PN-ABD-301
isn=62780

International Science and Technology Institute, Inc.
Headquarters: 1129 20th Street, N.W., Washington, D.C. 20036
202/785-0831 • Telex 270785 ISTI UR • FAX 202/223-5538

MADAGASCAR

MARS PRIVATE SECTOR RICE STUDY

Prepared for:

Office of Private Enterprise
Bureau for Africa
Agency for International Development

Contract No. AFR-0438-C-00-5037-00

May 1987

M A D A G A S C A R

MARS PRIVATE SECTOR RICE STUDY

Prepared for:

Office of Private Enterprise
Bureau for Africa
Agency for International Development

Contract No. AFR-0438-C-00-5037-00

By:

Donald J. Rhatigan
International Science and Technology Institute, Inc.
1129 20th Street, N.W.
Washington, D.C. 20036

May 1987

TABLE OF CONTENTS

MARS Private Sector Rice Study

Page

TABLES

ACKNOWLEDGEMENTS

This report is based upon a four week field assignment in Madagascar during March/April 1987 by a two person consulting team of Donald J. Rhatigan and Peter McPherson Robinson.

Mr. Rhatigan was supplied by the International Science and Technology Institute, Inc. (ISTI) of Washington, D.C. at the request of USAID/ANTAN and under subcontract to AID/AFR/PRE. Mr. Robinson was recruited locally in Madagascar by USAID/ANTAN.

The report was prepared by Mr. Rhatigan, who accepts sole responsibility for its contents, in the Washington, D.C. offices of ISTI subsequent to his return from Madagascar.

The team wishes to thank Mr. Sam Rea AIDREP/Antananarivo and the other members of the USAID/ANTAN staff, the many public officials and private citizens of Madagascar, and the officials and consultants of multilateral and bilateral donor organizations who cooperated in the interview sessions, field trips, appointments and logistics necessary to carry out the study.

LIST OF ACRONYMS

BCDRM	-	Central Bank of Madagascar
BTM	-	Madagascar Agricultural Development Bank
CCCE	-	Caisse Centrale de Cooperation Economique (French bilateral agency
CDSS	-	County Development Strategy Statement
CEE	-	European Economic Community
CENAM	-	National Artisan Center
DVA	-	Directorate of Agricultural Extension
FAD	-	African Development Fund
FAO	-	Food and Agriculture Organization
FED	-	European Development Fund
FIFABE	-	Societe De Development De La Betsiboka
FNDE	-	National Economic Development Fund
FOFIFA	-	National Agricultural Research Organization
GDRM	-	Government of the Democratic Malagasy Republic
IBRD/IDA	-	World Bank/International Development Association
ILO	-	International Labor Organization
IMF	-	International Monetary Fund
IRRI	-	International Rice Research Institute
MARS	-	Madagascar Agriculture Rehabilitation Support Project
MPARA	-	Ministry of Agricultural Production and Agrarian Reform
NDF	-	National Development Foundation
NGO	-	Non Governmental Organization
PAM	-	World Food Program
RNCFM	-	National Railroad Service
SMV	-	Plant Material Service
SOMALAC	-	Societe' Malagasy d'Amenagement du Lac Alastra
UNDP	-	United Nations Development Program
UNICEF	-	United Nations International Childrens Fund
USAID	-	United States Agency for International Development

EXECUTIVE SUMMARY

The objectives of the MARS Project Private Sector Rice Study were twofold:

- analyze the structure of private participation in key rice related services and the potential for increasing private sector activity in these areas.
- develop scopes of work for further detailed studies (up to two person months each), to be funded by the FY 87 MARS Amendment for those areas that have significant potential.

USAID/ANTAN indicated that for planning purposes, the total provisional budget for the recommended studies should be in the range of $150,000.

Nine rice related services to be analyzed were specified in the scope of work. Two additional areas were added by the consultants:

- rehabilitation of the national extension service
- small holder access to credit

Analysis of the very broad and complex issue of land tenure structure and titling, and land reform was specifically excluded from the analysis.

The analysis of the eleven rice related services is presented in Part I of this report. The criteria for selection of priority activities for further private sector studies were developed by the consultants in conjunction with USAID/ANTAN.

The four priority study topics which were identified and for which detailed scopes of work have been prepared are listed below in order of priority, along with the provisional budgets for each study. The scopes of work themselves are found in Part II of the report.

	Study Title (abbreviated)	Provisional Budget (US $)
1.	Design parameters for small holder credit project	$ 70,000
2.	Study of plant quarantine legislation and seed multiplication centers	52,000
3.	Assessment of rural road private contractor capability	25,000
4.	Agricultural equipment and hand tool production study	27,000
	TOTAL	$174,000

The total provisional budget for the four recommended studies is $174,000. Any combination of three studies could be carried out for less than $150,000.

The sectoral analysis revealed several activities which, while not appropriate for MARS Project Amendment 1 Private Sector Studies, are important to further private sector development, and capable of being addressed within the scope of the overall USAID/ANTAN program. These are in order of priority:

1. Consideration of foreign exchange support for importation of fertilizer and other agricultural inputs.

2. Consideration of foreign exchange support for importation of commercial vehicle spare parts and rolling stock.

3. Implementation of household level fuel conservation feasibility tests for existing improved cook stove designs. If results are sufficiently promising; financial incentives for semi mechanized commercial scale production for entrepreneurs who are willing to carry out their own market research and business plan preparation. A suggested approach is outlined in Section 3.7.2 of the Part I text.

PART I

ANALYSIS OF PRIVATE SECTOR ACTIVITY IN RICE RELATED SERVICES

1. Background

1.1 Importance of Rice to the Madagascar Economy

Agriculture is Madagascar's dominant economic sector; it employs 85% of the population and accounts for about 90% of export earnings. Production and farming systems vary widely, with many commodities produced, but production in value terms is dominated by rice paddy (30%) and beef (16%). A small group of export crops (coffee, cloves and vanilla) accounts for about 15% of production but some three quarters of merchandise exports. Industrial crops, notably sugar and cotton, contribute about 7% of agricultural production value. Approximately 80% of total production comes from small holder activity, and small farmers (in the 1 to 2 has. range) are the backbone of Madagascar's agricultural economy. Over half of agricultural production by value is for subsistence and the share of subsistence production has slowly increased over the past decade.

It is estimated that approximately seventy percent of Madagascar's population is engaged in paddy cultivation. Although the state intervened heavily in rice marketing and distribution after the 1972 revolution, production itself has always remained in private hands.

Two basic production patterns account for virtually all of Madagascar's paddy production. Cultivation on small holder plots, generally of less than one hectare in extent, and most often with little potential for expansion of land under cultivation, is practiced on 85% to 90% of the approximately 1.2 million has. under rice cultivation. Plots can be either irrigated, flooded or rained, and typically, especially on the High Plateau, only one crop is produced annually. Most production (about 80%) is for family consumption, with relatively little marketable surplus. Production in some areas is even insufficient to satisfy subsistence requirements. Use of fertilizers and other technical inputs is sparse; nevertheless, the Madagascar small holder is quite skilled in extracting maximum possible output from his land, given the limited means at his disposal. The High Plateau region, in particular, from Antananarivo to Fianarantsoa is devoted almost exclusively to small holder production.

The second, more extensive pattern of cultivation prevails in the larger scale irrigation perimeters (120 - 150,000 has. total), most notably in Lac Alaotra and Maravoay/FIFABE. Average plot sizes are considerably larger (4 to 5 ha. in Lac Alaotra), irrigation is more highly developed and technical inputs more widely used. These rice surplus areas account for about one half of the domestically produced rice marketed in the major urban areas.

Though statistics in Madagascar must always be treated with caution, total net milled rice production in recent years is estimated to be in the vicinity of 1.2 million metric tons, of which only an estimated 15%-20% is commercialized, the rest being used for subsistence consumption. The High Plateau, the most densely populated region, is a rice deficit zone, having produced only 60% of its necessities in 1985. The other major deficit zones are the South (22% of consumption in 1985) and the extreme North (20% of consumption in 1985). The East Coast is at about the break even point. The major surplus zone is Lac Alaotra which produces five times its own needs, and the Center West.

1.2 Production Trends and Policy Since the 1970's

Performance of the agricultural sector in general has been poor since the mid 1970's. Between 1979 and 1983, agricultural production did not grow at all, and in 1975-1978 and 1984-85 periods, production growth was insufficient to keep up with population growth. Per capita rice availability has, in fact, declined significantly from 157 kg/yr. in 1980 to 136 kg/yr. in 1985. Rice production, foreign trade, and per capita availability trends for 1960-1985 are shown in Table 1.1. It is seen that the nation shifted from a position of net exporter in 1970 to having to import 351,000 thousand tons in 1982.

The causes of this disappointing performance are mixed and include structural as well as short term factors. The main elements have been: (a) a major expansion of Government control over production, processing and marketing functions between 1972 and 1983, which discouraged private sector investment in productive activities; (b) pricing policies which favored urban consumers but discouraged farmers from producing for the market; (c) increasingly overvalued exchange rates which, together with a deteriorating balance of payments situation, led to acute foreign exchange shortages, and (d) a public investments policy heavily emphasizing industrial development which, due to over design, weak management and foreign exchange shortages had poor results in terms of production. In addition to institutional and policy factors, the economic crisis which hit the country in 1979-80 and the subsequent world recession caused further shortages of local budgetary funds and foreign currency for sector operations.

The consequences of these converging trends included the breakdown of essential services to farmers in many rural areas, limited availability of production inputs, and inadequate incentives for increasing output. In particular, input marketing and investment credit in agriculture declined markedly, while the nationalized banks increasingly lacked financial resources due to having to finance parastatal debt.

Table 1.1

PRODUCTION DE PADDY, IMPORTATIONS, EXPORTATIONS ET DISPONIBILITES APPARENTES EN RIZ

(1960 - 1985)

ANNEE	Production brute de paddy	Production nette de riz (1)	Stocks Publics (2)	Importations (3)	Exportations (3)	Disponibilités apparentes	Population	Disponibilités par tête
	.....en milliers de tonnes.....						1000 h.	kg/tête/an
1960	1229	692	-	-	15	677	5409	125
1961	1263	711	-	-	13	697	5528	126
1962	1330	749	-	-	25	724	5650	128
1963	1377	775	-	2	22	755	5774	131
1964	1520	856	-	4	25	835	5901	142
1965	1445	813	-	70	10	873	6031	145
1966	1603	902	-	13	18	896	6164	145
1967	1706	960	-	-	36	925	6299	147
1968	1797	1011	-	1	65	947	6440	147
1969	1844	1038	-	43	52	1028	6587	156
1970	1946	1095	-	20	68	1048	6740	155
1971	1893	1065	-	61	36	1091	6899	158
1972	1924	1083	-	49	26	1105	7064	156
1973	1913	1077	-	96	6	1166	7237	161
1974	1844	1038	5	129	7	1155	7416	156
1975	1972	1110	-	64	5	1175	7604	155
1976	2043	1150	5	72	4	1212	7799	155
1977	2154	1212	9	95	2	1301	8003	163
1978	1868	1051	7	153	1	1204	8217	147
1979	2045	1151	-	156	1	1313	8439	156
1980	2109	1187	2	177	1	1361	8672	157
1981	2013	1133	8	193	-	1319	8915	148
1982	1970	1108	66	351	-	1396	9169	152
1983	2147	1209	120	179	-	1334	9425	142
1984	2131	1193	30	111	-	1304	9689	144
1985	2178	1220	-	106	-	1356	9960	136

Source : MPARA

(1) Après déduction des pertes et semences et application d'un coefficient de transformation de 0,67.

(2) En fin d'année.

(3) Des données parfois sensiblement différentes sont aussi fournies par l'INSRE (cf. Annexe n°1 bis).

The crisis in the agricultural sector, especially the decline in marketed output of food and industrial commodities, led to a fundamental rethinking of Government strategy in the early 1980's. Since 1983, government policy has recognized that the private sector has a positive role to play in the process of economic and agricultural development. The practical consequence of this policy change has been that the government, in principle, if not entirely in practice, now supports

- moving towards a free market system as a means of improving producer incentives

- liberalizing previously government controlled and operated markets for agricultural input provision and distribution, and the marketing and distri- bution of agricultural produce. Since 1984, in fact, rice marketing and input supply and distribution have legally been completely liberalized. In fact, the transition from state control to a market based economy has proceeded in a somewhat deliberate fashion, but is now essentially complete, with the exception of MPARA rice buffer stock operations whose function is to stabilize prices and discourage speculation.

