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Report No. 10402-BR

STAFF APPRAISAL REPORT

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

JUNE 1, 1992

Environment and Agriculture Operations Division
Country Department I
Latin America and the Caribbean Region

CURRENCY EQUIVALENTS
(as of September 30, 1991) 1/

Currency Unit	=	Cruzeiro (Cr$)
Cr$ 550	=	US$1.00
Cr$ 1.00	=	US$0.0018
Cr$ 1 Million	=	US$1,818.2

WEIGHTS AND MEASURES

The metric system is used throughout the report.

FISCAL YEAR

State of Mato Grosso	=	January 1 to December 31
Project	=	January 1 to June 30

1/ Appraisal mission

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MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

GLOSSARY OF ACRONYMS

BEMAT	Banco do Estado de Mato Grosso (State Bank of Mato Grosso)
CASEMAT	Companhia de Armazens e Silos do Estado de Mato Grosso (State Warehouse and Silo Company)
CEAP	Conselho Estadual para Administraçao de Projetos (State Council for Project Administration)
CEMAT	Centrais Elétricas Matogrossenses, S.A. (Electricity Company of Mato Grosso)
CODEMAT	Companhia de Desenvolvimento do Estado de Mato Grosso (State Development Company)
CONDEMA	Conselhos Municipais de Defesa do Meio Ambiente (Municipal Councils for Environmental Defense)
CONSEMA	Conselho Estadual do Meio Ambiente (State Council for the Environment)
DTN	Departamento do Tesouro Nacional (National Treasury Department, Federal Ministry of Economy, Finance and Planning)
EMPAER	Empresa Matogrossense de Pesquisa, Assistência e Extensão Rural, S.A. (State Research, Technical Assistance and Extension Enterprise)
FEMA	Fundação Estadual do Meio Ambiente (State Foundation for the Environment)
FUNAI	Fundação Nacional do Índio (National Indian Foundation)
FUNDAGRO	Fundo de Desenvolvimento Agroambiental de Mato Grosso (Mato Grosso State Agricultural Credit Fund)
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Renewable Natural Resources)

ICB	Licitação Internacional (International Competitive Bidding)
ICM	Imposto Sobre a Circulação de Mercadorias (Federal Sales Tax)
INCRA	Instituto Nacional de Colonização e Reforma Agrária (National Institute for Colonization and Agrarian Reform)
INDEA	Instituto de Defesa Agropecuária (Institute for Agricultural Protection)
INTERMAT	Instituto de Terras de Mato Grosso (Mato Grosso State Land Institute)
LCB	Licitaçao Local (Local Competitive Bidding)
NGO	Organismos Não-Governamentais (Non-Governmental Organizations)
PCU	Gerência Estadual do Projeto (Project Coordination Unit)
PMF-MT	Policia Militar Florestal de Mato Grosso (Forest Military Police of Mato Grosso)
POLONOROESTE	Programa Integrado de Desenvolvimento do Noroeste do Brasil (Integrated Development Program for Northwest Brazil)
SANEMAT	Companhia de Saneamento do Estado de Mato Grosso (Mato Grosso State Sanitation and Sewerage Company)
SDR-PR	Secretaria de Desenvolvimento Regional da Presidência da República (Secretariat of Regional Development of the Borrower's Presidency)
SEAAF	Secretaria de Estado de Agricultura e Assuntos Fundiários (Mato Grosso State Secretariat for Agriculture and Land Affairs)
SEC-MT	Secretaria de Estado da Educação e Cultura (Mato Grosso State Secretariat for Education and Culture)
SEMA-MT	Secretaria de Estado do Meio Ambiente (Mato Grosso State Secretariat for the Environment)
SEPLAN-MT	Secretaria de Estado de Planejamento e Coordenação Geral (Mato Grosso State Secretariat for Planning and Coordination)
SES-MT	Secretaria de Estado da Saúde (Mato Grosso State Secretariat for Health)

SUDAM	Superintendência de Desenvolvimento da Amazônia (Superintendency for the Development of the Amazon)
UCAC	Unidade Central de Apoio à Comercialização (Central Marketing Support Unit)
UAPT	Unidade de Armazenagem, Processamento e Transformação (Storage, Processing and Transformation Unit)

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MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

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The project is based on the findings of a Bank appraisal mission which visited Brazil from September 30 to October 22, 1991. The mission was comprised of Messrs. L. Coirolo (Mission Leader, Agricultural Economist), F. Vita (Economist, FAO/CP), J. Wiles (Environmentalist, Consultant, World Wildlife Fund), P. Hazelton (Environmentalist), J. Dubois and J. Rezende (Forestry, Consultants), J. Landers (Tropical Agriculture Specialist, Consultant), J. McKenna (Resource Planning Specialist), J. Barbosa (Land Titling Specialist), E. Velez-Koppel (Credit and Marketing Specialist, Consultant), D. Gross (Anthropologist), V. Bellia (Transport Specialist, Consultant), A. Rabelo (Environmental Protection Specialist, Consultant), M. Tabanez (Environmental Protection Enforcement Specialist, Consultant), M. de Lima (Small-scale Mining Specialist, Consultant), and V. Baladao (Consultant, from the Center for Indigenous Work - NGO).

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MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

I. LOAN AND PROJECT SUMMARY

Borrower:	Federative Republic of Brazil
Executing Agencies:	Secretariat of Regional Development of the Presidency of the Republic/Secretariat of Planning of Mato Grosso
Amount:	US$205.0 million equivalent
Terms:	Repayable over 15 years, including 5 years of grace at the Bank's standard variable interest rate.
Beneficiaries:	Some 16,000 Amerindians living in 38 existing reserves would benefit directly from the demarcation and protection activities of the project. About 18,000 smallholders would have their land titles regularized. Some 32,100 low-income smallholder families in those areas which are suitable for sustainable agriculture would benefit directly from the strengthening of agricultural services. Much of the rural community in those same areas would also benefit from improved socio-economic infrastructure and services. Finally, current and future generations of Mato Grosso would benefit from actions taken to arrest deforestation and degradation of the state's natural resource base and to conserve biogenetic diversity.
Project Objectives and Description:	The principal objective of the proposed project would be to implement an improved approach to natural resource management, conservation and development in the State of Mato Grosso. The project would assist the Government to: (a) support changes in policies, regulations, and investment programs, to provide a coherent incentives framework for the sustainable development of Mato Grosso; (b) guarantee conservation of the rich biodiversity of the state, while creating the basis for sustainable utilization of its renewable natural resources for the direct economic benefit of the local population; (c) develop integrated agro-forestry farming systems in areas suitable for permanent agriculture; and (d) consolidate the technical operational capacity of state institutions, particularly those responsible for management of natural resources support services, the protection and management of forests and indigenous reserves, and agricultural services. The project, to be implemented over a five-year period, would support agro-ecological zoning and land tenure regularization; priority environmental management, protection and monitoring activities; agro-forestry development; socio-economic infrastructure and services; and project administration and technical cooperation.

Project Benefits: The main impact of the project would be a significant reduction in the rate of destruction of Mato Grosso's remaining natural rain forest, and effective conservation of biodiversity and protection of the environment and indigenous communities rights. Although techniques for quantifying environmental benefits are still quite rudimentary, the gains from preservation of the forest cover of the State would be significant. In addition, the consolidation and strengthening of agriculture in areas with sustainable agricultural potential would generate incremental net revenues of about US$35.0 million per year at full development. Other important project benefits include poverty alleviation and improvement of the health and well-being of beneficiaries.

Project Risks: In the past, inadequate technical knowledge, an unsuitable policy framework and weak institutions led to occupation of lands with little sustainable development potential, rapid deforestation and other forms of natural resource depletion in Mato Grosso. The availability of agro-ecological zoning, and the Government's commitment to comply with the zoning recommendations in its investment programming, will reduce the risk of continued occupation of fragile areas. The various policy and regulatory reforms recently adopted, and others being undertaken in connection with this project, should address the basic incentives issues which have also encouraged resource degradation in the State. To help minimize the risk that unforeseeable factors (e.g., unexpected weather or economic problems in other parts of Brazil that could once again spark heavy migration to the Northwest) might undermine the impact of the project-related environmental policy reforms and investments, appropriate monitoring and evaluation arrangements would be put in place at project start-up. In this regard, the State's field information system would be strengthened by the use of satellite imagery to permit the immediate detection of forest burning and other forms of invasion. Also, an independent evaluation committee, including NGO representatives, would convene annually to review progress and recommend necessary refinements of project strategy, and joint Government-Bank implementation reviews would be undertaken yearly. Finally, to address the risk that Brazil's fiscal problems might threaten the planned strengthening of the project's relatively young environmental, land and agro-forestry institutions, the State would present during negotiations an acceptable strategy to ensure that these agencies would be able to recruit and retain qualified technical and managerial staff. The project also includes comprehensive technical assistance and staff training to support institutional development, and progress would be monitored closely by the Government and the Bank throughout the life of the project.

ESTIMATED PROJECT COSTS AND FINANCING PLAN

	Local	Foreign (US$ Million)	Total
Estimated Project Costs			
A. Agro-Ecological Zoning and Land Tenure Regularization	27.4	12.6	40.0
B. Management, Protection and Monitoring of Natural Resources	47.9	6.5	54.4
C. Agro-Forestry Development and Support Services	60.4	9.8	70.2
D. Socio-Economic Infrastructure and Services	48.7	16.7	65.4
E. Project Administration and Technical Cooperation	11.4	0.5	11.9
Total Baseline Costs	195.8	46.1	241.9
-Physical contingencies	10.8	4.4	15.2
-Price contingencies	23.8	4.8	28.6
Total Project Costs	230.4	55.3	285.7
Financing Plan			
Mato Grosso State Government	40.0	-	40.0
Federal Government	40.7	-	40.7 1/
IBRD	149.7	55.3	205.0
Total	230.4	55.3	285.7

Estimated Disbursements

Bank FY:	1993	1994	1995	1996	1997	1998
			(in US$ million)			
Annual	40.0 2/	34.0	58.0	41.0	27.0	5.0
Cumulative	40.0	74.0	132.0	173.0	200.0	205.0

Rate of Return: N.A.
Maps: IBRD No. 23466

1/ Including US$11.7 million in local taxes.
2/ Including initial deposit of US$15.0 million into the Special Account, and US$20.5 million of retroactive financing.

II. AGRICULTURAL AND ENVIRONMENTAL POLICIES AND THE STATE OF MATO GROSSO

Agricultural and Environmental Policies

2.01 Government policies have had an important impact on the performance of the agricultural sector. Probably the most important action in this regard was Brazil's decision in the postwar era to embark on an import substitution-led industrialization strategy. This strategy was pursued through a variety of measures, including an overvalued currency, restrictive trade policies, and from time to time, outright bans and quotas on agricultural exports. The effect was to implicitly tax agriculture. To partially compensate for this, subsidized rural credit was introduced. This created further distortions and benefitted mainly larger producers. But the era of massive government intervention in agriculture in Brazil is now over. The Government initiated reforms of the last administration have been extended and deepened under the present administration. The Bank has supported these reforms under the Credit and Marketing Reform Project (Loan 2727-BR). With respect to rural credit, the Government moved towards reducing the availability of official (subsidized) credit and relying on private finance at market interest rates. A Bank loan for the Agricultural Credit Project (Loan 2971-BR) is assisting the Government to achieve this objective.

2.02 While the Government policy agenda during the 1980s has been dominated by macroeconomic stabilization concerns, policies with respect to agriculture and the environment were not neglected. The government assigned a high priority to protecting the environment and became aware of the effect that some agricultural policies were having on the environment. Changing policies to place agriculture on a more market - driven basis is having a positive effect on the environment, although farmers and the farming community are bearing the brunt of these changes. Farmers, faced with increasing production costs and falling commodity prices, have begun to seek more cost-effective technologies and to intensify the use of existing farm land and rural infrastructure. This is already evident in the country's major agricultural areas in the South and Southeast. There is growing interest in irrigation, soil conservation, environmental protection, livestock disease control, more efficient marketing and storage and more widespread application of the results of agricultural research. This, along with the Government initiatives to withdraw various fiscal incentives that encouraged expansion into areas which are less suitable from an agro-ecological standpoint, suggests that the growth of the land frontier may be coming to a close. Instead, agricultural development in the future is expected to derive increasingly from more land-intensive production methods.

2.03 As a result of the increased environmental awareness and a growing commitment to confront environmental issues at the federal level, the government undertook several important initiatives on the environment. Among these are: (a) the new national constitution, which was adopted in October 1988, incorporates an advanced chapter on the environment; (b) also in October 1988, the Government launched a special program (Nossa Natureza), which

included emergency measures to protect the Amazon region and other endangered ecosystems in the country; (c) the Government partially suspended the special fiscal incentive programs which had directly promoted extensive ranching and deforestation in the Amazon; and (d) a National Institute for the Environment (IBAMA) was created in February 1989 to help coordinate environmental protection activities, and an Environmental Secretariat was established, headed by an internationally prominent environmentalist reporting directly to the President of the Republic.

2.04 Along with the strengthened regulations, and more neutral agricultural incentives the Government has also prepared several major environmentally oriented investment programs for Bank financing, including the National Environmental Project, a Rondônia Natural Resources Management Project and the proposed Mato Grosso Natural Resource Management Project. Other environmental projects, aimed at controlling industrial and urban pollution, are also under preparation. Finally, the Government has also recently prepared a comprehensive pilot program to conserve the Amazon rain forest, which will be supported by a group of industrialized countries and administered by the Bank.

Experience with Past Bank Lending

2.05 As of March 31, 1992, the Bank had made 58 loans, totalling US$5,179.6 million (net of cancellations), for agricultural and rural development and environmental protection in Brazil. These loans include: one agricultural credit and export loan for US$303.0 million; one agricultural credit loan for US$300.0 million; two supplemental loans for US$30.3 million under the 1983 Special Action Program for Brazil; four loans for US$785.8 million for agro-industries; three for US$111.5 million for livestock, including an animal disease control project of US$51.0 million; one for US$18.2 million for grain storage; three for US$147.0 million for agricultural research; two for US$255.0 million for agricultural extension; one for US$100.0 million for land tenure improvements; one of US$495.0 million for credit and marketing reform; one for US$48.5 million for forestry development; one for US$195.0 million for the irrigation subsector; one for US$117.0 million for a national environmental project; one for US$167.0 million for a natural resource management project; and 35, totalling US$2,103.6 million, for various settlement, irrigation, land management and rural development projects in the Northeast, in Minas Gerais (the Southeast), Paraná (the South), and in the North and Northwest.

2.06 With regard to the Northwest Region, the POLONOROESTE Program (para. 2.12) has been financed by five Bank loans, including three which supported primarily the agricultural, rural development and environmental objectives of the Program. The Agricultural Development and Environmental Protection Project, known as Northwest I (Loan 1060-BR, of US$67.0 million, approved in 1981), was designed to upgrade existing agricultural settlements in central Rondônia. The Agricultural Development and Environmental Protection Project-Northwest II (Loan 2116-BR, of US$26.4 million, approved in 1982) financed similar activities in Mato Grosso. The New Settlements

Project-Northwest III (Loan 2353-BR, of US$65.2 million, approved in 1983) supported colonization of unoccupied lands in Rondônia. In addition, a Northwest Health Project (Loan 2061-BR, of US$13.0 million, approved in 1981) was designed to improve and maintain health conditions in the settlement areas of Rondônia and Mato Grosso, and a Northwest Highway Project (Loan 2062-BR, of US$240.0 million, approved in 1981) helped to finance the paving of Federal highway BR-364 between Cuiabá and Porto Velho and the construction of feeder roads to that highway. In 1983, under the Special Action Program (SAP) for Brazil, the Bank also approved US$22.8 million of supplemental financing for the Northwest I Project. Project Completion Reports have been prepared for all but the last agricultural project (Loan 2353-BR), for which the loan was closed on March 31, 1992. Experience under the agricultural operations in Mato Grosso is discussed in paras. 2.12 - 2.15.

The State of Mato Grosso

2.07 Overview. Mato Grosso is a frontier state encompassing 18% of the Amazon Basin of Brazil. It is Brazil's third largest state, with an area of 901,000 km2, equivalent to the combined size of France and Italy. Mato Grosso is a transition area between the cerrados (savannahs) to the east and south, which cover some 33% of its territory, and humid tropical jungles to the west and south which cover some 57%. The remaining 10% is part of the largest wetland in South America, the Pantanal. Migration, mainly from the south/southeast, caused annual population increases of about 6.5% during 1970-80 and 7% (4% in the south, 13% in the environmentally fragile north) between 1980-89, bringing the total state population to a currently estimated 2.1 million inhabitants.

2.08 Agriculture, the most important sector in the State economy, grew substantially during the last 10 years. This was accompanied by extensive deforestation, with forested areas (low and sparse, transition and Amazonian forest) declining from 55% of the State area in 1970 to 25% in 1989, and soil erosion/siltation and contamination of the Pantanal watershed from fertilizer/pesticides and mercury (from mining). Inadequate knowledge of the State's natural resource base, increased migration, limited institutional capability to direct and enforce desired land use patterns, and the prevailing regulatory framework all contributed to the State's inability to support viable smallholder settlements using suitable agricultural and soil conservation practices in the southern areas where the best soils are concentrated. Hence, livestock development flourished in the environmentally fragile west, and slash and burn cultivation by subsistence farmers spread into the Amazonian areas of the north.

2.09 Land Tenure, Farm Size and Land Use. The land tenure situation in Mato Grosso is complex, reflecting the various stages of migration over the last 15-20 years. In 1960, according to census data, the state had about 12,900 farms which occupied an aggregate area of 7.8 million ha. By 1970 these had grown to about 45,000 farms and 17.3 million ha. Owing to the strong colonization during 1970-80, the number of farms increased sharply to around 78,300 by 1990, representing a total occupied area of about 38 million

ha, or 43% of the state. However, land data, apart from revealing some major inconsistencies and overlaps, also indicate large areas which have conflicts of ownership. Based on information from the Ministry of Agrarian Reform and Development (MIRAD/INCRA), approximately 95.0 million ha (i.e., equivalent to 104% of the state) were occupied and registered in 1987, of which about 14.5 million ha (15%) were occupied without legal title (posseiros).

2.10 According to the Mato Grosso State Technical Assistance and Rural Extension Enterprise (EMATER-MT), there are presently about 73,300 small farmers in Mato Grosso with less than 200 ha. The parts of the State which have been identified as being suitable for some agricultural activities (para. 3.06) include about 64 municipalities and contain some 48,780 farmers. Average farm size in these areas is about 47 ha, of which about 13 ha are usually cultivated: 9 ha are generally under rice, maize and beans, and 4 ha are under coffee or bananas. The remaining area is left under natural pasture (9 ha) or secondary forest and fallow land (capoeira).

2.11 Agricultural Development. Agriculture is the dominant productive sector in Mato Grosso. It employs about 37% of the labor force, followed by services (32%), industry (16%) and commerce (15%). The agricultural sector continued to develop rapidly during the period 1980-89, with agricultural GDP growing by approximately 10% per year to about US$500.0 million in 1989. The rapid development was mainly due to increases in planted areas of crops such as soybeans, maize, cassava, cotton and sugar cane, and the expansion of the livestock subsector from 5.2 million head in 1980 to 8.0 million head in 1989. The most important crops in 1989/90 were soya (1.6 million ha), rice (366,600 ha) and maize (273,600 ha). The area planted to perennial crops, especially coffee and rubber, increased to a total of about 130,000 ha in 1989/90. Yields of food crops in Mato Grosso are comparable to the overall averages for Brazil, although in most parts of the state they are sustainable only with high levels of inputs. From 1980 to 1990, there has been a substantial increase in the production of annual crops, primarily through slash and burn cultivation supported by continued forest cutting. Perennial crops such as coffee and banana have been grown for some time; rubber and cocoa have been introduced only recently and are just coming into production. High yielding clones of rubber and cocoa are being planted under improved cultural practices using fertilizers and plant protection chemicals, and their production prospects appear promising.

2.12 Experience of POLONOROESTE. In 1980, in recognition of the growing socioeconomic problems caused by accelerating migration, the Brazilian Government launched a program of major investments in the northwest agricultural frontier areas of Rondônia and Mato Grosso. The POLONOROESTE aimed to absorb the human influx in an orderly and sustainable manner. The centerpiece of the program was the completion and asphalting of the main federal highway in the northwest region (BR-364) between Cuiabá and Porto Velho and the construction of feeder roads. The strategy of POLONOROESTE was to steer migrants away from the extensive areas which were ecologically fragile and/or occupied by indigenous groups. Non-exploitative systems of agricultural and forest production were to be promoted, with a view to

achieving permanent land occupation by the new settlers and reversing the trend of felling the tropical forest and abandoning it to low grade pasture or scrub after only a few seasons of food cropping. The technical strategy was based on support for permanent smallholder agriculture on farms of adequate size to generate reasonable annual incomes.

2.13 POLONOROESTE, financed by the Federal Government and the Bank, was coordinated by the Federal Government and executed by Federal and state-level institutions. Implementation encountered many technical, institutional and financial difficulties, and in its initial phase POLONOROESTE seemed to be failing in many respects. Only pavement of the BR-364 highway proceeded on schedule, while agricultural and social support services, and environmental and Amerindian protection programs fell behind. The program was widely criticized for having a questionable effect on reversing the destructive development patterns set in motion in the 1970s; the pace of occupation accelerated and deforestation increased.

2.14 A mid-term review of POLONOROESTE in 1984 highlighted the differences between the assumptions under which the program was planned and those under which it was being implemented. The circumstances were largely beyond the planners' control: inadequate and late disbursements of counterpart funds because of the difficult fiscal situation in Brazil, the virtual disappearance of investment credit needed to establish perennial crops, ineffective integration of participating agencies, and unexpectedly high migration, resulting in unchecked deforestation and continued encroachment into unsuitable areas of marginal soil fertility.

2.15 The Mato Grosso Rural Development Project (Loan 2116-BR), which closed in December 1988, also suffered from these shortcomings. According to the Project Completion Report (PCR N° 9382 of February 26, 1991), the project reached its physical targets for road construction and partially met the targets for the storage component. However, there was no specific initiative or project activity to contain deforestation. Implementation of the agricultural development strategy was also disappointing, particularly with regard to perennial crop cultivation, the creation of incremental agricultural employment, and the improvement of incomes and living standards of project beneficiaries. Nevertheless, the project did help to strengthen the social infrastructure in the area and the institutional capacity of some of the implementing agencies.

Main Lessons Learned Under POLONOROESTE

2.16 As outlined in the Project Completion Report, the following are the main lessons learned in the course of implementing the Northwest II Project in Mato Grosso, which have been taken into account in the design of the present project:

(a) The design of a project for a frontier area with a fragile natural environment should be based on better technical information about its sustainable development potential than that which was available at the start of the project. Agro-ecological zoning

should be done in order to delineate clearly the agricultural frontier, stabilize the land tenure situation and demarcate areas which are, or should be, reserves. Government commitment to implement the agro-ecological zoning should be a condition sine qua non of future development projects in such areas.

(b) When an important objective of a project is to alter land use patterns in an area, a thorough analysis should be undertaken of the policy and regulatory framework governing those patterns, to determine what complementary actions may be needed, in addition to investments in infrastructure and services, to stimulate the desired results. The success or failure of a program like POLONOROESTE rests not only on its technical quality and the political support it receives, but also on the overall policy framework (e.g., land regulations and fiscal incentives) to stimulate proper land use and natural resource protection. Otherwise, investments made to protect the environment may be undermined by stronger incentives working in the opposite direction.

(c) When the success of the agricultural production objectives of a project depends significantly on credit, a careful analysis needs to be made with respect to credit availability, accessibility, and the appropriateness of terms and conditions. In the event that prevailing conditions are not suitable and not amenable to change in the short term, the Bank should either make special provision for credit in the project itself (only in exceptional circumstances warranted by significant environmental or poverty alleviation objectives) or it should not proceed with the project.

(d) Project organization and management arrangements, especially when a multitude of implementing agencies are involved, should provide sufficient authority (including control over budgetary resources) over implementation.

