 5). The various modules (Smallholders Information System including Smallholders Training, Stock Management, Finance and Accounts, Personnel Information System, Monitoring and Evaluation, Executive Information System, Communication and Geographic Information System) will be developed and implemented during the project period as shown in Chart 1. Module 1 (Basic Information on Smallholders) is already completed and is, therefore, not shown in Chart 1.

6. Consultancy services would be needed for operationalization of the computerized MIS. However, the services would be employed for specific tasks from time to time, as the need arises. It is anticipated that the following applications would require consultant support:

- (1) Smallholders Information Systems PclAN Version - 4 persons for 1 month each
- (2) Financial Application for Cost Centers - 4 persons for 1 month each
- (3) Communications - 2 persons for 2 weeks each
- (4) Graphical Interface Programming - 2 persons for 2 weeks each
- (5) GIS - 2 persons for 1 month each

The estimated costs for the above expertise would depend on years of experience of the consultants as follows:

<u>Years of Experience</u>	<u>M\$/day</u>	<u>M\$/month</u>
A. > 10	1,500	30,000
B. 6 - 10	1,000	20,000
C. 3 - 6	700	14,000
D. < 3	400	8,000

Assuming that services are obtained from type B professionals, the estimated costs are as follows:

(1) Smallholders Information Systems PclAN Version	- M\$ 80,000
(2) Financial Application for Cost Centers	- 80,000
(3) Communications	- 20,000
(4) Graphical Interface Programming	- 20,000
(5) GIS	- <u>40,000</u>
Total	M\$ 240,000

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RISDA II PROJECT

Costs of Hardware and Software Purchased
Under the RISDA Project (Ln. 3139-MA)

A1 Hardware

No.	Hardware Description	Model	Qty	Unit Price (RM)	Total Price (RM)
A1.1	Central Processing Unit				
A1.11	Fujitsu M770 Model 4 o 32MB Memory o 1 MXC and 5 BMC o SVP o System Transformer o System Console and Printer o LNA Adapter	F8470A48	1	1,486,872.00	1,486,872.00
A1.2	Disk Subsystem				
A1.21	Fujitsu Disk Controller	F1700S1	1	181,434.00	181,434.00
	Fujitsu Fixed Disk Unit Head 2.5 GB	F84260A4	1	229,768.00	229,768.00
	Fujitsu Fixed Disk Unit 2.5 GB	F84260B4	1	153,738.00	153,738.00
A1.3	Tape Subsystem				
A1.31	Fujitsu Magnetic Tape Unit	F818A1	1	106,332.00	106,332.00
A1.32	Fujitsu Magnetic Tape Unit	F818B	1	53,133.00	53,133.00
A1.33	Fujitsu Cartridge Tape Controller	F1761E	1	138,228.00	138,228.00
A1.34	Fujitsu Cartridge Tape Drive (2 drives)	F8470A	1	102,522.00	102,522.00
A1.4	System Printers				
A1.41	Fujitsu Line Printer (1300ipm)	F8731D	1	81,080.00	81,080.00
A1.42	Fujitsu Line Printer (750ipm)	F8732D	1	72,123.00	72,123.00
A1.5	Terminals				
A1.51	Wyse 120 TTY Terminal	Wyse 120	26	1,375.00	34,375.00
A1.6	Network Equipments				
A1.61	Thick Ethernet Cable	-	100	16.00	1,600.00
A1.62	Transceiver for Thick Ethernet	-	6	750.00	4,500.00
A1.63	Terminal Servers (16 ports)	-	4	4,500.00	18,000.00
A1.64	AUI Drop Cable	-	8	735.00	4,410.00
A1.65	RS232C Cable and Sockets (for terminals and controllers)	-	28	112.00	2,912.00
A1.66	Async. Modem 2400bps	-	2	1,580.00	3,160.00
	Network Interface Cards	-	1	630.00	630.00
A1.7	Electrical Stabilizing Equipment				
A1.71	UPS (20 KVA)	EPS2020	1	71,500.00	71,500.00
A1.72	Electrical and Data Cabling	-	1	20,120.00	20,120.00

A2 Software

No.	Software Description	Qty	Unit Price (M\$)	Total Price (M\$)
A2.1	Operating System and Utilities			
A2.11	UXP/M (Unlimited Users)	1	228,424.00	228,424.00
A2.2	Database Management System (64 Users)			
A2.21	Informix - Online (Development)	1	241,280.00	241,280.00
A2.22	Informix - SQL (Development)	1	102,512.00	102,512.00
A2.23	Informix - 4 GL C Compiler	1	160,346.00	160,346.00
A2.24	Informix - 4 GL RDS (Development)	1	160,346.00	160,346.00
A2.25	Informix - 4 GL ID (Development)	1	44,706.00	44,706.00
A2.3	Language			
A2.31	Micro Focus COBOL	1	66,444.00	66,444.00
A2.4	PC Software			
A2.41	ProComm Plus	1	424.00	424.00
A2.42	PC TCP/IP Plus (with NFS support)	1	1,760.00	1,760.00
A2.5	Statistical Package			
A2.51	SPSS-X (4-6 users)	1	41,580.00	41,580.00
Others				
A3	Freight and Delivery			Free of Charge
A4	Installation and Testing			30,000.00
A5	Training			Free of Charge
A6	Conversion o Payroll System o Staff Loan Deduction Subsystem			Free of Charge
A7	Documentation			Free of Charge

GRAND TOTAL

3,832,858.00

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RISDA II PROJECT

Type of Software Purchased Under the
RISDA Project (Ln. 3139-MA)

1. LOTUS 123 Release 2.4
2. MS-EXCEL ver 4.0
3. SCO XENIX
4. MS - WINDOWS 3.1
5. Harvard Graphics for Windows
6. Flowcharting ver 3.0
7. MS - Project for Windows
8. MS - Word for Windows 2.0
9. Central Point Anti-Virus
10. PCTOOLS ver 7.1
11. Superbase 4 Windows (LAN)
12. FOXPRO 2.0 (LAN)

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RISDA II PROJECT

Distribution of PCs Purchased Under the
RISDA Project (Ln. 3139-MA) by State and Headquarters

State	PC 386	PC 386SX	PC 286	PC 486	Total
PERLIS	-	2	1		3
KEDAH	9	17	11		37
P. PINANG	-	2	1		3
PERAK	11	13	11		35
SELANGOR	5	9	5		19
NEGERI SEMBILAN	8	15	8		31
MELAKA	4	7	5		16
JOHOR	9	15	14	2	40
PAHANG	9	15	10	1	35
TERENGGANU	8	13	9		30
KELANTAN	11	12	9		32
HEADQUARTERS	16	40	82	2	140
TOTAL:	90	160	166	5	421

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RISDA II PROJECT

**Costs of Computer Hardware and Software
To Be Purchased Under the Project**

	Estimated Cost/Unit M\$	No. of Unit	Cost M\$		Total Cost M\$
1. Local Area Network (LAN) at Cost Center (PT) and Wide Area Network (WAN) to link PT to HQ..a/					
1.1 Server (For National Level) PC-486 or higher 24 Mb - memory 1 Gigabyte SCSI Harddisk		1	50,000		50,000
1.2 Networking Software Netware 3.11 (100 users) HQ Netware 3.11 (5 users) PRD b/ Gateway Fresh Utility Q Assist					254,000
	3,500	60	24,000		
	8,000	2	210,000		
	1,000	2	16,000		
	1,000	2	2,000		
1.3 Communications Cards Ethernet 2 Microcomm Terminator					1,465,500
	1,000	200	200,000	(pair)	
	16,500	75	1,237,500		
	140	200	28,000	(pair)	
1.4 Other Network Hardware Cost Modem UPS Wiring & Cabling Powerchute for Novell					482,500
	2,000	75	150,000		
	3,000	75	225,000		
			70,000		
	500	75	37,500		
2. Other Software Carbon Copy Plus X/Window GIS					282,200
	1,000	75	75,000		
	7,200	1	7,200		
	40,000	5	200,000		
3. Mainframe Hardware Laser Printer (4000 lpm) DASD (triple density)					500,000
	250,000	1	250,000		
	250,000	1	250,000		
GRAND TOTAL					3,034,200

a/ PT means the responsibility centers (including the State Offices, District Offices and Training Institutes of RISDA).