USAID, in conjunction with the World Bank and IMF, has supported the policy reform towards greater privitization of the economy. The FY 1988 CDSS states that USAID's primary goal for Madagascar will be:

> "to assist Madagascar to realize its full agricultural potential."

The primary issue to be addressed in pursuit of this goal will be:

> "How shall Madagascar liberalize its agricultural sector?"

It was further stated in the CDSS that:

> "The primary objective of the U.S. economic assistance program in Madagascar must be the success of the current liberalization policy, beginning with agriculture, especially rice."

1.3 The MARS Project Amendment

Consistent with the stated strategy of the CDSS, funding was provided under the MARS Project Amendment 1:

> "to investigate how the private sector can be encouraged to provide goods and services needed to expand the production and marketing of rice."

This report presents the results of the first stage of this process. Part I includes a diagnostic of the current status of rice production and distribution, with particular emphasis on the evolution of the private sector's participation in these activities. Based upon the analysis, activities were identified for which further USAID supported study should prove useful - either for developing issues for policy dialogue purposes, or for identifying activities which might be of interest for eventual project development or project support. Scopes of work for four recommended studies are included in Part II of the report.

2. Study Approach

2.1 Basic Premise

The basic premise for the diagnostic study of the rice sector, as stated in the scope of work is that:

> "not enough is known about the financial/economic/ social structure of private participation in key rice related services and the potential for increasing private activity in these areas."

The nine key related services referred to in the scope of work are:

- Fertilizer import distribution and sale
- Seed importation, multiplication , distribution
- Small farm equipment, production and sale
- Rural road construction and repair, including manufacture of hand tools
- Rice hulling and milling agro industries
- Farm-mill-market rice transport
- Warehousing
- Construction and repair of irrigation infrastructure
- Low cost energy efficient cook stove manufacture for food preparation

Two additional areas not included above but considered essential to rice production in Madagascar were added by the consultants. These are:

- Access to credit, production inputs, and extension by small farmers who do not qualify for credit from established banking services
- rehabilitation of the national extension service

The very broad and complex issues of land tenure structure, titling, and land reform were not addressed in the analysis.

2.2 Study Objective

The study objective was to:

> "Analyze each of the listed areas of activity with a view towards identifying those where scope exists for effective promotion of increased private sector activity through support or policy dialogue by USAID or other donors with the Government of Madagascar. Based upon the analysis, prepare scopes of work for appropriate studies in priority areas to define possible future interventions."

It was indicated by USAID/ANTAN that the approximate budget available to finance the to be defined studies was $150,000. It was further agreed that the nature of the studies would be oriented towards assessment/definition of parameters for possible future intervention rather than project design activity.

The work plan for this study included one month of field work in Madagascar by a two person team, plus three additional weeks of report and scope of work preparation in Washington by one of the consultants.

2.3 Criteria for Selection of Priority Activities

In conjunction with USAID/ANTAN, the consultants developed the following criteria as a basis for selecting those activities to which priority should be given in the identification of further private sector development oriented studies:

- Non duplication of ongoing or planned studies/projects
- The nature of the activity is such that scope exists for effective action via the private sector
- Specific targeted activities rather than broader, more macro type study themes
- The nature of the activity is such that development agency policy dialogue/intervention carried out in a politically/diplomatically acceptable manner, given Malagasy sensitivities, can make a significant difference in the way things are done
- The action will, in fact, facilitate increased rice production and/or distribution

- Project/action recommendations emanating from the defined studies should be of a nature such that implementation can be carried out with a minimum of direct management support by USAID/ANTAN.

The non duplication criterion was considered particularly relevant due to the plethora of study and project activities now taking place in the agricultural and transport sectors which are being financed by multilateral donors such as the UNDP, FAO, ILO, the World Bank and French, German and other European bilateral donors.

3. Analysis of Private Sector Activity in Rice Related Services

The analysis of private sector participation in the eleven identified activities is presented below. The focus of analysis in each case was to assess whether or not there was a useful private sector role to play, whether or not it was already taking place, and whether USAID, through either policy dialogue or economic support of increased private sector participation, could effectively facilitate more efficient rice production and distribution.

3.1 Fertilizer Import, Distribution and Sale

3.1.1 Current Situation

All chemical fertilizer used in Madagascar is imported. A urea plant has been constructed at Tomatave, but for various reasons, both technical and economic, has never operated, and most likely never will.

In the pre liberalization era, fertilizer import and distribution was a state monopoly. CORBOI was the principal importing agency. Retail sales at subsidized prices took place at the approximately five hundred "points de stockage des intrants agricole" operated directly by MPARA. Fertilizer usage in the rice sector has traditionally been low, and in the years prior to liberalization had virtually ceased due to foreign exchange shortages and distribution-bottlenecks.1 Since the onset of liberalization, most of the MPARA operated warehouses have been leased to private operators; fertilizer is imported directly by private operators, with the exception of that used by SOMALAC and several remaining parastatal marketing organizations; transport and distribution has for the most part passed to private hands.

For 1987, it was reported that $8 million in foreign exchange has been allocated for fertilizer importation for all crops. Recent price quotations for 15-15-15 NPK, F.O.B. Europe have averaged $130/ton. Using an average C.I.F. price of $320/ton, the allocation would permit importation of 25,000 tons this year, more than in recent years, but still considerably less than the 40,000 tons/year consumed in 1948.

The FAO is financing a small ($400,000 over several years) pilot program to increase fertilizer usage in the rice sector. Both FAO and SOMALAC technicians report that crop response to fertilizer tends to be better in the High Plateau than in the Lac Alaotra and Maravoay regions due to:

- serious mineral deficiencies (P, K) of many unfertilized High Plateau soils.

1/ Fertilizer consumption in the rice sector was less than 1000 tons in 1983

- inherently better soils and higher yields on unfertilized soils in the Alaotra and Maravoay areas.

throughout Madagascar, the traditional seed varieties used do not respond as well to fertilizer as do the new improved "green revolution" varieties now in general usage in all other important rice producing nations. Given the heterogeneity of soils in the High Plateau, current dosage recommendations tend to be highly localized. This characteristic, combined with the virtual collapse of the extension service, and technically uninformed/ uninterested retail distributors, has rendered difficult the demonstration effect of economically feasible fertilizer usage at the small holder level. The FAO estimates that the 1987 consumption of fertilizer for rice production, exclusive of the SOMALAC supplied Lac Alaotra area, will be about 15,000 tons. Based upon an average dosage of 400 kg/Ha., 35,700 has. of the approximately 1,000,000 has. under cultivation outside of Lac Alaotra will be fertilized, obviously, an extremely low level of utilization.

The extremely low level of fertilizer usage is as much a manifestation of the structural problems impeding increased rice production in Madagascar, as it is a specific cause of low-productivity. Among the specific factors contributing to the low utilization levels which have been cited by MPARA and the FAO are:

- The foreign exchange scarcity which limits the volume of imports.

- Ineffective extension support in the small holder sector, compounded by technically uninformed retail distributors, and untimely availability of fertilizer.

- High cost of fertilizer at both C.I.F. and retail levels. The cost problem has been compounded by a recently observed tendency of distributors to form cartels, whereby each distributor monopolizes importation and marketing of a given formulation, creating essentially non competitive pricing for specific formulations.

- Lack of liquidity on the part of potential users.

At current and even optimistic future levels of fertilizer consumption, the transport bottlenecks of the immediate post liberalization period are not considered to present important constraints, in and of themselves, to increased fertilizer usage. The inventory of trucks is increasing, spare parts availability is not as problematic as before, and private sector distributors and merchants have proven to be capable of responding to market demands, notwithstanding that the service has been somewhat less

than ideal. Additionally, the major trunk highway and access road rehabilitation has greatly improved rural access over the last two years.

3.1.2 Recommendations

The major opportunity for specific USAID intervention in the fertilizer problem would be to make available additional foreign exchange for fertilizer importation.

The nature of the constraints to increased utilization at the user level is so broad and so fundamental (i.e., reconstruction of the agricultural credit and extension systems), that in comparison with the other activities analyzed, there is relatively little opportunity for the type of concrete private sector development oriented studies which would be appropriate within the context of the MARS Project Amendment.

It should be noted that the World Bank is planning a broad study of the issue of imported agricultural inputs distribution and utilization. It is tentatively scheduled for the second half of 1987.

3.2 Seed Importation, Distribution and Sale

3.2.1. Current Situation

Paddy yields in Madagascar are quite low when compared with nations which have produced "green revolutions" through the introduction and dissemination of improved seed varieties. Virtually all rice production in Madagascar is germinated from domestically produced seed varieties--either stock from the previous year's crop, or purchase from seed production centers. The latter range from the five large MPARA-operated farms such as that at Lac Alaotra (580 has.) to small private sector operations of an almost artisanal nature.

A necessary condition for improved yields lies in the introduction of improved "green revolution" varieties of seed. While the International Rice Research Institute (IRRI) has been working to develop new varieties with the support of USAID grant financing, its efforts have been seriously hampered by outmoded seed quarantine legislation and restrictions which have been motivated by a fear of introduction of pests and diseases to the

Island. IRRI staff state that in the case of rice, wheat and other grain seeds, the restrictions are totally without technical foundation.

There is currently a great deal of donor activity to attempt to upgrade the quality of the nation's seed stock. Among activities concerned with rice seed production are:

- The Lac Alaotra seed multiplication center at Amosiboribory, financed jointly by the World Bank, France and USAID and operated by MPARA
- The European Development Fund (FED) project at Manakara
- Catholic Relief Service projects at Ambahivahibe and Andilavienaenia
- An IFAD/FAO pilot seed multiplication center at Anosy (Fianarantsoa)
- A German KFW seed multiplication center at Maravoay, which supplies the FIFABE perimeter
- The USAID financed quality control laboratory at Nanisana

Five large rice seed multiplication centers, among which are those at Lac Alaotra, Maravoay, Anosy and Mankara, are among forty of all types operated by MPARA. The ministry has stated that as a matter of policy it wishes to retire from direct involvement in seed multiplication operations through the conversion of thirty of its multiplication centers into privately managed mixed enterprises, and closure of the other ten. Among those retained would be the five rice seed multiplication centers.

The FAO is about to initiate a project which is entitled, "Strengthening of the National Seed Service - Organization, Promotion, and Coordination of National Seed Production." Its objectives are all encompassing, to wit:

i) Develop a master plan for a national seed industry

ii) Assist in the development of sufficient private sector seed multiplication operations to satisfy the seed demand forecast of the national development plan

iii) Promote the introduction and utilization of improved seed varieties

iv) Provide technical assistance to the SMV for the management of the seed multiplication centers under its management

v) Establish an organization for quality control of national seed production

vi) Draft regulation for the protection of seed dealers, producers and users

vii) Develop a management plan and train counterparts of the SMV who will be involved in the project

In spite of the broad objectives, the project's budget for a four year period amounts to $1.5 million, almost all for the four man technical assistance team, and an FMG 2.75 billion ($3.5 million) GDRM counterpart contribution--mostly for personnel and fuel. There is no provision for financing of infrastructure or seed production facilities.

3.2.2. Recommendations

In order to allow the introduction and development of improved "green revolution" varieties of seed, to establish a "release committee" to pass on the suitability of new varieties, and to regulate a private sector oriented industry, it is absolutely indispensable that the enabling legislation and institutional organization envisioned in objectives v) and vi) above materialize.

The FAO project budget allows only $4,500 for a consulting lawyer and agronomist to carry out the legal studies and draft the required enabling legislation. This is considered by all concerned grossly insufficient for the purpose.

The FAO and the Division de L'approvisionnment of MPARA have expressed positive interest in having USAID, through the MARS Amendment funds, provide the required expertise in the form of a Madagascan lawyer and an expatriate seed center specialist, to carry out the required legal and organizational studies.

Given the specific nature of the task and its convergence with both government policy and need, the legal and organizational study is recommended as a high priority activity for inclusion in the study program.