(e) In projects with greater than normal risks, the elements of institutional strengthening, training and technical assistance should be carefully planned to directly address these risks.

2.17 In response to these lessons, in 1987-88 the Federal and state Governments expressed their political commitment to implement an agro-ecological exercise in Mato Grosso. Preliminary studies were completed with FAO and UNDP assistance, and a draft project proposal was prepared in 1989 with the assistance of the FAO/CP. The project would be based on agro-ecological zoning, which is used to distinguish areas capable of sustainable development from those which are without any known long-term agricultural potential or which have special ecological (biological reserves and forestry reserves) or social (Amerindian lands) significance and therefore need to be protected.

III. THE PROJECT

Origin and Rationale for Bank Involvement

3.01 The Bank's assistance strategy for Brazil has three long-term objectives to stimulate development: (a) private sector development and public sector reform; (b) increasing the productivity and improving the living conditions of the poor; and (c) protecting the environment and local populations. The proposed project would contribute primarily to the third objective, but would also help to strengthen public sector management and to improve productivity and living conditions of poor rural smallholders. Considerable experience has been gained under the earlier POLONOROESTE projects, both in the Northwest Region in general and Mato Grosso in particular, and new technical knowledge has been developed which today makes it possible to identify and implement more appropriate strategies to discourage environmentally destructive development patterns, and promote more sustainable forms of land use. The Bank's participation in the proposed project would be instrumental in helping Mato Grosso to prevent destruction of its remaining northern tropical rain forest (about 225,000 km^2), protect critical watersheds of the Pantanal wetlands in the Southwest, and intensify smallholder cultivation in those already deforested areas which have soils suitable for permanent agriculture. It would also be important in helping to reduce spontaneous migration to neighboring Rondônia and other Amazon states.

3.02 A Bank identification mission in 1988 reviewed preparation documents and reached preliminary agreement with the Federal and State Governments on a development strategy based simultaneously on the need to implement agro-ecological zoning and on the reform of land tenure and environmental policies and regulations. Under the leadership of the Minister of Interior, a series of meetings took place during 1988/89 among representatives of concerned Federal Ministries and the State Government of Mato Grosso. They identified and agreed on the principal elements of a new framework to promote a transition from the prevailing extensive agricultural development scenario, towards greater intensification of land use in selected areas in accordance with the state's agro-ecological zoning. At the same time, recognizing that such a strategy would not succeed in isolation, the Government also proposed investments for: (i) environmental conservation, management and enforcement in those areas of Mato Grosso that should be protected or remain under forest cover; and (ii) a medium-term agro-forestry development program and supporting infrastructure and services to encourage sustainable productive activities in those areas where the population should ideally remain concentrated. The project was appraised in September/October 1991 and loan negotiations took place in late April 1992.

Project Objectives

3.03 The principal objective of the proposed project would be to implement an improved strategy for natural resource management, conservation and environmental protection and sustainable development in the State of Mato Grosso. The project would assist the Government to:

(a) support changes in policies, regulations and public investment programs to provide a coherent incentives framework for the sustainable development of Mato Grosso;

(b) improve the knowledge of the natural resource base, by providing more detailed data on land capability and land tenure to establish criteria for improving land management and for biodiversity protection in the various agro-ecological zones of the state;

(c) reduce environmental degradation and ensure the long-term preservation of the biodiversity of the State of Mato Grosso, through the conservation of ecologically significant samples of its territory;

(d) protect and enforce the borders of all conservation units, indigenous reserves, public forests and control and prevent illegal deforestation, wood transport and forest fires;

(e) develop sustainable agriculture in areas suitable for permanent agriculture, promoting integrated agro-forestry farming systems, and systems for sustainable forest management in areas which should remain under natural forest cover;

(f) support priority investments in socio-economic infrastructure and services in those areas where population should remain concentrated, in order not to undermine the delicate ecological balance of the state; and

(g) strengthen the technical and operational capacity of the State institutions responsible for the agro-ecological zoning, the protection and management of the environment, and agricultural and forestry support services.

Environmental Policy Framework

3.04 A suitable environmental policy and regulatory framework is essential to ensure that future development of the State of Mato Grosso is sustainable. In this regard, the Federal and State Governments have undertaken a series of reforms over the past two years, the implementation of which would be supported under the project. Additional complementary measures would also be undertaken under the project. The relevant reforms and their main features are summarized in Annex 1. They include: (a) institutionalization of the State's agro-ecological zoning by State law; (b) the adoption of suitable land regularization policies and practices, including the elimination of deforestation as a criterion for obtaining land title, and the adoption of new State land legislation; (c) elimination of economic and fiscal incentives which encourage inefficient resource allocation, non-sustainable private investment and environmental degradation; (d) adoption of new State environmental legislation (to complement existing Federal legislation), providing inter alia for improved forest protection and control of mining activities; (e) adoption of suitable policies concerning the

interdiction, delimitation, demarcation and protection of indigenous areas and provision of key services to their inhabitants; and (f) revision of the medium-term State and Federal investment programs for Mato Grosso, to reflect land use capabilities and ecological considerations. Commitment to the policy reforms, known as the Mato Grosso Environmental Action Plan (EAP), would be reflected in a letter from the Borrower and the State to the Bank. The contents of the letter were discussed and agreed during negotiations. Compliance with the EAP would be monitored throughout the life of the project. During negotiations, the Borrower and the State provided assurances that the policy reforms under the Mato Grosso EAP would be enforced throughout the duration of the project. They also provided assurances that their investment programs for Mato Grosso, which currently take into account land use capabilities, ecological and agro-ecological zoning considerations, would be, at each annual updated thereof, maintained consistent with such considerations and compatible with such zoning; and by September 30 each year during the execution of the project they would furnish to the Bank, for its review and comments, any intended update of such investment program for the forthcoming year (para. 4.02 (a)).

Agro-ecological Zoning

3.05 The State of Mato Grosso has experienced rapid and, generally unplanned territorial occupation. Hence, agricultural activities are now carried out in some areas where soil fertility is not suitable for sustainable development; gold mining and forest exploitation are practically uncontrolled; and only limited actions have been taken to conserve critical ecosystems. Some agro-ecological zoning work was supported under the POLONOROESTE II project, which included US$1.3 million to finance zoning of approximately of 55,000 km2 around Cáceres and part of the Guaporé Valley. In 1989, the Cândido Rondon Foundation completed a soil capability study of the entire State. Based on this, the Foundation has since completed a first approximation of a statewide socio-economic/agro-ecological zoning for Mato Grosso, which delineates seven macro zones based on soil fertility, slope, precipitation and socio-economic factors (see Map IBRD 23466).

3.06 The main features of the seven zones are summarized below:

(a) Zone 1 (approximately 76,000 km^2) - The fertile soils in the cerrados of central Mato Grosso are suitable for large-scale mechanized agriculture. For the most part these are already occupied by larger farmers, and no project interventions are envisaged in these areas.

(b) Zone 2 (41,000 km^2) - The fertile soils in the southeast and southwest of the state have a high concentration of small farmers and are suitable for diversified agriculture. The project would encourage further agricultural intensification and consolidation in this zone.

(c) Zone 3 (227,000 km^2) - Soils in the north of the state are of moderate to poor quality. The project would encourage farming systems based on agro-forestry, only in those areas which are already deforested and occupied by concentrations of small farmers.

(d) Zone 4 (175,000 km^2) - This zone covers the Pantanal wetlands, which are periodically flooded and are therefore suitable only for conservation and/or extensive animal production. As support for the Pantanal is included in the on-going Bank financed National Environmental Project (Loan 3173-BR), no project actions are envisaged for this area.

(e) Zone 5 (33,000 km^2) - These are areas under forest cover in the north of the state. The project would encourage the use of more sustainable practices in areas which are under private ownership, and the creation of forest reserves in public lands.

(f) Zone 6 (237,000 km^2) - This zone includes areas in the north of the state where the ecosystems are so fragile or unique that conservation and protection is the most appropriate course of action. The project would therefore support the creation and implementation of conservation units (state biological reserves and ecological stations).

(g) Zone 7 (112,000 km^2) - This zone comprises indigenous reserves, which would be protected under the project.

Project Components

3.07 The project has been tailored to the sustainable development potential of each of the major agro-ecological zones. It would include five components, to be implemented over a five year period, as follows:

(a) Refinement of agro-ecological zoning and land tenure regularization (US$40.0 million or 17% of total baseline costs): including land zoning, mapping and land regularization activities, with priority assigned to those areas where establishment of conservation units and indigenous reserves will occur, and areas where the need for land tenure regularization is more acute or where tenurial conflicts have already started;

(b) Management, protection and monitoring of natural resources (US$54.4 million or 22% of total baseline costs): including establishment, management/protection of conservation units and forestry reserves, protection of indigenous reserves; environmental protection, pollution control, strengthening of forestry police and monitoring of protected areas, training and technical assistance;

(c) Agro-forestry development (US$70.2 million or 29% of total baseline costs): including rural extension, agro-forestry research, rural credit, and market information systems;

(d) Socio-economic infrastructure and services (US$65.4 million or 27% of total baseline costs): including strengthening of the infrastructure related to health, education, water supply, rural electrification, and maintenance and rehabilitation of rural roads; and

(e) Project administration and technical cooperation (US$11.9 million or 5% of total baseline costs): including installation and operating costs of a Project Coordination Unit (PCU) in Cuiabá, supported by an independent technical cooperation group responsible for advising the PCU with respect to project monitoring and evaluation, and for recommending any needed changes in project strategy and content.

A. Agro-Ecological Zoning and Land Tenure Regularization

3.08 The overall objective of this component is to support completion/implementation of the agro-ecological zoning and clarification of the complex land tenure structure of the State, as a basis for other project activities and future development planning and administration.

3.09 Agro-ecological Zoning and Mapping. The available maps of Mato Grosso are at a scale of 1:1,000,000, except for some soil maps developed during the implementation of POLONOROESTE. While these have been adequate for general planning purposes, small scale maps are now needed for more detailed planning and implementation (e.g., for proper border control of zones and reserves; agro-forestry planning for specific areas within Zones 3), and all maps need wider dissemination. The project would support the refinement of the agro-ecological zoning, including the preparation and distribution by the State Secretariat for Planning and Coordination (SEPLAN-MT) of statewide agro-ecological, climatological, soil and topographic maps, and training of SEPLAN-MT staff. The project would also support the cartographic work necessary for the creation, management and protection of conservation units, forest reserves and indigenous reserves.

3.10 During negotiations, the State Government provided assurances that by June 30, 1994, agro-ecological, soil and topographic maps of its territory would be prepared, in consultation with the Secretaria de Assuntos Estratégicos of the Borrower's presidency, and furnished to the Bank, in accordance with terms of reference satisfactory to the Bank (para. 4.01 (a)). These maps would be at a scale of 1:50,000 for Zones 2 and 3 in the south of the State and Zone 2 in the north, and 1:250,000 for other areas in the south of the State and the project area in the north, considering for this purpose the parallel 13 degrees South Latitude as the division between north and

south. Aerial photography covering 100,000 km^2 in Zones 2 and 3 would also be supported under this project, to assist in zoning surveys, land tenure regularization and soil and water conservation programs undertaken by the agricultural extension service. In addition, in some critical areas from an environmental point of view, topographic, soil and agro-ecological maps would be produced at scales of 1:10,000 and 1:25,000. Agro-ecological zoning was legally instituted by Mato Grosso State Law of May 1992.

3.11 Land Tenure Regularization. The land tenure structure in Mato Grosso is uncertain, with many overlapping claims to use rights and ownership. Clarifying this present situation and developing and enforcing appropriate legal measures, policies and regulations, are essential. The project would provide funds to INTERMAT for physical facilities, equipment, materials and contractual services for the: (a) delimitation, demarcation and cadastral registration of approximately 41.3 million ha of public and private lands, equivalent to 45% of the total area of the state; (b) discriminatory action on about 19.2 million ha to identify public and private lands, resolve pending questions regarding indigenous areas and identify land for the creation of conservation areas; (c) demarcation of about 1,000 kms of conservation areas; and (d) issuance of titles on land currently occupied by about 18,000 families with legitimate rights of possession.

3.12 INTERMAT would administer and supervise this subcomponent, contracting out part of the cartographic and photographic work. A draft agreement between INCRA and the State Government on land regularization policies and practices which are to be observed in the state, consistent with the recommendations of the agro-ecological zoning, was reviewed during loan negotiations, and the signing of this agreement, if not completed earlier, would be a condition of loan effectiveness (para. 4.03 (a)). At negotiations, assurances were obtained that by September 30, 1992, the State would prepare and present to its Legislative Assembly, for approval, legislation on land use, in form and substance satisfactory to the Bank, and would take all actions necessary to have such legislation approved by its Legislative Assembly, as soon as possible (para. 4.01 (b)).

B. Management, Protection and Monitoring of Natural Resources

3.13 This component would help conserve the State's biodiversity, while creating the basis for sustainable natural resource utilization and management for the direct economic benefit of the local population. It comprises eight sub-components, described below.

3.14 Management and Conservation of Forest Resources. In order to conserve the State's renewable forestry resources in Zone 5, the project would support: (a) the identification, creation and demarcation of nine State Forest Reserves (RFE) covering an estimated 4.0 million ha.; (b) the preparation of an overall study for each of the nine reserve areas, including forest inventories, and the development of management plans and detailed action programs for the RFE; (c) implementation of a forestry awareness campaign; and

(d) training of foresters. FEMA would be responsible for the implementation of this sub-component, following demarcation by INTERMAT. The project would finance civil works and basic infrastructures for the RFE and law enforcement posts, equipment, vehicles, training, and awareness campaign material.

3.15 The State Government is committed to the delimitation and demarcation of private and public lands, the creation of forest reserves in public lands and the preparation of a plan of action for the sustained management of private lands in Zone 5. During negotiations, the State provided assurances that by June 30, 1994, it would establish and thereafter maintain forest reserves in areas identified as unoccupied public lands through the discriminatory works carried out during the first year of the project in Zone 5; and by June 30, 1995, it would establish and thereafter maintain forest reserves in all other areas in Zone 5 identified as unoccupied public lands through the discriminatory works, provided that at least nine reserves would be established by June 30, 1995 (para. 4.01 (c)). For privately owned areas in Zone 5, a satisfactory plan of action, to encourage the sustainable management of private forests, consistent with the agro-ecological zoning recommendations, would be completed no later than June 30, 1993, and put into effect thereafter (para. 4.01 (d)).

3.16 Mining Activities Rationalization. Although difficult to quantify, the consequences of the different forms of mining (garimpagem) practiced in Mato Grosso are becoming a serious threat to the State's environment. The effects include destruction of the riverine vegetation of critical watersheds, erosion of fertile alluvial soils and river banks, changes in river bed topography, water pollution and encroachment into conservation units and indigenous areas. Federal legislation was passed but is not effectively enforced, and few efforts have been made to rationalize or control mining activities in Mato Grosso. The project would support: (a) preparation of an inventory and mapping of mining activities in the State, with particular attention to environmentally more fragile zones; (b) preparation of a study on mining standards and on licensing of gold mining; (c) establishment of mining standards and licensing requirements for gold mining; (d) research on the applicability of environmentally more benign mining technology and establishment of demonstration projects/sites using new technology for gold extraction; and (e) implementation of health, education and other assistance programs for small mining communities. This sub-component would be implemented by FEMA in the northern areas of Mato Grosso where the garimpagem problem is most acute. The project would finance infrastructure, experimental sites, vehicles and equipment, training courses, consultancies and technical assistance, and operating costs. To reinforce Federal environmental legislation, the State provided assurances during negotiations that by September 30, 1992, it would prepare and present to its Legislative Assembly, for approval, proposed legislation on environment, satisfactory to the Bank, and would take all necessary actions to have the legislation approved by its Legislative Assembly as soon as possible (para. 4.01 (b)). The legislation would provide, inter alia, for stronger State regulatory powers over mineral and forestry extraction.

3.17 Establishment of Conservation Areas. Only about 217,000 ha in Mato Grosso are protected by small federal conservation units, of which two are national parks and two are ecological stations. In addition, there is a very small state ecological reserve (3,900 ha) and a municipal park (15 ha) in the city of Cuiabá. The ecological representativeness of the federal conservation units are very low, as a consequence of their relatively small size and geographical distribution.

3.18 The State Government is committed to the establishment of additional conservation units in all unoccupied public lands in Zone 6. After clarification and demarcation of the boundaries of public and private lands under the Land Tenure Regularization sub-component, the project would support: (a) ecological assessment of the proposed areas, preparation of management plans for each new conservation unit, essential infrastructure, and equipment needed to implement the management plans; (b) institutional strengthening of FEMA; and (c) public awareness campaigns to sensitize communities living in and around the conservation units. The areas targeted for establishment of conservation units include some 4.8 million ha: Chapada dos Guimarães - 70,000 ha (extension of an existing reserve), Cabeceiras do Rio Cuiabá - 300,000 ha, Rio Madeirinha - 800,000 ha, Rio Ronura - 700,000 ha, Serra Ricardo Franco - 400,000 ha, Serra de Santa Barbara - 800,000 ha, Pantanal do Rio das Mortes - 800,000 ha, Serra do Cachimbo - 500,000 ha and Apiacas - 477,000 ha. The project would finance surveys, construction of offices and control posts in the units, vehicles, training, technical assistance, and incremental salaries. In addition, evidence of the recent creation of the Pontal State Biological Reserve, in the municipality of Apiacas was presented by the State during negotiations. FEMA would be responsible for implementation. During negotiations, the Federal and State Governments provided assurances that: (a) by December 31, 1992, they would carry out a study on the feasibility of the enlargement of the existing conservation unit located in the Chapada dos Guimarães in Mato Grosso; and if so recommended by such studies, promptly take all action necessary to enlarge, and thereafter maintain as enlarged, such conservation unit (para. 4.02 (b)); and (b) by June 30, 1994, the State would establish and thereafter maintain conservation units in lands identified as unoccupied public lands through the discriminatory works carried out in the first year of the project in Zone 6, and by June 30, 1995, it would establish conservation units in all remaining lands identified as unoccupied public lands through the discriminatory works in Zone 6, provided that at least 16 conservation units are established (para. 4.01 (c)). For privately owned areas in Zone 6, a satisfactory plan of action to encourage the sustained management of private forests, consistent with the agro-ecological zoning recommendations, would be completed no later than June 30, 1993, and put into effect thereafter (para. 4.01 (d)).

3.19 Informal Environmental Education. The main objective of this sub-component is to sensitize the public in Mato Grosso to existing environmental problems and their effects, and to build community support for conservation and sustainable land use. Project activities would promote the establishment of Municipal Councils for Environmental Defense (CONDEMAs) in each district and non-governmental organizations (associations, NGOs, foundations and clubs)

concerned with environmental issues. This sub-component would be implemented by FEMA through meetings, seminars and use of audio-visual materials. The project would finance seminars and training courses, consultants' and trainers' honorariums, training of FEMA personnel, and other operating costs. Mass media would be used to disseminate the messages on issues of public interest, including relevant Federal and State legislation.

3.20 Enforcement Activities. The main aim of this sub-component is to ensure that the protected areas and conservation units are not encroached upon by settlers and/or illegal logging activities, hunting or predatory fishing. The State Forestry Police (PMF-MT) would be strengthened to enforce State environmental legislation and support FEMA's licensing operations and monitoring of mining, pesticide use and other polluting activities. The project would finance equipment (radio transmitters, refueling equipment, generators and battery chargers), vehicles (boats powered by 25 HP engines, a launch with a 60 HP engine, one helicopter and one ultralight aircraft), and office furniture; headquarters buildings and outposts; incremental salaries of forest police, travel costs, maintenance and other operating costs, and training, technical assistance and special studies.

3.21 Support to Indigenous Communities. The project would help to safeguard the areas occupied by indigenous groups against illegal encroachment and use by outsiders, and to strengthen health services for these groups. It would provide for: (a) the border demarcation of 9 indigenous reserves with an aggregate area of about 1.14 million ha and about 1,424 km of boundaries; (b) renewal of the boundaries of some sections of 38 reserves previously demarcated, encompassing an area of about 10.3 million ha; (c) identification and protection of isolated indigenous groups not yet officially contacted and, where appropriate, identification and demarcation of their areas; (d) strengthened FUNAI's monitoring and enforcement activities to protect indigenous reserves from illegal encroachment through the provision of fixed and mobile monitoring units equipped with communications equipment and through increased cooperation with the State Military Police and the Federal Environmental Agency; and (e) upgrading the health services available to indigenous groups, including visiting medical teams at the post level, specialized training of medical personnel and indigenous health monitors. Through an agreement with the State Government, additional health professionals will be hired to staff FUNAI's mobile health teams. The project would also finance a study and a few small-scale experiments for developing sustainable income-producing activities in indigenous communities.

3.22 Administration of the indigenous component would be carried out by a specialized team within FUNAI, including a general coordinator and sectoral coordinators for: (a) demarcation and boundary renewal; (b) protection of isolated Indians; (c) monitoring and enforcement; and (d) health services. This team would be assisted by an indigenous specialist (already hired) within the UNDP technical assistance mission and by short-term consultants. Draft operating agreements have been agreed in principle between the Military Police, FUNAI, IBAMA and the State of Mato Grosso to ensure effective protection of the indigenous reserves; between the State Health Agency and FUNAI for cooperation in staffing mobile health teams for indigenous

communities and adequate hospital care and diagnostic services to indigenous patients; and between FUNAI, INTERMAT and INCRA for cooperation in all matters of land settlement, disputes or titling near indigenous areas. The signing of these and all other operating agreements between the State and each project execution agency would be a condition of loan effectiveness (paras. 3.46 and 4.03 (d)). A specific FUNAI proposal for the protection of the Zoró Indigenous area was reviewed during negotiations; completion of removal of all squatters living within the boundaries of the Zoró Indigenous area would be a condition of loan effectiveness (para. 4.03 (b)). The State Government has removed most miners and other illegal occupants from within and around the Sararé Indigenous area; completion of removal of all miners and other illegal occupants from within and around the Sararé Indigenous area and presentation to the Bank of a satisfactory action plan (the Sararé Action Plan) to prevent future illegal occupations of the Sararé Indigenous area and to recuperate the area from any environmental damage caused by the mining, would be a condition of loan effectiveness (para. 4.03 (c)). The Borrower and the State Government provided assurances during negotiations that the Sararé Action Plan would be carried out in accordance with a timetable satisfactory to the Bank (para. 4.02 (c)).

3.23 Monitoring and Remote Sensing. A Forest Cover Monitoring Unit would be created as part of the project coordinating unit and physically located in SEPLAN-MT. The forest unit would work closely with FEMA, PMF-MT, the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA), FUNAI, the Brazilian Agricultural Research Company (EMBRAPA) and INTERMAT on land use and environmental monitoring activities and harmonize activities among different agencies executing zoning activities. In addition the unit would monitor the location and surface changes in mining and logging activities in order to assist in inspection and enforcement activities of FEMA. The maps produced would be sent to the State and Federal agencies responsible for the control of illegal intrusion and deforestation. The project would finance the services and project-related travel of four remote sensing technicians; image analysis equipment for aerial photography and satellite imagery; cartographic reproduction facilities; statewide Landsat imagery coverage; and related operating costs. During negotiations, the State provided assurances that by January 1, 1993, and by January 1 of each year thereafter until project completion, it would prepare a report on the satellite monitoring of the rate and location of deforestation that occurred in its territory during the preceding year, and the results would be made available to the Bank and the public (para. 4.01 (e)).

