

16133

Madagascar

Second Environment Program

Project Document
November 1996



THE WORLD BANK



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**Environment Group and
Cd8 Central Afr 2
Africa Region**

CURRENCY EQUIVALENTS

Currency Unit	=	Malagasy Franc (FMG)
US\$ 1.00	=	FMG 4,200
SDR 1	=	US\$ 1.45851

WEIGHTS AND MEASURES

Metric system

MALAGASY FISCAL YEAR

January 1 - December 31

LIST OF ACRONYMS

AGIR	Appui à la Gestion de l'environnement à travers des Instruments Régionalisés et l'approche locale (Regional and Local Environment Management Support Component)
ANAE	Association Nationale d'Actions Environnementales (National Association for Environmental Actions)
ANGAP	Association Nationale pour la Gestion des Aires Protégées (National Association for the Management of Protected Areas)
APPP	Annual Participatory Programming Process
CAPE	Composante Aires Protégées et Ecotourisme
CFSIGE	Centre de Formation pour les Sciences de l'Information Géographique et Environnementale (Environment Information Training Center)
COS	Comité d'Orientation et de Suivi (Steering Committee of the Environment Program)
DD	Direction des Domaines (Land Titling Directorate)
DEF	Direction des Eaux et Forêts (Water and Forests Directorate)
EP1, EP2, EP3	Environment Program Phase 1, Phase 2, Phase 3
ESFUM	Eco-Systèmes Forestiers à Usage Multiple (Multiple-Use Forest Ecosystems)
FORAGE	Fonds Régional d'Appui à la Gestion de l'Environnement (Regional Fund for Environment Management)
FTM	National Geographic Institute
GEF	Global Environment Facility
ICDP	Integrated Conservation and Development Project
IFAD	International Fund for Agriculture Development
NTPF	Non-Timber Forestry Products
ONE	Office National de l'Environnement (National Environment Office)
PPDOP	Participatory Process for the Definition of Options and Priorities
PRIF	Pre-Investment Financing
RPC	Regional Programming Committee
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WWF	World Wide Fund for Nature

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MADAGASCAR SECOND ENVIRONMENT PROGRAM

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MADAGASCAR SECOND ENVIRONMENT PROGRAM

Program Summary

Executing Agencies	Ministry of Environment - National Environment Office ANGAP (Parks management organization) DEF (Water and Forests Directorate) DD - Direction des Domaines (Land Titling Directorate) ANAE (National Association for Environmental Actions) FTM (National Geographic Institute) CFSIGE (Environment Information Training Center)
Probable Cost:	US\$155 million
Proposed IDA/ITF Credit: IDA Lending Program:	US\$30 million - Standard IDA terms FY 97 L
Proposed GEF grant: GEF Focal Area GEF Country Eligibility GEF Implementing Agencies GEF Preparation Costs: Associated UNDP Projects	US\$ 20.8 million Biodiversity Convention ratified as of March 4, 1996 UNDP, World Bank PRIF US\$ 0.5 million Spatial Approach to Natural Resources Management - US\$ 0.58 million Marine Resources Management - US\$ 1.5 million Environmental Policy and Training - US\$ 0.5 million
Proposed IFAD Credit	US\$ 8.1 million
Government Financing	US\$ 31.0 million
Financing Plan:	contributions agreed during negotiations: GEF, UNDP, IFAD, USAID, Germany, France, European Union, WWF to be firmed up with other donors: Switzerland, Norway, Japan
Program Appraisal Date: Appraisal Date (WB): Negotiations Date: Estimated Starting Date: Program Duration:	November 1995 and April 1996 (multi-donor) June 1996 September 1996 February 1997 5 years
Environment Category:	C

Program description	<p>The credits and grant would help finance the cost of:</p> <ul style="list-style-type: none">(i) improving the management of natural resources, including soil, water, forest, coastal zones and biodiversity, and start addressing urban problems;(ii) implementing generic mechanisms at regional and local level to support regionalization of programming and local management of natural resources;(iii) developing environmental management tools that are required in terms of drawing an inventory of natural resources, creating effective monitoring systems to track their evolution, formulating environmental strategies and policies, and undertaking necessary environmental analysis and management.
Program cost and financing:	<p>The cost of the programs estimated at US\$ 155 million, including US\$ 13.7 million of contingencies and US\$ 23.3 million of taxes. ITF would finance US\$ 30 million, GEF is expected to finance US\$ 20.8 million (GEF financing would be managed jointly by UNDP and the Bank), IFAD US\$ 8.1 million (managed by the Bank) and other donors US\$ 65.1 million. Government would finance about US\$ 31.0 million (4.0 million taxes, 7.7 million tax-exempt financing, and 19.3 million through tax exemption against external grants).</p>
Program benefits:	<p>Long term sustainable growth of the country cannot be achieved in the absence of proper management of its natural resources, and the cost of inaction would be higher than the cost of the program. The program would combine concrete actions which have short term measurable benefits with long term undertakings (e.g. policies, education) to ensure sustainability. Direct beneficiaries would include communities affected by the soil conservation schemes and the development activities of the conservation projects (protected areas, forest management, coastal management). Most beneficiaries would be within the poorest segments of the population. Induced benefits would come from the introduction of improved environmental impact analysis and mitigation measures for public investment, as well as from private investments in ecotourism facilities and services that would be induced by the program. Models have been developed that demonstrate that key activities can be economically justified under a fairly wide range of initial conditions.</p>
Program sustainability	<p>The long-term financial sustainability of protected areas would be ensured by a combination of income from ecotourism with the revenue from capital investment (e.g. through a trust fund or foundation such as the one recently established in the country).</p>

Financial sustainability of forestry operations would come from a decrease in the need for Government intervention together with an improvement in recovery of stumpage fees and other levies. In order to ensure long-term sustainability of ANAE mini-projects and FORAGE, cost recovery would be progressively introduced. The level of cost recovery would depend on the importance of direct benefits versus externalities. Fifty per cent of recovered funds would remain with ANAE, and thus contribute to the financial viability of the institution. The other fifty per cent would be managed at village community level to finance expansion and/or maintenance of mini-project investments.

Risks:

Policy risks. There is a strong relationship between environmental degradation, population increase and economic stagnation, including the decline of agriculture, so that the impact of the environment program would be limited in the absence of significant progress on the other fronts. In particular, policies that discriminate against agriculture and tourism would affect the program negatively. Such issues are being addressed under the on-going structural adjustment dialogue. *Institutional risks* are related to potential political instability that would affect the institutional set-up. Other risks are related to weak implementation capacity. ONE and other implementing agencies are subjected to formal implementation capacity to help them clarify their mandate, streamline their organizational structure and procedures, assess their human resources and program their training requirements. Finally, integrating Madagascar's present governmental agencies into the regional approach to natural resource management will be a challenge. Fortunately, the ongoing decentralization process is fully compatible with this objective.

PART I: Project Summary

MADAGASCAR SECOND ENVIRONMENT PROGRAM

I. INTRODUCTION — THE PROGRAM APPROACH

1.1. Faced with the many severe environmental problems facing the country, the Government prepared a National Environmental Action Plan (NEAP) in 1988, with the support of a group of donors, international agencies and NGOs, led by the Bank. The fifteen year program foresees the first five-year phase aimed at creating a proper policy, regulatory and institutional framework, a second phase aimed at the consolidation of the programs initiated under the first phase, and a third phase that would achieve the mainstreaming of environment into macroeconomic management and sector programs.

1.2. The First Phase Program (EP1) is under implementation and will end in December 1996. An analysis of achievements and lessons learned is presented in chapter III, and further detailed in Annex 1. Program implementation is coordinated by ONE, the National Environment Office, and by an annual meeting of a steering committee (COS: Comité d'Orientation et de Suivi) composed of representatives of Government Agencies, NGOs, the civil society and donors, but the EP1 is made up of a number of separate projects. Efforts to manage the annual budgetary process in a consolidated way are under way and a common monitoring system is being put in place.

1.3. At the time of the formulation of the NEAP and the EP1, the country did not have the necessary institutional framework to deal with environmental issues and programs, and as a result the work was developed with a large external input. In contrast, the Second Phase Program (EP2) was prepared by national institutions, in a country-driven participatory process that has developed since mid-1994 (see also Chapter IV - B), with interaction with donors taking place in meetings of the COS and through multi-donor missions.

1.4. Although the Environment cannot be considered a sector (it is rather a dimension of problems that spans across all sectors), the Program described in this report is part of a new generation of investment operations that follow an integrated sector approach, i.e. the SIPs (Sector Investment Programs). This approach, which aims at improving the effectiveness of public expenditures, has the following main characteristics:

- ⇒ It covers all or most priority activities related to the environment
- ⇒ It is prepared by local stakeholders
- ⇒ It is supported by all donors active in the environment in Madagascar
- ⇒ It minimizes reliance on international long-term consultants
- ⇒ It involves common implementation arrangements

II. BACKGROUND

A. Economic and Social Background

2.1. Madagascar's per capita income has plummeted by 40 per cent over the past two decades and stands now at US\$230. According to the 1996 Poverty Assessment, about 75 percent of Madagascar's population now lives in poverty compared to 43 percent in the 1960s. Ninety per cent of the poor live in rural areas. In other words, 68 per cent of the total population are poor and live in rural areas. The population's sense of impoverishment is accentuated by poor health conditions and a decline in education standards.

2.2. The recent years have been characterized by policy advances and reversals. Some positive steps toward economic reform have been taken: floating the exchange rate, lowering import tariffs, sharp price increases for energy, eliminating the commodity subsidies (which were introduced in 1994), official abrogation of "parallel financing", passage of a new banking law, and the appointment of expatriate administrators for the two state-owned banks, whose operations were threatening to derail macroeconomic stability. In addition, the composition of the public investment program has improved, and there have been significant sectoral achievements, including: an improved rice harvest in 1994/95, suggesting a supply response to price and exchange rate liberalization and stronger extension efforts; establishment of a private, non-profit drug procurement unit; rational pricing policies in energy; and liberalization of the petroleum sector. More recently, backwards steps were taken towards reactivating controls on private sector activity and stalling liberalization. However, agreement has now been reached with the IMF and IDA on a policy framework that opens the way to structural adjustment, thus giving hope again that improvement will materialize.

2.3. The Malagasy economy is natural resource based. Agriculture (including livestock, fisheries and forests) determines the global economic performance and is itself affected by national economic policies. The agricultural sector accounts for 31 per cent of GDP, provides raw materials for more than half of the industrial and services sectors, and employs over 70 per cent of the work force. Agricultural exports account for 60 per cent of foreign currency earnings. Exports of agricultural products will be key in determining growth. Although the number of foreign tourists is currently low (50,000 per year), tourism in general and ecotourism in particular are expected to fuel growth. Gems represent another revenue-generating sector.

2.4. In this context, the World Bank Country Assistance Strategy for Madagascar aims at helping the government promote private sector-export-led growth, attack poverty, improve natural resource management, build local capacity, and improve project implementation.

B. The Environment

2.5. **Biodiversity Significance.** Madagascar has been called the single highest major biodiversity conservation priority in the world owing to its combination of high diversity, endemism, and degree of threat. Although Madagascar occupies only about 1.9% of the land area of the African region, it has more orchids than the entire African mainland, and is home to about 25% of all African plants. Overall, about 80% of Madagascar's plant species are endemic, and for animals the proportion is usually even higher, the best example being the lemurs, close to 100% of which occur naturally only in Madagascar. In addition, 95% of the country's 265 reptiles and 99% of its 120 amphibians are endemic, and figures for other groups of organisms

are comparable. Higher-order endemism is also extremely high in Madagascar, making even less diverse Malagasy taxa exceptionally valuable. For instance, although there are only eight genera of endemic Malagasy fish, the genetic information in these species has been compared to the entire very rich cichlid fish fauna of the African rift lakes. Madagascar has also recently been selected as a critical site for marine conservation worldwide.

2.6. Madagascar is known for its high degree of environmental degradation. According to available information, almost eighty per cent of the country's original forest cover has disappeared, or has been severely degraded. The area covered with primary natural forest has declined from about 25 per cent of total surface in 1950 to 20 per cent in 1972 and less than 15 per cent today. Forest cover would disappear within 25 years if current trends continue. This results in the loss of topsoil (up to 150-200 tons per hectare per year on bare land). Poverty and the low level of agricultural technology (e.g. slash-and-burn agriculture) compounded by a rapid population increase (over 12 million rising at 3 per cent a year) are the main causes of natural resources degradation, including deforestation, vegetation fires, soil erosion and loss of fertility. The threats of deforestation, bush fires, and extensive cropping of marginal lands are removing the ground cover necessary to keep the highly erodible soils in place. Wilderness destruction is eliminating viable habitat critical to innumerable plants and animals not yet known to science, the same plants and animals which may hold the key to the discovery of a cure for some major diseases and provide alternative sources of income such as fruits, nuts, honey and other nontimber forest products. This degradation threatens not only biological diversity, but also watershed and soil stability vital to the agrarian economy. Poverty continues to threaten the sustainability of the natural resource base and rural poor need more options in order to utilize available natural resources in a sustainable manner. Reversing the downward spiral of environmental degradation would thus mostly benefit the poor, while maintaining exceptional biodiversity.

2.7. The negative impact of environmental degradation on the economy remains very high. The economic cost of lower agricultural productivity due to soil loss and siltation, damaged infrastructure, and the need to build new infrastructure to higher standards was estimated to equal between 5 and 15 per cent of Madagascar's GNP annually in 1990. Furthermore, as mentioned above, the country is losing largely endemic species and essential ecosystems of environmental, genetic, and medical importance, thereby making Madagascar one of the world's top priorities in terms of environment and conservation.

2.8. **Environmental Action Program.** Aware of these problems, the Government prepared a National Environmental Action Plan (NEAP) in 1988, with the support of a group of donors, international agencies and NGOs, led by the Bank. The NEAP, together with the National Environmental Policy and the Environmental Charter, clearly recognized the link between environmental protection and economic development. The NEAP consisted of the following six programs to be implemented over a period of 15 years:

- (a) protecting and managing the national heritage of biodiversity, with a special emphasis on parks, reserves and gazetted natural forests, in conjunction with the sustainable development of their surrounding areas;
- (b) improving the living conditions of the population. This would be done in rural areas by improving the protection and management of natural resources. Particular attention would be paid to watershed protection, reforestation, and agroforestry. In

urban areas, this would involve improving water supply and sanitation, waste management and pollution control in general;

- (c) promoting environmental education, training, and communication;
- (d) developing mapping and remote sensing tools to meet the demand for natural resources and land management;
- (e) developing environmental research on terrestrial, coastal and marine ecosystems; and
- (f) establishing mechanisms for managing and monitoring the environment.

In 1990, the NEAP was given legal power by the adoption of the National Environment Charter and the National Environmental Policy (Law 90-033, December 21, 1990).

C. Agricultural Strategy and Related IDA- and IFAD-Funded Operations

2.9. The World Bank Agricultural Strategy for Madagascar released on February 23, 1994 aims at promoting market-oriented policies, improving agricultural services, improving the management of natural resources, rehabilitating and expanding rural infrastructure, and streamlining the sector's public expenditures.

2.10. All the IDA-funded operations in the agricultural sector, and other operations in other sectors, have logical and/or operational linkages with the environment. Malagasy and Bank staff are currently developing these linkages.

2.11. The Forests Management and Protection Project (Cr.1878-MAG), deemed unsatisfactory for too long, was closed one year early in 1995. However, the component consisting of three large-scope contracts designed to reinforce DEF's capacity were carried out further under the EP1. This offered the advantage for both the country and the Bank to integrate related operations.

2.12. EP1 institutions such as ANAE and ANGAP have developed operational partnerships with the National Extension Service operating under the Second Agricultural Services Program (Cr.2729-MAG).

2.13. ANAE, DD and DEF are also coordinating activities with the Rural Engineering Service funded by the Second Irrigation Rehabilitation Project (Cr.2644-MAG).

2.14. ANAE uses the services and advice of the National Agricultural Research Institute (FOFIFA) in helping peasants choose better seeds and agricultural techniques, and in drawing a balance sheet of soil conservation efforts in Madagascar since 1950. FOFIFA is supported by the National Agricultural Research Project (Cr.2042-MAG).

2.15. Operators supported by ANGAP around protected areas and by ANAE in watersheds, have established cooperation agreements with rural finance operators supported by ADMMEC under the Rural Finance Pilot Project (Cr.2459-MAG).

2.16. Although formal collaboration still hasn't been established with the Livestock Sector Project (Cr.2433-MAG), there is a logical interaction that needs to be encouraged in the improvement of pasture land and the reduction of bush fires.

2.17. Finally, ONE and DEF have established links with the Second Energy Project, recently approved, to promote the sustainable use of fuelwood and sustainable development of the energy industry.

2.18. IFAD-funded operations. Since 1979, IFAD has participated in financing six projects: the Mangoky Agricultural Development Project (Loan No. 011-MG), the Second Village Livestock and Rural Development Project (Loan No. 091-MG), two successive projects in the Highlands (Loans No. 119-MG and No. 231-MG), the Midwest Development Support Project, (Loan No. 286-MG) and the Upper Mandrare Basin Development Project (Loans No. 376-MG and SRS-045-MG). The first three loans are closed and the other three scheduled to close in 1996, 1999 and 2001 respectively. The experience acquired shows the significant capacity that can be generated by actively involving beneficiaries and their organizations in a contractual relationship with a project. Experience also highlights the weakness of the institutions involved and the chronic lack of counterpart funds. The design of the proposed program takes these lessons into account.

III. THE FIRST ENVIRONMENT PROGRAM

A. Objectives

3.1. EPI had two main objectives: (i) to establish the foundations for environmental management through institution building, studies, and human resource development; and (ii) to develop operations of an urgent nature, namely: (a) protecting the heritage of biodiversity in the parks, reserves and gazetted forests, in conjunction with the development of the surrounding communities; and (b) fighting deforestation and erosion in priority watersheds where the negative economic impact was the highest.

B. Components

3.2. EPI consists of six components, all partly funded by IDA: (i) protecting and managing biodiversity at the level of fifty Protected Areas and a number of gazetted forests; (ii) developing community-based soil conservation and watershed management mini-projects; (iii) developing land management tools through mapping and remote sensing; (iv) improving land security through cadastral operations; (v) promoting environmental sensitization, education and training, and developing environmental policies and procedures; and (vi) developing a support program including institution building, reinforcement of the environmental data base, marine and environmental research, monitoring and evaluation.

3.3. Program implementation has been to a large extent through local and international NGOs. Despite the fact that progress on many components has been slower than anticipated initially, most of the project's objectives are being met. Some 42,000 families are benefiting from over 1,100 mini-projects for soil conservation work by ANAE (Association Nationale d'Actions Environnementales); twenty one national parks and other protected areas are being established and managed to the extent that ANGAP's (Association Nationale pour la Gestion des Aires Protégées) current funding allows; with nearly 840,000 ha surveyed, land titling has

begun to have an impact in and around protected areas; FTM (National Geographic Institute) has significantly improved its mapping capacity and produced aerials photographs and other geographic instruments over 80,000 km² of protected and surrounding areas, and ONE (National Environment Office) has developed activities in promotion, video production, training, policy formulation and regulatory framework improvement. New legislation has been established allowing the creation of Foundations and Trust Funds, and a National Environment Foundation (Tany Meva) has been established. A new forest policy has been formulated and is being translated into new legislation, providing for decentralization of forest management and rationalization of management plans and logging permits, and the reactivation of the existing National Forestry Fund. New legislation is also providing for the possibility of giving responsibility for natural resource management to local communities, under a negotiated contractual arrangements that will spell out the management system and the distribution of revenues.

3.4. A Forests Management and Protection Project (Credit 1878-MAG) was also implemented to: (i) help the FANALAMANGA parastatal develop the Mangoro industrial plantation to a production level which would allow profitable exploitation. This component represented the third phase of the Bank's involvement in the forestry sector in Madagascar; and (ii) assist DEF (the Waters and Forests Directorate) in programming, forest exploitation control, assistance to villagers for reforestation, and expansion and protection of natural reserves. The implementation of the FANALAMANGA component was satisfactory during the Project but the timber sales levels were insufficient to compensate for the poor results recorded during the first two phases and the ERR calculated was close to zero. DEF, for its part, experienced great difficulty in implementing the project, because of both management and technical deficiencies, and lack of a sector strategy. The situation improved significantly since the Project's mid-term review in 1992 with the reformulation of the Project focusing on forest inventory, the formulation of a new human resource policy and a new forestry policy. All activities initiated by the mid-term review and some new ones (the creation of new protected areas and the management of natural gazetted forests) were transferred in 1994 to the umbrella of the Environment Project, and are currently proceeding satisfactorily. The support to FANALAMANGA was terminated with the end of Credit 1878-MAG. Because of the time it took to carry out the consultation process to produce new forestry policies, forest management activities have been limited to a pilot scale, and thus had a limited impact in changing farmers' practices.

C. Lessons

3.5. Fulfillment of the program's objectives is generally satisfactory, although it varies from one component to another. After four years, the first phase of the Environment Program (EP1), can be evaluated according to the criteria presented in Box 1. A detailed discussion of how the EP1 has fared on each of these criteria is presented in Annex 1

Box 1 — Lessons of EP1 at a Glance

Criteria	Strengths	Weaknesses
Capacity Building and Policy Framework	<ul style="list-style-type: none"> ◆ Groundwork for program approach ◆ Spatial and regional approach adopted ◆ 3 institutions created ◆ 3 institutions reinforced ◆ Creation of environmental units in sectoral Ministries ◆ Environmentally sustainable sectoral policies ◆ New forestry policy, Forest Code bill ◆ Local management of renewable natural resources Law bill ◆ MECIE Decree ◆ Evaluation of the land tenure policy and cadastral system forthcoming 	<ul style="list-style-type: none"> ◆ Policies formulated without enough capacity to implement ◆ EP1 slow to reach cruising speed ◆ Institutional feud ◆ Overlapping responsibilities ◆ No arbitration mechanisms
Link between Conservation and Development	<ul style="list-style-type: none"> ◆ 1,000 demand-driven miniprojects ◆ Management in 21 protected areas ◆ Creation of 5 new protected areas underway ◆ Land titling pilot operations around 4 protected areas ◆ Natural forest management in 4 forests 	<ul style="list-style-type: none"> ◆ Limited scope and resources of miniprojects ◆ Too little done in too many areas ◆ Inadequate synergy with other development operations (reforms in tourism, agriculture, industry) ◆ Sensitization slow and underfunded ◆ Belated evaluation of cadastral work
Sustainability	<ul style="list-style-type: none"> ◆ Evidence of significant field impact for ANAE and ANGAP (monetary benefits and adoption rates) ◆ Increased public awareness ◆ Community-based movements ◆ GEF mobilized for biodiversity ◆ Tany Meva Foundation established ◆ Ownership in EP2 design 	<ul style="list-style-type: none"> ◆ Costly ICDPs ◆ Economic analysis only nascent ◆ Education, sensitization, training underfunded
Participation and Decentralization	<ul style="list-style-type: none"> ◆ Beneficiary assessment ◆ Participative forest policy formulation ◆ Workshop on Participation in ICDPs ◆ Symposium on Human Occupation in Protected Areas, Mahajanga Declaration ◆ Antsirabe Symposium on local management of resources ◆ 3 regional priority-setting workshops 	<ul style="list-style-type: none"> ◆ Most participative ICDPs also slower to produce hard data, donors' impatience
Implementation	<ul style="list-style-type: none"> ◆ Computerized financial management operational ◆ Computerized project management introduced 	<ul style="list-style-type: none"> ◆ Monitoring and evaluation system ineffective ◆ Cumbersome procurement and administration

3.6. Main strengths include the effective development of institutions and partnerships, high visibility and a substantial demonstration effect, both domestically and internationally, and effective field results (see above). Weaknesses were a slow and uneven take-off, insufficient program integration, consolidated monitoring not yet operational, and an as yet insufficient role given to environmental concerns when formulating policies that require hard choices, whether at the national or local level. The most important lessons which can be drawn from the first phase of the Environment Program, including the results of beneficiary assessment and other participatory processes that were carried out as part of EP2 formulation, concern the importance of impact evaluation, the overall environmental strategy, institutions, program scope and sustainability, and the importance of community involvement:

3.7. **Impact evaluation.** There has been no effort thus far at evaluating the impact of the policy framework on the environment—such as taxation of agricultural exports, the composition of public spending, or the investment regime. At the level of the operations, inadequate attention has been given to evaluating costs and benefits associated with environmental protection activities. For example, it is only very recently that ANAE started collecting the biophysical data necessary for evaluating on-site benefits associated with the introduction of more environment-friendly agricultural practices. However, systems to collect and evaluate data for estimating off-site benefits are yet to be developed. Similarly, not enough analysis has been carried out to evaluate benefits from proper exploitation of non-timber forestry products (e.g. medicinal plants, screening of plants for genetic engineering purpose), as well as the potential impact of ecotourism development. Developing this knowledge is critical not only to orient and prioritize environmental initiatives, but also to help formulate policies and examine the extent to which farmers should be subsidized to shift towards more environment-friendly agricultural practices.

(1) Environmental management strategy

3.8. Depletion of Madagascar's natural resource base can be reduced by changing the enabling policies, institutions, incentives, and other conditions so that resource users have the authority to manage their own resources, and the responsibility and incentives to do so in a sustainable manner. Environmental outcomes are the by-product of land use management and production decisions. In the absence of a land management and agricultural production policy, there is no viable resource conservation policy, because the method by which people manage land and production options determines their use of the forest. In particular, the realization that biodiversity cannot be isolated from other environmental concerns has led to the development of a regional/local approach to biodiversity conservation under EP2 that would be complemented by agricultural and other income generating activities that also aim at improving the management of natural resources at the local level. Therefore, the environmental strategy needs to increase the emphasis on rural development and smallholder land management on farmland and open access lands, especially in the areas where population pressure is the greatest, which are often far from the protected forests and parks. This approach would be implemented within a context which fosters better integration and sectoral links with the ongoing decentralization process, rural development efforts and regional growth pole activities with a spatial definition beyond the narrowly defined peripheral zones of the protected areas. The design of the program takes into account the outcome of all this work. The EP2 would complement the activities undertaken under several agricultural programs (extension, research, irrigation, livestock) that are also aimed at improving the management of natural resources at the farm level; more generally, it would be a key part of a global development strategy that combines macro-

economic stabilization, structural reform and the promotion of private sector investment and export-led growth.

(2) Institutions

3.9. The first phase of the environment program involved the establishment of several new institutions. Building capacity within these new institutions has taken time — even more time than initially anticipated — and has absorbed much of the efforts of this program. Although the impact of this work is difficult to measure, it is clear that key results have been achieved: ONE (National Environment Office) is well established in its role as both a coordinating and policy formulation agency; ANGAP and ANAE have developed a clear vision of their mission and their business is growing. Now that the various agencies have reached their cruising speed, clarifying their roles and mandates vis-à-vis other Central Government agencies is essential; this has been spelled out in detail in a recently produced Manual of Inter-institutional Relationships (the outline of the manual is presented in annex 4).

(3) Program scope

3.10. One central idea behind the design of the first Environment Program was to integrate all activities which support the environment into a single program — particularly those activities concerning biodiversity conservation, soil conservation and policy development. This integration helped foster priority-setting on a national scale and coordination of donor funding, as well as creating synergy between closely linked programs (e.g. improved land security as a means to improve soil, water and biodiversity conservation). However, another result of integrating all of these issues into the EP1 was the creation of an operation that was relatively complex for new institutions to manage. In the second phase, the rationale for maintaining such an integration is still the same. In addition, there are further environmental concerns which the Malagasy would like to address (e.g. improvement of marine and coastal environment, and improvement of environmental policies and standards in urban areas), as a follow-up to research and policy formulation under EP1. It will be essential to keep improving the existing management mechanisms in order to maintain the Environment Program within the limits of the Government's ability to implement it. As sectoral programs increasingly take the environment into account, another challenge will be to determine which are the environment-related activities that would be better carried out within the context of sector programs and thus be left out of the Second Phase Program (EP2).

(4) Sustainability

3.11. Inadequate attention has been paid to the financial sustainability of the country's environmental efforts. At present, about 90 percent of the costs of environmental management are financed by foreign development agencies. More specifically, the long term financial sustainability of some of the activities initiated under the EPI is not clear. This is particularly true for the Integrated Conservation and Development Projects, which have been started in some of the Protected Areas. Under its current economic situation, Madagascar cannot afford to protect its biodiversity patrimony alone. The expected global benefits lead to necessary cost-sharing with the international community, hence the opportunity to use GEF resources.

(5) Community involvement

3.12. Another very clear lesson learned in the course of the first phase, is the importance of working with the communities affected in the preparation and implementation of any activity. There has been insufficient recognition that environmental outcomes are the result of farmers' land use management and production decisions and that they hold the future of Madagascar's environment. Working with communities is the key. The ownership created when communities are involved increases the pace of implementation, the positive impact on the environment and the sustainability of this impact. This is now widely recognized in the country, and it is anticipated that all future programs will rely heavily on local participation, including beneficiary assessment.

IV. THE SECOND ENVIRONMENT PROGRAM

A. Concept, Rationale and Objectives

4.1. **The Roots of Madagascar's Environmental Problems.** At the root of Madagascar's environmental problems is the economy's failure to take off. Since Independence in 1960, misguided development policies have led per-capita GDP to decline by about half, the incidence of poverty to double, and most socio-economic indicators to decline. Madagascar is one of the few countries in the world where children will be less well educated than their parents. This situation is all the more tragic that Madagascar shares many of the characteristics of neighboring Mauritius or more distant Indonesia where effective development policies have been so successful at dramatically reducing poverty in less than a generation. Following the country's peaceful transition to a democratic regime in the early 1990s, there were great expectations that the country would adopt more growth-oriented economic policies and start reversing several decades of economic decline. This breakthrough has not yet materialized and the conditions necessary to stop poverty from spreading have yet to be established. Therefore, the vast majority (seventy-percent) of Madagascar's population (growing at over 3 percent per year) will continue to depend for its livelihood on low-productivity extensive subsistence agriculture—the main and most severe source of environmental degradation.

4.2. **Root Causes of Biodiversity Loss.** The GEF PRIF process clarified both the immediate and the root causes of terrestrial biodiversity loss in Madagascar which are essentially the same as those driving the overall spiral of environmental degradation. Expanding human populations using inappropriate agricultural technologies, including slash and burn, with little security of land tenure and few opportunities besides subsistence agriculture, are overexploiting existing agricultural and marginal lands and directly encroaching on forest areas in search of new land. Contributing to this is a breakdown in traditional regulatory mechanisms caused by increasing human migration within the country. These effects are further compounded by poorly regulated commercial exploitation of forests for timber due to weaknesses in central policies and institutions, and a failure to invoke the cooperation of all stakeholders, particularly those at local and regional levels. While existing protected areas are continually threatened by inadequate management, the major part of the country's biodiversity still lies outside statutory protected areas. Hence biodiversity loss is a direct consequence of forest loss. While coastal and marine sedimentation resulting from soil erosion is widespread, the impact of this on marine biodiversity is unknown. Currently the distribution, importance, status and threats to marine biodiversity as a whole are little known and understood.

4.3. **The objectives of the program** are to reverse current environmental degradation trends and to promote sustainable use of natural resources, including soil, water, forest cover and biodiversity. Another key objective is to create the conditions for environmental considerations to become an integral part of macroeconomic and sectoral management of the country. The program would be the second phase of implementation of the NEAP. It would continue and strengthen activities already launched under the first phase and initiate work in new areas where environment problems are important, as described below. The global environment objective of the GEF support to the Program is to curb the loss of globally significant biodiversity by slowing current environmental degradation trends, promoting the sustainable use of natural resources, and creating the conditions for environmental considerations to become an integral part of macroeconomic and sectoral management of the country.

4.4. The environmental program proposed in this document has to be understood as one that will endow the country with the capacity to manage its environmental resources more effectively and reduce the rate at which its natural resources are being depleted. It will not be able to stop environmental degradation altogether or to reverse it. This can only be achieved through an improvement in Madagascar's development performance. As in many other developing countries, the ultimate battle for Madagascar's environment will depend upon the economy's ability to intensify the use of land and develop non-agricultural sources of incomes.

4.5. **The overall development hypothesis** of the program is that depletion of Madagascar's natural resource base can be reduced by changing the enabling policies, institutions, incentives, and other conditions so that resource users have the authority to manage their own resources, and the responsibility and incentives to do so in a sustainable manner. The parallel hypothesis is that only through such an approach can the country's biodiversity and other natural resources be protected, in the context of rural poverty, political volatility and uncertain economic growth.

4.6. Resource sustainability requires changing behavior on the part of millions of Malagasy, including the way people perceive and manage resources - incorporating long term objectives into the short term calculus of resource users. It has been shown both here and elsewhere in Africa that this is possible to do, but it requires focusing on those enabling conditions that affect user behavior, and requires the flexibility to address the differences faced over the diversity of economic practices and ecosystems found in Madagascar. The battle to protect Madagascar's biodiversity will be won or lost on agricultural land away from the forest, because the battle in which rural populations are engaged is about production and land use, not about the environment.

4.7. In this battle, environmental outcomes are the by-product of land use management and production decisions. In the absence of a land management and agricultural production policy, there is no viable resource conservation policy, because how people manage land and production options determines what they do with the forest. Therefore, increased emphasis on rural development is required. This also requires patience, coordination among partners and a willingness to change as evolving circumstances merit. For that reason, the manner in which the environment program is planned and implemented - which emphasizes the building of sustainable institutional capacity among small businesses, local associations/NGOs and local officials through partnership programs - is a key element of the overall hypothesis. The EAP process itself becomes a key element of the success of the program.

Some assumptions related to the development hypothesis include:

- ⇒ There is a strong link between choices on natural resources use, and between different stakeholders.
- ⇒ Getting enabling conditions in place will lead to improved natural resources management (NRM) use, and reduced depletion of NR.
- ⇒ A key risk is whether that will in fact protect endemic species sufficiently, given variables beyond the control of the efforts of donors and their partners, including the threat of unintended internal migration?
- ⇒ Two parallel tracks are evident:
 - Putting in place national-level enabling conditions, with emphasis on policies, analytic capability, financial sustainability, and economic growth incentives.
 - Testing local/regional multi-resource partnership strategy with emphasis on growth poles in target regions which is aimed at reducing pressure on regional protected and environmental sensitive areas.

4.8. Biodiversity Areas and Conservation Priorities. Madagascar possesses a network of 39 protected areas, with 5 more in the process of classification. These 44 protected areas, covering a total area of around 1.4 million ha or 2.3% of the total land area, are divided into 9 national parks (5 existing ones and 4 under creation), 11 integral natural reserves and 23 special reserves (some protected areas are made of two parts with different status), all of them terrestrial (see Annex A and Map). The Government also intends to classify a small number of marine areas into national parks. In addition, around 15% of the territory is still covered by biodiversity-rich natural forests. To fully elaborate the conservation lessons learned in EP1, a GEF PRIF financed a participatory process for the design of the biodiversity elements of the Second Environment Program Support Project (EP2). The GEF preparatory activity involved two stages. The first stage was a scientific priority-setting workshop followed by the second stage, a participatory priority-setting process which integrated both scientific findings and local stakeholder priorities. The scientific workshop followed a methodology established for the Amazon and other key biodiversity areas. It assembled over one hundred of the foremost authorities on the biodiversity of Madagascar. These specialists defined priority areas for eight species groups and identified historical patterns of habitat loss and current human pressures. Through a participatory process, the workshop elaborated an integrated set of geographic priorities for biodiversity conservation and research. Through a so-called Participatory Process to Define Options and Priorities (PPDOP) in natural resource conservation, this scientific output was then taken to the stakeholder level to evaluate possible solutions, institutional needs, and conservation approaches. The scientific priority-setting process found that over half of the highest priority research and conservation areas lay outside of parks and reserves (see Annex B on gazetted forests). The stakeholder consultations revealed the need to work with communities to manage forests and to develop a more decentralized approach to solving environmental problems.

4.9. Anticipated Global Environmental Benefits. EP2, and particularly the GEF supported components, will help conserve Madagascar's unique biological diversity. Madagascar has higher numbers of endemic species, more higher-order endemism and more genetic information per unit area than perhaps anywhere on earth. This fact more than any other pushes Madagascar to the top of the global conservation priority list. A hectare of forest lost in Madagascar has a greater negative impact on global biodiversity than a hectare of forest lost virtually anywhere else on the planet.

4.10. GEF Operational Programs. Given the national scope of the EP2 and the range of ecological conditions in the country, the GEF project covers all four groups of focal ecosystems identified in the GEF Operational Strategy for Biodiversity. Due to the global biodiversity importance and extent of forest ecosystems in Madagascar the GEF project has a particular emphasis on these. Its second emphasis is on the relatively little known biodiversity of the coastal and marine systems. The GEF project will also address the unique semi-arid ecosystems of south-west Madagascar and, in that Madagascar's mountains are forest covered, Madagascar's mountain ecosystems. The activities to be carried out under the GEF project cover the full range of activities for both in-situ conservation and sustainable use that are suggested in the GEF Operational Strategy including protected areas, land use and resource management regimes, policy and institutional strengthening, stakeholder involvement, and inventory where the nature of biodiversity is currently unknown.

4.11. Specific GEF Project Objectives. The GEF funding will support a well-defined subset of activities within the overall EP2. Specifically the GEF objective is to extend the EP2 program to ensure that the root causes of the loss of globally important biodiversity are fully addressed. To meet this objective, GEF will support activities which contribute clearly to reducing the loss, and improving the sustainable use, of globally significant biodiversity, and which are beyond the resources of Government and other donors. These will fall under the following categories: (i) management of multiple-use forest ecosystems; (ii) management of protected areas including ecotourism; (iii) management of the coastal and marine environment; (iv) regional programming and local resource management; (v) formulation and communication of environmental policies, strategies and instruments; and (vi) biodiversity inventory and training in biodiversity management.

4.12. Environmental management strategy. Depletion of Madagascar's natural resource are the by-product of land use management and production decisions. In particular, the realization that biodiversity cannot be isolated from other environmental concerns has led to the development of a regional/local approach to biodiversity and other natural resources conservation under EP2 that would be complemented by agricultural and other income generating activities that also aim at improving the management of natural resources at the local level. Therefore, the environmental strategy needs to increase the emphasis on rural development and smallholder land management on farmland and open access lands, especially in the areas where population pressure is the greatest, which are often far from the protected forests and parks, requiring strong sectoral links from the protected areas to the regional growth poles. This approach would be implemented within a context which fosters better integration with the ongoing decentralization process, rural development efforts and regional growth pole activities with a spatial definition beyond the narrowly defined peripheral zones of the protected areas. The design of the program takes into account the outcome of all this work. The EP2 would complement the activities undertaken under several agricultural programs (extension, research, irrigation, livestock) that also aim at improving the management of natural resources at farm level; more generally, it would be a key part of a global development strategy that combines macro-economic stabilization, structural reform and the promotion of private sector investment and export-led growth.

4.13. Beneficiaries and target group. The main beneficiaries of the programme would be mostly households chronically food insecure, landless households, and stock-less households. Particular attention would be paid to farm and non-farm households generating their livelihood from local resources, which socio-economic studies have indicated are a rising percentage of the local population (including landless households exploiting local labour markets and production

opportunities in non-agricultural activities -- including processing and trading). This particular segment of the population has been fully identified and quantified under existing and ongoing IFAD projects. It is understood, therefore, that the current project which does not lend itself to traditional IFAD targeting would rely mostly on existing IFAD activities. These existing projects would be mainstreamed into EP2 which has a national coverage and therefore aim at the same population.

4.14. **Program design.** The program was initially focused on sub-sector objectives, resulting in a set of sixteen relatively independent "vertical" components. In parallel, a process of problem analysis with a regional and local perspective was developed (PPDOP - see above), together with work on the formulation of a number of key policies, namely decentralization and local management of natural resources, as well as on the need for mechanisms to promote synergy - both between EP2 activities and more generally with other development programs. The synthesis of all these elements led to some restructuring of the initial proposals and to the introduction of some new components at regional level, as well as to the formulation of detailed proposals for the annual programming process. Significant adjustments to the scope of the program and to the size of some components were introduced as a result: the scale of the watershed management and of the forest management components was significantly reduced on the basis of less ambitious targets; the scope and cost of the urban component and of the proposal on prevention of natural catastrophes were cut down; most support activities were also scaled down; the marine component was broadened up, and a Regional Fund was introduced. A key conclusion is that biodiversity conservation is not a component, but cuts across all activities. Proposals for Bank and GEF participation to the Program were defined during the process.

4.15. **Gender issues.** Men and women play a different role in the way people manage their natural resource base. Although all the components of the EPI include activities that are specifically benefiting women, the analysis carried out as part of appraisal indicates that a more pro-active approach was warranted. A working group has been set up, that has identified four areas of focus, and corresponding objectives and monitoring indicators are under development. They are: (i) the importance of women in the staff of the various implementing agencies; (ii) the need to carry out a specific analysis of the role of women when formulating many of the activities of the Program (e.g. ANAE's mini-projects, forest management plans); (iii) the need to promote active female participation to the formulation of all program activities and to improve their access to education opportunities; and (iv) the need to actively promote the development of women's organizations, both in rural and urban areas.

4.16. **The IDA's Country Assistance Strategy for Madagascar** was discussed by the Executive Directors on July 12, 1994. The Bank Group's overarching objectives in Madagascar are to help the government promote private sector-export-led growth, attack poverty, improve natural resource management, build local capacity and improve project implementation. The proposed project is consistent with the country strategy and contributes to meeting most of the foregoing objectives. The Bank has played a leading role since 1987 in the formulation and implementation of the NEAP. Continued involvement is essential to sustain the Government's commitment to difficult and critical changes in its public investment program, including by promoting the transition from projects to programs, and to mobilize the support of other donors. The Bank has also a key role to play in helping the country to mobilize GEF financing in relation with the global nature of the benefits that are expected from improved biodiversity protection.

4.17. **The involvement of IFAD** would help the program to capitalize upon experience gained under IFAD-funded agricultural development projects, and contribute to strengthen a poverty-

focused, client-led approach to conservation into both the national policy and institutional framework. Hence, IFAD participation comes as a suitable instrument for poverty alleviation and improvement of the welfare of the rural poor. Finally, the programme's strong emphasis on beneficiary participation in design as well as implementation is well in line with the Fund's basic strategic approach in Madagascar. Poverty alleviation would be more effective if approached within the broader context of a national integrated programme aiming at long-term sustainable growth through proper and effective management of natural resources, and the present program constitutes an appropriate entry point for IFAD to move gradually away from area based projects towards national programmes, in coordination with other donors mainly the World Bank.