3.3 Small Farm Equipment, Production and Sale

3.3.1 Current Situation

Agricultural equipment and hand tool supply and distribution in Madagascar is characterized by an essentially trimodal structure:

- Large four wheel tractors and accessory equipment: used primarily for sugar and cotton production and only occasionally for rice in extensive perimeters. All units are imported , primarily by the large import firms, as foreign exchange availability permits. At any given moment, an unsatisfactorily high percentage of the nation's tractor inventory is reportedly inactive due to lack of spare parts. The sector has

already benefitted from USAID support in the form of the foreign exchange made available for spare parts importation.

Smaller mechanical equipment, including threshers and reapers, animal traction ploughs, wheel barrows, etc.: SIDEMA, a parastatal, is the major active producer. Since 1983 it has been fabricating ploughs, wheel barrows and other simple equipment and importing small two wheeled tractors. Three factories that produce smal mechanized equipment were established at Tulear, Farafangana, and Lac Alaotra (Ambatondrazaka) in the late 1970's under the aegis of the parastatal TOLY. The first two are now closed, while the Lac Alaotra operation, after having closed briefly in 1986, has been reorganized as a mixed enterprise with the French firm, BELIN International as a 45% stockholder. Production will resume in July 1987 with a scheduled run of five hundred animal traction ploughs which will be marketed through SOMALAC. Private concerns reportedly also produce similar equipment, but no good aggregate data as to numbers and capacity is available.

USAID support of agricultural mechanization is channelled through the IRRI project. IRRI activity includes:

i) Assistance to FOFIFA in the organization of a farm mechanization program

ii) Advice to local fabricators on the fabrication of IRRI developed machines

iii) Demonstration and testing of IRRI developed machinery. IRRI will distribute design drawings of its prototypes free of charge to interested parties, but does not itself participate actively in the commercialization of machinery it has developed.

- Small hand tool production: almost exclusively the province of artisans producing in limited quantity for small local markets, generally using recycled scrap iron for raw material. Little of an aggregate nature is known about either demand or supply of agricultural hand tools, or of their suitability for Madagascar conditions. It has been the experience of some of the high labor intensity, rural road rehabilitation projects that hand tools used for construction purposes had persistent quality control related problems, most often eucalyptus wood shafts having proven too weak for the required service. The Centre Nationale de l'Artisan Malagasy (CENAM) is active in training producers of hand tools and providing marketing assistance. CENAM is not yet considered

to have had a major impact in these areas. USAID does not at present have any active program in support of hand tool production.

After two missions to Madagascar involving considerable field work, equipment testing and demonstration, an IRRI Los Banos staff agricultural engineer made the following conclusions and recommendations concerning mechanization for rice production in Madagascar. 1

i) There are abundant work animals in the country and their use should be encouraged in areas where their power and efficiency are adequate. The commonly used animal implements, the reversible steel plow, appear to be inappropriate both on the size and physique of the animals in the country. The cost of this implement is beyond the buying capacity of most farmers. The simple, lightweight and less costly animal plow used in many Asian countries should be tried. More efficient hand tools such as hoes and cultivators should be promoted and their fabrication should be encouraged.

ii) Large machines like 4-wheel tractors are not suitable on irrigated and water logged areas, such as those in Lac Alaotra and Maravoay, due to mobility problems. Heavy machines also make the hardpan deeper and deeper and more difficult to work. On such areas, skid supported tillers like the IRRI hydro-tiller or floating tiller appear to be better alternative.

iii) The potential of zero tillage planting of a second crop after the harvest of lowland rice should be explored to increase production at less input. Such a crop may be rice, wheat, maize or legumes. The RIP seeder and the inverted-T seeder are suitable equipment for this operation.

iv) In areas where labor shortages exist such as Lac Alaotra and Maravoay, the use of the mechanical transplanter, row seeder, harvester and thresher will increase labor productivity, reduce losses, and hence, generate more income for the farmers.

v) The local manufacture of farm machinery will help conserve some foreign exchange, establish rural industries and provide employment.

1/ Manalili I.C., Madagascar Trip Report 14 June - 08 July 1986 as transmitted to USAID/ANTAN by IRRI via memo dated 12 September 1986.

vi) To encourage local fabricators the government should relax import duties and taxes and facilitate importation of steel materials."

A market study recently completed for SIDEMA carried out a 385 sample survey of agricultural producers which attempted to establish a sample based inventory of agricultural implements and machinery and identification of opportunities and constraints to the development of the market for agricultural equipment, particularly that of SIDEMA.1 Among the principal conclusions of the study were:

i) There is a large unsatisfied demand for farm machinery and implements of the type produced by SIDEMA, TOLY, et al., and developed by IRRI (animal traction ploughs, small threshers, weeders, harrows, etc.)

ii) Lack of market sense and poor distribution networks, not ability to purchase, were the principal impediments to increased sales.

iii) The recycled pig iron used almost exclusively for raw material by artisans is supplied by CENAM and the Regie Nationale des Chemins de Fer (RNCFM). At a price of FMG 725/kg. it costs double the price of the imported steel used by SIDEMA and others with access to foreign exchange, who pay an average of FMG 350/kg.

iv) There is no current data available concerning the total national production of agricultural implements and hand tools.

v) Of the entire stratified sample of 385 households, rice was produced by 364 households on 1,074 Has., with a reported average yield of 1013 kg. rice/Ha. The average household consisted of nine members; i.e. two or three cultivating families, with an estimated disposable income of FMG 56,000 ($72) per capita annually.

vi) The survey disclosed no apparent shortage of hand tools as reported by responses, even though, by extrapolation, the analysts estimated that the existing inventory amounted to possession by perhaps only 50-60% of rice cultivating households.

vii) Sixty-six percent (66%) of those surveyed intend to purchase additional tools.

1/ RINDRA, "pour une meilleure commercialisation des produits de la SIDEMA," Oct. 1986.

viii) The principal equipment requested by rice cultivators were the plough, harrow, deweeder and spades (angady).

ix) Only 9% (or 33) of those surveyed had borrowed to purchase agricultural implements. Twenty six of the 33 or 7% of the entire sample of 385 had borrowed from the BTM.

x) Extrapolation of the survey data indicated that the current estimated inventory and percent of rice cultivators possessing essential implements was as follows:

Equipment	Estimated National Inventory	% of Rice Cultivators in Possession
Plough	178,000	15%
Harrow	166,000	14%

xi) Table 3.1 indicates the estimated inventory of major implements, various sources, and the SIDEMA consultants' estimate of the estimated annual market for each, based on analysis of the survey responses.

Table 3-1: Estimated Inventory and Annual Market For Machinery*

	ESTIMATED INVENTORY			RINDRA MARKET ANALYSIS		
Implement	CEEMAT Study 1984 (1)	BIT Study 1985 (2)	Rindra Survey 1986	Replacement	Unsatisfied Demand	Minimum Estimated mated Market
Plough	162,700	159,000	178,000	18,000	30,000	18-30,000
Cart	126,500	121,900	128,000	13,000	7,000	7-13,000
Weeder	41,600	55,100	100,000	6,000	5,000	5- 6,000
Harrow	140,700	144,600	166,000	24,000	24,000	24,000
Wheel-barrow	N.A.	26,600	64,000	10,000	5,000	5- 10,000

Source: (1) CEEMAT-SAMERAL: Study of equipment fabrication in factories of Tolv and SIDEMA, January 1984

(2) BIT: Preliminary market study for hand tools and agricultural equipment in Madagascar, February 1984

* NOTE: Data abstracted from RINDRA/SIDEMA report

The RINDRA study and the observations of IRRI confirm that:

- There is a substantial unsatisfied demand for proper agricultural equipment for rice cultivation.

- For whatever reasons, development of successful equipment prototypes in Madagascar is seldom followed by commercial scale production and marketing of these implements to meet the strong apparent demand.

- Virtually nothing is known about the supply/demand structure for hand tools.

3.3.2. Recommendations

The SIDEMA-RINDRA study indicates that there is an apparent unmet demand for agricultural equipment and to a lesser extent for hand tools. Nevertheless, a very basic question vital to allocation of donor support to equipment programs has not only not been answered, but apparently, has not even been asked. This is:

> "If, and to what extent, does the apparent unfulfilled demand for agricultural equipment and hand tools actually constrain production, harvesting and commercialization of rice?"

Additional equipment related issues for which better information is required are:

- Why is the agricultural equipment distribution system archaic to nonexistent and what can be done about it?

- If low equipment utilization is in fact an impediment to rice production, how can the private sector facilitate its resolution through more production and better marketing?

- Where in the order of constraints to production does the equipment problem fall vis-a-vis seed variety, fertilizer and credit scarcity, deficient extension service, etc.?

- How can the reported quality control problem of construction hand tools be resolved?

- Why is hand tool production frozen at the high unit cost artisan level? Does it make economic or social sense to mass produce those items and possibly drive artisans out of business in the process?

In order that some coherence can be assigned to the allocation of development resources to the equipment and tools issue, it is considered of high priority that a study be carried out to better define and address the above and other issues in this field.

3.4 Farm-Mill-Market Rice Transport

3.4.1 Current Situation

During the ten years following the 1972 revolution, Madagascar's then aging highway system received little maintenance and consequently suffered severe deterioration. Rolling stock and spare parts availability also declined, and parastatal transportation companies operated in a very inefficient fashion.

The overall situation was so bad that diagnostic reports prepared in the immediate post liberalization period listed transport and distribution bottlenecks as one of the major impediments to economic reactivation.

Since 1983, however, the GDRM, financed by the World Bank and various bilateral donors, has invested several hundred million dollars in highway reconstruction and rural road rehabilitation. The supply of rolling stock and spare parts has also greatly improved, assisted to a certain extent by the USAID program of foreign exchange support for spare parts importation.

As of April 1987, the following conditions prevailed:

- Rehabilitation of the Tomatave-Antonanarivo (369 km.); Antonanarivo-Fianarantsoa (410 km.) and Mahajanga-Antananarivo (578 km.) paved highways is virtually complete.

- The Lac Alaotra-Moramanga highway (133 km.) over which much of Antonanarivo's rice supply passes, is still all weather unpaved, but easily passable during the dry season harvest period.

- The Tulear and Tolanaro (Fort Dauphin) highways to Fianarantsoa still have long stretches in poor condition.

- The highway connection between Antsiranana (Diego Suarez) and Central Madagascar still has an unpaved 200 km. gap, which will be partially upgraded (bridge construction) in the near future.

- Rural road rehabilitation has improved conditions considerably and will be given continued emphasis in the World Bank VII Highway Project, and by bilateral donors. Much still remains to be done, however, to provide adequate farm to market access in key producing regions.

Inquiry among private transport operators at Tomatave indicated:

- that high cost and ready availability of spare parts remains a problem but not as serious as before.

- strong price competition currently exists on the Tomatave-Lac Alaotra Antananarivo-Fianarantsoa axis, indicative of adequate trucking capacity for current cargo volumes. A significant percentage of the nation's urban rice supply passes over this route.1

- Due to the recent ethnic disturbances, many trucks servicing Mahajanga and Tulear had shifted over to the Tomatave area, creating transport scarcities in the first two cities.

The above information indicates that while Madagascar's transport difficulties are far from resolved, the structural bottlenecks of pre-liberalization years are no longer quite as serious constraints to rice distribution and input provision as they were previously. It is recognized however that much of the rolling stock is old and/or in bad condition. Foreign exchange requirements for replacements will increase considerably within several years.

3.4.2 Recommendations

Transport bottlenecks have not been completely resolved. They do not, however, pose the major constraint to rice production and distribution as before. Given the already intense activity in the transport sector, and USAID's policy of not financing costly basic infrastructure, a low priority within the study budget is given to transport operations related study issues. At the macro level, further consideration should be given to renewal of foreign exchange availability for spare parts and rolling stock.

3.5 Rice Hulling and Milling Agro Industries

3.5.1 Current Situation

The aspects of the rice processing industry which have received major attention from donors are:

- the macro problem of milling capacity and the structure of the milling industry in the post liberalization era

- the development of "appropriate technology" solutions" to promote energy efficient decentralized rural milling operations.

Since 1984, virtually all commercial rice milling and husking is carried out by private operators, except in the Lac Alaotra and FIFABE perimeters. Even there, SOMALAC reports a sharp decline

---

1/ It should be borne in mind that this was the status in April 1987, prior to the onset of the High Plateau/Lac Alaotra rice harvest season.

in milling volume since private operators have been allowed to compete with its parastatal operation, which until recently has a monopoly on regional commercial milling operations.