3.24 Institutional Strengthening. The State's capacity to implement environmental conservation and protection activities is constrained by the weakness of the existing legislation and by the lack of presence at field level of FEMA, responsible for its implementation. FEMA is relatively young, created in 1987, and state environmental legislation (Law 4984), although comprehensive, did not adapt to local realities the Federal legislation from which it originated. In addition, the State Council for the Environment (CONSEMA) has no environmental master plan to be used for strategic planning. The proposed new environmental legislation (paras. 3.16 and 4.03 (c)) and

activities to be financed under the project would provide state agencies with additional regulatory powers and enforcement capacity, and would improve their strategic planning capability. The State is currently undergoing a reorganization/decentralization of all public agencies and services which would improve, in the long run, the presence of FEMA at field level. A State Government proposal on the organizational and staffing modifications of FEMA to ensure suitable capability to implement the environmental component of the project was reviewed during negotiations. The project would finance the recruitment of a specialized consultant to assist FEMA in the preparation of a strategy plan; a special program "Mutirão para a Natureza" which will award grants for projects elaborated at municipal level by legally recognized non-governmental groups; and construction of office facilities, purchase of vehicles, and other FEMA incremental operating costs to support decentralization to the field level.

C. Agro-Forestry Development

3.25 The overall objective of this component is to support the Government's effort to transform traditional extensive farming systems into permanent sustainable agro-forestry in the Northern part of the State (Zone 3); intensify agricultural production in the Southern fertile soils (Zone 2); and initiate the privatization of agricultural support services. The project would support a series of interventions designed to: (a) concentrate agricultural support services in the most productive and fertile areas of zone 2; (b) promote the cultivation of suitable perennial crops, excluding coffee and cocoa; (c) support expansion of cropped area on fallow land or abandoned pasture land, and initiate a program of fallow enrichment and sylvipastoral activities; (d) diversify the existing crop mix by promoting viable new crops, including trees, developing mixed cropping systems and introducing crop rotation techniques; (e) reinforce efforts to retain forest reserves and recuperate degraded land through the promotion of woodlots at farm level; (f) support two pilot projects to stimulate privatization of the extension service; and (g) encourage private investment in small-scale agro-processing and storage activities.

3.26 Agro-forestry Research. Specific objectives of the research sub-component would be to widen and accelerate the availability to farmers of financially and ecologically sustainable farming systems, emphasizing tree crops diversification, agro-forestry, and re-forestation; transfer at least half of the research activity to on-farm technology validation trials; and achieve effective integration with extension in technology transfer and research feedback. The applied research program, while continuing on-going activities of selection and adaptation testing of new high-yielding varieties, would focus on perennial crops, agro-forestry and forestry research. The perennial crops research topics will include selection and adaptation of new clones and improved planting materials of rubber, bananas, pupunha, acerola, and others for tolerance to acid soils and diseases and ability for sustainable, low-cost production; introduction and evaluation of available germoplasm and planting material; and definition of control measures for important pests. In agro-forestry mixtures, short- and long-duration perennial species would be intercropped with annual crops in their early

years. This mixed cropping system would improve sustainability of yields and productivity and maintain soil fertility by conservation of soil and moisture. Forestry research would concentrate on enrichment planting in secondary forest (tree fallow) regeneration of degraded areas and reforestation with plantations of timber species. Only basic evaluation of species would be carried out on-station; all subsequent testing would be on-farm technology validation trials which would later serve as demonstrations and for training purposes.

3.27 In total, the adaptive research program, to be implemented by EMPAER, would support about 260 experiments for perennial crops and 80 for agro-forestry, forestry, animal production and conservation of natural resources. Transfer of technology would be facilitated by a new regional organization based on an interdisciplinary research-cum-extension team headed by a subject matter specialist, to ensure the maximum flow of information to farmers through on-farm technology validation trials. The project would finance construction of offices and field laboratories, agricultural and laboratory equipment, consultancies and incremental operating costs, except salaries which would be financed by the State Government.

3.28 Rural Extension. The State agricultural extension services expanded rapidly under the previous POLONOROESTE projects. However, its effectiveness has been limited due to inadequate research back-up, excessive administrative tasks, insufficient attention to field work, concentration on specific crops rather than on overall farm planning, and lack of rural credit. At present, extension services are provided through a system of individual contact, resulting in relatively higher costs per beneficiary and limited coverage. The State Government of Mato Grosso has reorganized its extension services and consolidated them with agricultural research under only one institution, EMPAER. In the future, EMPAER would operate in 9 administrative regions and 62 local offices. A group extension methodology would support: specialized training for about 1,545 farmers who would assist with implementation of on-farm demonstrations and technology validation trials; re-training of about 420 EMPAER staff in agro-forestry and forestry, marketing, small-scale processing and farm management; and about 2,070 on-farm demonstrations and 690 technology validation trials. The project would also finance mass-media communication programs, the preparation of field manuals, and the establishment of a forestry and perennial crops seed bank. Some 32,100 farmers would be assisted. The target would be to establish a network of 1 agent per 300 farmers by year 5 of the project period (compared to the present of 1 to 70). The project would finance offices, training facilities, equipment, per diem and other incremental operating costs except staff salaries to be financed by the State Government.

3.29 Finally, to foster eventual privatization of agricultural services for small farmers, EMPAER will carry out two pilot projects: (a) in Year 1 of the project, fees would be introduced for individual extension visits in 10 municipalities, with an evaluation carried out in Year 2; (b) in three municipalities EMPAER would reimburse farmers the cost of private technical assistance, decreasing annually from 100% to 15% in year 4. The results of

the pilot projects would be used to expand the privatization of extension services throughout the State.

3.30 Rural Credit. The volume of rural credit in Mato Grosso decreased during 1986-91 from US$641.0 million (41,500 loans) to US$381.0 million (8,850 loans), while the average loan size increased three-fold. Furthermore, 1990 statistics indicate that 80% of short-term credit financed rice and soybean crops, traditionally grown by larger farmers. The lack of smallholder credit has contributed to slowing down the development of perennial crops in Mato Grosso, and slash and burn shifting cultivation of annual crops has increased. Recognizing the need for credit services as means of stabilizing rural settlement and modifying production systems, the State introduced in 1988 a barter form of credit in kind whereby borrowers received and repaid loans with their products. This pilot operation, administered by the Secretariat of Agriculture and Land Affairs (SEAAF) has been well accepted by farmers, and loan recovery has been satisfactory.

3.31 While over the longer term commercial banks should increase lending to farmers in Mato Grosso, presently this occurs only in sporadic cases because of high transaction costs and concentration of small farmers without definitive land title or any other type of collateral guarantee. Access to credit is a critical requirement for the success of the project's agricultural/environmental strategy. The availability of credit through the pilot "in kind" system has already proven its usefulness, but as credit demand grows, management of the collection and storage of in-kind payments will present increasing logistical problems and costs. The State has, therefore, decided to convert this into credit which is still denominated in-kind, but based on monetary transactions. The new system would be legally established through a specially regulated fund (FUNDAGRO) to be administered by the Mato Grosso State Bank, although other banks, acceptable to the Bank, could also participate.

3.32 Under the operating conditions of FUNDAGRO, the loan principle would be adjusted by the annual variation in product prices with interest charged in accordance with the formula applied under the Agricultural Credit Project (Loan 2960-BR). Although there may be short-term differences between inflation and product reference prices, these are not expected to be significant over the long run. To safeguard FUNDAGRO against possible erosion of value due to short-term variations, a small special fund would be established. FUNDAGRO would finance investments and essential inputs (seeds, seedlings, fertilizers and chemicals) for diversification into perennial crops, other than cocoa and coffee; enrichment of secondary growth/forest fallow with valuable wood species, and other on-farm investments such as storage facilities, equipment and fish culture activities. FUNDAGRO would not finance the large livestock breeding and fattening operations, but would support small scale milk/meat operations in the southwest of the State. Activities financed would be in accordance with the State's agro-ecological zoning. Some 15,000 farmers would benefit.

3.33 Presentation of satisfactory evidence of the establishment of FUNDAGRO and adoption of a satisfactory operating manual for FUNDAGRO would be

a condition of disbursement of the credit category of the loan (para. 4.04 (a)). During negotiations, the State provided assurances that: (a) it would maintain FUNDAGRO, under terms and conditions satisfactory to the Bank, and would cause FUNDAGRO to carry out its operations in accordance with the FUNDAGRO operating manual, satisfactory to the Bank; and (b) by June 30, 1993, and by June 30 of each year thereafter until project completion, the State would prepare and furnish to the Bank for review a report evaluating the performance of FUNDAGRO during the preceding year, under terms of reference satisfactory to the Bank (para. 4.01 (f)). The report would be prepared by the Project Coordination Unit, and an Inter-institutional Credit Group, comprising representatives of SEPLAN-MT, SEAAF, BEMAT and EMPAER.

3.34 Crop Storage, Processing and Marketing Information. The project would support the State Government's efforts to privatize marketing activities like storage and processing. Drying, storage and processing facilities would be financed through the new FUNDAGRO rural credit line. Therefore, state agencies like EMPAER, the State Warehouse and Silo Company (CASEMAT), and the Institute for Agricultural Protection (INDEA), reporting to SEAAF, would provide only support services in the planning/supervision of marketing infrastructure and training of farmers. EMPAER would identify storage/processing marketing projects, while CASEMAT would prepare the technical projects; BEMAT would assist farmer groups in supervising construction and would train farmers in storage/drying procedures. To assist in these efforts, the project would finance the establishment of a Central Coordinating Marketing Unit (UCAC) to provide data collection, analysis and dissemination of marketing and price information; support services to facilitate contacts between sellers and buyers; and support services to farmers' associations regarding the construction and overall management of the storage units. UCAC would be located in SEAAF and would report directly to the Secretary of Agriculture. The project would also finance the establishment and equipment of seven classification posts for the grading of farm products. INDEA would implement this component and would train UAPT personnel in grading and classification procedures. INDEA would also prepare information on grading and pre-classification at farm level for further dissemination by UCAC.

D. Socio-Economic Infrastructure and Services

3.35 One of the objectives of the project strategy is to encourage the concentration of population in those areas which have the potential for permanent agriculture, to mitigate the pressure on other areas which should remain under forest cover. Adequate and well-maintained, socio-economic infrastructure and basic social services are important incentives for retaining smallholders in Zones 2 and 3. At the same time, the State's commitment not to provide such infrastructure and services elsewhere should serve as a strong disincentive to encroachment of forested areas in Zones 5 and 6. The project would, therefore, finance a five-year time slice of essential activities in health, education, water supply, rural electrification, and maintenance and paving of existing rural roads. These

activities would be concentrated in Zones 2 and 3 in southern Mato Grosso and in three selected areas in the North, around the municipalities of Juina and Castanheira, Juara and Novo Horizonte, and Colider and Terra Nova do Norte, where high concentrations of population and good soils are coincidental.

3.36 Health. The project would support the consolidation and expansion of the health system in the Zones 2 and 3 through: (a) construction of about 27 new health posts, enlargement of 15 posts and restoration of 3 posts; (b) equipment for the newly constructed and expanded posts; (c) five ambulances and one vehicle for the coordination office; and (d) training of health instructors, newly recruited health assistants and complementary refresher training for existing personnel. The project would finance construction, vehicles, equipment and materials, and incremental operating costs. The State of Mato Grosso Health Secretariat (SES) would be responsible for implementation. During negotiations, the State provided assurances that it would enter into contractual arrangements with each municipality before SES start health investments in such municipality. Such arrangement would include inter alia the obligation of the municipality to provide maintenance required for works performed under the project, starting one year after execution (para. 4.01 (g)).

3.37 Education. Only about 29% of the rural school-age population in the target areas currently have access to schools, and dropout and repeater rates are very high. Among the main problems are: the shortage of classrooms, poor qualification of rural teachers, lack of equipment and educational material, and poor supervision. The project would, therefore, support a five-year slice of the Government's educational program, including: (a) construction, restoration, or expansion of about 200 rural schools, identified through a school mapping exercise; (b) training of about 400 uncertified teachers; (c) vehicles, equipment, and incremental operating costs; and (d) a pilot program on environmental education in about 15 schools. A coordinating unit within the Secretariat of Education (SEC) would supervise and coordinate implementation of the sub-component. During negotiations, the State provided assurances that it would enter into contractual arrangements with each municipality before SEC start education investments in such municipality. Such arrangement would include inter alia the obligation of the municipality to provide maintenance required for works performed under the project, starting one year after execution. (para. 4.01 (g)).

3.38 Water Supply. The project would support the establishment of simple water supply systems, including perforation of 55 artesian wells, construction of 290 kms of distribution network, and training of 55 well operators. Funds would be provided for construction, equipment and training. The Water Supply and Sewage Company of Mato Grosso (SANEMAT) would be responsible for the implementation. During negotiations, the State provided assurances that SANEMAT would establish the water supply systems only after signing contractual arrangements with the municipalities, and would maintain the systems for one year after their establishment and train one well operator per community during this period. After the first year, the maintenance of the water supply system would be a municipality responsibility (para. 4.01 (g)).

3.39 Rural Electrification. Zone 2, where agro-industrial and processing activities are to be promoted by the State, has a limited power distribution and the quality of service is poor. The project would support: (a) adaptation of the installations in the Cáceres and Quatro Marcos substations, and establishment of about 527 kms of distribution network; (b) adaptation of the installation in Rondonópolis substation and establishment of 155 kms of distribution network. The Electricity Company of Mato Grosso (CEMAT) would implement this component, which would be executed by private contractors following Bank procurement guidelines. CEMAT would hire a consultant to help in the preparation of bidding documents and procurement procedures in general. During negotiations, the State provided assurances that it would provide adequate maintenance for the works and equipment financed under this sub-component (para. 4.01 (h)).

3.40 Rural Transport. Adequate road rehabilitation and maintenance is critical to ensure timely input supply and marketing in Zones 2 and 3. The project would support rehabilitation of 3,000 kms of State roads, and 4,500 kms of municipal roads; paving of the existing 69 kms of gravel road from Arapuntanga to Jaurú (MT 248) and 55 kms of the gravel road from Lambadi to Salto do Céu - Vila Progresso; training of personnel in road management and administration; training and establishment of an environmental impact assessment unit; and a study of the legal/institutional arrangements needed to establish a permanent road maintenance system. The Company for the Development of Mato Grosso (CODEMAT) would administer the state and municipal road programs. During negotiations, the State provided assurances that before starting rehabilitation of municipal roads, it will sign contractual arrangements with each municipality providing for the obligation for such municipality to maintain the municipal roads improved by the project (para. 4.01 (g)); and that the State would provide adequate maintenance of State roads improved by the project (para. 4.01 (h)). Paving of the two roads would be carried out through ICB according to Bank procedures. Presentation of satisfactory Environmental Impact Assessments, including mitigating actions, if necessary, for the paving of the roads between Araputanga-Jaurú and Lambadi-Salto do Céu-Vila Progresso, would be a condition of disbursement for related expenditures (para. 4.04 (b)).

E. Project Administration

3.41 The project would help to strengthen the State and Federal Project Coordination Units, with particular emphasis on improving their monitoring and evaluation capabilities through training, technical assistance, and consultancies. Specifically, the project would finance: (a) the installation costs of the State Project Coordination Unit, including administrative offices, equipment and operating costs; (b) the operating costs of the Federal National Coordination Unit in the National Secretariat for Regional Development in the Presidency of the Republic (SDR-PR); (c) technical assistance; and (d) the implementation of a monitoring system based on

satellite imagery for the immediate detection of illegal deforestation and invasion of protected areas.

Project Organization

3.42 Institutional Strengthening. The proposed institutional and administrative arrangements for the project are based on detailed analyses of the lessons learned under the previous POLONOROESTE projects. An effort was made to distinguish problems attributable to lack of institutional capacity per se, from those which were due to inadequate or untimely release of counterpart funds. Funding problems were chronic under POLONOROESTE; when the funding situation improved during the last two years, implementation accelerated and state agencies managed to execute almost 100% of their physical targets.

3.43 The principal institutional problems of the earlier POLONOROESTE projects included: (a) overcentralization of decision-making and implementation responsibility at the Federal level; (b) inexperienced State institutions; (c) inadequate technical assistance and training, especially for some of the more innovative activities in environmental protection, conservation and agro-forestry development; and (d) the absence of adequate personnel policies to allow key project agencies to hire and retain suitably qualified staff. For each of the main project agencies, organizational structure, staffing, operating practices and budget were reviewed. Taking into account activities to be implemented, provision has been made under the project for institutional strengthening of the main agencies through increased staffing, training, technical assistance and consultancies; and for redefinition of lines of responsibility for project implementation between the Federal and State Governments and among some executing agencies. The main proposals for institutional strengthening under the project include: (a) decentralization of responsibility and accountability for the execution of most project activities from the Federal to the State Government; (b) primary reliance on the private contracting out of project works; (c) reliance on existing Government structures, rather than the creation of special entities; (d) extensive training, technical support and consultancy services, particularly in fields requiring greater innovation or in areas in which a major impact is expected in a short period of time; and (e) improvements in personnel policies.

3.44 Coordination Arrangements. The Secretariat for Regional Development within the Presidency of the Republic (SDR-PR) has federal responsibility for program coordination. Interministerial decrees describe, in general terms, the way in which the Federal Ministries and State Governments would collaborate, as well as the various programming, budgeting and funding procedures to be used. In addition, SDR-PR and the Secretariat of Planning of Mato Grosso (SEPLAN-MT) would conclude a separate Subsidiary Agreement defining their respective roles. The draft Agreement between the State (through SEPLAN-MT) and the Borrower (through SDR-PR), outlining respective responsibilities for project implementation, including agreed mechanisms of flow of project funds from the Federal Government to the State, was reviewed during negotiations. The Agreement would emphasize the State's

responsibility for project implementation, with a view to fostering a self-sustaining development process in Mato Grosso. A satisfactory signed Subsidiary Agreement between the Borrower and the State would be a condition of loan effectiveness (para. 4.03 (d)).

3.45 A State Council for Project Administration (CEAP), presided by the Governor, would be responsible for overall project guidance and policy direction, as well as for approval of the annual project budget and for ensuring and guaranteeing adequate allocation of counterpart funds in the state annual budget. CEAP would be comprised of representatives of SDR-PR, SEPLAN-MT, state implementing agencies, FUNAI, state offices of INCRA and IBAMA, the municipal Mayors' Associations and NGOs. SEPLAN-MT would function as the Executive Secretariat of the Council. It would be assisted on a day-to-day basis by a State Project Coordination Unit (PCU) which would be formed by a Director, 2 sub-directors (in charge of the technical and financial control units), 5 Area Chiefs (Supervision, Monitoring, Financial Control, Administrative Support, Documentation and Information), 7 Area Supervisors, 8 sectoral monitors, 4 technicians in financial control and auditing, and support staff. The Technical Unit would be responsible for the technical review and consolidation of the work programs of the executing agencies, with separate sections in charge of environmental control, forest development, agro-forestry, credit and marketing, Amerindian support, and socio-economic infrastructure and services. Technical staff would spend a minimum of one week per month on field supervision in order to ensure close contact with field staff and project beneficiaries, and effective response to local problems. The Financial Control Unit would handle budgeting, disbursements and accounting matters. The satisfactory staffing of the PCU would be a condition of effectiveness (para. 4.03 (d)). During negotiations, the State provided assurances that it would maintain within SEPLAN-MT the PCU, with satisfactory organization, structure, functions and staffing (para. 4.01 (i)).

3.46 Implementation Arrangements. The principal implementing agencies would include those for land regularization (INTERMAT, INCRA); agro-ecological zoning (SEPLAN-MT); environmental conservation, forest protection and management (FEMA, IBAMA, PMF-MT); support to indigenous communities (FUNAI, IBAMA, INTERMAT, INCRA, PMF-MT); rural extension and agricultural research (EMPAER); rural credit (BEMAT); rural transport (CODEMAT); marketing support services (SEAAF, EMPAER, CASEMAT, INDEA); rural electrification (CEMAT); health (SES-MT); education (SEC-MT); and water supply (SANEMAT). These agencies would be directly responsible for budgeting and implementation, and they would be accountable for the application of funds and the results obtained. To overcome the poor inter-agency coordination of the previous project, the various agencies would formalize the arrangements governing their form of cooperation, clearly identifying the distribution of tasks, and they would maintain an updated organization chart with job descriptions of all key field personnel financed by the project. Draft Operating Agreements (convênios) between the State (through SEPLAN-MT/PCU) and the project executing agencies, for each component, were reviewed during negotiations, and the signing of satisfactory agreements would be a condition of loan effectiveness (para. 4.03 (d)). During negotiations, the State Government

provided assurances that these agreements would be maintained throughout project implementation (para. 4.01 (l)).

3.47 Annual Plans and Budgets. Draft Annual Operating Plans (POAs), prepared by SEPLAN-MT, would be based on the multi-annual targets of the project, and corrected according to experience gained in the previous year, and submitted to the Bank each year, together with the estimated total State and Federal funding allocations (both counterpart funds and the amount of external funds budgeted). During negotiations, Federal and State Governments provided assurances that they would provide to the Bank: (i) by July 15, 1992, and by July 15 of each year thereafter, the annual budgetary allocation proposal for the project for the next calendar year; and (ii) for review and comments, by November 15, 1992, and by November 15 of each year thereafter, the draft POA including the physical targets, budget, staffing, training and procurement targets for project activities for the next calendar year. It would also provide the Bank with a copy of the final budget and POA as soon as they have been approved, and would take all necessary action to ensure that the project is implemented in each year in accordance with the POA (para. 4.02 (d)).

3.48 Project Monitoring and Environmental Impact Assessment. Physical and financial monitoring of project implementation, and on-going assessment of project impact, would be carried out through routine supervision by each of the project executing agencies and by the state Secretariat of Planning through its PCU/M&E unit and the Federal Government through SDR-PR. Monitoring and project coordination would be strengthened and information systems streamlined through technical assistance and training.

3.49 Executing entities would regularly collect and analyze data on key project indicators to assess progress, compare results obtained with initially expected target levels, and identify possible problems to be discussed with SEPLAN/PCU personnel at least on a monthly basis. A quarterly review of activities would be prepared by each institution and submitted to SEPLAN/PCU. SEPLAN/PCU, based on the quarterly progress reports, would conduct a technical review before presentation to the State Project Council. During negotiations, the State Government provided assurances that, based on the regular quarterly agency reports, State Council proceedings, and ad hoc reports on specific subjects carried out during project implementation, it would produce every six months project progress reports, and that copies of these semi-annual and annual progress reports would be sent to the Bank, through the SDR-PR, no later than three months after the end of each semester/fiscal year (para. 4.02 (e)). The semi-annual reports would: (i) describe the progress, or the lack of progress, in project execution and the degree of success in implementing agro-ecological policy; and (ii) identify possible implementation problems and describe plans to resolve them. These reports would be analyzed by Bank supervision missions.

3.50 Lessons learned from the previous POLONOROESTE projects indicate that there is a need to strengthen the monitoring and supervision of projects which have significant human or physical environmental consequences. Therefore, in addition to Federal Government/Bank supervision missions, a mid-

term review and final assessment of the project at the time of completion (PCR), an Independent Evaluation Committee would be invited yearly to monitor the environmental and social performance of the project. The Federal and State Governments provided assurances during negotiations, that: (i) a mid-term review of the project would take place through an exchange of views among the Bank, the Borrower and the State, no later than June 30, 1995, on the basis, inter alia, of a report by the Borrower submitted to the Bank at least 30 days prior to the review (para. 4.02 (f) (ii)); (ii) each year the State would invite an Independent Evaluation Committee to monitor the implementation of the environmental policy and regulatory reforms undertaken in connection with the project, the compatibility of annual Federal and State investment programs in Mato Grosso with the recommendations of the agro-ecological zoning and the impact of the project in the State; the composition of the Committee would include representatives of relevant local Brazilian Non-Governmental Organizations (NGOs); and the findings of the Committee would be made available to the Bank by June 30, 1993, and by June 30 of each year thereafter (para. 4.01 (j)); and (iii) A final assessment of the overall project implementation performance would be carried out within six months after the project completion date (para. 4.02 (f) (iii)).