4.18. Rationale For GEF Financing. Madagascar is without doubt one of the world's most important biodiversity countries. Although not as species-rich as some other countries in the Afro-tropical Realm, its exceptional levels of plant and animal endemism make Madagascar the country with sole responsibility for safeguarding some of the world's most interesting biodiversity. The discrepancy in Madagascar between threats to globally-significant biodiversity and government capacity to address them is unparalleled. Six years of concerted government and donor effort has made significant progress, but major support is still needed. Full implementation of these initiatives will only be possible with GEF funding.

4.19. The GEF contribution to EP2 is eligible for GEF funding in line with all four operational programs under the Operational Strategy for Biodiversity. In accordance with article 8 of the Convention on Biological Diversity the GEF project will address in situ conservation through support to protected areas and sustainable use across four major ecosystems: coastal, marine and wetlands; forests; mountains; and arid and semi-arid lands. The GEF project is a national priority as identified in the NEAP and conforms with COP guidance to support conservation and sustainable use of ecosystems and habitats and endemic species. It will promote sustainability through demonstration projects and innovative measures to strengthen local community involvement and integrate conservation and sustainable use with regional development programs. GEF funding is incremental and requested for only a small part of a holistic national plan that will address a comprehensive Madagascar-wide program, supported by all major donors, to protect the environment and promote sustainable development

4.20. The GEF contribution to EP2 will lay the groundwork for new approaches addressing root causes of biodiversity loss in the country. It will build integral components of biodiversity conservation into revitalized forestry institutions and strengthen the administration of protected areas. Finally and most importantly, it will build consideration of biodiversity into on-going national programs aimed at decentralizing the management of natural resources. GEF inputs are essential in overcoming the transaction costs of putting these new systems in place while maintaining ongoing conservation efforts.

B. Status of Program preparation

4.21. **Participatory approach to Project Processing.** The process of formulating the second phase program is being carried out entirely by Malagasy agencies. The initial participatory process, during the period June-December 1994, resulted in the preparation of an identification report that was discussed at the December 94 meeting of the program's Steering Committee (COS: Comité d'Orientation et de Suivi). Detailed preparation work was completed in November 1995, resulting in a report for each of the proposed sixteen components, plus a two volume

synthesis. In addition, four other groups of reports were made available to the multi-donor appraisal team, covering: (i) the outcome of the recently carried out Beneficiary Assessment of all EP1 activities; (ii) the results of the international scientific workshop on biodiversity; (iii) the results of the Participatory Process (PPDOP); and (iv) the outcome of three regional priority setting workshops carried out in November 95 in Toamasina, Antsiranana and Toliara. Finally, a formalized institutional capacity analysis of ONE was carried out in March-April 1996, and similar ones for ANGAP, ANAE and DEF are scheduled to take place before end-1996.

4.22. **The appraisal process.** A multi-donor pre-appraisal mission took place in June-July 1995, and full program appraisal took place end-November 1995, involving ten donors, four international NGOs and all Malagasy agencies (mission composition is given in annex 2. The team was structured in four groups, each one led by a different donor and two national counterparts. The work was structured into thirty two tasks (components or specific themes), and for each one a group of national and external experts has been assembled. Overall, some highly motivated 150 people have been working full time for three weeks. Everybody acknowledged that an exceptionally good team spirit developed during the process, which has allowed to reach a consensus on the priorities, strategies, scope and content of the EP2. Two follow-up multi-donor missions took place in March-April and June-July 1996, formal IDA appraisal being carried out as part of the latter. Strong emphasis is being put on participatory preparation and appraisal, integration of activities into one single program to ensure proper balance between components, and compatibility with the country's overall PIP.

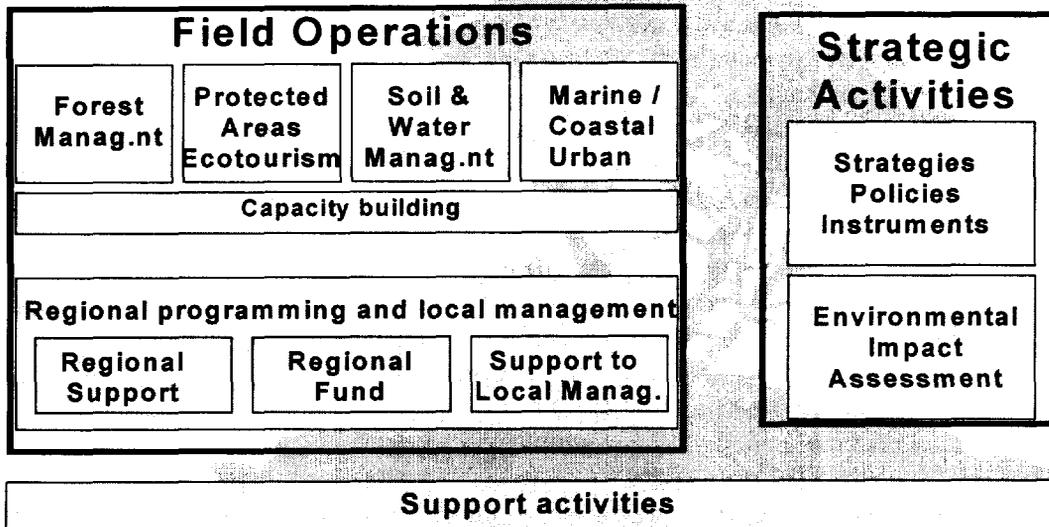
C. Summary description

4.23. The program will essentially pursue, improve and expand the priority activities that were initiated under EP1 by incorporating the lessons learned and adding selected new components. As stated in the **Government Policy Statement** presented in annex 11, the program emphasizes decentralization and local management of natural resources, particularly forests, as well as mechanisms to promote synergy - both between EP2 activities and more generally with other development programs. The program has three sets of components: field operations; strategic activities; and support activities, as described in the diagram below.

4.24. Implementation will be carried out by the various line agencies that were set-up during the first phase. High level policy guidance will be entrusted to a National Environment Council, under the Presidency of the Republic. Policy level coordination will be the responsibility of an Interministerial Environment Committee. Operational level coordination will be carried out by ONE. At field level, all activities would be managed with strong local participation.

4.25. Total program cost is currently estimated at US\$ 155 million (including taxes and contingencies). Such a cost is comparable to the cost of EP1 (US\$ 150 million, most of it net of taxes). The level of pledges made by the different donors is US\$ 108.5 million, in addition to US\$ 15.5 already financed. Assuming that Government would finance about US\$ 31 million (4 million taxes, 8 million net-of-tax financing, and 19 million through tax exemption against external grants), the financing gap stands at US\$ 5 million. It would be covered either by additional financing expected from some donors (e.g. Japan, Norway) or by scaling down the program. The country's commitment to such a large program would need formal confirmation, in the form of a "program-law". The law would be presented to the Parliament during its Autumn 96 session.

EP2: Program structure



EP2 Multi-donor Appraisal Team

1/10/96

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D. Detailed description

4.26. The program is defined as three sets of components, corresponding respectively to field operations, strategic activities and support activities, as follows:

I. Field Operations would fall under two categories:

1. Specialized Sub-sector Activities:

4.27. Corresponding to about eighty per cent of program cost, these activities would be geared towards improved management of natural resources, including soil, water, forest and biodiversity, and would include:

- **Sustainable Soil and Water Management;** US\$ 43.5 million (ANAE: 30.5; Ankarafantsika: 7.3, already financed; other watersheds: 5.7): Following the model developed under the EP1, ANAE would continue its decentralization process, expand its regional coverage and implement about 4,000 mini-projects under EP2. ANAE would keep expanding its current role, acting both as a funding and contracting channel responding to locally felt needs in matters of soil conservation and erosion control and as a soil conservation and rural development diagnostician. In addition to direct interventions based on the current demand-driven approach, ANAE would also design and develop the coordination linkages between the many villages concerned so as to resolve watershed-wide issues. The focus would be on demand-driven,

low-cost and locally adapted intervention that can contribute to spontaneous adoption of improved practices by other farmers (multiplier effect).

In addition, specific watershed management operations would be developed, either in cases where major investments need to be protected (Ankarafantsika and the Marovoay Plain; Mantasoa and Tsiacompaniry and the Antananarivo Plain; Taheza and the Ambahinakoho dam; Lokoho and the Andapa Plain) or on a small scale pilot basis (continuation of the work undertaken with FAO support on four watersheds in the Antananarivo Region).

No GEF funds will be allocated to this component. IFAD will contribute US\$7.1 million to the financing of ANAE's mini-projects.

- **Multiple-use Forest Ecosystem Management**; US\$ 29.9 million: New forestry policies have been formulated under the EP1, through a decentralized and highly participatory consultation process. The resulting strategy is to give back responsibility to local communities for the management of natural resources. Under EP2, a number of gazetted forests and community forests would be put under sustainable management. The process would include the following steps: (i) completion of the national ecological forestry inventory, and reconnaissance survey in the various regions in order to firm up the original list of forest blocks, as well as to identify new protected areas (300,000 ha); (ii) completion of on-going pilot forest management schemes (180,000 ha); (iii) participatory formulation of management plans, involving neighboring communities and the Forest Service (400,000 ha); and (iv) implementation phase, i.e. management of the forest for multiple use, in accordance with the management plan (150,000 ha under EP2, continuation under EP3). The total of 580,000 ha would correspond to about 8% of the forest cover of the country of about 8 million hectares, of which about four million hectares of gazetted forests. In order to ease pressure on the natural forest, the program would also encourage farmers and private enterprises to plant more trees, through land use planning and technical advice. Implementing such a program would also require reorganization as well as significant capacity building of the Forestry Service.

In this framework, GEF funding of US\$ 5 million will support the expansion of current government programs to empower sustainable community management of biodiversity rich forests outside the existing park and reserve system. Specifically, GEF will contribute to: (i) *System wide planning and the identification and zoning of new protected areas*, on the basis of the results of on-going inventory work; this will help ensure the appropriate definition of forest functions as either primarily production, watershed protection, or biodiversity protection. This will be achieved through long-term technical assistance in biology and land use planning and short-term technical assistance in the identification of new protected areas. (ii) *Planning and implementation* of sustainable community-based forestry management schemes in regions of key biodiversity importance (Annex B). (iii) *Training of forest service staff and other human resources development*,

to meet the challenge of incorporating biodiversity concerns into community forest management. Government human resources to work with communities will be strengthened, based on a review of human resources needs. And (iv) *Development of sustainable use and harvesting regimes for non timber forestry products*, including ecotourism and marketing of NTFPs, to give communities greater incentives to conserve standing forest.

- **National Parks and Ecotourism (CAPE)**; US\$ 43.1 million (including the continuation of several ICDPs - Integrated Conservation and Development Projects - already under implementation): In continuation of the work already developed under EP1, the objectives during the EP2 would be to: (i) complete the establishment of the network of protected areas (39 areas, 21 of which are already well advanced under EP1), through survey work, proper delimitation and legal action; (ii) provide infrastructure, equipment and staff to ensure effective conservation; (iii) promote ecotourism development; (iv) carry out applied conservation research programs in order to establish and monitor proper ecological indicators; (v) promote environmental awareness and strengthen environmental education. The network would be made of eleven National Parks or Integral National Reserves, and twenty eight other protected areas, for a total of 1.4 million hectares. The ICDP approach would be progressively replaced by the generic regional support mechanisms presented below. ANGAP would progressively take over direct management of the network from ICDPs operators. This would require a change in the formal mandate of ANGAP.

Under CAPE, GEF funding of US\$ 7.8 million will support management planning, equipment and operations at a number of parks and reserves which harbor globally significant biodiversity and which would otherwise receive no management because of resource scarcity and low ecotourism potential. Other donors will support transfer of field management to ANGAP for all 11 level-A areas¹ and the establishment of management at 4 of the 19 level-B and 5 of the 8 level-C reserves. GEF will support management plans for the remaining 15 level-B areas and 3 of the 8 level-C areas (See Annex A), through: (i) *Management plans* for 8 currently unmanaged or partially managed protected areas. Model management plans will be prepared, based on a review of existing management plans for areas under similar pressure; (ii) *Management Assistance*. Equipment, infrastructure, human resources development and technical support will be supplied for the implementation of management plans in 19 protected areas; (iii) *Operating and Administrative Costs*. (iv) *Analytical work to support policy reform on tourism taxation*: the government currently has no policy on tourism concessions that would allow concession revenues from tourism services near protected areas to return for protected area operating costs (it has been proposed that tourism services within a certain distance radius of a protected

¹ Level-A areas have been selected because of their high ecotourism potential; level-B areas face high pressures but have little ecotourism potential; level-C areas face lower short-term pressures and have little ecotourism potential, but are of equally high biodiversity significance.

area would be subject to concession fees which would return to the protected area to help defray management costs).

- **Marine and Coastal Environment;** US\$ 6.6 million: work would proceed in parallel at two levels: (i) national level: formulation of coastal zone management policies, legal framework and master plan; and (ii) design and implementation of management plans at local level, initially in the Nosy Be and Toliara areas, and formulation of recommendations for a new generation of marine parks in Madagascar. Defining long term institutional arrangements would be one of the outcomes of this component. In the mean time, the activities would be coordinated by a steering committee (ECOMAR) and managed by a small unit within ONE.

GEF funding of US\$ 2 million will support a field inventory of coral reef ecosystems, concentrating on the rich reefs of the western and southern coasts, the identification of critical sites, the establishment of local level management at additional sites (the most threatened, highest diversity ones), and the formulation of recommendations for a new generation of marine parks in Madagascar.

- **Urban Environment;** (cost included in other components - no GEF funding required): the urban environment activities included in the program are presented here for clarity, but are actually included under other components described below. The activities would include: (i) the integration of environmental concerns into urban development policies, including the updating of the Urban Code; this activity would be carried out as part of the Strategic Activities component (Policies-Strategies-Instruments); (ii) support to urban management activities by communities and local Governments, included as part of the AGIR component. A Steering Committee would be established to pilot urban-related activities; its secretariat would be within ONE.

2. Regional Programming and Local Management (AGIR).

4.28. Generic mechanisms at regional and local level would support regionalization of programming and local management of natural resources, through the following three components:

- **Support to Local Natural Resource Management and Land Tenure Security:** US\$ 6.9 million from non-GEF sources: the two objectives are (i) to enable transfer of management rights on public land, on a voluntary basis, from the state to village communities and to clarify the various land tenure rights in these villages; and (ii) redefine land management policies for the longer term. The first objective would be met by: (i) setting-up the appropriate legal and regulatory framework; (ii) creating a body of environmental mediators to facilitate the dialogue between state representatives and villages; (iii) training environmental mediators; (iv) building the capacity of the land-tenure administration (Direction des Domaines); and (v) implementing the scheme at the level of 150-200 villages, by mobilizing operational teams which include a mediator,

technical specialists and surveyors. During the initial phase (two or three years), ONE will directly manage the entire process. Beyond this initial phase, the operational teams will be contracted directly by sub-sector components in answer to villages request. To meet the second objective, the country would carry out a comprehensive participatory process (at national and decentralized levels) aiming at reassessing land use right policies and developing consensus on the necessary evolution of public land management (particularly in relation with decentralization). The expected outcome of this last process would be a revised Land Law (Code foncier).

- **Support to Regional Programming and Spatial Analysis;** US\$ 4.3 million, of which US\$ 3.0 million would be provided by GEF: six small regional technical units would be established to provide support to EP2 Regional Programming Committees (RPCs), in the form of visiting experts and full-time secretariat, for program management, for technical analytical work (e.g. watershed management, ecological corridors, urban environment problems) and for the formulation of local environmental strategies and sub-projects for financing by the Regional Fund presented below. AGIR essentially establishes a new mode of addressing the root causes of biodiversity loss and other natural resources degradation in Madagascar, which grew out of the participatory design of the program.
- **Regional Fund for Environmental Management (FORAGE);** US\$ 3.3 million, with no GEF funding: such a fund would offer a mechanism to finance environment management activities on a demand-driven basis; sub-projects sponsored by local governments or private organizations would have to fall within the priorities of the RPCs, and to match pre-defined eligibility criteria. Some of the activities that were initially proposed as sub-sector components (i.e. watershed management, urban environment) would fall under the generic mechanism of the Fund. Given the novel nature of the proposal, only limited financing has been allocated, further allocation would be contingent on the outcome of the mid-term review of the program (i.e. year 5 is not covered, although sub-projects prepared during year 3 could still be funded in year 4).

II. Strategic Activities

4.29. Strategic activities would require funding of US\$ 4.2 million, of which US\$ 1 million from GEF, and would include the following:

- ⇒ **Upgrading of the Legal Framework and Formulation of Environmental Policies;** including:
 - **Upgrading the Legal and Regulatory Framework:** inventory of existing texts, harmonization and updating, drafting of an Environment Code.
 - **Formulation of environmental policies, strategies and instruments:** along with the concerned ministries and agencies seven sectoral or transversal environmental policies and strategies will have been formulated during EP1: Mining, Energy, Industry, Tourism, Roads, Fishing, and

Aquaculture. During EP2 these policies would be finalized and five more policies would be formulated: Urban, Macro-economy, Biodiversity and Bioprospecting, Agriculture (e.g. use of agro-chemical inputs), and Mitigation of Unexpected Disasters. Instruments for policy and strategy implementation would also be developed. GEF will support the review of opportunities for increasing financial returns to Madagascar through the export and sale of NTFPs.

⇒ **Assisting Sector Ministries in Implementing Policies and Making Environmental Impact Assessment (EIA) Operational:** This component will be handled by the existing PSI/MECIE division within ONE. In order to handle the urban sector environmental issues, however, a specialized unit will be set up within ONE in order to assist the concerned ministries and agencies for this sector of special importance. For the twelve policies mentioned above, this component will consist of the following activities:

- **Environment Procedures:** completion of EIA regulations (by-laws for the application of the MECIE decree); formulation of EIA norms as well as of other norms and regulations; guidelines and procedures.
- **Implementation:** setting up of environmental units within the sector ministries; inventory of enterprises requiring an environmental audit; staff training; monitoring and evaluation of implementation.

III. Support Activities

4.30. Such activities would take the form of free-standing components only to the extent that they cannot be incorporated into the main components listed above. This set would include five components:

- ⇒ **Research;** US\$ 2.5 million: a research committee including the main actors in the sector would be set up. It would be responsible for (i) coordinating the identification and priority setting of research proposals; and (ii) commissioning research activities of common interest. A small unit would be established within ONE (CAREE: Cellule d'Appui aux Recherches et aux Etudes Environnementales) and would be responsible for (i) preparing the committee meetings; (ii) ensuring operational coordination and monitoring of the various operations; and (iii) ensuring proper dissemination of research results.
- ⇒ **Education-Training;** US\$ 2.0 million: improvement of environmental content in general education (schools, universities) as well as in vocational training (pre-employment and on-the-job) through teacher training and curricula upgrading; national information campaigns. The CFSIGE (Centre de Formation aux Sciences de l'Information Géographique et de l'Environnement) would be responsible for the component. It would make sure that the various agencies already involved in training during EP1 such as WWF or ANGAP would continue to strengthen local capacity in a coordinate way in using their respective competitive advantage.

- ⇒ **Geographic Instruments**; US\$ 1.2 million: capacity building of FTM, to complement major investments that were made under the EP1; and production of key geographic information (e.g. numeric maps on land use).
- ⇒ **Environmental Information System**; US\$ 1.7 million: Monitoring systems are being put in place under EP1, including a consolidated “dashboard” that would provide key indicators on the status of environmental resources and on the impact of the program; the systems are expected to be fully operational before the beginning of the EP2. Under this component, the capacity of the participating agencies to produce and exchange information would be further strengthened, new agencies would become part of the network, more synthetic indicators would be produced, and the diffusion of this information to other potential users would be developed (see also annex 7).
- ⇒ **Communication, Monitoring, Evaluation, Program Coordination and Management**; US\$ 5.8 million. The program would finance the operation of ONE and of the various coordinating bodies described in Chapter V (National Environment Council, Interministerial Committee, Steering Committee), including limited equipment and operations costs. This includes communication campaigns, the operation of a consolidated monitoring and evaluation system, as well as systematic beneficiary assessment and mid-term review of the program.

4.31. GEF would contribute US\$2 million to the above components. GEF will support a comprehensive assessment of biodiversity outside existing protected areas to determine real biodiversity values. Results will inform the process of protected area management phasing under CAPE, zoning of classified forests under ESFUM, and prioritizing regional conservation problems under Regional Programming and Local Management. GEF will also support applied research and training activities related to biodiversity management.

E. Cost estimates

4.32. Detailed cost estimates over five years are included in each component preparation report. At US\$ 155 million (including taxes and contingencies), the cost is similar to the actual cost of the First Phase Program (about US\$ 150 million, most of it net of taxes), but it might exceed financial availability (see section on financing). In order for the final size of the program to be compatible with the country’s PIP (Public Investment Program), it will be decided by the National Assembly, in the form of a “program-law”. The law would be presented to the Parliament during its Autumn 96 session. Current estimate is as follows:

	US\$ million
Sustainable soil and water management	
ANAE:	27.2
Ankarafantsika:	7.3
Other watersheds:	5.2
Multiple-use Forest Ecosystem Management	27.1
National Parks and Ecotourism	29.5
ICDPs and post-ICDP transition	10.2
Marine and coastal environment	6.1
<i>Total sub-sector components</i>	<i>112.6</i>

Regional Programming and Local Management	
Local resource management and land tenure	6.3
Regional programming and spatial analysis	3.8
Regional Fund (FORAGE)	3.0
<i>Sub-total</i>	<i>13.1</i>
Strategic activities	
Formulation and transfer of environmental policies, strategies and instruments	2.4
Making EIA operational	1.4
<i>Sub-total</i>	<i>3.8</i>
Support activities	
Research	2.2
Education-training	1.8
Geographic instruments	1.1
Environmental Information System	1.5
Coordination and management	5.2
<i>Sub-total</i>	<i>11.8</i>
Total Base Cost	141.3
Physical contingencies	6.4
Price contingencies	7.3
Grand-total	155.0

F. Financing

4.33. A tentative financing plan has been prepared (see detailed table in annex 3); it was discussed as part of the multi-donor negotiations held in September 96. In addition to the Bank, the following donors are expected to participate to the financing of the program: IFAD, GEF, European Union, France, Germany, Holland, Japan, Norway, Switzerland, UNDP, USAID. International NGOs such as WWF, who contributed to the financing of the EPI (including through direct mobilization of funds from bilateral donors) are also expected to participate. The level of pledges made by the different donors who participated to the pre-appraisal missions - including IDA - is US\$ 103.5 million, in addition to US\$ 15.5 already financed. Assuming that Government would finance about US\$ 31.0 million (4.0 million taxes, 7.7 million net-of-tax financing, and 19.3 million through tax exemption against external grants), the financing gap stands at about US\$ 5 million. It is expected to be covered by additional financing expected from some donors (e.g. Japan, Norway).

4.34. IDA would act as the lender of last resort, with the supervision process focusing on the program as a whole and the use of IDA resources being defined through the annual programming process on the basis of the coverage and availability of other donor financing. Nevertheless, IDA funding would be initially focused on specific components. The current proposal (subject to finalization of financing plan) is to concentrate IDA funding on the following: sustainable soil and water management (ANAE US\$ 12.5 million; other watersheds: US\$ 2 million); protected areas (US\$ 5.5 million); local NR management (US\$ 3 million); Regional Fund, also managed

by ANAE (US\$ 3 million); marine/coastal environment (US\$ 1 million); and support activities (US\$ 3 million). The Bank is also to act as administrator for expected contributions from **IFAD** (US\$ 8.1 million, focused on soil and water conservation mini-projects, US\$ 7.1 million, and program coordination and management, US\$ 1 million) as well as from **GEF** (US\$ 12.8 million, focused on forest inventories and pilot management, and on selected protected areas - proposals for GEF funding would also include about US\$ 8 million administered by UNDP and focused on biological inventories, marine parks, strategic studies on trade of biodiversity products and support to regional programming and spatial analysis - incremental cost calculations for GEF funding are presented in annex C). The following list shows other donors interests for the various components:

Sustainable soil and water management:	France, Germany, Japan, Norway, Switzerland
Multiple-use Forest Ecosystem Management:	France, Germany, Switzerland, USAID, WWF
National Parks and Ecotourism	EU, France, Holland, USAID, WWF
Marine and coastal environment	UNDP, WWF
Regional and Local Management, FORAGE:	France, UNDP, USAID
Strategic activities	France, UNDP, USAID
Support activities	France, USAID, WWF

Estimated financing plan
(million of US dollars)

<u>Source of financing</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>
IDA	20.0	10.0	30.0
GEF	12.5	08.3	20.8
IFAD	3.0	5.1	8.1
Other donors	35.0	14.6	49.6
On-going donor-supported projects	3.0	12.5	15.5
Government ^{1/}	31.0	-	31.0
Total	104.5	50.5	155.0

^{1/} including US\$ 19.3 million of tax exemptions, 4.0 million of budgeted taxes and 7.7 million of net-of-tax financing

4.35. Because some of the funding is already in place, and in order to maintain maximum flexibility, it is neither necessary nor desirable to introduce cross-conditionalities on the effectiveness of the IDA financing. The effectiveness of IFAD financing would nevertheless be dependent upon the effectiveness of the IDA Credit, in line with IFAD's standard practice regarding their cooperating institutions.

G. Procurement

4.36. The provisions presented in this section will apply to all goods, works and services funded under the IDA Credit, the IFAD Loan and the part of the GEF Grant to be managed by the Bank. All goods, works and services would be procured in accordance with Bank guidelines. All ICB and consultant contracts would follow the Bank standard bidding documents or sample form of contracts. Procurement arrangements are summarized in the following table:

Procurement Arrangements ('000 US\$)	Procurement Method				
	International Competitive Bidding	National Competitive Bidding	Other	N.B.F.	Total
A. Operating Costs	-	-	24,108 (9,183) (6,487)	20,473	44,581 (9,183) (6,487)
B. Grants for Sub-Projects	-	-	25,067 (12,294) (0) (7,100)	1,945	27,013 (12,294) (0) (7,100)
C. Consultant Services, Studies, Training	-	-	12,950 (4,215) (3,202) (1,000)	22,094	35,044 (4,215) (3,202) (1,000)
D. Goods and Vehicles	2,844 (1,848) (1,060)	769 (500) (400)	615 (400) (200)	13,952	18,180 (2,748) (1,660)
E. Civil Works	-	4,689 (1,596) (1,452)	-	7,856	12,545 (1,596) (1,452)
F. Unspecified	-	-	-	17,643	17,643
Total	2,844 (1,848) (1,060)	5,458 (2,096) (1,852)	62,741 (26,093) (9,889) (8,100)	83,964 -	155,007 (30,037) (12,801) (8,100)

Note: Figures in parenthesis are the respective amounts financed by International Development Association (1st line), WB-managed GEF (2nd line), and IFAD (3rd line, where applicable)

4.37. Construction contracts mobilized by Government services would be limited to an aggregate of US\$ 12.5 million, of which the IDA Credit is expected to finance about US\$ 1.6 million and GEF about US\$ 1.5 million, and would be of limited size, not exceeding US\$ 500,000 per contract, and spread all over the country; foreign firms are not likely to bid for such contracts; they would therefore be procured using local competitive bidding (NCB). All vehicles as well as equipment and supplies contracts exceeding US\$ 100,000 would be procured through ICB and would be bulked to the extent possible. Under ICB procurement of goods, locally manufactured goods would be allowed a preference of 15 per cent or the import duty, whichever is lower. For goods contracts amounting to less than US\$ 100,000 per contract, up to an aggregate amount of US\$ 0.5 million of IDA funds and US\$ 0.4 million of GEF funds, national competitive procedures acceptable to the Bank would be used. For goods contracts amounting to less than US\$ 30,000 per contract prudent shopping (international or local - up to US\$ 0.2 million and US\$ 0.1 million each for IDA and GEF respectively) would be used. All goods purchased under "operating costs" category will follow as far as practically possible the above procurement methods. Procurement under the "Grants for Sub-Projects" category which includes small scale works, goods and services involving community participation will be carried out in accordance with the corresponding provisions of the Bank guidelines.

4.38. All technical assistance, studies and training contracts funded under the IDA Credit, the IFAD Loan and the GEF Grant would be procured in accordance with the Bank's guidelines for the

selection of consultants; technical assistance would be primarily in the form of individual short-term consultants, that could be either self-employed or supplied by a consulting firm; consulting firms would be used when a team is required (e.g. mid-term evaluation).

4.39. Requirements for Bank review of procurement operations would be as follows:

- (i.) Procurement of goods and construction contracts: proposals for advertising, draft tender documents, bid evaluation, and award proposals for all contracts for goods exceeding US\$ 100,000 and for all contracts for works exceeding US\$ 200,000 would be subject to review by the Bank prior to their execution.
- (ii.) Contracts with consulting firms and with individual consultants: prior review would be required only for contracts exceeding US\$100,000 in the case of consulting firms and US\$50,000 in the case of individual consultants, and for all sole source contracts; it would cover draft letter of invitation, including terms of reference and short list of pre-selected firms, bid evaluation and award of contracts.
- (iii.) Contracts below the prior review thresholds under (i) and (ii) would be subject to an ex-post review by the Bank on a selected basis (about one in five contracts).

H. Disbursement

4.40. The Credit Agreement for EP1 provided for 26 disbursement categories, corresponding to six different parts of the program. The Credit Agreement was used as a arbitration mechanism for budgetary allocation, and proceeds of the credit had to be reallocated several times. In the EP2, the number of categories would be minimized, ideally to the standard five categories of civil works, goods and equipment, consultants and training, operating costs, and unallocated. Additional categories were added only for activities that would not fit such breakdown (i. e. ANAE's mini-projects and FORAGE projects). The disbursement percentages have been calculated in order to exclude taxes on the whole of the program.

4.41. Financing and disbursement arrangements would be determined each year in accordance with the annual work program and funding requirements prepared by ONE and agreed on with all donors. A new special account in the name of ONE would be established to expedite disbursements of the IDA funds. The maximum deposit would be US\$ 2 million, corresponding to four months of expenditures on IDA supported components. An initial amount of US\$ 1 million would be withdrawn from the credit at the time of credit effectiveness to constitute the initial deposit. The remaining funds would be provided when ONE has established that the full amount is required. Special accounts in the name of ONE would also be opened in the same commercial bank for the IFAD Loan and the GEF Grant. The maximum deposit would be US\$ 0.6 million for the IFAD account. An initial amount of US\$ 0.3 million would be withdrawn from the IFAD Loan at the time of loan effectiveness to constitute the initial deposit. The maximum deposit would be US\$ 0.4 million for the GEF account. An initial amount of US\$ 0.3 million would be withdrawn from the grant at the time of grant effectiveness to constitute the initial deposit. The special accounts would be replenished on a monthly basis, or sooner, as needed. Disbursements requests by participating implementing agencies would be handled as under the EP1. Replenishment requests would be fully documented except for contracts of less than (i) \$ 200,000 for works; (ii) \$100,000 for goods and consultant services (firms); (iii) \$50,000 for consultant services (individuals); (iv) all operating costs and training costs which

may be claimed on the basis of Statement of Expenditures (SOEs). Documentation of SOEs would be made available for review by Bank supervision missions. Special accounts will be “decentralized” through advance of funds (in local currency) for periods up to 90 days to field offices; the system will be monitored by supervision staff and subjected to audit. The account in local currency already open under EP1, operated by ONE, would continue to be used to disburse Government’s contribution to program’s expenditures. It would receive an initial deposit of US\$ 200,000 equivalent. It would be replenished on a monthly basis, or when reduced to one third of the original amount, whichever comes first. Evidence of the initial deposit would be a **condition of credit effectiveness**.

Disbursement of IDA, GEF and IFAD funds, by categories

Category	Amount (US\$ million)			Share of financing
	IDA	GEF	IFAD	
Civil works	1.4	1.3		85%
Goods	2.4	1.5		100% of foreign expenditure 85% of local expenditure
Consultant services, training and audits	4.5	3.0	0.9	100%
ANAE’s Mini-projects	9.0		6.4	100%
FORAGE’s projects	2.0			100%
Operating costs	6.7	5.6		90% in year 1 and 2 and 70% thereafter
Unallocated	4.0	1.4	0.8	

Estimated IDA, GEF and IFAD disbursement is based on detailed COSTAB tables and would be as follows:

Estimated IDA, IFAD and GEF disbursement (US\$ million)						
	1997	1998	1999	2000	2001	2002
IDA						
Annual	3.3	6.2	6.0	6.3	5.7	2.5
Cumulative	3.3	9.5	15.5	21.8	27.5	30.0
IFAD						
Annual	0.8	1.8	1.6	1.8	1.5	0.6
Cumulative	0.8	2.6	4.2	6.0	7.5	8.1
GEF						
Annual	1.4	2.7	2.5	2.7	2.4	0.9
Cumulative	1.4	4.1	6.6	9.3	11.7	12.8
Percentage	11	32	52	73	92	100

V. PROGRAM IMPLEMENTATION

A. Organization and management

5.1. The first phase program worked primarily as a set of coordinated but independent projects. Under the second phase, program integration would leap forward through the consolidation and strengthening of the annual programming and budgeting process, as well as the consolidation of the monitoring system. On the other hand, there would be no attempt at this stage to consolidate disbursement or procurement procedure between donors.

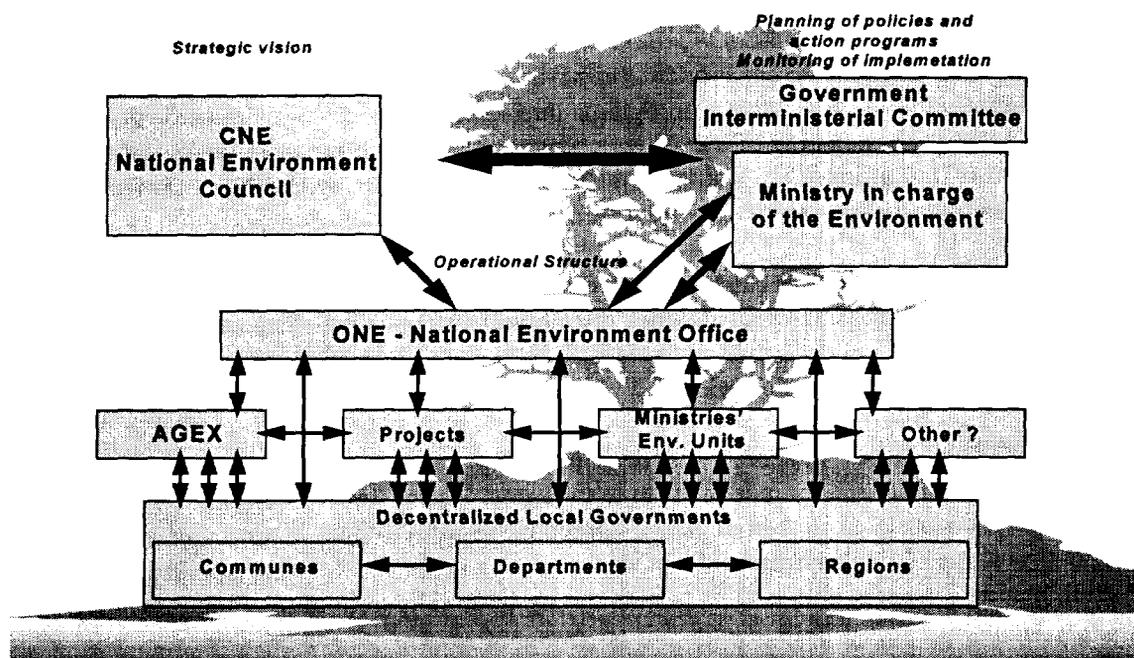
5.2. Implementation will be carried out by the various line agencies (AGEX) that were set-up during the first phase and coordinated at the operational level by ONE. The annual programming and budgeting process is described in section B below. At field level, all activities would be managed with strong local participation.

5.3. High level policy guidance will be entrusted to an independent consultative National Environment Council (CNE), which is to be created. Policy level coordination will be the responsibility of an Interministerial Environment Committee (CIM), also under creation; the Minister in charge of the Environment will chair the Committee on behalf of the Prime Minister. Operational level coordination will be carried out by ONE. The definition of the respective roles and responsibilities of central Government services and ONE - which has been an issue in the past - has been spelled out in detail in a manual (see Outline in annex 4). Draft decrees for the establishment of CNE and CIM are already available, and were reviewed during negotiations. The actual creation of these two entities would be a **condition of Credit effectiveness**.

5.4. Implementation arrangements would be further refined on the basis of EP1 experience, of the newly defined components (e.g. the Regional Environment Management Fund), of the new developments outlined above, and of the programming mechanisms outlined in section B below. They would be spelled out in an **implementation manual**. The manual will include an Implementation Agreement between Government and ONE, as well as subsidiary agreements between ONE and all implementing agencies. Key monitoring indicators will also be part of the Manual and Agreements. Achievement of objectives will be taken into account for resource allocation during the annual budgetary process. The manual was reviewed and agreed upon during negotiations. The formal adoption of the manual by all implementing agencies would be a **condition of Credit effectiveness**.

5.5. The Regional Fund for Environmental Management (FORAGE) would work on a demand-driven basis, as part of the regional process described below. The Fund would be administratively managed by ANAE; the management mechanisms would be identical to the one already in place for ANAE's mini-projects, but the actors would be different: broader range of beneficiaries (i.e. village communities, local Governments, NGOs, projects). The funding decisions would be entrusted to an independent committee (separate from ANAE), against a set of pre-established criteria. A key criteria would be the level of priority given to the sub-project by the Regional Programming Committee (see below), meaning that the decision would be *de facto* taken at the regional level. A manual specifying the eligibility criteria (beneficiaries, types of sub-projects, conditions of eligibility for financing from the Fund, financing rules, implementation of sub-projects, monitoring and evaluation) was reviewed and agreed upon during negotiations. The formal adoption of the manual by ANAE and other agencies would be a **condition of Credit effectiveness**.

EP2: Institutional setup



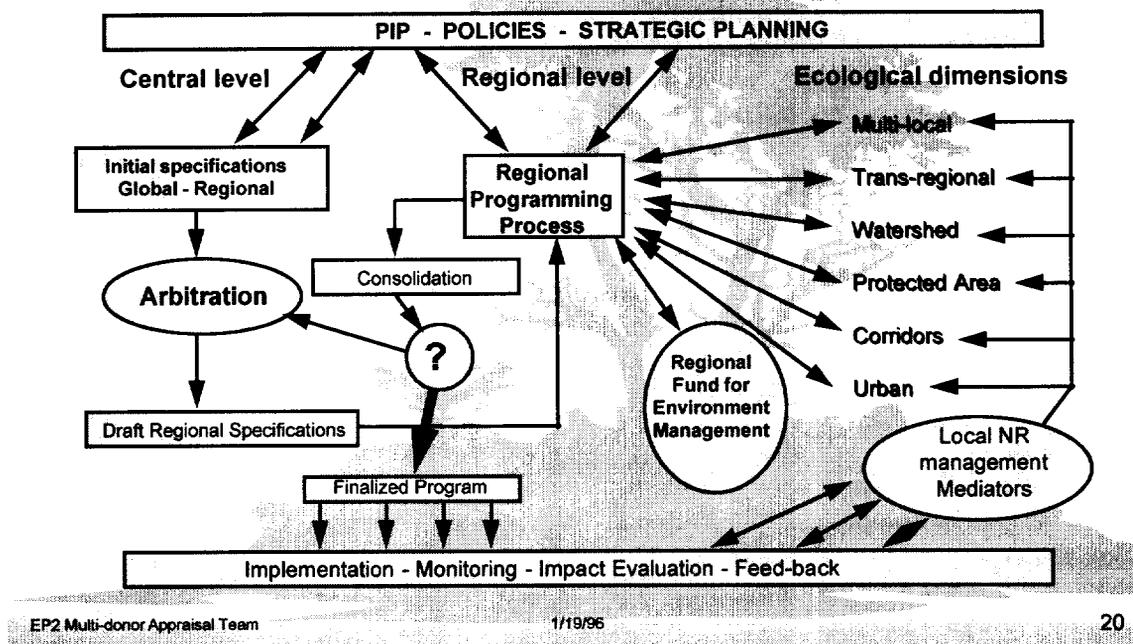
5.6. The overall institutional setup is presented in the diagram above. It illustrates that the various agencies would eventually work with the various levels of decentralized Governments, in line with the new Constitution of the country. In anticipation, a regionalized process would be established (see B below), at the level of the future Regions. The implementing agencies (AGEX) would work initially on an *ad hoc* basis with the regional representatives of the various ministries, as well as with other relevant local entities (e.g. projects).

B. The Annual Participatory Programming Process

5.7. The integration of the annual programming process, and its decentralization at regional level, are the key new features that would represent a major evolution towards a program structure. The overall process is described in annex 5 and illustrated by the diagram below, as well as by the flow-chart presented in annex 5.

5.8. The Region (i.e. the administrative entity defined under the new constitutions, but not yet in place) would be the level where annual work plans would be detailed, within the limits of resources assigned from the center. It is at this level that coordination and synergy would take place, both between components of the EP2 and with other programs in the area. It is also at this level that the various ecological, social and economic dimensions of the problems would be cast into the boundaries of the management units, i.e. the Regions. Waiting for regional governments to be put in place, the EP2 would establish *ad hoc* "Regional Programming Committees" (RPCs), where all key stake holders would be represented. The RPC would set priorities for the various activities to be funded under the program.

EP2: Annual Programming Process



5.9. When fully operational, the yearly budget cycle would work as follows: the initial specification would be prepared in global terms (i.e. national scale) by the Ministry in charge of the program, based on the strategic plan and on instructions from the Finance and Planning Ministries. An initial arbitration procedure would then take place, in order to break down the program into regional specifications. The arbitration procedure would be based on a formalized multi-criteria notation system, on the pattern of the one being already in place in the Ministry of Agriculture (this was developed with the support of several donors, including a Bank IDF grant). After the detailed work at regional level, the regional proposals would be aggregated at national level in order to check for consistency with the initial specifications and potential problems (e.g. duplications, overlaps, etc.). If need be, the arbitration procedure would be applied again, resulting in a new iteration between the Center and the Regions.

5.10. Part of the process at regional level would be to analyse problems according to their specific ecological dimension (see diagram above), and to formulate multi-local environment management strategies through participatory processes ("concerted strategies"); one of the outcome would be the identification of sub-projects for funding by the FORAGE (para 5.5). A key task of the RPC - with the support of the technical units established under the AGIR component - would be to integrate such proposals into their regional program, i.e. to cast them within the administrative boundaries of the region. The methodology for regional programming would be initially developed by actually applying it - on a pilot basis - to a limited number of Regions during the 2nd half of FY 96, as part of the programming and budgetary process for the first year of implementation of the EP2 (i.e. year 1997).