According to FOFIFA statistics (see Table 3.2, Rice Mills, Husking Mills and Paddy Production by Province), 98 rice mills and 458 husking mills were distributed throughout the Island in 1984, with the heaviest density, as might be expected, in the Antananarivo area. The relative scarcity of commercial operations in Fianarantsoa, relative to its paddy production, is probably explained by the high incidence of on farm milled paddy for auto consumption in that province.

If an average productivity of 1.5 tons/hr. for rice mills and 0.4 tons/hour for husking mills is assumed,1 the estimated cumulative milling capacities were 700,000 tons/year for rice mills and 500,000 tons/year for husking operations. Based upon an estimated 400,000 tons/year paddy which is commercially milled (20% of total paddy production), the figures would seem to indicate considerable excess milling capacity, a situation which apparently also existed prior to the 1972 revolution. Actual milling capacity is undoubtedly less, given allowances for registered mills which are not actually operating, and the confirmed frequency of low productivity due to run down equipment and spare parts and fuel shortages.

1/ Abstracted from the "Rapport Final D'Une Mission de Reflerion sur le secteur rizicole Malgache," R. Hirsch, Caisse Central de Cooperation Economique, Jan 1986.

Table 3.2 Rice Mills, Husking and Paddy Production by Province*

Province	Rice Mills 1984 nb	%	Husking Mills 1984 nb	%	Paddy Production 1984 1 000 t	%
Antananarivo	40	43,0	268	58,5	403,6	18,9
Finarantsoa	10	10,8	7	1,5	547,3	25,7
Toamasina	23	24,7	104	22,7	551,7	25,9
Mahajanga	11	11,8	28	6,1	322,7	15,1
Toliara	6	6,5	24	5,2	159,3	7,5
Antsernana	3	3,2	27	5,9	146,4	6,9
TOTAL	93	100,0	458	100,0	2,131,1	100,0
Estimated Theoretical Capacity	700 000 t/an		500 000 t/an			

Source: AIRD Report 1984
MPARA (For regional distribution of production)

* NOTE: Table abstracted from "Rapport final d'une mission de relexion, et al; Annex 10

Many of the large rice mills are reportedly underutilized, particularly in Antananrivo and Tomatave, where many private mills were completely shut down between 1975 and 1982.

More recent figures than those of Table 3.2 indicate a strong trend towards reestablishment of old husking mills or establishment of new ones. One hundred sixty one (161) additional units had been registered by Dec. 31, 1985. During the same period, only one new and four reactivated rice mills were registered. The obvious conclusion is that for whatever reasons a strong spontaneous trend towards decentralized rural milling appears to be taking place. The implications of this trend are that:

- decreasing volume may force some of both parastatal and private rice mills to close.

- market forces already seem to be producing a shakeout which will benefit the more efficient producers.

- there is as yet no clear evidence whether in the long run producers will be better or worse off if the trend towards decentralized private milling operations continues.

The trend towards decentralized private milling operations, as noted in the statistics, has led to a resurgence of interest on the part of various donors in "appropriate technology" milling hardware, powered, ideally, by local power sources such as hydro-power. USAID has already financed the construction of a domestically fabricated water turbine powered mill at Ampefy. It is most notable for the fact that the highly skilled machine work required for fabrication was performed by Madagascan technicians.

The FAO, as part of its post harvest loss reduction project, has investigated the feasibility of promoting local manufacture of village scale rice hullers, and also, of using water power to drive them in selected sites in the Antsirabe/Betafo region.1

The conclusions and recommendations of the FAO consultant are reproduced as follows:

1. The hulling of rice at the village level would bring a number of benefits; an important one is that bran could be recovered and used as animal feed. This is not possible with hand pounding.

1/ R.W. Hitchings, "Small Scale Rice Dehulling and Water Power Potential in Madagascar," FAO, Nov. 1986.

2. The power source for village-scale hulling is an important area; the consultant carried out detailed investigations of the potential of manual power, engine power and water power in this application.

3. Hand-driven rice hulling machines using the Engelberg principle were found not to be viable, because insufficient power is produced. Machines already at the project site, which were claimed to be for manual operation, were found to be unworkable by hand.

4. It may be possible to build a hand-driven huller using the rubber roller principle. However, the rollers must currently be imported, and wear quickly. Japanese aid may in the future promote the local manufacture of machines using the rubber roller principle.

5. After reconditioning, one of the Engelberg-type hullers found at the project site (originally specified as hand-operated) was connected to a 5 hp motor; this configuration produced 150 kg./hr. of clean hulled rice. Such performance makes it suitable, technically speaking, for village use.

6. Eight sites in the Antsirabe/Betafo region were identified as potential locations for water-powered hullers.

7. A huller was designed, by the consultant, to be suitable for local manufacture. It incorporated several novel features, and required the minimum of steel in its construction. In the first tests, it was driven by a 5 hp motor, and produced 80% hulled rice at an estimated rate of 100 Kg/hr.

RECOMMENDATIONS (of the FAO consultant)

1. Detailed studies are required to determine the viability and the benefits of village-level rice dehulling machinery, and, if appropriate, to select sites for the introduction of this technology.

2. Further development is required for the low-cost 100 Kg./hr. huller, now in prototype form, before it is manufactured locally.

3. The Indian 'Amuda no. 3' and the Toly hullers both need to be reworked to optimize the design for small-scale manufacture, to save both production time and raw materials. This work could be carried out at the consultant's UK base.

4. Animal power should be considered as an alternative power source for rice hullers, based on relevant experience gained in other countries.

Indications are that decentralized milling, though still constrained by equipment, spare parts, fuel, and capital/credit scarcities, is one of the relatively few areas of the private economy which has exhibited some spontaneous dynamism. Nevertheless, a key question concerning the allocation of donor resources to support of local milling capacity development is posed on page 7 of the FY 1988 CDSS, i.e.

> "to what extent does the unavailability of local processing facilities pose a constraint on the actual production of rice and other agricultural products?"

In response to the question, it may be said that at this moment, there is no hard evidence, one way or the other. It must however be recognized that conditions are improving relatively rapidly. The current perception in the absence of hard data is that while milling capacity may be a problem in isolated local areas, there appears to be little indication that rice is not planted, nor does harvested paddy rot in field for lack of access to commercial threshing or milling. It is at the same time recognized that the quality of milled rice may not be up to export standards. There is however, little evidence at the time that significant price differentiation for quality will be paid by the relatively thin, relatively low income urban consuming market for milled rice.

3.5.2 Recommendations

The key issue concerning allocation of the project study budget is how, given the essentially decentralized nature of the evolving private milling industry, can USAID intervene in a cost effective manner to further its development?

At the micro level, support can be continued for Ampefy type demonstration projects or "appropriate technology" hardware development, neither of which is in any way a leveraged use of scarce resources. It must also be recognized that the track record for eventual commercial scale success of donor institution financed prototype hardware development is notoriously poor.

At the macro level, the problem always returns to the scarcity of foreign exchange in all sectors of the economy; and the unsatisfactory state of small industry credit availability. Neither is a situation exclusive to milling operations.

Given the factors presented above, particularly that it is not even certain if there is a serious problem, rice milling agro-industries specific studies are not recommended for inclusion in the study program.

3.6 Warehousing

3.6.1 Current Situation

For discussion purposes, rice warehousing can be classified in two categories; on farm or community post harvest storage and commercial storage.

The FAO, through its recently completed project, MAG/84/004, "Reduction of post harvest rice loss," has been most active in analyzing the topic of threshing and on farm storage losses. Among the major findings of the study, which concentrated on the Antsirabe, Lac Alaotra and Maravoay regions, were that:

- rice loss through manual threshing averaged 7% but could be reduced to 2% with the use of appropriately designed mechanical threshers
- post harvest storage losses tend to be small throughout Madagascar, and are not of a magnitude to induce individual farmers to invest in improved on farm storage facilities
- In Ansirabe, an important High Plateau small holder area, the establishment of community level warehouses was not considered necessary.

Hard data concerning commercial storage capacity was not available to the consultant. Informed opinion, however, indicated that in the major commercial rice handling centers; Tamatave, Antananarivo, Lac Alaotra and Maravoay, surplus capacity existed.

3.6.2 Recommendations

Commercial grain warehousing operations, when permitted to operate in an essentially private sector, market based environment, leave little opportunity for effective donor intervention beyond technical assistance for operations, and/or financing of additional capacity. Neither seems to be a pressing requirement in Madagascar at the present, nor does investment in on farm storage facilities. It is therefore recommended that warehousing not be considered as a topic for inclusion within the study program.

3.7 Low Cost, Energy Efficient, Cook Stove Manufacture

3.7.1 Current Situation

The "foyer ameliore," as it is known in French, is a wood or charcoal burning stove of the type generally used for cooking throughout large areas of the developing world. Various "appropriate technology" stoves of proven design have been developed by various donor organizations in a variety of nations.

Their advantage lies in the ability to substantially reduce charcoal or wood consumption through more efficient combustion. The economic benefit to individual users, and the ecological benefits to nations in the case of mass individual usage, is readily apparent.

In spite of its simple design, ease of fabrication and low cost, the "foyer ameliore" has never progressed beyond the artisan level in volume of either production, sales or use. The persistent lack of success of development institutions in promoting mass use and mass production of the "foyer ameliore" is a classic illustration of their seeming inability to bring appropriate technology solutions beyond the artisan or prototype level into the realm of commercial scale light industry.

One can only surmise why?

Perhaps the explanation lies in some combination of an obsession with the artisanal as opposed to the commercial, lack of market sense, failure to communicate with potential entrepreneurs, or the realization that once a prototype passes from the artisanal to the successful commercial stage, there is no longer a demand for recruitment of international "experts" as artisan fabrication specialists.

The situation in Madagascar seems to be no different. To quote the FY 1988 CDSS Annexes, page 8,

> "Hery Vao, MIEM's renewable energy resources group, is currently developing an intensive improved charcoal stoves strategy. This strategy will focus initially on a needs analysis examining the artisanal sector; marketing constraints, cooking habits and socio-economic analyses, followed by a program of design, testing and dissemination."

3.7.2 Recommendations

Inquiry confirmed that the above referenced study will be commencing shortly. It would obviously be redundant, and given its institutional context, futile to include funding for yet another study of the "foyer ameliore" within the MARS Project study budget.

What is required, if "foyer ameliore" usage is ever to begin to be promoted on a mass basis in a nation where deforestation is a serious issue, is a deinstitutionalization of the concept, i.e., transfer from the public sector/artisan/socio- economic analysis approach to an entrepreneurial/marketing focus.

USAID/ANTAN, as part of its private sector development focus, could initiate this process without the expenditure of any additional study funding, and on an informal basis. A suggested route could be:

- Assembly of what should be publicly available information on the various designs that have been developed from the ILO, UNICEF, UNDP, etc.

- Dissemination free of charge of design drawings to interested would be entrepreneurs/fabricators. They can easily be found through informal networking.

- If the fuel consumption economics vs. production cost looks interesting to any of the potential entrepreneurs, USAID through one of its funding mechanisms, would assist in the financing of start up and working capital for raw material if the entrepreneur would do his own market research and develop a viable business plan. Upon commitment to enter production, USAID might possibly assist in a public relations campaign advocating the economic benefits of the stove.

If the "foyer ameliore" is financially viable for producers at the hand made artisan level, there is no reason why it should not be viable for mechanically assisted fabrication with relatively inexpensive metal working machinery. Putting the concept to the test of the market is long overdue. If it is not viable there, it is hard to justify the continued efforts at duplicative institutionally supported development.

3.8 Construction and Repair of Irrigation Infrastructure

3.8.1 Current Situation

Rehabilitation of the nation's irrigation infrastructure will remain one of the high priorities of MPARA for the coming decade. Within MPARA, the construction and rehabilitation of irrigation infrastructure falls within the jurisdiction of the Direction de l'Infrastructure Rurale.