3.51 In the past, monitoring activities have placed an excessive administrative burden on field staff, in particular, through the use of multiple repetitive questionnaires and frequent visits of various institutions. Under the project, information requirements would be streamlined, and requests for statistical information on project progress and developments in the field would be channelled through the management staff of the participating agencies and the PCU. During negotiations, the Borrower provided assurances that by September 30, 1992, it would furnish to the Bank for review draft performance indicators and operating procedures for the M & E of project activities, and by December 31, 1992, would adopt indicators and procedures satisfactory to the Bank (para. 4.02 (f) (i)). These activities and project M & E during implementation would be supported by technical assistance. The Government has already entered into an agreement with UNDP to field a team of six sectoral technicians and one administrative assistant which would strengthen the SEPLAN/PCU capacity in monitoring and evaluation through "on the job training" of the PCU technicians. The above technicians would be locally recruited according to UNDP rules and regulations. Finally, since the main measure of success of the various project interventions would be their effectiveness in reducing the rate of deforestation in Mato Grosso, the project would provide for the establishment of a forest cover monitoring unit within SEPLAN-MT (para. 3.23).

3.52 Accounts and Auditing. Each of the federal and state implementing agencies would maintain separate accounts for project expenditures, which would be audited annually by independent private or public auditors acceptable to the Bank. This audit report would also convey the auditor's opinion and comments as necessary on the methodology employed in the compilation of the Statements of Expenditures, their accuracy, the relevance of supporting documents, eligibility for financing in terms of the project's legal agreements and standards of record keeping and internal controls related to the foregoing. The Special Account to be opened for this project would be

audited by independent auditors satisfactory to the Bank (para. 3.62). During negotiations, the Federal and State Governments provided assurances that: (a) the Special Account and the project accounts would be established, maintained and audited annually according to standards and procedures satisfactory to the Bank; (b) terms of reference for the auditors would include, inter alia, detailed procedures for the examination and verification of the Statements of Expenditures (SOEs) of the project accounts; and (c) copies of the audit reports would be submitted to the Bank within six months of the close of each fiscal year (para. 4.02 (g)).

Project Costs

3.53 The total project cost, including taxes, physical and price contingencies, is estimated at US$285.7 million, with a foreign exchange component of US$55.3 million, or about 19% of the total cost (Loan and Project Summary and Annex 6). Project baseline costs amount to US$241.9, including $11.7 million equivalent in local taxes. Physical contingencies of US$15.2 million, or about 6% of total baseline cost, have been estimated at 10% for civil works, 15% for road construction, 10% for equipment and furniture, vehicle maintenance costs and personnel field allowances. Price contingencies of US$28.6 million or 12% of baseline cost were included and are based on estimated international inflation rates of 3.9% p.a. through 1997. It was assumed that periodic currency adjustments, estimated on a purchasing power parity basis, would compensate for differences between the rates of the US dollar and local currency inflation. Recent experience indicates that this assumption may not be valid in some cases; increases in local currency costs for civil construction over some of the last years have exceeded the rate of devaluation of the local currency. Therefore, project costs would be carefully monitored throughout the project implementation period. In the event that this trend continues, it would become necessary for the Government to finance these cost overruns, and the Bank, if needed, would reduce its disbursement percentages to maintain participation through project completion.

Financing Plan

3.54 The proposed Bank loan of US$205.0 million would finance 75% of total project costs net of taxes, or 72% of costs including taxes (Annex 6, Table 6.4, and Loan and Project Summary). The share of Bank financing is justified because of the strong environmental focus of this operation. Significant policy actions have already been undertaken in preparation for the project, to which commitment is high at both Federal and State levels. However, the severe fiscal situation in the country also makes it difficult at this point in time to carry out the kinds of environmental initiatives planned under the project because the benefits, although substantial in economic terms, would materialize only in the long term and largely in the form of foregone losses. The proposed share of Bank financing would also help to reduce implementation risks caused by inadequate or untimely counterpart funding. Counterpart funds would be provided by the Federal (US$40.7 million or 14% of costs including taxes) and State Governments (US$40.0 million or 14% of costs including taxes). The Bank loan would finance 100% of foreign exchange costs and 65% of local costs. It would be repayable over 15 years,

including a five-year grace period. The Federative Republic of Brazil would be the Borrower of the loan and would assume the foreign exchange risk. To enable the early start-up of project activities, retroactive financing would be provided up to a maximum of US$20.5 million in respect of eligible project expenditures incurred in between the end of project appraisal (October 1991) and loan signing, expected in mid-1992.

Procurement

3.55 Procurement arrangements are summarized in the following table:

Procurement Arrangements
(US$ Million)

Category	Procurement Method ICB	LCB	OTHER	NBF	TOTAL COST
Civil Works	17.6	41.5	6.0 1/	-	65.1
	(12.7)	(29.9)	(4.3)	-	(46.9)
Equipment, Machinery, Vehicles and Furniture	9.0	20.5	4.2	0.5 2/	34.2
	(6.5)	(14.8)	(3.0)	-	(24.3)
Contractual Services	17.3 3/	12.8	1.0	-	31.1
	(17.3)	(12.4)	(0.7)		(30.4)
Technical Assistance, Training and Studies	-	-	22.2	-	22.2
			(22.2)		(22.2)
Salaries and Benefits	-	-	58.0	-	58.0
			(16.8)		(16.8)
Other Operating Costs	-	-	41.0	-	41.0
			(39.8)		(39.8)
Investment Credit	-	-	34.1	-	34.1
			(24.6)		(24.6)
TOTAL	43.9	74.8	166.5	0.5	285.7
	(36.5)	(57.1)	(111.4)	-	(205.0)

Figures in parenthesis are the respective amounts expected to be financed by the Bank.

1/ Includes only materials for small civil works to be executed under force account.
2/ Computer equipment to be acquired as reserve procurement item and not to be financed under the proposed Bank loan.
3/ Aerial photography and land zoning operations.

3.56 Civil works would include road paving and rehabilitation, well perforation and buildings. Road paving contracts exceeding US$5.0 million would be awarded through International Competitive Bidding (ICB) following Bank procurement guidelines. For road rehabilitation, well perforation and buildings, because of the dispersed nature and relatively small size of most of these works, and for which the largest single contract is not expected to exceed US$5.0 million, it is unlikely that foreign contractors would be interested. Accordingly, Local Competitive Bidding (LCB) procedures, satisfactory to the Bank, would be used, although interested foreign bidders would be allowed to participate. For all components other than roads, force account would be permitted for very small works which cannot be grouped into contracts of at least US$150,000, provided the aggregate value of such works does not exceed US$6.0 million. For these works, the Bank would finance only the cost of materials. Total civil works procurement under the project would be US$65.1 million, of which about US$17.6 million would be procured through ICB and about US$41.5 million through LCB.

3.57 Contracts for goods exceeding US$500,000 for a cumulative total of US$9.0 million, would be awarded through International Competitive Bidding (ICB) following Bank procurement guidelines. Contracts for goods and equipment expected to cost between US$25,000 and US$500,000, and long-term helicopter and light aircraft leasing and maintenance contracts, not exceeding an aggregate amount of US$20.5 million, would be procured under LCB. Office equipment, furniture, and other similar goods required by several of the executing agencies over the project implementation period, estimated to cost less than US$25,000 per contract, would be awarded on the basis of evaluation of price quotations invited from at least three suppliers in accordance with procedures acceptable to the Bank, provided they do not exceed an aggregate amount of US$4.2 million. Computer equipment manufactured in Brazil and required by the project, as reserve procurement items, would not be financed under the proposed loan. With respect to goods and equipment financed under the investment credit sub-component of the project, since the majority of these operations are expected to average less than US$1,000-2,000 and no individual operation would exceed US$50,000, established commercial procurement practices would be followed.

3.58 Contract services for aerial photography and land zoning operations amounting to about US$17.3 million, and exceeding US$5.0 million per contract, would be awarded through ICB, according to Bank procedures. Other services not expected to exceed US$1.0 million dollar per contract and US$12.8 million in the aggregate, would be procured through LCB procedures satisfactory to the Bank. Consultant services would be procured in accordance with Bank guidelines for the use of consultants.

3.59 Civil works contracts over US$3.0 million, and contracts for rural electrification equipment, aircraft leasing and contract services over US$250,000, would be subject to prior Bank review of bidding documents, bid evaluation, award proposals and final contracts. In total, Bank review would cover about 60% of the value of contracts financed under the project. During negotiations, the State and Federal Governments provided assurances that the above procurement arrangements would be followed (para. 4.01 (k)).

3.60 The Project Implementation Schedule and Estimated Annual Contractual and Other Payments are summarized in Annex 6, Table 6.6. The loan closing date would be December 31, 1997.

Disbursements and Special Account

3.61 The proceeds of the proposed loan would be disbursed against eligible project expenditures at the rates of: (a) 100% of costs incurred in the natural resource management and protection sub-components, land zoning, land regularization, training costs, studies, and Technical Assistance; (b) 75% of all incremental costs for rural extension, agro-forestry research, rural credit and project administration at Federal and State level; and (c) 50% of all socio-economic infrastructure costs and roads paving and maintenance. Disbursement for civil works not exceeding US$3.0 million, contracts for goods and equipment below US$250,000, works carried out by force account and operating expenses would be made against Statements of Expenditures prepared by the various executing agencies and the PCU and certified by SDR-PR. Supporting documentation would be retained by the PCU. Conditions of disbursement would be: (i) for rural credit expenditures, that the final legal documents establishing FUNDAGRO and a satisfactory FUNDAGRO operating manual have been presented to the Bank; and (ii) for road paving expenditures, that satisfactory Environmental Impact Assessments, including mitigating actions, if necessary, had been presented to the Bank (paras. 3.33, 3.40 and 4.04 (a)-(b)).

3.62 To facilitate Bank disbursement and reduce Government prefinancing requirements for local currency expenditures, a Special Account would be opened in the Central Bank with an initial deposit of US$15.0 million. Withdrawals from the Special Account would be supported by the required documentation or Statements of Expenditures (SOEs). Loan disbursements are expected to be completed within about 5-1/2 years (Loan and Project Summary and Annex 6, Table 3). The Bank standard disbursement profile for this type of project is about 8-1/2 years. However, the previous POLONOROESTE project in Mato Grosso (Loan 2116-BR) took only 7 years to complete, including a period of loan suspension of 9 months, related mainly to non-compliance under another POLONOROESTE project (Loan 2060-BR). Furthermore, the State has now acquired extensive experience in implementation, reflected in the fact that during the last year of Loan 2116-BR project performance was good, exceeding targets in some areas of production and service delivery (see PCR Report No. 9382). Finally, Bank financial participation of 75% of the overall project costs, excluding taxes, would help to minimize counterpart funding shortages and delays which have played a large role in past implementation delays. Consequently, the proposed five and one-half year disbursement period is realistic.

Project Benefits and Justification

3.63 The main benefits of the project, i.e., reduction of wasteful deforestation, conservation of biodiversity, protection of the environment and of indigenous communities' rights do not, for the most part, yield direct financial returns. Nevertheless, the establishment of conservation units and state forests would help to preserve the forest patrimony and ensure genetic resources for agriculture, forestry, medical and other scientific and industrial uses. Because much of the protected area would be on steep terrain, they would also protect critical watersheds by influencing water flows and decreasing soil erosion. Project enforcement actions would benefit the population as a whole by reducing the risk of water pollution and providing a safer environment. In addition, some 16,000 indigenous people living on 38 existing reservations and at least nine more to be created would benefit from increased protection from encroachment, boundary demarcation and improved health services. Finally, about 32,100 low-income farm families would benefit directly from the strengthening of technical services in those areas of the state which allow sustainable agricultural development. A large part of the rural community in those same areas would also benefit from improved socio-economic infrastructure and services.

3.64 Farmers' Benefits. The project technical strategy, which would be promoted by extension messages based on adaptive research, would stress adoption of improved cultural and husbandry practices (timing, plant spacing, and weeding) and modern inputs (seeds, fertilizers and pesticides); utilization of improved genetic material and certified seeds; improved soil conservation activities on farmers' fields; and reduction in crop losses due to improved on-farm storage and drying. Eight illustrative farm models, five for Zone 2 and three for Zone 3, have been analyzed to verify the returns and production increases expected to come from the farmers who would adopt the proposed practices. Average assumed yields at full development are 20% to 40% below those already being obtained by the most progressive farmers in the area and are therefore considered to be conservative estimates for the typical farmer. Overall, the project would support an agricultural development program which would result in: (a) decreases in the area of annual crops by 34,900 ha and of cotton by 8,500 ha; (b) diversification with perennial crops on about 47,300 ha; and (c) enrichment of 20,000 ha of secondary growth/forest follow. The additional output from the project would represent only a relatively small share of total domestic production of these crops, and no significant marketing problems or price effects are foreseen.

3.65 At present, the average family income of project beneficiaries is estimated at an equivalent of about US$1,930/year. It is projected that this would increase to an average of about US$5,155/year at full development, representing an increase of 170% over the present level. This level would be sufficiently attractive for the farmers to adopt the technical strategy encouraged by the project. The returns to labor would increase from US$7.4/worker-day to US$11.9/worker-day. The estimated financial rates of return of the models vary from 13% to more than 50% for the various farm models.

3.66 Economic Return to Agricultural Development. An economic rate of return has been estimated only for the agricultural development component. The cost stream used in the economic evaluation of productive agricultural activities included: (a) all on-farm incremental investment and operating costs (based on the phased aggregation of the different farm models); (b) off-farm investments and incremental operating cost for agricultural extension, storage and drying facilities, and access roads, and 30% of the cost of project coordination and management; and (c) recurrent costs of services and maintenance of infrastructure after the five years of project implementation. The benefits of the agricultural development component would be the increased production generated by 20,200 low-income farm families (estimated to adopt the proposed practices) presently living in Zones 2 and 3. The benefit stream used in the economic rate of return analysis includes all the incremental production (and reduced losses) that these farmers would be expected to achieve.

3.67 The prices used in the economic analysis for internationally traded commodities have been estimated on the basis of World Bank price projections, which were brought to farmgate to take into account transport, handling and insurance costs. All other commodities are valued at farmgate prices. Labor was priced at the on-going market wage adjusted by a standard conversion factor of 0.80. Brazil is also a net importer of fertilizer for which a similarly adjusted border price was calculated. Physical contingencies at 15% for roads construction, 10% for buildings, office equipment and furniture, and vehicles running costs and personnel field allowances have been added to costs. Any transfer payments such as duties and taxes were excluded from the costs streams. The local currency portion of the costs has been adjusted by a standard conversion factor of 0.80. Based on these assumptions the ERR was estimated at 15%. To measure the impact of possible changes in the project's benefits and costs streams, several sensitivity tests were conducted to reflect possible variations in output and prices. However, even under the most conservative assumption (total costs increased by 20%), the ERR was still about 13%. Finally, the ERR was calculated assuming that only 50% of roads costs are directly related to the agricultural development component of the project, which resulted in a slightly higher 18% return.

3.68 Employment Benefits. The proposed project would improve the incomes and living standards of those families who are already in the project area on existing holdings, without having to migrate to other areas. It is estimated that the development of perennial crops in the project area would create requirements for approximately an additional 17,000 fully employed laborers per year at full development, of which about 19% would be provided by hired labor. In addition, the economic activities generated by the incremental agricultural production would increase the number of job opportunities in the intermediary processing industries.

3.69 Fiscal Impact. While the long-term fiscal impact of the project would be positive, this is not likely to be the case during the years immediately following project completion. Total recurrent costs in project year 5 (i.e., the final year of project implementation) would be about US$18.0 million, equivalent to approximately 5% of the total 1990 State budget. By

full development (project years 12-15), selected project activities should provide the State with annual incremental tax revenues at least sufficient to cover that amount. These revenues would derive from the federal tax on the circulation of goods (ICM) that would apply to the incremental marketable production, and they would be retained by the State Treasury and municipalities. However, in the first years after project completion, there would probably be a negative gap, and the State may require continued fiscal support from the Federal Government for a few years. To a certain extent, such support would be justified given that most of the deforestation and other natural resource degradation in Mato Grosso over the last ten to fifteen years has been caused by migration from other parts of Brazil.

Project Risks

3.70 Inadequate knowledge of the State's natural resources led to the occupation of some lands with little or no sustainable potential, accompanied by rapid deforestation and resource depletion. However, given current technical knowledge, particularly the availability of agro-ecological zoning, the prospects for achieving sustainable development, and environmental protection, in Mato Grosso are much better. The Government's commitment to comply with the zoning recommendations in its investment programming would reduce the risk of continued occupation of areas without sustainable potential.

3.71 The project would support the identification, creation and border demarcation of conservation units and indigenous reserves. However, such measures would not, by themselves, be sufficient to prevent illegal encroachment and deforestation of these areas. Protection of environmentally fragile areas in Mato Grosso has been weak in the past, both because of the economic and financial incentives framework which often encouraged use of those areas, and because of the State's limited enforcement capacity and inadequate knowledge of the situation in the field. Various environmental policy and regulatory reforms which the Government has taken in the last few years and other being undertaken in preparation for this project should help to redress the basic incentives/disincentives problems. Those project activities designed to intensify land use in suitable areas and to develop sustainable forms of extractive production in areas which should remain under forest cover would also help to reduce pressure on the forests by small, shifting cultivators. Finally, the environmental protection subcomponent would strengthen the institutional capacity of key agencies to enforce the State's environmental policies and legislation and to protect the borders of its conservation units and reserves. The field information system would also be strengthened and supplemented by the use of satellite imagery, permitting immediate detection of forest burning and other forms of invasion. However, given the extensive areas to be protected, it must be recognized that even these measures may not eliminate all illegal activities during the project period.

3.72 The Mato Grosso EAP would be maintained throughout the project period, and would address the most important known causes of environmental degradation in Mato Grosso. However, there is always a risk that

unforeseeable factors could undermine the impact of these reforms. For instance, unexpected weather or economic problems in other parts of Brazil could once again accelerate spontaneous migration to the Northwest Region. Unanticipated diseases could undermine the viability of some important agricultural and agro-forestry activities in those parts of the State which are currently capable of sustaining production. To mitigate these risks, appropriate monitoring and evaluation devices are being put into place at project start-up; an Independent Evaluation Committee, including NGO representatives, would convene annually to review progress and recommend corrective actions or refinements to project strategy as necessary; and a joint Government-Bank implementation review would be undertaken annually.

3.73 Another possible risk stems from the fact that current fiscal difficulties in Brazil have led the State Government to place severe restrictions on staff recruitment and compensation, which could threaten the necessary strengthening of Mato Grosso's environmental, land and agro-forestry institutions. The State Government presented during negotiations a strategy to ensure that project executing agencies would be able to recruit and retain qualified technical and managerial staff, and the agreements reached (e.g., acceptable personnel plans, providing for recruitment, career development and adequate remuneration of essential staff) would be closely monitored. The project also includes considerable technical assistance and staff training to support the development of key institutions. Also, Bank and Federal Government supervision of the project would be intensive throughout the project period (Annex 8).

3.74 Although the potential problems mentioned above should not be minimized, the alternative of inaction would pose far greater risks. Accelerated migration to the frontier areas of Mato Grosso and Rondônia did not start with POLONOROESTE. Rather, the program was established in 1980 to try to cope with a process which was already underway: during the 1970s, the population of these States more than quadrupled, socio-economic problems increased, deforestation was uncontrolled, and the security and well-being of the State's indigenous inhabitants were being threatened. POLONOROESTE did not succeed in reversing these trends during the first few years, but its accomplishments have been significant. Today, the State and Federal Governments are far better poised to confront the enormous challenges of reducing the inflow of migrants to the State and channelling them into sustainable economic activities. Without active intervention, the continued uncontrolled spread of low-cost, extensive and itinerant agricultural production systems would eventually destroy the remaining natural forests. The project represents a major new initiative on the part of both the Government and the Bank to begin to reverse this trend.

IV. SUMMARY OF AGREEMENTS REACHED AND RECOMMENDATIONS

4.01 During negotiations, the State of Mato Grosso provided assurances that:

(a) By June 30, 1994, agro-ecological, soil and topographic maps of the State of Mato Grosso would be prepared, in consultation with the Secretaria de Assuntos Estratégicos of the Borrower's presidency, and furnished to the Bank, in accordance with terms of reference satisfactory to the Bank (para. 3.10);

(b) By September 30, 1992, it would prepare and present to its Legislative Assembly, for approval, proposed legislation on land use and on environment, in form and substance satisfactory to the Bank, and it would take all necessary action to have such proposed legislation approved by its Legislative Assembly as soon as possible (paras. 3.12 and 3.16);

(c) (i) By June 30, 1994, it would establish and thereafter maintain forest reserves and conservation units in areas identified as suitable (all unoccupied public lands) through the discriminatory works carried out in the first year of the project in Zones 5 and 6 of the agro-ecological zoning respectively; and (ii) by June 30, 1995, it would establish and thereafter maintain forest reserves and conservation units in all remaining areas, identified as suitable (all unoccupied public lands), through the discriminatory works in Zones 5 and 6 of the agro-ecological zoning, respectively, provided that the minimum number of forest reserves and conservation units established by June 30, 1995 would be nine and 16, respectively (paras. 3.15 and 3.18);

(d) By June 30, 1993, it would prepare, and put into effect thereafter, a satisfactory plan of action to encourage the management of privately owned forest areas in Zones 5 and 6, consistent with the agro-ecological zoning (paras. 3.15 and 3.18);

(e) By January 1, 1993, and by January 1 of each year thereafter until project completion, it would prepare and report on the satellite monitoring of the rate and location of deforestation that occurred in its territory during the preceding year, and the results would be made available to the Bank and to the public (para. 3.23);

(f) (i) it would maintain FUNDAGRO, under terms and conditions satisfactory to the Bank, and would cause FUNDAGRO to carry out its operations in accordance with the FUNDAGRO Operating Manual, satisfactory to the Bank; and (ii) by June 30, 1993, and by June 30 of each year thereafter until project completion, the State would prepare and furnish to the Bank for review a report evaluating the performance of FUNDAGRO during the preceding year, under terms of reference satisfactory to the Bank (para. 3.33);

(g) It would enter (through SES, SEC, SANEMAT and CODEMAT, respectively) into contractual arrangements, satisfactory to the Bank, with each municipality in which health, education, water supply and road rehabilitation programs would be carried out, before starting such part of the project in each such municipality, each agreement to contain, inter alia, the obligation of the municipality to provide the maintenance required for the works performed under the project, starting one year after its respective execution (paras. 3.36, 3.37, 3.38 and 3.40);

(h) It would provide maintenance for the works and equipment included under the Rural Electrification and Rehabilitation of State Roads components of the project (paras. 3.39 and 3.40);

(i) It would maintain within SEPLAN-MT the PCU with satisfactory organization, structure, functions and staffing (para. 3.45);

(j) It would invite each year an independent evaluation committee to monitor the implementation of the environmental policy and regulatory reforms undertaken in connection with the project, the compatibility of annual Federal and State investment programs in Mato Grosso with the recommendations of the agro-ecological zoning, and the impact of the project in the State. The composition of the committee would include the representatives of relevant local Brazilian NGOs. It would make the findings of the committee available to the Bank by June 30, 1993, and by June 30 of each year thereafter (para. 3.50 (ii));

(k) Procurement procedures would be as specified in paras. 3.55 - 3.59; and

(l) It would maintain the Operating Agreements with the various project executing agencies throughout the life of the project (para. 3.46).