C. Monitoring, evaluation and beneficiary assessment

5.11. **Consolidation of M&E.** The program approach requires that the M&E function be consolidated at the program and no longer at the project/agency level. The program approach creates a need for global information on the financial situation of the program and its various components, the rate of completion of work, the impact achieved, etc. Consolidating the information and information flows does, however, not mean information retention. Since ONE would be central to the consolidated M&E system, a management audit has been undertaken which made recommendations as to ONE's capacity to manage such a system in light of the experience garnered during EP1.

5.12. The overall M&E system would consist of four sub-systems or components, namely (i) the technical, (ii) financial, (iii) Environmental Information System (EIS), and (iv) beneficiary assessment components, as detailed in annex 7. During EP1, the financial and accounting modules became operational. The project implementation module is also operational, but it is too complex and it is being simplified. The first beneficiary assessment was carried out in 1995. In addition, a pilot was undertaken for the third component (EIS) and produced promising results, and the system is now under full-scale implementation.

5.13. **M&E Plan.** Procedures and indicators for the M&E of program components would be spelled out in an M&E Plan to be included in the Implementation Manual. This M&E Plan would describe the M&E system for EP2, including its objectives, indicators, structure, managing institutions, inputs, interfaces, outputs and standards. (Refer to Annex 7 for details).

5.14. **Beneficiary Assessment.** In addition to making the system an operational and efficient management and reporting tool, EP2 will make client consultation, in particular beneficiary assessment, an annual exercise. EP1 agencies carried out a comprehensive beneficiary assessment for the IDA-funded components of EP1 between July and November 1995. The value of collecting clients' reactions and ideas justifies that the exercise be conducted on a yearly basis to cover all the EP2 components, regardless of the identity of the donor. Among the very first to be held in Madagascar, the beneficiary assessment executed under EP1 has contributed to building local capacity to organize and lead such systematic client consultation. Future beneficiary assessments would tap into and reinforce this capacity. A summary of the findings of the beneficiary assessment of EP1 and specific proposals for EP2 can be found in Annex 7-C.

5.15. **Mid-term Review.** The M&E setup would include a multidonor mission to assess the performance and impact of the program at mid-term. Specific attention would be given to the operation of the components in the AGIR category (Regional Programming, regional Fund, Local Resource Management) as well as to the progress in the introduction of cost recovery.

D. Procurement and Disbursement Procedures

5.16. Two main problems have been encountered during EP1. First, due to the existence of six implementing agencies handling procurement and disbursement matters independently, the program has generated a large amount of paperwork. Administration and differences in interpretation have burdened and sometimes delayed the implementation of the work programs. In 1994, the problem was brought to a head and the Bank had to reinforce its own capacity by assigning a Task Manager to the field on a permanent basis to deal with the flow of no-objection

requests and reduce its turn-around time for decisions. EP2 will address these deficiencies by introducing or reinforcing the measures detailed below.

5.17. **Autonomy.** EP2 implementing agencies have in many instances been too rigorous in applying procedures and not used the autonomy provided for in the Credit Agreement and other legal documents. During EP2, implementing agencies must apply the rules and procedures set out in Development Credit Agreements and other IDA documents more accurately and use the freedom margin they are entitled to. For instance, below certain thresholds, IDA no-objections should be limited to specifications or terms of reference.

5.18. In addition, current thresholds and methods for procurement and disbursement purposes (e.g. for International Competitive Bidding, disbursements through the special account, etc.) would be reviewed and adapted if need be.

5.19. **Controls by IDA.** However, more leeway *ex ante* will also mean more systematic controls *ex post*. Audit procedures and standards must therefore be met and punctual controls in the form of random samples must be increased. In particular, this would require Bank missions to carry out a more systematic control of statements of expenditures.

5.20. **Procurement Literacy.** Before the launch of EP2, specific refreshment courses would be organized to reinforce the capacity of the program managers in charge of procurement and disbursements and address the specific problems they encountered during EP1.

5.21. **Grouped Procurement.** If Program implementing agencies were to group purchases at the beginning of a fiscal year after carefully planning their work, the number of procurement procedures would be cut dramatically, the margin of error would be reduced, costs would diminish, and donors' responses would be swifter. EP2 would therefore systematize collective planning and arrive at Program-wide procurement plans.

5.22. **Management of Special Accounts.** EP2 would maintain the centralized management of Special Accounts which, after it was introduced in 1994, proved helpful in smoothening contacts between the Program and the Bank.

E. Accounting, Auditing and Reporting Requirements

5.23. **Accounting.** In the course of EP2, each participating agency would maintain adequate accounting records to allow accurate and timely recording of its operations and would prepare annual financial statements in accordance with generally accepted accounting principles. These annual financial statements would be consolidated by ONE. Annual financial statements prepared for audit would consist of the cumulative accounts since Credit effectiveness, a summary of each special account, and a summary of reimbursements and replenishments claimed under the statement of expenditure (SOE) procedures.

5.24. **Computerized Accounting and Financial Management System.** ONE's computerized financial management and accounting system — which has been operational since 1994 — would be reviewed and validated by professional auditors within the first year of EP2 to ensure that it meets the standards and expectations of accounting, financial and budgetary management.

5.25. **Auditing.** Annual financial statements of IDA-, IFAD- and GEF-financed components would be prepared and audited in accordance with the International Standards on Auditing (ISA).

In addition, the audits would be performed by or in association with a member of the International Federation of Accountants acceptable to IDA. By June 30 of each year, ONE would submit to IDA audited financial statements for the preceding financial year. In addition to separate audit opinions on the Credit accounts, the auditor's report would include: (i) the statement of expenditure, (ii) all special accounts, and (iii) a long-form report or management letter commenting on the adequacy of the accounting system and internal controls.

5.26. Furthermore, ONE and participating agencies, in association with EP2 donors, will explore the possibility and implications of harmonizing auditing standards and procedures regardless of the origin of funds. It may not be feasible to reach such a degree of integration before the end of EP2. Nevertheless, contingent upon the successful development of the program approach, the harmonization of accounting, auditing, and reporting requirements among donors would be considered for EP3.

5.27. **Reporting.** On the basis of information gathered from the implementing agencies and units, ONE would prepare semiannual and annual reports on progress, problems, and issues covering every program component. Copies of the reports would be submitted to IDA and other donors within two months after the end of the reporting period.

5.28. **Evaluation of EP1.** In addition to these periodic reports and the mid-term review, ONE would produce a comprehensive report on the achievements of EP1, i.e. its performance, impact and the main lessons learned. This comprehensive report would be available before the end of the first year of EP2.

F. Supervision of program implementation

5.29. Program implementation would be supervised jointly by donors twice a year, one in spring focusing on implementation, and once in autumn focusing on programming for the following year. As much as possible, this would take the form of joint missions; but the spring supervision could also be achieved through separate coordinated missions, different donors taking the lead for different components (e.g. Swiss and German Cooperation could take the lead for the forestry activities).

5.30. On the basis of the annual programming process presented in V-B above, the annual joint review of the program of work and budget by donors becomes a more significant step than in the past. This would be handled through a joint multi-donor mission that would take place on a yearly basis. The COS would continue to exist, but more as an open discussion forum than an approval body. Its date would be advanced to May or June in order to fit the timing of the budgetary process.

5.31. In the third year of implementation, the fall joint mission would carry out a mid-term review of the program, as a starting point for the formulation of the EP3.

5.32. The full time presence of a staff member at the Resident Mission has proven to be a key factor in smooth program implementation. For the EP2, it is proposed to maintain a similar arrangement, with the difference that two donors (i.e. USAID, France) confirmed during negotiations that they would participate to the financing.

5.33. Bank supervision effort for the EP2, covering IDA, GEF and IFAD funding, is estimated to require about 40 staff-week per year, including 20 staff-week from the multi-donor resident

staff and 20 staff-week for two missions a year from headquarters (one around May-June, to assess implementation progress during the previous year and participate to the COS, and the participation to the multi-donor annual review around October-November).

VI. BENEFITS AND RISKS

A. Overall justification

6.1. Long term sustainable growth of the country cannot be achieved in the absence of proper management of its natural resources. The proposed program was entirely prepared by the Borrower, with a high level of participation (cf. section IV-B), and thus **fully consistent with the country's priorities**. It is also **consistent with the CAS** (section IV-A), and considered by the Country Team to be part of the core lending program.

6.2. **Program design and sizing** are based on the experience of the First Phase Program (EP1), and are the result of a comprehensive preparation and appraisal process, involving all national environmental institutions, many of the country's stake holders at national, regional and local level, local and international NGOs, and all interested donors. In many instances this has resulted in significant evolution or departure from the EP1 design (e.g. phasing out of the ICDP model for protected areas, introduction of regional level mechanisms to ensure synergy and complementarity between program components and between the EP2 and other programs or projects, priority given to decentralization and local management of natural resources). In all cases, the main concern was **cost-effectiveness** and **long-term sustainability**.

6.3. The lessons of EP1 have also been incorporated into **the institutional arrangements** of the program, as presented in section V-A. The emphasis on participation and the systematic use of beneficiary assessment techniques should guarantee that the program would remain on track. Institutional uncertainty and rivalry that were a problem during EP1 would ease up now that clear arrangements have been defined (annex 4).

6.4. The program has been subjected to **economic analysis**, as presented in section B below. Fiscal impact and financial sustainability are discussed in section C. **Environment impact** is discussed in section D, and **risks** in section E.

6.5. The program would combine concrete actions with short term measurable benefits with long term undertakings (e.g. policies, education) to ensure sustainability. Direct beneficiaries would include communities affected by the soil conservation schemes and the development activities of the conservation projects (protected areas, forest management, coastal management). Most beneficiaries would be within the **poorest segments of the population**. Indirect benefits would come from private investments in ecotourism facilities that would be induced by the program. Benefits of global significance would come from improved protection of biodiversity resources of the country (protected areas, forest management, marine and coastal management).

B. Cost-benefit analysis

6.6. A comprehensive analysis of expected benefits has been undertaken by ONE and the implementing agencies as part of program formulation, and complemented during the December 95 and April 96 missions. Given the program approach and the fact that most field activities would be demand-driven, it is not possible to forecast the exact nature of the various

interventions. Instead, several models have been developed that demonstrate that key activities (ANAE mini-projects, forest management and protected areas) can be economically justified under a fairly wide range of initial conditions. This analysis is summarized below, and detailed in annex 9. The implication is that the various agencies would need to closely monitor costs as well as to perform economic modeling on an on-going basis in order to ensure that their work results in the greatest possible impact. This is further discussed in section V-C and in annex 7 on monitoring and evaluation.

6.7. The specific conclusions for the three major components of the program that were analyzed are as follows:

- **Sustainable soil and water management:** Individual mini-projects typically consist of a range of measures which combine shorter-term productivity gains, such as rehabilitation of small-scale irrigation infrastructure or the introduction of vegetable cash crops, with soil conservation techniques which yield longer-term productivity gains, such as alley-cropping or planting of Eucalyptus trees on hill slopes. In the longer term, the gradual spread of mini-projects in a region, combined with some spontaneous adoption of techniques by other farmers, is expected to reduce the gravity and incidence of environmental problems including uncontrolled brush fires, degradation of soil structure and fertility, and sedimentation of irrigation reservoirs and canals. Many mini-projects include associated assistance at marginal cost for rural development such as provision of potable drinking water, and literacy or health training.

Economic NPV and IRR of ANAE-financed activities.

	NPV*		IRR	Comments:
	12%	20%		
1. Improved Hillside Management I	820	465	61%	Ten year horizon
2. Improved Hillside Management II	672	297	34%	Ten year horizon
3. Diversion dam for irrigation I	587	343	57%	Ten year horizon
4. Diversion dam for irrigation II	102	6	21%	Ten year horizon
5. Improved vegetable gardens	10,866	6,715	75%	Ten year horizon
6. Eucalyptus reforestation in the Lake Alaotra region				
Economic analysis	-387	-3136	11%	25 year horizon
Financial analysis	2482	-518	18%	25 year horizon
7. Improved Woodstoves / Charcoal	34,084	20,538	149%	16 year horizon

*All net present values are per hectare except #7 which does not have an area equivalent

A number of illustrative models corresponding to the most common conditions encountered under EPI are presented in annex 9. The results of this analysis are summarized in the table above. Indirect benefits on reduced downstream siltation have not been quantified, and this explains in particular the low returns shown by model 6 on Eucalyptus plantation for watershed protection purpose; downstream benefits are considered substantial, so that total return would be in fact higher.

- **National Parks and Ecotourism:** Protected areas in Madagascar are primarily justified from the global biodiversity benefits. A study by Kramer et al. of willingness to pay for rainforest protection concludes to levels of US\$ 1 billion. Furthermore, a study of foreign tourists to Mantadia Park found their expressed

benefit (willingness to pay) from the Park to be in the range of US\$ 1-2.5 million (NPV at 10%). Given Madagascar exceptional biodiversity, it is safe to state that global benefits much exceed the cost of the program, and that the issue is only one of cost-effectiveness and financial sustainability; this is discussed in section C below.

- **Multiple-use Forest Ecosystem Management:** The benefits of management stem from ensuring the continuing flow of values from biodiversity, non-timber forest products, protection of off-site benefits, sawnwood, and charcoal. In a without project scenario, the sawnwood and charcoal benefits would be lower, and the other benefits would be expected to continue declining at an inestimable cost. It is not possible at this point in time to calculate and project the full economic costs of forest degradation and conversion. For the with project scenario, the benefits from sawnwood and charcoal are estimated. It is assumed that the same area is consistently viable for producing both benefits since the different grades of wood are used for the production of each benefit. Based on the detailed assumptions presented in annex 9, an analysis of the with-project situation alone shows that direct costs of forest management are largely compensated by direct timber and charcoal benefits (net present value of US\$16 million and internal rate of return of 22% for the management of 580,000 ha over the EP2 and EP3 period). Benefits from conversion of forest to agriculture or costs from deforestation have not been estimated, on the other hand, but a major conclusion of the scientific workshop on biodiversity carried out as part of program preparation is that improved management of forest out of the protected areas is of key importance in Madagascar. The large global benefits mentioned in the previous paragraph also contribute to the justification of the forest component, and it is intended that - on this argument - GEF would be asked to contribute to its cost.

C. Financial sustainability and cost recovery

6.8. Given the constrained fiscal situation of Madagascar, financial implication of the EP2 proposal are a major concern. It has been addressed in various ways, as presented below.

6.9. At about US\$ 31 million per year, the size of the EP2 is similar to the size of the EP1 (US\$ 150 million over five years, mostly net of taxes). Fiscal constraints are reflected in insufficient allocation of counterpart funding in the Public Investment Budget. Most resources are assigned as counterpart funding to externally financed operations. The key issue is therefore the financial viability of the Program after the cessation of external support (i.e. at the end of EP3). The analysis presented below focuses on the three main field operations: ANAE's mini-projects, forest management, and Protected Areas, as well as on the Regional Fund (FORAGE).

6.10. **ANAE's mini-projects.** The interventions supported by ANAE are designed to be limited in time (two years), and to generate enough additional income at village level to ensure that farmers would maintain the investments and continue to apply sustainable resource management practices. The sustainability of the ANAE actions rests in part on the system of preparing mini-projects. Communities prepare written requests for assistance from ANAE. ANAE works with those communities identifying production-enhancing actions, conservation-related actions, and parallel rural development actions (e.g., health or education) all of which opens the door to potential collaboration with more communities in the same region. Thus the program is very demand-oriented although ANAE has clear criteria on what constitutes an

eligible request for assistance. The focus on local level involvement means that actions tend to mesh well with the local agricultural calendar, thus avoiding problems of labor availability. The cost-sharing arrangements common to all mini-projects further endow the participants with a strong sense of ownership of any investments.

6.11. Cost effectiveness would be improved under EP2 as compared to EP1, because institutional overhead costs would be spread over a larger program and because the size of mini-projects would increase. Reducing the size of the component, or even closing it down all together, would therefore prevent ANAE to reach new beneficiaries, but would not affect long term benefits from passed operations. In addition, given ANAE's success and increasing visibility, it is likely to continue to attract funding for the foreseeable future. Another issue is the one of replicability of the use of subsidy (ANAE mini-projects and FORAGE). Subsidies are considered justified in the short term to offset the risks of change and promote sustainable natural resource management.

6.12. In order to ensure long-term sustainability of the schemes, **cost recovery** would be progressively introduced. The level of cost recovery would depend on the importance of direct benefits versus externalities, it would be determined on the basis of typical models ("modèles normatifs") being developed for all possible activities. Waiting for the analysis to be complete and the approach to be validated in the field during the 1997 cropping season, the expectation is that cost recovery would apply to about half of the costs of mini-projects. Fifty per cent of recovered funds would remain with ANAE, and thus contribute to the financial viability of the institution; the objective would be that recovered funds would eventually finance one hundred per cent of the overhead costs of ANAE, and that continuing financing would be required only for the direct cost of new mini-projects. Through the creation of locally managed revolving funds, the other fifty per cent would be used at village community level to finance expansion and/or maintenance of investments.

6.13. **Forest management.** The transfer of management responsibility to local communities, within the specifications of the management contract, would in the long run decrease the work load of the Forest Administration (DEF), potentially resulting in budgetary savings. In addition, recovery of stumpage fees and other levies should improve. Such levies are managed through the existing National Forestry Fund (NFF). Recovery already increased from FMG 178 million in 1993 to FMG to about FMG 1.7 billion in 1995 (US\$ 420,000 equivalent). The improvement of recovery and the revision of fee levels is part of the Forest Component of EP2. It is well within possibilities to reach a level of FMG 7-10 billion a year by the end of EP2. This would ensure financing of the operations of the entire forest service, including recurrent costs from the program (with the exception of civil servants salaries).

6.14. **Protected areas.** Reaching self-financing is one of ANGAP's main goals. The first avenue is to contain costs, by phasing out the costly ICDP approach. The other one is to raise revenue; a number of instruments would be combined for that purpose: (i) within the limits of what the tourism market can support, entrance fees would be increased (50% go to neighboring communities and 50% remain with ANGAP); (ii) ANGAP would develop various commercial activities (visitor centers, sale of posters, calendars, tee-shirts, etc.) and levy copyright for certain activities within the protected areas (e.g. film making); and (iii) ANGAP is discussing with private operators in the hotel and tourism sector possible mechanisms for channeling to ANGAP a fair share of the benefits of ecotourism development (royalties, green tax, etc.). Two sets of assumptions have been worked out by ANGAP, a low case corresponding to a continuation of current restrictive policies and a high case corresponding to improve policies and faster tourism

development. By the end of EP3, ANGAP's income would reach US\$ 2.7 million per year in the low case and US\$ 4.4 million in the high case. This compares favorably with an estimated annual financing requirement of US\$ 4 to 5 million. In addition, a legal framework and umbrella organization (called Tany Meva) have been put in place under the EP1, with USAID support, in order to set-up trust fund or foundations that would allow ANGAP to attract private donations. Experience elsewhere suggests that all the above mechanisms are likely to allow ANGAP to become self-sustainable financially in the long run. In the short and medium run, and given the global nature of benefits related to biodiversity management, GEF and other grant funds would be required to sustain the network of protected areas.

6.15. **FORAGE.** Following the pattern presented above for ANAE's mini-projects, cost recovery would also be introduced for FORAGE sub-projects, at a level that would depend on the importance of direct benefits versus externalities. Fifty per cent of recovered funds would remain with FORAGE, and thus contribute to the financing of the fund, and the other fifty per cent would be used at village community level to finance expansion and/or maintenance of investments.

6.16. A pre-requisite would be for Government to review subsidy and/or cost recovery policies of other operations (e.g. the Bank-financed Social Fund) in order to ensure consistency.

D. Environmental sustainability

6.17. The whole program is geared towards the improvement of natural resource management and other environmental concerns. There is no requirement for environmental impact assessment as such; the expected impact of the program is summarized in section VI-A above and detailed in annex 9.

E. Risks

6.18. **Policy risks.** There are strong interactions between environment degradation, population increase and economic stagnation, including the stagnation of agriculture, so that the impact of the environment program would be limited in the absence of significant progress on the other fronts. Madagascar's future can be seen within two extremes. First, with continued "muddling through", the prognosis is devastating — net capital inflows will shrink rapidly, import capacity will be impaired, GDP per capita will continue to fall and poverty will rise rapidly creating the real possibility of social explosion. The second scenario for Madagascar's future could materialize if the government can overcome internal differences and reticence toward comprehensive reform, and formulate and implement a transparent and credible economic reform program that would lead to a foreign investment rebound and lay the basis for export-led growth. Based on experience in other countries, adoption and maintenance of a credible reform program from 1996 onward could elicit major new flows of foreign investment by about 1999, with growth accelerating toward the levels of fast-growing developing economies within about a decade.

6.19. Policies that discriminate against agriculture have a direct impact on incentives for deforestation and shifting cultivation; more generally speaking, the incentive framework for agriculture development (e.g. rural infrastructure and access to markets, availability of social and financial services) determines land use intensification and thus has a direct influence on natural resources management practices; such issues are being addressed under the on-going structural

adjustment dialogue as well as under various sector projects. Policies that discriminate against tourism development (e.g. visa regime, air transport monopoly) would also affect the program negatively, because ecotourism is a major potential source of income from protected areas.

6.20. **Institutional risks** are related to potential political instability, resulting in particular into policies that would affect the institutional set-up and promote inter-institutional competition. Such a situation would compromise program implementation, as it happened in 1994 with the creation of a separate ministry for the environment. The proposed institutional arrangements (para. 11) would address these issues by providing for more stability.

6.21. Other risks are related to weak implementation capacity. Formal implementation capacity analysis has already been carried out for ONE, and is on-going for ANGAP, DEF and ANAE. DD is scheduled to follow in early 1997. Such reviews are designed to formulate recommendations on how best to address this latter risk by helping the institutions clarify their mandate, streamline their organigram and working procedures, assess their human resources and program their training requirements.

6.22. Finally, integrating Madagascar's present governmental agencies into the regional approach to natural resource management will be a challenge. As the APPP is a new approach in Madagascar, careful design and adaptive implementation will be required to ensure that its full potential is realized. Fortunately, the on-going decentralization process is fully compatible with this integration. Under decentralization, annual work plans will be defined at the regional level, and regions will coordinate EP2 components with other programs, as well as focus on various social and economic aspects of environmental problems. It is well understood that decentralization will take some time. Therefore, temporary Regional Programming Committees (RPCs) will be established until the regional governments are fully prepared to assume their new roles. RPCs will be comprised of all key stakeholders will be established to set priorities for the activities that are to be funded under EP2.

VII. ASSURANCES, CONDITIONS AND RECOMMENDATIONS

A. Assurances obtained at negotiations

Assurances were obtained at negotiations on the following:

- (i.) The institutional setup of the Environment Program would not be significantly modified without prior consultation with donors.
- (ii.) Adequate auditing procedures would be applied (para 5.25).
- (iii.) The Directors General of ONE, ANAE, ANGAP, CFSIGE and FTM, the Deputy Director General of ONE and the Directors of DEF and DD would be acceptable to IDA at all time during Program implementation.
- (iv.) Government would carry out, in collaboration with donors, a mid-term evaluation of the Program (para 5.15).
- (v.) Government would conduct a review of all major donor-financed operations in rural areas, for which the Government is responsible, to determine to what extent cost

recovery mechanisms can be introduced or strengthened, and harmonized with one another. Based on such review, adequate cost recovery mechanisms would be introduced in the Program (para 6.12 and 6.15).

- (vi.) The review of the institutional capacity of ONE, DEF, DD, ANAE and ANGAP would be completed and Government would ensure that the Agencies would take the measures that may be needed to strengthen the capacity of these institutions (para 6.21).

B. Conditions of Board Presentation

There are no conditions for Board Presentation.

C. Conditions of effectiveness

- (i.) The National Environment Council and the Interministerial Environment Committee would have been officially created (para 5.3).
- (ii.) The Implementation Manual of the Program, including the Monitoring and Evaluation Plan, would have been formally adopted by all implementing agencies (para 5.4).
- (iii.) The Manual of Procedures of the Regional Fund (FORAGE) would have been formally adopted by all implementing agencies (para 5.5).
- (iv.) An initial deposit of the equivalent of US\$ 200,000 would have been into the project account (para 4.41).

E. Conditions of disbursement

There are no conditions of disbursement.

F. Recommendation

6.23. On the basis of the above actions, conditions and agreements, the proposed Program would be suitable for an IDA credit of US\$ 30.0 million equivalent and a GEF Grant of US\$ 20.8 million equivalent.

PART II: Technical Annexes

MADAGASCAR

SECOND ENVIRONMENT PROGRAM SUPPORT PROJECT

Lessons from the First Environment Program

A. Institutional Setup of EP1

1. The Malagasy NEAP came first in Africa (1989). Before the NEAP, no national environmental institutions existed in Madagascar. Institution building therefore became the top priority of EP1, namely through the creation of three new institutions (ONE, ANGAP and ANAE) and reinforcement of three existing ones in the public sector (DD, DEF, FTM).
2. The *Office national de l'Environnement* (ONE) was created as a small but powerful public environmental agency to coordinate environmental policy and actions. Its mandates would include: (i) environmental policy; (ii) environmental impact assessments; (iii) accounting, procurement and disbursement; (iv) coordination of training, education and awareness campaigns; (v) coordination of environmental studies; and (vi) environmental data management.
3. The *Association nationale pour la Gestion des Aires protégées* (ANGAP), a private association, coordinates the biodiversity component of EP1 under the responsibility of the Ministry in charge of Agriculture. It is in charge of setting up Integrated Conservation and Development Projects in protected areas. ANGAP contracts out the actual management of protected areas to field operators, with the possibility of becoming the direct manager in the medium term. Specifically, ANGAP would: (i) help the Ministry of Agriculture in biodiversity policy and planning; (ii) administer funds for the management of protected areas; (iii) train staff in biodiversity management; (iv) launch communication campaigns; (v) monitor and evaluate actions in biodiversity management; (vi) set up a national biodiversity data system.
4. The *Agence nationale d'Actions environnementales* (ANAE), a private association, would finance the preparation, appraisal and implementation of community-level miniprojects for watershed management, reforestation and other rural development activities in five priority regions. Minigrants would be channeled and managed through the field operators assisting rural communities, thereby developing the private sector and creating links between the GOM and a number of NGOs.
5. The *Direction des Domaines* (DD, formerly DPRA), the Land Department in the Ministry of Agriculture, would be in charge of: (i) carrying out cadastral surveys; (ii) creating the conditions for the privatization of the surveyors' profession; and (iii) launching a pilot operation for titling private land.
6. The *Direction des Eaux et Forêts* (DEF), the Waters and Forests Department of the Ministry of Agriculture, would: (i) improve its field management on gazetted natural forests; (ii) prepare a new forest legislation; and (iii) refine the national biodiversity policy.

7. Finally, the national geographic institute, *Foiben-Taosarintanin'i Madagasikara* (FTM), a public enterprise under the purview of the Ministry of Public Works, would be in charge of producing maps and geographic information required by the other components.

8. All the above made for an ambitious program, endowed with a multifarious, decentralized, structure to address complex problems but underlied by a single logic. The implementing agencies have been slow in reaching their cruising speed due to general problems -- mainly the political instability through which the country went in the early 1990s -- or management problems such as delayed procurement procedures and delayed fund allocations. All agencies have now been established and endowed with the appropriate resources and are pursuing their activities at an accelerated rhythm. They should be able to continue to fulfill their mandates until the end of the 15-year environment program and beyond. However, due to delays in the first two years of the Project and to ensure a smooth transition between EP1 and EP2, the closing date of EP1 was postponed by six months till December 31, 1996.

B. Physical Achievements of EP1

9. **Monitoring and Evaluation (M&E).** M&E suffered from several shortfalls in the course of EP1. Consequently, indicators on physical achievements have not been centralized even after the introduction of the SOMAGI system. Some implementing agencies lack proper financial information on some projects officially placed under their responsibility but over which they actually have little oversight. Finally, few impact indicators exist, either because it is still early to measure the long-term impact of the actions undertaken since the beginning of EP1 or because they simply haven't been defined. It is therefore key to define operational indicators to measure the performance and impact of EP2 before the start scheduled for early 1997.

10. The reasons for the M&E shortfalls include the following: (i) pioneering nature of the program which could not rely on similar programs in other countries at the time; (ii) confusion between internal and external M&E: ONE, through the installation of the SOMAGI system attempted to capture too high a level of detail on physical achievements thereby creating an unwieldy and of EP1 eventually useless tool; (iii) the central M&E tool came too late in the game after several agencies had already introduced a more simple tool to address their own M&E needs; (iv) insufficient consulting among agencies on M&E concepts, processes and tools; (v) inadequate support from the donor community.

11. Key indicators tables 1-4 and paras 12-21 hereafter summarize the physical achievements.

12. **Table 1: Physical Achievements of ANAE.** ANAE will be fulfilling most of its objectives by the end of EP1. Between 40% and 50% of the number of participating families and physical targets have been reached already as of April 1996. It is reasonable to expect final achievements in the order of 75% given that the miniprojects for the 1995-1996 campaign involve much larger numbers than in previous years. (Please note that 1995-1996 targets are included in these figures while 1995-1996 results won't be available until April 1997.)

13. **Table 2: Physical Achievements of ANGAP.** ANGAP's achievements in the course of EP1 have included contracting out the management for 22 out of the 38 existing protected areas and ensuring own management of another four, to reach a total of 26. Although this is lower than the initial target, one can legitimately argue that the target itself was set too high. The cost of setting up an operational structure of the ICDP type turned out to be more costly than expected (over US\$ 500,000 on average per year). Even with significant foreign assistance (see Table ???), ANGAP was not able to contract out the management of all of the protected areas. Therefore, in order to cut costs and build up its in-house capacity, ANGAP decided to take over the management of four areas. This development had not been envisioned at the beginning of EP1 but should set the trend for EP2, thereby reducing the costs of operational structures in and around protected areas. An additional six protected areas will have been added to the existing network by the end of EP1 instead of the eight projected initially.

14. **Table 3: Physical Achievements of DEF.** The achievements of DEF during EP1 can be broken down into three categories: (i) those which were carried forth from the closed Forests Protection and Management Project (Credit 1878-MAG) numbered 2, 3, 4, 5 and 7; (ii) those which were initiated under the first phase of the National Environmental Action Plan (EP1) numbered 1, 6 and 8; and (iii) those started in the framework of specific cooperation projects under the purview of DEF numbered 9-13. The major activities started after the mid-term review of Cr. 1878-MAG, i.e. the preparation of a new forest legislation, of an ecological forest inventory and of a human resource policy for DEF, are developing at a very satisfactory rate. The new forest legislation bill will be submitted to the May 1996 National Assembly session. It results from an intensive effort to involve the regions and field forestry actors in the drafting process through a number of workshops and conferences. The forest inventory will be completed by the end of EP1 albeit with some delays. It will give a reliable state of the Malagasy forests and allow to verify the degradation percentages commonly used but never verified. It will also serve as baseline data for future similar surveys and be used by forest planners in the allocation of forest concessions. The implementation of the new human resource policy has started and all targets will be reached. For reasons similar to those invoked under para 13 on ANGAP, DEF will not have been able to add eight but four new protected areas to the existing network. In addition, six protected areas will have seen their status change in the course of EP1 to reflect the reality more accurately or, in certain cases, allow better planning of biodiversity usage. Finally, the research program has produced very mixed results: only the eucalyptus trimming module has advanced practical knowledge. Prominent among the activities launched since the beginning of EP1 is the management of gazetted forests designed to adopt more rational forest exploitation techniques. Currently in use on a pilot mode in four forests, this new orientation in forestry should become central during EP2. The Debt for Nature Swap Program operated by WWF has proved instrumental in creating 321 nature protection agent positions, fixed-term employees hired to strengthen the regional and local offices of the Waters and Forests administration. Little information is available at DEF on the performance of bilateral cooperation projects, which in itself is an indicator of the insufficient integration of these activities in DEF's core business.

15. Table 4: Physical Achievements of DD. Targets for this component were adjusted downwards considerably after it appeared that the procedure leading to the titling was technically complex and quite controversial. Sequencing the various steps of the operation - mainly carrying out the aerial reconnaissance, sensitizing beneficiaries to the benefits of titling and drawing up the cadastral plans - has proven a difficult task to coordinate. Several sites therefore had to be postponed or canceled because the proposed work was meeting with too much criticism. Another important drawback is that the land registration and titling activities were to be pilot ones, whose continuation would depend on successful the results of evaluations around mid-term review. However, these evaluations were not undertaken until the beginning of the fifth year of the Project and no conclusions have therefore been drawn as to the environmental benefits of titling. This was taken into account in the design of EP2: the importance of land security as an objective continues to be emphasized but the means to attain the objective will be left open, in accordance with the general trend toward the devolution of the management of renewable natural resources to communities. Titling would only be used if the beneficiaries express the wish to receive a title on the resources (land, forest, water, ...) entrusted to their stewardship. In addition, an international symposium on land tenure and cadaster has been scheduled for June 1996, which will review the conclusions of the studies, address once again the fundamental question of the benefits of land titling for the environment, and suggest possible reorientations for EP2. Finally, the development of the private surveyor profession has by and large been overlooked during EP1.

16. Physical Achievements of FTM. Among the targets, half were set at appraisal and half in the course of EP1 when FTM's remote-sensing equipment became operational to meet new orders. Delivery of this equipment was delayed by two years due to a flaws in the bidding process and technical problems with the color laboratory. Yet, by the end of EP1, FTM will have been able to supply the updated national forest map coverage requested by DEF in its forest inventory work. The targets set at the beginning of EP1 were generally revised downwards because FTM's main client, DD, itself scaled down its titling activities in the conditions described above. In addition, due to financial constraints at DD, products executed by FTM were never sold to DD. Institutionally, FTM is currently going through a dramatic cultural change from a inward-looking parastatal to a market-oriented mixed enterprise. Financial and human resource management are being professionalized and the notion of profitability has been adopted by the direction committee. Talks have been initiated with the Ministry of Public Works to contemplate opening FTM's capital to the private sector.

17. Physical Achievements of ONE. ONE was mandated to fulfill tasks in a number of areas ranging from mainstreaming the environment in national development policies to the financial coordination of EP1.

18. As the leader of the movement to mainstream the environment, ONE has started the formulation of sectoral policies that better integrate environmental concerns. Typically, the process consists of three phases: the diagnostic, the proposal, and the validation in a national workshop. So far, the process has been completed for tourism, industry, mines and energy. An ecologically sustainable road sector policy should also be completed by the end of EP1. Each time, a group of international and national experts is selected to carry out the first two phases and lead the debates and formulate clear recommendations in the third phase. It is then up to the legislative and executive branches of Government to adopt or amend the recommendations. According to needs, the process may also include in-depth training for beneficiaries, as in the case of the “ecologically sustainable industrial policy” formulation exercise. ONE has also sponsored a decree titled *Mise en compatibilité des investissements avec l’environnement (MECIE)*, introducing standards to be met by all investments, notably the obligation to hold an environmental impact assessment. Although the Decree has been published it still needs a number of “Arrêtés” to make it fully operational. This work is proceeding and will assume more importance in EP2. ONE, with its in-house capacity, has started evaluating such impact assessments to advise the authority responsible for granting the investment permit. Environmental units are being established in sectoral ministries (so far one unit has been created in the Ministry of Industry while the Ministry of Agriculture has created a unit in its civil engineering directorate). Last but not least, ONE, under the cover of the Minister of Agriculture, has sponsored a bill on the local management of renewable natural resources, the adoption of which by the National Assembly in the form of a law will lay the ground for major innovations under EP2.

19. The Research component suffered from a lack of focus and link to operations. However, not all the research programs were placed under ONE’s responsibility. In fact, the institutional context featuring several organizations invested with similar mandates (CNRE, IHSM, CNRO, Universities) but funded from different sources (World Bank, COI, ORSTOM, ...) partly explains why coordination has been lacking. 1995 saw the streamlining of the research programs funded by the World Bank to make them more useful to operations. Need-based research is the trend set for EP2, this time based on a national program scale and regardless of the source of funds.

20. Information, Education, Sensitization and Training achieved only little compared to its objectives essentially due to the decision of the African Development Bank, the main donor for this component, to cancel its Credit given that Madagascar was not paying its debt arrears. WWF was therefore left as the only organization with the means and the program to undertake significant actions in this area.

21. Coordination is the last major function entrusted to ONE. ONE partially fulfilled its mandate: it skillfully organized the annual mid-year and end-year sessions of the CFE and the COS and has met the annual financial and accounting audit requirements. In addition, ONE has represented the environment in the budgetary dialogue with the Ministry of Plan for several years and has managed to secure adequate resources for the implementation of EPI. One of the weakness in this component was the M&E function, as explained above. A special paragraph in the section on the impact of EPI will address the institutional capacity issues at ONE.

Table 1 : EP1 Physical Achievements - SOIL CONSERVATION AND RURAL DEVELOPMENT MINIPROJECTS (ANAE)

Activities 1/	Nb of activities	Participating Families			Physical Data				Costs (in current 1000 Fmg)			Remarks
		Target nb	Actual nb 2/	% of target	Target ha	Target nb	Actual 2/	% of target	Grant	Community Related Participation	Overhead 3/	
1 Reforestation	775	25,502	16,531	65%	8,945		4,445	50%	2,475,084	1,323,399	235,367	
2 Ravine stabilization	48	926	424	46%		71	42	59%	230,887	29,453	25,770	
3 Hillslope development	662	17,873	8,235	46%	4,090		1,701	42%	1,147,337	806,381	113,808	
4 Perennial crops on hillslopes	362	10,013	5,269	53%		355,834	163,291	46%	416,475	181,978	27,418	Fruit trees
5 Annual crops on hillslopes	65	2,167	62	3%	489		11	2%	100,208	155,897	6,042	
6 Forest valley bottom development	5	431	169	39%	430		72	17%	180,883	83,275	8,328	
7 Embankment protection	5	678	250	37%	650		100	15%	74,747	3,070	5,002	Area protected
8 Bridges built	1	2,000	2,000	100%		1	1	100%	39,786	5,000	2,547	
9 Dams built	5	326	305	94%	458		370	81%	128,135	20,702	8,779	Area irrigated
10 Dams rehabilitated	9	702	442	63%	613		450	73%	78,569	12,261	10,857	ibid.
11 Intensive riziculture	142	3,405	697	20%	245		101	41%	133,696	183,579	8,439	
12 Off-season crops	79	1,865	306	16%	97		16	16%	54,934	39,036	478	
13 Vegetable growing	320	9,059	2,303	25%		144,721	80,561	56%	315,660	37,976	12,198	Vegetable gardens
14 Fruit tree growing	228	7,325	811	11%		318,604	15,371	5%	319,988	119,698	20,871	
15 Schools rehabilitated	1	40	40	100%		1	1	100%	891	186	99	
16 Rural libraries created	1	17	146	859%		3	3	100%	800	40	99	
17 Drinking water adduction	1	32	65	203%		1	1	100%	20,498	4,763	1,312	
18 Drinking water well	53	2,229	380	17%		69	17	25%	277,494	13,654	36,542	
19 Improved stoves	44	3,430	145	4%		7,060	378	5%	216,145	61,368	17,704	
20 Alternative fuel schemes	43	3,450	66	2%		3,450	50	1%	369,150	145,935	-	Production units
21 Biogas schemes	1	80	80	100%		1	1	100%	4,140	300	593	Units
22 Small livestock	44	873	80	9%		5,681	550	10%	54,440	4,364	5,214	Rabbits, chickens, ducks
23 Pisciculture	63	973	78	8%		115,867	7,864	7%	43,798	54,071	3,824	
24 Apiculture	29	643	43	7%		629	19	3%	26,082	3,858	1,677	
25 Manure stables	2	45	19	42%		2	1	50%	1,185	1,615	76	
26 Village granary	3	104	-	-		3	-	-	10,500	8,441	-	Units
27 Rural track	1	500	500	100%		5	5	100%	83,348	10,631	-	Length in kilometers
28 Teaching to read and write	2	540	-	-		540	-	-	23,350	10,704	-	Trained rural families
TOTAL	2,992	95,228	39,446	41%					6,828,210	3,321,635	553,044	
									64%	31%	5%	

ANAE's Payroll and Headcount						
	1990	1991	1992	1993	1994	1995
Payroll (FMG) 4/	634,900	33,584,000	67,590,000	195,786,000	289,083,000	656,442,000
Headcount 5/	4	9	13	19	25	46
Average salary 4/	158,725	3,731,556	5,199,231	10,304,526	11,563,320	14,270,478

1/ Calculated on 1,088 mini-projects launched since 1991 and till 08/31/96 in partnership with 86 operators (mini-projects for the 96/97 campaign are included, but only in part, as the objectives for the 96/97 campaign 96/97 are not yet completely recorded)

2/ Realizations recorded till the date 08/31/96. Note that data on achievements corresponding to the on-going 95/96 campaign is not complete, this explains the gap between objectives and achievements.