b/ PRD is the District Office of RISDA

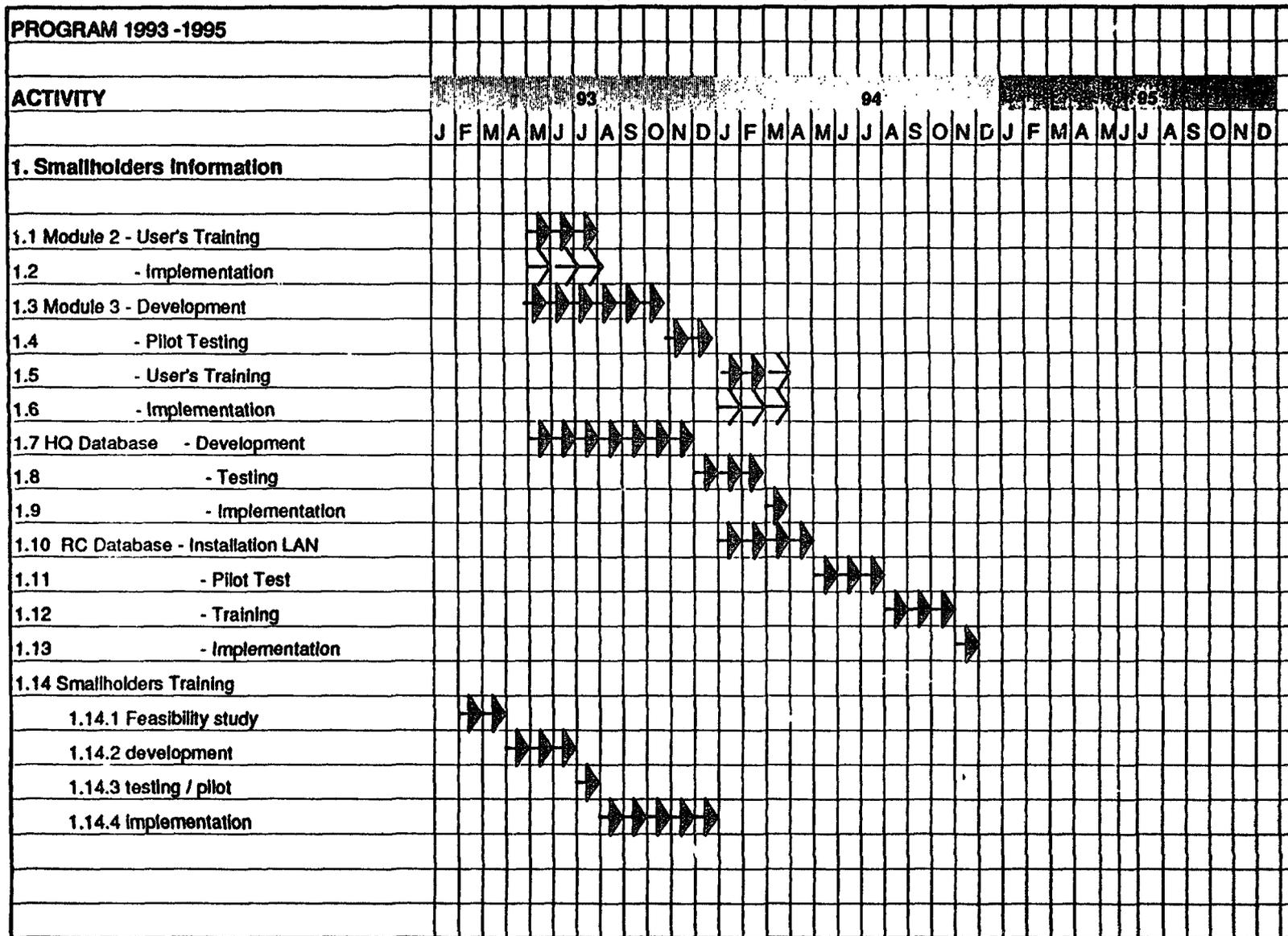
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RISDA II PROJECT

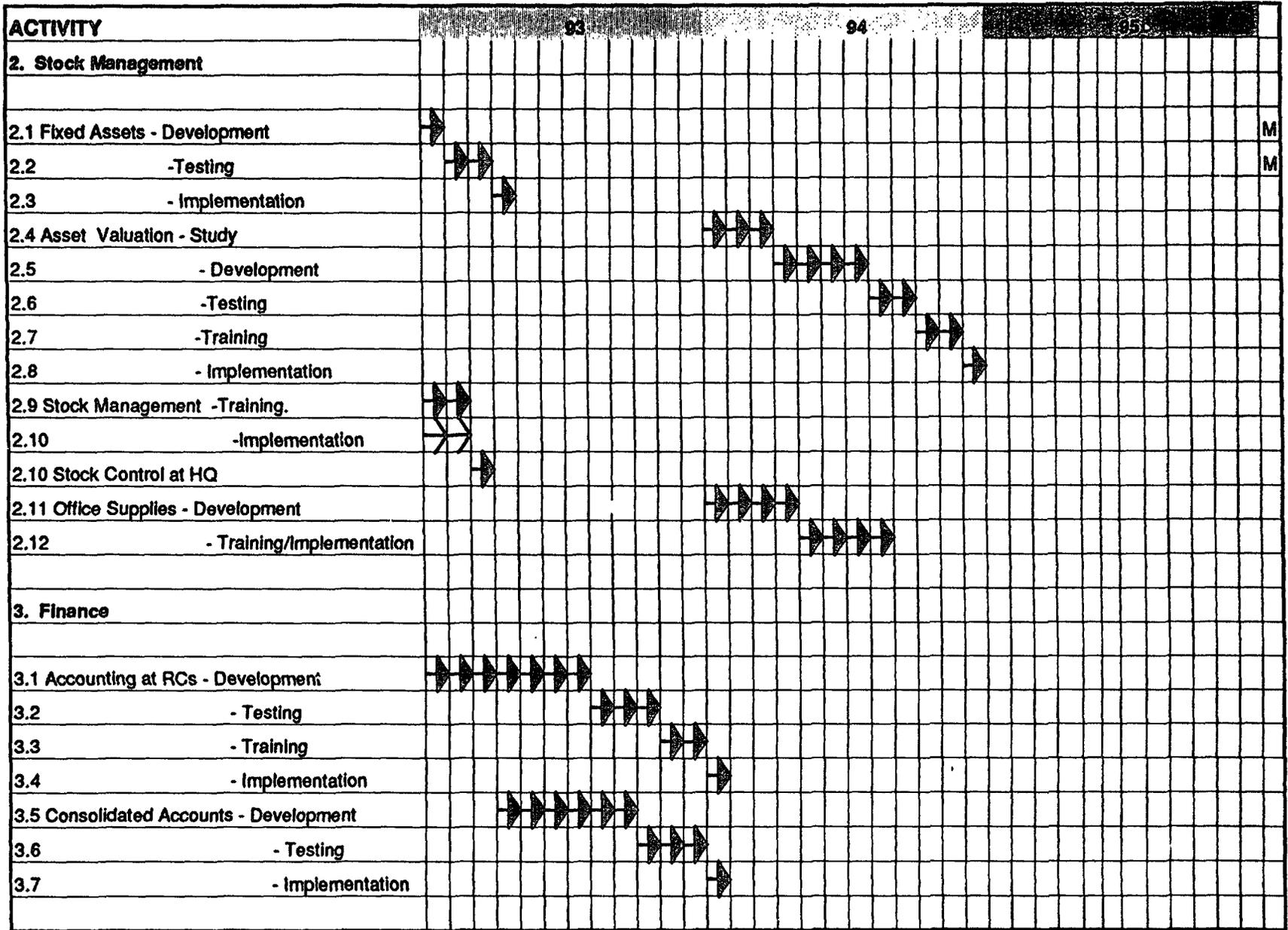
Training Requirements for RISDA's
Computer Unit Staff