Irrigation systems are classified in four categories by MPARA:1

i) Les grandes perimetres: the large systems with 2500 ha. or more within the command areas and which generally require major infrastructure such as concrete dams and/or reservoirs. Examples include systems such as Lac Alaotra, Maravoay, Tabeza, Morandava, Mangoky, Mahavavy, etc. All construction work for the large

---

1/ This section abstracted from the PPI Schema Directeur, June 1986 by Lewis Berger Int, Inc.

systems is directly under the supervision of the DIR. About 80,000 ha. of rice cultivation are included in these large systems.

ii) Small irrigation perimeters (Petits Perimetres Irrigues or PPI) of 200 has to 2500 has. Construction by the public sector usually consists of derivation dams, and the primary and secondary canal systems. The tertiary and on farm, networks are normally self-help projects of the users associations. 140,000 has to 170,000 has. are included in this classification.

iii) The Microhydraulique perimeters are small developments with average command areas of 50 ha, which have been built essentially by user groups. They usually consist of earthen derivation dams and an unlined principal canal. A total of 500,000 has of land are irrigated in this manner. An Operation Microhydraulique project is financed by the FED. PL-480 funds have also been used to assist in dam construction.

iv) Family Scale Irrigation Schemes: About 150,000 has. total of simple run of river diversion schemes with command areas of between 1 has. and 5 has. are located in the High Plateau. Another concentration, generally of larger command areas (up to 10 ha) and also totaling about 150,000 has. is located in the forested areas of the North and North East.

A very ambitious program of rehabilitation of the PPI has been initiated in 1985. The goals are to rehabilitate parts of all the nation's 187 perimeters between 200 and 2500 has. Goals are 26,000 ha of rehabilitation by 1990 and 59,000 has. by 1995.

The funding committed for the 1986-1990 period (FNDE, BIRD/IDA, CCCE, FED, CEE) is about FMG16.4 billion ($21 million) versus an estimated construction cost of FMG 21.9 billion ($28 million). In addition, the objective of 25,900 has. for 1990 could be extended through utilization of food counterpart funds for smaller projects. It is anticipated that in addition to the above donors, USAID, FAD, PAM and others will be asked to participate USAID PL-480 funds have already been used in both the PPI and Microhydraulique programs.

3.8.2 Recommendations

Given the extent of activity and the number of actors already involved, including the Mission through the PL-480 program, there is little of incremental significance which could be accomplished through allocation of project study funding in this area. It is therefore recommended that none of the MARS project study budget be allocated directly towards feasibility studies for irrigation perimeter rehabilitation.

3.9 Rural Road Construction and Repair

3.9.1 Current Situation

As indicated in Section 3.4, Farm-Mill-Market Transport, primary and rural road construction and rehabilitation will proceed at a very intense pace for the next four years. Investment in the major program, the 7th World Bank Highway Project, which will also have other donor co-financing as well as GDRM government funding, is estimated to be of an order of magnitude of several hundred million dollars. Preliminary project planning calls for rehabilitation/reconstruction of 2800 km. of earthen surface rural access roads and periodic maintenance of 5000 km. over a four year period. At the urging of the World Bank, and in a major departure from its practice of recent years, the Ministry of Public Works has made a policy decision to contract out the work itself to private sector contractors and project supervision to private sector consulting groups.

It is desired that as much of the work as possible for the rural road rehabilitation and maintenance components of the project be executed by indigenous Madagascar firms rather than the large international contracting organizations. It is at the same time recognized that local contractor capacity is currently insufficient to take on this workload (perhaps $100 million or more in contract value) and that programs to expand and upgrade local capacity will be required to avoid substantial project implementation delays.

To begin to quantify the effort required, a survey of forty one small and medium construction enterprises in five provinces (all except Tolanaro (Fort Dauphin)) who had previously worked for the Ministry was carried out as part of the 7th Highway Project feasibility study.1

The survey focused on:

- availability and quality of labor, supervision and management
- technical competence and equipment availability
- overall capability to undertake rural road rehabilitation contracts
- experience in high labor intensity construction techniques.

1/ Renardet Engineering, "Inventaire des Resources Locales," Etude des Petites et Moyennes Enterprises, January 1987.

The results showed that thirty-six of the forty-one firms had annual billings of FMG 500 million ($640,000) or less. They were classified as small firms. Only seven of these thirty-six however, had billings greater than FMG 100 million ($130,000).

The five firms in the sample with billings of from FMG 500 million to FMG 5 billion ($6.4 million) were classified as medium enterprises.

The study concluded that based upon current financial capability and equipment availability and using conventional construction techniques, only five of the firms were capable of doing the periodic maintenance contracts and only one could handle rural road rehabilitation. It was considered, nevertheless, that through the use of high labor intensity techniques, which require only a tractor and a compactor by way of heavy equipment, that enterprises with annual billings of FMG 250 million ($320,000) or more would be capable of handling the proposed project work. Seven of the forty-one enterprises would be in this category.

The report emphasized that lack of finance and equipment, rather than human resources shortcomings were the major constraints. This finding is consistent with the virtually consensus positive judgment heard during the course of the consultants fieldwork concerning the high quality and trainability of Madagascan labor.

3.9.2 Recommendations

The World Bank and the Ministry of Public Works fully recognize that upgrading of contractor capacity in the areas of works financing and equipment procurement, technical training, works organization, and project and business management will be required to prevent serious delays in project implementation. The World Bank is currently (May 1987) beginning to assess these requirements, but has indicated that its budget for the assessment is quite limited.

The United States is headquarters for many firms with long experience in international contracting and working with host country construction subcontractors. The consulting resources from which USAID can draw are therefore extensive. Support for upgrading of recipient country private sector contracting capability is an activity consistent with USAID's worldwide private sector development strategy. It is therefore recommended that MARS Project study resources be used to provide a consultant with extensive international construction contracting experience to work with the Sindicat de Entrepreneurs, in coordination with the Ministry of Public Works, the World Bank and international contractors present in Madagascar to define the measures and programs necessary to upgrade domestic Malagasy contracting capability to be able to meet the demands which will be imposed

of the 7th Highway Project. While a provisional scope of work for the study has been included in Part II of this report, it will require amendment pending the results of the Bank's preliminary assessment.

The World Banks officials concerned with the 7th Highway Project have reiterated the Bank's request that liaison with USAID/ANTAN be maintained concerning the eventual utilization of USAID/ANTAN MARS Private Sector study funds for the detailed assessment of training needs.

3.10 Agricultural Extension Service

3.10.1 Current Situation

Except for certain parastatals such as SOMALAC, FIFABE, etc. and certain specialized cash crop oriented extension services, (cotton, tobacco, coffee, clove), the Direction de la Vulgarisation Agricole (DVA) of MPARA is in charge of agricultural extension throughout the nation.

It is generally recognized that the quality and scope of DVA coverage among rice cultivators has virtually disintegrated over the course of the last fifteen years. It is also generally accepted that pay as you go, user supported, private extension services work well only in prosperous cash crop environments with strong producer associations. By process of elimination, the only practical alternative for large scale coverage of small holder rice cultivation is the reconstruction of a national public sector extension service.

The World Bank has been addressing the extension problem for some time. It will soon fund a comprehensive study whose eventual objective will be the preparation of a master plan for reorganization of the DVA. The study itself is projected for eighteen months, to start in July 1987. Implementation will obviously be several years away.

3.10.2 Recommendations

Given the scope of the problem and the necessarily public sector oriented operation of a renewed extension service, extension service renewal is not considered an appropriate theme for study within the scope of the MARS contract. In the future, financial and technical assistance to support implementation of the reorganization plan should be considered .

3.11 Small Holder Access to Credit

3.11.1 Current Situation

It is now quite evident, three years after the liberalization of producer prices, that significant increases in paddy yield on land currently under cultivation are still limited by a series of

non-price constraints, among which are unavailability of improved seed varieties, fertilizer and other technical inputs, inadequate extension service, poor equipment, etc. Underlying these constraints, and in fact perpetuating them, are serious liquidity constraints at both macro and micro levels -- foreign exchange at the macro level; and at the micro level, lack of access to production and development credit by a large majority of rice cultivating small holders. Unless the credit constraint can be substantially ameliorated, the potential for introduction of the input intensive "green revolution" cultivation systems which will be required to significantly raise yield levels will be limited, even if extension service coverage were to be measurably improved.

The World Bank has observed that:

> "Madagascar has not had a coherent agricultural credit policy for some years. In practice, banks have traditionally directed the bulk of their lending to the industrial and commercial sectors because they are more profitable. In the agricultural sector, banks have extended development and seasonal credits mostly to large farms and to government institutions and companies. Credit for small farms has been very limited with the exception of certain development projects with a small holder credit component."1

The $4.0 million credit line to the BTM for relending to the agricultural sector which will be furnished via the World Bank's Second Agricultural Credit Project will do very little towards easing the credit constraint for small holders. Its target group of beneficiaries will be small and medium enterprises in the private agricultural and agribusiness sectors. Conversely, the Bank's First Agricultural Credit Project, whose implementation began in 1981, was very clearly targeted towards extending credit to the small holder sector. Potential beneficiaries were to be 1.5 million small holder families with holdings of five hectares or less. Loans were to be extended on an individual basis, and local village organizations were to be used as intermediaries.

The scheme proved unsuccessful for a variety of reasons, among which were political interference and administrative arrangements too complex for village institutions to manage competently. Consequently, arrears rates were high. By 1983, as a result of sanctions imposed by the BTM on delinquent loans, only about one third of Madagascar's villages were still eligible for credit. Actual BTM lending to the small holder sector was so small that project funds were no longer used for this purpose.

1/ Paragraph 3:08; Staff Appraisal Report: Madagascar Second Agricultural Credit Project, the World Bank, November 1986.

The credit situation for small holders has not materially changed. Except for areas such as Lac Alaotra and MARAVOAY/ FIFABE where credit is managed in conjunction with major development schemes, access of small holders to BTM or other bank credit is extremely limited.1

In spite of these prior difficulties, and high operating costs, small holder lending remains a priority objective of the World Bank's agricultural recovery strategy for Madagascar. As part of the 2nd Agricultural Credit Project, a study will be carried out to formulate a small holder oriented national policy for agricultural production and development credit. The policy study, however, will focus only on the provision of institutional credit (i.e., through the formal banking system) in a manner which will be consistent with the general credit policy of the Central Bank (BCRDM). The possible provision of small holder redit through other, perhaps more flexible channels, will not be addressed in the study.

Terms of reference for this study are now being prepared. It is expected that it will begin during the 2nd half of 1987.

3.11.2 Recommendations

An increasing body of evidence from many developing countries has been accumulating in recent years vis a vis the characteristics of successful and unsuccessful design and implementation of small holder credit projects.

Among the more frequently noted observations are:

- institutional credit disbursed with little supervision and/or where political considerations enter into credit decisions is often perceived by small holders as a form of a non-reimbursable grant rather than a financial obligation, with predictable consequences for payback rates.

- Lending to individual producers via the intermediary of a producer association, with group rather than individual contractual responsibility for repayment, generally results in much lower default rates.

- Very few agricultural small holders anywhere can meet the usual collateral requirements of institutional credit. Special collateral arrangements emphasizing personal and group guarantees must be substituted for conventional collateral arrangements.

1/ Recall that the SIDEMA agricultural equipment market study showed that only 33 of 385 families in the sample had used credit for equipment purchases.

- Successful small holder credit projects require high operating costs relative to loan value due to the necessity for close administrative and technical supervision in order that the credit be used in the manner intended.

- Credit projects work better if the beneficiaries perceive that they will gain increased economic control over their own resources, and begin to exercise decision making power for themselves rather than depending on others to decide for them. The opposite situation, resource use decisions being dictated from above, quite often produces opposite results.

It also has been observed that the more positive of the characteristics noted above can be more easily integrated into the type of smaller, "customized" credit operations managed by private nongovernmental organizations (NGO's). Conversely, some of the less favorable characteristics (e.g. property or deposit based collateral, top-down planning) tend to be incorporated in institutional credit programs, a fact to which the results of the First Agricultural Credit Project small holder credit program bears witness.

Currently in Madagascar, institutional credit is not flowing to small holders, and private NGO credit programs don't exist. Indications are, however, that the level of community organizational ability required for successful private sector small holder credit programs exists in abundance, as is amply demonstrated by the user group organization in the small perimeter (PPI) and microhydraulique irrigation user groups.

Given the virtually total absence of credit access at the small holder level, and its necessity if the nation is to become self sufficient once again in rice production; all avenues of improving the situation should be explored. It is therefore recommended that highest priority should be given in the use of MARS Project study funds to a preliminary study to define the cultural, institutional and economic parameters required for successful implementation of nongovernmental organization (NGO) managed small holder credit operations. Investigation of this avenue of resolving the small holder credit crisis would be completely complimentary with the World Bank study concerning a policy for the provision of small holder credit through public sector institutions. It would also be consistent with USAID's strategy of helping small farmers and with promoting private sector solutions to problems where they are appropriate.