3/ Related expenses include ANAE staff's field visits and research costs 4/ Current FMG 5/ Including HIQ and regional antennas since 1995

Table 2 : EP1 Physical Achievements - BIODIVERSITY PROTECTION (ANGAP)

Activities	Unit	Target	Revised target	Actual	% Achieved	Remarks
1 Field operations						
=Managt of protected areas (PAs)						
Contracted out (COPAs)	nb	40		29	72%	Including 1 PA under creation - Initial target set too high
Contracted out	ha	1,150,000		984,910	86%	
Average annual budget per COPA	\$			\$577,389		Based on the 6 major P.A.in 1995
% of expenses for conservation (COPA)	%			20%		
% of expenses for development (COPA)	%			16%		
Own-managed (OMPAs)	nb	3	3	4	133%	
Own-managed (OMPAs)	ha	101,599	101,599	101,599	100%	
Average annual budget per OMPA	\$			\$258,104		
Coordination in PA management	nb of PAs	45		28	62%	
Protected areas added to network	nb	8		0	0%	Submitted by DEF to Government. Expected to be finalized before the end of EPI
2 Institutional development						
Establishment of regional antennas	nb		1	1	100%	
Construction of ecomusea	nb		2	2	100%	
Construction of interpretation centers	nb		4	0	0%	All 4 centers will be completed by the end of EPI (bidding in process)
Construction of HQ building	nb	1		0	0%	Purchase of existing building refused by Bank, SBD for construction received Bank no-objection

ANGAP's Payroll and Headcount					
	1991	1992	1993	1994	1995
Payroll (FMG) 1/	n.a.	44,151,606	274,205,020	359,402,689	755,689,118
Headcount 2/	10	21	28	41	65
Average salary 1/	n.a.	2,102,457	9,793,036	8,765,919	11,625,986

1/ Current FMG

2/ Including one regional antenna since 1995

Table 3 - EP1 Physical Achievements - FOREST MANAGEMENT (DEF)

Activities	Unit	Target	Revised target	Actual	% of revised target	Costs	Duration since beginning	Remarks
1 Gazetted forest management								
Management plans established	ha		169,300	133,500	79%	\$172,470		New activity since 1994 in 4 gazetted forests (COEFOF Project: Ankeniheny, Bongolava, Andavakoera, Fierenana)
Management plans established	ha		2,885	0	0%	\$563,118	12 months	ibid. since 1995 in 2 gazetted forests (DEF/GTZ Project: Ambatolampy)
Management plans executed	ha		26,500	9,275	35%	\$146,463	1 year	ibid. in 1 gazetted forest. Costs exclude technical assistance. Total average cost expected at \$30/ha
Training in social forestry	nb of trainees			357	n.a.	n.a.		DEF/GTZ Project
2 Forest inventory		n.a.				\$2,112,500		New activity since mid-term review of Forestry Project
Forest cover maps 1/200,000	nb of maps		45	0	0%	\$2,736,233	18 months	Technical problems at FTM will delay delivery of maps but all maps to be delivered by end of EPI
Forest statistics	nb of sampling parcels		800	728	91%		9 months	ibid.
Forest species handbook	nb of species		200	123	61%		6 months	184 text sections and 68 photographs
3 Forest policy		n.a.				\$1,125,000	15 months	
Formulation of a new policy	policy adopted		1	1	100%			
Establishment of a national master plan	plan adopted		1	1	100%			
Formulation of a new forest law	bill in Parliament		1	1	100%			
Study of regional master plans	nb of regional schemes		6	6	100%			Added to original contract
4 Protected Area Network		n.a.						
Creation of new protected areas	nb of PA	8		2	23%	\$462,427	15 months	4 new PA will be added to network by end EPI
Modification of protected area status	nb of PA		6	5	82%			6 PA will see their status change by end EPI
5 Human resources development		n.a.				\$744,351		New activity since mid-term review of Forestry Project
Training of executives abroad	nb of man-months		26	26	100%			
Training of trainers locally	nb of man-months		11	11	100%			
Establishment of local training modules	nb of modules		100	38	38%			
Training of forestry agents locally	nb of man-months		132	53	40%			
Training in forest management abroad	nb of man-years		2	0	0%			To begin in September 1996
6 Monitoring and evaluation		n.a.						Decided in 1995
Building DEF's M&E wing	building opened		1	0	40%	\$56,250		
Computerizing DEF's M&E system	system in place		1	1	60%	\$4,981		

Computerizing forest statistics	system in place		1	1	60%	\$4,981	
Computerizing DEF's accounting	system in place		1	1	100%	\$10,840	
7 Applied research						\$217,118	
Eucalyptus growth	nb of species	15		5	33%		4 years
Soil conservation alternatives	ha	20		0	0%		4 years
Adapted species for 2 regions	nb of species	n.a.		63	n.a.		4 years
Inventory of new species in 2 areas	nb of species	n.a.		138	n.a.		4 years
8 Debt for Nature Swap program						\$2,500,000	5 years
Reforestation	ha	n.a.		2,516,246	n.a.		
Nurseries	nb	n.a.		1,750	n.a.		
Sensitization	nb sensitized	n.a.		273,232	n.a.		
Village association creation	nb	n.a.		941	n.a.		
9 Social forestry project (1995)						\$1,189,500	3 years
Reforestation	ha			65	n.a.		
Updating forest maps	nb of maps	3		2	67%		
Communal maintenance of plantations	ha	35		35	100%		
10 Forest seed improvement						\$240,250	7 years
Seed production	kg	7,786		23,827	306%		
Seedling production	nb	58,500		60,000	103%		
Seed sales	US\$	61,250		108,250	177%		
11 NRM project in Menabe 1/						\$655,750	2 years
Reinforcement of credit groups	nb of groups	162		162	100%		
Protection contracts with communities	nb of contracts	2		1	50%		
12 Support to CIREF in Morondava 1/						\$135,300	n.a.
Control and repression	nb of fines	n.a.		18	n.a.		
13 Highland watershed managt 1/						\$200,500	4 years
Land surveyance	ha	706		521	74%		
Reforestation	ha	995		737	74%		
Creation of peasant organizations	nb of organiz.	33		33	100%		
Creation of village committees	nb of committees			14	n.a.		

1/ Cost for 1995 only

Table 4: EPI Physical Achievements - LAND TENURE SECURITY (Direction des Domaines)

Activities	Unit	Target	Revised target	Actual	% of target	Duration	Cost	Remarks
1 Cadastral operations own-managed								
Area surveyed and delimited	ha	2,000,000	823,000	823,000	100%		FMG 101,000/parcel FMG 6,000/ha	Revision after start-up delays and coordination problems having led to criticism by field operators in protected areas
Titles issued	nb	100,000	40,000	12,003	30%	56 man-months	FMG 28,000/title	No operation completed due to the unavailability of cadastral plans
Parcels judged	nb	100,000	1,250	670	54%	100 man-months	FMG 27,000/parcel FMG 2,300/ha	
Parcels under litigation	nb	n.a.	n.a.	1,822	n.a.			
Parcels subject to appeal 1/	nb	n.a.	n.a.	n.a.	n.a.			
2 Cadastral operations contracted out to private surveyors								
Area surveyed and redelimited	ha	200,000	15,000	0	0%			Only one site programmed for 1996
Titles issued	nb	10,000	10,000	0	0%			
Parcels judged	nb	10,000	10,000	0	0%			
Parcels under litigation	nb	n.a.	n.a.	0	n.a.			
Parcels subject to appeal	nb	n.a.	n.a.	0	n.a.			
3 Studies and workshops								
Land lease	nb	1			80%	30 weeks	\$140,708	Under way, results expected May 96
Land taxation	nb	1			90%	21 weeks	\$43,667	ibid.
Communal tenure zones	nb	1			80%	22 weeks	\$68,851	ibid.
International symposium on land tenure and cadaster	nb		1		20%	3 days	n.a.	Symposium to be held last week of June 96
Project Management Unit Status	nb	1		1	100%	n.a.	\$4,250	Study recommended privatizing the unit. Ministry reluctant to agree, lest all the projects under its supervision followed the same route.
4 Computerizing cadastral records in rural areas	nb	1			10%	6 months	\$1,100,000	ICB under way

1/ Appeal to Court of Appeal after the Land Tribunal's decision

Table 5. First Environment Program 1991-1996 1/
Financing Plan: Allocations and Uses (in US\$)

Component	World Bank (IDA, Norwegian & Swiss grants)	USAID (KEPEM, SAVEM)	France	U.N. (UNDP, FAO, GEF)	WWF 2/	Switzerland	Norway (NORAD) 3/	Germany (GTZ, KfW)	Europe	Netherlands	Government 4/	Total
Environmental policies, Program coordination, Monitoring & Evaluation, Environmental Education (ONE)	\$6,200,000	\$22,000,000	\$800,000	\$1,400,000	\$1,700,000	-	-	-	-	-	\$3,778,051	\$35,878,051
Biodiversity Protection (DEF/ANGAP)	\$3,000,000	\$40,000,000	\$300,000	\$2,400,000	\$2,800,000	-	\$800,000	\$7,400,000	-	\$1,600,000	\$779,513	\$59,079,513
Forest Department (DEF) Reinforcement	\$7,000,000	\$22,500,000	-	\$2,950,000	\$1,000,000	\$10,900,000	-	\$8,100,000	-	-	\$775,720	\$53,225,720
Soil conservation (ANAE)	\$3,300,000	-	-	-	-	\$750,000	-	-	-	-	\$444,784	\$4,494,784
Cartography (FTM/CFSIGE)	\$7,600,000	-	\$2,700,000	-	-	-	-	\$3,100,000	-	-	\$634,863	\$14,034,863
Land security (DD)	\$5,700,000	-	-	-	-	-	-	-	-	-	\$2,812,275	\$8,512,275
Environmental Research (ONE/CNRE/CNRO/ORST OM)	\$1,000,000	-	\$400,000	-	-	-	-	-	-	-	-	\$1,400,000
Marine Environment (COI)	-	-	-	-	-	-	-	-	\$3,000,000	-	-	\$3,000,000
TOTAL ALLOCATED	\$33,800,000	\$84,500,000	\$4,200,000	\$6,750,000	\$5,500,000	\$11,650,000	\$800,000	\$18,600,000	\$3,000,000	\$1,600,000	\$5,447,154 \$7,683,943	\$187,309,148
of which: Grants	\$7,800,000	\$74,200,000	\$4,200,000	\$6,750,000	\$5,500,000	\$11,650,000	\$800,000	\$18,600,000	\$3,000,000	\$1,600,000	\$5,447,154	\$139,547,154
Loans	\$26,000,000	\$10,300,000	-	-	-	-	-	-	-	-	-	\$36,300,000
Tax exempt	\$7,800,000	\$84,500,000	\$4,200,000	\$6,750,000	\$5,500,000	\$11,650,000	\$800,000	\$18,600,000	\$3,000,000	\$1,600,000	-	\$144,400,000
TOTAL USED (end of EPI)	\$27,300,000	\$67,600,000	\$4,200,000	\$6,750,000	\$5,300,000	\$11,650,000	\$800,000	\$12,400,000	\$500,000	\$1,600,000	\$3,651,645 \$7,683,943	\$149,435,588
of which: Tax exempt	\$7,800,000	\$67,600,000	\$4,200,000	\$6,750,000	\$5,300,000	\$11,650,000	\$800,000	\$12,400,000	\$500,000	\$1,600,000	-	\$118,600,000

or 80% of Total Allocated

1/ Understood as including all environmental projects in Madagascar between 1991 and 1996

2/ Including \$700,000 from British ODA and \$200,000 from Deutsche Bank

3/ Funding from the Norwegian Foreign Ministry is channelled through the World Bank

4/ Before 1995, taxes (TTL and DTI) were paid out of an interministerial budget item and are therefore not captured here.

Based on the breakdown of Government counterpart for 1995, counterpart funds stricto sensu (RPI or Government funds for net-of-tax expenses) represent only 30%.

70% of counterpart funds representing TTL and DTI for 1991-1994 amounts to over \$7,000,000, which should be added to the \$5,447,154 allocated and \$3,651,645 used during EPI.

C. Field Impact of EP1

22. The overall development impact of the program is still not clear. The primary reason is that the central objective of the first phase was the creation and reinforcement of national institutions aimed at answering the needs of the environment. Institutional building takes a long time to translate into material and quantifiable benefits. Furthermore, the overall development impact of EP1 is limited given that field activities have so far been limited in scope. ANAE, in particular, suffered from insufficient funding to launch miniprojects in the first two years of the EP1. The shortfalls described above in the realm of M&E also explain why indications of impact are scarce.

23. However, ad hoc evaluations of field activities undertaken in soil conservation miniprojects, the management of protected areas and the management of gazetted forests reveal encouraging results.

24. **Table 6.A: ANAE.** On the basis of a very limited sample of miniproject sites for which data series are available between 1992 and 1996, the impact of the ANAE-funded activities is very positive. These four sites were located in the highlands and contained the usual conservation-development mix of ANAE packages (reforestation, hillslope development, soil improvement, together with vegetable growing, fruit tree growing, and dam rehabilitation). Thanks to ANAE's support during four consecutive agricultural campaigns, yields have risen significantly, new and more intensive techniques have been adopted, and crops have been diversified. Some land that previously was let fallow to allow for crop interspacing has been recovered and put under cultivation thanks to new crop mixes which allow soil regeneration. In four years annual family income increased between 20 and 85 per cent in real terms. Adoption rates of the new techniques by non-beneficiary farmers range between 48 and 246 per cent, which proves that the benefit of adopting the techniques is patent to many who have come in contact with the miniprojects without directly benefiting from them. Finally, the frequency of bush fires has been greatly reduced, in one case even eliminated, and on-site soil loss estimates suggest that conservation measures do have a real impact if the current estimated rates are compared to the national average (0.5 ton per hectare per year compared to 200 tons per hectare per year).

25. Some additional evidence that ANAE is having some real impact on the ground is included in Table 6.B. This table reflects the data from 5 sites in the Toliara province where ANAE financed energy-efficiency miniprojects. Activities consisted of the dissemination of energy efficient woodstoves and techniques to make charcoal out of *bozaka*, the typical savanna grass which grows on grazing land in the south of Madagascar. As a result of ANAE's intervention, considerable savings were recorded in the time spent by a household to collect wood and to cook and in the quantity of wood and charcoal used by a household for cooking and heating purposes.

26. **Table 7: ANGAP.** The most visible impact of ANGAP's work has taken the form of entry fees collected in protected areas. Between 1992 and 1995, the number of visits to protected areas has recorded very important annual increases due principally to improvements in the collection of fees (the number of incoming tourists rises by less than 10% annually). In 1995 only, the total revenues from all parks exceeded \$100,000, producing significant revenues that will cover part of the parks' operating costs and also generate investments into community development projects through the 50 per cent entry fee retrocession mechanism. Few systematic indicators are available as of yet to assess the impact of ANGAP's actions on biological conservation in Madagascar. Monitoring systems have been put in place in most protected areas under management. Although time series are still insufficient to identify real trends, there are indications that land clearing is decreasing in most areas.

27. **Link between Conservation and Development.** The view has now come to prevail that the protection of Madagascar's environment won't be won in the forests, let alone the protected areas. It is more likely that without appropriate measures to address such problems as low agricultural productivity, and land and resource insecurity, the spiral of degradation will not stop. In a nutshell, development still suffers from inadequate resources. Obviously, the NEAP cannot remedy this situation alone.

28. The first phase of the NEAP focused mainly on biodiversity protection in protected areas while promoting development work around them. The link between conservation and development was expressed by schemes called Integrated Conservation and Development Projects (ICDPs) in and around protected areas (see Annex A). In addition to these ICDPs, protection agents in 12 protected areas benefit from educational training provided by WWF.

29. Experience with ICDPs is mixed. While some of them have undoubtedly managed to curb reduction in forest cover, sensitization to the long-term link between conservation and development among the local population has been slow and underfunded. Responses to the needs of local populations are often inadequate: a participatory approach is adopted by more and more ICDPs but fundamental discrepancies remain between the objectives of the ICDP (mostly conservation) and those pursued by the population (mostly development). An ICDP is designed primarily for conservation and uses development as a means of compensation. Even if there was an effort to balance conservation and development, a high percentage of the resources provided by bilateral and multilateral donors is allocated to conservation, and development activities remain insufficient in relation to the needs of the population around the protected areas.

30. It is still too early to draw a balance sheet of how ICDPs have fared in Madagascar. Many of them have not been operational for more than a couple of years. While lessons must be learnt from past experience, it is necessary to test the methodology more with more variants to it, particularly on the degree to which the population should be involved in design, execution and monitoring. However, it is clear that only limited impact should be expected without massive infusions of financial and human resources, making the whole scheme unsustainable in the long run.

31. It is therefore EP2's responsibility to do more for environmental protection outside of protected areas, in particular in other forests and agricultural areas. In the latter, synergy with other operators from the private and public sectors must be encouraged (e.g. public and private extension, research, credit, tourism). The regional approach adopted in EP2 to address environmental problems should help establish those links. In addition, EP2 will do more in the areas of soil conservation and the management of forest ecosystems, including by promoting sustainable forest exploitation.

32. **DEF.** However early it still is for the new forest management techniques to produce significant impacts, it is clear that new revenues can be generated. In the gazetted forest of Ankeniheny where the first management plan is being implemented with DEF's support, a newly created association of over 100 lumber jacks benefits from 25%-higher-than-normal prices for products of higher quality. The supply of such higher-quality products will only increase with the mechanization of felling and sawing and the training of traditional exploitants. Side benefits include the advanced knowledge in the regeneration of valued timber species like palissander. No field impact can be noticed to date for the activities designed to build up DEF's capacity (forest and human resource policy and forest inventory). However, these measures were indispensable as revealed by the completion report for the Forests Protection and Management Project. The direct benefits of these activities can be measured in terms of the accrued knowledge and methods which will be used in the future. It is no understatement to say that DEF has come out of its lethargy and undergone a metamorphosis in the course of EP1, which will make it a real partner in the implementation of more rational methods to use renewable natural resources. Nevertheless, a comprehensive reform of DEF to make it service-oriented will not be possible without a general overhaul of the public administration and its systems of incentives.

33. Short of being able to detect a positive impact of titling on environmental conservation, one can at least state that DD's activities helped solve numerous land conflicts between neighbors. The public inquiry and the following legal procedure generally allows to clarify the tenure situation of a given plot of land which may be claimed by various parties and formalize this through the attribution of a right and a title.

34. **FTM.** As a support component of EP1, mapping and remote sensing does not have a directly monitorable field impact but enables the execution of other activities such as forest inventories, redelimitation of protected areas, titling, etc. Nevertheless, impact indicators related to FTM's long-term development have been designed for EP2 (see Annex 7).

35. **ONE.** Given its mandates, ONE does not have direct field impact. The impact of ONE's actions will be measured through the implementation of improved sectoral policies, the enforcement of environmental impact assessments for industrial investments or the even the acts of better informed individuals. In other words, the impact will be indirect and take a long time to materialize. Of all the institutions created or strengthened to implement EP1, ONE has faced the most challenging tasks. Unfortunately, its in-house capacity is still low respective to these tasks. It would therefore be tempting to reinforce ONE's internal capacity. However, it has always been the intention to keep ONE small confined within a non-operational role similar to that of a consulting firm. As an outcome of the beneficiary assessment held in 1995 (see paras ???-???), ONE underwent a capacity audit in March-April 1996. Among the recommendations of the audit, the scope of activities currently assigned to ONE should be narrowed, its role should be recentered on the advising/consulting function, the position of Director General should be reinforced, staffing and training plans should be reviewed and staff should be evaluated according to their performance in meeting preassigned objectives.

36. **General Public Awareness.** Without being attributable to any institution in particular, another achievement of EP1 is the degree to which it has helped raise public awareness for the environment. Environmental awareness has risen in the Malagasy population since the launch of the NEAP. Guides' associations trained and equiped by ANGAP help fight against deforestation in and around protected areas; lumber jacks' associations supported by DEF improve the management of gazetted forests by reducing waste; peasants' groupings helped by ANAE protect their watersheds against erosion; *fokontany* organize themselves for trash collection campaigns in some cities.

37. **International Visibility.** Moreover, EP1 has helped increase the international visibility of Madagascar in the outside world. The international community is doing a lot to help preserve Madagascar's species and their habitats. The Global Environment Facility (GEF) is ready to support incremental costs linked to biodiversity conservation under EP2. In addition, ecotourism holds potential for increasing revenues for biodiversity protection, while at the same time generating income for local populations. EP1 has supported some actions in promoting ecotourism. EP2 will continue and increase this support. A national foundation, *Tany Meva*, was set up to serve as recipient of donations of many origins -- public or private, local or international -- and shelter for smaller foundations. The funds invested in it will bear interest to be used for sustainable activities in natural resource management. Without the polarization of the international community on the protection of the country's natural riches, the plight of the Malagasy population would not even be known as well as it is today. Being a little provocative, one can argue that having emphasized the need for conserving Madagascar's unique biodiversity and concentrated aid on protected areas during EP1 has helped trigger off more international concern and actions for sectors such as agriculture, health and education. In light of this, the "lemurs vs. men" fallacy may finally help men more than they expected.

Table 6. A - Field Impact of ANAE 1/

Indicators	Tsimahabeomby		Miandrarivo		Amboasary Nord		Amparafarabe	
	Before	After	Before	After	Before	After	Before	After
Yields (T/ha)								
<i>Irrigated Rice</i>								
• Traditional	1.8	2.4	-	-	-	-	1.8	2.1
• - Broadcast	-	-	1.0	-	1.0	1.5	-	-
• - Replanting	-	-	2.0	2.5	2.0	2.5	-	-
• Line Planting	-	3.6	3.0	4.0	-	3.0	2.2	4.0
• Intensive	-	5.5	-	6.0	-	4.0	-	7.5
<i>Rain-fed Crops</i>								
• Cassava	10.0	60.0	10.0	20.0	10.0	10.0	7.0	42.0
• Yams	10.0	18.0	10.0	10.0	10.0	10.0	5.0	20.0
• Taro	50.0	50.0	40.0	40.0	-	-	-	-
• Potatoes	10.0	10.0	10.0	20.0	-	-	10.0	15.0
• Beans	-	-	0.8	1.0	0.8	1.0	-	-
• Groundnuts	-	-	-	-	2.0	2.5	-	-
• Garlic	-	-	-	-	-	10.0	-	-
• Onions	-	-	-	-	-	12.0	-	-
• Cabbage	-	-	-	-	-	20.0	-	-
• Cauliflower	-	-	-	-	10.0	20.0	-	-
Income ('000 of 1992 FMG)								
• Ag. Income per Family / year	599	1,108	2,968	3,591	860	1,548	-	-
Dissemination								
• Nb. families outside project adopting conservation techniques / Nb. families in project	85%		120%		48%		246%	
Conservation								
• Frequency of bush fires	2 y	0	2 y	4 y	2 y	4 y	1.2 m	6 m
• Soil loss (T/ha/year) 2/	-	~ 0.4	-	~ 0.5	-	~ 0.5	-	-

1/ On the basis of 4 miniproject sites located on the highlands between 1992 and 1996

2/ Data before miniprojects not available. The average figure for Madagascar is estimated at 200 T/ha/year on degraded land without conservation measures.

Table 6. B - Field Impact of ANAE 1/

	Before Miniproject	After Miniproject
Wood Collection Time / family 2/		
• Duration of consumption per collection	6.0 days	45.0 days
• Time spent on collection per year	60.8 days	8.1 days
Cooking Time / family 3/		
• Cooking time spent by woman per day	5.0 hours	1.25 hours
• Cooking time spent by woman per year	1825.0 hours	456.25 hours
Fuelwood Consumption / family 3/		
• Consumption per family per day	5.7 kg	1.5 kg
• Annual wood consumption	2.08 tons	0.55 ton
Charcoal Consumption / family 3/		
• Consumption per family per day	2.76 kg	0.75 kg
• Annual charcoal consumption	1.0 ton	0.27 ton

- 1/ On the basis of 2 miniprojects at 5 sites promoting more efficient energy consumption and benefiting 116 families in the area of Ranohira (Toliara province).
 2/ Improved woodstoves.
 3/ Improved woodstoves and *bozaka* charcoal bricks.

Table 7 - Field Impact of ANGAP

	Unit	Initial Target	Revised Target	Actual	Remarks
Visits to protected areas	nb. of visits	-	-	74,371	Significant yearly increase (155%-16%-86% between 1992 and 1995)
Annual income from entry fees	\$	-	\$70,000	\$90,437	Figures for the 4 most visited Protected Areas in 1995 only
Average tourist spending in peripheral area	\$	-	-	\$10	Daily spending in addition to the cost of lodging and entry fee, per tourist
Funds available for micro-projects	\$			\$118,129	
Number of micro-projects				102	
Population reached				3570	

MADAGASCAR

SECOND ENVIRONMENT PROGRAM SUPPORT PROJECT

Participation and Consultation

A. Beneficiary Assessment

1. Participatory evaluation has been gaining more ground since the beginning of EP1. A notable development was the beneficiary assessment conducted in 1995 for all of the EP1 activities. The design or redesign of EP2 took several of the beneficiary assessment findings into account. In addition, EP2 will systematize the beneficiary assessment approach and explore ways of introducing the principles into the various monitoring and evaluation systems already in place. Following are the principal findings of the beneficiary assessment conducted for EP1.
2. The following paragraphs synthesize five regional reports authored by the following research groups: CAST, Cabinet Colin Rabenitany (CCR), Groupe de Recherche pour la Connaissance du Sud (GReCS), MIARA MITA and Office Statistique et Informatique pour la Programmation du Développement (OSIPD). These reports evaluated the impact of the first five year environmental program (EP1) financed by the World Bank, USAID and various other donors. The first objective for this "user evaluation", better known as a Beneficiary Assessment (BA), was to have the different levels of beneficiaries assess for themselves the impact of EP1 and its success in attaining defined goals. The second objective was then to identify problems and make recommendations in preparation for the second five year program (EP2).
3. This evaluation took place between July and November 1995 and included interviews with 1,746 beneficiaries and numerous key informants. The five research groups covered distinct geographical zones. CAST covered the east of Madagascar, CCR the north, and GRECS worked in the south. The highlands in central Madagascar were covered by MIARA MITA and OSIPD. MIARA MITA also did the administrative part of the evaluation, which was conducted in Antananarivo and covered inter-agency collaboration and benefits. This Beneficiary Assessment was coordinated and financed by ONE and supervised by Catherine Reid.
4. This annex presents the outcome of the Beneficiary Assessment, s presented by the various consultants, it does not necessarily reflects the opinion of the EP2 appraisal team. Beneficiary Assessments are a tool for managers to improve program services through a better understanding of participants and their perceptions. They are not an objective measurement of actual achievements, this is the role of the monitoring and evaluation system.

Beneficiary Assessment Highlights and Consequences

Component or Agency	Positive Aspects	Negative Aspects	Recommendations	Influence on EP2 Design
General	<ul style="list-style-type: none"> * First comprehensive poll of rural perceptions of the Environment Program * AGEX found it useful 	<ul style="list-style-type: none"> * Fear of sanctions * Time horizon of Program too short to change attitudes in a lasting manner * AGEX poorly known * Mistrust of "outsiders" 	<ul style="list-style-type: none"> * Make exercise more systematic and insist on its constructive intent 	<ul style="list-style-type: none"> * Some AGEX will use BA reports as training tools
ANAE	<ul style="list-style-type: none"> * Success of many miniprojects and generated enthusiasm * Capacity building: more field operators than before 	<ul style="list-style-type: none"> * Bad projects covered up 	<ul style="list-style-type: none"> * Decentralize * Be more open about failures 	<ul style="list-style-type: none"> * EP2 will increase support for ANAE * First field impact studies executed * 5 regional antennas planned for EP2
Protected Areas	<ul style="list-style-type: none"> • Concept linking conservation and development • 50 % of entrance fees to Pas are funding micro-projects for neighbouring communities • Job creation (e.g. tour guides) 	<ul style="list-style-type: none"> * Conflicts on boundaries * Protected area operators act as "in conquered land" * Promises made to populations late in materializing * Uneven distribution of benefits 	<ul style="list-style-type: none"> * Include participation in planning stages * Uphold traditional values as much as possible * Accelerate disbursements of 50% of park entry fee revenues * Improve communication and information 	<ul style="list-style-type: none"> * Regional approach to development and conservation rather than ICDP exclusively
DD	<ul style="list-style-type: none"> * Titles solve land conflicts * Local staff known to the communities 	<ul style="list-style-type: none"> * No sign of link between titling and enhanced conservation * Social implications of titling overlooked 	<ul style="list-style-type: none"> * Improve information and sensitization 	<ul style="list-style-type: none"> * Assessment of land tenure policy and cadaster under way * EP2 will foster titling only when requested by the communities
DEF	<ul style="list-style-type: none"> * Positive reforestation activities 	<ul style="list-style-type: none"> * Salary differences with ANGAP hinder good cooperation 	<ul style="list-style-type: none"> * Improve communication with ANGAP at the field level * Actions to be taken against inefficient field agents 	<ul style="list-style-type: none"> * EP2 will include participatory forest management activities
FTM			<ul style="list-style-type: none"> * Conduct intensive marketing * Improve service quality 	<ul style="list-style-type: none"> * FTM is opening up
ONE		<ul style="list-style-type: none"> * Lack of human resources * Cumbersome administration * Unclear link with Ministry in charge of environment 	<ul style="list-style-type: none"> * Improve communication with private sector * Encourage better coordination among donors 	<ul style="list-style-type: none"> * Institutional audit held * EP2 will relieve ONE of unnecessary activities

4. **Two important caveats** are in order at this juncture. First, many of the efforts of EPI focused on capacity building at the institutional level. New agencies were created, contracts were awarded and guidelines established. An impressive amount of work was accomplished building institutions for the future. But a Beneficiary Assessment does not measure institution building, it measures impact **in the eyes of the community**. At that level, the findings are not as impressive, although laudatory for the scope of activities attempted. Second, this assessment was to be a constructive tool in the continuing effort to improve services on the ground. This document should not be used to give sanctions, but rather to fuel reflection and discussion on efforts to attain environmentally sustainable development.

5. General Findings and Conclusions

- The population views the environment as a resource to be used and profited from.
- There are no shortcuts on the investment of time: It requires years of consistent work to begin to see behavior changes.
- The inclusion of the population in all prioritizing and planning activities is necessary for long term impact.
- Better communication between the various actors is direly needed.
- Traditional values need to be explored and reinforced.
- There is a general mistrust of activities which require a large number of outsiders, especially expatriates.
- Migration has a strong negative impact on the environment. The population feels loyalty to the land where their family is buried.
- Almost nowhere does the population know the name or the function of the executing agency (ANGAP, ANAE) which funds and supervises the various NGO operators. In one case, even the name of the operator was unknown. This hinders the population in cases where they need to communicate grievances, abnormalities or successes to a higher level. It also hinders the executing agencies in providing oversight.
- In many of the areas visited, the population asked for intensive reforestation programs and seedling nurseries. They are willing to participate in the work and care for trees, especially in areas experiencing severe deforestation and erosion such as Bezaha Taheza and Andranovory. But the population expressed the need for adapted trees which should be distributed for planting in the correct season. *"We are convinced of the need to protect the environment. We have seen successful reforestation and our surroundings are becoming green again."* Villager near protected area.
- In areas where traditional structures no longer exist, the new community management groups (Comité de Gestion Villageois: COGES or CGV) are more effective. Where more traditional decision making bodies are evident, it is recommended to use them and not superimpose an outside structure.

6. **The Protected Areas: Creation and Management.** The overwhelming majority of the population recognizes the importance of their surroundings for their survival. The environment is viewed through the optic of its utility for providing the population's needs. The forest is described as providing items necessary for daily life; food, firewood, water, medicine and animal pastures. It also protects the soil, brings rain and provides shelter for the family tomb. The forest and the environment have direct, immediate benefits for the surrounding population. Rational use of environmental resources has been encouraged to protect the benefits for all.

7. Using this perspective, the new contracts now envisaged between villagers and the government for the controlled use of resources fit an already accepted logic. National parks and protected areas, in which natural resources cannot be used by the population are much less easily accepted. This is especially true when people from the outside (researchers, tourists, NGO agents) have access to these areas. Compensation for loss of various forest uses with other items deemed important by the community, such as schools and health clinics, has been seen as a way to balance the needs of community and national or international concern for the Malagasy environment. The community views compensation as a long term commitment to provide for needs of the population which are no longer being met by the forest.

8. The rural population's opinions of EPI activities are very conflicted. Almost everywhere, the number of **satisfied** beneficiaries is **equal to** those who are **dissatisfied** with the same programs. Naturally, those that directly benefit from the program (by employment, tourism, etc.) are somewhat more favorable to program returns than others. The benefits of environmental activities has been unevenly distributed between community members and even between different villages. This has exacerbated an already tense situation. Because dissatisfied people tend to be outspoken that satisfied ones, negative comments tend to outweigh the positive ones in the following paragraphs.

9. Unfortunately, in every region, in every project, there are people who are dissatisfied with the results of compensation agreements. Many of these promises have not been kept, leaving the population feeling betrayed. In one area, the population has transformed the acronym of the project into the expression "*people who speak with empty mouths.*" The negative impact of this perception (and reality) will hinder future activities. Dissatisfaction also comes from programs which don't fulfill expectations, i.e. schools without tables or teachers, health clinics without nurses or medicine, half completed water canals and wells.

10. All the evaluators involved in this assessment are convinced that the only way to have sustainable conservation is to actively involve the communities. Local participation will only happen if the communities become central actors in setting priorities and planning activities. And this, in turn, will only happen if the communities truly believe that their livelihoods are intrinsically important to outsiders, not just as part of a conservation strategy. This process of trust and engagement is one that takes time anywhere, but even more so in remote areas with little contact with those beyond their neighborhood.

11. This presents a dilemma for the NGO operators working on environmental protection. NGOs know the importance of community participation and involvement but they realize the time it takes to build such coalitions. They are constrained from taking a long term participatory approach by the urgency of the environmental degradation which they observe. It might require too much time to truly educate and engage the population in a environmentally sustainable plan. By the time this process is completed there might not be anything left to preserve. This leaves communities and EPI actors in a difficult and tense relationship, positioned in opposite camps.

12. The destruction of the environment is evident. Wild fires ravage the countryside in what most programs attribute to "traditional" ways. During the course of this evaluation, beneficiaries consistently noted that the current trend of extensive uncontrolled fires are not in accordance with customs and are sometimes criminal in nature. Drought, migration and political discordance are contributing factors. Many beneficiaries note that the traditional burning methods are controlled and therefore less dangerous. Some community members would like to encourage these traditional methods rather than completely forbidding fires which they see as having many benefits.

13. At the same time that the environment is being destroyed so are people's lives. EPI had been called a "povertization program" by those that see the negative impact of conservation efforts which are overwhelming concentrated on interdictions. In some areas, the boundaries of a protected area have been badly defined by the Administration, and the population is experiencing famine-like conditions because of limited access to what they consider "their" resources. "*People are hungry and NGOs block their access to food.*" Frequent meetings and lectures about

the importance of the environment alone will not motivate the population, who perceive the program's objectives as contrary to their well being.

14. The need to improve communication at almost all levels is evident here. Even when beneficiaries appreciate an activity, too often they do not see any link to environmental conservation (land titling, education, etc.). The population is often displeased because of the lack of contact or communication with the program operators, who are essentially outsiders.

15. The population distrusts the program implicitly because there are so many outsiders involved. Rumors abound in which agents or foreigners are involved in the illegal smuggling of plant and animal species by outsiders. The fact that program staff are not from the community, whether they are Malagasy or not, makes integration more difficult but all the more essential.

16. Many of EPI activities have inordinately benefited the richer, more educated population within the rural areas. Many of the pilot activities require inputs which are not accessible to everyone (land, capital, surplus labor). At Montagne d'Ambre, for instance, the pilot animal husbandry activities limited itself to a population which is educated and has extra financial resources to follow care instructions for improved breed animals. Because of this, the participants are all civil servants, who have a regular outside income. Is this the population applying the most pressure on the protected area? If not, perhaps program resources should be used to reach other groups.

17. The evaluators observed that it is often the poorest population which use the most primary resources out of the forest for their survival. Ironically, this marginal population has been little influenced by the environment program. It is essential to reach the marginalized population who currently oppose the environment program's activities. If not, those left out will continue to thwart or even sabotage program efforts.

18. There are other social tensions as well. Those involved in the tourist industry around the parks make considerably more money than other members of the community. In Isalo, the behavior of tourist guides preoccupies the population. The guides reportedly spend much of their free time drinking, taking drugs and playing cards. They no longer work in the rice fields and seldom visit their families. The breakdown of traditional values and customs creates stress within the community and adds to other problems already discussed.

19. There remain numerous conflicts and negative feelings about the protected areas' geographical limits. In many of the protected areas, over three quarters of the population does not know its exact limits. As already mentioned, as the protected areas were being set up, various guarantees were given about future activities to compensate the community for their loss of forest resources. Discussions of development programs, such as schools, health clinics and irrigation canals were considered promises by the population, even if they took place before the EPI even started. The fact that many of these schemes have not been realized has led to resentment and disillusionment. *"We are waiting for the water canal that was promised ten years ago, yet the program has given us nothing. In addition, they measured our grazing land and then forbade us to enter; they put up signs and transformed our land into a forbidden forest (protected forest)."* Beneficiary at Beza Mahafaly.

20. There exists a fundamental conflict between the long term planning strategies of the operators and the short term needs of the population, which has not been adequately addressed. As long as the forest is more economically advantageous than alternatives offered by the program there will continue to be considerable infractions and tensions. *"We are like rats caught in a trap, we're imprisoned here and are not allowed to use our resources."* Traditional chief.

21. A majority of beneficiaries highlight the importance of their environment and the extent of degradation is perceived by over half of those interviewed. Nevertheless, in some protected areas, up to 80% of the population is critical of conservation efforts. Most beneficiaries accept that conservation is necessary, although they point out that it shouldn't entail their becoming poorer. *"We have two choices, either we will stay and starve, or we will have to move elsewhere."* reported a villager in area where they are no longer allowed to use some of their rice fields.

22. The population vastly prefers development activities (schools, clinics, agricultural techniques) to conservation activities (reforestation, contour lines). It is the promise of this type of activity which motivate them to participate in the program. 82% of the population at Andringitra said that they want the project to stay and *"continue helping us to develop on all fronts: infrastructure, the economy, food security, and socio-cultural projects."*

23. **ANGAP.** Fifty per cent of the park ticket revenue is reserved for the surrounding population. It is to be used for development programs determined by the community themselves. This system - an initiative of ANGAP - is appreciated by the population who had never benefited from such fallout before the EP1. On the negative side, it appears that the system is extremely difficult to balance. There are more demands that can be met with the available funds and equitable distribution becomes a serious limitation. The development committee is supposed to decide on program funding, but in Isalo they are having difficulties doing this without alienating different villages.

24. ANGAP has undergone considerable institutional development and is capable and enthusiastic. Coordination with their operators and with other agencies still needs to be improved.

25. Recommendations:

- It is essential that the economic returns to the people living in the peripheral zones be more significant than at the present time. This need should be considered with each new program. Programs should analyze short term impact and clearly state the impact on poorer, marginalized populations.
- Collaboration should exist between regional programs, private actors and ANGAP to help identify vulnerable populations and exchange information about activities.
- ANGAP could accelerate disbursement of the 50 % of park entrance fees earmarked for the local population. This money should be more accessible to the communities and perhaps be kept at a local level. These funds have also lost a substantial percentage of their value due to inflation. This reinforces the need to disburse funds quickly.
- There should be a rationalization of the protected areas and other program sites, i.e. where there is no longer any forest the limits should be redrawn to reflect that reality. For example, at Ankarafantsika, there is a bustling town and a national road which runs through the

"protected area" encouraging illicit trade in precious woods by outsiders. And at the DEF site in Andranovory a beneficiary noted that, *"No one practices slash and burn any more because there is not longer any forest"*. In situations like this activities should focus on reforestation.

26. ANAE. There currently exists little to no coordination and collaboration between ANAE and ANGAP, although it was foreseen in the original design. A strong argument can be made that villages in the park periphery hold an ideal target population for ANAE. Once again the lack of coordination between executing agencies leads to a limiting of possibilities.

27. ANAE funding and activities have encouraged local NGOs and encouraged the creation of others. While there were few NGOs with whom to collaborate with in the beginning stages, there now exists more NGOs and, therefore, more of a choice. This should encourage a more rigorous selection process.

28. In Marovoay, the NGO representing ANAE is not known to the population. Activities are seen as the personal initiative of a DEF engineer, who gives them inputs (seeds, hoes, etc.) and training. The lack of transparency worried evaluators, who imagined that the population would demand more participation if they knew the extent of outside support and funding.

29. There exist some differences of priorities between ANAE and their operators. While ANAE focuses on soil conservation, many of its funded NGOs are more concerned with general development.

30. Success and enthusiasm in some of the ANAE sub-projects is striking. This should be encouraged and expanded upon. As one woman remarked *"Before, we would run out of rice and begin purchasing it from others by August. But now, we have enough rice to eat for an extra three to four months. All of this is due to improved rice growing techniques."*

31. Recommendations:

- ANAE is highly centralized, even after forming its regional centers. Much decision making needs to be devolved to the centers, although ANAE should continue to actively supervise.
- ANAE's success should allow it to be more open about other sites where activities are less successful. Mistakes in the field can teach lessons instead of meaning sanctions.

32. **Direction des Eaux et Forêts (DEF).** While DEF is called upon to represent the government and ensure that the Malagasy patrimony is protected, agents often feel inferior to the "private" agencies (ANGAP, ANAE, ONE) and NGOs due to large pay discrepancies. At Montagne d'Ambre, regional agents of DEF (SPEF) did not participate in EP1 because of conflicts over the different salary scales. In addition, agents hired by "Debt-for-Nature" to supplement DEF are paid much more than the DEF agents. This has created conflicts and resulted in the demotivation of some DEF agents. Different pay scales has also encouraged corruption in some areas, such as along the Route National 7. In this area DEF agents have illegally sold cutting permits despite large scale deforestation.

33. Regardless of its constraints, there have been some very positive reforestation activities (notably in Fandriana); creation of dams in two other sites are also viewed positively. *"We are convinced of the need to protect the environment. We have seen successful reforestation and our*

surroundings are becoming green again." In other areas, 22% of the population notes that fires and erosion are diminishing. 15% have increased incomes because of agroforestry activities and 20% no longer buy fertilizer because they have learned composting techniques.

34. Delayed payments from ONE are cited as a major constraint to DEF in carrying out planning and implementation.

35. There is currently insufficient staff for the present work load and this is exacerbated by the governmental freeze on hiring.

36. Recommendations:

- The roles of different DEF staff should be clarified and there should be a more coherent order to activities, purchases and training.
- Coordination is needed between organizations which work in the same areas. While there are less problems at a central level, there exist many misunderstandings in the field between ANGAP and DEF agents.
- DEF needs to identify those decentralized services that are performing well and those that are not. Sanctions should be administered to those that are not performing their tasks properly. There also needs to be more follow-up of decentralized agents and services.

37. **Direction des Domaines (DD).** Land titling is viewed favorably by beneficiaries because it is free and gives them legal rights to their land: "*Legal titling to the land has encouraged us to work and has especially given a clearer understanding of the limits that separate our land and the protected area.*" However, the connection to conservation is often missing. Only 3 % of the population in Ankarafantsika cited preservation of the protected area and environmental conservation as a reason for land titling. Beneficiaries believe that the government gave them titles to their land for several reasons: (i) to avoid conflicts; (ii) to increase tax revenues; and (iii) to allow them to sell the land.

38. Staff to this component have not looked at the many social implications of their work. In some cases, DD has given title to community land in the sole name of the traditional chief rather than in the names of the community inhabitants, even though DD agents knew that the population was against the idea. There are also instances of wealthier people getting title to larger parcels at the expense of their neighbors' land. One elderly woman remarked that she watched the land marker move closer to her house during each DD agent visit. The population has many concerns about paying land taxes and other possible fiscal responsibilities, which are not addressed during the sensitization.