1. Network Management
 - Understanding
 - Administration
 - Implementation
2. Data Communications
 - Understanding
 - Administration
 - Management
3. Geographical Information System (GIS)
4. Project Management
5. Strategic Information Planning
6. Financial Management for IT personnel
7. Teleprocessing Database Design & Implementation
8. Computer Operations
 - Security Management (Hardware & Software)
9. PC Maintenance
10. INFORMIX RDBMS Administration
11. Graphical User Interface
 - Windows Programming
 - Implementation
 - Management
 - Windows communication across networks

**MALAYSIA
RISDA II PROJECT
Computerised MIS Program**



RC = Responsibility Center



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RISDA II PROJECT

Human Resource Development Component

Component Objectives

1. The human resource development component has two main objectives:
 - (a) To support, through training, the provision of skills and knowledge required to enable project component objectives to be met; and
 - (b) To increase RISDA's capacity to implement human resource development (HRD) and to introduce the systematic practice of human resources management (HRM).

In order to achieve these objectives the project would support the strengthening of RISDA's capacity to manage training, training of staff and smallholders in improved tapping technology, cooperatives management, nursery management, computer technology and communications techniques. The project would also provide support for training programs begun under the RISDA I project but not fully completed.

Training Activities Included in the HRD Component

A. Training for Improved Tapping Technology

2. The project will support the introduction of Low Intensity Tapping Systems (LITS) with stimulation as a means of overcoming the problem of labor shortages in the rubber subsector. While the technology underpinning LITS is relatively simple, the effective implementation of LITS requires high levels of skill and supervision. The RISDA II project will, therefore, place great emphasis on ensuring that the management, technical and tapping skills of those engaged in the project-supported LITS program reach the highest possible level. During the first year of project implementation, a pilot introduction of LITS in seven mini-estates would be undertaken.

3. Project Year I. The trainee target groups in project year 1 would be the following:

- (i) The RISDA Coordinator of the LITS program plus one other person from the Extension Division and two staff from the mini-estates Division (4 persons).
- (ii) Mini-estate Managers at State level (4 persons).
- (iii) District Officers - ROs (5 persons).

(iv) Assistant mini-estate managers responsible for districts (5 persons).

(v) Supervisors of each mini-estate - AROs (7 persons).

4. The total for LITS training in Project Year I is 25 persons or two courses. Training would be conducted by RISDA at selected ILRs and RRIM staff would serve as resource persons.

5. High quality tapping is essential for a successful LITS program. The project will provide training for all mini-estate tappers involved in the pilot introduction phase (7 mini-estates) during 1993 or at the latest in early 1994. The target group for the first seven mini-estates is 160 tappers who will be trained in situ for a period of three days by a training team from the ILRs. Each training group will have ten tappers and two trainers. For the pilot phase of LITS a total of 16 courses will be conducted (Table 1).

6. Project Year 2. With the addition of 50 additional mini-estates in about 20 districts during PY 2 the target groups for training would be:

(i) RISDA headquarters staff in charge of mini-estates and extension (5 people).

(ii) Mini-estate managers, one per State (9 persons).

(iii) Assistant mini-estate managers (to be future trainers) (20 persons).

(iv) Supervisors of mini-estates - AROs (50 persons).

(v) District Officers - ROs (20 persons).

7. About 700 tappers from the additional 50 mini-estates would be trained in situ by teams of trainers from the ILRs. Each course for ten tappers would run for three days, with a total of 70 courses.

8. Project Year 3. An additional 100 mini-estates would be included bringing the total number to 167. Trainee target groups would be:

(i) Mini-estate managers at State level (7 people).

(ii) Assistant mini-estate managers (40 persons).

(iii) Supervisors (100 persons).

(iv) District Officers (40 persons).

(v) District Extension Officers (124 persons).

9. Tapper training would be provided for about 1,000 tappers from the additional mini-estates. About 100 in situ courses of three days duration would be managed by ILR training teams.

10. LITS training would be conducted by RISDA staff certified by RRIM as trainers. Approximately 8 RISDA staff should participate in the RRIM tapping LITS course which has been specially designed for the LITS program (Table 1).

B. Training for Nursery Improvement

11. The RISDA II project will put special emphasis on the improvement of the quality of planting materials. The number of nurseries will, by the second year of project implementation, be reduced from 28 to approximately 15 and the capacity to manage, operate and supervise will be increased through training. Four target groups have been identified for nursery related training (Table 2):

- (i) Approximately 15 nurseries under management of ESPEK will require training for the supervisor of each nursery (15) and a nursery manager for a cluster of nurseries. The total size of the trainee group is 20 persons. This group must understand nursery operations and the objective of producing quality planting material. The course of 10 days will be offered by RRIM.
- (ii) The second target group includes nursery managers in charge of operations and their key assistants. The course would emphasize technology of nursery management and include some practical budgrafting training. Included would be 15 nursery managers plus one assistant per nursery (30). In addition, the 15 cooperative managers should also attend the course.
- (iii) Another target group would be RISDA staff with responsibility for planting materials (clone inspectors), especially those who will visit nurseries to see that planting material is ready for distribution. This target group includes RISDA headquarters and State officers and 8 ILR trainers (8). The group totalling about 15 persons should attend the 10 day RRIM course as for groups (i) and (ii) above.
- (iv) Budgrafters are essential to nursery operations and they are in short supply in some States. Approximately 100 budgrafters will be trained over a period of seven days at ILRs.

12. Timing of Nursery Training. Groups (i), (ii) and (iii) should be enrolled in the RRIM course as soon as possible and preferably during 1993. RRIM has indicated willingness to offer the training if financing can be arranged. Training for budgrafters (Group IV) will take place in Project Years 1 and 2.

C. Strengthening of Cooperatives

13. Training will be provided for staff and Board members of cooperatives to be strengthened under the project (see Annex 13 for details, particularly paras. 31-33 for training). Topics in the training program include business management and planning, and accounts and audit for NARSCO staff; and management and accounting, bookkeeping, and store management for cooperatives staff. Mini-estate management and land development and group replanting training will be given to selected staff from cooperatives which are likely to have mini-estate responsibility. Training for cooperatives Board Members will also be provided to expose them to internal audit, cooperatives management, policy making and cash management. Training will be provided by ANGKASA, MKM and ILR depending on specialization (Table 3).

D. Communications Skills Training

14. Weakness in communications skills amongst the AROs was identified as a serious weakness in RISDAs extension programs during RISDA I project appraisal. Funding was provided for the development of a communications skills course and a number of AROs were trained. However, due to the short implementation period of RISDA I, a considerable number of staff have yet to be trained.

15. Communications skills training will be provided for about 1330 staff including agricultural officers, PRD and ROs (300 persons) in courses of 6 days' duration and for extension and mini-estate personnel (1,000 persons) in courses of 14 days' duration. The training courses will be offered by the ILRS (Table 4).

E. Overseas Training

16. The project will finance limited overseas training for staff of the RISDA Computer Unit in order to increase their capacity to provide management support for the RISDA. It is envisaged that the overseas training of short duration will mostly take place in the region and will be limited to a total of five persons (Table 5).

F. Technical Assistance

17. Targeted technical assistance will be provided to strengthen the capability of the Communications Unit which has responsibility for the design and production of extension support materials, journals and teaching aids. Five months of technical assistance for strengthening the Unit's graphics capability will be funded. TA will also be provided to strengthen training management and to assist RISDA management establish a human resource development system. The period of TA involvement will be spread over twelve months in the case of training management and nine months in the case of HRD and the consultant-months would be 6 and 7, respectively (Table 6).

