BRAZIL
Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

GEF Project Brief

Latin America and Caribbean Region
LCC5C

Date: October 3, 2003
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Project ID: P075379
Focal Area: B - Biodiversity

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Sector(s): General agriculture, fishing and forestry sector (80%), Other social services (10%), Sub-national government administration (10%)
Theme(s): Other environment and natural resources management (P), Civic engagement, participation and community driven development (P), Biodiversity (P), Land management (P), Climate change (P)

Project Financing Data

[ ] Loan [ ] Credit [X] Grant [ ] Guarantee [ ] Other:

For Loans/Credits/Others:
Total Project Cost (US$m): $14.59 **Cofinancing:** Yes
Total Bank Financing (US$m): 0
Has there been a discussion of the IBRD financial product menu with the borrower? ☒ Yes ☐ No

Financing Plan (US$m): Source	Local	Foreign	Total
BORROWER/RECIPIENT	5.84	0.00	5.84
IBRD	0.00	0.00	0.00
BORROWING AGENCY	1.20	0.00	1.20
LOCAL COMMUNITIES	0.56	0.00	0.56
GLOBAL ENVIRONMENT FACILITY	6.73	0.00	6.73
NON-GOVERNMENT ORGANIZATION (NGO) OF BORROWING COUNTRY	0.26	0.00	0.26
Total:	14.59	0.00	14.59

Borrower/Recipient: STATE GOVERNMENT OF RIO DE JANEIRO
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Project implementation period: 5 years

A. Project Development Objective

1. Project development objective: (see Annex 1)

The **development objectives** of the proposed project are to promote an integrated ecosystem (IEM) approach to guide the development and implementation of sustainable land management (SLM) practices while providing environmentally and socially sustainable economic opportunities for rural communities living in the North and Northeast *Fluminense* administrative regions of the Rio de Janeiro State (RJS).
The **global objectives** are: (i) to address threats to biodiversity of global importance, (ii) reverse land degradation in agricultural landscapes, (iii) enhance carbon sequestration, and (iv) increase awareness at all levels of the value of adopting an IEM approach in the management of natural resources. These objectives would be achieved primarily through promoting the adoption of an integrated ecosystem approach in rural areas compatible with Operational Programs (OP) on Integrated Ecosystem Management (OP 12) and Sustainable Land Management (OP 15), and by directly addressing the identified threats and constraints that are preventing the adoption of these approaches in Rio de Janeiro, which are also identified in other parts of Brazil, particularly in the Atlantic Forest ecoregions. The project would be implemented in five watersheds representative of the four major ecosystems of global significance in the Atlantic Forest biome situated in the North and Northeast administrative regions of Rio de Janeiro State, known as the North and Northwestern *Fluminense* (NNWF) regions. These ecosystems are: (i) floodplain forests; (ii) tropical semi-deciduous forests; (iii) tropical moist broadleaf forests; and (iv) coastal ecosystems.

2. Key performance indicators: (see Annex 1)

Indicators will be developed in relation to the main expected outcomes and impacts of the GEF Alternative, which are:

- Change in total land area characterized by biodiversity-friendly agricultural practices that enhance soil structure stability in micro-catchments (X ha by PY 5);
- Ttal area of riparian and other indigenous forests rehabilitated for biodiversity conservation and hydrology stabilization objectives (X ha by PY5);
- Aea of biodiversity conservation-friendly land use mosaics established on private lands supporting corridor connectivity in project watersheds (X ha by PY5;
- Reuction in erosion (X % by PY5) and downstream sedimentation (Y % by PY5) rates in at least 5 micro-catchments; (v) amount of GHG sequestered (X tons of CO2 ha-1 by PY5);
- Creation of coordinating bodies characterized by significant stakeholder representation from micro-catchment, municipal and state levels (No. by PY 1);
- Rural community organizations and organizational models created that have adopted and implemented IEM objectives in 50 micro-catchments No x PY4);
- Education, training and awareness of beneficiary stakeholders (3,000 by PY5, project executors (200 by PY 4, and schools (25 by PY4; (ix) best practices and lessons learned disseminated through 30 workshops/events in the NNWF region (20 by PY3 and 30 by PY 5), national workshops (4 by PY5), media campaign (3 by PY5) and homepage (1 by PY 1).

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)
Document number: Report No. 24182-BR **Date of latest CAS discussion:** May 20, 2002

The World Bank Group's Country Assistance Strategy for 2000-2002 identifies the need to implement solutions that require a combination of protection of priority ecosystems with balanced measures to reduce poverty and develop sustainable alternatives for increasing the income of the local population. The CAS Progress Report (2002) stresses the support to improve environmental sustainability. It also states that the next full CAS to be prepared in 2003 would lay out how Bank assistance would help Brazil achieve a set of indicators adapted from the seven Millennium Development Goals, including "ensure environmental sustainability". One of the current CAS themes is environmental management and it states that helping GOB decentralize environmental policy and support local constituencies is an important part of the Bank's long term environmental strategy. In addition, the CAS lists a number of options for an expanded environmental assistance program to include, amongst other things, possible programs to support sustainable activities that increase the income of the local populations that live close to important native vegetation areas. The NNWF area falls within the latter category. The proposed project is also consistent with the CAS strategy to increase the focus on the rural poor through community-based initiatives.