39. In some areas, land titling has increased pressure on the protected area. Young people, who would normally have to wait for their land inheritance, began cutting down forest under the assumption that they would then get a title to it. And others that did not receive titles also enter to forest to find cultivable land.

40. Dramatically lower salary scales for DD agents, compared with the NGOs and "private" agencies has led to some negative consequences, including demotivation and indifference. This encourages corruption and abuse of power by some agents which, in turn, negatively affects the whole program.

41. DD was rated favorably in many areas because they and their local staff are known by the beneficiaries. The local community leaders (CLS) also facilitated communication with the beneficiaries.

42. Recommendation: DD needs to improve its information - sensitization component at all levels, especially concerning the free services which it provides.

43. **Office National de l'Environnement (ONE).** A major constraint for ONE is the lack of a clear institutional link or home within the government.

44. Lack of communication and cooperation between executing agencies and ONE has effectively negated ONE's role as a central coordinating body.

45. More communication with the private sector is also needed. Those private sector representatives interviewed were not aware of new environmental policies (Développement industriel écologiquement durable - Développement énergétique écologiquement durable) or legislation (e.g. Decree # 95-377 concerning the compatibility of investments with the environment). Therefore, these policy efforts have had little effect.

46. There is a serious lack of human resources within ONE which was remarked upon by every interviewee and confirmed during the evaluation team's dealings with ONE.

47. Recommendations:

- Identify a government structure which can guarantee and acknowledge the autonomous role of ONE in its decision making.
- Encourage better coordination and coherence in the financing and accounting requirements of the different donors.
- An institutional capacity audit should be conducted to highlight weaknesses in ONE's structure and collaboration efforts and make recommendations for positive change.

50. **The National Cartography Agency (FTM).** Funding and activities for FTM have changed drastically. Originally, grants were to fund most of FTM's equipment. These became loans, and it was decided that services should be paid for, without adequate financial analysis.

51. Beneficiaries are critical of FTM at all levels. It will need to conduct intensive marketing and provide better services to recapture the confidence of its clients.

52. While serious technological problems and institutional culture constraints exist, the evaluation team felt that FTM was making large efforts to deal more effectively with its public.

53. **Problems Encountered during the Evaluation.** First, the idea of a constructive assessment to improve ongoing work was unfamiliar to program level participants. This led to retention of information and documents.

54. The coordinating agency (ONE), the executing agencies, and the operators were all uncomfortable with the idea of being evaluated by their clients and suspicious of evaluators' motivations and political tendencies.

55. The fact that the evaluation would be used as a tool to plan PE.2 raised fears of reprisals and reprimands.

56. Coordination and communication among executing agencies, operators, and the evaluation team proved difficult. Different representatives were present at every meeting and information shared did not necessarily make it back to their organization.

57. Certain operators are quite possessive of "their" protected area and reticent about external, independent evaluations.

B. Forestry Policy

58. The forestry policy of 1985 based on the "Protect and Produce, Develop and Don't Destroy" motto has become obsolete in the context of economic liberalization, disengagement of the state from the productive sector and political decentralization. The new forest policy formulation process resulted from the mid-term review of the Forests Protection and Management Project in 1992 but only started mid-1994.

59. The process, followed in partnership by DEF and the Swiss NGO *Intercoopération suisse*, consisted of an 18-month long series of regional and national workshops in which representatives of the national and regional administrations, private operators, NGOs, development projects, informal associations and peasants' organizations participated in the formulation of this new forestry policy. This participatory exercise resulted in the validation of a forest policy at the national level and the drafting, in December 1995, of a forest code to be submitted to the National Assembly.

60. The four new orientations of this policy - i.e. (i) curbing forest degradation; (ii) improving the management of forest resources; (iii) increasing the forests' coverage and potential; and (iv) enhancing the economic performance of the sector - and the resulting Forest Master Plan have set the course of action to be followed by DEF and its partners in the forestry sector throughout EP2.

C. Local Management of Renewable Natural Resources

61. In order to address the pressures exerted on the environment by the situations of free access, in which natural resources are perceived as belonging to nobody and are consequently overused, Madagascar has launched a long-haul movement to reconcile human occupation and the environment.

62. Under the leadership of ONE, ANGAP and DEF, two major symposia were held in Mahajanga (November 1994) and Antsirabe (May 1995) which regrouped all walks of life: ministers, members of parliament, farmers, operators, various associations, etc. Both symposia examined ways of solving free-access problems by devolving the management of renewable natural resources to users. Typically, the users of a specific resource would, through a contract signed with the administration, be entitled to using - not owning - the resource and extract value from this right.

63. The Mahajanga Declaration was drafted on November 26, 1994 (see hereafter) and as a follow-up, a bill was drafted to be submitted to the National Assembly. In addition, EP2 has integrated the dimension of decentralized management through several components, notably ESFUM and GELOSE.

D. Participation in ICDPs

64. ANGAP, in partnership with PACT/GMU, also organized a workshop in May 1995 on participation and responsibilities in three USAID-funded protected areas (Ranomafana, Zahamena and Andohahela). One of the major findings of the workshop which brought together ICDP representatives, technical advisers and farmers, was the importance of the time factor in participation: the most participative ICDPs were also the slowest to produce concrete results but donors are mostly interested in results. Participation takes a long time and consensual decision-making. It should therefore be expected to start slowly but be more sustainable in the long run than top-down decisions.

65. The link between conservation and development was also discussed from the point of view of participation. Participation, as a preliminary condition for a mix between conservation and development, not just as a confidence-building device to rally local populations to the cause of conservation, was found to foster success in ICDPs. Real participation and mutual compromises seem indispensable ingredients to escape the stalemate too often caused by the divergence between objectives pursued by ICDP operators, i.e. conservation, and those pursued by the populations, i.e. development.

E. GEF-Funded Scientific and Participatory Workshops

66. A Global Environment Facility PRIF financed a participatory process for the design of the biodiversity elements of EP2. The GEF preparatory activity involved two stages. The first stage was a scientific priority-setting workshop followed by the second stage, a participatory priority-setting process which integrated both scientific findings and local stakeholder priorities. The scientific workshop followed a methodology established for the Amazon and other key biodiversity areas. It assembled over one hundred of the foremost authorities on the biodiversity of Madagascar. These specialists defined priority areas for eight species groups and identified historical patterns of habitat loss and current human pressures. Through a participatory process the workshop elaborated an integrated set of geographic priorities for biodiversity conservation and research (see Table ???). This scientific output was then taken to the stakeholder level to evaluate possible solutions, institutional needs, and conservation approaches. Through a series of local, multi-local, regional, and national consultations, national biodiversity conservation priorities were developed for EP2 (see Tables in annexes A and B).

67. The technical key findings of the participatory process were that the high-priority reserve approach was inadequate to address the full needs of biodiversity conservation in Madagascar and that approaches which better addressed the root causes of biodiversity degradation were

needed. The process also found a strong need for decentralization and an emphasis on reserves and forests which had not been targeted in the first five years of the NEAP. The scientific priority-setting process found that over half of the highest priority research and conservation areas lay outside of parks and reserves. The stakeholder consultations revealed the need to work with communities to manage forests and to develop a more decentralized approach to solving environmental problems.

68. As a direct consequence of the GEF PRIF funded exercises, the AGERAS and FORAGE components were introduced into EP2 design to address the regional and spatial dimensions of environmental problems.

F. Regional Priority-Setting Workshops

69. To complete the consultative process before the launch of EP2, three priority-setting exercises were carried out at the regional level, which served as a rapid evaluation of the activities undertaken in EP1 and gave the implementing agencies and the donors a better idea as to the expectations of the regions for EP2. 89 people including 22 farmers or breeders, 36 members of the regional administration and 32 operators (private businesses, NGOs, church groups, etc.) participated in three different two-day workshops. Across the three workshops held in Toamasina, Antsiranana and Toliara, the participants were asked to express their quantified preferences on the EP2 proposal.

70. The results were the following: the ESFUM component received the most points in all three, followed by ANAE's microprojects in two instances and ANGAP's management of protected areas in the third one. The improvement of living conditions, regional socio-economic development and the conservation of natural resources came out as the priority goals of the environment program.

71. These findings comforted the donors in their views that more needed to be done during EP2 to (i) promote the management of natural forests; (ii) reinforce environmental education and information; and (iii) multiply ANAE's miniprojects. Interestingly, all three components were largely underfunded during EP1.

MADAGASCAR

MISSION MULTIBAILLEURS D'EVALUATION DU PE2, MULTIDONOR EP2 APPRAISAL MISSION

(Chef de mission - Mission leader : Siméon, Banque mondiale)

Groupe	Groupe 1		Groupe 2			Groupe 3			Groupe 4			Groupe 5		
Chefs de file	Labrousse, Finoana, Rabemananjara		Gaylord, Andriamampianina, Rakotonindrina			Rantrua, Rakotoary			Weber, Rakotovao, Randrianarison			Wolff		
Thème	ESFUM	GCES	APET	MARIN	URBAIN	IGB-SIE-CADASTRE	GEST LOC, DECENTR., FONCIER	Recherche, SIEF	ECO	INST	LEGAL	FACIL	DIVERS	Tot.
Allemagne	Sepp-C									Fischer-B		Wolff-C		3
Banque mondiale	Wong-B		Clément-C	Gabriel-C		Rantrua-B			Bosquet-B Keck-B	Reid-C	Clément-C	Bosquet-B	Falloux-B	9
FIDA	Schellekens-C												Bakayoko-B	2
France		Perez-C	Saurin-R		Lebigot-R	Gallois-R Pinganaud-R	Bertrand-R	Albrecht-R Elouard-R Moizo-R	Weber-C				Galtier-B	11
Japon	Kawamata-B													1
Nations Unies		Traore-C Koohafkan-C	Raondry-R Tilkin-C							Soumahoro-B	Cacaud-C		Daso-B Hough-B Tilkin-C	8
Norvège	Sydness-B													1
Suisse	De Rham-B Giger-C Labrousse-C West-B													4
Union européenne			Dailly-R	Avalle-R Desan-R Lalande-R										4
USAID	Gallegos-B		Gaylord-B Grenfell-R Monfort-C	Wynter-C	Enders-C	Dufils-R	Bingham-C Scharffenberger-R			Scharffenberger-R	Bingham-C	Andriam-ialison-C Rasemdratsi rofo -C		11
ONG (CARE, CI, VSF, WWF)	Rabetaliana-R Rajaonson-R Roffet-R Siegel-R	Veerkamp-R	Clausen-R Langrand-R	Siegel-R	Fry-C	Lehman-R	Rabodomalala-R				Vonk-R			12
Total	20		20			13			13			4	6	76

B= bailleur
C= consultant
R= personne ressource

Cost Tables

Madagascar		(million FMG)					('000 US\$)				
Second Environment Program Support Project											
Components Project Cost Summary		Local	Foreign	Total	% Foreign Exchange	% Total Base Costs	Local	Foreign	Total	% Foreign Exchange	% Total Base Costs
A. Field Operations											
1. Specialized Sub-sector activities											
a. Sustainable Soil and Water Management											
Soil Conservation and Improvement of Rural Life		104,303	9,998	114,301	9	19	24,834	2,380	27,214	9	19
Ankarafantsika Watershed		15,570	14,969	30,538	49	5	3,707	3,564	7,271	49	5
Other Watershed Management		13,324	8,642	21,967	39	4	3,172	2,058	5,230	39	4
Subtotal Sustainable Soil and Water Management		133,197	33,608	166,805	20	28	31,714	8,002	39,716	20	28
b. Multiple Use Forest Ecosystem Management											
		56,867	56,917	113,785	50	19	13,540	13,552	27,092	50	19
c. PCDI and CAPE											
Integrated Conservation and Development Projects (PCDI)		42,882	-	42,882	-	7	10,210	-	10,210	-	7
National Parks and Ecotourism		84,882	39,203	124,085	32	21	20,210	9,334	29,544	32	21
Subtotal PCDI and CAPE		127,764	39,203	166,967	23	28	30,420	9,334	39,754	23	28
d. Marine and Coastal Environment											
		13,389	12,064	25,453	47	4	3,188	2,872	6,060	47	4
Subtotal Specialized Sub-sector activities		331,218	141,792	473,010	30	80	78,861	33,760	112,621	30	80
2. Regional Programming and Local Management											
Support to Local NR Management		12,991	13,469	26,460	51	4	3,093	3,207	6,300	51	4
Support to Regional Programming		10,197	5,667	15,864	36	3	2,428	1,349	3,777	36	3
Regional Fund for Environmental Management		12,419	-	12,419	-	2	2,957	-	2,957	-	2
Subtotal Regional Programming and Local Management		35,607	19,136	54,743	35	9	8,478	4,556	13,034	35	9
Subtotal Field Operations		366,825	160,928	527,753	30	89	87,339	38,316	125,655	30	89
B. Strategic Activities											
1. Policies, Strategies, Instruments		3,188	6,850	10,038	68	2	759	1,631	2,390	68	2
2. Making EIA Operational		3,365	2,674	6,040	44	1	801	637	1,438	44	1
Subtotal Strategic Activities		6,553	9,524	16,078	59	3	1,560	2,268	3,828	59	3
C. Support Activities											
1. Environmental Research		5,121	4,330	9,451	46	2	1,219	1,031	2,250	46	2
2. Education, Training		3,220	4,340	7,560	57	1	767	1,033	1,800	57	1
3. Geographic Instruments		1,848	2,772	4,620	60	1	440	660	1,100	60	1
4. Environmental Information System		2,686	3,719	6,405	58	1	640	886	1,525	58	1
5. Program Coordination and Management		14,049	7,703	21,752	35	4	3,345	1,834	5,179	35	4
Subtotal Support Activities		26,924	22,864	49,788	46	8	6,411	5,444	11,854	46	8
Total BASELINE COSTS		400,302	193,316	593,619	33	100	95,310	46,028	141,338	33	100
Physical Contingencies		17,401	9,201	26,602	35	4	4,143	2,191	6,334	35	4
Price Contingencies		83,165	36,890	120,055	31	20	5,080	2,255	7,335	31	5
Total PROJECT COSTS		500,869	239,407	740,276	32	125	104,533	50,473	155,007	33	110

Madagascar Second Environment Program Support Project Expenditure Accounts by Components - Base Costs ('000 US\$)										
Field Operations										
Specialized Sub-sector activities										
Sustainable Soil and Water Management				PCDI and CAPE			Regional Programming and Local Management			
Soil Conservation and Improvement of Rural Life	Ankarafantsika Watershed	Other Watershed Management	Multiple Use Forest Ecosystem Management	Integrated Conservation and Development Projects (PCDI)			Marine and Coastal Environment	Support to Local NR Management	Support to Regional Programming	Regional Fund for Environmental Management
				National Parks and Ecotourism						
I. Investment Costs										
A. Civil Works	930	626	155	5,253	-	4,339	462	216	-	-
B. Goods	321	299	358	1,648	-	1,629	645	1,030	120	-
C. Vehicles	963	-	964	2,666	-	2,856	410	-	250	-
D. Consultant Services										
Short Term Consultants	-	-	498	1,272	-	-	810	500	614	-
Long-Term Technical Assistance	-	1,979	60	4,902	-	1,296	429	263	-	-
Contracted Services	-	432	140	2,947	-	1,209	1,318	2,850	1,158	-
Subtotal Consultant Services	-	2,411	698	9,121	-	2,505	2,557	3,613	1,772	-
E. Training and Fellowships	-	-	218	1,211	-	438	92	541	-	-
F. Mini-projects	18,827	-	964	107	-	-	381	-	-	2,957
G. Regional Fund Projects	-	-	-	-	-	-	-	-	943	-
H. Unspecified	-	-	-	-	10,210	-	-	-	-	-
Total Investment Costs	21,040	3,336	3,357	20,007	10,210	11,767	4,546	5,400	3,085	2,957
II. Recurrent Costs										
A. Staff	1,725	-	560	3,055	-	10,008	376	-	331	-
B. Operation and maintenance of Vehicles	-	-	918	1,379	-	4,419	216	-	141	-
C. Other Operating Costs	4,449	3,935	396	2,651	-	3,350	922	900	220	-
Total Recurrent Costs	6,175	3,935	1,874	7,085	-	17,777	1,514	900	692	-
Total BASELINE COSTS	27,214	7,271	5,230	27,092	10,210	29,544	6,060	6,300	3,777	2,957
Physical Contingencies	1,361	-	262	1,355	100	1,477	303	315	378	-
Price Contingencies										
Inflation										
Local	6,740	-	607	2,508	242	4,758	705	502	770	-
Foreign	118	-	73	716	-	513	143	155	100	-
Subtotal Inflation	6,858	-	679	3,224	242	5,272	848	657	871	-
Devaluation	-4,979	-	-438	-1,777	-180	-3,433	-508	-356	-563	-
Subtotal Price Contingencies	1,878	-	242	1,447	62	1,838	340	301	308	-
Total PROJECT COSTS	30,453	7,271	5,733	29,893	10,372	32,860	6,703	6,916	4,463	2,957

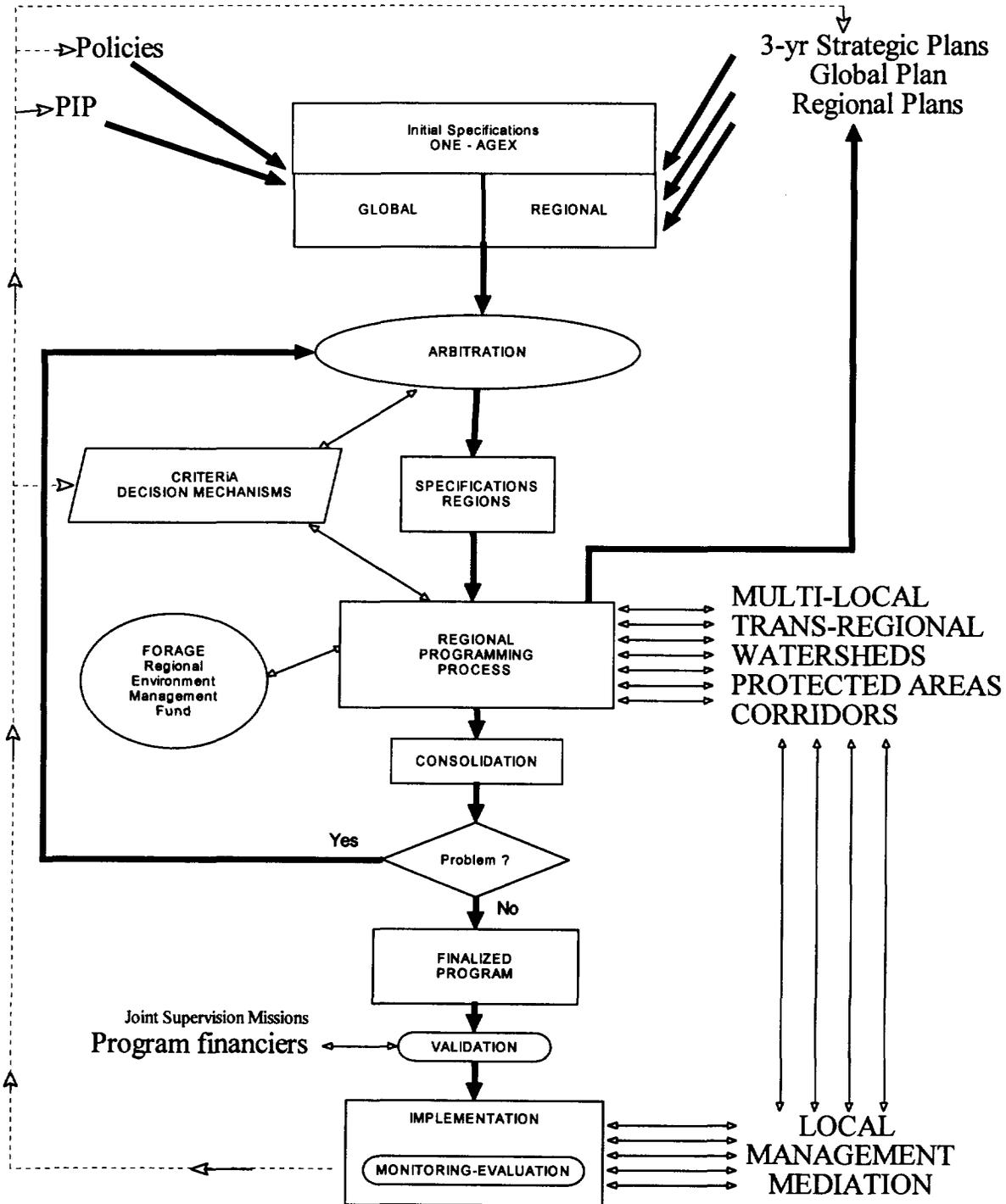
Strategic Activities		Support Activities					Total
		Environmental Research	Education, Training	Geographic Instruments	Environmental Information System	Program Coordination and Management	
Policies, Strategies, Instruments	Making EIA Operational						
-	-	-	-	-	-	-	11,981
-	150	24	210	1,100	350	404	8,287
-	-	43	-	-	-	564	8,716
1,350	38	130	205	-	495	200	6,112
-	-	-	500	-	-	-	9,428
1,040	700	1,628	230	-	335	1,121	15,108
2,390	738	1,758	935	-	830	1,321	30,648
-	150	246	75	-	32	400	3,403
-	-	-	105	-	-	-	23,341
-	-	-	-	-	-	-	943
-	-	-	-	-	-	-	10,210
2,390	1,038	2,070	1,325	1,100	1,212	2,689	97,528
-	-	55	60	-	73	1,239	17,483
-	-	27	-	-	-	30	7,130
-	400	98	415	-	240	1,221	19,197
-	400	180	475	-	313	2,490	43,809
2,390	1,438	2,250	1,800	1,100	1,525	5,179	141,338
120	72	113	90	55	76	259	6,334

**Outline of Manual of Procedures for Environmental Management
(coordination and inter-institutional relationships)**

In order to prevent the recurrence of conflicts of institutional responsibility, as it has happened in the past, ONE and the KEPEM project have prepared a Manual of Procedures that specify responsibilities in the following way:

- The actions to be carried out under the programme are described as a series of generic activities (e.g. formulation of sector policies).
- A list of all possible actors has been established, on the basis of the institutional set up of the Program. They are:
 - ⇒ The Government as a whole (Cabinet)
 - ⇒ The National Environment Council (CNE)
 - ⇒ The Ministry in charge of the Environment
 - ⇒ The Interministerial Environment Committee (CIM)
 - ⇒ The Technical Ministries
 - ⇒ The National Environment Office (ONE)
 - ⇒ The Implementing Agencies (AGEX) of the Program
 - ⇒ The Private Operators
 - ⇒ NGOs
 - ⇒ Local Governments
 - ⇒ The Environment Program's Steering Committee (COS)
 - ⇒ The Financing Agencies
- A list of eight possible types of involvement:
 - ⇒ Designs, prepare
 - ⇒ Clears
 - ⇒ Approves, decides
 - ⇒ Presents, submits
 - ⇒ Participates
 - ⇒ Executes
 - ⇒ Controls
 - ⇒ Is informed
- For each activity, a "responsibility matrix" is presented. The rows describe the series of generic tasks corresponding to the activity (e.g. for the formulation of sector policies, the list includes: identification, definition of objectives, drafting of terms of reference for studies, etc.). The columns correspond to all the actors listed above. Using eight different symbols, each cell of the matrix show the type(s) of involvement of each actor for each task.
- The Manual presents about forty such tables. In addition, there are five annexes that describe a number of key institutional mechanisms and potential problem areas such as:
 - ⇒ procedures for concertation
 - ⇒ the coordination function
 - ⇒ managing decisions on coordination problems
 - ⇒ mapping of interinstitutional relationships
 - ⇒ relationship with NGOs, Government projects, donors

EP2: Annual Financial Programming Process



TERMS OF REFERENCE FOR MULTI-DONOR SUPERVISION STAFF

Introduction

During the preparation process for the Environment Program 2 (EP2), it became evident that there was a need for a focal point to facilitate coordination of the multi-donor interventions for Environment Program 2. Based on the past year's experience with a resident World Bank staff person with task management responsibilities for the Bank's EP1 components, the donors and international agencies involved in the EP2 preparation process have recommended that a resident Madagascar Multi-Donor Supervision Staff (MMDSS) be established. This will ensure a focal point for donor coordination, working for all the donors and paying full-time attention to administrative, financial, programmatic and other matters related to implementation of EP2.

Justification

Given the importance of the program (the financial envelope would reach \$155 million) and the number of donors, international agencies and non-governmental organizations involved in implementation (World Bank, UNDP, FAO, UNESCO and US, German, French, Norwegian, Swiss and Japanese bilateral assistance agencies, Care, WWF and Conservation International), having a person responsible full time for navigating between these agencies and between these agencies and the Malagasy executing agencies is justified.

Specific Scope of Work

The role of the MMDSS would be twofold: (a) to serve as a focal point for donor coordination and facilitation of implementation of donor contribution which are part of EP2 and (b) to serve as task team member for the World Bank (IDA) contributions of EP2 and in its role of fiduciary agent for funds expected from IFAD, GEF and Norway. The MMDSS would be responsible for the following specific tasks :

- (a) responsible for serving as a secretariat for the donors involved in EP2, calling and organizing local donor meetings, preparation of issues papers for discussion and ensuring the dissemination of information on all the components and support elements of EP2 to all the donors, international agencies and non-governmental organizations and AGEX;
- (b) responsible for facilitating functional contacts between donor agencies and the AGEX and for trouble-shooting and facilitation of problem-solving between those agencies;
- (c) responsible for assisting in the standardization (to the extent possible) of various donor administrative arrangements for program implementation;
- (d) responsible for playing a role in regional work programming, especially for assisting in the definition of the regional programming processes and structures;

- (e) responsible for organization and participation in local multi-donor missions in coordination with the task managers and project officers of the various donor agencies;
- (f) responsible for providing regular quarterly reports on the progress of the overall program to the donors and for input to the Washington-based Multi-Donor Secretariat newsletter on the Madagascar Environment Program;
- (g) responsible for assisting in the design and implementation of beneficiary assessments for EP1 and EP2;
- (h) responsible for monitoring the monitoring and evaluation processes of the AGEX and those of the various components of EP2;
- (i) responsible for assisting in making linkages between the macroeconomics framework for the PIP and EP2; and
- (j) responsible for maintaining close linkages with the AGEX and with the environmental desk officers of the sectoral ministries (once established).

Time Frame

Ideally, the MMDSS would be resident in Madagascar from October 1996 till end-1998, with possible extensions if deemed necessary by the donors and contingent upon available financing.

Qualification

The MMDSS should have: (a) a master's level university degree, preferably in environmental or physical sciences (work experience and other qualifications can serve in lieu of a specifically environmental sciences degree); (b) complete mastery of French and English; (c) good communication skills and ability to work with a broad variety of individuals; (d) prior experience in project management, especially environmental projects; (e) knowledge and familiarity with Madagascar and the Environment Program; (f) good foundation in environmental economics; and (g) excellent computer skills.

Indicative US\$ Budget (this budget is based on a one-year scenario)

Salary and Benefits	\$ 50,000
Housing	\$ 12,000
Relocation	\$ 5,000
Local Travel and Per Diem	\$ 5,500
International Travel	\$ 7,500
TOTAL	\$ 80,000

Offices, support staff and local communications will be provided by the host agency.

MADAGASCAR

SECOND ENVIRONMENT PROGRAM SUPPORT PROJECT

Monitoring and Evaluation (M&E)

Consolidation of M&E. The program approach adopted for EP2 requires that the M&E function be consolidated at the program and no longer at the project/agency level. The program approach creates a need for global information on the financial situation of the program and its various components, the rate of completion of work, the impact achieved, etc. However, as explained in Annex 1, the M&E function failed to become operational under EP1 because the system designed to cover the whole Program attempted to become an internal monitoring and evaluation tool. In doing so, it became a useless competitor of the M&E tools deployed by each component or agency. For example, the system was supposed to include 1300 indicators which is far too much for external M&E. In order to ensure coherence of internal and external M&E, a M&E task force including all the agencies has been set up during EP2 preparation to prepare all the necessary documentation. This task force will continue to meet to address the various common issues and prepare the bi-annual report for COS and CFE meetings.

Quantitative M&E. Therefore, contrary to what happened during EP1, quantitative M&E must principally be conceived in terms of external monitoring and evaluation. The quantitative tools will consist of an array of indicators, maximum 10 per component, which will measure the performance and impact of activities undertaken against predefined annual targets. Variations from the target values will need to be explained. Initially, indicators should be consolidated manually. Contingent upon successful development of the system, computerization based on adapted software would be considered.

In addition to the set of indicators, it is crucial that the agencies continue to prepare strategic work programs and annual work programs. However, ONE from now on needs to harmonize the budgetary and spatial codification of these plans to allow effective monitoring and evaluation. Progress in the implementation of these plans will be reviewed twice a year, during the CFE and COS meetings.

Environmental Information System (EIS). The *Tableau de Bord environnemental* experience of EP1 allowed to define the principles of an EIS and bidding for hardware and software is under way. The network structure makes each component or agency responsible for defining and operating its data bases and catalogues. ONE will ensure proper data exchange, verify the coherence among catalogues, assist other agencies to reinforce their data bases, and, when needed, carry out cross-component analyses and publish results.

Qualitative M&E. The qualitative tools will include periodic beneficiary assessments to cover the whole or specific parts of the Program, plus a number of ad hoc instruments of which a number have been described in Annex 1bis on Participation and Consultation.

Mid-term Review. The M&E setup would include a multidonor mission to assess the performance and impact of the program at mid-term. The performance of each component would be assessed in relation with the quantitative objectives set up in their annual work programs and the corresponding achievements as documented by the M&E system, and if need be the design of the program would be adjusted, including the allocation of funds to the various activities of the program.

EP2 External Indicators. Following is a tentative list of quantified M&E indicators, as well as the standard description sheet which should accompany each of these indicators to specify its characteristics (qualities, measurement specification and cost, source, formula and parameters...). Some indicators need to be further refined. Most indicators have been assigned a target value to be reached by the end of EP2. Values to be reached at the end of every Program year have also been defined or will defined before implementation but are not presented here. The final list of indicators and quantitative annual targets would constitute a contract between the Program implementing agencies and the Government and donors. All these indicators have been standardized and gathered into a M&E report produced by the M&E committee.

List of Impact and performance indicators

Component	Objectives	Indicators	unit	PY5 target	Code	I/P (1)	Source of measurement
Sustainable Soil and Water Management							
● Promote techniques of soil management coherence with environment	● Top soil loss in miniproject sites		1t/ha/year	<1	MPI01	I	M&E ANAE
		● Area under direct conservation from miniprojects	Ha	8,300	MPP02	P	M&E ANAE/ Operators
● Promote rationale land use	● Area of large watershed protected		Ha	4,150	MPI03	I	Surveys/Ex post evaluation Accounting System (AS) DEF/ANAE
		● Programs coherent with recommendations implemented	Number		MPP04	P	
● Strengthen technical capacities	● Families outside projects adopting techniques		Number	50,000	MPI05	I	Survey/farmers self-evaluation M&E/ANAE/ Operators M&E ANAE
		● Families participating in miniprojects:	Number	26,400	MPP06	P	
		● Peasant associations operating their own miniprojects	Number	80	MPP07	P	
		● Reduction of ANAE budget participation	%	20	MPP08	P	
● Participate to yield and financial increase	● Internal Return Rate		%	10	MPI09	I	ANAE
		● Agricultural income increases in miniproject sites	%	30	MPI10	I	M&E/Ex post evaluation
		● Yield increases in miniproject sites	%	50	MPI11	I	
Multiple-Use Forest Ecosystem Management (ESFUM)							
● Knowledge of the status of forest and its evolution	● Area mapped		Ha		SFP01	P	DEF
		● New protected areas created	Number	4	SFP02	P	DEF
		● Control stations set up	Number	10	SFP03	P	DEF
● New forest management practices	● Area under Natural Resources contracts		Sq. Km	1500	SFP04	P	DEF
		● Increase in populations' income from forest products	%	10	SFI05	I	DEF/Operators
	● Texts ratified		Number	7	SFP06	P	DEF
		● Forest operators trained in new techniques	Number	150	SFP07	P	DEF/ Training center
		● Increase of revenues in forest research stations	%	50	SFP08	P	DEF
● Increase forest surface and potential	● Area reforested		Ha	30,000	SFI09	I	DEF/Monthly control stations reports
● Increase performance of forest service staff	● Annual Work Plan realization		%	80	SFP10	P	DEF
National Parks and Ecotourism							
● Protected area network set up	● Protected areas with operational structure and funding		Number	12	APP01	P	ANGAP/DEF
● Network conservation	● Operational managing structures		Number		APP02	P	ANGAP
		● Degradation of primary forests in level-A protected areas	%		API03	I	ANGAP/FTM
● Network Sustainable management	● Protected areas under direct management by ANGAP		Number	11	APP04	P	ANGAP
		● Self-financing of ANGAP	%	14	APP05	P	AS ANGAP
● PA used as training sites	● Annual increase in . of tourists visiting level-A protected areas		%	20	APP06	P	ANGAP
● PA used for entertainment	● Students and pupils having visited the protected areas		Number	11000	API07	I	ANGAP
● Participate to local population development	● Amount of entrance fees available for mini-projects		US\$	89000	API08	I	ANGAP

Marine and Coastal Environment

● Ensure sustainable management and exploitation of marine natural resources	● Local management plans under implementation	Number	MCP01	P	Survey
	● Zone under existing regional action plans	Sq. Km	MCP02	P	ONE/EMC
● Participate to local population development	● Fishing yields in managed areas	Tons	MCI03	I	PRECOI/EMC
	● Increase in fishing families' income	%	MCI04	I	PRECOI/EMC
	● Increase of foreign currency by activities diversification	%	MCI05	I	PRECOI/EMC
● Prevent marine pollution	● Diminution of marine pollution	Quality ratio	MCI06	I	PRECOI/EMC
● Marine biodiversity conservation	● Surface of new protected areas created	Sq. Km	MCP07	P	ONE/EMC

Local Natural Resource Management and Land Tenure Security (GELOSE)

● Locally sustainable management of NR	● Management Transfer completion rate	%	GEP01	P	ONE
	● Land tenure security (LTS) completion rate	%	GEP02	P	DD
	● Agreed environmental mediators	Number	GEP03	P	ONE
	● Status of renewable resources within local management areas	Quality ratio	GEP04	P	Survey
● Increasing Biodiversity and NR benefits for local community	● Total area under relative land tenure security	Sq. Km	GEP05	P	DD
	● Economical management systems implemented	Number	GEP06	P	ONE
	● Management cost per hectare	US\$ Eq.	GEP07	P	ASONE
	● cost per hectare of LTS	US\$ Eq.	GEP08	P	AS DD
	● Increase in populations' income where management transfer is implemented	%	GEP09	P	Survey
● Land tenure security	● Total of tax collection within land tenure security areas	FMG/Hab	GEP10	P	
	● LTS cost recovery	FMG million	GEP11	P	

Support to Regional and Spatial Approach (AGERAS)

● Biodiversity conservation	● Threats on biodiversity within AGERAS managed areas	Quality ratio	AGI01	I	Operators PA/Regional structure (RS)
	● Local capacities development	Quality ratio	AGI02	I	AGERAS/RS
	● Multilocal problems resolved	%	AGP03	P	AGERAS/RS
	● Operational participative multilocal structures	Number	AGP04	P	AGERAS
	● Operational regional planning units	Number	AGP05	P	AGERAS
	● Projects completion rate	%	AGP06	P	AGERAS

Regional Fund for Environmental Management (FORAGE)

● Promoting regional environmentally sustainable financing mechanism on a demand driven basis	● Financing requests sent to FORAGE	Number	FOI01	I	FORAGE
	● Projects financed by FORAGE/ project request	%	FOP02	P	
	● Average waiting period between request and implementation	month	FOP03	P	

Strategies and EIA

● Environment policy formulation	● Formulated policies	Number	11	PSP01	P	ONE
	● regulations texts agreed and diffused	Number	11	PSP02	P	ONE
● Policy implementation	● International conventions ratified	Number		PSP03	P	ONE/Miniteries
	● Evolution of Environment status	Quality ratio		PSI04	I	ONE/Miniteries
	● Operational environmental units created	Number		PSP05	P	ONE/Miniteries
	● Environmental NGOs and associations	Number		PSP06	P	ONE/Miniteries

● Making EA procedures operational	● Total investment subject to environmental impact assessments	US\$ Eq.	PSI07	I	ONE
	● Actions implemented by local population	Number	PSP08	P	ONE
	● Private companies in accordance with environmental standards	Number	PSI09	I	ONE
	● Public surveys	Number	PSP10	P	ONE
	● Operations reviewed by ONE	%	PSP11	P	ONE
	● EIA realized	Number	PSP12	P	ONE

Environmental Research

● Promote instruments for sustainable NRM	● Research fields finalized	Number	REP01	P	research agencies
	● Strengthen local researcher capacities	Number	REP02	P	AGEX
● Strengthen local researcher capacities	● Contracts and terms of references issued	Number	REP03	P	ONE/CAREE
	● Quality of results	Quality ratio	REP04	P	survey
	● Consultation of reports	Number	REI05	I	ONE/CAREE

Communication, Education and Training

● Enhance communication activities and impact	● TV/radio shows and magazines on the Environment	Number	CEP01	P	ONE
	● Audience of broadcast programs	Number	CEP02	P	ONE/survey
	● Messages assimilated by populations	%	CEI03	I	Survey
● Enhance environmental training	● Educational staff trained	Number	CEI04	I	CFSIGE
	● % satisfied training requests	%	CEP05	P	Survey
	● Schools with green classes	Number	CEP06	P	CFSIGE
	● Students attending green classes	Number	CEI07	I	SFSIGE/AGEX
	● Special courses implemented	Number	CEI08	I	CFSIGE/Ministry of education
	● Optional courses taught in colleges	Number	CEP09	P	ONE/CFSIGE
	● Students attending such courses	Number	CEP10	P	ON/CFSIGE

Cartographic basic instruments

● Satisfy users needs	● Satisfaction of geographic information users	%	80	IGI01	I	ONE/FTM/AGEX
	● Execution of orders	%	100	IGP02	P	FTM
● Ensure FTM profitability	● Turnover	%	100	IGP03	P	FTM
	● Self-financing capacity of FTM	FMG billion	17	IGP04	P	FTM
	● Gross operating profit: FMG	FMG billion	4	IGP05	P	FTM
	● EP2 "geographic" contracts obtained by FTM	%	70	IGP06	P	FTM
	● Economical value of FTM	FMG billion	70	IGI07	I	FTM

EIS

● Make EIS network operational and useful	● Informed decisions made	Number	SI101	I	
	● Consultations of databases by users	Number	SI102	I	
	● Network focal points	Number	SI103	I	
	● Knowledge status on protected areas	Quality ratio	SI104	I	
	● Knowledge of environmental status	Quality ratio	SI105	I	
	● Satellite accounts	Number	SI106	I	

Coordination

● Coordination	● M&E system quality	Quality ratio	COI01	I
	● PT, PTA and PS adopted	Quality ratio	COP02	P
	● % of PTA realization	%	COP03	P
	● Disbursement rate	%	COP04	P
	● procedures time	Days	COP05	P
	● % PIP allocation upon request	%	COP06	P
	● % problems resolved	%	COP07	P
	● Amount of reallocated funds	US\$	COP08	P
	● % AGEX satisfaction	Quality ratio	COP09	P

Global Indicators

<i>Each indicator measures one of the objective of the program</i>	● Satisfied Malagasy people vis-à-vis the program	%	TRI01	I
	● Biodiversity and renewable resources status	Quality ratio	TRI02	I
	● Increase in income	%	TRI03	I
	● Total private investment generated by the program	FMG billion	TRI04	I
	● Land tenure security	Quality ratio	TRI05	I
	● Erosion rate	Quality ratio	TRI06	I
	● Women participation	%	TRI07	I
	● % financial realization	%	TRI08	I
	● Malagasy growing awareness	Number	TRI11	I

(1) I=Impact, P=performance

Disbursements by Semesters and Government Cash Flow
(‘000 US\$)

	IDA	GEF	Other	Total	Program cost	Government	
						Annual	Cumulative
1	0	0	0	0	20,146	-20,146	-20,146
2	3,298	2,515	9,990	15,803	20,146	-4,343	-24,489
3	3,298	2,515	9,990	15,803	16,224	-422	-24,911
4	2,907	2,241	7,890	13,038	16,224	-3,186	-28,097
5	2,907	2,241	7,890	13,038	15,639	-2,601	-30,697
6	3,112	2,096	7,482	12,689	15,639	-2,949	-33,647
7	3,112	2,096	7,482	12,689	13,495	-805	-34,452
8	3,164	1,848	5,980	10,992	13,495	-2,502	-36,954
9	3,164	1,848	5,980	10,992	11,999	-1,007	-37,962
10	2,538	1,701	5,545	9,784	11,999	-2,216	-40,177
11	2,538	1,701	5,545	9,784	0	9,784	-30,394
Total	30,037	20,802	73,774	124,613	155,007	-30,394	-30,394

Economic Analysis of the EP2.

Introduction.

1. Natural resources serve three major economic functions: they supply direct utility to individuals, they supply inputs to the economic process, and they supply services that support life (Pearce and Warford 1993). The sources of Madagascar's growth are likewise linked to its natural resources base. The World Bank's prescription for growth outlined in the 1994 Country Assistance Strategy (CAS) is to assist the government to promote private sector- and export-led growth, attack poverty, improve natural resource management, build local capacity, and improve project implementation. The two principal elements of growth identified in the CAS are private sector development and export diversification and *the three sectors expected to lead Madagascar's growth are agriculture, manufacturing and tourism.*
2. The success of this development strategy, which clearly hinges on sustainable growth in agriculture, fisheries, and tourism, relies in part on two issues. First, favorable policies and investments are necessary to ensure the sustainable management of the natural resources which drive the productivity of those sectors. Second, such investments must also generate benefits for the predominantly poor, rural population of Madagascar which relies directly on those same natural resources for meeting its most immediate needs. Madagascar's fifteen-year Environment Program is the principal vehicle for achieving these objectives. The program arose out of the preparation the National Environmental Action Plan which itself was a response to concern about the long-term impact on the country's well-being of depredatory patterns of resources consumption.
3. This annex appraises the economic rationale for the second five-year phase of the Environment Program (EP2). Section 1 reviews some of the proximate and underlying causes of environmental degradation, reviews the economic contributions of Madagascar's natural resources and, through the use of case study results, the implications of mismanagement. Section 2 briefly presents the EP2, describing how the program components contribute to the generation of the economic benefits, policy corrections and incentives that can ensure sustainable development. Section 3 then presents the findings of a cost/benefit analysis of two major components of the program: soil and water conservation mini-projects, and multiple-use forest ecosystem management.