4. Selection of Priority Activities for Private Sector Studies

Table 4.1, MARS Private Sector Rice Study: Summarized Recommendations, summarizes the recommendations for USAID's further participation in each of the eleven rice sector related activities analyzed in Section 3. The recommendations have been based upon the criteria discussed in Section 2.3 of this report; and in consideration of the estimated $150,000 available for private sector studies within the MARS Project Amendment 1 budget.

4.1 Recommended Private Sector Studies

The four priority study topics which were identified, and for which scopes of work have been prepared are listed below. In order of priority, they are:

1. Cultural, institutional and economic parameters for NGO managed small holder credit operations

2. Study of legal and organizational issues related to introduction of new seed varieties and divestiture of rice seed multiplication centers

3. Assessment of training requirements for upgrading of private contractor sector for rural road rehabilitation and maintenance

4. Study of small agricultural equipment and hand tool production, distribution and utilization for rice production.

The scopes of work for these studies will be found in Part II of this report.

4.2 Additional Recommended Actions in Support of Private Sector Development

The analysis of Section 3 revealed several activities, which while not appropriate for private sector studies, are both important and attainable within the constraints imposed by the nature and scope of the USAID/ANTAN overall program. These are, in order of priority:

1. Consideration of foreign exchange support for fertilizer and agricultural input importation

2. Consideration of foreign exchange support for commercial vehicle spare parts and rolling stock importation.

3. Implementation of household level fuel conservation feasibility tests for existing improved cook stove designs. If results are commercially promising, financial incentives for commercial scale production. A suggested approach is outlined in Section 3.7.2.

Table 4.1, Mars Private Sector Rice Study

Summarized Recommendations

	Activity	Recommendations
1.	Fertilizer import distribution and sale	No private sector study. Consider additional FOREX support for imports.
2.	Seed importation, distribution and sale	Legal/organizational study to draft enabling legislation, develop plan to facilitate introduction of improved seed varieties and establishment of private or mixed enterprise rice seed multiplication and production centers.
3.	Small farm equipment, production and sale	Study to assess if current level of availability and use is important constraint or not to rice production, and to make recommendations vis a vis improved production, distribution, and use.
4.	Farm-mill-market rice transport	No private sector study Consider FOREX support for spare parts/rolling stock import.
5.	Rice hulling and milling agro industries	No private sector study.
6.	Warehousing	No private sector study.
7.	Low cost, energy efficient cook stove manufacture	No private sector study. Mission support for household fuel conservation study of existing designs; financial incentives for commercial production.
8.	Construction and repair of irrigation infrastructure	No private sector study.

9.	Rural road construction and repair	Study to assess training requirements to upgrade private contracting capacity to meet demands imposed by rural road rehabilitation and maintenance component of World Bank 7th Highway Project.
10.	Agricultural Extension Service	No private sector study. Future considerations of technical assistance and financial support for extension service reorganization plan.
11.	Small holder access to credit	Study to define cultural, institutional and economic parameters for NGO managed small holder credit operations.

PART II

SCOPES OF WORK FOR RECOMMENDED PRIVATE SECTOR STUDIES

SCOPE OF WORK

Design Parameters for Small Holder Credit Project

INTRODUCTION

Part II of this report presents the detailed scopes of work for the four recommended private sector studies to be financed via the MARS Project Amendment 1 budget.

The provisional budgets for the studies are summarized as follows:

	Study Title	Provisional Budget
1.	Design parameters for small holder credit project	$70,000
2.	Study of plant quarantine legislation and seed multiplication centers	$52,000
3.	Assessment of rural road private contractor capability	$25,000
4.	Agricultural equipment and hand tool production study	$27,000
	TOTAL	$ 174,000

Each of the four proposed studies is designed to be carried out in a two-three month calendar period. The first two studies call for two expatriate and one Madagascan consultant for each study. The private sector contractor and agricultural equipment studies call for one expatriate consultant plus one local counterpart each, with the counterpart to be provided by USAID/ANTAN.

The total provisional budget for the four studies is $174,000. Any combination of three studies as currently budgeted could be carried out for less than $150,000.

It is emphasized that the scopes of work should be reviewed prior to implementation with both the relevant GDRM agencies and other donors, in order to avoid inadvertent duplication and to maximize complementarily of effort.

A. Background

It is now quite evident, three years after the liberalization of producer prices, that significant increases in paddy yield on land currently under cultivation are still limited by a series of non-price constraints, among which are unavailability of improved seed varieties, fertilizer, and other technical inputs, inadequate extension service, poor equipment, etc. Underlying these constraints, and in fact perpetuating them, are serious liquidity constraints at both macro and micro levels -- foreign exchange at the macro level; and at the micro level, lack of access to production and development credit by a large majority of rice cultivating small holders. Unless the credit constraint can be substantially ameliorated, the potential for introduction of the input intensive "green revolution" cultivation systems which will be required to significantly raise yield levels will be limited, even if extension service coverage were to be measurably improved.

The $4.0 million credit line to the BTM for relending to the agricultural sector which will be furnished via the World Bank's Second Agricultural Credit Project will do very little towards easing the credit constraint for small holders. Its target group of beneficiaries will be small and medium enterprises in the private agricultural and agribusiness sectors. Conversely, the Bank's First Agricultural Credit Project, whose implementation began in 1981, was very clearly targeted towards extending credit to the small holder sector. Potential beneficiaries were to be 1.5 million small holder families with holdings of five hectares or less. Loans were to be extended on an individual basis, and local village organizations were to be used as intermediaries.

The scheme proved unsuccessful for a variety of reasons, among which were political interference and administrative arrangements too complex for village institutions to manage competently. Consequently, arrears rates were high. By 1983, as a result of sanctions imposed by the BTM on delinquent loans, only about one third of Madagascar's villages were still eligible for credit. Actual BTM lending to the small holder sector was so small that project funds were no longer used for this purpose.

The credit situation for small holders has not materially changed. Except for areas such as Lac Alaotra and Maravoay/ FIFABE where credit is managed in conjunction with major development schemes, access of small holders to BTM or other bank credit is extremely limited.

Small holder lending remains a priority objective of the World Bank's agricultural recovery strategy for Madagascar. As part of the 2nd Agricultural Credit Project, a study will be carried out to formulate a national policy for agricultural production and development credit, particularly for small holders. The policy study will focus, however, only on the provision of institutional

credit (i.e., through the formal banking system) in a manner which will be consistent with the general credit policy of the Central Bank (BCRDM).

In spite of the past difficulties encountered in attempting to serve the credit requirements of the small holder sector through the formal banking system, neither the World Bank nor the bi-lateral donors active in Madagascar are at present considering alternative non-public sector schemes for reaching small holders.

An increasing body of evidence from many developing countries has been accumulating in recent years vis a vis the characteristics of successful and unsuccessful design and implementation of small holder credit projects.

Among the more frequently noted observations are:

- institutional credit disbursed with little supervision and/or where political considerations enter into credit decisions is often perceived by small holders as a form of a non-reimbursable grant rather than a financial obligation, with predictable consequences for payback rates.

- Lending to individual producers via the intermediary of a producer association with group rather than individual contractual responsibility for repayment generally results in much lower default rates.

- Very few agricultural small holders anywhere can meet the usual collateral requirements of institutional credit. Special collateral arrangements emphasizing personal and group guarantees must be substituted for conventional collateral arrangements.

- Non-governmental agencies have proven to be useful in bridging the gap between the small holder and the credit system. Because of their closeness to the small farmer and the community, non-governmental agencies and their personnel can often make personal, subjective judgments about the credit worthiness of a person or an association. This may open the way to extend credit, not so much on the basis of collateral which the small farmer often does not have, but on the basis of knowledge and judgment of the person in question.

- Successful small holder credit projects require high operating costs relative to loan value due to the necessity for close administrative and technical supervision in order that the credit be used in the manner intended.

- Credit projects work better if the beneficiaries perceive that they will gain increased economic control over their own resources, and begin to exercise decision making power for themselves rather than depending on others to decide for them. The opposite situation, resource use decisions being dictated from above, quite often produces opposite results.

It has been observed that the more positive of the characteristics noted above can be more easily integrated into the type of smaller, "customized" credit operations managed by private nongovernmental organizations, (NGO's) or national development foundations (NDF's). Conversely, some of the less favorable aspects tend to be found more often in institutional credit programs, a fact to which the results of the First Agricultural Credit Project small holder credit program bears witness.

NDF's typically offer to their clienteles:

- Credit assistance for productive activities to groups who are not credit worthy in the eyes of traditional lending institutions.

- Promotional assistance through which general and administrative training is offered to beneficiary groups.

- Technical assistance to beneficiaries for development or implementation of NDF financed projects.

Currently in Madagascar, institutional credit is not flowing to small holders and private NGO/NDF credit programs don't exist. Indications are, though, that the level of community organizational ability required for successful private sector small holder credit programs exists in abundance, as is amply demonstrated by the user group organization in the small perimeter (PPI) and microhydraulique irrigation user groups.

Given the virtually total absence of credit access at the small holder level, and its necessity if the nation is to become self sufficient once again in rice production; all avenues of improving the situation should be explored. The focus of this study will be to investigate whether or not the conditions required for successful implementation of nongovernmental organization (NGO) managed small holder credit operations exist in Madagascar. Investigation of this avenue of resolving the small holder credit crisis would be completely complimentary with the World Bank study concerning a policy for the provision of small holder credit through public sector institutions. It is also consistent with USAID's strategy of helping small farmers and with promoting private sector solutions to problems where they are appropriate.

B. Objectives

The objective of this study will be to define the cultural, institutional, and economic parameters required for the organization of NDF's or similar organizations, and the design of successful NDF managed small holder credit projects in Madagascar. It is intended that the results of this study will provide the basis for the eventual design of several demonstration private NGO operated credit projects whose revolving funds could be financed through USAID/ANTAN sources. They would ideally coincide with some of the small or micro-hydraulique perimeters whose rehabilitation is being funded by PL 480 funds.

C. Statement of Work

Achievement of the study objectives will require a twin focus. The first will be the definition of an institutional environment favorable to the establishment of private, non governmental development organizations within the Madagascan polity. The second will be the definition of the socio/economic and cultural characteristics of credit beneficiaries at the village level, a prerequisite to the design of meaningful participatory self help projects capable of being financed through NGO managed credit.

To address these issues, the following tasks will be carried out:

1. Establish contact with PVO's currently operating in Madagascar (e.g. Catholic Relief Service, etc.) for purposes of familiarization with program context, operating environment, etc.

2. With the collaboration of USAID/ANTAN and MPARA select several small holder irrigation perimeters in the High Plateau region for purposes of conducting field work.

3. Conduct appropriate socio/economic and anthropological analyses among populations of selected perimeters. The focus will be to gain a sufficient understanding of community social and economic dynamics in order to be able to define alternative schemes of beneficiary organization for the purpose of utilizing non-institutional credit and extension.

   The consultant will at his discretion use whatever may be the appropriate methodologies, given the social context and study time constraints to carry out the research (e.g. individual or group interview, informal survey, etc.) Among themes to be investigated are formal and informal community leadership structures, interest/potential for group self help; perceived needs, role of government in community life, current

organization for water management and rice production, current sources and uses of credit and inputs, and any others considered relevant to the study objective.

4. Assess the political, cultural, economic and social superstructure with a view towards identifying groupings or organizations with the interest in and potential for establishing private, non-profit, organizations for promoting rural self help and management of non-institutional small holder credit.

5. Assemble information on legal requirements for establishment of private non profit service organizations.

6. Use any additional information sources as required in order to carry out study objectives.

7. Based upon study research, propose several possible organizational alternatives for promoting flow of non-institutional credit to small holders who do not qualify for formal institutional credit.

8. Identify requirements for additional studies which will be required in pursuit of the eventual goal of implementing demonstration projects for NGO management of small holder credit operations, and prepare scopes of work for these studies.

D. Reports

The consultants will prepare a draft final report which will contain:

1. A profile of the characteristics of the small holder village structure in the perimeters studied based upon the field research.

2. An assessment of the potential for establishment of NGO's for the purpose of providing credit to small holders.

3. Based upon study results, formulate alternate organizational proposals for establishment of NGO managed small holder credit projects.