1a. Global Operational strategy/Program objective addressed by the project:

The proposed project's objectives are fully consistent with the provisions of the Convention on Biological Diversity (CBD) and the UN Framework Convention on Climate Change (UNFCCC). It is also consistent with the GEF Operational Strategy, and specifically with its Operational Programs on Integrated Ecosystem Management (OP 12) and Sustainable Land Management (OP 15), in that it address land degradation issues and promotes the adoption of comprehensive land and ecosystem management interventions that integrate ecological, economic, cultural and social goals to achieve long-term protection and sustainable use of biodiversity, the reduction of net emissions and increased storage of greenhouse gases in terrestrial ecosystems, and the conservation and sustainable use of watersheds, providing benefits at the local, national and global levels (for details on how the project objectives are consistent with these OPs, see Section C.1 and Annex 4).

The **global benefits** would include: increased storage of greenhouse gases in terrestrial ecosystems, which would be primarily achieved through the adoption of improved land management (soil carbon uptake enhanced by agroforestry and conservation agriculture practices in both cultivated and grazed areas). To a lesser extent, carbon would also be sequestered through the restoration and further protection/conservation of degraded natural forests (and hence increasing forest biomass), particularly degraded riparian forests (which are protected by the Brazilian legislation in view of their conservation and environmental importance); conservation and sustainable use of biological diversity, by (a) supporting the implementation of the *Serra do Mar Biodiversity Corridor* through the adoption of SLM and IEM in selected watersheds; (b) promoting public and private protected areas and conditions for their sustainable management in sites containing remnants of the Atlantic Forest biome; (c) adopting improved agricultural practices that enhance soil biodiversity (non-till systems, legume crop rotation, mulching, and other conservation agriculture practices); and (d) promoting conservation of agrobiodiversity; and protection of watersheds in areas of global importance.

2. Main sector issues and Government strategy:

Sector Background and Issues

The Atlantic Forest is one of the five biodiversity "hottest hotspots" among the world's 25 top priority conservation areas, due to its exceptional level of species endemism and high level of risk to a number of threats. Of the 55 terrestrial ecoregions in Latin America and the Caribbean which have been designated as maximum priority for biodiversity conservation, two overlap with the Atlantic Forest; these are: (i) the Brazilian Coastal Atlantic forests and (ii) the Brazilian Interior Atlantic forests.

The State of Rio de Janeiro is unique in Brazil for having the highest percentage of Atlantic Forest with respect to total area among all of the country's states. Fortunately, some of these tracts are already being conserved in protected areas (PAs). Moreover, there exist a number of additional albeit smaller forest fragments dispersed throughout the region, mostly located on private lands. The State holds a large portion of the *Serra do Mar* Corridor, considered one of the richest biodiversity areas in the Atlantic Forest. The northern part of this Corridor is the subregion of the Atlantic Forest with the greatest concentration of i) endemic species for many groups and ii) threatened species of birds. In addition, the Corridor presents one the most important network of protected areas of the Atlantic Forest (e.g. *Serra dos Órgãos*, *Serra da Bocaina* and *Itatiaia* National Parks; *Três Picos* and *Desengano* State Parks, the latter located in the NNWF) that harbor an extremely high concentration of endemic and endangered species. The Corridor approach represents a sound long-term survival strategy for native species in this part of the Atlantic Forest.

Within the State, the most threatened fraction of the remaining primary vegetation occurs in the administrative regions of the North and Northwestern *Fluminense* (NNWF), respectively. Collectively, these two regions encompass an area of 15,000 km2 and 22 municipalities, with an altitude ranging from sea level to 1,750 m which in part contributes to the diverse habitats and rich biodiversity. This richness can be perceived in the extraordinary wealth of its ecosystems characterized by a number of distinct natural aquatic and terrestrial habitats, endemic biodiversity and the occurrence of the two aforementioned ecoregions of global importance. Several species of plants, birds and fish live nowhere else but in the NNWF regions[1].

Two major typologies of forest formations are recognized in the NNWF regions, the humid/ombrophyle and dry/deciduous/seasonal forests. Seasonal deciduous formations include fragments of tableland forests in the North Fluminense, with the best preserved being *Mata do Carvão* in the municipality of São Francisco do Itabapoana, whose drainage constitutes one of the watersheds target by the project. This area was identified as being of high biological importance by National Program for Biological Diversity - PRONABIO because of its populations of red-browed Amazon parrot. The last tableland forest within the territory of the State, this area is considered the boundary for the distribution of Amazon rainforest plant species, with wood species such as *peroba* being important for conservation purposes. This classification also includes semi-deciduous dry forest to the North/Northwest of the edges of *Desengano* State Park, in the municipalities of Campos and São Fidélis, moving along the boundaries of the states of Minas Gerais and Espírito Santo. Formations to the Northwest in Laje do Muriaé and Miracema were listed by PRONABIO as being highly important because they are home to the globally endangered species plumbeous antvireo and the buffy tufted-ear marmoset (for scientific names, see Annex 9).