I. The links between environment and economy in Madagascar

4. Pursuing the mutual goals of growth and sustainability in the natural resource-based sectors of agriculture, ecotourism, fisheries, and forestry requires identifying sectoral and national policies and other incentives which need to be corrected. Corrections along those lines is necessary if complementary on-the-ground investments in natural resources management are to succeed. For example, improvements in agricultural productivity, which might reduce pressure on fragile slopes and forests, are linked to many variables: cost and availability of inputs and credit, marketing and transport systems, unbiased trade rules, product prices which reflect production costs, advances in farmer knowledge and innovation, which are linked to communication and support services, and property rights. Many of these factors can negatively or positively influence the "sustainability" of managing the natural resources which are the building blocks of improving yields and reducing poverty.

5. A recent review of the economics of the Madagascar NEAP (Larson 1994) points out the importance of getting the appropriate incentives in place that will lead to more sustainable paths of resource consumption. The share of the total marginal benefits of “preservation” that accrues to farmers must increase if their patterns of resource use are to change. A combination of approaches are needed to achieve this goal. One approach is through education which would increase resource user understanding of the importance of existing habitat for water and soil management. Another means is through the sharing of tourism proceeds either through direct employment or in direct transfers of a portion of revenues to affected communities. *A third approach is “to change the key underlying factors that are driving the demand for agricultural extensification and as a result the demand for deforestation.”* (Larson 1994). In other words, land users lack the incentives or means for adapting their land use systems. Indeed, the most recent World Bank agricultural sector study found that a combination of insufficient formal credit and the poverty of farmers makes it virtually impossible for them to afford the capital inputs necessary to initiate any agricultural improvements. Additional blockages stem from the poorly maintained road network and communications system with resulting poor development and integration of rural markets. Finally, extension services are insufficient or non-existent in many areas and do not act as an effective link between the government’s agricultural objectives and field assistance (Keck, Sharma and Feder, 1993).

6. *Agriculture.* The Bank’s 1994 agricultural sector strategy note estimates that there is some 32.8 million hectares of potentially cultivable land in Madagascar. Approximately 3.0 million ha are annually cultivated, of which about 1.8 million ha are cultivated on a permanent basis (World Bank 1994). Much of the unused potential area is ecologically fragile with serious consequences from agricultural use, and/or inaccessible without large investments in new rural infrastructure. The country’s agricultural potential is closely linked to the soil management regime, particularly given the increasing land constraints in certain areas of the country, notably the central highlands. Soils in Madagascar are generally acidic, highly erosive, and of varying degrees of fertility.

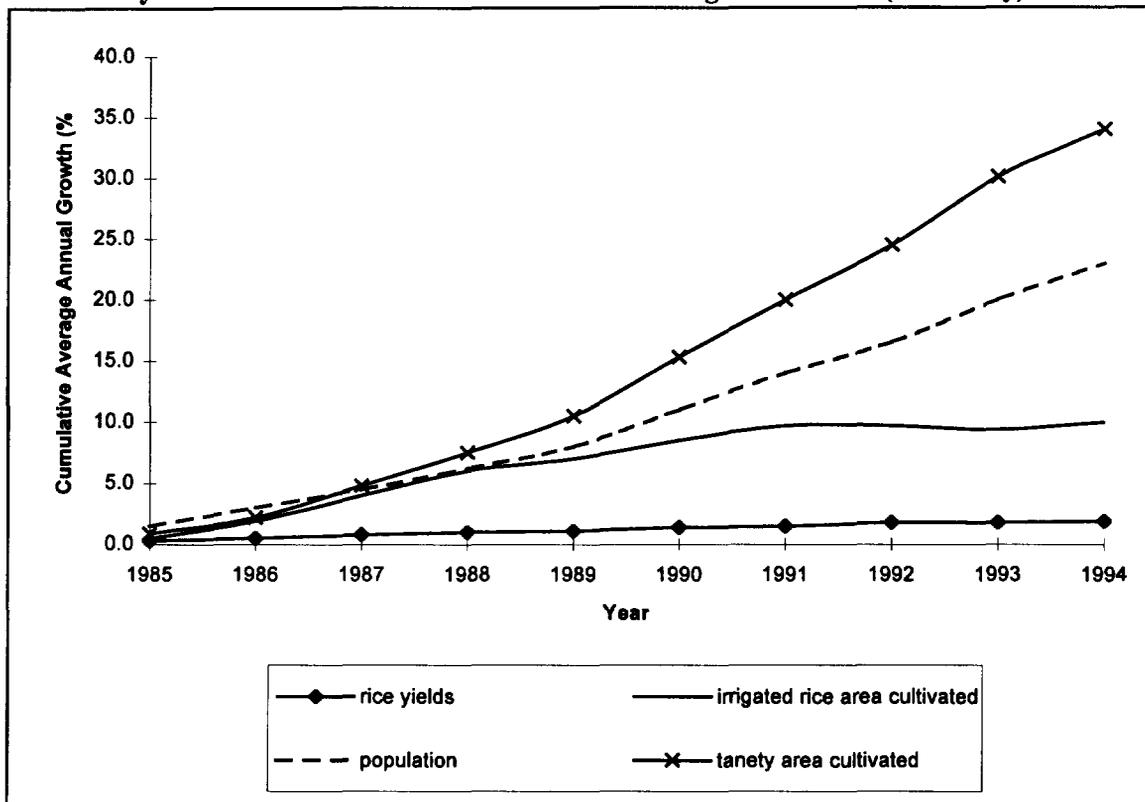
7. The agriculture sector accounts for approximately 34% of GDP and agricultural exports account for around 45 percent of total exports. However, the agricultural growth picture is particularly important given that 80 to 85 percent of the population lives in rural areas and is directly dependent upon agriculture for their subsistence. Yet underinvestment in this sector has been a persistent problem and despite agricultural policy reforms since the late 1980s, output increases are strongly linked to increases in agricultural area rather than through yield improvements. Table 1 shows that increases in agricultural land area outpaces improvements in yields for twelve major crops. The problem is considered particularly acute in the large central highlands of the country where farmers increasingly cultivate marginally productive slopes (the *tanety*) and forego conservation investments. Graph 1 demonstrates these trends for the sub-province (*fivondronana*) of Ambohidratrimo.

Table 1. Changes in land area and yield of selected crops

Percent change: 1976 - 1995		
Crop	Area	Yield
Rice paddy	14%	11%
Maize	52%	-19%
Potatoes	84%	10%
Sweet potatoes	20%	-1%
Cassava	56%	12%
Sugar cane	76%	-12%
Beans	-17%	-5%
Groundnuts	-34%	-22%
Coffee	3%	-3%
Cloves	70%	-30%
Sisal	-28%	-7%
Vanilla	109%	-10%

Source: FAO, 1996

Graph 1. Population growth, shortage of irrigated lands and low investments keep yields low and increase the cultivation of marginal hillsides (the tanety).



Source: Aboulabbes, Rasolofoharivony and Rajery, 1994.

8. *The impacts of erosion.* The lack of smallholder investments in agriculture leads to several on-site and off-site environmental problems. On-site problems of physical and chemical soil erosion are commonplace across Madagascar, effectively keeping yields too low for farmers to make investments. Natural factors, including steep slopes, intensive rainfalls, and highly erosive soils all contribute to this process. Recent analysis of the slash-and-burn practice (tavy) in eastern Madagascar show that bare soil, which precedes hillside rice cultivation, hillside rice cultivation itself, and ginger cultivation all generate considerably higher levels of soil loss and runoff than found on fallow and forest land (see table 2). The soil losses correspond to fertility losses. The result is that yields decline so quickly that in most cases individual fields cannot be farmed more than two consecutive years. Yet even very low-cost investments can shift the land's sustainable yield. The ANAE experience has shown that simple biological fixation through hedgerows is an adequate investment to move from shifting hillside farming to fixed plots on the central highlands.

Table 2. Observed soil losses and runoff under various land uses in the eastern rainforest zone.

Land use	Soil loss (as solids and in suspension) in kg/ha	Runoff (mm)
Bare soil	149,000	681
Planted in ginger	144,000	542
Tavy	14,500	571
Savoka (bush-covered fallow)	295	142
Forest	9.7	13
Savannah	817	154

Source: Lambo Rakotovao, 1995.

9. Perhaps more serious, but far less quantifiable, are the off-site costs of soil erosion induced by poor agricultural management and deforestation. Negative off-site erosion effects are best documented for irrigation systems and infrastructure, although there are also serious consequences for the productivity of certain coastal fisheries. This is evident in the expanse of irrigated plains near Marovoay, located near the headwaters of the Betsiboka river. Since 1983 the Federal Republic of Germany has been financing rehabilitation of the irrigation systems in the area. The region can be characterized as having intense rainfall and highly erosive soils which, under the patterns of deforestation and land use, has led to very high rates of soil erosion and increasing sedimentation of important irrigation water storage reservoirs. Data on three of five reservoirs are presented in table 3. Two of the reservoirs, the Amboromalandy and Ambilivily, are part of watersheds where the land resource is increasingly degraded savannah. The third reservoir, the Ampijiroa, is located within the largely forests Ankarafantsika protected area.

Table 3. Sediment deposition of irrigation reservoirs in West Madagascar (SCET - AGRI Dinika 1986)

Reservoir	Initial volume (Mm ³)	Size of the watershed	Vegetation cover	Years	Soil deposition (Mm ³)	Soil loss (t/km ² /day)
Amboromalandy	20	50	increasingly degraded savannah	1933-1970	2.2 (0.059/yr)	1427
				1970-1983	1.2 (0.092/yr)	2215
				1983-1986	0.6 (0.200/yr)	4800
Ambilivily	13	30.5	increasingly degraded savannah	1957-1970	2.7 (0.208/yr)	5901
				1970-1986	3.6 (0.225/yr)	8852
Ampijiroa	2	76.8	100% forests in a protected area	1970-1986	0.1 (0.006/yr)	98

10. Table 3 shows that the annual rate of sedimentation is much higher and is, in fact, increasing with time in the two reservoirs located in unprotected, degraded areas of the larger watershed. The reservoir sedimentation is 50 to 100 times greater in the unprotected watersheds than in the forested watershed. Assuming no further increases in erosion rates, the lifespan of the Ambilivily reservoir is 30 years, 80 years for Amboromalandy, and 317 years for Ampijiroa.

11. This soil erosion generates considerable management costs to the farming community dependent upon the water resources of the reservoirs. To maintain an adequate water supply to the reservoirs for farming purposes, it is necessary to undertake expensive desilting operations on 25 kilometers of irrigation canals and dredging of 25,000 m³ of sediment from the irrigation drainage system. The rehabilitation costs to raise the dam on the Amboromalandy reservoir amount to US\$3.3 million. In addition, rehabilitation of the canal system requires additional investments of US\$1.2 million. These costs, combined with the project costs of US\$300,000 for rehabilitation of the Ambilivily and Ambondromifehy watersheds gives a total erosion mitigation cost of US\$4.8 million. Failure to undertake these corrective actions, or to otherwise rehabilitate the degraded watersheds results in the sedimentation of 150 ha of irrigated area every year. Given a rice output of 3T per hectare per year, a cultivated area of 18,000 ha, and a price of 1,000FMG/kg of rice, the annual loss in production is worth US\$13.8 million. While short-term mitigation costs are much lower than the value of lost rice output, such corrective investments are likely to become prohibitively expensive as long as erosion continues unabated. A more sustainable response, and a less costly one in the long-term, would be to invest in rehabilitating the watershed which would have a positive impact on overall regional productivity. This would entail assessment and management of land use within an entire watershed.

12. The case of Marovoay demonstrates that erosion-induced sedimentation of irrigation systems increases investment and maintenance costs, reduces agricultural productivity because of poor water control, and reduces total irrigable area. Another potential problem that could be assessed through EP2 research is the effect of increasing fertilizer use in irrigation on water quality, including on fish populations downstream of irrigation systems. The fertilizer question is significant given the trend towards liberalizing access to agricultural inputs, increasing use of fertilizer-responsive rice varieties, and increasing fertilizer application in second-season crop production.

13. In a second example, an analysis conducted in 1990 (AIRD, 1990) assessed the impact of environmental degradation on irrigation investments in Madagascar. *The analysis, which used prototypical models, found that both the East and West Coast investment models become economically and financially unattractive if environmental problems are not addressed.* The Central Plateau investments remain marginally attractive, through net present values are reduced by more than two thirds. In all cases, the combined effects of environmental degradation pose a serious threat to the viability of irrigation investments. The same investigation found that investments in watersheds to avoid degradation are viable, with potential increased benefits to watershed inhabitants from improved productivity on upland crops and from the realization of benefits from forest products (AIRD 1990).

14. Environmental degradation also results in increased investments in rural infrastructure. The Route Nationale 2, the highway which links the capital and the country's principal port, was severely damaged, and collapsed in places, as a result of massive levels of soil and water runoff during the 1993 cyclones. The road passes through the slash-and-burn areas of the eastern rainforest region and the greatest cyclone damage was registered in those areas. The devastation necessitated a road rehabilitation investment of US\$12.5 million. While this is an imprecise measure of the economic impact of environmental degradation, it is clear that the costs of mitigation are substantial enough to warrant a better understanding and quantification of the economic externalities of seemingly destructive land uses on major public investments such as roads, ports and hydroelectric dams.

15. *Forests and biodiversity.* There are no accurate figures for the extent of tree cover in Madagascar although on-going analysis should produce a reliable calculation sometime in the next year. Estimations range from 4.1 million ha (remaining moist forest) to 12 million ha (total forest cover), depending upon the definition of forest land and the methodology employed. Deforestation figure are also estimates. Estimates of forest clearing report that brush fires in 1993 affected 96,130 ha. Slash-and-burn agriculture is estimated to result in conversion of 200,000 to 300,000 ha of natural forest each year in the eastern moist forest ecosystems. A study of a portion of the eastern forests using aerial photographs and satellite images indicates deforestation occurring at an annual rate of 2 percent (Kramer, Richter and Pattanayak 1995). Table 4 summarizes deforestation data from this study.

Table 4. Changes in forest cover for the Vohitra watershed, Madagascar

	1957	1976	1984
Area (ha)	321,040	286,370	21,399
Percent of 1957 area	100%	53%	40%

Source: Kramer, Richter and Pattanayak (1995).

16. Continued forest loss in Madagascar is a concern not only because of the soil loss problems already discussed, but also because Madagascar's forests are rich in other potential consumptive and non-consumptive values. The NEAP and the economic analysis of the first phase of the environment program estimated that tavy imposed an economic cost of US\$84 million as a result of lost forest revenues. This assumes a country capacity to capture timber revenues from the forest area that would otherwise be burned for tavy. While that may not be possible at present, the farmer's current preference for tavy directly competes with national, and international preferences for sawnwood, charcoal, fuelwood, tourism, non-timber forest products and maintaining biodiversity.

17. For most farmers on the forest frontier, the present incentives are generally skewed in favor of forest conversion and poor forest management. In a 1990 overview of Madagascar's forest sector, Nagle commented that: "One of the most pervasive problems is that farmers living next to a forest see more value to their families in clearing and cropping/grazing activities than they see in sustained tree management.....the benefits from government-promoted forest exploitation have seldom accrued to those living in the forest area. Their socio-political power is limited or non-existent in forestry, but may be significant through low-cost agricultural practice. This historic maldistribution of local costs and benefits is the primary constraint to sustainable forest management in Madagascar." (Nagle 1990).

18. *The marine and coastal resources.* The mangrove area of Madagascar is estimated at between 300,000 and 400,000 ha depending upon the author. The coral reefs of Madagascar, concentrated along the west coast, are more than 1,000 kilometers in length. The export revenues from shrimp exports climbed from US\$34 million in 1990 to US\$58 million in 1994. For fishing in general the actual amounts exploited are unknown and data is lacking as to the quantify of fish and shellfish actually available for exploitation. This makes it impossible for Malagasy authorities to accurately value their fish stocks or effectively price fishing licenses in line with relative scarcities. The coastal zone is also increasingly important as an immediate source of food and income for coastal populations.

19. Despite a lack of complete data, there are clear signs that coastal resources are not being well managed. The FAO estimates that there is 30,000 tons of fish caught as bycatch in shrimp nets which is discarded into the sea each year. Returning mostly dead bycatch to the sea poses an environmental problem because large quantities of dead fish increase nutrient levels, causing eutrophication and undesirable ecosystem changes such as algae blooms and decreases in fish and shrimp catches.

20. Table 5 summarizes many of the points made in this section regarding the principal environmental problems in Madagascar, their economic consequences, their proximate immediate causes (e.g., extensification of agriculture into marginal areas), and some of the policy, investment or cultural constraints which tend to underly unsustainable patterns of natural resource use.

Table 5. Environmental problems, their economic consequences and causes.

Environmental Concern	Economic consequence	Immediate causes	Underlying Causes: Economic Policies, Prices and Institutions
* Soil erosion, degradation and sedimentation.	* Stagnant yields and per capita agricultural output. Production increases are closely linked to extension into marginal lands. This reinforces agricultural household poverty, food insecurity and low or no economic growth (see poverty assessment). * Siltation of irrigation	* Cultivation of marginal lands, particularly on the central highland. * Annual burning of pastureland is often uncontrolled and destroys protective vegetation cover which increases overland waterflow and soil loss.	* Agricultural inputs and technologies are absent that are necessary to intensify production and decrease soil loss. * Small farmers have little knowledge about conservation and tend to follow social traditions which do not encourage soil-conserving agricultural

	<p>dams and canals reduces their lifespan and agricultural yield, while increasing maintenance costs.</p> <p>* Infrastructure increasingly susceptible to damage from water and soil runoff.</p>	<p>* Declining length of fallow periods of shifting cultivation in more populated communities.</p> <p>* Naturally high erosivity of soils, a consistently uneven topography, and high intensity rainfall encourage soil erosion.</p>	<p>practices.</p> <p>* Poor infrastructure and communications prevent a ready flow of goods and information.</p> <p>* Credit is largely unavailable, acting as a further disincentive to investments in land.</p>
<p>* Deforestation, Forest Degradation, and Biodiversity Loss</p>	<p>* Lost economic contribution from valuable hardwoods.</p> <p>* Lost non-timber forest benefits.</p> <p>* Genetic resource values are lost.</p> <p>* Infrastructure increasingly susceptible to damage from water and soil runoff.</p> <p>* Possible decline in tourism</p>	<p>* Slash and burn agriculture</p> <p>* Illicit timber harvesting</p>	<p>* Low, administratively set stumpage fees encourage over-extraction of the resource.</p> <p>* Command and control approach is unenforceable</p> <p>* Virtual open access to non-timber forest products, and biodiversity products acts is an incentive to over-exploit them, and market them at prices below social costs.</p>
<p>Degradation of the marine and coastal resources</p>	<p>* Decrease in aquaculture productivity</p> <p>* Decrease in fishing yields</p> <p>* Decrease in shellfish collection yields</p> <p>* Decreased tourism</p> <p>* Reduced shoreline protection increases vulnerability of coastal structures to wind, waves and storms</p>	<p>* Anarchical trawling practices by industrial fishing vessels.</p> <p>* Pollution of nearshore habitats caused by the dumping of wastes and sedimentation from land erosion.</p> <p>* Mangrove cutting around certain coastal cities leading to deforestation.</p>	<p>* Virtual open access to coral reefs and coastal fishery resources.</p> <p>* No requirements for fishing industry and fisheries to undertake EIAs.</p> <p>* General Fishing Law of 1922 is outmoded.</p> <p>* Price of fishing licences is administratively set failing to reflect either the relative fish market values nor demand for licences.</p> <p>* Mangrove stumpage fees are relatively insignificant.</p>

II. The components of the EP2.

21. The EP2 consists of four sets of components: specialized sub-sector activities, regional programming and local management activities, strategic activities, and support activities. Each component across all four sets of activities is discussed briefly to provide a sense of their economic implications. Beyond direct investments in field activities, the components cover critical issues ranging from national and regional natural resource planning, improving the incentive and policy framework, developing institutional capacity, and improving understanding of environmental issues through research, education, communication, training, and the development of geographic instruments as an analytical tool.

Specialized sub-sector activities

22. *Multiple Use Forest Ecosystems (ESFUM)*. This US\$29 million component, which was prepared in the context of the DEF's new National Forest Management Plan, consists of the following principal activities:

- Implementation of a National Forest Ecological Inventory, designed in the EP1 as a baseline tool for making management decisions.
- Implementation of a new forest management approach that is linked to community management of renewable forest resources and includes transfer of that authority to specified communities, professionalization of the forestry profession, and economic valorization of forest products.
- Increase the area and the potential of the forestry resource including decreasing pressure on natural forests.

23. These actions are expected to lead to the protection of watershed and biodiversity values of natural forests, an increase in the level and quality of wood and non-wood production, elimination of open access to forest stands, a reduction in illegal felling of trees, the improved marketing of non-timber forest products, and a more active role of communities in forest management. The component also undertakes essential strengthening of the technical, analytical and management capacities of the Directorate of Water and Forests (DEF).

24. As a result, biodiversity outside protected areas will be better protected, rural incomes will rise, and streams of financial and economic benefits will be generated from forests that are competitive with agricultural benefits. The component is also expected to continue the trend towards improved rates of collection of forest concession fees. Section 4 includes an economic analysis of this component.

25. *Soil and water conservation mini-projects*. This component, implemented by the National Association for Environmental Management (ANAE) has as its primary objective to combine activities which enhance production, decrease erosion and improve soil fertility in smallholder agricultural communities in order to improve their long-term agricultural productivity. Farming communities work with ANAE-supported agencies to define their primary problems and needs and assess how ANAE can possibly assist. The main clients consist of densely populated agricultural communities facing considerable land constraints as they cultivate both irrigated valley bottoms and surrounding hillsides.

26. Individual mini-projects typically consist of a range of measures which combine shorter-term productivity gains with soil conservation activities which yield longer-term productivity gains and environmental improvements. The gradual spread of mini-projects in a region, combined with spontaneous adoption of techniques by other farmers, is expected to reduce the gravity and incidence of environmental problems including uncontrolled brush fires, degradation of soil structure and fertility, and sedimentation of irrigation reservoirs and canals. Many mini-projects include associated assistance at marginal cost for rural development such as provision of potable drinking water, and literacy or health training. Table 6 lists the types of benefits and costs expected from two typical mini-project designs.

Table 6. Benefits from ANAE mini-projects

Mini-project	Benefits
<p>1a. Improved water control in micro-irrigated areas (100 ha or less)</p> <p>1b. Biological fixation through establishment of hillside hedgerows on farmer fields.</p> <p>1c. Potable water source</p>	<p>1a. Higher yields of rice and of second season products improves nutrition, reduces demand for rice imports, and increases quantity of goods traded in domestic market.</p> <p>1b. Stabilizes soil erosion, improves hillside agricultural yields and soil nutrient content, provides mulch for cattle feed and for creating compost which fertilizes irrigation areas. Reduced labor time. Improves fertility enough to allow quasi-permanent cropping of the same plot.</p> <p>1c. Reduces incidence of diarrhea which reduces cost of purchasing medication.</p>
<p>2a. Community-level reforestation including creating a nursery</p> <p>2b. Increase number of fruit trees</p> <p>2c. Vegetable gardens on lower slopes</p> <p>2d. Intensive irrigated rice</p>	<p>2a. In areas distant from natural forest this ensures a local supply of energy and construction material, helps stabilize soil erosion and fertility, provides mulch, and endows participants with a much greater sense of ownership</p> <p>2b. Increase and diversify household revenues and nutrition.</p> <p>2c. Increase and diversify household revenues and nutrition.</p> <p>2d. Double or triple rice output on a small plot.</p>

27. The sustainability of the ANAE actions rests in part on the demand-driven and participatory nature of mini-projects. Communities prepare written requests for assistance from ANAE which then works with those communities to identify production-enhancing actions, conservation-related actions, and parallel rural development actions (e.g., health or education) all of which opens the door to potential collaboration with more communities in the same region. Although the program is demand-oriented ANAE has clear criteria on what constitutes an eligible request for assistance. The focus on local level involvement means that actions tend to mesh well with the local agricultural calendar, thus avoiding problems of labor availability. The cost-sharing arrangements common to all mini-projects further endow the participants with a strong sense of ownership of any investments. Table 7 demonstrates that, for a subset of mini-projects, participants typically assume about 20% to 50% of costs, although the amount may be as low as 6% and as high as 90% (not shown here).

Table 7. Cost-sharing between ANAE and participants in the financing of mini-projects.

	Mini-project components	Total mini-project cost (FMG)	Beneficiary contribution to total cost	
			FMG	Percent
1.	Reforestation and Fruit trees	5,553,507	2,169,166	39
2.	Reforestation and Fruit trees	6,395,623	3,072,160	48
3.	Reforestation, slope management, fruit trees, irrigated rice, off-season crops, rabbits and chickens	5,249,290	2,490,820	47
4.	Reforestation, agroforestry, vegetables, fruit trees, irrigated rice	14,110,940	7,449,375	53
5.	Improved woodstoves	7,260,000	1,950,000	27
6.	Improved woodstoves	7,465,000	2,115,000	28
7.	Vegetable gardens	12,174,430	2,537,080	21
8.	Vegetable gardens	9,436,919	590,669	6
9.	Sandbag dam	35,650,000	11,162,500	31
10.	Reforestation, agroforestry, vegetable gardens	2,789,515	591,440	21
11.	Diversion dam for irrigated crops	27,895,000	2,772,000	10
12.	Diversion dam for irrigated crops	60,219,070	8,006,570	13

28. *Ecotourism and Protected Areas.* The benefits of this program differ depending upon the official category of protected area considered. Some areas are either too small, too remote, or too fragile to be frequented by tourists. However, they maintain high priority biodiversity status and therefore one benefit of the component is to ensure that these areas remain protected for their contribution to the country's biodiversity patrimony. For the few protected areas with ecotourism potential, the component will support actions that further develop this potential, increasing and diversifying the revenues from ecotourism, and ensuring that the benefits of entry fees are shared equally with the village communities living in the peripheral zones of the parks. The component is expected to generate new income and employment opportunities as well and will mark the first efforts to link with the private sector in the provision of services to park visitors. Sound management of the protected areas network is considered integral to ensuring continued growth in the contribution of Madagascar's ecotourism industry to the national economy.

29. *Coastal and Marine Ecosystem Management.* Given the absence of coastal and marine management in the first phase, the main focus of this component on establishing national, regional and multi-local coastal resource management plans is the logical first step to sustainable management of these valuable resources. The main benefits of this component will come from the improved productivity of the country's coastal areas through the establishment of sound management practices for mangroves, fisheries, tourism development, and aquaculture among others.

The Regional Programming Activities.

30. *Support to local natural resources management (GELOSE).* In Madagascar, the government has an extremely limited capacity to actively manage, monitor and collect revenues from the exploitation of natural resources such as forests, forest products, mining, and fishing. Although local communities have an interest in the management of such resources, they have very little or no legal rights to manage or otherwise regulate consumptive uses. The absence of effective government or local management, creates a situation of open access to most natural resources, highly conducive to illegal activities, overharvesting and overmining in violation of principals of maximum sustainable yield, under-pricing of natural resources, and other unsustainable practices such as high-grading of natural forests. Because the local communities do not benefit from certain natural resources, particularly forests, their preference is to convert them to agricultural uses as needed.

31. This component is intended to be the key instrument for testing the viability of natural resources management contracts between local communities and the state in order to eliminate the open access problem and create greater benefits to local communities which makes them more competitive with the benefits from agriculture. Through a mediator, communities will be gaining state-recognized rights to control access to certain natural resources, and to charge fees to “outsiders” such as forest concessionaires or mining companies to use those resources. Thus, this component is an important vehicle for improving the incentive framework at the community level in favor of better management of the natural resource base. It also has an important role in facilitating the work undertaken under several other EP2 components, particularly the ESFUM and the marine and coastal environment components.

32. The component will also continue the efforts to redefine the country’s land tenure policies and the role of the government’s land titling agency, particularly in rural areas where greater flexibility in tenure regimes and less onerous procedures are clearly necessary. The financial resources to support this latter process are under the program’s *strategic activities*.

33. *Support to regional programming.* In the context of the country’s on-going process of decentralization, EP2 preparation work concluded that beyond the obvious national-level environmental issues, support to actions defined and implemented at the regional level can significantly increase the level of ownership, and will, in general, be more responsive to region-specific environmental problems. Thus, the EP2 is supporting the creation of six regional technical committees, corresponding to the six administrative regions of the country. The regional committees undertake analysis of environmental problems, coordinate local actors in the development of plans to deal with environmental problems, and assist in the design of specific projects or actions. A clear advantage of this process is that the beneficiaries can become part of the process to identify problems and define responses which can reach them relatively quickly (see the regional fund component, below). The National Office for the Environment (ONE) maintains an overall coordinating function in the regional programming process. The goal, by the end of EP2, is to have undertaken the necessary regional environmental planning and analysis to facilitate full decentralization and integration of environment into overall regional development. The regional fund, discussed below, is a flexible funding source intended to support investment proposals produced by the regional programming process.

34. *Regional Fund for Environmental Management (FORAGE).* FORAGE is the instrument to finance those specific actions defined through the regional programming process, already discussed.

The detailed criteria for the FORAGE are in the process of being prepared. The general principal is that the regional programming process is likely to identify numerous actions which: (i) are not addressed by the direct, sector-specific components of the EP2, and/or (ii) address environmental externalities specific to the regional or sub-regional level. The regional fund can make either credits and grants and is seen as an ideal mechanism for rapid response to address environmental problems which the program's beneficiaires identify.

Strategic Activities.

35. *Policies, strategies, and instruments.* This component is the main vehicle for addressing the underlying policy, institutional and structural problems which encourage unsustainable natural resources management in Madagascar. Through its focus on the elaboration of strategies and economic instruments, and specialized training on the application of those instruments, the component supports the belief that distortions of sectoral and national policies must be removed if natural resources are to be managed sustainably. *For example, the cost of fishing, mining and forestry licenses and concessions must be set at a level which reflects the market value, replacement cost and relative scarcity of those resources in the country.* The component will also contribute to the on-going reflections and possible redesign of the national land tenure policy and support the formulation of a policy on bio-prospecting. In so doing, the component will facilitate better linkages between the implementing agencies, government ministries, decentralized agencies, and other private organizations.

36. *Making EIA operational.* This component establishes a framework for the development and use of environmental impact assessments (EIAs) and environmental evaluations (EAs) of public sector investments. Some examples of activities which could be subject to EIAs or EAs include electrical transmission lines, aquaculture, dams, ports, oil pipelines, pesticide use and storage, construction of tourism facilities, and mining. The application of environmental assessments is a crucial step for defining on-site and off-site negative environmental impacts of development activities which can then be incorporated into cost-benefit analysis. The government's interest in EIA, reflected in its plans to issue a decree on compatibility of public investments with the environment, is another indication that there is a strong perceived need to take better account of environmental externalities in development. In that context, the component holds considerable promise in facilitating the process of mainstreaming environment in development during the third phase of the environment program.

Support Activities.

37. *Environmental research.* This component is intended to undertake both resource-specific research and transversal research. It also will try to better coordinate and leverage foreign participation in research which would contribute to the environment program's overall goals.

38. *Education and training* This component is designed to support implementing agencies (e.g., DEF, ANAE, ANGAP) in public information campaigns related to the EP2's direct and regional components, as well as design and initiate activities for broader public education on environmental management. Target populations include the government ministries and the national assembly, village communities, school teachers and students, the media, tourists, NGOs, and urban communities. The component is an important catalytic element for garnering broad-based public understanding and support for the idea that the fate of the country's natural resources lies in the hands of its people and that sound management can be a source of economic prosperity and national pride.

39. *Geographic instruments and environmental information systems.* Geographic tools, such as GIS, are increasingly used to support analysis of trends in natural resources and in the management of those resources. Similarly, environmental monitoring is done to improve knowledge on the state of the environment and on the impact of development on the environment. These two components support very basic levels of data collection and analysis for the production of up-to-date maps and environmental indicators. There is a considerable potential for these components to contribute to future economic analysis of the environment in Madagascar. For example, establishing annual data sets on the environment would be extremely useful in conducting time series analysis of the relationships between environment and trends in specific sectors, population distribution, rural development policies and economic growth.

III. Economic Analysis of the ANAE mini-projects and the ESFUM component.

40. This section presents the findings of the economic analysis of two of the program's specialized sub-sector components. The first component is the soil and water conservation mini-projects implemented by the ANAE. The second component is the DEF-implemented Multiple Use Forest Ecosystems component (ESFUM). The objectives and approaches for the both components were discussed in the previous section. The economic analysis focuses on assessing the on-the-ground benefits of these two components, and includes a discussion of the analytical assumptions behind the economic models, followed by a presentation of results and sensitivity analysis. The section concludes with a brief treatment of the economic benefits from biodiversity and non-timber forest products.

Soil and water conservation mini-projects component.

41. *Assumptions.* Seven representative models are used to analyze five types of ANAE-supported activities: improved hillside cultivation with hedgerows, improved irrigation management, community reforestation, improved woodstoves/charcoal, and high-value vegetable gardens. These represent some of the most important types of actions ANAE supports in terms of conservation and production impacts. They often appear mixed together in a single mini-project, or in two consecutive mini-projects at the same site. Some additional actions which have not been subject to analysis include fruit trees, pisciculture, apiculture, ravine stabilization, and biogas.

42. The data on the benefits of improved productivity and per hectare costs are based upon ANAE's own analysis of EPI implementation experience. Activities were analyzed, as opposed to mini-projects themselves, because there is no standard formula for what actions are within a given mini-project. Table 8 summarizes the set of prices for agricultural crops and labor used in the economic analysis. Market prices are used in valuing all agricultural products except rice. The value of agricultural labor is difficult to set in the ANAE context since actions are undertaken throughout the country. In the absence of better information on the opportunity costs faced by farmers in different communities, the value of unskilled agricultural labor is estimated at FMG2,000 per day. This figure is based upon ANAE estimates of the going wage in mini-project areas and based upon discussion with farmers.

Table 8. Values used in the analysis of ANAE mini-projects.

Crop/Variable	Value
Rice	FMG 1,020/kg
Manioc	FMG 250/kg
Sweet Potato	FMG 300/kg
Wheat	FMG 1,500/kg
Potato	FMG 500
Various Other Vegetables	Between FMG 750 and FMG 2000 per kilo
Labor	FMG 2,000/day
Manure	FMG 15,000/cart (FMG 50/kg)
Fertilizer (NPK)	FMG 2,000/kg

43. The costs of interventions are based upon actual ANAE costs during the first phase of the environment program. All economic analyses include an additional cost equal to 31% of mini-project investment costs which captures the ANAE's expected overhead costs during EP2. The agricultural labor days per hectare are based upon estimates of the ANAE and the Madagascar resident mission. In the case of irrigated rice, the resident mission provided estimates of annual labor days for three types of irrigation systems. The differences in total labor days have to do with the mode of planting and managing irrigated rice, where seed broadcasting requires the least time and intensive cultivation systems require the most time.

44. The economic price of rice, which was set at FMG1,020/kg, was calculated as follows:

Table 9. Economic Import Parity Value of Paddy *

	Unit	
FOB price in Thailand <i>(5% broken white rice, milled, BOT posted average price in 1995)</i>	US\$/t	327
Add Freight and insurance to point of import	US\$/t	60
Equals c.i.f. at point of import		387
Conversion to FMG at market exchange rate of FMG3900 = \$US1	FMG/t	1,509,300
Add local port handling charges	FMG/t	100,000
Add local transport and marketing costs from the port to the capital	FMG/t	100,000
Equals wholesale milled rice price in the capital	FMG/t	1,709,300
Equivalent wholesale price of paddy (66% of milled)	FMG/t	1,128,138
Less transport costs from the farm to the capital	FMG/t	(110,000)
Equals import parity value at farm gate	FMG/t	1,018,138
Rounded off price per kilo	FMG/kg	1,020
	US\$/t	261

* FOB price obtained from price quotes listed on the World Wide Web.
Freight and insurance estimated by World Bank Commodity Policy & Analysis Unit.
In-country costs calculated by World Bank Madagascar Resident Mission.

45. *Results*. The results of the economic analysis (summarized in table 10) show that activities can generate IRRs ranging from 11% (reforestation) to 149% (improved woodstoves). With the exception of reforestation, positive net benefits are realized within three years. These returns measure only the on-site impacts of ANAE-supported actions and there was no attempt to measure the although additional off-site benefits which are likely to be substantial in many cases.

Table 10. Economic NPV and IRR of ANAE-financed activities.

Mini-project	Net Present Value*		Time horizon of analysis	Time to realize positive net benefits (years)
		IRR		
1. <i>Improved Hillside Management</i>	820	61%	10 years	3
2. <i>Improved Hillside Management</i>	672	34%	10 years	3
3. <i>Diversion dam for improved irrigation: Rice, Potatoes and Wheat</i>	587	57%	10 years	2
4. <i>Diversion dam for improved irrigation: Rice, Potatoes and Wheat</i>	102	21%	10 years	2
5. <i>High-value vegetable gardens</i>	10,866	75%	10 years	1
6. <i>Eucalyptus reforestation in the Lac Alaotra region</i>				5
	<i>Economic analysis</i>	-387	11%	25 years
	<i>Financial analysis</i>	2,481	18%	25 years
7. <i>Improved Woodstoves and Charcoal in Ranohira</i>	34,084	149%	16 years	1

*All net present values are expressed in \$US per hectare (except #7 which does not have an area equivalent), and assume a 12 percent discount rate.

46. *Improved Hillside Management.* An assessment of two cases of hillside management (*tanety*) through biological fixation focused on the productivity effect of improved management of slopes. The hillside management often involves the establishment of low-cost hedgerows on which crops such as manioc are interplanted with nitrogen-fixing leguminous plants. This technique fixes soils, reduces erosion, improves soil fertility, reduces labor requirements, and contributes to more sedentary agricultural practices. Additional benefits of reduced externalities from soil erosion (e.g., the reduced sedimentation in irrigated areas and damage to public infrastructure), are not quantified.

47. The economic analysis demonstrates the impact of hedgerows on manioc and sweet potato yields at two sites. The first site considers 5.2 hectares of land converted to improved management techniques. The second site considers the improved system on a single hectare. The cost structures for the two cases are very different, reflecting the differences in initial site conditions.

48. Experience under EP1 indicates that the agricultural yields of both crops typically increases by more than 100 percent when hedgerows are established. Manioc cultivation, which in traditional systems, and depending upon initial soil conditions, yields anywhere from 5 to 10 t/ha, can increase to 20 to 40 t/ha with hedgerows. With traditional cultivation approaches, manioc yields decline rapidly and farmers will cultivate new land every three to five years. However, in the economic analysis, the without project case assumes that the manioc productivity project does not decline over time.

49. EP1 experience also suggests that these activities can reduce agricultural labor time in manioc and other crops. In the case of one hillside cultivation mini-project, labor days for manioc decreased from 350 days/year to 212 days per year and taro annual labor days decreased from 1,600 to 625. For purposes of the economic analysis, this decline in labor time was overlooked since it is uncertain that such favorable changes exist in all circumstances. For the with project case, the analysis assumes that establishing hedgerows effectively reduces cultivated area by 15%. This cost of conservation is factored into the calculation of yields per hectare.

50. At a discount rate of twelve percent, the two examples analyzed produce incremental NPVs of \$US672 and \$US820 per hectare. Whereas the costs of intervention in the first case were \$372, in year one, dropping to \$347 by year three, in the second model the costs are US\$645 in the first year but only US\$34 by year three. This variations in costs and benefits depending upon site conditions is a major reason to require both ex-post and ex-ante economic evaluation of mini-projects.

51. *Irrigation improvements through changes in techniques and water control.* The ANAE's support to irrigated areas is typically limited to introducing changes in farming techniques to increase yields. The changes in irrigated rice cultivation focus on shifting from broadcast methods to line planting and a small area dedicated to intensive rice cultivation. While broadcasting requires approximately 165 labor days/ha, in-line planting requires 175 labor days/ha, and intensive rice cultivation demands 200 labor days/ha. The following two models look at exceptional cases where ANAE sponsored high-cost rehabilitation of diversion dams necessary to ensure irrigated crop production.

52. Both models represent problems of the central highlands where irrigation areas are scarce and improvements in yields and water control are vital to keep up with population growth. At a twelve percent discount rate the two irrigated areas analyzed produce incremental net present benefits of \$US102 and \$US587 per hectare. The wide range in net present benefits highlights the fact that ANAE must be very careful in selecting sites where expensive rehabilitation works will be profitable. It is far more common for ANAE to introduce the irrigated agricultural improvements without infrastructure investments, resulting in much lower costs and larger benefits. The typical changes in irrigated crop area and in yields are summarized in the following table.

Table 12. Yield effects of improved irrigation management.

Crop	Without project		With project	
	Area (ha)	Yield (t/ha)	Area (ha)	Yield (t/ha)
<i>Rice</i>				
- broadcasting	25	1.8	3	2.4
- in line	0		19	3.0
- intensive	0		3	5.5
<i>Potatoes</i>	6	10.0	9	10.0
<i>Wheat</i>	0		4	1.5

53. *Improved vegetable gardens.* Establishing, improving or diversifying vegetable gardens (cultures maraicheres) is another common element of ANAE mini-projects. While gardens are often

a peripheral element of many projects, they play an important role in generating relatively immediate benefits, opening up the possibility to pursue a broader range of activities in the future. This is the case of several communities living in the peripheral zones of the Isalo National Park which is located in the semi-arid southern highlands. The socio-economic conditions in the participating communities are characterized by quasi-permanent poverty status, degradation of health, a lack of agricultural inputs, very low yields (1 to 1.7 t/ha for irrigated rice, 400 kg/ha for maize, and 4 kg/ha for manioc), and an absence of agricultural support services. Environmental problems include soil degradation and erosion, loss of plant cover, and siltation of irrigated areas.

54. Newly established village groups, working with a local NGO, are developing village financial associations (*caisse communautaire villageoise*) which will make it possible to afford agricultural inputs. In the immediate term, the ANAE supports low-cost interventions to improve and diversify vegetable garden production so as to better meet nutritional needs and generate a surplus which can be sold to neighboring communities and hotels operating around the national park.

55. An economic analysis based on the experience of two such mini-projects demonstrates that the benefits from the vegetable gardens are substantial, with an incremental NPV of \$10,866 per hectare and an internal rate of return of 75%. Assuming a stable market for vegetable output, the proceeds to the participants will help support the development of the village financial association and will allow the village to begin making investments in itself.