G. Equipment

18. Funding will be provided for upgrading teaching and communications equipment and materials to ensure that the quality of training and management information remains as high as possible. A total of US\$9,000 will be allocated for Communications Unit equipment and software and US\$200,000 for the Training Unit, ILRs and Wisma RISDA (Table 7).

H. Management of Training

19. The scope and scale of training required by RISDA personnel has broadened with the advent of the RISDA I and RISDA II projects and with the intensification of male and female smallholder training. RISDA's in-house training capacity through its four Training Institutes (ILRs) and one Kuala Lumpur-based training center (Wisma RISDA) is already reaching a point where capacity is fully stretched and indeed considerable amount of staff training is implemented on behalf of RISDA by other agencies. Thus the emphasis has shifted in RISDA from being primarily a supplier of in-service training to identifying training needs and negotiating for training services with appropriately-qualified institutions and firms.

20. RISDA now needs to manage training activities to a greater extent than before. Management of training implies systematic needs assessments undertaken in consultation with the Directorates and other RISDA units, design of training programs, evaluation of proposals from suppliers of training, implementation administration, and training impact evaluation. In addition, the administration and management of the RISDA training centers and on-site training activities supervised by the ILRs requires management input.

21. The project will support the strengthening of training management capacity in RISDA by providing funds for an in-house Training Management course to be offered by local consultants specializing in such training. It is envisaged that the consultants would conduct the course in modules over a period of, say, one year. After each module, trainees would be able to seek advice based on their experiences prior to the subsequent module. The target group for the Training Management course would be six persons from the Training Unit and four ILR Principals. The estimated cost of providing the Training Management course is US\$48,000 (Table 6). Detailed terms of reference for the consultants are at Appendix 1.

I. Human Resource Development

22. One of the lessons learned from the implementation of the RISDA I project was the need to strengthen the management of human resources within RISDA. Consultants hired to develop a communications skills course and to strengthen training management also undertook a human resources management study and made recommendations based on their observations and findings.

23. RISDA does not have a fully-implemented human resource development (HRD) system in place and human resource management is weak. By HRD is meant the normally accepted activities which deal with recruitment based on specific

job descriptions, training based on training needs assessments, appointment of qualified staff to positions requiring specific skills, career development, promotion on merit and some form of manpower planning.

24. Human Resource Management (HRM) is, in effect, an indication that managers are using the output of the HRD system to actively and effectively manage their human resources. One important outcome of good human resources management from the manager's point of view is a workforce which can achieve objectives assigned to a particular unit, division or department. In achieving these goals, managers gain in terms of their standing in the organization and motivation of the staff improves.

25. The manager who manages his/her human resources, anticipates vacancies or new skill needs, hires on the basis of clear job descriptions, observes and discusses skill competence with staff, trains only on the basis of need, and identifies staff with potential for positions of greater responsibility. The expected outcome of active HRM is greater work efficiency and effectiveness, higher staff morale and usually less but better-focussed training.

26. RISDA now needs to institutionalize HRD/HRM. The project will provide funding for the hiring of technical assistance to help guide the process for developing awareness, appreciation and adoption of an HRM approach within RISDA. The TA would be expected to take the RISDA I human resource management report as a starting point and, after analysis of the existing situation, design a series of activities for senior, middle and junior managers which would clarify the meaning and advantages of adopting a HRM approach in RISDA. Once this phase of awareness raising and clarification is complete, the consultants would:

- (a) Review and make recommendations on the HRD function in RISDA, with special reference to strengthening RISDA's capacity to actively support HRD. Recommendations should also include the location of a HRD entity in the organizational structure;
- (b) Examine RISDA's training activities and make recommendations on how best they can be managed;
- (c) Develop HRM guidelines for RISDA managers to facilitate their practice of HRM; and
- (d) Set targets with indicators to assist managers in introducing and practicing HRM.

27. The estimated cost of the technical assistance to develop RISDA's HRD and introduce HRM is US\$56,000 (Table 6). Detailed terms of reference for the consultants are at Appendix 2.

Cost of the Human Resource Development Component

28. The estimated cost of the HRD component is US\$1.207 million including US\$144,000 for technical assistance and US\$27,000 for overseas training (Table 8). Of this, the incremental costs of training for LITS, nursery improvement and communications skills amounting to US\$551,000 would be financed from RISDA's operating budget and have not been included in overall project costs, which relate only to RISDA's development budget.

MALAYSIA
RISDA II PROJECT
LITS TRAINING
(US\$'000)

TARGET GROUP	Course Duration	Unit Cost	Trainee Number	PY1	PY2	PY3	Total Cost	Training Responsibility
RISDA LITS Coordinator HQ Extension Division Mini Estates Division State and District Staff	6 days	US\$180/trainee/ course	25	4.5			4.5	ILR
HQ, State, and District Mini Estate Supervisors for Additional 50 Mini Estates	6 days	US\$180/trainee/ course	104		18.72		18.72	ILR
HQ, State, and District Mini Estate Supervisors for Additional 100 Mini Estates	6 days	US\$180/trainee/ course	311			55.98	55.98	ILR
RISDA Trainers	10 days	US\$300/trainee/course	8	2.4			2.4	RRIM
Tapper Training for 7 Mini Estates (Pre-effectiveness)	3 days	US\$624/course (10 tappers and 2 trainers)	160	10.0			10.0	ILR
Tapper Training for Additional 50 Mini Estates (Year 2)	3 days	US\$624/course (10 tappers and 2 trainers)	700 (est)		43.68 (est)		43.68	ILR
Tapper Training for Additional 100 Mini Estates (Year 3)	3 days	US\$624/course (10 tappers and 2 trainers)	1000 (est)			62.40 (est)	62.40	ILR
TOTAL			2308	16.9	62.40	118.38	197.68	

ILR = RISDA's Training Institutes

RRIM = Rubber Research Institute of Malaysia

**MALAYSIA
RISDA II PROJECT
NURSERY IMPROVEMENT TRAINING
(US\$'000)**

TARGET GROUP	Topic	Course Duration	Unit Cost	Trainee Number	PY1 /a	PY2	PY3	Total Cost
Espek Supervisor Nursery Manager	Nursery Management for Clusters of Nurseries	10 days	US\$235/trainee	20	4.7 /b			4.7
Nursery Managers in Charge of Operations and Assistants	Nursery Management Technology	10 days	US\$235/trainee	30	7.1 /b			7.1
Cooperatives Managers	Nursery Management	10 days	US\$235/trainee	15	3.53 /b			3.53
RISDA Staff (HQ), State Officers and ILR Trainers	Nursery Management	10 days	US\$235/trainee	15	3.53 /b			3.53
Budgrafters	Techniques	7 days	US\$100/trainee/course	100	5.0	5.0		10.0
TOTAL				180	23.86	5.0		28.86

/a If central nursery program is delayed, the training schedule may shift to PY2 and 3.

/b If central nursery program is on schedule, training should take place before July/August 1994.

Note: Nursery improvement training is to be carried out by RRM and budgrafting by the ILRs.