4.02 During negotiations, the Borrower and the State of Mato Grosso provided assurances that:

(a) (i) Policy reforms under the Mato Grosso EAP would be enforced throughout the duration of the project; (ii) Federal and State investment programs for Mato Grosso, which currently take into account land use capabilities, ecological and agro-ecological

zoning considerations, would, at each update thereof, be maintained consistent with such considerations and compatible with such zoning; and (iii) by September 30 of each year during the execution of the project, furnish to the Bank, for its review and comment, any intended update of such investment program for the forthcoming year (para. 3.04);

(b) By no later than December 31, 1992, a study on the feasibility of the enlargement of the existing conservation unit located in the Chapada dos Guimarães in Mato Grosso would be carried out; and if so recommended by such studies all action necessary to enlarge, and thereafter maintain as enlarged, such conservation unit would be promptly taken (para. 3.18);

(c) The Sararé Action Plan (to prevent future illegal occupations of the Sararé Indigenous Area and to recuperate the area from any environmental damages caused by mining) would be carried out in accordance with a timetable satisfactory to the Bank (para. 3.22);

(d) The Borrower would provide to the Bank: (i) by July 15, 1992 and by July 15 of each year thereafter, the annual budgetary allocation proposal for the project for the next calendar year; and (ii) for review and comments by November 15, 1992, and by November 15 of each year thereafter, the draft POA, including the physical targets, budget, staffing, training and procurement targets for project activities for the next calendar year. It would also provide the Bank with a copy of the final budget and POA as soon as they have been approved, and would take all necessary actions to ensure that the project is implemented each year in accordance with the respective POA (para. 3.47);

(e) Satisfactory project progress reports would be prepared by the State and furnished to the Bank, through the SDR-PR, no later than three months after the end of each semester of the fiscal year (para. 3.49);

(f) (i) By September 30, 1992, the Borrower would furnish to the Bank for review, draft performance indicators and operating procedures for the M&E of project activities, and by December 31, 1992, would adopt indicators and procedures satisfactory to the Bank (para. 3.51); (ii) a mid-term review of the project would take place through an exchange of views among the Bank, the Borrower and the State, no later than July 31, 1995, on the basis, inter alia, of a report by the Borrower submitted to the Bank at least 30 days prior to the review (para. 3.50 (i)); and (iii) a final assessment of the overall project implementation performance would be carried out within 6 months after the project completion date (para. 3.50 (iii)); and

(g) (i) The Special Account and the project accounts would be maintained and audited annually according to standards and procedures satisfactory to the Bank; (ii) terms of reference for the auditors would include, inter alia, detailed procedures for the examination and verification of the Statement of Expenditures for project accounts; and (iii) copies of the audit reports would be submitted to the Bank within six months of the close of each fiscal year (para. 3.52);

4.03 Conditions of loan effectiveness, if not completed earlier, would be:

(a) the signing of the INCRA/State of Mato Grosso agreement mentioned in para. 3.12;

(b) completion of removal of all squatters living within the boundaries of the Zoró Indigenous area (para. 3.22);

(c) (i) completion of removal of all miners and other illegal occupants from within and around the Sararé Indigenous Area; and (ii) presentation to the Bank of a satisfactory plan (The Sararé Action Plan) to prevent future illegal occupations of the Sararé Indigenous Area and to recuperate the area from the environmental damages caused by mining (para. 3.22); and

(d) satisfactory staffing of the Project Coordination Unit (para. 3.45), the signing of a satisfactory Subsidiary Agreement between the Borrower and the State (para. 3.44), and the signing of satisfactory Operating Agreements between the State and each project execution agency (para. 3.46).

4.04 Conditions of loan disbursement would be:

(a) for credit expenditures, presentation of satisfactory evidence of the establishment of FUNDAGRO and that FUNDAGRO has adopted a satisfactory Operating Manual (paras. 3.33 and 3.61); and

(b) for road paving expenditures, presentation of satisfactory Environmental Impact Assessments, including mitigating actions if necessary, for the paving of the roads between Araputanga-Jaurú and Lambadi-Salto do Céu-Vila Progresso (paras. 3.40 and 3.61).

4.05 Subject to the above agreements and conditions, the proposed project would be suitable for a Bank loan of US$205.0 equivalent with a term of 15 years, including a 5-year grace period.

June 1, 1992

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Matrix of Main Environmental Policy Issues, Measures and Actions

Problems Responsible for Environmental Degradation	Actions Taken Since First Identification Mission (October 1988)	Actions to be Taken	Monitoring Actions and Timing
1. Inappropriate exploitation of areas due to absence of zoning and land use controls.	Development of socio-economic-ecological zoning which identifies land suitable for sustainable development from those which do not have that potential or which have special ecological or social (Indigenous reserves) significance and need to be protected. State Law of May 1992 legalizing the agro-ecological zoning.	- Further detailing of zoning and soil maps scale 1:50,000 in Zone 2/3, 1:250,000 other zones of the State. - Enforcement of zoning.	- Completion of agro-ecological zoning not later than June 30, 1994. - Continuous monitoring of compliance with zoning by executing agencies by means of satellite imagery to detect illegal deforestation and encroachment. - Continuous enforcement of zoning by State Forest Police/INTERMAT/FEMA. - Yearly independent review of compliance with zoning. Results available to Bank by May 30 each year.
2. Increased deforestation by settlers trying to gain title to land since land regulations require deforestation as evidence of land occupancy/ development; deforestation in areas without sustainable development potential and illegal deforestation; and wild cat gold mining.	INCRA agreement with the State of Mato Grosso, not recognizing deforestation as evidence of land occupation for titling purposes in the context of Mato Grosso's agro-ecological zoning law of May 1992. State environmental legislation, under preparation, to control deforestation and mining in the State.	- Enforcement by State Forestry Police - FEMA. - Environmental legislation to be presented to State Legislative Assembly by September 1992. - FEMA to prepare sustained management plan for Zone 5 areas and a plan of incentives for private forest areas to be completed during Year 1.	- Decrease in deforestation and small-scale gold mining, as monitored annually by FCR and FEMA.
3. Weak capability at State level with respect to development and enforcement of land policy and control of land occupation.	Preparation by State of a draft land legislation and regulations determining INTERMAT/INCRA compliance with recommendations of zoning.	- Land legislation to be presented to State Legislative Assembly by September 30, 1992. - Implementation of land legislation and regulations together with INCRA (draft agreement to be presented at negotiations) to ensure that all land activities in the State are consistent with socio-economic-ecological zoning.	- No new settlements, no new titling of land in areas that do not have sustainable development potential as identified by zoning. - Annual joint Bank/Government review of project pro

4.	Incentives to corporations and individuals to engage in economically unsound and ecologically unsustainable cattle ranching.	Presidential Decrees N°s 96943 of 10/12/88, 97637 of 4/10/89 suspending fiscal incentives and official credit for cattle ranching and deforestation in the Amazon area. Law N° 8617 of 1/16/91 and Presidential Decrees N° 101 of 4/17/91 and 153 of 6/25/91.	- Maintenance of supervision of fiscal incentives; no new policy incentives to be undertaken.	- Joint Bank/Government yearly review (within the context of Bank supervision mission) of coincidence of incentive/ disincentive economic framework with recommendations of zoning.
5.	Inadequate protection of Indigenous populations and Indigenous Reserves.	Government proposal to demarcate and protect Indigenous Reserves not yet demarcated, improve health conditions of Indigenous population, and State Government/FUNAI draft agreement to use State Forest Policy to protect Indigenous areas.	- Demarcation/renewal of boundaries, improve health conditions, improve protection.	- Continuous monitoring by State/FUNAI. - Monitoring by Independent Evaluation Committee. - Monitoring by satellite imagery of encroachment/ invasion and deforestation of Indigenous areas. - Joint Bank/Government review of improvements in Indigenous protection, within the context of Bank supervision missions.
6.	Government investments, particularly roads, attracting settlers to areas without sustainable development potential.	Acceptance in principle that the investment program for the State is consistent with the socio-economic-ecological zoning. Road investments only in Zones 2 and 3 of zoning (IBRD map 23466).	- Federal and State updates of annual investment programs for Mato Grosso consistent with the State's socio-economic-ecological zoning. - Socio-economic infrastructure will be made only in zone 2/3 of southern areas and three zones in the north around; i) Juina and Castanheira; ii) Juara and Novo Horizonte; iii) Colider and Terra Nova do Norte.	- Yearly satellite imagery monitoring statewide deforestation, new roads and newly populated areas.

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Environmental Management, Protection and Monitoring

Background

1. Mato Grosso contains the headwaters of two very large river basins, the Amazon (which includes the Araguaia River Basin) and the Paraguay. Also within its boundaries are parts of the world's largest contiguous wetlands, the Pantanal and the Amazon, and part of the world's most biologically diverse savannah - the Cerrado. Development in the state, particularly agricultural development, has been based on extensive cultivation, with little concern for sustainable land use. As a result the ecological balance of all three important ecosystems is today threatened. Current environmental legislation, if enforced, could do much to arrest deforestation, gold mining, pollution and other environmentally harmful activities. With regard to biodiversity, there are few significant protected areas in the State, and the creation of conservation units is hampered by the chaotic land tenure situation (according to the State's Land Institute - INTERMAT - titles have been granted for more than 104% of the State's territory).

2. Sound environmental maragement, conservation and protection is essential for sustainable development. The environmental sector of Mato Grosso needs urgent technical and financial assistance to adequately provide such services. Awareness of environmental issues within the public and private sectors of Mato Grosso is quite low and the viability of long-term sustainable practices has yet to be demonstrated. This points to the need for Mato Grosso's public service and their private counterparts to jointly educate the state's leaders and citizens.

3. The design of the project is based on finding solutions to those problems which are most detrimental of the state's natural resource base, while also providing the misusers with education and options for shifting into more sustainable uses. Given the high unemployment and underemployment in Mato Grosso, and the lack of good unoccupied land on which to "homestead", people need, more than ever, assistance in utilizing the resources they currently exploit in the most productive and environmentally benign ways possible, while also improving their standard of living. There is also a tremendous need to establish some protected areas in order to preserve to the maximum extent possible the state's rich biodiversity, and to foster better management systems in other areas which are not within the state's domain and which the state cannot afford to purchase.

Objectives and Scope

4. The environmental management, protection and monitoring activities will collectively: establish a state system of nine ecologically important

protected areas; establish forest reserves on public lands and foster sustainable forest management practices on private lands; require and assist gold miners to alter their extractive practices, reclaim degraded areas, and improve their standard of living; build community support for conservation and sustainable land use in the state, public environmental education, and work with other local, state and national programs to ensure that the citizen receive the necessary tools to conserve and sustainably utilize their resources; improve law enforcement, monitoring, licensing and control of illegal activities using satellite imagery, on the ground monitoring and aerial surveys; and build a strong state conservation agency which works effectively with other state agencies and non-governmental groups working on state conservation issues, and which services the environmental needs of Mato Grosso. The specific sub-components are described below[1].

5. Forestry Conservation and Sustainable Management. The preliminary agro-ecological zoning for Mato Grosso identified nine areas (Zone 5) which should be maintained or managed as State Forests. INTERMAT will research the titles/land ownership situation in all Zone 5 areas. Public lands will be decreed and established as State Forest Reserves and subsequently FEMA's Forestry Division will prepare guidelines and a strategy for these reserves management; FEMA will also prepare management plans for some privately held production areas. Presently, all forestry activities and mineral extraction are subject to control by federal institutions only, but the State has drafted its own environmental legislation which, after final review by the Bank, will be presented to the State Legislative Assembly by September 30, 1992. Outside of the nine State Forest Reserves, the new legislation will enable the state to enforce, license and control the use of forestry resources.

6. In preparing the management plan for each State Forest Reserve, an overall study of the RFE will be done, all forestry types will be described and mapped, an overall administrative management plan will be created, and homogenous subdivisions of the RFEs will be delineated. Based on a detailed vegetation and soil map of the RFEs, silvicultural inventory and detail description for selected subdivisions in the RFEs will be produced and management plans prepared for these areas. Limited experimentation will be undertaken to test the sustainability of alternative harvesting techniques, with continual inventory and monitoring carried out. This should generate information on future adjustments and revisions to the management plan. Finally, a manual on sustainable forestry and agro-forestry would be jointly produced by FEMA and EMPAER.

7. Mining Activities Rationalization. The objective of this sub-component is to minimize environmental impacts on Mato Grosso's hydrologic resources caused by mineral extraction, mainly by small-scale wild cat gold mining (garimpagem). This will be done by establishing mining standards for gold miners and through licensing and monitoring (based on existing federal and state legislation), and regulating those standards. This project will assist the gold miners, the municipal prefects and appropriate organizations through the

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[1] Support to indigenous communities is discussed in Annex 4.

establishment of demonstration projects for mining, and educational programs on the use and adaptation of proper (mitigation) technology for extraction and reclamation. Social services and financing will be made available to support these changes.

8. By December 31, 1992 FEMA will survey mining activities in ecologically fragile areas in Mato Grosso, and by March 31, 1993, the State will prohibit mining in these fragile areas (as well as in Zones 5,6,7). The location of these fragile areas will be incorporated into the agro-ecological zoning maps, which will be published and available for public access. The Bank has recommended that the state incorporates mining technicians and materials from the State Mining Company (METAMAT), which was recently abolished, into the FEMA program for regulating and managing mining in Mato Grosso.

9. Conservation Areas. There are currently four significant[2] protected areas in Mato Grosso:

Pantanal National Park	135,000 ha
Chapada dos Guimarães National Park	39,000 ha
Serra das Araras Ecological Station	28,700 ha
Taiama Ecological Station	14,225 ha
TOTAL.....	216,925 ha

None of these areas is well protected, and the Chapada dos Guimarães National Park has not yet been decreed. Through the National Environmental Project (Loan 3173-BR), Mato Grosso will support management of Taiama Ecological Station and Serra das Araras Ecological Station, and will demarcate and implement the Chapada dos Guimarães National Park.

10. The preliminary agro-ecological zoning for Mato Grosso delineates the existing conservation areas, proposes extension to some of these areas and identifies areas which should be created. The project will support the extension of the Chapada dos Guimarães National Park (which will entail adoption of a decree for a state protected area extension to the federal conservation unit), and the establishment of eight other areas targeted to become state conservation units. Including the Chapada dos Guimarães (state-owned) extension, this should total 4,847,000 ha. These areas, in the order of priority for action are as follows:

1.	Chapada dos Guimarães	700,000 ha
2.	Cabeceiras do Rio Cuiabá	300,000 ha
3.	Rio Ronura	700,000 ha
4.	Serra Ricardo Franco	400,000 ha
5.	Serra de Santa Barbara	800,000 ha
6.	Rio Madeirinha	800,000 ha
7.	Pantanal do Rio das Mortes	800,000 ha
8.	Serra do Cachimbo	500,000 ha
9.	Apiacas (Pontal)	477,000 ha

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[2] Recently, Ique Ecological Station was transferred to FUNAI to be protected as an indigenous area.

11. These nine areas (out of 16 actually identified in the zoning) were chosen for priority attention by the Conservation Data Center in 1989 using the following criteria: high biological diversity, endemism occurrence, vegetation representation, headwaters areas, and zones of exceptional characteristics with regard to geology and geomorphology, paleontology, archaeology and history. Also, the degree of human intervention in the area and the environmental integrity were, and will continue to be, factors which weigh into the type of management and the priority which the area receives with regard to demarcation and establishment. All 16 areas on the map will be studied by INTERMAT as new and potential areas for conservation, but INTERMAT will focus on the nine above order in the order shown.

12. The following methodology for study/establishment of the nine areas will be used:

1. Conservation Unit Team training in park planning and management;
2. Acquisition of equipment and material necessary for field work;
3. Permission from IBAMA to collect botanical and zoological specimens from the area for more accurate identification;
4. Rapid ecological assessment training at one-site (which will prepare the team for work at other sites) to assess the current ecological and socioeconomic situation of the area;
5. Determination of the conservation unit park limits and discussion on the management type most appropriate for the area;
6. Demarcation of the area;
7. Preparation of management plan ;
8. Implementation of the management plan and park establishment (which will include park staff training and hiring, preparing housing and visitor's centers as necessary, etc.);
9. Building community orientation and collaboration (this should be done as early as possible and continued throughout the life of the project).

13. Private Reserves. Due to the poor financial state of Mato Grosso, the state must find ways to secure important protected lands for the state's genetic stock and heritage. The State of Mato Grosso will present to the Bank by September 30, 1992 a plan to provide incentives to private land owners to maintain and protect natural (and preferably primary) forests, savannas and waterways on their land. This strategy would be especially applicable in zones 5 and 6, yet other possible areas should be considered for their high ecological importance. All proposals would have to be evaluated by FEMA's technical staff.

14. Informal Environmental Education. The public in Mato Grosso needs to be made more aware of existing environmental problems and their effects, in order to build community support for conservation and sustainable land use in the State. This proposition is based on the notion that it is imperative that the citizens understand that they are vital elements in, say, a watershed ecosystem (whether it be the Paraguay River watershed, the Amazonia watershed or the Araguaia) and that their land use practices and development programs have an impact on that drainage area. Radio and television will be utilized, as well as other appropriate means, to communicate important and helpful messages. The

program will start by training and building a competent FEMA education staff. Their training will be heavily field oriented, so that during training FEMA is also receiving and cataloguing information about the state's natural resource use and problems at the municipal level.

15. One of the fundamental training-field activities will focus on public attitudes and environmental awareness in the Upper Paraguay River watershed, with FEMA (and CONSEMA members) preparing a plan of action and major education program for appropriate land use and recovery in this region. FEMA's Environmental Education Team will work with an experienced consultant to achieve the following objectives under the project: (a) identify community leaders and influential policy makers in the majority of the municipalities of the Upper Paraguay River Basin; (b) catalogue conservation NGO's; (c) catalogue membership institutions and associations and their objectives related to land use and development in the region; (d) identify the important means of communication throughout the watershed; (e) collect and disseminate information on projects in the region; (f) identify the principal socio-environmental problems in the Upper Paraguay River watershed of Mato Grosso; and (g) prioritize actions according to their political and economic importance, size, geographic location, and ecological problems. This process will call upon the use of existing data and people with diverse expertise. The plan of action will also include measures for program evaluation and decentralization (sub-contracting) of groups to help carry out the action plan. The initial focus is on the most densely populated areas of Upper Paraguay River watershed in Mato Grosso, however other important areas in the other two watersheds will be included once the methodology has been firmly established. FEMA's Environmental Education Department will receive technical assistance from a long-term consultant who has had several years experience in fostering community interest in conservation of natural resources in the neighboring Mato Grosso do Sul.

16. Enforcement Activities. The project will help to establish a system of licensing and control, monitoring and law enforcement for the state of Mato Grosso. In particular, the Forestry Police will be assisted to effectively protect Zones 5,6 and 7, control illegal deforestation, burning, hunting, fishing and transport. The operational strategy includes thorough training for the Forestry Police and their use of satellite images, helicopters and airplanes for law enforcement and monitoring. FEMA will also be strengthened and supported to license and regularly monitor mining, pesticide use and pollution activities. In an attempt to conserve the hydrological resources of the state, FEMA will register, license and monitor all industrial activities in the state, and will, in coordination with those working on the gold mining rationalization sub-component, map the activities in the Teles Pires River Basin which have an environmental impact. The licensing work requires that FEMA decentralize and set up monitoring outposts throughout the state.

17. Institution Strengthening. The Mato Grosso state government is currently undergoing a reorganization which will affect FEMA and SEMA. A Special Secretary for the Environment will oversee FEMA, and FEMA will be directly linked to the Governor's cabinet. As some of the specifics are still being worked out, flexibility has been incorporated into project planning.

18. There are currently over 110 staff employed at FEMA, many of whom do not work regularly, while others find it difficult to determine their specific job responsibilities. At the same time, there are many dedicated individuals who work diligently on planning of environmental programs, and who will continue to strive to make FEMA a strong state agency. Nonetheless, the programs which are presented by the institution are often not well thought out, lack justification, or are not cohesive in their objectives and methodology. The project will therefore, support development of a strategic plan for halting and preventing the rapid destruction of Mato Grosso's natural resource base and will support mechanisms for discovery and dissemination of information to the government and private community on eco-development. To this end, during the first year FEMA will focus its efforts on strategic planning and determination of the most efficient and effective manner to implement its decentralization throughout the state. FEMA will contract a strategic planning firm to rapidly bring to light many of the questions which the institution should address. In addition, it will contract two experience staff in human resources development, an ecologist and two accountants (to work specifically with the project accounts), and will purchase essential equipment for FEMA's headquarter's in Cuiabá.

BRAZIL

MATO GROSSO NATURAL RESOURCES MANAGEMENT PROJECT

Agro-Forestry Development

Present Agricultural Production Situation

1. In the past, much of the land in Mato Grosso was brought under cultivation by a combination of officially sponsored settlement schemes and private initiatives, applying low cost, extensive and itinerant production systems which resulted in unnecessary deforestation and pasture burning. The majority of the smallholder producers (below 200 ha) in areas where the soil and climatic conditions are favorable are producing subsistence crops like rice, maize, beans and manioc, which are treated as cash crops. In the project area, located in the Northern, Eastern and Southwestern parts of the State, about 400,000 ha is devoted to rice, maize and beans cultivation. Since 1984 cotton is grown on about 38,000 ha and manioc on about 11,000 ha. Rice and maize yields have increased by 19% and 32%, respectively, as a result of the increased use of hybrid seed coupled with higher fertilizer use. Yields of other crops like cotton and beans have remained stagnant.

2. The present agricultural development strategy has not sufficiently encouraged cultivation of perennial crops because of the lack appropriate technological support from extension and research, and adequate rural credit. In the total project area, there are about 133,000 ha of coffee, cocoa, rubber and banana. Virtually no new areas have been brought under tree crop cultivation since 1988, and in many locations production has declined because of low yields in old plantations, inadequate cultural practices, and low prices. Improved rubber clones have been planted under improved cultural practices, and their production prospects are considered promising with projected yields of up to 2,000 kg/ha, (traditional clones have a ceiling of about 1,400 kg/ha). Bananas, especially the favorite Maca variety, suffer from "panama" wilt and debilitation from root borers which result in low yield and short life. Citrus, which is the next important perennial crop, is grown in small areas and is free of the serious "decline" disease. Small but increasing areas of other perennial crops are also planted in the project area (papaya, pineapple, Brazil nut, Ammatto, guarana, black pepper, coconut and others).

Agro-Forestry Development Proposal

3. The project would support Government efforts directed at obtaining a gradual transformation of the extensive agricultural system to a permanent sustainable system in the Northern fragile areas of the State (Zone 3), and the intensification of agricultural production in the Southern fertile soils (Zone 2). The main objective of the component would be to recuperate the vast area currently under fallow in Zones 2 and 3 through a productive exploitation system by providing farmers with an effective practical option for

diversification, reducing the pressure on forest clearing, and training farmers in better soil and fallow management. The component would, therefore, involve: (a) the diversification of the existing crop mix by promoting viable new crops, including timber trees; (b) the development of mixed cropping/intercropped systems (consorcio); (c) the introduction of crop rotation techniques; and in order to reduce the pressure on expansion to existing forest areas, support for the expansion of the cropping area to the existing fallow or abandoned pasture land; and (d) initiation of a program of fallow enrichment.

4. The fallow enrichment program would comprise of three basic lines of action: (a) introduction on already cultivated land of consorcios of short maturing crops (for example banana/papaya) or long maturing with short maturing crops (for example cupuacu/maracuja and rubber/banana); (b) recuperation of degraded lands with timber species or long maturing fruit crops (pupunha); and (c) enrichment of capoeira with consorcios of long maturing timber species ("capoeira melhorada" teak and pinho cuiabano). While the introduction of consorcios in already cultivated land is relatively well known among farmers, the introduction of timber species in degraded land or the enrichment of capoeira is not advanced. However, by using appropriate fallow management and enrichment techniques (i.e., proper cropping mix, soil enriching shadow trees, and proper inter-planting of shadow and timber trees) it would be less expensive for the farmers to clear forest fallow land than to clear natural forest, while still maintaining good soil fertility. Additional incentives to the small farmer to use fallow rather than natural forest land will include the possibility of preparing the land for animal traction, which is very important for the small farmer, and the timely inter-planting of trees and planting of hedges for mulching. Lack of adequate technical assistance, agricultural research and credit have prevented the dissemination of these practices, which could improve crop yields and are sustainable over time (in contrast to deforestation of new land, where soil fertility decreases after only a few years).