56. *Reforestation.* The two main benefits of reforestation, which is undertaken in approximately 80% of all ANAE mini-projects, are ensuring a local household energy supply and controlling soil erosion. This model builds upon mini-project experience in the Lac Alaotra region where widespread degradation of hillsides contributes to sedimentation of the region's extensive irrigation schemes. The model demonstrates the financial and economic value of reforestation. Financial net benefits are calculated on the basis of adding participant costs with the direct investment costs of ANAE, but not including other ANAE costs of training, technical assistance, etc. Economic net benefits are calculated on the basis of total activity costs.

57. Eucalyptus growth rates in community plantations are estimated at 10 m³/ha/year and eucalyptus wood density is estimated at 700 kg/m³, which gives a total annual output of 7,000kg/ha. At a price of FMG 117/kg¹, the fuelwood stock from reforestation would have a market value of FMG 420,000/ha. If plantations can be harvested every four years (near Antananarivo harvesting is possible every three years), then an annual harvest regime would permit cutting of one quarter the total area to avoid depletion. The three mini-projects considered here cover plantations of 38 hectares. Assuming a failure rate of 10%, this gives an area of 34.2 hectares of which 6.8 ha. can be harvested annually.

58. The analysis generates a financial rate of return of 18% and an economic rate of return of 11%. An important unquantified benefit, reduced irrigation sedimentation, is considerable, particularly in more degraded and denuded areas like those near Lac Alaotra's irrigation schemes.

¹ Pre-devaluation price of firewood was FMG 53/kg, equivalent to US\$0.03 per kg. Multiplying the foreign currency price from early 1994 by today's exchange rate of FMG3900/US\$1 gives a current price of FMG117/kg.

59. *Improved Wood Stoves and Alternative Charcoal Systems.* Mini-projects for improved wood stoves and alternative charcoal systems have been very successfully introduced in the communities living in the periphery of the Isalo national park. The alternative charcoal systems are based upon the production of charcoal from *bozaka* rather than from wood. *Bozaka* are wood-stemmed grasses approximately 2-3 cm in diameter which have proved suitable for the charcoal-making process. In the absence of complete information, it is assumed that both the woodstoves and the charcoal production systems need to be reconstructed every four years, essentially representing a recurrent cost to the participants but no cost to ANAE past year one when the technology is introduced.

60. Experience with these types of projects found that benefits accrue within one year in the form of reductions in fuelwood consumption, in amount of time allocated to fuelwood collection, in cooking time, and in charcoal consumption. Table 13 shows the value of the changes in each of these four areas. The last column gives a value of the annual savings in time and wood consumption based upon a price of FMG117/kg of wood, FMG500 per labor day, and 116 participating households.

Table 13. Benefits of improved woodstoves and charcoal systems

Variable	Without project	With project	Annual savings	Value of annual savings (millions of FMG)*
Amount of fuelwood consumed annually	2.08 MT/hh	0.54 MT/hh	1.5 MT/hh	5.0
Time spent collecting fuelwood annually	61 days/hh	8 days/hh	52 days/hh	3.0
Time spent cooking per year	152 days/hh	38 days/hh	114 days/hh	6.5
Amount of wood consumed as charcoal	4.0 MT/hh	1.1 MT/hh	2.9 MT/hh	9.9**

* One kilo of fuelwood is valued at FMG 117. Labor time is valued at FMG 500 per day. It is assumed that the new practices only reduce total consumption by 25% of the amount shown in the previous column. Thus, the value of *annual* savings from reduced fuelwood consumption is: $375 \times 117 \times 116 = \text{FMG } 5 \text{ million}$.

** Charcoal's wood equivalent is based upon an estimated transformation rate of 25%.

61. Based on the above calculations, these interventions have an internal rate of return of 149% and a net present value, in terms of reduced consumption of natural resources, of FMG132 million.

62. *Rates of return for individual mini-projects.* The above analysis distinguishes various types of ANAE-supported activities. The mini-project per se is not treated as a unit of analysis since its content is highly variable, depending upon the location and the needs of the participants. Soil conserving measures are inevitably a part of any mini-project. The result is that the mini-projects represent a balance of high returns from vegetable gardens and irrigation improvements with the less profitable hillside management, agroforestry and reforestation activities. A key question that must be

asked, therefore, is whether the less profitable aspects of mini-projects will persist in the absence of an ANAE presence. This concern can be addressed in a financial analysis which removes the subsidy and ANAE overhead costs to discern private benefits.

63. There is not as yet comprehensive information on the number of households not directly related to the mini-project which have nevertheless adopted various mini-project techniques to the management of their fields. An initial review by the ANAE of the first phase shows that for every two households participating in mini-projects, a third household adopts mini-project improvements. Thus, for the EP2, if 100,000 households participate, one could expect that another 50,000 households will, on their own, adopt the improved resource management techniques. Given the low cost and low technology of *most* mini-project activities, it is believed that farmers could readily adopt the mini-project approaches without additional cost to the state. Such adoption rates suggest that the costs per hectare are much lower than those calculated for the economic analysis.

64. The economic analysis of the ANAE mini-projects highlights the fact that individuals obviously enjoy considerable benefits from better management of their agricultural lands. However, those benefits are being produced because of a subsidy of the state to bring about changes in practices. The subsidy is the vehicle for over-coming poor household constraints to investment in agriculture, particularly for the adoption of approaches with which most farmers have little experience. The implication is that subsidies should not be a permanent fixture of the mini-project program. ANAE should, during the course of EP2, put in place a cost-recovery system, which would require repayment for those activities which largely on-site benefits but limited or no off-site benefits.

65. *Sensitivity analysis.* A sensitivity analysis of the results looks at the switching values for variables used in the seven case studies. The results of the sensitivity analysis are summarized in Table 14. The results suggest that, with the exception of reforestation, the outcomes are relatively insensitive to even large changes in the estimated flows of costs and benefits. In the case of agricultural activities on hillsides and irrigated areas, the estimated yields of manioc and rice are the most important variables in determining the level of incremental net benefits. With the exception of the reforestation case, even large increases in costs, particularly the ANAE's overhead and investment costs, would not compromise the economic viability of the mini-projects. The low switching values in the reforestation case highlight the low level of quantifiable economic benefits of this component, and thus its relative sensitivity to changes in both cost and benefit estimates (downstream effects on siltation have not been incorporated). This finding reinforces the fact that it is important to design mini-projects which combine the relatively unattractive, but environmentally critical reforestation activities with other high-value activities.

Sensitivity analysis of Soil and Water Conservation Mini-project Economic Models

Case 1. Improved hillside cultivation			Case 3. Improved irrigated rice system			Case 5. Vegetable gardens		
	NPV*	Switching values		NPV*	Switching values		NPV*	Switching values
<i>Without project benefits</i>			<i>Without project benefits</i>			<i>Project costs</i>		
manioc	51.9	32%	rice	272.0	77%	in-kind materials	-2.8	-3027%
sweet potato	31.2	54%	sweet potato	178.0	117%	labor	-7.3	-1161%
<i>Without project costs</i>			<i>Without project costs</i>			investments	-17.3	-490%
labor	-27.0	-62%	labor	-64.7	-323%	overhead	-5.4	-1570%
fertilizer	-14.0	-120%	fertilizer	-82.2	-254%	<i>Project benefits</i>		
<i>Without project net benefits</i>			<i>Without project net benefits</i>			Incremental project benefits	84.8	72%
<i>With project benefits</i>			<i>With project benefits</i>			Case 6. Reforestation		
manioc	67.6	25%	rice	452.3	46%	<i>Project costs</i>		
sweet potato	35.1	48%	sweet potato	253.8	82%	labor	-8.8	17%
<i>With project costs</i>			wheat	45.4	460%	investments	-12.9	12%
labor	-27.5	-61%	<i>With project costs</i>			overhead	-4.0	38%
fertilizer	-14.0	-120%	labor	-85.8	-243%	other recurrent costs	-12.1	12%
investments	-1.0	-1611%	fertilizer	-121.0	-173%	<i>Project benefits</i>		
overhead	-0.5	-3120%	investments	-25.6	-816%	Incremental project benefits	-1.5	
<i>Incremental project benefits</i>			overhead	-7.0	-3004%			
	16.8		<i>Incremental project benefits</i>					
				208.9				
Case 2. Improved hillside cultivation			Case 4. Improved irrigated rice cultivation			Case 7. Improved woodstoves/charcoal		
	NPV*	Switching values		NPV*	Switching values		NPV*	Switching values
<i>Without project benefits</i>			<i>Without project revenues</i>			<i>Costs of improved woodstoves</i>		
manioc	3.6	73%	rice	1100.3	60%	labor	-4.3	-3091%
sweet potato	1.8	146%	<i>Without project costs</i>			investments	-3.7	-3593%
<i>Without project costs</i>			labor	-469.7	-141%	<i>Costs of alternative charcoal system</i>		
labor	-3.1	-85%	<i>Without project net benefits</i>			labor	-4.6	-2890%
fertilizer	-1.6	-164%	<i>With project benefits</i>			investments	-3.9	-3408%
<i>Without project net benefits</i>			rice	1641.8	40%	overhead	-3.5	-3798%
<i>With project benefits</i>			<i>With project costs</i>			<i>Benefits of improved woodstoves</i>		
manioc	6.5	40%	labor	-211.1	-314%	Value of saved wood	31.7	419%
sweet potato	5.1	52%	fertilizer	-689.5	-96%	Reduced wood collection	18.8	708%
<i>With project costs</i>			investments	-55.8	-1190%	Reduce cooking time	40.4	329%
labor	-4.6	-57%	overhead	-15.1	-4404%	<i>Benefits of alternative charcoal system</i>		
fertilizer	-1.7	-152%	<i>Incremental project benefits</i>			Value of saved wood	62.0	215%
investments	-1.7	-152%		664.0		<i>Incremental project benefits</i>		
overhead	-0.3	-1016%				Incremental project benefits	132.9	
<i>Incremental project benefits</i>								
	2.6							

Economic analysis of the multiple use forest ecosystem management component.

66. *Values for sawnwood.* Establishing an economic value for the cut wood products of Madagascar is far from precise. A typical method for putting an economic price on this wood would be to work back from the f.o.b. price for wood exports at the port in Toamasina, deducting the costs of transport, labor and any taxes to arrive at the price for the standing timber. However, Madagascar's wood exports are extremely small. The DEF estimates that 99% of all wood products are domestically consumed (ONE 1995).

67. An alternative approach would be to start with the market price in Antananarivo and remove all costs of transport, labor and taxes to again arrive at the price paid for access, or the stumpage value. However, historically, the fees concessionaires paid for forest harvesting permits were set administratively, not taking into account the costs of government administration or, more importantly, the relative value of species that were harvested. As a result, wood is generally considered to be underpriced. A third alternative is to use the prices of sawnwood from other countries (see the Bhutan Third Forestry Development Project) as references for estimating an economic stumpage value in Madagascar. Replacement cost methods are inappropriate as the country is not faced with domestic supply shortages.

68. Another complication arises from the fact that the price for timber in Antananarivo is linked to quality. It is believed that if wholesalers could consistently receive a high quality product, they would be willing to pay a higher price (as much as double the current price) for that wood. This tendency has already been observed in Antananarivo (G. Grosnick, personal communication, Madagascar). With time, improvements in quality, changes in the concession system and better information on prices in rural areas would lead to much higher stumpage and market prices which would more closely reflect cut wood's use values. For a given quality of wood, stumpage prices are expected to decrease in increasingly remote forest areas, although this would be compensated for in the case of woods harvested in the west which can be transported directly to the port at Mahajanga for export.

69. Given this situation, three sources on wood product prices are compared to calculate an average cost. The first source is a 1990 forest sector review (Nagle 1990). A second source is a draft management plan for the 25,000 ha Ankeniheny forest (1994) located approximately 100km east from the capital. The third source is a socio-economic study of land use, including forest products, (1995) surrounding the town of Didy, which is approximately 300 km northeast of the capital.

70. Nagle (1990) cites Bertrand's (1989) prices for various species and grades of wood in the Antananarivo market. The prices range from a high of US\$525/m³ to a low of US\$37/m³. The management plan for Ankeniheny gives an average price of manually sawnwood of US\$46/m³. In Didy the price buyers in Antananarivo are willing to pay local concessionaires in Didy are equivalent to US\$63/m³ to US\$173/m³, depending on the various species and grades of wood. The same study estimates that the raw stumpage cost (access fees and labor costs for logging) are approximately 32% of this total, or US\$22/ha to US\$62/ha. The economic analysis assumes that the starting economic price of sawnwood is US\$50/m³.

71. *Values for fuelwood and charcoal.* The Bank's 1994 study of the environmental impact of woodfuels in Madagascar determined that the prices of woodfuels are: (i) less expensive than imported petroleum fuels or electricity, and (ii) variable with respect to wood availability, demand,

climate, soil conditions, and user preferences at individual sites. The same study found that consumers do not perceive kerosene as a replacement for woodfuels because of its high comparative cost and the poor quality of kerosene stoves available on the market. The appropriate price to use is the local market price (the equivalent to farm gate) since neither charcoal nor fuelwood are export goods. The total national supply is too large to consider using the replacement cost based on the price of kerosene. Existing documents suggest that the price of charcoal at roadside ranges from FMG2,250 to FMG4,000 for a standard sack of 43kg., depending upon the region. This is equivalent to FMG52/kg to FMG93/kg. For this analysis, the lowest price of FMG52 (US\$13.4/mt equivalent) is used as a conservative estimate.

72. *Model assumptions.* The economic model employed assumes that the productive area under management is 180,000 ha in the first two years (representing the pilot zones for which preparation work was carried out under the EP1). The area yielding direct benefits then increases by 50,000 hectare annually in years three through five. This is the target total area for management under the EP2. In years five through ten, an additional 50,000 hectares is brought under management so that, by year 10 the total area is 580,000 ha, the long-term target set by the DEF.

73. According to a 1994 forest management proposal made by a consulting team to the DEF, the length of forest rotations (period needed to recut the same parcel of forest) has never been determined for the moist tropical forests of eastern Madagascar. There are no studies on the growth rates of natural species, nor on the growth effects of different silvicultural treatments. A forestry consultant to the DEF estimated that based on other country experiences, a 40-year rotation for tropical moist forest is probably adequate to maintain yields and larger sustainable management goals. The ESFUM component would also focus on improving manual harvesting and wood cutting techniques to an extent that the marketable wood volume increases from about 20% of standing timber to 35%. The US\$6.6 million costs of the EP2 local resources management component (GELOSE), which is expected to focus on forest areas managed under the ESFUM component, have been included in the analysis.

Table 14. Assumptions for the ESFUM model.

Annual productive area	180,000 ha in years 1-2 Annual increase of 50,000 ha in years 2-10 Maximum managed area in year 10 = 580,000
Average price of sawnwood	US\$50/ha
Average yield of sawnwood	8.4m ³ /ha
Average price of charcoal	US\$13.40/mt (US\$0.013/kg)
Average yield of charcoal	9,000kg

Table 15. Economic Analysis of the ESFUM and GELOSE components

Year	Area managed ('000 ha)	Volume of Sawn Wood (million m3)	Sawn Wood Revenues (million FMG)	Charcoal Production (mt/ha)	Revenues from		GELOSE costs		Net annual cash flows	
					Charcoal (million FMG)	DEF Costs (million FMG)	(million FMG)*	(million FMG)	(US\$ '000)	
1	180	37,800	7,371	45,000	2,358	32,745	6,418	-29,433	-7,547	
2	180	37,800	7,371	45,000	2,358	17,952	7,368	-15,591	-3,998	
3	230	48,300	9,419	57,500	3,013	22,811	5,119	-15,499	-3,974	
4	280	58,800	11,466	70,000	3,668	14,353	3,374	-2,593	-665	
5	330	69,300	13,514	82,500	4,323	11,235	3,461	3,141	805	
6	380	79,800	15,561	95,000	4,978	14,714	3,461	2,364	606	
7	430	90,300	17,609	107,500	5,633	14,715	3,461	5,065	1,299	
8	480	100,800	19,656	120,000	6,288	14,715	3,461	7,768	1,992	
9	530	111,300	21,704	132,500	6,943	14,715	3,461	10,470	2,685	
10	580	121,800	23,751	145,000	7,598	14,715	3,461	13,173	3,378	
11	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
12	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
13	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
14	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
15	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
16	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
17	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
18	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
19	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
20	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
21	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
22	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
23	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
24	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
25	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
26	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
27	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
28	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
29	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
30	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
31	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
32	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
33	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
34	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
35	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
36	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
37	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
38	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
39	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	
40	580	121,800	23,751	145,000	7,598	3,050	0	28,299	7,256	

* GELOSE is the name of the local resources management component.

RESULTS

NPV (in US\$ '000)	9,855
IRR	17%

Sensitivity Analysis

Variable	NPV (million FMG)	Switching values
Sawn Wood Revenues	134,977	28%
Charcoal revenues	43,179	89%
DEF Costs	113,289	34%
Costs of GELOSE	26,435	145%
Net benefits	38,433	

74. The cost-benefit analysis results, presented along with sensitivity analysis results in table 15, show that the ESFUM component, when combined with the local resources management component, has an internal rate of return of 17% and an NPV of US\$9.8 million. When only the ESFUM

component is considered, the IRR climbs to 22% while the present value of net benefits increases to US\$16.6 million. The quantified benefits are limited to sawnwood and charcoal production. It is assumed that the same forest areas can produce both benefits since they rely on different grades of wood. However, the ESFUM component is expected to also generate benefits by ensuring the continuing flow of values from biodiversity, non-timber forest products (NTFPs), and protection of benefits from off-site activities (e.g., agriculture). In other words, it is not possible at this point in time to accurately calculate and project the full economic benefits of improved forest management. Although there is no without project scenario, it is clear that in such a case both the direct benefits from sawnwood and charcoal as well as the other expected benefits from biodiversity and NTFPs would continue declining at an unestimable cost.

75. The sensitivity analysis indicates that changes in sawnwood revenues, followed by changes in the DEF's implementation costs, would have the greatest impact on the component's measurable economic benefits. The major factors which might reduce the sawnwood revenues include possible shortfalls in the area brought under management, failures to realize improvements in harvesting and cutting techniques, and price changes.

76. *Biodiversity and Non-timber forest benefits.* Although the ESFUM cost-benefit analysis does not include biodiversity and non-timber forest benefits, this sub-section briefly reviews some of the existing information on those benefits.

77. Although there are a few estimates and official statistics on the export value of certain plant and animal species, no estimates exist as to the aggregate or average per hectare value of biodiversity in Madagascar, in part because of lack of knowledge of the volume of consumption and trade in the domestic market. A GEF-supported biodiversity priority setting exercise in 1995 found that there are considerable levels of biodiversity found in forest and non-forest lands which are not part of Madagascar's protected areas system. Table 16 summarizes data presented in studies by McManus (1995) and by Vallade (1995) on the export values of Madagascar's biodiversity.

Table 16. Estimated Annual Export Values for Madagascar's Biodiversity

Product	Estimated Annual Export Value (US\$)
Rosy Periwinkle	1,000,000
Reptiles and Amphibians	500,000
Butterflies, birds, orchids, succulents, aquatic plants, palms	50,000 - 150,000 each
<i>Prunus africanum</i> bark	700,000

78. The non-timber forest benefits from Madagascar's natural forests are also considerable. Field work by Shyamsundar (1993) found that fuelwood, crayfish, crab, tenreck and frog contributed a combined mean annual value per household of US\$66.2 (US\$1=FMG1800). In a review of non-timber forest benefits, Lampietti and Dixon (1995) report that studies of NTFBs of natural forests in developing countries render *annual* extractive values ranging from \$5/ha to \$162/ha, not including the value of hunting activities.

IV. Financial analysis and cost recovery.

ANAE soil and water conservation mini-projects.

79. The seven ANAE activities modeled in the economic analysis are reconsidered here from the farmer's perspective in order to assess the potential for future cost recovery arrangements between the ANAE and its beneficiaries. Revised calculations of the ANAE activities remove the non-market costs of production such as family labor and manure, as well as the ANAE's overhead cost. In addition, each model carries specific assumptions on the expected value of output consumed by the family in order to determine how much the activities contribute to generating cash income. With the exception of vegetable gardens, household consumption is estimated as equal to 80% of total output. It is on the basis of cash income only that repayment capacity is assessed. Repayment structures include a five percent annual interest charge on outstanding ANAE-subsidized investment costs. The length of repayment grace periods for participating farmers were set based upon the time necessary for farmers to realize a net incremental increase in their cash income. The results for each activity are discussed below, followed by a set of accompanying tables.

80. Improved hillside cultivation of manioc and sweet potato. The two examples of this activity produce distinctly different results. Both cases assume that 25% of increased output is consumed and that annual repayments should not exceed twenty-five percent of the incremental cash improvements. However, in the first case, which has substantially lower per hectare investment costs than the second case, the results show that 100 percent of investment costs could be recovered in less than six years. In contrast, only thirty-three percent of investment costs can be recovered over the same period in the second example. Based on these results, it is clear that there ought to be some level of cost recovery in this type of activity although the two models considered here also demonstrate that such a capacity depends upon several factors including the initial conditions, the analytical assumptions, the level of investment, and the likelihood of expected outcomes.

81. Irrigated agricultural improvements from a diversion dam. The analysis of two examples of this activity produce results similar to those discussed above. In the first example, the returns to the investment are considerably greater because of improvements in rice yields combined with the expansion of area dedicated to second-season crops. As a result, the farmers are able to repay 100 percent of investment costs within three years. In contrast, the second case does not include second-season crops and involves less intensification than the previous example. Assuming no additional household consumption for five years (i.e., all increased output is sold in the market), the farmers would still only be able to repay 10% of the investment costs after five years. It is important to note that an increase in the repayment requirements from 25% of incremental cash to say, 100%, would result in total repayment of the investment within four years.

82. Vegetable gardens. In the case of establishing vegetable gardens, it is assumed that households consume fifty percent of the output, while the other fifty percent is marketed. It is

also assumed that annual repayments are equal to 50 percent of the incremental cash improvement among participants. Based on these assumptions, the farmers could repay 100 percent of the investment costs within three years.

83. Reforestation. In the economic analysis, a “financial” internal rate of return of 18 percent was calculated which excluded the overhead costs of ANAE but included the investment costs subsidized by ANAE. The objective here is to assess the capacity of farmers to repay those investment costs. Although eucalyptus reforestation has important off-site benefits through reductions in erosion, it also provides critical on-site benefits in the form of household fuelwood. Thus, it is assumed that 80 percent of the eucalyptus produced is consumed locally, leaving 20 percent that can be potentially marketed. Given the relatively long period before returns begin (four years), and the low level of marketable fuelwood, it is not surprising that farmers could not repay the costs of this investment.

84. Improved woodstoves and charcoal. The benefits of this activity are in the form of reductions in wood consumed and in time reductions for wood collection and cooking. Although these activities do not generate direct cash income benefits, any time savings offer participants the opportunity to earn income from other activities. In the absence of immediately identifiable cash income benefits, cost recovery should not be a requirement for this activity.

Case 1. Improved hillside cultivation of manioc and sweet potato (5.2 ha)												
YEAR	Unit	0	1	2	3	4	5	6	7	8	9	10
<i>Without project scenario</i>												
Net returns	US\$	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590	3,590
less household consumption of 80%	US\$	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872
available cash income	US\$	718	718	718	718	718	718	718	718	718	718	718
labor days	days	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275	2,275
cash/labor days	US\$	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
<i>With project scenario (before cost recovery)</i>												
Net returns	US\$	3,051	3,547	4,043	4,653	5,149	5,149	5,149	5,149	5,149	5,149	5,149
less the without project consumption	US\$	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872	2,872
less consumption increase of 25%	US\$	0	0	293	445	569	569	569	569	569	569	569
total available cash income	US\$	179	675	878	1,336	1,708	1,708	1,708	1,708	1,708	1,708	1,708
labor days	days	2,033	1,961	1,961	1,961	1,961	1,961	1,961	1,961	1,961	1,961	1,961
cash/labor days	US\$	0.09	0.34	0.45	0.68	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Investment costs	US\$	-100	-173	-173	0	0	0	0	0	0	0	0
ANAE subsidy	US\$	100	173	173	0	0	0	0	0	0	0	0
<i>Incremental change (before cost recovery)</i>												
change in total available cash income	US\$	-538	-43	160	618	990	990	990	990	990	990	990
change in cash/labor day	US\$	-0.23	0.03	0.13	0.37	0.56	0.56	0.56	0.56	0.56	0.56	0.56
change in cash/labor day (%)	percent	-72%	9%	42%	116%	176%	176%	176%	176%	176%	176%	176%
<i>Cost Recovery Plan*</i>												
Incremental cash improvement	US\$	0	0	160	618	990	990	990	990	990	990	990
Total repayment due	US\$	-105	-292	-488	-448	-294	-46	0	0	0	0	0
Repayment	US\$	0	0	40	155	247	46	0	0	0	0	0
Net cash improvement	US\$	0	0	120	464	742	944	990	990	990	990	990
Percent of investment costs recovered:	100%											
* Assumes 5% interest, 2-year grace period, 4-year repayment, interest capitalized during grace period, based on recovery of 100% of investment costs.												
Repayment level is set at 25% of incremental cash improvement												

Case 2. Improved hillside cultivation of manioc and sweet potato (1 ha)												
YEAR	Unit	0	1	2	3	4	5	6	7	8	9	10
<i>Without project scenario</i>												
Net returns	US\$	231	231	231	231	231	231	231	231	231	231	231
less household consumption of 80%	US\$	185	185	185	185	185	185	185	185	185	185	185
available cash income	US\$	46	46	46	46	46	46	46	46	46	46	46
labor days	days	260	260	260	260	260	260	260	260	260	260	260
cash/labor days	US\$	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
<i>With project scenario (before cost recovery)</i>												
Net returns	US\$	262	384	493	588	588	588	588	588	588	588	588
less the without project consumption	US\$	185	185	185	185	185	185	185	185	185	185	185
less consumption increase of 25%	US\$	0	50	77	101	101	101	101	101	101	101	101
total available cash income	US\$	77	149	231	303	303	303	303	303	303	303	303
labor days	days	558	400	373	345	345	345	345	345	345	345	345
cash/labor days	US\$	0.14	0.37	0.62	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Investment costs	US\$	-259	-155	-122	0	0	0	0	0	0	0	0
ANAE subsidy	US\$	259	155	122	0	0	0	0	0	0	0	0
<i>Incremental change (before cost recovery)</i>												
change in total available cash income	US\$	31	103	185	257	257	257	257	257	257	257	257
change in cash/labor day	US\$	-0.04	0.20	0.44	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
change in cash/labor day (%)	percent	-22%	110%	249%	394%	394%	394%	394%	394%	394%	394%	394%
<i>Cost Recovery Plan*</i>												
Incremental cash improvement	US\$	31	103	185	257	257	257	257	257	257	257	257
Total repayment due	US\$	-271	-447	-598	-552	-488	-423	0	0	0	0	0
Repayment	US\$	0	0	46	64	64	64	0	0	0	0	0
Net cash improvement	US\$	31	103	139	193	193	193	257	257	257	257	257
Percent of investment costs recovered:	33%											
* Assumes 5% interest, 2-year grace period, 4-year repayment, interest capitalized during grace period.												
Repayment level is set at 25% of incremental cash improvement												

Case 3. Irrigated agricultural improvements from a diversion dam (25 ha)												
YEAR	Unit	0	1	2	3	4	5	6	7	8	9	10
<i>Without project scenario</i>												
Net returns		18,979	18,979	18,979	18,979	18,979	18,979	18,979	18,979	18,979	18,979	18,979
less household consumption of 80%		15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183
available cash income		3,796	3,796	3,796	3,796	3,796	3,796	3,796	3,796	3,796	3,796	3,796
labor days		5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450	5,450
cash/labor days		0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
<i>With project scenario (before cost recovery)</i>												
Net returns		19,440	34,757	34,757	34,757	34,757	34,757	34,757	34,757	34,757	34,757	34,757
less the without project consumption		15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183	15,183
less consumption increase of 25%		1,064	4,894	4,894	4,894	4,894	4,894	4,894	4,894	4,894	4,894	4,894
total available cash income		3,193	14,681	14,681	14,681	14,681	14,681	14,681	14,681	14,681	14,681	14,681
labor days		5,450	7,510	7,510	7,510	7,510	7,510	7,510	7,510	7,510	7,510	7,510
cash/labor days		0.59	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95	1.95
Investment costs		-6,442	0	0	0	0	0	0	0	0	0	0
ANAE subsidy		6,442	0	0	0	0	0	0	0	0	0	0
<i>Incremental change (before cost recovery)</i>												
change in total available cash income		-603	10,885	10,885	10,885	10,885	10,885	10,885	10,885	10,885	10,885	10,885
change in cash/labor day		-0.11	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26	1.26
change in cash/labor day (%)		-16%	181%	181%	181%	181%	181%	181%	181%	181%	181%	181%
<i>Cost Recovery Plan*</i>												
Incremental cash improvement		-603	10,885	10,885	10,885	10,885	10,885	10,885	10,885	10,885	10,885	10,885
Total repayment due		-6,442	-6,764	-4,245	-1,600	0	0	0	0	0	0	0
Repayment		0	2,721	2,721	1,600	0	0	0	0	0	0	0
Net cash improvement		0	8,164	8,164	9,285	10,885	10,885	10,885	10,885	10,885	10,885	10,885
Percent of investment costs recovered:		100%										
* Assumes 5% interest, 1-year grace period, 3-year repayment, interest capitalized during grace period.												
Repayment level is set at 25% of incremental cash improvement												

Case 4. Irrigated agricultural Improvements from a diversion dam (100 ha)												
YEAR	Unit	0	1	2	3	4	5	6	7	8	9	10
<i>Without project scenario</i>												
Net returns		47,513	47,513	47,513	47,513	47,513	47,513	47,513	47,513	47,513	47,513	47,513
less household consumption of 80%		38,010	38,010	38,010	38,010	38,010	38,010	38,010	38,010	38,010	38,010	38,010
available cash income		9,503	9,503	9,503	9,503	9,503	9,503	9,503	9,503	9,503	9,503	9,503
labor days		17,050	17,050	17,050	17,050	17,050	17,050	17,050	17,050	17,050	17,050	17,050
cash/labor days		0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56	0.56
<i>With project scenario (before cost recovery)</i>												
Net returns		56,990	72,444	72,444	73,750	73,750	73,750	73,750	73,750	73,750	73,750	73,750
less the without project consumption		45,592	57,956	57,956	59,000	59,000	59,000	59,000	59,000	59,000	59,000	59,000
less consumption increase of 25%		0	0	0	0	0	0	3,687	3,687	3,687	3,687	3,687
total available cash income		11,398	14,489	14,489	14,750	14,750	14,750	11,062	11,062	11,062	11,062	11,062
labor days		17,770	17,770	17,770	17,770	17,770	17,770	17,770	17,770	17,770	17,770	17,770
cash/labor days		0.64	0.82	0.82	0.83	0.83	0.83	0.62	0.62	0.62	0.62	0.62
Investment costs		-13,388	0	0	0	0	0	0	0	0	0	0
ANAE subsidy		13,388	0	0	0	0	0	0	0	0	0	0
<i>Incremental change (before cost recovery)</i>												
change in total available cash income		1,895	4,986	4,986	5,247	5,247	5,247	1,560	1,560	1,560	1,560	1,560
change in cash/labor day		0.08	0.26	0.26	0.27	0.27	0.27	0.07	0.07	0.07	0.07	0.07
change in cash/labor day (%)		15%	46%	46%	49%	49%	49%	12%	12%	12%	12%	12%
<i>Cost Recovery Plan*</i>												
Incremental cash improvement		1,895	4,986	4,986	5,247	5,247	5,247	1,560	1,560	1,560	1,560	1,560
Total repayment due		-13,388	-14,057	-13,451	-12,815	-12,078	0	0	0	0	0	0
Repayment		0	1,247	1,247	1,312	1,312	0	0	0	0	0	0
Net cash improvement		1,895	3,740	3,740	3,935	3,935	5,247	1,560	1,560	1,560	1,560	1,560
Percent of investment costs recovered:		10%										
* Assumes 5% interest, 1-year grace period, 3-year repayment, interest capitalized during grace period.												
Repayment level is set at 25% of incremental cash improvement												

Case 5. Vegetable Gardens (2 ha)												
YEAR	Unit	0	1	2	3	4	5	6	7	8	9	10
<i>With project scenario (before cost recovery)</i>												
Net returns		5,969	5,969	5,969	5,969	5,969	5,969	5,969	5,969	5,969	5,969	5,969
less consumption of 50%		2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985
total available cash income		2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985
labor days		612	612	612	612	612	612	612	612	612	612	612
cash/labor days		5	5	5	5	5	5	5	5	5	5	5
Investment costs		-4,739	0	0	0	0	0	0	0	0	0	0
ANAE subsidy		4,739	0	0	0	0	0	0	0	0	0	0
<i>Cost Recovery Plan*</i>												
Incremental cash improvement		2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985	2,985
Total repayment due		-4,739	-3,409	-2,013	-546	0	0	0	0	0	0	0
Repayment		1,492	1,492	1,492	546	0	0	0	0	0	0	0
Net cash improvement		1,492	1,492	1,492	2,439	2,985	2,985	2,985	2,985	2,985	2,985	2,985
Percent of investment costs recovered:		100%										
* Assumes 5% interest, no grace period, 4-year repayment, Repayment level is set at 50% of incremental cash improvement												
Case 6. Reforestation in the Lac Alaotra region (8.5 ha)												
YEAR	Unit	0	1	2	3	4	5	6	7	8	9	10
<i>With project scenario (before cost recovery)</i>												
Net returns		0	0	0	0	1,785	1,785	1,785	1,785	1,785	1,785	1,785
less consumption of 80%		0	0	0	0	1,428	1,428	1,428	1,428	1,428	1,428	1,428
total available cash income		0	0	0	0	357	357	357	357	357	357	357
labor days		1,533	767	767	767	767	767	767	767	767	767	767
cash/labor days		0.00	0.00	0.00	0.00	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Investment costs		-2,527	-1,322	0	0	0	0	0	0	0	0	0
ANAE subsidy		2,527	1,322	0	0	0	0	0	0	0	0	0
<i>Cost Recovery Plan*</i>												
Incremental cash improvement		0	0	0	0	357	357	357	357	357	357	357
Total repayment due		-2,527	-3,975	-4,174	-4,382	-4,602	-4,644	-4,689	-4,736	-4,785	-4,837	-4,892
Repayment		0	0	0	0	179	179	179	179	179	179	179
Net cash improvement		0	0	0	0	-4,423	-4,466	-4,511	-4,558	-4,607	-4,659	-4,713
Percent of investment costs recovered:		0%										
* Assumes 5% interest, 4-year grace period, 6-year repayment, Repayment level is set at 50% of incremental cash improvement												

Protected Areas and Ecotourism Component.

85. The purpose of this section is to consider the likely evolution of Madagascar's tourism and ecotourism industry and, on the basis thereof, to evaluate the potential for ANGAP (the National Association for the Management of Protected Areas) to attain financial self-sufficiency by the end of the third phase of the Environment Program (EP3). The recent trends in tourism growth and in park visitation, shown below, serve as a base for estimating future revenues. Between 1987 and 1995, visits to protected areas grew at an average annual rate of 104 percent. The decline in 1991 is attributable to the civil unrest that year.

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995
Tourists visiting Madagascar	28,136	34,405	38,954	52,923	34,891	53,655	55,102	65,839	78,890
Visits to protected areas			1,429	3,960	1,808	5,855	14,941	17,369	36,206
Percent visiting protected areas			4	7	5	11	27	26	46
Percent annual increase in PA visits				177	-54	224	155	16	108

Sources : Ministère de la police; the DEF until 1991, and ANGAP since 1991.

The entry fees to the protected areas are currently set as follows:

Non resident	20 000 FMG (approximately \$5)
Expatriate resident	15 000 FMG (approximately \$ 3.75)
Resident adults	1 000 FMG (approximately \$ 0.25)
Children under 14	150 FMG (approximately \$ 0.04)
Researchers	50 000 FMG (approximately \$ 12.5)

86. Because non residents generate the bulk of the ecotourism receipts in Madagascar, ANGAP expects to increase its entry fees from the current \$5 per tourist to \$10 per foreign tourist. The analysis assumes that this essential fee change will take place by the beginning of 1997 to correspond with the launching of the EP2. On the basis of planned developments during the EP2 and EP3, ANGAP expects to supplement its entry fees with earnings from a range of activities including guide and porter fees, royalties on artisanal products and other items sold at shops, and concessions to private enterprises.

87. A tourism expert participating in the December, 1995 pre-appraisal mission calculated an *average* per tourist expenditure at Madagascar's category A protected areas of US\$25 and broken down as follows:

- US\$10 entry fee (50% of the fee is channeled directly to local communities)
- US\$1.5 for guide fees
- US\$2.5 for porter's fees
- US\$3 for maps, guides, posters, and other low-cost items
- US\$2 for artisanal objects sold through gift shops.
- US\$6 from lodging and dining concessions

88. Based on these figures, the following table presents the estimated annual income for ANGAP from 1997 through 2006, assuming average annual growth of 12 percent in the number of tourists. The calculations also assume that 50 percent of entry fees are reinvested in the local, periphery zone communities and the revenues from the other activities increase gradually from 1997 to 2001 before they attain the expected levels listed above. For example, ANGAP's concession royalties are estimated at only \$1 per tourist in 1998, increasing by \$1 per tourist annually, until they reach \$6 per tourist in 2003.

ANGAP's estimated annual operating income from category A protected areas.

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Number of visitors to PAs (X1000)	36.2	40.5	45.4	50.8	57.0	63.8	71.5	80.0	96.0	107.5	120.5	135.0
Entry fees (x1000 \$)	107	110	454	508	570	638	715	800	960	1,075	1,205	1,350
Local share of entry fee	?	?	227	254	285	319	357	400	480	537	602	675
Share of entry fee to ANGAP	?	?	227	254	285	319	358	400	480	538	603	675
Guides	0	0	32	45	72	96	107	120	144	161	181	203
Porters	0	0	45	76	114	160	179	200	240	269	301	338
Ecoshop sales	?	?	23	51	114	191	215	240	288	323	362	405
Artisanal sales	?	?	23	51	86	123	143	160	192	214	240	270
Concession royalties	0	0	0	51	114	191	286	400	576	645	723	810
TOTAL ANGAP(X1000\$)			350	528	785	1,080	1,288	1,520	1,920	2,150	2,410	2,701

89. According to the preceding projections, ANGAP's receipts would reach US\$2.7 million in 2006. Current estimates place ANGAP's annual operating costs (not including major investments during the EP2 and EP3) at \$4 to \$5 million. Thus, the estimated \$2.7 million in annual revenues would cover anywhere from 54 to 67 percent of ANGAP's operating costs.

90. A more optimistic scenario could significantly increase the estimated receipts to a level sufficient to meet the estimated operating costs. Such a scenario would be the result of several actions which could lead to three major changes in the model: (i) annual tourism growth of 15 percent rather than 12 percent, (ii) a reduction in the distribution of entry fees to communities from 50 percent to 30 percent, and (iii) a payment to ANGAP of ten percent of the tourism tax collected at the airport. These changes would generate an estimated US\$4.4 million in revenues for ANGAP by the year 2006, representing an increase of sixty-three

percent from the original estimate. Annual revenues of US\$4.4 would be sufficient to meet anywhere from 88 to 100 percent of ANGAP's estimated recurrent costs.

91. ANGAP recommends the following specific actions to create the conditions for realizing the higher estimated revenues:

- establish currency exchange offices within the service areas of the four most visited protected areas, with eventual offices at all category A protected areas.
- establish within the same service areas reliable national and international communication links (telephone and fax).
- define and apply a system for granting property rights (through auction or another form) to encourage investment in lodging in the peripheral zones of the protected areas.
- create or improve landing strips near protected areas with limited access by road.
- create a single administrative transaction point in order to streamline the procedures for undertaking investments in the peripheral zones or within protected areas.
- reduce the difficulties tourists typically encounter entering and leaving the country by simplifying procedures and requirements.
- permit other companies (besides Air Madagascar) to operate flights to and from Madagascar.
- introduce a national-level tourism marketing strategy which places more attention on the protected areas and biodiversity of the island (rather than beach tourism).
- develop mutually beneficially partnerships between ANGAP and tour operators.
- give ANGAP the authority to set entry fees and other fees generated from protected area tourism as well as the percentage which must be reinvested in local communities.

92. The investments foreseen under the EP2 and EP3 are critical if ANGAP is to have any chance to reach revenue levels sufficient to meet their operating costs. A third model assumes that ANGAP continues to operate in the absence of any additional investment in protected areas. It is assumed that this would lead to an increase in tourism of only 5 percent per year during the EP2, gradually diminishing during the EP3. Furthermore, the model assumes that there are no revenues from activities beyond the entry fee (e.g., no ecoshops), and no concessions awarded to the private sector which has no interest in bringing clients to poorly maintained protected areas. Under such a scenario it is estimated that by the end of EP3, ANGAP's annual receipts would fall to \$200,000, which represents only five percent of operating costs.

93. Another potential contribution to the long-term financial sustainability of the protected areas system is the USAID-sponsored Tany Meva foundation. This foundation will serve as a mechanism for attracting external funding in the form of equity for managing Madagascar's biological heritage. If ANGAP is able to demonstrate its capacity as a managing agency, it could attract financial sponsors to contribute to the foundation. The interest from those contributions would then be available for ANGAP to invest in revenue-generating activities.

Multiple Use Forest Ecosystems Component (ESFUM) and the National Forestry Fund.

94. The purpose of this section is to assess the evolution of the National Forestry Fund (NFF) and estimate the potential future contributions this fund could make to the operating costs of the DEF for implementing the ESFUM component.

The NFF has the following sources of revenues:

- fees from cutting permits
- fees on exported logs, timber, and wood products
- fees on exports of raphia, artisanal products and cashew nuts
- fees on exports of wild plants or flowers including medicinal products
- forest access fees, fines, and legal transaction costs

95. The following table shows the receipts and expenditures of the FFN since its creation in 1988. The table shows the rapid increase in the rate of fee recovery, particularly in the last two years. However, expenditures also increased rapidly over the same period, even exceeding revenues in 1992 and 1993. As of July 3, 1996 the fees collected for the year total 720 million FMG whereas costs for the year reach 1.4 billion FMG.