MALAYSIA
RISDA II PROJECT
COOPERATIVES STAFF TRAINING
(US\$'000)

TARGET GROUP	Topic	Course Duration	Unit Cost	Trainee Number	PY1	PY2	PY3	Total Cost	Training Provider
A. NARSCO Supervisory Staff (ARO)	Business Management and Planning	One month/year	US\$600/month	10	6.0	6.0	6.0	18.0	ANGKASA
	Accounts and Audit	One month/year	US\$600/month	10	6.0	6.0	6.0	18.0	ANGKASA
B. Cooperatives Staff	Business Management incl. Accounting	2x15 days year 1, 1 mo. year 2 (accounting)	US\$600/month	64	38.4	38.4		76.8	ANGKASA
	Bookkeeping (Accounts clerks)	15 days	US\$300/trainee/course	64	19.2			19.2	ANGKASA
	Store Management	7 days	US\$140/trainee/course	15		2.1		2.1	ANGKASA
	Contract Pricing and Management	7 days	US\$140/trainee/course	40		5.6		5.6	ANGKASA
	Mini Estate Management	7 days	US\$140/trainee/course	64		5.6		5.6	ILR
	Land Development and Group Replanting	7 days	US\$140/trainee/course	40		5.6		5.6	ILR
C. Board Members	Internal Audit	7 days	US\$140/trainee/course	128 (2x64)	8.96	8.96		17.92	MKM
	Cooperative Management, 7 days Policy, Cash Management and Business Applications		US\$140/trainee/course	768 (12x64)	42.0	42.0	23.52	107.52	MKM
TOTAL				1203	120.56	120.26	35.52	276.34	

ANGKASA = Cooperative College
MKM =

MALAYSIA
RISDA II PROJECT
COMMUNICATIONS SKILLS TRAINING /a
(US\$'000)

TARGET GROUP	Course Duration	Unit Cost	Trainee Number	PY1	PY2	PY3	Total Cost
A. MANAGERS							
Agricultural Officers	6 days	\$120/trainee/course	11	1.32			1.32
PRD	6 days	\$120/trainee/course	62	2.40	2.40	2.64	7.44
RO (extension)	6 days	\$120/trainee/course	223	9.60	9.60	7.56	26.76
B. EXTENSION AND MINI ESTATE STAFF							
ARO	14 days	\$280/trainee/course	700	84.0	84.0	28.0	196.00
Mini Estate Supervisor	14 days	\$280/trainee/course	332	49.0	35.0	8.96	92.96
TOTAL			1328	146.32	131.00	47.16	324.48

/a Training to be offered at RISDA ILRs.

**MALAYSIA
RISDA II PROJECT
OVERSEAS TRAINING /a
(US\$'000)**

Topic	Course Duration	Unit Cost	Trainee Number	PY1	PY2	PY3	Total Cost
Network Management	1 month	US\$5.0	2		10.0 /b		10.0
Data Communications	1 month	US\$5.0	2		10.0 /b		10.0
Teleprocessing Data Base Design and Implementation	1 month	US\$7.0	1		7.0 /c		7.0
TOTAL			5		27.0		27.0

/a All trainees from RISDA Computer Unit.

/b Courses in region.

/c Course in USA.

MALAYSIA
RISDA II PROJECT
TECHNICAL ASSISTANCE FOR HRM
(US\$'000)

Item	Unit Cost	Duration	PY1	PY2	PY3	Total Cost
<u>A. Communications Unit</u>						
Graphics Expert	8.0/mo.	9 months	40.0			40.0
<u>B. Training Unit</u>						
In House Training Management Course for 10 People (Modular)	8.0/mo.	6 consultant–months over a 12–month period	16.0	16.0	16.0	48.0
<u>C. HRD</u>						
Strengthen RISDA HRD capacity and assist management with Human Resource Management (HRM)	8.0/mo.	7 consultant–months over a 9–month period	20.0	18.0	18.0	56.0
TOTAL			76.0	34.0	34.0	144.0

**MALAYSIA
RISDA II PROJECT
TRAINING EQUIPMENT
(US\$'000)**

Item	Number	Unit Cost	PY1	PY2	PY3	Total Cost
<u>A. Communications Unit</u>						
Computer (486)	One	4.0		4.0		4.0
Graphics Software	Several	2.0 (Sum)		2.0		2.0
Laser Printer	One	3.0	3.0			3.0
Subtotal			3.0	6.0		9.0
<u>B. Training Unit/ILRs</u>						
Video/Computer Projector (ILRs)	4	16.0		64.0		64.0
Photocopier (ILRs)	4	5.0	20.0			20.0
Risograph	1	24.0		24.0		24.0
Overhead Projector (High Powered)	8	1.60	6.4	6.4		12.8
Slide Maker	1	10.0	10.0			10.0
Computer Software	Several	10.0 (Sum)	5.0	5.0		10.0
Training Reference Books (ILRs, RISDA HQ)	Several	12.0 (Sum)	6.0	6.0		12.0
Video Teaching Aids (ILRs)	Several	10.0 (Sum)	5.0	5.0		10.0
Plotter	1	14.0		14.0		14.0
Text Scanner	1	3.0	3.0			3.0
Network Accessories	4 Sets	5.0		20.0		20.0
Subtotal			55.4	144.4		199.8
TOTAL			58.4	150.4		208.8

MALAYSIA
RISDA II PROJECT
HUMAN RESOURCE DEVELOPMENT COMPONENT COST
(US\$'000)

Item	Cost
LITS Training /a	197.7
Nursery Improvement Training /a	28.9
Cooperative Strengthening	276.3
Communications Skills Training /a	324.5
Overseas Training	27.0
Technical Assistance	144.0
Equipment for Training and Communications	208.8
TOTAL	1,207.2

a/ These costs are to be financed from RISDA's operating budget and have not been included in overall project costs, which relate only to RISDA's development budget.

Terms of Reference for Consultants

Management of Training

1. The volume and variety of training programs required by RISDA have increased to the point where the institutional emphasis is on the management of training programs delivered in house and by outside agencies rather than solely in house through the RISDA Training Institutes (ILRs). The RISDA II project, which plans to introduce new and improved technology for nursery management and tapping and strengthen cooperatives will, in addition to a comprehensive routine training program, place new demands on RISDA's ability to manage its training programs efficiently and effectively.

2. The services of an experienced consultant group are required to design and implement an in house training management course for RISDA headquarters, field and ILR staff who will have responsibility for training program implementation. The course, which could be designed as a number of modules delivered over a period of, say, one year with monitoring between modules would be offered to about six persons from the RISDA headquarters Training Unit and approximately four ILR principals.

3. Qualifications and Experience of Consulting Firm. The firm should have a proven record of successful activity in the area of training and training management. Experience with training in the agricultural sector, while not critical, would be advantageous. The firm should be able to assign a team of well qualified and experienced persons for the duration of the assignment.

4. Main Responsibilities. The consultants will be expected to create within RISDA the capacity to manage training programs and to provide RISDA with the necessary systems, procedures, and guidelines required to support staff in sustaining the management of training in RISDA.

5. Main tasks. The main tasks of the consultants would be as follows:

- (a) Review progress with strengthening training management achieved during the implementation of the RISDA I project.
- (b) Undertake an analysis of RISDA's present and future requirements for training management.
- (c) Identify RISDA personnel who should be included in the training management activity.
- (d) Propose training management program.
- (e) Implement agreed program.
- (f) Provide necessary monitoring/supervision of on-the-job application of skills in the event that the program is in modular form.
- (g) Evaluate progress based on agreed indicators.
- (h) Provide RISDA with an end of assignment report.

Terms of Reference for Consultants

Human Resource Development/Human Resource Management

1. RISDA management is concerned about the effectiveness of its largely well-educated staff and wishes to strengthen its approach to human resource development and to begin to actively practice human resource management. Management's concern stems in part from government's initiative on quality management and from the implication of decreasing public support for institutions such as RISDA which are expected to generate more of their own revenues.
2. The services of a suitably qualified and experienced firm will be required to review RISDA's human resource management system, strengthen the system where appropriate and plan and implement a program of human resource management. The assignment, which should be completed over a period of about 9 months, may consist of a number of linked activities or modular training sessions supported by work place assignments and supervision.
3. Qualifications and Experience of Consulting Firm. The firm should have a proven record of successful consulting in the area of HRD/HRM and be able to assign suitably qualified and experienced staff for the duration of the consultancy.
4. Major Responsibilities. The consultants will be expected to institutionalize a workable system of HRD which meets the needs of RISDA and to assist RISDA managers in introducing a system of human resource management.
5. Main Tasks. The main tasks of the consultants would be as follows:
 - (a) Review present HRD arrangements and documentation.
 - (b) Propose a program of HRD strengthening which may include organizational adjustments, changes in responsibility, modified procedures and new or updated regulations.
 - (c) Implement the strengthened system.
 - (d) Sensitize senior management to the need for HRM, indicating the benefits likely to be obtained from adoption of systematic HRM.
 - (e) Design a RISDA-specific approach to HRM including training programs for managers.
 - (f) Help RISDA management incorporate HRD and active HRM in its corporate culture through updated mission statements and job descriptions.
 - (g) Monitor progress in adapting HRD and HRM approaches by workplace observations and use of indicators.
 - (h) Prepare end-of-assignment report.