Research on Forestry and Agro-Forestry

5. Research on forestry and agro-forestry in Mato Grosso has been traditionally neglected in favor of adaptation and selection of annual crop varieties, fertilizer levels and other cultivation technique. Only during the last four years has EMPA-MT (now EMPAER) started to work on perennial crops such as rubber, coffee, banana, other tree crops and timber species. However, there is still an acute lack of research on sustainable agro-forestry, re-forestation and recuperation of degraded lands. For these reasons the project would support, within the general objectives of the research sub-component, specific research activities on financially and ecologically sound farmer systems, emphasizing tree crop diversification, agro-forestry and re-forestation. The forestry research program would be subdivided into enrichment planting in secondary forest (tree fallow), regeneration of degraded areas, and re-forestation with plantation timber. As part of the agro-forestry research, consórcios of short and long duration perennial species will be intercropped in their early years with annual crops.

6. Since both agro-forestry and forestry research involve costly pluri-annual experiments, only basic evaluation of species would be carried out on-station. All other work, such as technology validation trials (TVTs), will be carried out on-farm and would later be used for demonstration and training purposes. Under the project a total of 16 trials on species will be conducted (11 for forestry and 5 for agro-forestry) and 352 TVTs (46 forestry and 306 agro-forestry) will be done.

7. In the Northern Region of the State there would be a heavy research emphasis on sustainable small farming systems employing agro-forestry and re-forestation techniques, secondary forest management, regeneration of degraded areas, and future tree crop diversification to widen market potential. The research stations of Juina and Alta Floresta would focus mainly on agro-forestry and forestry research, while the station in Sinop would carry out agro-forestry, forestry (including seed technology) and agricultural research focusing on systems for Zone 3 soils. The Sinop station would house the Forestry Seed Bank (funded under the extension budget) and part of the facilities would be available for seed technology research.

8. In the Southern Region more emphasis will be placed on rubber (São José do Rio Claro and Canarana), citrus and bananas (Rondonopolis, Caceres, Quatro Marcos), which have already developed markets, and fruits such as avocado, mango, pineapple and others which can be produced out-of-season. Forestry research in the South will focus on regeneration of degraded areas, and will be concentrated in Quatro Marcos in the Southwest and Canarana in the Southeast.

Table 1: Suggested Fruits and Forestry Species to be Utilized

Short Maturing Fruits

Abaxi (Anans sativa)
Banana (Musa spp.)
Mamão (Carica papaya)
Maracujá (Passiflora edulis)
Acerola (Malpighia sp.)

Long Maturing Fruits

Citros (Citrus spp.)
Coco Anão (Cocos nucifera)
Caju Anão (Anacarcium occidentale)
Carambola (Averhoa carambola)
Araca bói (Psidium spp.)
Capuacu (Theobroma grandiflora)
Manga (Mangifera indica)
Pupunha (Bactris gasipaes) palmito
Urucum (Bixa orellana)

Forestry Species

Teca (Tectona grandis)
Ameixa (Protium heptaphyllum)
Pinho Cuiabana (Schizolobium)
Inga (Inga edulis)
Frejo (Cordia goeldiana)
Pupunha (Bactris gasipaes) uso multiplo
Castanheira (Bertholettia)
Cerejeira (Torresa acreana)

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Support to Indigenous Communities

Background

1. Approximately 16,000 indigenous people live in Mato Grosso, accounting for less than one percent (0.77%) of the State's estimated (1989) population of 2,065,000. Two thirds of the State's indigenous population (69%) live on fully legalized reservations protected by the National Indian Foundation (FUNAI). An additional 4,171 indigenous people (26%) live on areas of land demarcated as indigenous reserves, but not yet fully legalized, while about 5% live in non-demarcated areas.

2. Demarcated indigenous areas occupy a total of 9.5 million hectares, an additional 1.3 million ha has been identified but not yet demarcated, and about 13 percent of the land officially identified as indigenous land remains to be demarcated. The combined total of 10.8 million ha is equal to roughly 12 percent of the total land area of the state. However, there are still several indigenous groups in Mato Grosso which are substantially out of contact with national society. Their numbers and precise locations are unknown. Still other indigenous people lives on the fringes of the national society as rubber tree tappers or fishermen. Nearly all the indigenous groups in the state are highly susceptible to introduced disease, especially respiratory diseases such as tuberculosis, influenza, pneumonia etc. Malaria, diarrhea, and other preventable diseases are frequent causes of death, especially among infants.

Government Efforts to Protect Indigenous People

3. Since 1910, the Indian Protection Service and its successor, FUNAI, have provided assistance to indigenous groups in the form of reservations, intermediation with national society, health and educational services. Perhaps the most important role FUNAI has played is the creation of Reservations for the exclusive use of indigenous groups. FUNAI is organized at the local, regional and national level. There are five local administrations (ADRs) in Mato Grosso, based in Cuiabá, Rondonopolis, Tangara da Serra, Barra do Garças and Xavantina. Each ADR has an administrative staff with responsibility for a number of Indian Posts. Indian Posts (Postos Indígenas) are generally located on Indigenous Reserves and staffed by a FUNAI Agent.

4. Despite its inefficiency and allegations of corruption, FUNAI has demarcated a total of 9.5 million ha of indigenous reserves in the State. From 1982 to 1988, the POLONOROESTE Program provided a major impetus and financial support for the demarcation of 5.7 million ha of indigenous reservations in Mato Grosso through the Special Amerindian Project. This Project was designed to protect indigenous people from the negative effects of economic growth following

construction of the BR 364 Highway from Cuiabá to Porto Velho. This project was part of the POLONOROESTE Program, but financed exclusively by local counterpart funds at the request of the Brazilian Government.

5. FUNAI and the POLONOROESTE program were less successful in protecting indigenous people from disease. Levels of infectious disease on indigenous reservations are very high. Mortality is high especially among children. Regular visits to indigenous reserves by Mobile Health Teams partially supported under POLONOROESTE have not been maintained. Vaccination programs have not been kept up to date. There has been little systematic training of FUNAI health personnel or indigenous healtn monitors. In Mato Grosso, FUNAI has only a handful of full-time health professionals on its staff. Most of the physicians and nurses are on half-time contracts making it impossible for them to take entire days to visit the indigenous communities. Even those on half-time contracts do not work the full period for which they are paid. In addition, the pharmacies on Indian Posts are haphazardly stocked, often with inadequate storage, and not subject to careful controls.

Indigenous Sub-Component

6. The indigenous sub-component is an integral part of the project agro-ecological zoning and environmental protection program. It will invest primarily in providing support to FUNAI and the State of Mato Grosso for actions aimed at improving health and land security of indigenous peoples in the state. Consequently, the sub-component will provide for: (a) demarcation and boundary renewal of indigenous Reserves; (b) assistance to isolated indigenous people in Mato Grosso; (c) monitoring and enforcement in indigenous Reserves; and (d) support for health care and disease control.

7. It is not intended that Bank funding replace FUNAI's regular budgeted programs in the region, but rather that it support enhancement of a selected subset of activities. FUNAI has agreed that it would maintain its programs and funding levels in Mato Grosso, independently of the project. The project will not assume personnel or other FUNAI basic operating costs, nor will it add significantly to FUNAI's physical infrastructure as have previous special projects in the POLONORESTE region.

Demarcation and Boundary Renewal

8. Fully legalized reservations with clearly demarcated boundaries are essential for the maintenance of secure indigenous reservations in Brazil. There are 37 demarcated indigenous reserves in Mato Grosso (Table 1). AI Saluma has been approved for demarcation but has not yet been physically demarcated. Three additional reservations were approved for demarcation by the Interministerial Work Group (AI's Estivadinho, Figueiras, Juininha) and are awaiting only an interministerial order (portaria) authorizing their physical border demarcation. Nine additional areas have been delimited or interdicted by FUNAI, but have not yet been brought before the Interministerial Work Group. Finally, during the life

of the project, FUNAI will engage in locating and assessing the needs of several isolated indigenous groups in Mato Grosso. It is possible that some of these groups will be eligible for reservation status.

9. In order to support unimpeded access of indigenous people to the land, the project will support the demarcation of new indigenous reserves and the renewal of boundaries on existing reservations specifically, it will finance the boundary demarcation of the various reservations indicated above totalling at least 1,138,452 ha with 1,424 km of boundaries. As much as possible, the work will be done with the participation of the indigenous people of each area. The actual demarcation will be carried out by specialized topographical firms contracted by FUNAI and accompanied by FUNAI personnel. The State of Mato Grosso would need to take action to remove non-indigenous people from indigenous land where they are present, but the project will not finance land purchases or compensate squatters living illegally on indigenous reservations. The submission of an acceptable plan for the removal of all illegal squatters on AI Zoró would be a condition for negotiation.

Assistance to Isolated Indigenous People

10. Although the State of Mato Grosso is heavily settled, with a considerable network of urban settlements, there are still several isolated indigenous groups, without regular contact or only sporadic contact with the national society. FUNAI has a special unit established to investigate the location and situation of these groups. Some of them appear to be located on existing indigenous reserves, while others are in areas not under FUNAI protection. The latter groups will receive priority attention by FUNAI. The project will equip and support four teams, adding two new teams to the two now in existence. These teams will work in the field, setting up base camps for the purpose of learning as much as possible about the isolated groups, fending off non-indigenous settlers, prospectors, etc., and making contact if necessary. They will bring health services to the isolated indigenous people and attempt to provide vaccination and other services as soon as feasible. As their work evolves, these teams will identify areas traditionally used by these isolated groups and, where appropriate, set procedures in motion to demarcate indigenous lands. The indigenous component will finance acquisition of equipment, supplies, per diem for field teams as well as construction of base camps in the Juina area where many of the isolated groups are located.

Monitoring and Enforcement of Indigenous Reserves

11. One of the persistent problems on indigenous reserves in this region is the entrance of unauthorized non-indigenous people as squatters, loggers, prospectors for gold and other minerals, rubber tappers, hunters and fishermen. FUNAI has inadequate resources for monitoring and protecting the indigenous reserves. It has few vehicles, little use of aircraft, and only incipient arrangements for cooperation with Federal and State enforcement agencies.

12. Therefore, FUNAI has signed an agreement with IBAMA and the Military Police to collaborate in monitoring and enforcement on indigenous lands. A

special division of the State Military Police will be responsible for monitoring and enforcement of the zoning laws, together with the Federal Environmental Agency (IBAMA). The State of Mato Grosso has enacted a law raising the forestry police from battalion to company strength, with a total of over 600 staff. Under the project, the Military Police Forestry Battalion will receive support in the form of aircraft, technical assistance, communications equipment, etc. for use in stepped up enforcement activities. In particular, the Police will set up a monitoring system capable of detecting incursions into protected land (including indigenous reserves) by sawmills. The police will also have jurisdiction over prospecting on protected areas, as well as activities, such as prospecting, that may contribute to the pollution of waterways flowing through indigenous areas and other protected areas.

13. FUNAI itself will receive support under the project in the form of vehicles, watercraft, communications equipment, training and operating expenses for two mobile units, one based in Cuiabá, another in Juina. In addition, the project will support construction and equipping of a fixed support unit in Juina, an area undergoing rapid economic expansion and strategically located near number of indigenous areas. The fixed station will help to coordinate monitoring and enforcement activities with the military police detachment planned for this locality. It will also serve as a logistics and communications hub for activities relating to isolated indigenous reserves in the same region, health activities (Juina is also the site of a state hospital facility under construction), and regular services to indigenous areas in the vicinity.

Health Care and Disease Control

14. The key to improving the health of indigenous people in Mato Grosso is to return the focus of prevention and primary care to the indigenous community. This means upgrading the facilities and retraining personnel at the Indian Post level, providing for regular visits by health personnel to the indigenous villages for preventive and curative care. The mission determined that it would be counterproductive to invest further in the casas do índio as health-care facilities, because it would continue to divert indigenous people needing care away from their own communities.

15. However, returning the focus of health care to the community will not be sufficient. Secondary and tertiary care facilities must continue to be provided. Since FUNAI does not have sufficient personnel and resources to provide quality hospital care and diagnostic services, and the potential patient population is not large or concentrated enough to warrant substantial investment in these services, FUNAI has reached an agreement with the State of Mato Grosso for the latter to assume more responsibility for hospital care and diagnostic services. Since the State of Mato Grosso itself lacks an extensive hospital network, it subsidizes admissions by indigenous people to private hospitals through AIH (Authorizations for Hospital Admissions) under the Federal Health System. In some cases, FUNAI has had difficulty getting indigenous patients admitted to State subsidized hospitals.

16. The agreement between FUNAI and the State of Mato Grosso provides for (a) an increase in the number of AIHs, (b) an allocation of a specific number of beds in a State Hospital, (c) training and recycling for health professionals involved in caring for indigenous people, (d) additional health professionals to be contracted by the State and seconded to FUNAI, and (e) cooperation by the State Health Department in the coordination and evaluation of the indigenous component of the PRODEAGRO. Under item (d), the State Health Department would contract physicians and nurses in various locations on fixed-term contracts where FUNAI lacks sufficient manpower. These professionals would be hired on a full-time, exclusive basis and would be made available to FUNAI as needed to work on mobile health teams in the indigenous communities. There would be special salary supplements to equalize any differences between state and FUNAI salaries. This provision must clearly obligate medical personnel to field assignments and would be subject to careful supervision. The contracts would be canceled if such personnel did not lend themselves to work in indigenous communities.

17. Support will be provided for upgrading FUNAI's medical personnel. This will be accomplished by means of recycling for FUNAI's nursing assistants (atendentes de saude), nurses aides (auxiliares de enfermagem), nurses and doctors. FUNAI has agreed to create the post of Head Nurse in accordance with existing legislation that requires this structure. The head nurse, rather than physicians, will be responsible for programming, staff assignments and supervision of field staff. FUNAI's field staff will be reassigned from urban sites to locations on indigenous reserves. Resources will be allocated to improve communications between villages, Indian Posts, and regional centers, by the acquisition of solar recharged batteries, and additional radio transceivers. Living accommodations for health personnel stationed in the field will be upgraded.

18. There will also be a major upgrading of the pharmacy facilities and practices in FUNAI health facilities. Specialized consultants will be brought in to design a standard list of pharmaceuticals for Indian Posts and other facilities. The project will support implementation of adequate storage facilities plus proper inventory and control systems. A medical information system will be developed through the purchase of microcomputers, development of procedures, and training. In addition, FUNAI and CAIEMT will also carry out a survey of health facilities and health conditions in the indigenous reservations administered by religious missions. These areas will be eligible for participation in the project to the extent feasible and necessary.

Table 1

DEMARCATED INDIGENOUS AREAS IN MATO GROSSO

AI	ETHNIC	POP	AREA(HA)	PMR	IDD	DEL	GRP	DMC	HML	CRI	SPU
APIAKA/KAIABI	APIAKA, KAIABI	248	109245	162	99	0	87	87	99	88	88
ARIPUANA	CINTA LARGA	107	75649	565	99	0	85	85	0	0	0
BAKAIRI	BAKAIRI	461	61405	135	99	0	85	85	91	61	87
COPOTO/JARINA	KAYAPO	217	634915	415	99	0	0	99	99	87	87
JAPUIRA	RIKBAKTSA	90	152509	193	99	0	85	88	0	0	0
JARUDORE	BORORO	0	4706	39	99	0	0	99	99	87	87
MARECHAL RONDON	XAVANTE	295	98500	200	0	0	0	99	?	0	0
MENKU	MYKY	35	47095	92	99	74	0	77	99	87	87
MERURI	BORORO	402	82301	169	99	0	0	99	99	0	87
NAMBIKWARA	NAMBIKWARA	249	1011961	533	99	83	84	84	99	87	87
PARABUBURE	XAVANTE	2543	224447	294	99	0	0	99	91	87	87
PARECI	PARECI	578	563587	373	99	68	0	84	91	87	87
PERIGARA	BORORO	71	10740	62	99	0	0	99	0	0	0
PIMENTEL BARBOSA	XAVANTE	754	328966	340	99	0	0	86	99	88	87
PIRINEUS DE SOUZA	NAMBIKWARA	135	28212	83	99	81	99	83	85	84	0
RIKBATSA	CANOEIROS	630	79935	198	99	0	86	83	99	87	87
RIO FORMOSO	PARESI	79	19749	90	99	85	85	86	99	99	99
SANGRADORO/VOLTA GRANDE	BORORO, XAVANTE	546	100280	208	99	0	0	99	91	83	0
SANTANA	BAKAIRI	189	35470	105	99	99	99	84	0	2	0
SAO DOMINGOS	CARAJA	93	5705	37	99	0	0	88	0	0	0
SAO MARCOS	XAVANTE	1234	188478	237	99	0	0	73	0	0	0
SARARE	MANAIRISU	66	67420	132	99	81	84	83	85	85	87
SERRA MORENA	CINTA LARGA	138	147836	184	99	99	85	85	0	0	0
SETE DE SETEMBRO	SURUI	461	247870	205	99	99	99	85	85	85	85
TADARIMANA	BORORO	143	9785	51	99	45	87	85	91	64	87
TAPIRAPE/KARAJA	TAPIRAPE/KARAJA	399	66166	110	99	0	0	99	99	84	87
TEREZA CRISTINA	BORORO	211	26237	134	99	0	0	85	0	0	0
TIRECATINGA	PARECI,NAMBI,MENKU,I	348	180575	208	99	83	86	83	91	87	87
UMUTINA	UMUTINA,PARECI,NAMBI	205	28120	122	99	15	86	84	0	60	99
UTIARITI	PARECI	117	412304	429	99	83	86	82	91	87	87
VALE DO GUAPORE	NAMBIKWARA	367	242593	552	99	81	84	84	85	85	87
VOLTA GRANDE	XAVANTE	27	11640	69	99	0	0	87	0	0	0
XINGU (PQI)	TXUKARRAMAE,SUYA,MAT	2688	2642003	898	99	0	0	99	99	87	87
ZORO	ZORO	236	353789	304	99	87	85	87	91	87	87

TOTAL

INDIGENOUS AREAS IN MATO GROSSO TO BE DEMARCATED UNDER PRODEAGRO

AI	ETHNIC	POP	LANDAREA	PMR	IDD	DEL	GRP	DMC	HML	CRI	SPU
ARARA BEIRADAO	APARA	160	242776	224	87	0	0	0	0	0	0
AREOES[1]	XAVANTE	643	218515	266	99	99	99	73	0	0	0
ESCONDIDO	RIKPAKTSA, APIAKA	30	275100	220	85	85	0	0	0	0	0
ESTIVADINHO	PARECI	20	1970	16	82	99	84	0	0	0	0
FIGUEIRAS	PARECI	16	10000	65	82	99	88	0	0	0	0
IRANTXE[1]	MYKY, PARECI,IRANTXE	150	46790	104	99	77	87	86	0	87	87
JUININHA	PARECI	20	70500	150	99	85	88	0	0	0	0
PEQUIZAL	ALANTESU	0	3186	28	87	0	0	0	0	0	0
PIRIPICURA	KAWAHIB	0	0	0	0	0	0	0	0	0	0
SALUMA[2]	SALUMA (Enauene-Naue)	156	752000	700	84	87	87	0	0	0	0

TOTAL

POSSIBLE INDIGENOUS AREAS TO BE IDENTIFIED UNDER PRODEAGRO

AI	ETHNIC	POP	LANDAREA	PMR	IDD	DEL	GRP	DMC	HML	CRI	SPU
APIAKA BOCADO	UNKNOWN	UNKNOWN									
APIAKA SAO TOME	UNKNOWN	UNKNOWN									
ARIKEM(CACH.DO SERINGAL)	KARITIANA (?)	UNKNOWN									
CABIXI	UNKNOWN	UNKNOWN									
CAPITAO MARCOS	PARECI	16	0	0	0	0	0	0	0	0	0
CHIQUITANOS	CHIQUITANOS	UNKNOWN									
ESTACAO RONDON	PARECI	15	600	10	86	0	0	0	0	0	0
LAGO GRANDE	KARAJA	UNKNOWN									
MORERU	UNKNOWN	UNKNOWN									
PARECI UIRAPURU	PARECI	9	480	9	86	0	0	0	0	0	0
RIO DOS PEIXES	UNKNOWN	UNKNOWN									
TAIHANTESU	NAMBIKWARA	0	4700	32	0	0	0	0	0	0	0
TATUI	KAYABI,APIAKA,MUNDUR	256	109000	0	0	0	0	0	0	0	0

[1] This area previously decreed, but not yet physically demarcated.

[2] Authorization to demarcate has already been given by Interministerial Order.

CODES: POP=population; PMR=permimeter; IDD=identified; DEL=delimited; GRP=Interministerial Group Approval; DMC=demarcated; HML=confirmed by decree; CRI=local land registry; SPU=federal registry; NI=presence of invaders; 99=action completed, date unknown.

BRAZIL

MATO GROSSO NATURAL RESOURCES MANAGEMENT PROJECT

Farm Models and Financial Analysis

1. Based on the results of agro-ecological zoning the State has been divided into seven zones. Development of agricultural production will be concentrated in Zones 2 and 3. Zone 2 includes areas of good soil fertility with high concentration of smallholder producers in the South, where the project would aim at increasing production of annual (rice, beans and maize), and perennial (rubber, banana, fruits and consorcios of fruit tree species), crops, and introduction of forestry species. In the Northern Zone 3 the project would encourage farming systems based on enrichment of "capoeira" and recuperation of degraded land with forestry species, perennial crops (rubber, banana, and long maturing species) and "consorcios" of perennial crops (See Annex 3).

2. Eight farm models, five for Zone 2 and three for the Zone 3 illustrate the production conditions under the project and have been used for the financial analysis. A summary table for the models showing individual cropping patterns and crop yields is presented in Table 5.1. Detailed price data and crop budgets are presented in the working papers on file.

Southern Areas - Zone 2

3. Farm Model 1 - Cotton Expansion. This illustrates areas presently under old coffee, where farmers would be encouraged to reduce the area under coffee and diversify to other labor intensive cash crops like cotton. As few farmers would be willing or able to make a wholescale change, some coffee would remain and this would need to be rehabilitated by cutback construction of contour bunds and use of fertilizer.

4. Farm Model 2A - Fruit Short Cycle and Forestry Species. This represents areas which presently cultivate only semi-mechanized annual crops (rice and maize), but which have suitable land for cultivating fruit trees. At full development farmers would reduce the area of annual crops, diversify to a consorcio of, say, banana/papaya, and plant an area of fallow with forestry species. Farmers will use mechanized land preparation, improved and treated seeds of high yielding varieties, fertilizers and plant protection measures. Contour ridging will aid soil and moisture conservation in the annual crop area.

5. Farm Model 2B - Citrus. This illustrates other areas which presently cultivates only annual crops using semi-mechanized technology, but which would diversify their cropping pattern towards perennial citrus fruits cultivation while still retaining some annual crops. Farmers will use mechanized land preparation, improved and treated seeds of high yielding

varieties, and plant protection measures for maize. Soil conservation measures will be applied to the annual crops areas to control erosion.

6. Model 3 - Dairy Improvement. This represents areas presently engaged in a small-scale extensive dairy operations, where farmers who each presently own a small cattle herd of about 40 animals maintained on 40 ha of natural pasture, would adopt more appropriate veterinary measures to improve livestock health. Fertilizer will be used on annual crops and pasture, in addition to improved treated seeds.

7. Model 4 - Rubber/Banana. This illustrates areas presently cultivating annual crops (rice/beans/maize), and bananas maca with very low production due mainly to "panama" disease. Farmers would replace the existing stand of banana with the disease resistant variety "mysore", and would diversify to rubber intercropped with banana during the first three years. The area under annual crops, cultivated manually, is expected to decrease slightly. Fertilizers would be used only on banana and rubber, while erosion control measures would be introduced to the annual crop area.

Northern Areas

8. Model 5 - Cupuacu, Maracuja plus Enrichment of Capoeira. This model illustrates areas presently cultivating coffee, annual crops, with small amount of cotton, by manual methods. Farmers would diversify and reduce the coffee and annual crop area with a "consorcio" of maracuja-cupuacu, and will gradually adopt a fallow enrichment technology and plant small woodlots to satisfy home consumption requirements for fuelwood. Farmers will use improved and treated seeds, fertilizer and chemical products.