Year	Fees collected (in million FMG)	Expenditures (in million FMG)
1988	14	5
1989	113	34
1990	196	59
1991	165	123
1992	196	266
1993	211	218
1994	10	308
1995	1,689	768
1996	720*	1,458*

* Through July 3, 1996

96. As the FFN collection system continues to improve, it is possible to estimate its potential contribution to meeting the costs of managing the 580,000 ha of forests under the ESFUM component. On the basis of recent experience, a forest economist with the DEF generated the following estimates on the fees collected in each province for various grades of wood (categories 2 through 5)

Volume of wood and fees collected							
Province	Category 2 (m3)	Fees (million FMG)	Category 3 (m3)	Fees (million FMG)	Category 4 and 5 (m3)	Fees (million FMG)	Total fees (million FMG)
Antananarivo	0	0	8800	211	7200	137	348
Antsiranana	9360	487	63960	1535	67080	1274	3296
Fianarantsoa	5840	304	54560	1261	58400	1110	2675
Mahajanga	1600	83	11400	538	24000	456	1077
Toamasina	9360	487	71760	1722	74880	1423	3632
Tulear	1600	83	8000	192	6400	122	397
Total timber volume	27760	1444	227480	5459	237960	4522	11425
Total charcoal volume	6940	79	56870	455	59490	476	1010
Total fees (million FMG)		1,523		5,914		4,998	12,435

97. The above table shows that total receipts could reach 12.4 billion FMG per year, equivalent to \$3.1 million at an exchange rate of 4,000FMG per US dollar. To this sum can be added annual fees on the exportation of wood products totalling US\$160,000, for a total of US\$3.27 million. Of this amount, the DEF estimates that sixty percent would be paid in currency while the remaining forty percent would be collected in the form of in-kind payments or direct reforestation. Thus, the cash contribution to operating costs would be approximately \$1.96 million annually. In comparison, the DEF's annual recurrent costs, by the end of the EP2, are estimated at US\$0.9 million. The FFN fee calculations presented above rely on the DEF's own estimates of expected production from the 580,000 hectares under the ESFUM component. The economic analysis, presented earlier, relied on much more conservative production estimates than those of the DEF. However, applying the same assumptions as the DEF with respect to forestry fund collection rates (approximately 3 percent of the value of sawnwood and 1 percent of the value of charcoal), to the production estimates used in the economic analysis, leads to estimated annual fees of US\$0.9million. Based on these calculations it appears that the forestry fund could, within ten years, meet anywhere from 50 percent to 100 percent of the DEF's annual operating costs. The DEF is expected to undertake more refined analysis of their annual work programs to move gradually towards full cost recovery by the end of the Environment Program.

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 - Composante Conservation des sols et amélioration du cadre de vie rural - Etude de faisabilité technique pour le Programme Environnement 2, 1997-2001. ANAE, Antananarivo, juin 1995 - Document complémentaire: septembre 1995
 - Composante Gestion conservatoire des eaux et des sols, sous-composante Bassins-versants, DEF
 - Composante Ecosystèmes forestiers à usages multiples, DEF. Version révisée, mai 1996, 3 volumes.
 - Composante Aires protégées et Ecotourisme, ANGAP
 - Composante Environnement urbain, ONE
 - Composante Environnement marin et côtier, ONE
 - Composante Cadastre et Sécurisation foncière, Direction des Domaines
 - Composante Information géographique de base, FTM
 - Composante Sensibilisation - Information - Education - Formation, ONE
 - Composante Prévention et atténuation des catastrophes naturelles et technologiques, ONE
 - Composante Appui au PAE - Volet Gestion économique des politiques, ONE
 - Composante Appui au PAE - Volet Système d'Information sur l'Environnement, ONE
 - Composante Appui au PAE - Volet Procédures environnementales, législation environnementale, ONE
 - Composante Appui au PAE - Volet Recherche environnementale, ONE
 - Composante Appui au PAE - Volet Appui à la mise en oeuvre de la gestion locale communautaire des ressources naturelles renouvelables, ONE
 - Organisation institutionnelle et Coordination du PE2, ONE
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 - Politique forestière malgache, document d'orientation
 - Plan directeur forestier national, version provisoire
 - Avant-projet de loi portant révision de la législation forestière
5. Manuel de procédures pour la coordination des relations interinstitutionnelles dans la gestion de l'environnement à Madagascar, ONE - KEPEM, septembre 1995

6. **Projet de loi relatif à la gestion communautaire locale des ressources naturelles renouvelables**
7. **Rapport sur l'état de l'environnement à Madagascar, ONE - Institut national de la Statistique, 1995**
8. **GEF design assistance to EP2: summary of findings - CI, Washington, November 1995**
9. **Evaluation par les bénéficiaires. 5 volumes plus executive summary. 1995**
10. **Joint appraisal mission. Working documents. Preliminary version. COS 1995, document N° 1, December 1995**
11. **ONE. Audit des capacités institutionnelles. Rapport final. Institutions et Développement et Cabinet Mpanazava, Avril 96**
12. **ONE. Manuel d'organisation du programme environnemental 2. Version préliminaire. Août 1996.**
13. **ONE. Système de suivi-évaluation. Manuel d'indicateurs et Manuel de procédures. Versions préliminaire. Août 1996.**
14. **Projet de décret fixant le cadre institutionnel pour la gestion de l'environnement. Septembre 1996.**

Sector Policy Statement
(Translation of the original in French)

1- Present Situation

11/ Malagasy Environmental Charter (CEM)

Aware that the environmental degradation centered around humankind is the principal cause of the incessant research for a development at all levels, the Malagasy State promulgated Law 90-033, establishing the Environmental Charter ratified by the National Assembly on December 21, 1990. Indeed, the country's economy relies mainly on natural resources.

This CEM contains the general principles of the National Environment Policy (PNE) and the arrangements translating in operational terms the implementation of this PNE in the framework of the overall development of Madagascar.

12/ Environmental Action Plan (PAE)

The operational implementation of this law has caused the officials to put in place an PAE in which the different phases are about 5 years long:

Environmental Program 1 or EP1 starting in 1991
Environmental Program 2 or EP2 starting in 1997
Environmental Program 3 or EP3 starting in 2002

The goal of the PAE is to promote development via the sustainable use of natural resources, and in particular to protect the biological diversity of Madagascar for the benefit of future generations.

This PAE has the following objectives:

- to limit the degradation of original ecosystems
- to promote rational modes of use of renewable natural resources and the preservation of ecological functions
- to construct an economic and sectoral planning system based on the relevant environmental concerns

13/ Environmental Program 1 or EP1

The EP1 is the first integrated environmental project of the Republic of Madagascar. The principal objective is to get the PAE started. Multiple missions were identified and the steps for attaining the objectives are as follows:

- an education, training and environmental awareness project
- a biodiversity protection project
- a soil conservation and rural live improvement project
- a land titling, mapping and remote sensing project
- an PAE support project composed of the following:

- ⇒ a research subcomponent
- ⇒ an environmental legislation subcomponent
- ⇒ a database subcomponent
- ⇒ an environmental impact assessment subcomponent

The EP1 finishes this year, and the PAE begins its second phase in 1997.

14/Institutional Framework

For implementation of a plan an appropriate institutional framework is needed for to ensure the success of the project. The structures implanted during the EP1 are the following:

- Minister in charge of the Environment
- National Office of the Environment (ONE), the operational management structure
- National Association of Environmental Action (ANAE)
- National Association for the Management of Protected Areas (ANGAP)
- Geographic Information and Environmental Training Center (CFSIGE)

Existing institutions such as the Land Management and Land Titling Directorate (DD), the Office of Water and Forests (DEF) and the Mapping Institute (FTM) were strengthened.

The two anticipated structures in the CEM, namely the National Institutional Environmental Structure (SINE) and the National Conservation Commission for Development (CNCD), were not functional.

2-Basic Policy Principles

21/ Objectives:

The overarching objective consists of optimizing the management of natural resources for human development needs.

22/Strategic Principles of the Environmental Action Plan

The Government is aware of the importance of good management of natural resources for the economic development of the country, and conversely of the influence of the level of economic development on the use of natural resources. The strategy of managing natural resources which underlines the PAE is thus an integral part of the country's development strategy, in the framework of the policy of resurgence of growth of the economy.

Also for the implementation of this policy the following principles were adopted:

- Decentralization of the Program implementation towards decentralized local governments, initially at the level of the future administrative Regions, as much for the program planning as for the execution of activities.
- Long term vision of actions and financing
- Intensification of dialogue instead of transmission through a hierarchy
- Presentation of the program to the population emphasizing the benefits rather than the constraints

- Mobilization of local populations in the conception and implementation of environmental activities.
- Use of associations and other NGOs in the private sector in the implementation of activities

3-Principal Medium Term Measures:

The continuation and consolidation of achievements of EP1 is the principal objective of the Environmental Program 2. Strengthened by the experience of EP1, the country has to supply itself with institutional, legal and regulatory instruments, adequate for handling the various eventual constraints, internal and external to the program, in its implementation. The program approach will be better in relation to the coordinated independent projects approach.

31/ The new institutional framework

The structures for the management of operations established during the EP1 will be maintained and even strengthened for the implementation of Environment Program 2. ONE will be charged with the operational coordination of the program.

On the other hand, the experience of EP1 confirmed the necessity for the country to have on the one hand a forum for reflection and discussion, and on the other hand improved mechanisms for coordination within the Administration.

The institutional structures which were specified by the CEM and which were not implemented during EP1, namely the SINE and the CNCD, no longer correspond to this new vision of need, so they will be replaced by two new entities:

31.1/ National Environmental Council (CNE)

- The National Environmental Council, independent body, has a consultative character, charged with giving its opinion on the general direction and strategic vision on environmental matters.

31.2/ Interministerial Environment Committee (CIME)

- The Interministerial Environment Committee, guarantor of the real and effective integration of the requirements for an environmentally sustainable development.

32/ Environmental Program 2 (EP2):

The components of the Environmental Program 2 are notably:

32.1/ Direct Components:

- multiple use forest ecosystem
- protected areas and ecotourism
- management for the conservation of water and soils
 - ⇒ mini project
 - ⇒ management of large watersheds
- marine and coastal zone

32.2/Transversal components

- support to regionalized management and spatial approach
- Support to Local Natural Resource Management and Land Tenure Security
 - ⇒ land tenure securization
 - ⇒ management of natural resources by local community
- Regional fund for environmental management

32.3/ Strategic components:

- Elaboration and transfer of policies, strategies and instruments
- Environmental impact assessment of investments (MECIE)

32.4/Support components

- environmental communication
- environmental education and training
- environmental information system
- finalized environmental research
- geographic information
- support to the coordination and management of EP2

33/ Program law, the reform of the legal and regulatory framework

In view of the lessons of EP1 and for the implementation of EP2 the Government has committed itself to:

- Define or redefine the mandates of some of the entities as well as the mechanisms of their interventions. In particular,
 - ⇒ the CNE and the CIME as defined in section 31 will be constituted shortly
 - ⇒ as well, the mission of the private entity charged with managing the network of Protected Areas will be redefined to get better results
 - ⇒ the management of Protected Areas will be conferred to ANGAP which is an evolution from its mission of coordination to that of strategic and operational manager in order to improve conservation of these ecosystems. In the framework of this management, the Government, in concert with ANGAP, will enact all necessary legislative and regulatory measures in order to permit ANGAP to do the following:
 - ◇ to contribute to the management of disputes concerning the Protected Areas
 - ◇ and to put in place plans for managing the network
 - ⇒ CFSIGE is mandated to develop and implement the environmental education and training policy
- launch a national debate on the development of a Land Code. Meanwhile, a more simple form of land tenure will be enacted, called relative land security system, giving legitimacy to *de facto* situations that are accepted and guaranteed by the community and allowing such a community, with a simple procedure, to manage in a rational manner the renewable natural resources made available to them.
- pass a Program contract with FTM for the period 1997-2001 for the rehabilitation and production of basic geographic information

- specify the respective roles of central government, local governments and their partners in the implementation of the environment action plan, in accordance with the principle of Government withdrawal and the policy of promoting private initiative
- set the rules and institutional framework for such an implementation
- establish the conditions for the integration of the PAE in the National Development Plan as well as for the integration of the various environmental activities at regional level
- provide for the inscription in the budget law of the necessary Government contributions corresponding to the Financing Agreements passed with financing institutions, in particular external ones
- with regard to the MECIE decree on the compatibility between investments and the environment, review its application and applicability with the aim of having operational aspects of environmental assessment, control and monitoring taken over progressively by line ministries and local governments
- within the framework of the integration of environmental concerns into the country's sectoral and global development policies, proceed with the formulation of environmental policies for various sectors (agriculture, water, macro-economy, ...), and implement the policies that have been formulated during the phase I of the Environment Program (tourism, roads, energy, mining, industry)

Consequently, a draft Program Law that would complete, specify or modify the provisions of the CEM will be presented to the Parliament at its next session for the implementation of the above policy. The regulations that are required for the application of the policy will be promulgated shortly, in particular with regard to the relative land security system and the management of protected areas.

To complement the above, the Government also intends to:

- present to the next session of the Parliament a proposal for a Forest Policy Orientation Law and a proposal for a law for a Revision of the Forestry Legislation
- promulgate as soon as possible the various by-laws and regulations required to implement the Program, particularly the by-laws to implement the revised forestry legislation (once the law voted by Parliament) and the by-laws to implement the recently adopted law on the local community management of renewable natural resources, in particular the decree on environmental mediators
- ensure that the various institutions involved in the Program have sufficient implementation capacity, in particular by making sure that planned or on-going institutional capacity analysis will be completed and ensuring that the measures that might appear necessary would be actually implemented.

34/Financial and economic aspects

In order to strengthen the way strong interactions between environment and development are taken into account, criteria of economic and financial analysis will be systematically introduced in the formulation of the activities of the program, particularly ANAE's mini-projects, the activities under the regional fund component (FORAGE - Regional Fund for Supporting Environmental Management), and the management of forest areas.

The search for the long-term financial viability of the Program will also require setting-up cost recovery mechanisms for those activities that justify it, i.e. those that generate quickly enough tangible benefits at the level of the beneficiaries of the programs.

Aware that the financing of development activities in rural areas follows very diverse approaches and that such a diversity might be a problem for implementing the cost recovery policy mentioned above, the Government intends to conduct a review of all major operations under its responsibility with a view to determining whether, and to what extent, such operations provide or allow for cost recovery and, if so, whether, and to what extent, cost recovery mechanisms can be introduced or strengthened, as the case may be, under such operations, and harmonized with one another.

PROTECTED AREAS LISTED ACCORDING TO PRIORITIES

Source	ANGAP Name	ANGAP Ground Area (ha)	ANGAP New Category	CI-GEF Knowledge after PRIF Scientific and Participatory Workshops					WB Donor of Oper. Structure in EP1
				Total Score	Biologic a Diversity	Priority for Conservation	Priority for Research	Degree of Pressure	
1	Ankarana	18,225	A-2	24	E	E	E	E	USA
2	Andohahela	76,020	A-7	24	E	E	E	E	USA
3	Analamera	34,700	B-2 1	24	E	E	E	E	USA
4	Tsimanampetsotsa	43,200	B-2 4	24	E	E	E	E	-
5	Cap Sainte-Marie	1,750	B-1 8	24	E	E	E	E	USA
6	Manombo	5,020	B-1 1	23	E	E	VI	E	WB
7	Masoala	220,000	A-3	22	E	E	E	I	USA
8	Isalo	81,450	A-11	22	E	VI	E	VI	WB/USA
9	Andranomena	6,420	B-1 9	22	VI	E	E	VI	WB/USA
10	Lokobe - Nosy Tanikely	2,220	A-10	21	E	E	E	A	WB
11	Mangerivola	11,900	C-5	21	VI	VI	E	VI	-
12	Tsaratanana - Manongarivo	83,872	B-2 2	20	E	VI	VI	I	WB
13	Marojejy - Anjanaharibe	92,240	B-1 6	20	E	VI	I	VI	KfW
14	Andringitra - Pic d'Ivohibe	34,613	B-1 5	20	E	VI	VI	I	KfW
15	Betampona	2,228	B- 1 10	20	VI	VI	VI	VI	Brit. Church
16	Beza Mahafaly	600	B-1 2	20	VI	E	VI	I	WWF/USA
17	Ambatovaky	60,030	C-6	20	VI	VI	VI	VI	-
18	Mantadia	10,000	A-6	20	VI	E	I	VI	USA
19	Mananara Nord	24,000	B-1 3	20	VI	E	I	VI	UNDP/WB
20	Bemaraha	152,000	A-9	19	E	VI	VI	A	France/WB
21	Zahamena	73,160	B-1 7	19	VI	I	VI	VI	USA
22	Ranomafana	41,600	A-4	19	VI	VI	I	VI	USA
23	Andasibe (Analamazaotra)	810	A-5	18	I	VI	I	VI	USA
24	Namoroka	21,742	B-2 3	18	I	E	VI	A	-
25	Zombitse - Vohibasia	21,500	B-1 4	18	I	VI	VI	I	Norway
26	Ambohijanahary	24,750	C-8	18	I	VI	VI	I	-

Source	ANGAP		ANGAP New Category	CI-GEF Knowledge after PRIF Scientific and Participatory Workshops					WB Donor of Oper. Structure in EP1
	Name	Area (ha)		Total Score	Biologic a Diversity	Priority for Conservation	Priority for Research	Degree of Pressure	
27	Baie de Baly	1,500	C-7	18	I	E	VI	A	WB
28	Montagne / Forêt d'Ambre	18,200	A-1	17	VI	I	VI	A	USA/WB
29	Ambohitantely	5,600	B-2 6	17	I	I	A	VI	WB
30	Ankarafantsika	60,520	A-8	17	VI	I	VI	A	KfW
31	Kalambatritra	28,250	B-2 7	15	U	VI	E	A	-
32	Midongy du Sud	43,423	B-2 10	13	U	I	E	L	WB
33	Bora	8,380	B-2 9	11	U	U	E	I	-
34	Tampoketsa Analamaitso	17,150	C-1	4	U	U	U	U	-
35	Marotandrano	42,200	B-2 8	-	-	-	-	-	-
36	Kasijy	18,800	C-2	-	-	-	-	-	-
37	Maningoza	7,500	C-3	-	-	-	-	-	-
38	Bemarivo	11,570	C-4	-	-	-	-	-	-
TOTAL		1,407,14		3					

A= Average = 3 points

E= Exceptional = 6 points

I= Important = 4 points

L= Low = 2 points

U= Unknown = 1 point

VI = Very Important = 5 points

PROTECTED AREAS QUALIFYING FOR GEF ASSISTANCE (LISTED ACCORDING TO PRIORITIES)

Source	ANGAP Name	ANGAP Ground Area (ha)	ANGAP New Category	Conservation International - GEF Knowledge after PRIF Scientific and Participatory Workshops					UNDP - WB GEF Funding for	
				Total Score	Biological Diversity	Priority for Conservation	Priority for Research	Degree of Pressure	Mnagemen t Plan	Management
1	Tsimanampetsotsa	43,200	B-2 4	24	E	E	E	E	X	X
2	Cap Sainte-Marie	1,750	B-1 8	24	E	E	E	E	X	X
3	Manombo	5,020	B-1 1	23	E	E	VI	E		X
4	Andranomena	6,420	B-1 9	22	VI	E	E	VI		X
5	Tsaratanana - Manongarivo	83,872	B-2 2	20	E	VI	VI	I		X
6	Marojejy - Anjanaharibe	92,240	B-1 6	20	E	VI	I	VI		X
7	Andringitra - Pic d'Ivohibe	34,613	B-1 5	20	E	VI	VI	I		X
8	Betampona	2,228	B- 1 10	20	VI	VI	VI	VI	X	X
8	Beza Mahafaly	600	B-1 2	20	VI	E	VI	I		X
9	Ambatovaky	60,030	C-6	20	VI	VI	VI	VI	X	X
10	Mananara Nord	24,000	B-1 3	20	VI	E	I	VI		X
11	Zahamena	73,160	B-1 7	19	VI	I	VI	VI		X
12	Namoroka	21,742	B-2 3	18	I	E	VI	A	X	X
13	Zombitse - Vohibasia	21,500	B-1 4	18	I	VI	VI	I		X
14	Ambohijanahary	24,750	C-8	18	I	VI	VI	I	X	X
15	Baie de Baly	1,500	C-7	18	I	E	VI	A		X
16	Ambohitantely	5,600	B-2 6	17	I	I	A	VI	X	X
17	Kalambatritra	28,250	B-2 7	15	U	VI	E	A	X	X
18	Midongy du Sud	43,423	B-2 10	13	U	I	E	L		X
TOTAL		573,898								

A= Average = 3 points

E= Exceptional = 6 points

I= Important = 4 points

L= Low = 2 points

U= Unknown = 1 point

VI = Very Important = 5 points

BIOGEOGRAPHICAL FEATURES OF PROTECTED AREAS QUALIFYING FOR GEF ASSISTANCE

Protected Area	Area (ha)	Main Habitat Type	Special Interest
Northern Region			
RS d'Analamera	34700	deciduous forest, rainforest	plant spp from eastern and western Domain, endemic <i>Propithecus d. perrieri</i> , Aye Aye, Fossa, Mad. Fish Eagle, Hawk <i>Accipiter henstii</i>
RS de Manongarivo	35250	differs with altitude, lowland rainforest	21 mammal spp, 8 primate spp, 3 carnivore spp, endemic bird fam., 47 bird spp, 48 reptile and frog spp
RNI 4 de Tsaratanana	48622	rainforest, differs with altitude	12 mammal spp, 54 bird spp, endemic reptiles and frogs, <i>Lemur macaco</i> and <i>L. rubriventer</i> , endemic birds <i>Atelornis crossleyi</i> , <i>Phyllastrephus cinereiceps</i>
RNI 12 de Marojejy	60150	rainforest, differs with altitude, forest types from 3 different regions	2000 endemic plant spp, 17 frog and 22 reptile spp, 102 bird spp, 3 endangered bird spp, <i>Propithecus d. candidus</i>
RS d'Anjanaharibe Sud	32100	similar to RNI 12, but only forest types from 2 regions	assumed to have a rich fauna and flora, Lemurs, Indris, carnivores
Western Region			
RS d'Andranomena	6420	dry deciduous forest, remarkable Baobabs	many endemic species, endemic tortoise <i>Pyxis planicauda</i> , two Boa species, several Lemur spp, Fossa
RNI 8 de Namoroka	21742	dry deciduous forest, differs with soil, Euphorbia, Baobab, Pachypods	12 mammal spp, 56 bird spp, endemic frogs and chameleons, endemic chameleon <i>Brookesia bonsi</i>
PN Zombitse/Vohibasia	21500	southern most dry deciduous forest	67 bird spp, 14 mammal spp, 6 lemur spp, endemic bird and gecko <i>Phyllastrephus apperti</i> , <i>Phelsuma standingi</i>
RS d'Ambohijanahary	24750	transition zone of central and western forest types	several palm spp, <i>Propithecus verreauxi deckeni</i>
Baie de Baly	1500	dry deciduous forest, Mangroves, temp. lakes, wetlands	migrating birds area, endemic and very rare tortoise <i>Geochelone yniphora</i>
Eastern Region			
RNI 3 de Zahamena	73160	primary and secondary rainforest, montane forest	61 bird spp, 12 mammal spp, Crocodile, Lemurs <i>Propithecus d. diadema</i> , <i>Varecia variegata</i>
RS d'Ambatovaky	60050	rainforest, similar Zahamena	

Protected Area	Area (ha)	Main Habitat Type	Special Interest
RS de Mangerivola	11900	rainforest, similar Zahamena	
RNI de Betampona	2228	rainforest, lowland	
PN Mananara Nord	24000	lowland rainforest, mangroves	largest protected part of mad. lowland rainforest, 60 bird, several primate spp, <i>Brachypteracias</i> sp, <i>Hapalemur simus</i> , <i>Indri indri</i> , <i>Allocebus trichotis</i> , Dugong, crocodile
South -Eastern Region			
SIB de Midongy du Sud	24145 and 43423	intact southern mad. montane rainforest	together with RNI 11 the largest remaining bloc of this type of forest, 42 bird spp, several mammals, still not well studied
RS de Manombo	5020	lowland rainforest, 50%	58 bird spp, endemic birds <i>Lophotibis cristatus</i> and <i>Canirallus kioloides</i>
RNI 5 d'Andrigitra	31160	rainforest, differs with altitude and exposition	22 frog spp. 65 bird spp, 1 endangered bird spp, 2 rodent spp <i>Brachyuromys</i> , birds <i>Neodrepanis hypoxantha</i> , <i>Atelornis pittoides</i> , <i>Dromaeocercus brunneus</i>
RS du Pic d'Ivohibe	3453	rainforest 70%, degraded secondary forest 30%	43 bird spp, Lemurs and reptiles, <i>Lemur fulvus rufus</i> , <i>Propithecus diadema</i> , endemic bird <i>Randia pseudozosterops</i>
RS de Kalambatritra	28250	one of the rare rainforest fragments in the Central Domain	9 mammal spp, rainforest birds, 34 bird spp, fossa, <i>Lemur fulvus fulvus</i> , bushpig
Southern Region			
RNI 10 de Tsimanampetsotsa	43200	dry thorn shrub vegetation, Didieraceae, halophil vegetation	high plant endemism, 72 bird spp, 3 lemur spp, <i>Lemur catta</i> in high density, endemic fish <i>Typhleotris mad.</i> , endemic plover <i>Charadrius thoracicus</i>
RS du Cap Ste Marie	1750	dry bush vegetation	rare plant spp, 3 tenrec spp, bird spp that are confined to dry bush vegetation, plants <i>Aloe millotii</i> , <i>Megistostegium perrieri</i>
RS de Beza-Mahafaly	600	dry thorn shrub, Didiereaceae, gallery forest	12 mammal spp, 5 primate, 4 tenrec spp, 61 bird spp, <i>Geogale aurita</i>

GAZETTED FORESTS PRIORITIZED FOR CONSERVATION PURPOSES

	Gazetted Forest	Province	Area ha	Priorities after PRIF Scientific Workshop	
				Biological	Research
1	Fort Carnot 3	Fianarantsoa	19,710	E	E
2	Anjiabe	Toamasina	38,000	E	E
3	Lokaitra	Toamasina	58,000	E	E
4	Haute Rantabe	Toamasina	33,200	E	E
5	Mahakiry	Toamasina	142,500	E	E
6	Vohitaly	Toamasina	10,300	E	E
7	Vohitrambo	Toamasina	11,525	E	E
8	Anandrivola	Toamasina	3,800	E	E
9	Anjanaharibe	Toamasina	7,500	E	E
10	Ankarahaka	Toamasina	14,750	E	E
11	Farankaraina	Toamasina	1,634	E	E
12	Kambolaza	Toamasina	27,600	E	E
13	Vohidramontsona	Toamasina	14,500	E	E
14	Bezavona Atsimo	Antsiranana	27,800	E	E
15	Besariaka	Antsiranana	38,260	E	E
16	Ambodivohitra	Antsiranana	2,420	E	E
17	Cap Masoala	Antsiranana	27,682	E	E
18	Antrafanaomby	Antsiranana	31,915	E	E
19	Andavakoera	Antsiranana	12,575	E	E
20	Ivongo	Fianarantsoa	9,220	E	VI
21	Vondrozo et Ivohibe 4	Fianarantsoa	40,694	E	VI
22	Ivongo	Fianarantsoa	8,700	E	VI
23	Ihorombe	Fianarantsoa	2,375	E	VI
24	Efasy	Fianarantsoa	10,650	E	VI
25	Ivohibe et Ivongo	Fianarantsoa	17,277	E	VI
26	Lopary	Fianarantsoa	2,516	E	VI
27	Ambre	Antsiranana	5,595	E	VI
28	Antafondro	Antsiranana	39,000	E	VI
29	Fenoamby Sud	Fianarantsoa	3,180	VI	E
30	Menambondro Nord	Fianarantsoa	2,319	VI	E
31	Mahavelona-Ambod.	Fianarantsoa	5,203	VI	E
32	Amparibe	Fianarantsoa	1,200	VI	E
33	Nosy Varika	Fianarantsoa	3,120	VI	E
34	Mananjary 1	Fianarantsoa	2,480	VI	E
35	Mananjary 2	Fianarantsoa	3,900	VI	E
36	Manakara 2	Fianarantsoa	3,810	VI	E
37	Tampolo	Toamasina	537	VI	E
38	Ambatomalama	Toamasina	2,200	VI	E
39	Amparafana	Toamasina	3,500	VI	E
40	Andranobe 1	Toamasina	2,375	VI	E
41	Nankinana	Toamasina	3,987	VI	E
42	Namolazana	Toamasina	57,800	VI	E

	Gazetted Forest	Province	Area ha	Priorities after PRIF Scientific Workshop	
				Biological	Research
43	Andavakimenarana	Toamasina	1,416	VI	E
44	Ampiadianombalahy	Toamasina	33,247	VI	E
45	Haute Teza	Toamasina	12,230	VI	E
46	Ambohilero	Toamasina	117,000	VI	E
47	Sivora	Toamasina	7,400	VI	E
48	Savarindrano	Toamasina	1,900	VI	E
49	Vohitraholahy	Toamasina	16,800	VI	E
50	Namandrahana	Toamasina	900	VI	E
51	Fénérive	Toamasina	294	VI	E
52	Fierenana	Toamasina	63,790	VI	E
53	Andravory	Antsiranana	29,280	VI	E
54	Bezavona et Sakatia	Antsiranana	5,400	VI	E
55	Analalava	Antsiranana	4,400	VI	E
56	Ambomihirahavavy	Antsiranana	68,500	VI	E
57	Ampataka	Toliary	7,750	VI	E
58	Ankoadava	Toliary	33,530	VI	E
59	Befotaka Tsimembo	Mahajanga	18,600	I	E
TOTAL			1,177,146		

A= Average
E= Exceptional
I= Important
U= Unknown
VI= Very Important
VL= Very Low

CALCULATION OF GEF INCREMENTAL COSTS

BROAD DEVELOPMENT GOALS

1. Aware of the significant environmental problems that it faced, the government of Madagascar approved its National Environmental Action Plan (NEAP) in 1989. It then embarked on the implementation of the NEAP through a fifteen year Environment Program. The first five year phase aimed at creating a proper policy, regulatory and institutional framework. In this second phase, for which GEF Incremental Funding is being sought, the first phase programs will be consolidated before the final phase which will mainstream environment into macroeconomic management and sector programs.

BASELINE

2. Madagascar's Second Environment Program aims to curb current environmental degradation trends, promote the sustainable use of natural resources, and create the conditions for environmental considerations to become an integral part of macroeconomic and sectoral management of the country. Under the baseline activities proposed in PE2, biodiversity actions would be limited to improving the management of 20 national parks and reserves, and 19 other identified priority sites would remain unmanaged. Forest management would focus on production, so inventory of the remaining biodiversity resources, including marine biodiversity, would remain incomplete, despite the knowledge that existing national parks and reserves cover but a small part of Madagascar's biodiversity and most were established with other interests in mind. In particular, the root causes of biodiversity loss, identified as local and district actions, would be left largely unaddressed.

GLOBAL ENVIRONMENTAL OBJECTIVE

3. Madagascar has been called the single highest major biodiversity conservation priority in the world owing to its combination of high diversity, endemism, and degree of threat. Although Madagascar occupies only about 1.9% of the land area of the African region, it has more orchids than the entire African mainland, and is home to about 25% of all African plants. Overall, about 80% of Madagascar's plant species are endemic, and for animals the proportion is usually even higher, the best example being the lemurs, close to 100% of which occur naturally only in Madagascar. In addition, 95% of the country's 265 reptiles and 99% of its 120 amphibians are endemic, and figures for other groups of organisms are comparable. Higher-order endemism is also extremely high in Madagascar, making even less diverse Malagasy taxa exceptionally valuable. For instance, although there are only eight genera of endemic Malagasy freshwater fish, the genetic information in these species has been compared to the entire very rich cichlid fish fauna of the African rift lakes. Madagascar has also recently been selected as a critical site for marine conservation worldwide.

4. The global environment objective of the Second Environment Program Support Project is to curb the loss of globally significant biodiversity by slowing current environmental degradation trends, promoting the sustainable use of natural resources, and creating the conditions for environmental considerations to become an integral part of macroeconomic and sectoral management of the country. Given the national scope of the EP2 and the range of ecological conditions in the country, the GEF project would fall under all four GEF biodiversity

operational programs, with higher emphasis on forest ecosystems, and to a lesser extent on coastal and marine ecosystems.

GEF ALTERNATIVE

5. The GEF contribution to EP2 will lay the groundwork for new approaches to addressing root causes of biodiversity loss in the country. It will build integral components of biodiversity conservation into revitalized forestry institutions and strengthen the administration of protected areas. Finally and most importantly, it will build consideration of biodiversity into on-going national programs aimed at decentralizing the management of natural resources.

6. By adding GEF financing to the second phase of the Environment Program the shortcomings noted in the baseline are overcome. In particular the Environment Program is extended to complete inventory of the still little known biodiversity of the forests and marine ecosystems of the country, critical sites for terrestrial and marine protected areas are identified and management is established, effective management is established at those known biodiversity sites that are of little ecotouristic value (ie. the sites other than National Parks), and the root causes of biodiversity are attacked through support to a program of regional and district action.

SYSTEM BOUNDARY

7. In this case the system boundary is the country of Madagascar as a whole, together with its fringing reefs and coastal zones. The program cuts across all sectors of the economy and involves public, private and community institutions.

INCIDENTAL DOMESTIC BENEFITS

8. Long term incidental domestic benefits will stem from the increased valuation of non-timber forest products (NTFP's) resulting from a review and revision of policies and mechanisms to address these. In particular the use, export and sale of an increasing range of products, together with the values associated with their genetic composition (bioprospecting), will be enhanced. In the long term incidental domestic benefits may stem from increased ecotourism associated with the identification and establishment of new biodiversity reserves and national parks, including marine sites.

COSTS

9. The GEF contribution is \$20.8 million allocated as follows:

	\$ (million)
Multiple-use Forest Management Component	\$5.0
National Parks and Ecotourism	\$7.8
Marine and Coastal Environment	\$2.0
Regional Programming and Spatial Analysis	\$3.0
Environmental Policies, Strategies & Instruments	\$1.0
Research and Inventory	\$2.0
Total	\$20.8

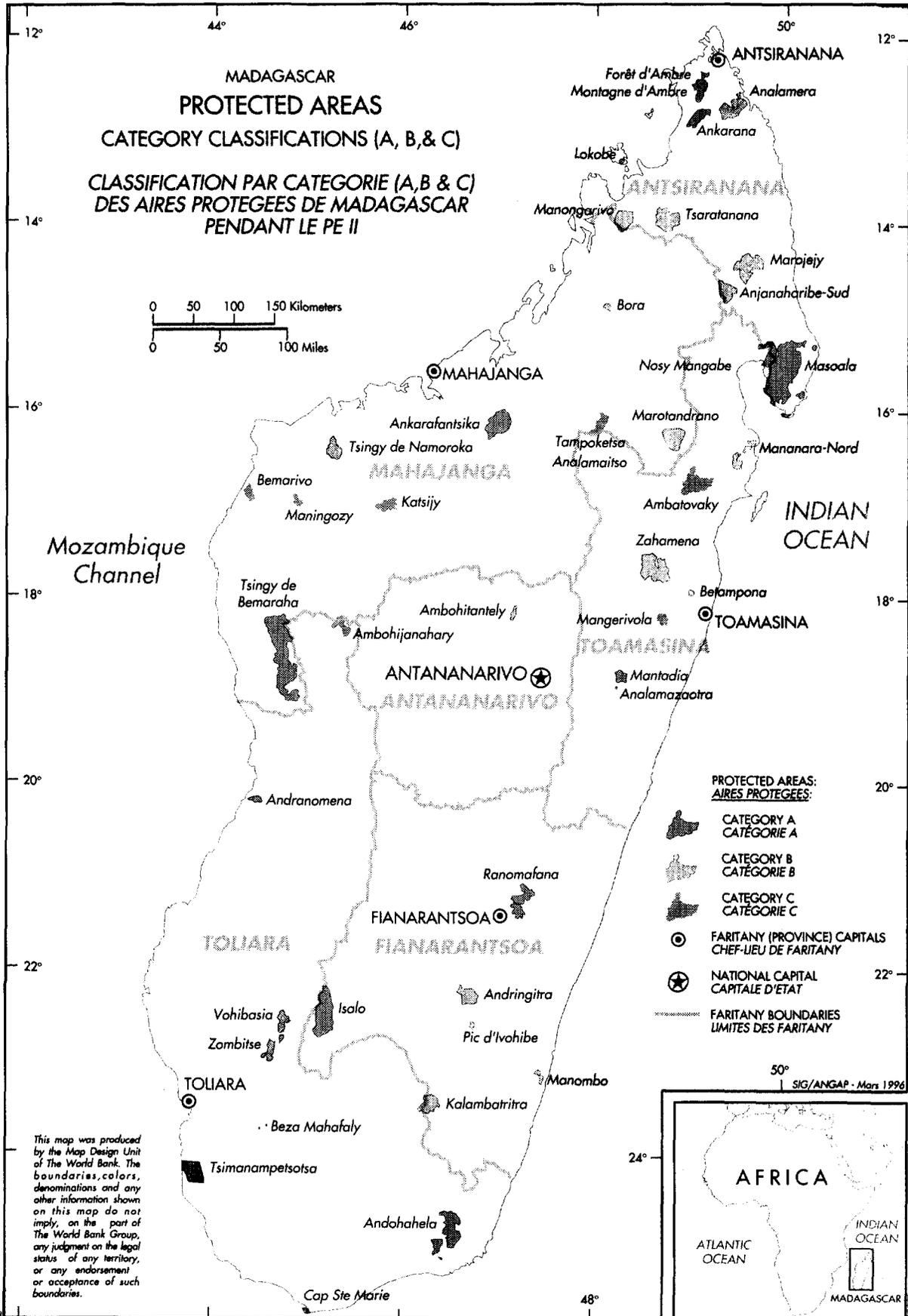
10. INCREMENTAL COST MATRIX

Component	Cost Category	Cost (\$million)	Domestic Benefits	Global Environmental Benefits
Sustainable Soil and Water Management	Baseline	\$43.45	Reduced soil erosion and increased productivity on smallholder farms.	Rate of forest conversion by tavy reduced.
	Alternative	\$43.45		
	Increment (GEF)	\$0.0 (\$0.0)		
Multiple-use Forest Ecosystem Management (ESFUM)	Baseline	\$15.89	Completion of national forest inventory. Improved multiple-use forest management by state, private interests and communities.	
	Alternative	\$29.89	Increased revenues to state, private and communities from ecotourism and commerce in non-timber forest products.	New protected areas identified, management plans prepared and implemented, .
	Increment (GEF)	\$14.0 (\$5.0)		
National Parks and Ecotourism (CAPE)	Baseline	\$26.35	Basic protected area system strengthened. Policy and mechanisms established for protected area concession and tourism taxes to be levied and proceeds returned to the areas.	20 national parks and reserves effectively managed.
	Alternative	\$43.15		18 additional national parks and reserves brought under effective management.
	Increment (GEF)	\$16.8 (\$7.8)		
Marine & Coastal Environment	Baseline	\$3.45	National coastal zone management policies, legal framework and master plan established. Local level action plans prepared, two sites protected.	2 high priority sites brought under effective management.

Component	Cost Category	Cost (\$million)	Domestic Benefits	Global Environmental Benefits
	Alternative	\$6.6		Inventory of coral reef ecosystems, identification of critical sites, establishment of local level management at additional sites.
	Increment (GEF)	\$3.15 (\$2.0)		
Regional Programming and Local Management (AGIR)				
- Local Natural Resource Management & Land Tenure Security (GELOSE)	Baseline	\$9.3	Improved land tenure security.	Possibly incidental benefits in reduced forest conversion.
	Alternative	\$9.3		
	Increment (GEF)	\$0.0 (\$0.0)		
- Regional Programming and Spatial Analysis (AGERAS)	Baseline	\$0.0	None, this program does not exist in the baseline.	
	Alternative	\$4.3		Root causes of biodiversity loss identified and tackled at regional and local levels
	Increment (GEF)	\$4.3 (\$3.0)		
- Regional Fund for Environmental Management (FORAGE)	Baseline	\$0.0	None, this activity does not exist in the baseline.	
	Alternative	\$3.5	Regional and local level activities in watershed management, urban environment improvement etc. financed.	Financing for regional and local level biodiversity activities identified through AGERAS
	Increment (GEF)	\$3.5 (\$0.0)		

Component	Cost Category	Cost (\$million)	Domestic Benefits	Global Environmental Benefits
Strategic Activities				
- Environmental Policies, Strategies and Instruments	Baseline	\$2.2	Improved national environmental policies, strategies & instruments.	
	Alternative	\$3.2		Increased valuation of biodiversity through review and revision of policies on use, export, and sale of non-timber forest products.
	Increment (GEF)	\$1.0 (\$1.0)		
- Sectoral environmental units	Baseline	\$1.1	EIA operationalized.	Incidental benefits in reduced negative impacts on biodiversity.
	Alternative	\$1.1		
	Increment (GEF)	\$0.0 (\$0.0)		
Support Activities				
- Research	Baseline	\$0.5	Limited research in support of PE2.	
	Alternative	\$2.5		Comprehensive inventory and assessment of biodiversity outside existing protected areas to determine real biodiversity values.
	Increment (GEF)	\$2.0 (\$2.0)		
- Communication, Education & Training	Baseline	\$0.7	Increased awareness, knowledge and skills in environment across full range of society.	Increased awareness, knowledge and skills in biodiversity management.
	Alternative	\$0.7		
	Increment (GEF)	0.0 (\$0.0)		
- Geographic Instruments	Baseline	\$1.2	Increased availability of spatial data on land use, etc. in map form.	Increased availability of spatial data on factors affecting biodiversity.
	Alternative	\$1.2		
	Increment (GEF)	\$0.0 (\$0.0)		

Component	Cost Category	Cost (\$million)	Domestic Benefits	Global Environmental Benefits
- Environmental Information Systems	Baseline	\$1.2	Increased ability to monitor, interpret, and plan for environmental change	Increased ability to monitor, interpret, and plan for environmental change
	Alternative	\$1.2		
	Increment (GEF)	\$0.0 (\$0.0)		
- Program coordination and management (including monitoring and evaluation)	Baseline	\$5.9	Effective program management	Effective program management
	Alternative	\$5.9		
	Increment (GEF)	\$0.0 (\$0.0)		
Totals	Baseline	\$111.24		
	Alternative	\$155.99		
	Increment (GEF)	\$44.75 (\$20.80)		





IMAGING

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