MALAYSIA
RISDA II PROJECT
PROJECT COMPONENTS BY YEAR
(M\$ '000)

	1994	1995	1996	Total	Foreign Exchange (%)
Replanting and Maintenance					
(a) Grant Payments /a	200,220.0	195,670.0	191,700.0	587,590.0	35
(b) Rubber Nursery Improvement /b	400.0	400.0	400.0	1200.0	5
Rehabilitation	3,000.0	3,000.0	3,000.0	9,000.0	35
Infrastructure					
(a) Upgrading	4,000.0	4,000.0	4,000.0	12,000.0	35
(b) Maintenance	1,000.0	1,000.0	1,000.0	3,000.0	25
Extension and Smallholder Training	5,000.0	5,000.0	5,000.0	15,000.0	10
Applied Research (RRIM) /c	800.0	1,000.0	810.0	2,610.0	20
Mini-Estate Dev. & Improvement /d	3,000.0	3,000.0	3,000.0	9,000.0	15
Strengthening of Cooperatives					
(a) Technical Assistance /e	120.0	240.0	120.0	480.0	-
(b) Training /f	307.0	307.0	90.0	704.0	5
Computerized MIS					
(a) Equipment /g	2,500.0	534.0	-	3,034.0	80
(b) Technical Assistance /h	120.0	120.0	-	240.0	-
Human Resource Development					
(a) Training Equipment & Materials /i	150.0	380.0	-	530.0	80
(b) Technical Assistance /j	200.0	80.0	80.0	360.0	-
(c) Staff Training (Overseas) /k	-	70.0	-	70.0	100
Monitoring and Evaluation /l	40.0	120.0	-	160.0	-
Base Costs	220,857.0	214,921.0	209,200.0	644,978.0	34
Physical Contingencies /m	265.0	91.4	0.0	356.4	80
Price Contingencies /n	147.0	200.0	134.0	481.0	30
Total Project Costs /o	221,269.0	215,212.4	209,334.0	645,815.4	34

a/ From Annex 16.2.

b/ RRIM supervision costs.

c/ From Annex 10.

d/ Supplementary development costs (over and above grant entitlements) of mini-estates established prior to the project and not yet in production, averaging 4,000 ha p.a. over the project period.

e/ Twenty-four person-months.

f/ From Annex 15, Table 3.

g/ From Annex 14, Table 4.

h/ See Annex 14, para. 6.

i/ From Annex 15, Table 7.

j/ From Annex 15, Table 6.

k/ From Annex 15, Table 5.

l/ Eight person-months of consultancy.

m/ 10% for computer and training equipment.

n/ For computer and training equipment, applied research and technical assistance, with the inflation rate assumed at 2.5% p.a. for foreign costs and 4.5% p.a. for local costs.

o/ Includes taxes and duties estimated at M\$1.1 million for infrastructure (5% of costs) and equipment (10% of costs).

MALAYSIA
RISDA II PROJECT
COSTS OF REPLANTING AND MAINTENANCE 1/
(M\$ million)

YEAR OF REPLANTING	1994									1995						1996						
	RUBBER			OIL PALM			OTHER CROPS			RUBBER		OIL PALM		OTHER CROPS		RUBBER		OIL PALM		OTHER CROPS		
	HA	INSTALLMENT	COST	HA	INSTALLMENT	COST	HA	INSTALLMENT	COST	HA	COST	HA	COST	HA	COST	HA	COST	HA	COST	HA	COST	
1988	22617	469.3	10.81	0	0	0.00	0	0	0													
1989	25663	599.22	15.38	0	0	0.00	0	0	0	25663	12.04	0	0	0	0							
1990	29063	710.1	20.64	0	0	0.00	2530	716.30	1.81	29063	17.42	0	0	0	0	29063	13.64	0	0	0	0	0
1991	31489	722.5	22.75	4859	474.25	2.30	2833	716.30	2.03	31489	22.36	0	0	2833	2.03	31489	18.87	0	0	0	0	0
1992	32833	722.5	23.72	4969	846.7	4.21	3426	728.68	2.50	32833	23.72	4969	2.36	3426	2.45	32833	23.31	0	0	3426	2.45	
1993	33230	973.48	32.35	5272	1321.9	6.97	3498	728.70	2.55	33230	24.01	5272	4.46	3498	2.55	33230	24.01	5272	2.50	3498	2.51	
1994	24000	1781.64	42.76	3600	1705.3	6.14	2400	1457.99	3.50	24000	23.36	3600	4.76	2400	1.75	24000	17.34	3600	3.05	2400	1.75	
1995										24000	42.76	3600	6.14	2400	3.50	24000	23.36	3600	4.76	2400	1.75	
1996																24000	42.76	3600	6.14	2400	3.50	
TOTAL			168.21			19.62			12.39		165.67		17.72		12.28		163.29		16.45		11.96	

1/ Based on grant payment instalments as shown at Annex 5 and summarized in columns for the year 1994. For "other crops", the grant rate for non-citrus fruits has been used. The grant instalments are weighted, assuming that 90% of smallholders would receive grants applicable to holding size of 4 ha or less and 10% would receive grant applicable to holding size of more than 4 ha. The crop proportion for replantings in 1994-1996 is assumed to be 80% rubber, 12% oil palm and 8% other crops in the light of recent experience. The crop proportion for 1993 is estimated and figures for replantings in 1992 and earlier are actuals.

Malaysia
RISDA II Project
Financing Plan
(US\$ million)

Component	World Bank		GOM		Rubber Smallholders/a		Total
	Amount	%	Amount	%	Amount	%	Amount
Replanting and Maintenance							
(a) Grant Payments	62.70	27	85.70	37	82.00	38	230.40
(b) Rubber Nursery Improvement/b	0.36	90	0.04	10	-	-	0.40
Rehabilitation	0.95	27	2.55	73	-	-	3.50
Infrastructure Development and Maintenance	1.60	27	4.30	73	-	-	5.90
Extension and Smallholder Training	1.60	27	4.30	73	-	-	5.90
Applied Research (RRIM)	-	-	1.10	100	-	-	1.10
Mini-Estate Development and Improvement	0.96	27	2.54	73	-	-	3.50
Strengthening of Cooperatives							
(a) Technical Assistance	0.18	90	0.02	10	-	-	0.20
(b) Training	-	-	0.30	100	-	-	0.30
Computerized MIS							
(a) Equipment	1.04	80	0.26	20	-	-	1.30
(b) Technical Assistance	0.09	90	0.01	10	-	-	0.10
Human Resource Development							
(a) Training Equipment and Material	0.16	80	0.04	20	-	-	0.20
(b) Technical Assistance	0.18	90	0.02	10	-	-	0.20
(c) Staff Training (Overseas)	0.09	90	0.01	10	-	-	0.10
Monitoring and Evaluation (Consultancy)	0.09	80	0.01	10	-	-	0.10
Total Financing	70.00	28	101.20	40	82.00	32	253.20

a/ Through replanting cess payments.

b/ RRIM supervision costs.