9. Model 6 - Long Maturing Fruits Plus Enrichment of Capoeira. This illustrates areas presently cultivating only annual crops on land suitable for fruit trees. At full development farmers would have reduced their annual crops area and their fallow land on which they would be cultivating pupunha or enriched capoeira, in addition to small woodlots for home consumption. Cultivation of annual crops will require improved seeds and fertilizer.

10. Model 7 - Rubber and Banana. This model represents areas presently cultivating annual crops, but with land suitable for rubber cultivation. At full development farmers would have introduced rubber initially intercropped with bananas and annual crops. Fertilizer will be used on annual crops.

Agricultural Production

11. Based on a total of 20,200 farmers who are expected to adopt the technologies supported by the project, the project incremental agricultural production has been estimated at full development in year 11 as follows: (a) annual crops for subsistence: 19,700 tons of maize, 6,000 tons of rice, 4,200 tons of beans; (b) annual cash crops: 1,825 tons of coffee, 7,170 tons of cotton, 44,300 tons of bananas, 29,300 tons of papaya, 11,800 tons of citrus,

22.7 million liters of milk, and 27,632 heads of cattle. In addition, forestry production will reach about 42,300 m3 and about 41,200 of fence posts in year 15. Incremental production of more exotic crops in year 11 will be about 900 tons of rubber, 3,000 tons of maracuja, 32,200 tons of cupuacu, and 17.9 millions of palmito.

Financial Analysis

12. The models analyzed show the present situation and the possible development of farmers who are already established in the Northern area using animal traction or using semi-mechanized equipment, and farmers in the Southern area depending mainly on their family labor. Each model assumes a present situation estimated to remain the same under "without project" conditions, which may overstate the potential in areas with poorer soil, where productivity could well fall in the absence of increasing fertilizer use. The analysis is focussed, in particular, on investigating the return to labor and the return per family, both of which are considered important motivators of small farmer behavior. Financial rates of return have also been calculated to measure the return on farm investment.

13. The farm budgets include: (a) on-farm investments for land clearing, pasture improvement (only in the South), tree crops establishment, minor farm tools and equipment; and (b) operating and maintenance costs including improved seeds, fertilizers, soil conservation, and disease control. They exclude non-cash expenses such as family labor. Prices for inputs and production output were assumed to be at the average level prevailing over the last year, in real terms.

14. Results of the analysis are shown in Table 5.2. The present average family income of the project beneficiaries is estimated to be the equivalent of about US$1,932/year. This would increase to an average of US$5,155/year in year 15 of the project and corresponds to an increase of about 170% over the present level. The return to labor would increase from US$7.4/person-day to US$11.9/person-day. These levels are expected to be sufficiently attractive for the farmers to adopt the technical innovations encouraged by the project.

15. The estimated financial rates of return of the models vary from 13% in the case of the dairy model, to more than 50% for Models 2 and 7 (fruits and citrus and rubber/banana, respectively). For all models except dairying, the financial rate of return would still average 11.5% if incremental production decreases by more than 15% or if incremental total costs increase by more than 17%. The dairy model is more sensitive to changes in costs and revenues (a minor change of only 5% would drop the internal rate of return to 11.5%) and therfore extension service will need to exercise special care in selecting the circumstances in which it should be promoted.

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Farm Models, Cropped Area and Yields per Hectare

	Without Project							With Project																	
	Rice	Beans	Maize	Coffee	Cotton	Natural Pasture	Banana	Rice	Beans	Maize	Coffee	Cotton	Improved Pasture	Banana/ Papaya (1)	Teak (2)	Citrus	Banana Pure Stand	Rubber/ Banana (3)	Pupunha (4)	Imbaúba (5)	Enrich. Capoeira (6)	Cupuac./ Maracuja (7)
Model 1: Cotton Expans.																							
Area (ha.)	7.00	3.36	3.50	5.00	1.00	-	-	3.00	2.00	3.50	3.00	3.00	-	-	-	-	-	-	-	-	-	-	-
Yields (ton/ha)	1.30	0.45	1.00	0.70	1.00	-	-	1.40	0.55	2.50	1.40	1.40	-	-	-	-	-	-	-	-	-	-	-
Model 2A: Fruits Short Cycle																							
Area (ha.)	5.50	-	4.50	-	-	-	-	5.00	-	4.00	-	-	-	3.00	1.00	-	-	-	-	-	-	-	-
Yields (ton/ha)	1.40	-	2.00	-	-	-	-	1.80	-	3.00	-	-	-	$10.00	280.00	-	-	-	-	-	-	-	-
Model 2B: Citrus																							
Area (ha.)	3.50	3.00	4.50	-	-	-	-	3.00	3.00	3.00	-	-	-	-	-	3.00	-	-	-	-	-	-	-
Yields (ton/ha)	1.40	0.50	2.00	-	-	-	-	1.80	0.70	3.00	-	-	-	-	-	0.68	-	-	-	-	-	-	-
Model 3: Dairying																							
Area (ha.)	4.00	-	5.50	-	-	40.00	-	4.00	-	5.50	-	-	40.00	-	-	-	-	-	-	-	-	-	-
Yields (ton/ha)	1.60	-	2.00	-	-	(8)	-	1.80	-	3.00	-	-	(8)	-	-	-	-	-	-	-	-	-	-
Model 4: Banana/Rubber																							
Area (ha.)	2.50	2.00	2.00	-	-	-	3.50	2.50	2.00	1.00	-	-	-	-	-	-	2.50	3.00	-	-	-	-	-
Yields (ton/ha)	1.30	0.45	1.00	-	-	-	0.41	1.40	0.55	2.50	-	-	-	-	-	-	638.00	1.50	-	-	-	-	-
Model 5: Fruits/Capoeira																							
Area (ha.)	4.00	1.10	4.20	3.00	0.00	-	-	3.00	1.10	3.00	2.00	0.00	-	-	-	-	-	-	-	0.10	5.00	-	3.00
Yields (ton/ha)	1.30	0.35	1.70	0.70	1.00	-	-	1.40	0.50	2.30	1.20	1.40	-	-	-	-	-	-	-	(3)	(4)	-	5.30
Model 6: L.D. Fruits/Capoeira																							
Area (ha.)	2.50	1.00	4.00	-	-	-	-	1.00	1.00	2.40	-	-	-	-	-	-	-	-	3.00	0.10	3.00	-	-
Yields (ton/ha)	1.30	0.35	1.70	-	-	-	-	1.40	0.50	2.30	-	-	-	-	-	-	-	-	2500.00	(3)	(4)	-	-
Model 7: Rubber/Banana																							
Area (ha.)	2.50	1.00	4.00	-	-	-	-	2.00	1.00	3.00	-	-	-	-	-	-	-	4.00	-	-	-	-	-
Yields (ton/ha)	1.30	0.35	1.70	-	-	-	-	1.40	0.50	2.30	-	-	-	-	-	-	-	1.50	-	-	-	-	-

(1) Consortium Banana/Papaya: Banana average 510 cachs/ha; papaya average 2860 kg/ha
(2) Teak production 400 fence posts/ha in year 5 and logs in year 20= 280m3/ha
(3) Banana intercropped only first four years
(4) Pupunha yields expressed in palmito hearts
(5) Production assumed as teak
(6) Enrichment of capoeira: year 5 = 45 fence posts/ha; year 20 teak logs 30 m3/ha; pine cuiabana logs 45 m3/ha
(7) Maracuja intercropped only first 5 years
(8) Without project: milk 260 litres/cow/year; cattle sales 0.25 head/ha. With project: milk 700 litres/cow/year; cattle 0.4 head/ha.

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MATO GROSSO NATURAL RESOURCES MANAGEMENT PROJECT

Farm Model Indicators

MODELS	NET INCOME (US$/YEAR)		NET MANDAY (US$/PERSON-DAY)		I.R.R.
	W/O a/	W/P b/	W/O a/	W/P b/	%
Southern States					
el 1 - Cotton Exp.	3381.0	3790.0	7.0	7.6	2[illegible]4
el 2A - Fruit Sh. Cy.	1192.0	5357.0	6.5	14.7	>50.0
el 2B- Citrus	1500.0	5571.0	7.2	8.9	>50.0
el 3 - Dairying	2031.0	5290.0	11.5	18.2	13.0
el 4 - Rubber	2211.0	5543.0	10.7	12.4	27.0
Northern States					
Model 5 - Rubber/Marac.	2705.0	8688.0	5.5	17.4	28.0
Model 6 - Fruit Enr. Cap.	1217.0	2269.0	5.3	5.3	23.0
Model 7 - Rubber/Banana	1217.0	4728.0	5.3	10.4	>50.0
Average	1931.8	5154.5	7.4	11.9	-

W/O = Without Project
W/P = With Project in year 15

ANNEX 6
Table 6.1

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Estimated Project Costs by Component

	Local	Foreign (US$ Million)	Total
Estimated Project Costs			
A. Agro-Ecological Zoning and Land Tenure Regularization	27.4	12.6	40.0
Agro-Ecological Zoning	6.2	12.0	18.2
Land Tenure Regularization	21.2	0.6	21.8
B. Management, Protection and Monitoring of Natural Resources	47.9	6.5	54.4
Forestry Conservation and Sustained Management	10.2	0.4	10.6
Mining Activity Rationalization	5.8	1.1	6.9
Conservation Areas	2.3	0.2	2.5
Informal Environmental Education	1.4	0.1	1.5
Enforcement Activities	15.8	2.5	18.3
Institutional Strengthening	4.9	0.8	5.7
Protection Indigenous Reserves	6.6	1.2	7.8
Monitoring and Remote Sensing	0.9	0.2	1.1
C. Agro-Forestry Development	60.4	9.8	70.2
Agricultural Research/Meteorological Stations	10.4	1.7	12.1
Rural Extension	25.2	1.9	27.1
Agricultural Credit	24.2	6.1	30.3
Market Information System	0.6	0.1	0.7
D. Socio-Economic Infrastructure and Services	48.7	16.7	65.4
Health	4.7	0.5	5.2
Education	7.9	1.7	9.6
Water Supply	4.5	1.7	6.2
Rural Electrification	6.3	2.7	9.0
Rural Transport	25.3	10.1	35.4
E. Project Administration	11.4	0.5	11.9
Project Administration (State)	6.3	0.2	6.5
Project Administration (Federal)	2.3	0.1	2.4
Technical Cooperation	2.8	0.2	3.0
Total Baseline Costs	195.8	46.1	241.9
-Physical contingencies	10.8	4.4	15.2
-Price contingencies	23.8	4.8	28.6
Total Project Costs	230.4	55.3	285.7

ANNEX 6
Table 6.2

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Annual Phasing of Project Costs by Components, including Contingencies
(US$ '000)

Year	01	02	03	04	05	Total
A. Agro-Ecological Zoning and Land Tenure Regularization						
1. Agroecological Zoning	6687.0	7537.5	5971.2	638.1	641.7	21475.5
2. Land Tenure Reg.	2625.6	6492.4	7090.7	6083.9	3900.4	26193.0
Sub-Total	9312.6	14029.9	13061.9	6722.0	4542.1	47668.5
B. Nat. Res. Mgmt./Protect.						
1. Protect. Indigenous Res.	2640.1	1865.3	1880.5	1593.1	1164.5	9143.5
2. Conservation Areas	277.4	506.5	564.1	688.7	883.0	2919.7
3. Mining Activ. Procedures	460.7	1152.3	1919.3	2191.1	2662.5	8385.9
4. Forestry Police	4155.9	6396.6	3641.5	3402.9	3538.6	21135.5
5. Manag. Cons. Forest Res.	1176.2	2257.2	2929.2	3081.3	2898.4	12342.3
6. Instit. Strengthening	1114.9	1763.1	1400.2	1213.2	1062.2	6553.6
7. Informal Educ.	391.4	315.3	311.5	323.6	334.3	1676.1
8. Remote Sensing	749.2	109.9	145.3	114.4	162.2	1281.0
Sub-Total	10965.8	14366.2	12791.6	12608.3	12705.7	63437.6
C. Agro-forestry Development						
1. Rural Extension	6309.6	6930.5	5390.0	5567.9	6578.5	30776.5
2. Agric. Res/Meteo. Std.	5030.0	3583.6	1664.4	1748.3	1796.7	13823.0
3. Agric. Credit	3648.8	8352.3	11326.6	9780.1	1994.6	35102.4
4. Price Info/System	366.7	91.0	94.6	98.3	102.1	752.7
Sub-Total	15355.1	18957.4	18475.6	17194.6	10471.9	80454.6
D. Socio. Econ. Info./Services						
1. Health	587.8	1167.8	1304.6	1438.5	1612.6	6111.3
2. Education	562.5	2547.7	3673.6	2856.7	1841.7	11482.2
3. Water Supply	1369.6	2069.8	2150.6	1489.5	820.7	7900.2
4. Rural Roads	9075.2	14811.4	13468.4	5209.0	2055.4	44619.4
5. Rural Electrification	4546.9	2657.0	3450.8	0.0	0.0	10654.7
Sub-Total	16142.0	23253.7	24048.0	10993.7	6330.4	80767.8
E. Project Admin/Mgmt. State	1663.5	1356.0	1412.7	1450.3	1506.9	7389.4
F. Proj. Admin. Federal	535.1	535.7	535.9	550.4	568.9	2726.0
G. Technical Cooperation	1517.5	854.8	876.9	0.0	0.0	3249.2
TOTAL PROJECT COSTS	55491.6	73353.7	71202.6	49519.3	36125.9	285693.1

BRAZIL
MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Summary Accounts by Project Component
(US$'000)

	Protec. Indig. Reserves	Conserv. Areas	Mining Activities	Forest. Pol.	Commun. Forestry Dev.	Institut. Strength.	Informal Educ.	Remote Sensing/ Monitoring	Land Tenure Reg.	Agroecol. Zoning	Rural Exten.	Agric. Res/Mutes Station	Agric. Credit	Market Info. System	Health	Education	Water Supply	Rural Roads	Rural Electr.	State Proj Adm. Mgmt.	Federal Proj Adm. Mgmt.	Technical Coop.	TOTAL	Physical Contingencies %	Physical Contingencies Amount	Price Contingencies %	Price Contingencies Amount
I. INVESTMENT COSTS																											
A. Construction																											
1. Roads and Wells	32.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	40.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Buildings	154.0	216.0	1033.0	320.0	160.0	673.6	0.0	0.0	676.0	0.0	706.7	3495.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	186.0	216.0	1033.0	320.0	160.0	673.6	0.0	0.0	676.0	0.0	706.7	3535.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B. Vehicles/Mach./Impl.	487.9	225.0	300.0	2900.0	450.0	720.0	22.0	0.0	251.4	315.0	2300.0	1446.7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C. Equipment																											
1. Spec. Tech. Equip.	47.9	0.0	0.0	175.0	0.0	28.4	14.2	385.1	423.7	102.1	16.5	434.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Office Equipment	0.6	0.0	0.0	40.2	90.0	239.2	0.0	371.1	47.0	48.7	123.0	106.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3. Miscellaneous	163.6	93.1	1500.0	444.1	100.2	0.0	4.0	0.0	13.0	45.0	430.3	50.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	[illegible]	93.1	1500.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D. Credit Requirement	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E. Contract Services	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F. Technical Assistance																											
1. Studies	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Training	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL INVESTMENT COSTS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
II. RECURRENT COSTS																											
A. Salaries																											
1. Professionals	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. General Service	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
B. Travel/Perdiem																											
1. Personnel Perdiem	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2. Travel Fares	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Sub-total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C. Vehicles O&M	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
D. Contract Services	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
E. Office Supplies	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
F. Refresher Courses	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
G. Miscellaneous	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL RECURRENT COSTS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL BASELINE COSTS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Physical Contingencies	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Price Contingencies	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TOTAL PROJECT COSTS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Taxes	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Foreign Exchange	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ANNEX 6
Table 6.4

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Estimated Schedule of Bank Disbursements
(US$ million)

Bank Fiscal Year	Quarter Ending	Disbursement During Quarter	Cumulative Disbursement Amount	Cumulative Disbursement % Total	Balance of Loan
1993	Sept. 30, 1992	--	--	--	205.0
	Dec. 31, 1992	25.0 1/	25.0	12.2	180.0
	March 31, 1993	10.0 1/	35.0	17.1	170.0
	June 30, 1993	5.0 1/	40.0	19.5	165.0
1994	Sept. 30, 1993	5.0	45.0	21.9	160.0
	Dec. 31, 1993	6.0	51.0	24.9	154.0
	March 31, 1994	9.5	60.5	29.5	144.5
	June 30, 1994	13.5	74.0	36.1	131.0
1995	Sept. 30, 1994	14.0	88.0	42.9	117.0
	Dec. 31, 1994	15.0	103.0	50.2	102.0
	March 31, 1995	15.0	118.0	57.6	87.0
	June 30, 1995	14.0	132.0	64.4	73.0
1996	Sept. 30, 1995	12.0	144.0	70.2	61.0
	Dec. 31, 1995	10.0	154.0	75.1	51.0
	March 31, 1996	10.0	164.0	80.0	41.0
	June 30, 1996	9.0	173.0	84.4	32.0
997	Sept. 30, 1996	9.0	182.0	88.7	23.0
	Dec. 31, 1996	8.0	190.0	92.6	15.0
	March 31, 1997	5.0	195.0	95.1	10.0
	June 30, 1997	5.0	200.0	97.6	5.0
1998	Sept. 30, 1997	3.0	203.0	99.0	2.0
	Dec. 31, 1997	2.0	205.0	100.0	0.0

1/ Including initial deposit of US$15.0 million into the Special Account and US$20.5 million of retroactive financing.

ANNEX 6
Table 6.5

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Financing Plan

(US$ million)

	IBRD	STATE GOVT	FEDERAL GOVT	TOTAL
A. AGRO-ECOLOGICAL ZONING AND LAND TENURE REGULARIZATION	46.8	0.1	0.8	47.7
Agro-Ecological Zoning	21.1	0.1	0.3	21.5
Land Tenure Regularization	25.7	--	0.5	26.2
B. NATURAL RESOURCES MANAG/PROT.	59.5	--	3.9	63.4
Protection Indig. Reserves	8.9	--	0.2	9.1
Conservation Areas	2.7	--	0.2	2.9
Mining Activ. Procedures	7.8	--	0.6	8.4
Forestry Police	19.8	--	1.3	21.1
Manag. Conserv. Forest Rec.	11.4	--	0.9	12.3
Inst. Strengthening	6.2	--	0.4	6.6
Informal Educat.	1.6	--	0.1	1.7
Remote Sensing	1.1	--	0.2	1.3
C. AGROFORESTRY DEVELOPMENT	47.7	28.4	4.4	80.5
Rural Extension	13.0	15.6	2.2	30.8
Agric. Research/Meteo St.	9.2	3.9	0.7	13.8
Agric. Credit	25.0	8.7	1.4	35.1
Market Information	0.5	0.2	0.1	0.8
D. SOCIO-ECONOMIC INFRASTRUCTURE	41.1	9.5	30.2	80.8
Health	2.4	2.6	1.1	6.1
Education	7.5	2.0	2.0	11.5
Water Supply	3.7	2.1	2.1	7.9
Rural Roads	22.5	--	22.1	44.6
Rural Electricity	5.0	2.8	2.9	10.7
E. PROJ. ADMIN/MGT.STATE	5.0	1.9	0.5	7.4
F. PROJ. ADMIN/MGT. FEDERAL	1.9	--	0.8	2.7
G. TECH. COOPERATION	3.0	0.1	0.1	3.2
TOTAL	205.0	40.0	40.7	285.7 1/

1/ Including about US$11.7 million in local taxes not financed by IBRD.

ANNEX 6
Table 6.6

BRAZIL

MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Allocation of Loan Proceeds

CATEGORY		ITEM AND % OF EXPENDITURES (NET OF TAXES)	TOTAL AMOUNT (US$ M)
1.	(a)	Agro-ecological Zoning and Land Tenure Regularization 100% of expenditures	41.0
	(b)	Management, Protection and Monitoring of Natural Resources 100% of expenditures	46.8
	(c)	Extension, Research and Marketing Information 75% of expenditures	16.3
	(d)	Health and Education 50% of expenditures	4.7
2.		Roads Paving and Maintenance, Water Supply and Rural Electrification 50% of expenditures	27.2
3.		Rural credit. 75% of expenditures	22.2
4.		Training, consultancies, studies and consultants. 100% of expenditures	16.9
5.		Project administration 75% of expenditures	6.2
6.		Unallocated	23.7
		TOTAL	205.0

ANNEX 6
Table 6.7

BRAZIL

MATO GROSSO NATURAL RESOURCES MANAGEMENT PROJECT

Implementation Schedule

Estimated Annual Contractual and Other Payments
(US$ Million)

	Payment Years 1	2	3	4	5	Total Payment	Remarks
Civil Works							
Road Paving	-	8.8	8.8	-	-	17.6	ICB
Other	6.0	8.5	14.0	8.0	5.0	41.5	LCB
	1.0	1.2	1.2	1.3	1.3	6.0	Force Acc.
Equipment, Machinery Vehicles and Furniture							
Rural Electrification Equipment	1.5	4.9	2.6	-	-	9.0	ICB
Other	4.1	4.1	8.2	4.0	0.1	20.5	LCB
	0.8	0.8	0.9	0.9	0.8	4.2	Shopping
	0.2	0.3	-	-	-	0.5	NBF 1/
Contractual Services							
Aerial Photography and Land Zoning Operations	5.7	11.6	-	-	-	17.3	ICB
Other	2.5	2.5	2.6	2.6	2.6	12.8	LCB
	0.2	0.2	0.2	0.2	0.2	1.0	Shopping
Technical Assistance, Training, Studies	4.4	4.4	6.7	6.5	0.2	22.2	-
Salaries and Benefit	16.8	10.3	10.3	10.3	10.3	58.0	-
Other Operational Costs	8.2	8.2	8.2	8.2	8.2	41.0	-
Investment Credit	4.1	7.5	7.5	7.5	7.5	34.1	-
TOTALS	55.5	73.3	71.2	49.5	36.2	285.7	
Bank-Financed	(51.0)2/	(52.0)	(51.0)	(36.0)	(35.6)	(205.0)	

1/ NBF Not Bank-Financed.
2/ Includes retroactive financing for US$20.5 million.

ANNEX 7
Table 7.1

BRAZIL
MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

List of Executing and Collaborating Agencies[1/]

Project Activity	Main Executing Agency	Main Collaborating Agencies
Agro-Ecological Zoning	SEPLAN	INTERMAT FEMA, FUNAI
Land Tenure Regularization	INTERMAT, INCRA	
Management and Conservation of Forest Resources	FEMA PMF-MT	
Mining Activities Rationalization	FEMA	
Establishment of Conservation Areas	FEMA	
Informal Environmental Education	FEMA	
Control of Forestry and Mining Activities	FEMA, SEPLAN, PMF-MT, FUNAI	
Support to Indigenous Communities	FUNAI	IBAMA, FUNAI, SES-MT, INTERMAT, INCRA
Monitoring of Deforestation	Forest Cover Monitoring Unit to be established within SEPLAN	SEMA/FEMA, PMF-MT, IBAMA, FUNAI, EMBRAPA, INTERMAT
Agro-forestry Research	EMPAER	
Rural Extension	EMPAER	
Rural Credit	BEMAT	EMPAER, CASEMAT, SEAGRI, SEPLAN
Storage, Processing and Marketing Information	EMPAER, SEAAF	
Health	SES-MT	
Education	SEC-MT	
Water Supply	SANEMAT	
Rural Electrification	CEMAT	
Maintenance and Paving of Rural Roads	CODEMAT	
Project Administration	SDP-PR, SEPLAN/PCU	

1/ In addition to these public agencies, relevant international and national non-governmental organizations have participated in project preparation and would be encouraged to participate actively in implementation as well. There will be NGO representation in the State Council for Project Administration (para. 3.45). NGOs will also participate in the Annual Independent Evaluation Committee which will monitor environmental and social performance of the project (para. 3.5), and in such other project activities as are agreed in the course of each annual operating plan exercise (para. 3.47).