Humid formations encompass the edges of Desengano State Park towards the south in the watersheds of the Imbé and Macabu Rivers. The region also contains the variations in altitude existing in this typology, encompassing marshy (alluvial) forest and lowland forests up to cloud formations and altitude "fields." The amount of area covered is residual at low altitudes, increasing as the terrain becomes dynamic and unsuitable for agricultural use. These areas are of extreme biological importance, with over 18 species of globally endangered animal species such as the maned three-toed sloth, the wooly spider monkey, the red-browed Amazon parrot, the black-headed berryeater and the solitary tinamou. The watershed of the

Doce River is a plant mosaic of small marshlands and forest regenerations of *restinga* and dry forest. Waterlogged areas form part of the lagoon complex of the North Fluminense, important as a resting and feeding place for northern migratory birds such as *maçaricos* (shore birds) and *marrecas* (wild ducks). In addition to forest habitats, this region holds one of the best-preserved *restingas* of Brazil (*Jurubatiba*), which also support important endemics. The *Jurubatiba* National Park is considered a refuge for species already extinct in other regions of Rio de Janeiro where *restingas* are degraded or have already disappeared.

In addition to the biodiversity associated with wild animals and plants, it should also be noted that the region's smallholder agriculture sector constitutes a rich source of *agro-biodiversity* in subsistence crops such as manioc, sweet potato, corn, beans and rice. Due to their tradition and relative geographic isolation, some rural communities maintain rare varieties of such crops that may be resistant to emerging pests and diseases.

The Atlantic forest also plays an important role in the *global carbon cycle*. The total land area under the remaining Brazilian Atlantic forest is about 8 million hectares (of which 841,000 ha are located in the Rio de Janeiro State – see **map of forest remnants** in **Annex 9**, **Appendix 2**)[2]. The protection of this forest will serve to store significant amount of carbon and thus reduce the net emission rate of CO_2 into the atmosphere. In addition to the forest, other natural systems and productive landscapes (e.g., lands subject to such sustainable agriculture practices as crop rotation, mulching, no-tillage, etc.) and improved agro-sylvo-pastoral systems, can make substantial contributions in carbon storage. According to the Intergovernmental Panel on Climate Change (IPCC), the net annual gain in carbon sequestration from e.g. improved grazing land management, or from land-use change to agroforestry, exceeds the potential gain from other improved land management or land-use change options, including forest management and rice paddies.

Biodiversity Threats. Considered one of the three most threatened ecosystems on Earth, Brazil's Atlantic Forest has been reduced to less than 7.5% of its original area of 110 million ha. Major threats to Brazil's Atlantic Forest are deforestation (for logging and charcoal production) and agricultural expansion. The State of Rio de Janeiro has the highest index of Atlantic Forest deforestation in the past 10 years, and the NNWF are the State's administrative regions that suffered the most deforestation over this period of time. A recent study carried out by the Fundação SOS Mata Atlântica (the main NGO acting for the protection of the forest) in collaboration with the National Institute for Space Research (INPE), identified an area of deforestation amounting to an estimated total 1,000,000 ha between 1990 and 2000. The State of Rio de Janeiro had the highest deforestation rate (16,7%) among the nine analyzed between 1990-2000, almost 40% higher than that of the second ranked.

Despite the characteristic richness of the region's agrobiodiveristy, the smallholder agricultural sector also poses a threat to the biome's biodiversity. The major threats associated with the smallholder agriculture are: (i) deforestation of the floodplain forests and grasslands attributable to the introduction of conventional mono-cropping agriculture (mainly sugar cane), and consequent loss of soil fertility and soil erosion; (ii) deforestation of the remaining tropical semi-deciduous forests associated with the advance of the agricultural frontier into marginal areas (slash and burn, fuelwood and logging), and subsequent erosion of agricultural lands (mainly due to overgrazing); (iii) unsustainable and illegal forest exploitation (fuelwood, logging and extraction of ornamental species and herbs) and poaching (as a means of complementing the diet of rural families) in the remaining tropical moist broadleaf forests and montane grasslands; (iv) deforestation of *restingas* (sand formations) and mangroves and subsequent advance of the agriculture frontier into these and other coastal ecosystems, through the introduction of irrigated horticulture by small farmers; and (v) inadequate agricultural practices leading to loss in soil biodiversity.

One major "driving force" which has contributed to the present situation has been past rural policies, which

were historically aimed at assigning priority to mono cropping of coffee, sugar cane and extensive cattle-raising. Smallholder agriculture in the NNWF is suffering the effects of these policies that have significantly increased rural poverty in the region.