4. Proposed scopes of work for additional studies necessary for project identification purposes.

E. Study Schedule and Team Composition

A calendar period of three months is foreseen for the study. The study team will consist of an anthropologist or sociologist who will serve as team leader; an agricultural economist/small holder

credit specialist and a Madagascan consultant economist, sociologist, or anthropologist. The team leader's participation will be three man months, including one week of preparation/ research in Washington, 10 weeks of field work in Madagascar, two weeks for final report preparation in Washington and four days travel. The agricultural economist/credit expert will participate for four weeks in Madagascar during the second half of the team leader's field work. The local Madagascan consulting economist or sociologist will participate in the study during the ten week field study period.

F. Expertise Required

1. Team Leader: M.S. or Ph.D. Anthropologist or Sociologist. Must have prior field experience in Madagascar; and must have prior experience with the private voluntary organization environment in at least an evaluation capacity or working directly with PVO's, if possible. Ability to communicate effectively in French and Malgache without assistance of translator mandatory.

2. Agricultural Economist/Credit Expert: M.A. or Ph.D in economics, prior experience with small holder agriculture in developing nations. Prior experience in PVO environment at least at the evaluation level. Prior experience in Madagascar desireable but not mandatory. Ability to communicate effectively in French mandatory.

3. Madagascan Consultant: Professional credentials in economics, sociology anthropology or related discipline; prior extensive field work at village or small perimeter level in Madagascar mandatory; ability to be effective in interpersonal contact at all levels of Malgasy society. Fluent French and Malgache.

G. Provisional Budget

1. Team Leader:

Fee: 80 days @ $400/day	$ 32,000
Per Diem: (70 days x $80) ($170 x 2)	5,840
Air Fare & Misc. Travel	4,000

2. Agricultural Economist:

Fee: 30 days x $260 x 1.2	9,360
Per Diem: (30 x $80) + ($170 x 2)	2,740
Air Fare & Misc. Travel	4,000

3. Malagasy Consultant		
60 days @ 100/day		6,000
4. Miscellaneous Expenses		5,000
	Total	$ 68,940
	SAY	$ 70,000

SCOPE OF WORK

Study of Plant Quarantine Legislation and Seed Multiplication Centers

A. Background

Paddy yields in Madagascar are quite low when compared with nations which have produced "green revolutions" through the introduction and dissemination of improved seed varieties. Virtually all rice production in Madagascar is germinated from domestically produced seed varieties -- either stock from the previous years crop, or purchase from seed production centers. The latter range from large MPARA-operated operations such as that at Lac Alaotra (580 has.) to small private sector operations of an almost artisanal nature.

A necessary condition for improved yields lies in the introduction of improved "green revolution" varieties of seed. While the International Rice Research Institute (IRRI) has been working to develop new varieties with the support of USAID grant financing, its efforts have been seriously hampered by outmoded seed quarantine legislation and restrictions which have been motivated by a fear of introduction of pests and diseases to the Island. IRRI staff state that in the case of rice, wheat and other grain seeds, the restrictions are totally without technical foundation.

Five large rice seed multiplication centers, among which are those at Lac Aloutay and Maravoay are among the forty seed centers of all types operated directly by the Direction de L'Approvisionnment Agronomique (DAA) of MPARA.

If seed renewal every four years on the 900,000 has of rice cultivation under irrigation were to be fixed as an objective, albeit a very modest one, for a seed renewal program, 10,000 metric tons of production of improved seed would be required annually. This quantity reportedly is not capable of being produced in the centers managed by the DAA, one of the reasons for which the DAA wishes to promote the establishment of private farms, specialized in rice seed production. Additionally, the Ministry has stated that as a matter of policy it wishes to retire from direct involvement in seed multiplication operations through the conversion of thirty of its multiplication centers into privately managed mixed enterprises -- and closure of the other ten. Among those retained would be the five rice seed multiplication centers.

The FAO is about to initiate a project which is entitled, "Strengthening of the National Seed Service - Organization, Promotion, and Coordination of National Seed Production." Its objectives are all encompassing, among which are:

- to establish an organization for quality control of national seed production
- to draft regulation for the protection of seed dealers, producers and users

In spite of the broad objectives, the projects budget for a four year period amounts to $1.5 million, almost all for the four man technical assistance team, and FMG 2.75 billion ($3.5 million) GDRM counterpart contribution -- mostly for personnel and fuel. There is no provision for financing of infrastructure or seed production operations, per se.

In order to allow the introduction and development of improved "green revolution" varieties of seed, to establish a "release committee" to pass on the suitability of new varieties, to create mixed enterprise seed farms, and to regulate a private sector oriented industry, it is absolutely indispensable that the enabling legislation and institutional organization envisioned in the above objectives materialize.

The FAO project budget allows only $4,500 for a consulting lawyer and agronomist to carry out the legal studies and draft the required enabling legislation. This is considered by all concerned grossly insufficient for the purpose.

The FAO and the Division de L'approvisionment of MPARA have expressed positive interest in having USAID, through the MARS Amendment funds, provide the required expertise in the form of a Malagasy lawyer and an expatriate seed center specialist, to carry out the required legal and organizational studies.

B. Objectives

The objectives of this study will be:

1. Draft appropriate legislation and regulations

   - to liberalize introduction of improved seed varieties to Madagascar.

   - to establish an appropriate body for approving, certifying, and releasing new seed varieties and regulating a private seed industry.

   - as necessary, to permit the operation of the five rice seed multiplication centers as mixed enterprises.

2. Draft an organization and implementation plan for the transfer of the five seed multiplication centers to privately operated mixed enterprises.

3. Propose recommendations as considered necessary for more efficient operation of the seed multiplication centers.

Note: It is recognized that due to the highly political content of the objectives of this study; not all may be attainable within the proposed time frame or budget. It is therefore imperative that the proposed scope of work be carefully reviewed with appropriate GDRM authorities before proceeding with a finalized scope of work.

C. Statement of Work

To achieve the objectives of the study, the consultants will be required to become thoroughly familiar with the legal, institutional, and political environment which has led to the existing body of plant quarantine legislation and regulation; and with the operating environment of both the five MPARA operated rice seed multiplication centers; and with a sampling of private sector seed production operations as well. Specifically, the consultants will carry out the following tasks:

1. Prior to reporting to Madagascar the legal consultant will conduct a literature search (possibly through contact with IRRI) in order to assemble relevant plant quarantine legislation from rice producing nations, which have successfully introduced "green revolution" rice seed varieties on a large scale. Upon arrival in Madagascar, the material will be evaluated for relevance to the Madagascan situation, in conjunction with team members and government officials participating in the study.

2. A review will be conducted of existing Madagascan legislation and regulations concerning introduction of seed and plant varieties; operation of the seed multiplication industry; formation of privately operated mixed enterprises, and other topics as relevant to the objectives of the study. Among the relevant legal documents are:

- Ordonnance: 86-013 — page 1989 et al; Gazetin Panjakan of 4 Oct. 1986; pertains to legislation fitosanitaire
- Loi 86-017: page 2335; Ibid of 5 Nov. 1986 (essentially same text as Ord 86-013)
- Decret 86-310: regulations for application of Ord 86-013 (note: several drafts may exist, or a more recent decree may have supplanted Dec. 86-310)
- Others as relevant

3. Coordinate closely with MPARA and other relevant government entities in order to receive their input concerning any proposed revisions of existing legislation/regulations

4. Coordinate with the FAO and other donor agencies active in the seed production sector to ensure complementarily of effort and to avoid duplication.

5. The seed specialist will carry out field visits to the five MPARA operated seed multiplication centers and to several privately operated rice seed operations. This program will serve as a basis for drawing up the draft operation and implementation plan for conversion of the MPARA operated seed centers to privately operated mixed enterprises; and for assessing the overall structure of improved rice seed supply/demand and for recommending operational improvements for the five seed centers.

6. The consulting team, will at its discretion; use any additional information sources for fulfilling the study objectives; and, if appropriate, make any additional recommendations as deemed necessary for improving the availability and dissemination of improved rice seed varieties in Madagascar.

D. Reports

The consultants will prepare a draft final report which will, as a minimum, include:

1. An evaluation of the literature search, highlighting the relevance or non-relevance of legislation/regulation from elsewhere for the Madagascan context.

2. Draft proposed model plant quarantine legislation and supporting regulations for Madagascar which will facilitate the introduction of improved seed varieties while at the same time respecting legitimate preoccupations concerning protection against introduction of pests and disease.

3. Draft proposed enabling legislation/regulations as required pertaining to the proposed private operation of the MPARA seed center.

4. An implementation and organization plan for seed center transfer and operation consistent with proposed legal drafts.

5. Recommendations concerning operational improvements of rice seed centers.

6. Other recommendations/legal drafts as considered appropriate to fulfill general objectives of study.

The basic report will be written in English. Draft legal documents will be translated into French.

E. Study Schedule and Team Composition

The team leader will be an agronomist/seed specialist. He will be assisted by a consulting international lawyer and a resident Madagascan lawyer. It is suggested that MPARA assign a senior official to serve as a liaison with the team; as well as a counterpart conversant in operations of the MPARA operated seed centers.

The project schedule will be:

Two weeks Washington for literature search/assembly of legal documents. Field work in Madagascar will not begin, until the literature search is completed and relevant legal documentation assembled. The field work will be carried out over a six week period followed by two weeks in Washington for draft final report preparation by the team leader and legal consultant.

Participation will be:

1.	Team Leader	Three days preparation in Washington, six weeks Madagascar, four days travel and two weeks draft final report preparation in Washington.
2.	Legal Consultant	Two weeks literature search in Washington; two weeks Madagascar; four days travel, one week legal review/draft final preparation in Washington.
3.	Madagascan Lawyer	Four weeks Madagascar
4.	MPARA Senior Liaison	As required
5.	MPARA counterpart	As required for field trips

F. Expertise Required

1. Seed Specialist/Team Leader: An agronomist with technical credentials in seed center management and, specific prior experience in rice seed production and multiplication. Should be conversant in plant quarantine legal issues. Ability to communicate in French without translator mandatory.

2. Legal Consultant: International lawyer with prior contact with French based legal systems and also with those of several major rice producers; e.g. Philippines, India, pre independence French Indo-China, etc. Fluency in French is mandatory.

3. Madagascan Lawyer: Qualified lawyer of noted reputation, capable of gaining access to ministerial levels of government.

G. Provisional Budget

A.	Fees:	
	1. Team Leader/Seed Specialist: 50 days x $260 x 1.5	$ 19,500
	2. Legal Consultant 27 days x $500/day	13,500
	3. Madagascar Lawyer 20 days x $150/day	3,000
	Subtotal	36,000
B.	Per Diem:	
	1. Team Leader (42 days x $80) + ($170 x 2)	3,700
	2. Legal Consultant (14 x $80) + ($170 x 2)	1,460
	Subtotal	5,160
C.	Air Fare & Misc. Travel (2 x $4,000)	8,000
D.	Local Transport & Misc. Express	3,000
	TOTAL BUDGET	$ 52,160
	SAY	52,000

SCOPE OF WORK

Assessment of Rural Road Private Contractor Capability

A. Background

During the 1988 - 1991 four year period, the Ministry of Public Work is planning to rehabilitate/reconstruct 2800 km. of earthen surface rural access loads and provide periodic maintenance for 5000 km of rural roads. The work will be financed through a combination of GDRM government, World Bank/IDA, and possibly bi-lateral donor funds. Project planning is now being carried out by the East Africa Highway Transport Division of the World Bank under the Madagascar Highway Project III. In a major change of policy the MTP has decided that as much of the proposed work as possible will be carried out by indigenous Malagasy small and medium private construction contractors. It is also possible that high labor intensity construction techniques will be used to minimize requirements for heavy equipment. It is generally agreed that the Malagasy private contractor sector will require considerable upgrading to be able to fully take advantage of this opportunity. The World Bank has initiated a preliminary assessment of training requirements for small and medium contractors. The Bank has indicated however, that a more complete assessment such as that proposed would, however, be useful, and complementary to their effort.

B. Objectives of Study

The overall objective of this study will be to identify and define the types of activities and programs which will be required to expand the quantity and quality of indigenous Malagasy private contractor capability for rural road rehabilitation, reconstruction, and maintenance planned in the Madagascar 7th Highways Project.