Malaysia
RISDA II Project
IBRD Loan Disbursement Categories

<u>Disbursement Category</u>	<u>Amount (US\$ million)</u>	<u>% of Expenditures to be financed</u>
(1) Replanting and Maintenance, Rehabilitation, Infrastructure, Extension and Smallholder Training, & Mini-Estate Development and Improvement	67.8	27
(2) Computer and Training Equipment	1.2	80 a/
(3) Consultants' Services /b and Overseas Training	1.0	90
Total	70.0	28

a/ It is assumed that these items would be procured locally and would be financed at 80% by the Bank. Otherwise, Bank disbursement would be 100% of foreign exchange expenditures of imported equipment and 100% of the ex-factory cost of such items manufactured locally.

b/ Includes RRIM supervision costs for rubber nursery improvement, and consultant services for strengthening of cooperatives, computerized MIS, human resource development, and monitoring and evaluation.

Malaysia
RISDA II Project
Schedule of Loan Disbursements/a

IBRD Fiscal Year	Period Ending	Cumulative Disbursements		Standard Disbursement Profile for Malaysian Agricultural Projects
		Amount (US\$ Million)	%	
94	June 30, 1994	0.3	-	0
95	December 31, 1994	4.0	6	3
	June 30, 1995	12.0	17	6
96	December 31, 1995	21.0	30	14
	June 30, 1996	33.0	47	22
97	December 31, 1996	48.0	68	30
	June 30, 1997	65.0	93	38
98	December 31, 1997	70.0	100	46

a/ Loan Closing Date: December 31, 1997

MALAYSIA

RISDA II PROJECT

Supervision Plan: Bank Supervision Mission Schedule

Project Year	Approximate Mission Dates	Areas of Concentration	Expected Skill Requirements	Staff Inputs (staff-weeks)
1 (1994)	Feb 1994	Loan effectiveness; recruitment and appointment of consultants for cooperatives and human resource management; review of arrangements for 1994 agricultural program, LITS program, rubber nursery improvement arrangements, research, progress on the strengthening/ rationalization plan for cooperatives, progress in computerized MIS, and arrangements for local staff and smallholder training; accounting and auditing; disbursement procedures; and procurement arrangements.	Agriculture (Tree Crops) Economic/Financial Analysis LITS Specialist	6.0
1 (1994)	Aug./Sept. 1994	Review of LITS progress; progress in computerized MIS; review of work program and budget for 1995; procurement arrangements; monitoring and evaluation (M&E) arrangements; and implementation of the plan for cooperatives.	Agriculture (Tree Crops) MIS Financial Analysis/ Cooperatives Operations LITS Specialist	6.0
2 (1995)	Feb./March 1995	Retrospective review of 1994 agricultural program; work program and budget for 1995; progress in computerized MIS and M&E; improvements in extension services and infrastructure; and progress in LITS, research and nurseries.	Agriculture (Tree Crops) Rural Engineering Nursery Specialist Rubber Research Specialist	4.0
2 (1995)	August/ September 1995	Progress in LITS; accounting and auditing; progress in staff and smallholder training; work program and budget for 1996; and progress with computerized MIS and plan for cooperatives.	Agriculture (Tree Crops) Training LITS Specialist	4.0
3 (1996)	Feb./March 1996	Retrospective review of 1995 program; progress in LITS; progress in plan for cooperatives; nursery improvement; research; and extension effectiveness.	Agriculture (Tree Crops) Nursery Specialist	4.0
3 (1996)	August/ September 1996	Progress in LITS; research; accounting and auditing; progress of 1996 agricultural program; staff and smallholder training; strengthening of cooperatives; and extension program for the post-project period.	Agriculture (Tree Crops) LITS Specialist Rubber Research Specialist	4.0
(1997)	Nov./Dec. 1997	Project Completion Report.	Economics/Financial Analysis Agriculture MIS	4.0

Malaysia
RISDA II Project
Rubber Yield Profiles

Rubber (Kg Dry Rubber/ha)

Years	With Project (Without LITS)		With Project (With LITS)		
	Individual/TSS	Group and Mini-Estate	Individual/TSS	Group	Mini-Estate
1/a	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
5	-	-	-	-	-
6	-	-	-	-	-
7	-	200	-	200	250
8	300	500	300	600	600
9	600	900	600	900	950
10	800	1100	800	1100	1100
11	1000	1200	1000	1200	1200
12	1100	1300	1100	1300	1350
13	1300	1400	1200	1400	1450
14	1400	1600	1300	1600	1600
15	1500	1700	1400	1700	1700
16	1500	1600	1500	1700	1700
17	1400	1600	1500	1700	1700
18	1500	1500	1400	1500	1600
19	1400	1400	1300	1500	1600
20	1200	1300	1400	1400	1600
21	1000	1200	1300	1400	1500
22	900	1300	1300	1300	1500
23	1000	1200	1200	1300	1400
24	900	1100	1200	1200	1400
25	900	1000	1100	1300	1300
26	800	900	1200	1300	1300
27	700	1100	1100	1200	1200
28	1000	1000	1000	1200	1200
29	800	900	900	1100	1100
30	600	700	900	1000	1100
Total Yield (Tons)	23.6	27.7	26	30.1	31.4
Years of Production	23	24	23	24	24
Mean Annual Yield/ha	1026 kg.	1154 kg.	1130 kg.	1254 kg.	1308 kg.

LITS = Low-intensity Tapping Systems

Individual = Individual Replanting

TSS = Simultaneous Replanting

Group = Group Replanting

a/ From land preparation to planting.

Malaysia
RISDA II Project
Oil Palm Yield Profile

Years	Oil Palm (Ton ffb/ha)			Extraction Rate (%)	
	Individual/TSS	Group	Mini-Estate	Oil	Kernel
1/a	-	-	-	-	-
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	2	12	4
5	3	4	5	12	4
6	6	8	8	14	4
7	10	12	12	16	4
8	12	15	15	18	4.5
9	14	17	17	19	4.5
10	16	19	19	20	4.5
11	17	20	20	20	4.5
12	18	20	20	20	4.5
13	18	20	20	20	4.5
14	18	20	20	20	4.5
15	18	19	19	20	4.5
16	17	19	19	20	4.5
17	17	19	19	20	4.5
18	16	18	18	20	4.5
19	16	18	18	20	4.5
20	15	17	17	20	4.5
21	15	17	17	20	4.5
22	14	16	16	20	4.5
23	14	16	16	20	4.5
24	13	15	15	20	4.5
25	13	15	15	20	4.5
26	12	14	15	20	4.5
27	12	14	14	20	4.5
28	11	13	14	20	4.5
29	11	12	13	20	4.5
30	10	11	12	20	4.5
Total Yield (tons)	356	408	415		
Years of Production	26	26	26		
Mean Annual Yield/ha	13.7	15.7	16.0		

Individual = Individual Replanting

TSS = Simultaneous Replanting

Group = Group Replanting

/a From land preparation to planting.

MALAYSIA
RISDA II PROJECT
RUBBER ECONOMIC FARMGATE PRICES

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
RSS 1 SPOT NY (US\$/TON) 1/	1080	1156	1170	1185	1200	1220	1231	1230	1228	1225	1222	1220
LESS: FREIGHT AND INSURANCE	150	150	150	150	150	150	150	150	150	150	150	150
FOB MALAYSIAN PORT (US\$/TON)	930	1006	1020	1035	1050	1070	1081	1080	1078	1075	1072	1070
EXCHANGE RATE	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
FOB MALAYSIAN PORT (M\$/TON)	2371.5	2565.3	2601	2639.25	2677.5	2728.5	2756.55	2754	2748.9	2741.25	2733.6	2728.5
LESS: RESEARCH CESS	40	40	40	40	40	40	40	40	40	40	40	40
MARKETING, PROCESSING ETC.	120	120	120	120	120	120	120	120	120	120	120	120
FARM-GATE PRICE FOR RSS 1	2211.5	2405.3	2441	2479.25	2517.5	2568.5	2596.55	2594	2588.9	2581.25	2573.6	2568.5
WEIGHTED FARM-GATE PRICE 2/	1990.35	2164.77	2196.9	2231.33	2265.75	2311.65	2336.90	2334.6	2330.01	2323.13	2316.24	2311.65

1/. IBRD May 1993 price projections adjusted to constant 1993 dollars using the MUV index.