Environmental and Socio-economic Consequences. With the decline of mono cropping, the environmental and socio-economic consequences of this agricultural production system became clearer. This situation is evidenced by the precarious nature of basic infrastructure, high degree of erosion, the lack of rural sanitation, the progressive decline in family income, persistent illiteracy, and the intensification of the rural exodus. The incidence of **poverty** among rural households in the State of Rio de Janeiro is about 27% (440,000 people), or about 2.5 times the poverty levels found in urban areas . This percentage increases to 35-39% in some municipalities in the NNWF regions of the State, levels similar to those found in some of the poorest parts of the country (e.g., the Northeast). With regard to environmental degradation, particularly the Northwest region exhibits a dramatic scenario of environmental degradation, with generalized removal of forest cover, even in a large part of the mountain areas, a situation that is aggravated by the insufficient and irregular rainy season, causes severe water deficits. It should be noted that 80% of this region's land in under moderate to severe degree of erosion, with frequent occurrence of deep rills and moderately deep gullies throughout the rural landscape.

The loss of the original vegetation cover in these regions and unplanned and unmanaged occupation of land have resulted in the degradation of millions of hectares characterized by impoverished soils. The reduction of vegetative cover has also resulted in a decrease in habitat of native fauna and disrupted the water flow levels in watersheds, thought to have contributed to an increase in the occurrence of flooding, changes in the dynamics of water springs and alterations in the local climate. Another effect of deforestation has been the decrease in carbon stocks in the soil and the biomass. Soil fertility fell abruptly, and consequently so did productivity, generating a movement to clear additional forested area. Slash and burn is the only "technology" adopted by rural communities as a means of compensating for soil acidity and low fertility. However, this practice is not sustainable in light of land fragmentation and diminishing forested lands.

Several **constraints** limit the adoption of measures to address these issues, hence impeding the implementation of integrated and cross-sectoral approaches that would lead to sustainable landscapes. Among these are:

(i) Limited scope of existing policies that promote sustainable human settlement patterns and support the adoption of integrated approaches;
(ii) Limited technical assistance and the need for additional financial incentives for sustainable land use;
(iii) Limited financial resources to support targeted research important for biological diversity conservation and enhanced carbon storage;
(iv) Lack of alternative livelihoods for local communities residing in globally important biological sites (such as buffer zones) and environmentally sensitive areas;
(v) Lack of integration of conservation and development efforts around protected forests (and those proposed for protection) and protected coastal formations;
(vi) Lack of systematized data and information necessary for decision-makers to incorporate ecosystem-level considerations into production activities; and
(vii) Unequal land distribution, leading rural workers and landless people to focus on meeting short-term economic needs, to the detriment of the environment, particularly forest remnants.

For a detailed description of *environmental issues, biodiversity threats, root causes and*

constraints/barriers identified in the NNWF (particularly in five of it watersheds proposed for project support), see matrix at the end of Annex 9. For a more detailed/specific description of these issues and constraints in one of the watersheds proposed for project support (Imbé), see matrix at the end of Annex 9[4].

Government Strategies to Address Sector Issues

In light of this situation, public authorities and civil society recently mobilized to recover degraded rural areas. As part of this effort, technicians and researchers have focused efforts to identify new production systems that incorporate environmental considerations as well as other measures such as erosion control, soil conservation and/or recovery, water regulation and sustainable forestry. In support of this new policy, the Government of the State of Rio de Janeiro (GoRJ), through the State Secretariat of Agriculture, Fisheries and Rural Development (SEAAPI), is carrying out the Microcatchment State Program for Rural Sustainable Development (*Rio Rural*) and the State Program for Fruit Production and Diversification (*Frutificar*). These Programs are designed to promote economic development through harnessing market forces, reducing regional inequalities and social pressure on urban areas (including actions to address land tenure issues, through the *Rio Rural*), placing greater emphasis on the agriculture sector in an attempt to make it easier for people to remain in rural areas, and rehabilitating and conserving the State's renewable natural resources. In addition, the Federal Government, through the National Smallholder Agriculture Program (PRONAF), coordinated by the Ministry of Agrarian Development (MDA), has supported an increase in infrastructure programs such as road repair and rural electrification, and has facilitated specific credits for smallholder agriculture.

With regard to policies and strategies to address specific **biodiveristy** issues and threats to the Atlantic Forest, at the corridor level which extends from south and north-central RJS to Minas Gerais and Sao Paolo State, the GEF-cofunded Critical Ecosystem Partnership Fund (CEPF), is supporting a number of activities designed to increase the number and size of priority conservation under protected. In the NNWF specifically, the most recent initiative to conserve biodiversity is the soon to be implemented KfW-supported Pro-Atlantic Forest Program which is focused on strengthening: (i) management of the *Desengano* Park and the *Mata do Carvao* Reserve, the two main protected areas (PAs) in the NNWF; and (ii) the enforcement system in and around the PAs. The State Government of Rio de Janeiro has committed itself to providing additional support and implementing conservation initiatives to address many of the previously identified threats to the region's biodiversity and support the transition to livelihood options built on biodiversity friendly activities. In the NNWF, the main initiative is the aforementioned KfW-supported Pro-Atlantic Forest Program. The Federal Government is particularly committed through the implementation of two recently launched initiatives, the National Forest Program (*Programa Nacional de Florestas* - PNF) and the Atlantic Forest Subprogram, the latter under the Pilot Program to Conserve the Brazilian Rain Forest (PPG7), in which the World Bank plays a key coordination and secretariat role. It is expected that these two new initiatives will provide significant contribution to ensure adequate protection and conservation of the Atlantic Forest remnants, particularly in strengthening the Protected Areas system, the enforcement of forest legislation, and to control forest fires. However, much remains to be done to address land degradation in the surroundings of remaining Atlantic forest fragments, and to arrest and reverse encroachment into the forest.