C. Statement of Work

To achieve the overall objective, the consultant will:

1. Assess the current capacity of established small, medium and large Malagasy owned construction contractors in terms of their ability to meet the projected demands of the rural road rehabilitation and maintenance contract awards over the next four years. Specifically, the consultant will assess managerial and financial capacity, labor quality and quantity, equipment availability, experience in high labor intensity construction techniques and any other factors deemed relevant to the assessment.

2. Identify the constraints, both internal to the firms, and external in terms of the general economic, banking, regulatory and competitive environment which pose problems for upgrading and expansion of contractor capability.

3. Analyze the stock of managerial, technical and administrative human resources likely to be available to the construction industry and propose various alternatives for expanding the current capacity (e.g., through Contractor Association Financial Workshops, formal courses, international technical assistance, etc.

4. Assess the current stock of skilled, semi-skilled and unskilled labor available to the construction sector. Assess trainability of Malagasy labor. Propose cost efficient alternatives for training and upgrading labor to meet project demands.

5. Analyze the financial constraints faced by the contracting sector and propose alternatives for improving the situation, given the prospective economic and banking environment in Madagascar.

6. Propose alternate solutions for improving heavy equipment availability and utilization, such as leasing, renting, direct import, etc. in order to reduce the equipment constraint to project implementation.

7. Assess the existing experience, potential, and training requirements for large scale use of high labor intensity construction techniques for project implementation.

8. The consultant will render judgement as to the positive and negative aspects of a large international construction contractor presence in Madagascar in terms of its impact on the development of indigenous contracting capacity.

9. Inventory and evaluate relevant training facilities and programs in Madagascar.

D. Methodology and Work Plan

To develop the information necessary to carry out the analyses, the consultant will, in cooperation with a Malagasy counterpart civil engineer:

1. Prior to departure from Washington, coordinate with World Bank officials associated with the Madagascar 7th Highway Project concerning project planning, current sector capacity, suggested training requirements, etc. In particular, the consultant will ascertain World Bank plans to upgrade contractor capacity, and will take special care to adjust the work, if necessary, with

approval of USAID/ANTAN, so that the study effect will be complementary to and not duplicative of any World Bank sponsored programs for upgrading contractor capability.

2. Conduct in depth interviews with a representative sample of top management of at least fifteen Malagasy owned construction contracting organizations, including large, medium, and small groups. The sample chosen should include at least two groups each in Antsirtanana, Tomasina, Fianarantsoa and Tulear, and at least six to eight contractors from Antananarivo, including at least two each from small, medium and large categories. The classification basis for company size may be patterned after that used in "Rapport Finaux, Volume VIII, Inventaire de Resources Locales, Etude des Petites et Moyennes Entreprises, Etude de Preinvestissement des Routes d 'Acces des Zones Productrices a Madagascar. This document may be used as a baseline reference. The overall assessment should expand on this document, not duplicate it.

3. Carry out field inspections of work being done by the contractors in the sample at the time of the survey, or failing that, physically inspect their facilities and equipment.

4. Coordinate with relevant Malagasy private and public sector entities, and with international and bilateral donor organizations in Madagascar active in the transport field. Liaison should in particular be established with the Sindicat des Entrepreneurs, the private construction contractor association, and the Director General des Routes of the Ministry of Public Works.

5. The consultant will at his discretion, use any additional contacts and/or documentation necessary in order to develop the required information for fulfilling study objectives.

E. Reports

The consultant will submit a draft final report which will include:

1. A assessment of the current state of the private construction contractor capacity for carrying out the rural road rehabilitation program, based upon the information developed in the interview and field visit program.

2. Recommendations concerning the nature and scope of training required to upgrade the sector's capacity.

3. Recommendations concerning an implementation plan for providing the required upgrading. The plan should endeavor in so far as practicable to emphasize private sector, self financing solutions to training, and which will not require direct management supervision of USAID/ANTAR.

F. Study Schedule and Manpoer Required

1. A period of two calendar months is foreseen for the study. An international highway construction management expert will be the team leader and will spend two man-months on the study, including 2-3 days initial preparation in Washington; four days travel, five weeks field work and preliminary report preparation in Madagascar, and two weeks final report preparation in Washington. He will be assisted during the five weeks in Madagascar by a national counterpart provided by USAID/ANTAN.

G. Expertise Required

1. Team Leader/International Highway Construction Management Expert. Extensive experience in international highway construction management/ supervision, including organization, training, and supervision of host country sub-contractors or joint venture partners. Experience must include secondary and rural road construction in developing nations. Bachelors degree or equivalent in civil engineering required. Ability to communicate effectively in French without assistance of a translator is absolutely necessary.

2. Malagasy Counterpart: Preferably a civil engineer with supervisory experience and with good contacts among local construction contractors. Fluency in both French and Malagache required.

H. Provisional Budget

1 Lead Consultant:	Fee 50 days x $260 x 1.2	=	15,600
	Per Diem: ($35 x $80) + (2 x $170)		3,140
	Air Fare X Misc.		4,000
	Local Transport and Misc. Expenses		2,000
			$24,740
		SAY	$25,000

SCOPE OF WORK

Agricultural Equipment and Hand Tool Production Study

A. Background

Agricultural equipment and hand tool supply in Madagascar has an essentially trimodal structure:

- Large equipment such as four wheel tractors and accessory equipment is used primarily for sugar cane, cotton and other cash crop production. It is imported and distributed by private sector dealers based in Antananarivo.

- Small agricultural equipment such as two wheel tractors, mechanical threshers, harrows, animal traction ploughs, etc. are either imported or assembled locally from imported parts (tractors, generators, etc.) or fabricated locally using imported metal. A parastatal (SIDEMA), a mixed enterprise (TOLY/BELIN), small private factories; and some artisans are among the producers. The International Rice Research Institute (IRRI) is also doing some development testing, and design modification work on prototype rice seeders, and other equipment.

- Hand tools are for the most part produced by village level artisans from high cost recycled scrap metal. CENAM (the National Artisan Production Center) is active in training artisans in production and providing market assistance.

This study will focus only on the latter two categories of equipment, i.e. small agricultural equipment and hand tools, and with particular reference to their utilization for rice production.

Recent studies of various aspects of the agricultural equipment situation have indicated that:

- There is a large unsatisfied demand for farm machinery and implements of the type produced by SIDEMA, TOLY/BELIN, et al and being developed by IRRI and others (animal traction ploughs, deweeders, harrows, etc)

- There is no current data available concerning the national production level of small agricultural equipment and hand tools.

- A recent survey based study for SIDEMA has given some indications of the market for small agricultural equipment.

- Little is known concerning the supply/demand structure for hand tools.

B. Objectives of the Study

Though the above indicates that there is an apparent unmet demand for agricultural equipment and to a lesser extent for hand tools, it appears that a very basic issue vital to allocation of donor support to equipment programs has not only not been answered, but apparently, has not even been asked. This is:

1. "If, and to what extent, does the apparent unfulfilled demand for agricultural equipment and hand tools actually constrain production, harvesting and commercialization of rice?"

In order that some priority can be assigned for the allocation of development resources to the small agricultural equipment and hand tools issue; the objective of the study will be to develop the information to assess the above and the following issues related to the small agricultural equipment and hand tool sector in Madagascar, i.e.:

2. Why is the agricultural equipment distribution system archaic to nonexistent and what can be done about it?

3. If low equipment utilization is in fact an impediment to rice production, how can the private sector facilitate its resolution through more production and better marketing?

4. Where in the order of constraints to production does the equipment problem fall vis a vis, seed variety, fertilizer and credit scarcity, inadequate extension, etc.?

5. How can the reported quality control problem of construction hand tools be resolved?

6. Why is hand tool production frozen at the high unit cost artisan level? Does it make economic or social sense to mass produce those items, and possibly drive artisans out of business in the process?

7. What priority should be assigned to assistance for the small agricultural equipment and hand tool sector, given the scope of the USAID/ANTAN program?

8. What alternative forms in the way of program and/or financial support should donor assistance to the sector take?

C. Statement of Work

To achieve the objectives, the consultant, assisted by a Malagasy counterpart to be recruited by USAID, will use all available means at his disposal in order to develop the requisite information to address these objectives. Specifically he will:

1. Prior to arriving in Madagascar, establish contact with World Bank officials in Washington to familiarize himself with the Bank's rice and/or equipment related programs in Madagascar.

2. Review the following reports available via USAID/ANTAN, which should provide baseline reference information for evaluation of the sector.

   - RINDRA-CONSEIL; Pour une meilleure commercialisation des produits de la SIDEMA, October 1986.

   - I.C. Manalili, IRRI Assistant Agricultural Engineer, Madagascar Trip Report 1 (15 Nov. - 20 Dec. 1985) and Trip Report 2 (14 June - 8 July 1986)

   - Catalogues Artisans; Outils et Equipments 1986, CENAM

   - Catalogues of SIDEMA, CIMELTA JEUMONT and other local commercial scale machinery and equipment fabricators

3. Develop a directory of both parastatal (SIDEMA; TOLY/BELIN, etc) and commercial scale agricultural equipment fabricators in the private sector; and of IRRI and other organizations who may be working on equipment prototype design, development or production. Conduct an interview program with management of all the parastatal and development programs, and with a representative sample of private fabricators in order to develop a profile of product lines and level of production, markets, production and quality control problems; distribution and marketing systems; constraints to expansion of activity, number of employees, scale of business; raw material availability, financial and regulatory constraints, etc.

4. Develop a representative sample of artisan tool producers in the principal rice producing regions of the country, Loc Alaotra; Maravoay (FIFABE); High Plateau (Antananarivo/Antsirabe Region and Fianarantsoa). Carry out an interview program with these producers, adjusting

the questionnaire as appropriate to the scale of the operation, to develop similar information as in paragraph C.2 for the small equipment producers.

5. While carrying out the artisan producer interview program, talk to a sample of rice cultivators in each region in order to get a sense from the rice producer side, of whether equipment and tool issues are, in fact, a constraint to rice production. Care should be taken, especially in labor shortage areas, to separate the issues of labor productivity and rice production per se. The key issue is whether or not potentially realizable levels of rice production are actually foregone due to equipment and tool problems.

6. Supplement the information obtained in Tasks 3, 4, and 5 with the judgments of informed agricultural field professionals such as IRRI personnel, field extension agents etc.

7. The consultant will, at the discretion, use any additional information sources and/or documentation necessary in order to develop the required information for fulfilling study objectives.

D. Reports

The consultant will prepare a draft final report which will contain:

1. A producers directory and a diagnostic profile of operation, product lines, opportunities and constraints, and other information developed in Task C.3 for small agricultural equipment producers.

2. A profile of the structure of production; operation, markets, constraints, etc. of the artisan hand tool producing sector. In so far as it may be possible, attempt to develop an estimate of the level of production and approximate number of producers on the national scale.

3. Based upon information developed, provide responses to the questions 1 to 8 of the objectives section of the Scope of Work.

4. Include any other appropriate conclusions/recommendations as developed.

The main body of the report should be limited to approximately fifty single spaced typewritten pages.

E. Study Schedule and Manpower Required

A period of two calendar months is foreseen for the study. An agricultural engineer or agricultural economist will be the lead consultant and will spend two man months on the study, including 2-3 days initial preparation in Washington, four days travel, six weeks in Madagascar for field work and initial report drafts, and two weeks final draft preparation in Washington. He will be assisted during the six weeks in Madagascar by a national counterpart recruited by USAID/ANTAN.

F. Expertise Required

1. Lead Consultant: Agricultural engineer or agricultural economist. Must have prior experience in tropical rice producing environment, must be knowledgeable in small agricultural equipment and hand tool issues, and must be capable of carrying out survey interview program, and subsequent analysis. Must be senior level professional in his specialty with requisite professional degree. Ability to communicate effectively in French without assistance of translator is absolutely necessary.

2. Malagasy counterpart: Preferably an agricultural engineer or equivalent, with prior hands on experience at supervisory level in equipment fabrication, or field extension work in a semi mechanized environment. Fluency in both French and Malagache required.

G. Provisional Budget

1. Lead Consultant:

Fee 55 days x $260 x 1.2	$ 17,160
Per diem = (42 x $80) + (2 x $170)	3,700
Air Fare & Misc. Travel	4,000
Local Transport & Misc. expenses	2,000
	$ 26,860
SAY	27,000