2/. Weighted price estimated at 90% of RSSI price.

MALAYSIA
RISDA II PROJECT
OIL PALM ECONOMIC FARMGATE PRICES

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Palm Oil in US\$/ton 1/												
CIF NW Europe Price	424	370	360	350	340	335	327	320	315	310	300	288
Ocean Freight, Insurance, etc.	45	45	45	45	45	45	45	45	45	45	45	45
FOB price, Port Klang	379	325	315	305	295	290	282	275	270	265	255	243
Palm Oil in M\$/ton												
Exchange Rate	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
Port charge and transport	40	40	40	40	40	40	40	40	40	40	40	40
Ex-mill price	926.45	788.75	763.25	737.75	712.25	699.5	679.1	661.25	648.5	635.75	610.25	579.65
Palm Kernels in US\$/ton 1/												
CIF NW Europe Price	243	252	260	260	260	260	264	260	250	250	250	245
Ocean Freight, Insurance, etc.	45	45	45	45	45	45	45	45	45	45	45	45
FOB price, Port Klang	198	207	215	215	215	215	219	215	205	205	205	200
Palm Kernels in M\$/ton												
Exchange /rate	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55	2.55
Port charges and transport	35	35	35	35	35	35	35	35	35	35	35	35
Ex-mill price	469.9	492.85	513.25	513.25	513.25	513.25	523.45	513.25	487.75	487.75	487.75	475
FFB in M\$/ton												
20% oil +4.5% Kernels	206.44	179.93	175.75	170.65	165.55	163.00	159.38	155.35	151.65	149.10	144.00	137.31
Processing cost	30	30	30	30	30	30	30	30	30	30	30	30
Mill Purchase price	176.44	149.93	145.75	140.65	135.55	133.00	129.38	125.35	121.65	119.10	114.00	107.31
Transport to mill	15	15	15	15	15	15	15	15	15	15	15	15
FFB farm-gate price	161.44	134.93	130.75	125.65	120.55	118.00	114.38	110.35	106.65	104.10	99.00	92.31

1/ IBRD May 1993 price projections adjusted to constant 1993 dollars using the MUV index.

MALAYSIA
RISDA II PROJECT
ECONOMIC COSTS AND BENEFITS (M\$ MILLION)

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Benefits															
Rubber							5.61	28.02	69.9	117.08	155.64	180.34	202.53	224.73	246.92
Oil Palm					1.52	4.46	8.82	12.47	15.41	17.41	18.35	18.22	18.71	18.88	18.71
LITS on Mini-Estate /a	0.2	3.1	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
LITS on Smallholdings /b				1.25	3.75	7.5	12.5	18.75	25	25	25	25	25	25	25
Sale of Rubberwood /c	15	15	15												
Subtotal	15.2	18.1	23.2	9.45	13.47	20.16	35.13	67.44	118.51	167.69	207.19	231.76	254.44	276.81	298.83
Costs															
On-farm Costs of Rubber	73.26	95.34	105.6	42.54	30.84	30.72	35.88	58.74	62.92	104.64	109.02	113.52	113.58	112.86	110.34
On-farm Costs of Oil Palm	8.7	11.71	14.34	8.79	9.13	10.22	11.17	11.76	12.21	12.41	12.65	12.61	12.42	12.13	11.84
Rubber Nursery Improvement	0.4	0.4	0.4												
Infrastructure	5	5	5	1	1	1	1	1	1	1	1	1	1	1	1
Input Transport and Staff Travel	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1
Extension and Training	2	2	2	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal	92.36	117.45	130.34	54.33	42.97	43.94	50.05	73.5	98.13	120.05	124.67	129.13	129	127.99	125.18

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Benefits															
Rubber	258.02	258.02	252.47	244.15	230.28	208.08	191.43	183.11	177.56	169.24	155.37	149.82	152.59	152.59	138.72
Oil Palm	18.38	18.05	17.55	17.22	16.56	16.23	15.57	15.24	14.57	14.24	13.58	13.25	12.59	12.09	11.26
LITS on Mini-Estate /a	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
LITS on Smallholdings /b	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
Sale of Rubberwood /c															
Subtotal	309.6	309.27	303.22	294.57	280.04	257.51	240.2	231.55	225.33	216.68	202.15	196.27	198.38	197.88	183.16
Costs															
On-farm Costs of Rubber	107.46	102.78	98.16	94.74	92.52	89.82	86.94	84	81.24	78.72	76.26	73.98	72.06	68.94	64.08
On-farm Costs of Oil Palm	11.41	10.94	10.41	10.04	9.58	9.22	8.75	8.42	8	7.69	6.84	6.09	5.23	4.81	4.24
Rubber Nursery Improvement															
Infrastructure	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Input Transport and Staff Travel	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Extension and Training	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Subtotal	121.87	116.72	111.57	107.78	105.1	102.04	98.69	95.42	92.24	89.41	86.1	83.07	80.29	76.75	71.32

Economic Rate of Return = 14%

a/ These are benefits net of costs. Benefits include labor savings and an assumed 15% increase in yields due to reduced bark consumption and improved tapping.

b/ Mainly group replantings (TSBs). Benefits include labor savings and are net of costs.

c/ At M\$500/ha.

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RISDA II PROJECT

Selected Documents and Data in the Project File

A. Project Preparation Reports and Related Documents

1. Proposal for RISDA II Project --- Prepared by RISDA, Feb/March 1992
2. Defining Priorities for National Extension Intensification Programme under RISDA II --- Prepared by RISDA (undated)
3. Proposal for Smallholders Extension Intensification Program --- Prepared by RISDA, February 1993
4. Progress of RISDA MIS Program --- Prepared by the Information Technology Unit (ITU) of RISDA, March 1992
5. Proposal for RISDA MIS Program (1993-95) --- Prepared by the ITU of RISDA (undated)
6. Problems and Future Management of Mini-Estates --- Prepared by RISDA, November 1992
7. Proposed Nursery Management System --- Prepared by RISDA (undated)
8. Proposal to Develop the National Smallholders Institute for Development (NASHID) --- Prepared by RISDA, February 1993
9. RISDA II Project Training Program Proposal --- Prepared by RISDA, March 1993
10. Strengthening of Smallholders Cooperatives --- Prepared by the Cooperative and Social Development Unit of NARSCO, December 1992
11. RISDA II Project: Training Program Proposal for Rubber Smallholders Cooperatives --- Prepared by NARSCO, June 1993
12. Collaborative Development Projects for Malaysian Rubber Smallholder Sector --- RRIM Project Proposal (Original Proposal: November 1992; Revised Proposal: February 1993)
13. Proposed Planting Material Production for Smallholder Sector: Additional Option --- Prepared by RRIM, March 1993

14. Collaborative Development Projects for Malaysian Rubber Smallholder Sector --- RRIM's Responses to the World Bank's Aide-Memoire, June 1993
15. Proposal for Studies on Nutritional Aspects in Relation to Low Frequency Tapping Systems --- Prepared by RRIM, June 1993
16. Proposal for Study of Clonal Performance and Tree Dryness Incidence in Progressive Smallholdings --- Prepared by RRIM, June 1993
17. Proposal for Development of Physiological/Biochemical Parameters as Early Warning Indicators of Stress in Hevea Trees --- Prepared by RRIM, June 1993

B. Working Papers

1. Tables on Crop Budgets for Rubber and Oil Palm, Production, Farm Incomes, Project Costs, and Economic Analysis
2. RISDA's Staffing Position as of January 1993