Footnotes

1. For example, a number of endemic fish species which resist in the dried mud for long periods of drought, endemic species of orchids, bromeliads and other plant species, endangered birds, endemic and endangered species of primates, arboreal species of Amazonian genera distributed throughout Brazil, and rare endangered plant species, including the Brazil wood (after which the country is named), as well as five of the seven mangrove

species occurring in Brazil.

2. This map of was updated by the prospoed project partner *SOS Mata Atlantica* (NGO) in July/August 2003.

3. Sector issues to be addressed by the project and strategic choices:

Although issues of sustainability and natural resources management are explicitly identified as significant elements of SEAAPI's rural development projects, the activities undertaken are generally targeting the farm or sub-community levels, with little effort to link these activities within a broader planning framework based on an ecosystem approach. However, based on experience gained from natural resource management projects in other regions in Brazil, the State Government recognizes the need and the value of using integrated and cross-sectoral approaches that would lead to sustainable landscapes and support the implementation of sustainable rural development activities, adopting the microcatchment as a physical unit for planning purposes.

To do so, the following constraints would be addressed as limiting factors to the integrated management of the State's ecosystems:

(i) *Limited scope of existing policies that support the adoption of integrated approaches and weak participation in the policy dialogue*: The proposed project would assist SEAAPI in continuing its efforts to work effectively with other sectors' institutions, both government and non-government. It would also help to develop and pilot an incentive system to promote the transition to more sustainable livelihoods for local communities residing in globally important biological sites (such as buffer zones) and environmentally sensitive areas; and it would support the integration of programs and policies at the local level, capitalizing on the existing coordination mechanisms, particularly through the State (CEDRUS) and Municipal Sustainable Rural Development Councils (CMDRS);

(ii) *Limited technical assistance and the need for additional financial incentives for sustainable land use*: Through the provision of training, technical assistance, targeted research and financial incentives, project implementers and beneficiaries would be exposed to appropriate methods to adopt sustainable agricultural practices and conservation activities; the project would also provide technical assistance to implement more effective participatory methods essential for achieving governance and sustainable development;

(iii) *Lack of systematized data and information necessary for producers and decision-makers to incorporate ecosystem-level considerations into production activities*: Gaps in the knowledge base need to be filled to provide the basis for the adoption of SLM and IEM. The project would support socio-economic and environmental monitoring, and *disseminate results and best practices* through the wider Atlantic Forest ecoregion and beyond, particularly to other Latin American countries with similar agro-ecological conditions, hence providing the basis for knowledge transfer and, subsequently, increasing the potential for repeating project lessons and transferring experience at state, national and international levels;

(iv) *Land degradation:* one of the proposed project priorities would be to seek solutions for land degradation issues, including soil vulnerability to water erosion, soil fertility loss; and

(v) *Rural poverty*: given the effects of land degradation on productivity (e.g. erosion causing yield reductions) and, subsequently, in the reduction of small producers' incomes, the project would target its support to small-holder farmers, through the provision of training, technical assistance,

financial incentives and information needed to improve/recover soil conditions and to add value their output by processing it before sale, hence generating on-farm income increase. It would also support incentives to the adoption of off-farm activities that generate income while at the same time reduce pressure over the natural resources basis.

The strategic focus of the proposed project would be to develop mechanisms that would complement specific components of the ongoing projects. These incremental activities would introduce a broader, ecosystem-focused approach to development. Because it is expected that many of the investment activities have the potential to produce both global as well as local benefits, GEF funding would be limited to developing the enabling conditions (information, experimentation, collective action, access to technical assistance and inputs, monitoring and evaluation) that would allow farmers to make more-informed decisions on management systems capable of reducing biodiversity loss and land degradation.

Another strategic aspect of the proposed project is the value it would have in the regional Brazilian (South-Southeast Brazil) context. It would be carried out as a part of a larger program, not a stand-alone project in Rio de Janeiro. The WB LAC Rural Strategy suggests a programmatic approach which fits well with the situation of Brazil. In other words, the project would maintain linkages with other planned or on-going World Bank loans, as well as projects supported by the GEF and other international agencies, such as the KfW. The project would focus on the broader regional program of the World Bank, which covers the South-Southeast Brazil States, by continuing and improving its current coordination with the on-going World Bank-supported microcatchment projects of the South-Southeast Brazil. It will promote information dissemination among these and other relevant GEF and KfW-funding projects in support of the Atlantic Forest (for details, see further Section D.2).