BRAZIL
MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Project Physical Targets and Schedule of Implementation

	Units	1	2	3	4	5	Total
A. LAND ZONING, MAPPING, REGULARIZATION							
Delimitation, Demarcation, Cadastral	Million Ha.	8.2	12.4	12.4	8.3	-	41.3
Issuance of Titles	Families	-	4500.0	4500.0	4500.0	4500.0	18000.0
Demarcation of Conserv. Areas	Km.	104.0	264.0	264.0	264.0	104.0	1000.0
Zoning 2nd Approximation	Million Ha.	8.0	10.8	8.0	-	-	26.8
B. MANAGEMENT/PROTECTION ENVIRON.							
1. Identification State Forests (FEPS)	No.	-	1.0	3.0	3.0	2.0	9.0
FEPS Area	Million Ha.	-	0.4	1.3	1.3	1.0	4.0
Prep. FEPS Land Manag. Plans	No.	-	1.0	3.0	3.0	2.0	9.0
Prep. Priv. Land Manag. Plans	Million Ha.	-	0.2	0.3	0.3	0.3	1.1
2. Mining Activities Rationalization							
Preparation Strategic Study	No.	1.0	-	-	-	-	1.0
Establish. Demonstration Sites	N2	-	200.0	-	-	-	200.0
Map of Fragile Areas	Set	1.0	-	-	-	-	1.0
Training in Mining/Environ. Law	No.	1.0	-	1.0	-	-	2.0
3. Conservation Units							
Conservation Area Names	Name	Chap. Guimaraes Apiacas	Rio Naderinha Rio Cuiaba	S. Barbara Rio Ronura	Rio Nortes Ricardo Franco	Cachimbo	
Conservation Areas	000 Ha.	547.0	1100.0	1500.0	1200.0	500.0	4847.0
Management Plans	No.	2.0	2.0	2.0	2.0	1.0	9.0
4. Informal Environ. Education							
Study Environ. Assessement	No.	1.0	-	-	-	-	1.0
Train FEMA Tecnicians	Days	10.0	30.0	30.0	30.0	30.0	130.0
Training Communities	Days	20.0	20.0	20.0	20.0	20.0	100.0
5. Control Forestry and Mining Activ.							
Training Basic Forestry Policy	Courses	3.0	2.0	1.0	-	-	6.0
Training Helicopter Pilot	Persons	6.0	-	-	-	-	6.0
Training Fix. Wing	Persons	6.0	-	-	-	-	6.0
Satellite Imagery Interpretation	Courses	3.0	3.0	3.0	1.0	-	10.0
Special Studies Rioteles	No.	1.0	-	-	-	-	1.0
Routine Inspect. FEMA Grad.	Days	630.0	500.0	500.0	500.0	500.0	2630.0
Routine Inspect. Forestry Police	Days	20000.0	20000.0	20000.0	20000.0	20000.0	100000.0
Aerial Reconessaince	Days	900.0	900.0	900.0	900.0	900.0	4500.0
Inspections	Days	900.0	900.0	900.0	900.0	900.0	4500.0

BRAZIL
MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Project Physical Targets and Schedule of Implementation

	Units	1	2	3	4	5	Total
6. Support Indigenous Communities							
Demarcation New Boundries	Km.	839.0	348.0	443.0	-	-	1630.0
Rehabilitation of Boundries	Km.	305.0	600.0	600.0	490.0	-	1995.0
Training Health Monitors	Days	-	141.0	141.0	141.0	141.0	564.0
Advanced Trg. Public Health	Days	240.0	-	220.0	-	220.0	680.0
Medium Level Trg. Public Health	Days	-	750.0	-	750.0	-	1500.0
Health Ref. Serv. Diagnostic	Days	200.0	300.0	200.0	100.0	100.0	900.0
7. Monitoring Deforestation							
Training Programs	No.	2.0	2.0	-	-	-	4.0
Monit. Visits in State Graduate	Days	60.0	60.0	60.0	60.0	60.0	300.0
Monit. Visits in State Medium	Days	40.0	40.0	40.0	40.0	40.0	200.0
8. Institutional Strengthening							
Study Strategic Planning	No.	1.0	-	-	-	-	1.0
Workshop on Conflict Resolution	No.	1.0	1.0	1.0	1.0	1.0	5.0
Mutirao Para Natureza Projects	Days	50.0	50.0	50.0	50.0	50.0	250.0
C. AGROFORESTRY DEVELOPMENT							
1. Research							
Annual Crops Trials	No.	35.0	70.0	70.0	139.0	139.0	453.0
Perennial Crops Trials	No.	7.0	31.0	64.0	80.0	80.0	262.0
Forestry Trials	No.	5.0	3.0	2.0	1.0	-	11.0
Agroforestry Trials	No	1.0	3.0	1.0	-	-	5.0
Test of Product. System On-Farm	No.	-	30.0	30.0	30.0	30.0	120.0
Test of Product. System On-Station	No.	12.0	12.0	12.0	12.0	-	48.0
Forestry TVTs	No.	-	21.0	33.0	42.0	46.0	46.0*
Agroforestry TVTs	No.	-	44.0	176.0	220.0	220.0	220.0*
2. Extension							
5 Ha. Demon. Fields Estab.	No.	3	6	-	-	-	9.0
1 Ha. Demon. Fields Estab.	No.	45	45	45	45	-	180.0
Specialized Farmers Courses	Events	200	350	350	350	295	1545.0
Courses Farm Leaders	Events	-	15	15	15	15	60.0
Other Farmer Courses	Events	400	700	700	700	700	3200.0
Extension Basic Coursees/Tech.	Persons	214	50	50	50	50	414.0
Refresher Extension Courses	Persons	214	304	304	304	304	1430.0
Forestry Courses/Technicians	Persons	50	50	50	50	50	250.0
Other Specializ. Courses/Techn.	Persons	6	6	6	6	6	30.0

* cumulative

BRAZIL
MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Project Physical Targets and Schedule of Implementation

	Units	1	2	3	4	5	Total
2. Extension (contd.)							
Demonstrations	Events	270	450	450	450	450	2070.0
TVTs	Events	90	190	200	200	190	870.0
On-Farm Demonstrations	Events	-	36	71	71	71	249.0
Field Days	Days	90.0	180.0	180.0	180.0	180.0	810.0
Excursions	Days	180.0	280.0	280.0	270.0	270.0	1280.0
Seminars	Days	2.0	27.0	27.0	27.0	27.0	110.0
Total Farmers Attendance	No.	15090.0	17520.0	19950.0	27240.0	32100.0	32100.0*
Farmers Adopting Technology	No.	2020.0	6060.0	12120.0	18180.0	20200.0	20200.0*
Farmers Using FUNDAGRO	No.	1435.0	4305.0	8610.0	12915.0	14350.0	14350.0*
Farmers/Extensionist Ratio	No.	120.0	150.0	180.0	270.0	330.0	-
3. Rural Credit							
Farmers for Seasonal and Invest. Loans	No.	1435.0	4305.0	8610.0	12915.0	14350.0	14350.0*
On-farm Seasonal Loans	Million US$	13.7	14.9	15.2	15.6	16.2	16.2*
On-Farm Invest. Loans	Million US$	1.8	3.7	5.5	5.5	1.8	18.3
Projectos Piscicuctura	No.	50.0	100.0	100.0	100.0	50.0	400.0
Agroindustria Comunitaria	No.	-	5.0	5.0	5.0	-	15.0
Armazen UAPT 700 Tons	No.	2.0	2.0	-	-	-	4.0
Armazen UAPT 1000 Tons	No.	1.0	1.0	-	-	-	2.0
4. Crop Storage							
Central Coord. Unit	No.	1.0	-	-	-	-	1.0
Classification Posts	No.	7.0	-	-	-	-	7.0
D. SOCIO-ECONOMIC INFRASTRUCTURE							
1. Health							
New Health Posts	No.	-	5.0	5.0	5.0	5.0	20.0
Health Posts for INCRA Schemes	No.	-	2.0	2.0	2.0	1.0	7.0
Enlarged Health Posts	No.	3.0	5.0	5.0	2.0	-	15.0
Restored Health Posts	No.	3.0	-	-	-	-	3.0
Ambulances	No.	1.0	4.0	-	-	-	5.0
Study on Health Study	No.	1.0	-	-	-	-	1.0
Training Health Assistants	Persons	-	30.0	30.0	27.0	27.0	114.0
Refresher Training Courses	Persons	100.0	100.0	100.0	100.0	100.0	500.0
2. Education							
Construc 1 Room School	No.	-	10.0	20.0	13.0	-	43.0
Construc 2 Room School	No.	-	20.0	17.0	10.0	-	47.0
Extension Exist. Schools	No.	20.0	30.0	20.0	20.0	20.0	110.0
Pilot Environ. Educ	No. Schools	-	-	14.0	14.0	14.0	14.0*

* cummulative

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MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Project Physical Targets and Schedule of Implementation

	Units	1	2	3	4	5	Total
2. Education (contd)							
Environ. Teachers Trg. Courses	Days	-	19.0	920.0	920.0	939.0	2798.0
Uncert. Teachers Courses	Days	210.0	1800.0	1800.0	1800.0	-	5610.0
3. Water Supply							
Wells	No.	10.0	15.0	15.0	10.0	5.0	55.0
Distribution Network	Km.	52.0	78.0	78.0	52.0	29.0	289.0
House Linkages	No.	1760.0	2640.0	2640.0	1760.0	900.0	9700.0
4. Rural Electrification							
Sub-Station Improvement	No.	2	-	-	-	-	2.0
Electr. Branch Caceres	Km.	121	158.0	300.0	-	-	579.0
Electr. Branch Rondonopolis	Km.	73	82.0	-	-	-	155.0
5. Rural Transport							
State Roads Conservation	000 Km.	3.0	3.0	2.0	2.0	1.0	11.0
Municipal Roads Conservation	000 Km.	4.5	4.5	3.0	2.0	1.0	15.0
Paving Araputanga-Juary	Km.	-	39.0	30.0	-	-	69.0
Paving Lambadi-Villa Progreso	Km.	-	33.0	22.0	-	-	55.0
Institutional Study	No.	1.0	-	-	-	-	1.0
Total Trg. of Personnel	Days	350.0	350.0	350.0	350.0	350.0	1750.0
E. ADMINISTRATION AND MONITORING							
1. Monitoring Ind. Committee	Unit	1.0	1.0	1.0	1.0	1.0	5.0
2. Evaluation Midterm/Ex-Post	Unit	-	-	1.0	-	1.0	2.0
3. Technical Assistance							
International Consultant	Person/Month	3.0	3.0	-	-	-	6.0
Local Consultant	Person/Month	24.0	24.0	-	-	-	48.0
Professionals	Person/Month	8.0	8.0	8.0	-	-	24.0
Administrative	Person/Month	1.0	1.0	1.0	-	-	3.0

ANNEX 7
Chart

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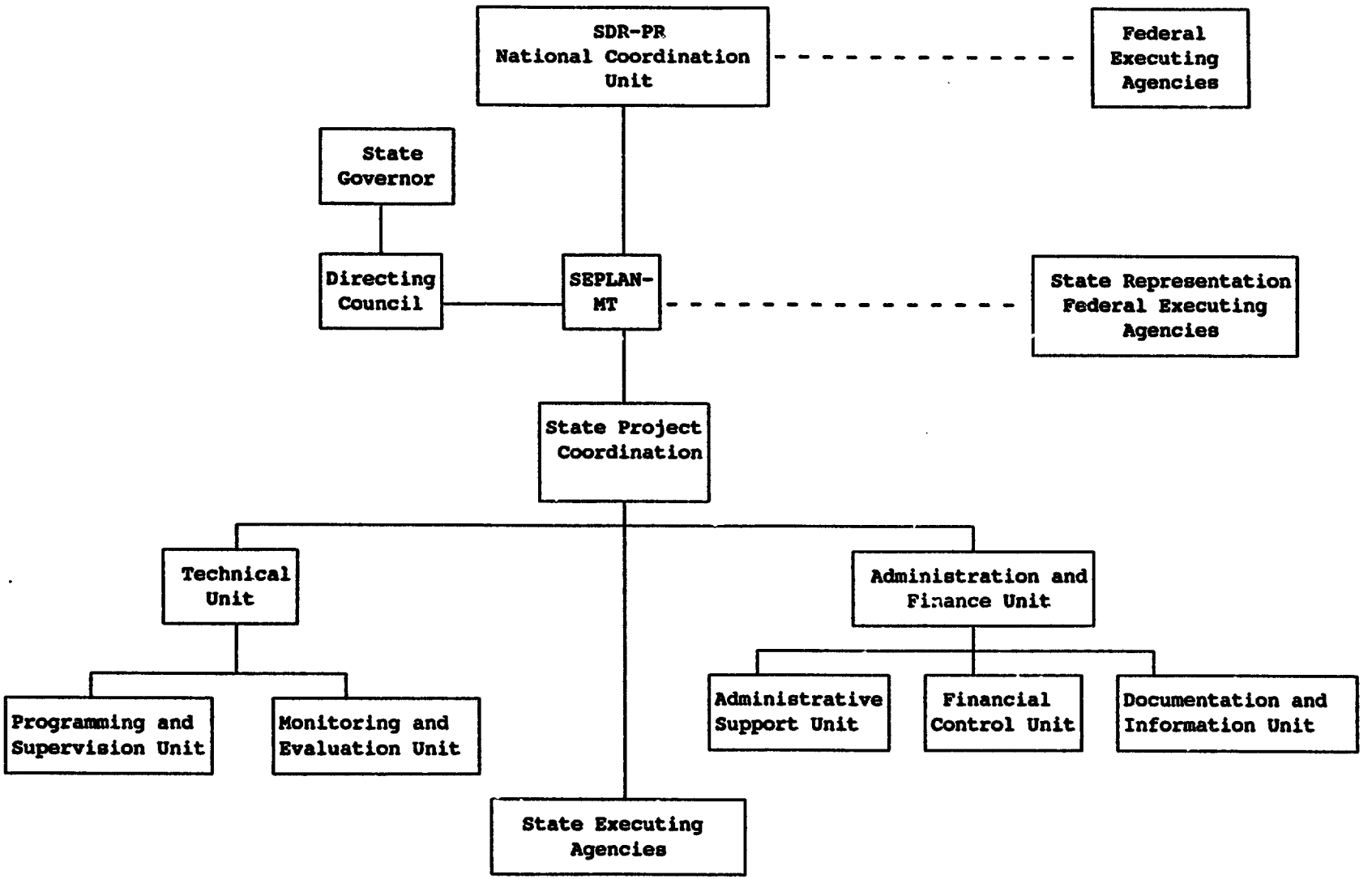
MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Project Organizational Chart



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MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Project Supervision

1. Supervision of the Mato Grosso Natural Resource Management Project will take place on several levels, and will be very intensive throughout the implementation period. In broad terms, the principal responsibilities for supervision will rest with the State Government (through the Project Coordination Unit, PCU, of the State Secretariat of Planning), the Federal Government (through the Secretariat of Regional Development of the Presidency of the Republic, SDR-PR), and the Bank (through LA1EA). Non-governmental organizations (NGOs) and a UNDP technical assistance team will also play important roles.

2. At State level, the PCU will routinely supervise the work of the project executing agencies, based on quarterly monitoring and evaluation (M&E) reports which will be received within one month of the close of each trimester of the calendar year. The content and format of the M&E reports is being modified, as discussed in para. 9 below.

3. The PCU will include a Forest Cover Monitoring Unit which will monitor the location and surface changes in mining and logging activities throughout the State, on the basis of satellite imagery obtained at 18-day intervals. This will provide an extremely powerful instrument for the continuous monitoring of project impact, and will help to direct the State's enforcement activities in support of the Mato Grosso EAP. The findings will be aggregated each year into an annual Satellite Monitoring Report, which will be submitted to the Bank for review by January 1, 1993 and each January 1 thereafter.

4. The PCU will also enjoy the full-time support of six UNDP techrical assistance specialists with internationally recognized credentials (as well as the equivalent three full-time specialists, to be used for short-term inputs as necessary), to support and monitor project implementation. Three of the full-time specialists have been recruited, and selection of the remaining three is at an advanced stage of processing.

. The State Council for Project Administration (CEAP), chaired by the State Governor, will meet at least once quarterly (or more often, as needed) to review project implementation progress and take decisions on outstanding issues. Quarterly progress reports, annual operating plans, the report of the Annual Independent Evaluation Committee, the annual Satellite Monitoring Report, and the mid-term evaluation report will be discussed and reviewed by the CEAP.

. At Federal level, the SDR-PR will supervise the project at frequent intervals. The SDR-PR will receive all quarterly progress reports; conduct such independent field visits as it considers necessary, and participate with the Bank in all major supervision missions to Mato Grosso. The SDR-PR will also pay particular attention to any issues which may arise concerning the performance of Federal executing agencies under the project.

7. Within the Bank, LA1EA will coordinate all supervision efforts for the project, which will be allocated higher supervision coefficients than normal. The Bank will receive two consolidated semestral progress reports each year, based on the quarterly progress reports compiled by the PCU. The timing of supervision inputs may vary over the course of any one year, depending on the specific needs of individual project components, but normally three main supervision missions would be mounted in February/March, July and November/December. The first would, inter alia, review the findings of the Annual Satellite Monitoring Report (due January 1) and the semestral report for the second semester of the preceding calendar year. The July mission, intended to be a full annual joint Bank-Government implementation review, would consider the findings of the Annual Independent Evaluation Committee (due to the Bank by June 30), the annual audit report on the use of loan and counterpart proceeds (also due by June 30) and the proposed annual budgetary allocation for the project for the succeeding year (by July 15). The third mission would be timed to coincide with review of the draft Annual Operating Plan for the succeeding calendar year (due to the Bank by November 15). To support its periodic Headquarters inputs, the Bank will station one full-time staff member in Mato Grosso to provide continuous supervision of the project. Specialized staff of the Bank's Recife Office in Northeast Brazil may also be called upon to provide occasional inputs and advice, as needed.

8. NGOs have participated in project design and will also be actively involved in monitoring implementation. NGOs would be represented on the State CEAP (para. 5). Through their participation in the CEAP, NGOs will have the opportunity to review and approve all annual operating plans for the project, review and discuss all quarterly supervision reports and other M&E reports and materials which come to the CEAP, and participate in all major project-related decisions. Selected NGOs will also participate as members of each Annual Independent Evaluation Committee (para. 10).

9. The State has a format for quarterly reporting, which focusses heavily on physical and financial targets, and which is too complex to facilitate timely decision-making and identification of problems. A detailed proposal has been prepared to simplify the monitoring and evaluation indicators, and improve the design and quality of the M&E reports. This was reviewed during loan negotiations and understandings were reached as to the type of indicators which would be central to the assessment of performance of individual components and the overall project. With assistance from the UNDP specialists, and after further discussions with each of the executing agencies, a revised set of indicators will be submitted to the Bank in draft by September 30, 1992, for review, with a view to adopting a final version by December 31, 1992. All quarterly reports beginning with the January 1-March 31, 1993 report, will be based on the new format.

10. Annual, Mid-term and Final Project Reviews. An Independent Evaluation Committee (IEC) would be invited yearly to monitor the environmental and social performance of the project. Specifically, the IEC would monitor implementation of the environmental policy and regulatory reforms undertaken in connection with the project, the compatibility of annual Federal and State investment programs in Mato Grosso with the recommendations of the agro-ecological zoning and the impact of the project in the State. The IEC would include representatives of relevant NGOs, and the report would be available by June 30 of each year, beginning June 30, 1993. A mid-term review of the project, by June 30, 1995, would provide an opportunity for full stock-taking and exchange of views among the Bank, the Borrower and the State about project performance

and the need for redirection of any activities during the remaining years of the project. A final assessment of the overall project implementation performance and impact would be carried out within six months of the project completion date.

11. The following would be key dates each year, from the standpoint of project supervision:

Date	Activity/Report Due
January 1	Annual Satellite Monitoring Report due to the Bank
January 30	Fourth Quarterly Report covering the period October 1-December 31, compiled by the State PCU
March 31	Second Semester Report for the preceding year (July 1-December 31) due to the Bank
	(FULL BANK SUPERVISION MISSION IN FEBRUARY/MARCH)
April 30	First Quarterly Report covering the period January 1-March 31, compiled by the State PCU
June 30	Annual Independent Evaluation Committee Report due to the Bank
June 30	Annual Project Audit Report on preceding financial year due to the Bank
July 15	Annual budgetary allocation for succeeding year presented to the Bank
	(FULL BANK SUPERVISION MISSION/ANNUAL JOINT BANK-GOVERNMENT IMPLEMENTATION REVIEW IN JULY)
July 31	Second Quarterly Report covering April 1 - June 30, compiled by the State PCU
September 30	First Semester Report for current year (January 1-June 30) due to the Bank
October 31	Third Quarterly report covering the period July 1-September 30 due from the PCU
November 15	Draft Annual Operati Plan for Succeeding Year due to the Bank for review
	(FULL BANK SUPERVISION MISSION IN NOVEMBER/DECEMBER)

ANNEX 9

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MATO GROSSO NATURAL RESOURCE MANAGEMENT PROJECT

Documents Available in Project File

WORKING PAPERS

1	SOCIO-ECONOMIC-ECOLOGICAL ZONING, ENVIRONMENTAL PROTECTION AND ENVIRONMENTAL MONITORING COMPONENTS
2	AÇAO FUNDIARIA
3	ENVIRONMENTAL COMPONENT
4	MANAGEMENT AND CONSERVATION OF FOREST RESOURCES
5	PRODEAGRO: AMERINDIAN COMPONENT
6	AGRICULTURAL RESEARCH AND RURAL EXTENSION
7	COMPONENTE: TRANSPORTES
8	RURAL CREDIT COMPONENT
9	PROJECT COSTS TABLES
10	ECONOMIC ANALYSIS
11	FARM MODELS AND AGRICULTURAL PRODUCTION

MAP SECTION

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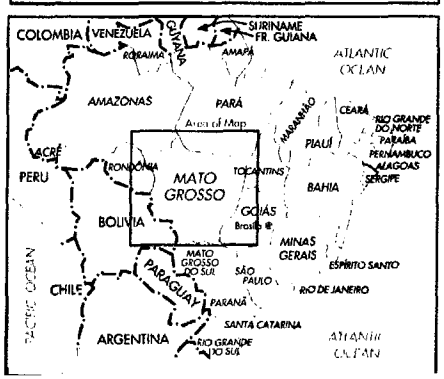
MATO GROSSO

NATURAL RESOURCE MANAGEMENT PROJECT

SOCIO-ECONOMIC-ECOLOGICAL ZONING

- ZONE 1 - HEAVILY MECHANIZED AGRICULTURAL PRODUCTION, PRINCIPALLY SOYBEAN
- ZONE 2 - INTENSIFICATION OF AGRICULTURAL PRODUCTION WITH AGRICULTURAL DIVERSIFICATION
- ZONE 3 - INTENSIFICATION OF AGRO-FORESTRY
- ZONE 4 - LIVESTOCK PRODUCTION
- ZONE 5 - SUSTAINABLE FOREST MANAGEMENT
- ZONE 6 - CONSERVATION AND PERMANENT PROTECTION
- ZONE 7 - INDIGENOUS RESERVES

- SELECTED ROADS
- MAIN TOWNS
- STATE BOUNDARIES
- INTERNATIONAL BOUNDARIES



AMAZONAS

PARÁ

RONDÔNIA

TOCANTINS

GOÍAS

BOLIVIA

MATO GROSSO DO SUL

Rio Juruena

Rio São Manuel ou Teles Pires

Rio Araguaia

Rio Morres

Alta Floresta

Peixoto de Azevêdo

Vila Rica

Juruena

Colider

Juína

São Félix do Araguaia

Sinop

Sorriso

Ribeirão Cascalheira

Campo Novo Parecis

Canarana

Vila Bella SS. Trindade

Pontes e Lacerda

Nova Xavantina

Mirasso D'oeste

Várzea Grande

Cuiabá

Araguaiana

Jaciara

Poconé

Rondonópolis

Alto Araguaia

9°

11°

13°

15°

17°

0 50 100 150 200

KILOMETERS