The project would promote integrated planning and management of unique production-based ecosystems on a microcatchment basis. It would support the implementation of this IEM approach in two adjacent ecoregions of global importance - the Brazilian Coastal Atlantic forests and the Brazilian Interior Atlantic forests. Within these ecoregions, five watersheds have been selected for project support, following specific social and ecological criteria (see Section C.3 for a description of selection criteria).

The project would be implemented over five years and would cover **five** watersheds (6,570 Km2) or 44 % of the NNWF and the relevant administrative areas of the 24 municipalities that overlap with the NNWF region (two of these municipalities belong to the *Região Serrana* or Mountainous administrative region of the Rio de Janeiro State)[1]. Within this project area, interventions would take place at three levels:

(i) *Watershed level*, including the following activities: development of watershed management strategies; support to the implementation of *Serra do Mar* biodiversity corridor in the NNWF; and monitoring and evaluation and project dissemination;

(ii) *Municipal level*, where the following activities are proposed for the aforementioned 24 municipalities: implementation of training and environmental education programs to enhance local capacity and increase public support for conservation and sustainable use of natural resources, and the formulation of a proposal for the creation of an environmental services fund, that would offer incentives to producers from all municipalities of the state;

(iii) *Microwatershed/microcatchment level*: within each of the five selected watersheds, a number of pilot microcatchments would be targeted by the project up to a total of 50, which would be selected in PY1 (covering 15% of the total watersheds' area). On a demonstrative basis, activities would include the development and implementation of Micro-watershed Development Plans

(PEMs) and Individual/Farm-based Land Use Plans (PIDs); and promotion of incentives for the adoption of improved management practices; applied research to support the adaptation of existing soil management practices and technological solutions to local agro-ecological conditions; training of producers and other local stakeholders. The use of incentives (grants for technical assistance and small investments) would be demand-driven, and a consequence of the PEMs and related individual/thematic plans.

Consistent with SEAAPI's existing, rural development projects, the GoRJ's role would be primarily normative (targeting criteria, operational mechanisms, monitoring and supervision), administrative (contracting, accounting) and as a convener (of producers, agro-industry, national and local government, NGOs, international assistance) and disseminator of results and lessons learned. Implementation would largely be contracted out to NGOs, producer associations, specialized contractors and local government agencies. The project would build on existing *agriculture/natural resources research capacity* (state and national agricultural research institutions – PESAGRO and EMBRAPA, universities, NGOs, private institutions), *extension services* (state agency/EMATER, municipalities, NGOs, private), *local organizations* (municipalities, NGOs, producers and community organizations), and *project management experience* (financial management, procurement, reporting). As such, the proposed project is expected to mainstream an ecosystem approach into rural development activity at all levels, from local community and individual farmer decision making to state strategic planning. Monitoring and evaluation activities will be particularly important because the Government must be assured of the viability and effectiveness of the approach before scaling it up.

Footnotes:

1. These watersheds cover a total of 6,579 km2. In descending order of size, they are: Muriaé (378,423 ha), Macabu (110,890 ha), Imbé (93,659 ha), Coastal watersheds around "Mata do Carvão" (39,765 ha), and Doce (34,219 ha).

C. Project Description Summary

1. Project components (see Annex 1):

Component	Indicative Costs (US$M)	% of Total	Bank financing (US$M)	% of Bank financing	GEF financing (US$M)	% of GEF financing
1. Planning for SLM Actions	0.00	0.0	0.00	0.0	0.00	0.0
1.1. Development of Policies, Regional Plans and Regulations	0.21	1.4	0.00	0.0	0.17	2.5
1.2. Local Land Management Planning	1.28	8.8	0.00	0.0	1.07	15.9
2. Incentive System for SLM	0.00	0.0	0.00	0.0	0.00	0.0
2.1. Financial Incentive Program for Sustainable Agriculture	7.43	50.9	0.00	0.0	1.78	26.4
2.2. Support to Adaptive Management Practices	0.43	2.9	0.00	0.0	0.36	5.3
3. Organization and Capacity Building for SLM	0.00	0.0	0.00	0.0	0.00	0.0
3.1. Community Organization	0.64	4.4	0.00	0.0	0.38	5.6
3.2. Training of Project Executors	0.49	3.4	0.00	0.0	0.47	7.0
3.3. Training and Environmental Education of Beneficiaries	1.84	12.6	0.00	0.0	1.47	21.8

4.	Project Management, M & E	0.00	0.0	0.00	0.0	0.00	0.0
4.1.	Participatory Management of the Project	1.22	8.4	0.0	0.0	0.40	5.9
4.2.	Monitoring and Evaluation	0.67	4.6	0.00	0.0	0.31	0.0
4.3.	Project Dissemination	0.39	2.7	0.00	0.0	0.32	0.0
	Total Project Costs	14.60	100.0	0.00	0.0	6.73	100.0
	Front-end fee	0.00	0.0	0.00	0.0	0.00	0.0
	Total Financing Required	14.60	100.0	0.00	0.0	6.73	100.0

Total project costs including contingencies.

Component 1 – Planning for Sustainable Land Management Actions (US$ 1.49 million, 10.2% of total project cost)

The main subcomponents and activities foreseen, as described below, cover policy formulation and action planning, all key elements needed in the development of a dynamic framework for rural and environmentally sustainable decision-making to be supported under the project. Baseline programs in support of this component would include the State Environmental Enforcement Program implemented by the Environmental (FEEMA) and Forestry (IEF) Agencies, respectively, and the KfW-supported Pro-Atlantic Forest Program and specialized technical assistance provided by the Conservation International Brazil (CI-Brazil). For a detailed description of this and other project components, see **Annex 4**.

Development of Policies, Regional Plans and Regulations. This subcomponent would support studies, workshops and public consultations to define the policy, legal and regional planning framework for ecosystem management in the NNWF regions of Rio de Janeiro State. The following activities would be supported under this subcomponent: (i) the design of an incentive system for sustainable agriculture, followed by a study on the identification of the most appropriate financing mechanisms to be proposed for implementation in the State; (ii) update and fine-tuning of Watershed Management Strategies (WMSs) in the five priority watersheds; and (iii) support studies. The majority of studies would be identified during project implementation, however, the following have already been identified: a) identification of tools to implement the *Serra do Mar* biodiversity corridor in the NNWF region; b) regulatory studies (and associated action plans) to continuously assess present policy/regulatory distortions, based on the assumption that removing inadequate regulations can improve livelihoods and address sustainability even more quickly than investment projects; and c) specific analysis and data collection for improving the technical/scientific basis for the causal framework for land degradation (in coordination with subcomponent 4.2 on M&E). The incentive system would be designed to facilitate financial sustainability beyond the project implementation period, and would build upon existing and potential financial mechanisms to channel funds to smallholder farmers for the adoption of on-and-off-farm practices which enhance the conservation and sustainable use of watershed resources and biodiversity and increase carbon sequestration (e.g., water charges, fuelwood levy, compensation payments for environmental services, and carbon trades through direct transactions). This initiative would be part of a long term strategy to biodiversity conservation in the project area.

Local Land Management Planning. This subcomponent, to be implemented by the State Rural Extension Agency -EMATER (and supported by the Public Defender's Office), will support activities that would orient intervention efforts and the regulation of conduct by rural producers regarding preservation of natural resources and management of ecosystems as landscapes. Implementation of these activities would be done with ample participation of rural communities, seeking their involvement in all phases of project execution, always trying to improve community representation, with the identification of producers located

on each stream of the microcatchment (geographical unit for intervention). Activities under this subcomponent would include: (i) formulation of Microcatchment Development Plans (PEMs) in critical and/or unique Microcatchments identified from project watersheds; (ii) preparation of Individual/Farm-based Land Use Plans (PIDs); (iii) participatory preparation of Terms of Conduct for Responsible Natural Resource Use for each microcatchment, establishing principles and standards applicable to the conservation, management and sustainable use of natural resources; and (iii) promotion of community participation in legislation enforcement.

GEF resources would finance the preparation of these studies and strategies, expanding the microcatchment planning activities financed under the *Rio Rural* into a larger ecosystem context that would promote the idea of an integrated system of connected large natural areas to protect biological biodiversity, while addressing rural poverty, land degradation and climate change issues.

Component 2 - Incentive System for Sustainable Land Management (US$ 7.86 million, 53.8% of total project cost)

This component aims to provide incentives for small farmers and other relevant ecosystem managers at the Microcatchment, municipal and watershed levels to move from existing conventional and unsustainable smallholder agriculture to sustainable livelihood activities which enhance biodiversity and carbon sequestration in the agricultural landscape. It would finance technical assistance, investments and targeted research demands identified in the WMSs and PEMs. GEF would provide incremental resources to support the transition to sustainable livelihood activities financed by the program, through the provision of technical assistance, equipment, goods and/or small works. Once the transition has been achieved with the help of GEF resources, the design of the new incentive system (under Component 1) would ensure ongoing financial support to sustainable activities which create significant environmental benefits at the local, regional and global level without further GEF involvement (GEF funds would not be used on a recurrent basis, but would help jump start other self-sustaining financial mechanisms). GEF funds would also play a catalytic role in ensuring future replication of financing mechanisms. About 70% of the incremental cost of this component would be financed (and earmarked) under the baseline programs *Rio Rural*, *Frutificar* and *Pronaf* (for co-financing details, see incremental cost matrix of Annex 2).

Financial Incentive Program for Sustainable Agriculture. The financial incentive program for sustainable agriculture would initially operate under the existing incentive legislation (State Socio and Economic Development Fund – FUNDES) or another appropriate mechanism to be identified during project preparation, to facilitate the adoption of the project strategy within the benefited microcatchments. As part of project implementation, a proposal for the creation of an environmental services fund will be developed under Component 1, and legislative approval will be seek, if necessary; the project would also seek to pilot that new system to facilitate financial sustainability beyond the project implementation. This subcomponent includes the development of two activities:

Activity 1 relates to financial incentives for the implementation of local productive and development incentives for the farms and microcatchments by the project. These earmarked funds (investment and maintenance) would be disbursed using existing lines of credit provided by the Federal Government through the PRONAF, and by the *Rio Rural* and *Fruticar* Programs, being carried out by SEAAPI, an of the Government of the State of Rio de Janeiro. These actions will be considered as counterparts in the proposed project; and

Activity 2, to be supported by GEF funds, will work towards the integration and harmonization of local development and productive support for the planning of the same farms and microwatersheds mentioned in Activity 1 above, aimed at the sustainable management of natural resources. These resources will be

used in coordination with those of Activity 1, i.e., as a complement to baseline actions, this activity will provide direct technical and financial support to farmers and groups of farmers encouraging the adoption, on a pilot basis, of SLM practices and activities, integrating and harmonizing the investments funded by existing credit lines offered by PRONAF, *Rio Rural* and *Frutificar*. Through this technical/informational and financial support, it would also provide support needed to increase post-harvest value-added from agro-ecological and non-wood forest products.

This activity is also aimed at ensuring that practices linked to the principal lines of action are effectively implemented. These are: a) recovery of degraded lands; b) redirection of productive systems towards systems that are more adequate in social and environmental terms; c) commercialization of products that are recommended in social and environmental terms; d) management of water resources; and e) sustainable use and management of biodiversity.

Possible and more specific activities that could be supported under this sub-component would include: (i) support to alternative livelihood activities with lower or no negative environmental impacts -organic agriculture, eco-tourism, on- and off-farm small-scale processing of farm products, mineral water extraction, and traditional crafts-; (ii) protection and development of existing agro-biodiversity resources; (iii) technical assistance and; (iv) field activities to develop and test the legal and institutional requirements for certification of "ecosystem-friendly" products. All activities financed with GEF resources under the incentive program would have a demonstrative effect and would be representative of one or more of the four major ecosystems of the project area. A condition for financing these activities would be the linkage with subprojects identified in the Microcatchment Development Plans (PEMs).

Support to Adaptive Management Practices. This subcomponent would support the adaptation of existing soil management practices and/or adequate technological solutions to unsustainable land use issues identified by the farming community at the microcatchment level. Applied research efforts would be realized in direct co-operation with farmers, in order to adapt and validate the existing technology to their agroecological and socio-economic circumstances. It would also seek to implement the sustainable use and management of natural resources, through the introduction of pilot units, with regard to reducing pressure on threatened ecosystems. The activities foreseen under this subcomponent include: (i) improvement and validation of practices for the integrated management of natural resources; (ii) adaptation and validation of cropping, agroforestry and pasture management systems to increase carbon stocks and biodiversity; and (iii) implementation of pilot units to improve the use of rural space in environmentally fragile and vulnerable areas or in the buffer zones of Conservation Units. Under this subcomponent, GEF funds would support technical assistance, equipment and studies for the identification and adaptation of existing appropriate technologies and systems to respond to different land uses, consistent with improved agro-ecosystem management.

Component 3 – Organization and Capacity Building for Sustainable Land Management (US$ 2.97 million, 20.3% of total project cost)

This component would include training, education and community engagement efforts to facilitate the creation of environments favorable to the formation and strengthening of rural organizations for self-management of natural resources. They would complement productive and commercialization group activities encouraged by the baseline through the *Rio Rural* and PRONAF. Direct beneficiaries would be intersectoral technicians, smallholder farmers, rural youth and residents of project-supported watersheds.

Initiatives for the capacity building and organization of the local rural population would play a fundamental role in the formation of a community environmental outlook, generating the following outputs: empowerment of communities and increased effectiveness in participation in local management decisions,

including the regulation of natural resource use; higher adoption of sustainable environmental techniques; increased employment opportunities; improved smallholder producers' organizations for purposes of self-management; strengthened rural organizations, particularly for self-management; and increased professionalism among intersectoral and rural extension staff.

Capacity building and rural organization are being implemented through the baseline – Rio Rural and PRONAF. The GEF would finance the incremental costs associated with work to support rural organization, which would place emphasis on the integrated management of natural resources, particularly dealing with issues related to biological diversity, climate change, and land degradation.

Community Organization. Under this subcomponent, qualified professionals in different fields would be mobilized to undertake diagnostic studies of the existing community organizations and to facilitate the development and implementation of community self-management activities.

Training of Project Executors. By means of training and environmental awareness efforts for relevant intersectoral and extension staff, this subcomponent will implement management and technical capacity building programs with project executors, involving about 270 staff. It would also carry out specific capacity training to support the implementation of socio-environmental actions, on-farm, and in microcatchments.

Training and Environmental Education of Beneficiaries. Under this subcomponent, training and environmental education efforts will be carried out among beneficiaries to enhance local capacities and increase support for sustainable natural resources management. Training would be oriented towards safeguarding and valuing traditional culture and making university, technical and scientific knowledge available in an integrated manner to diverse groups of rural producers and residents of project-benefited watersheds.

The beneficiaries' training and environmental education processes would be monitored by the local extension staff with the participation and direct involvement of communities, favoring the interest, understanding and formation of proper habits, which would contribute towards mitigating climate changes and maintaining biodiversity. Training and environmental education activities would be executed through various methods (community meetings, exchange trips, teaching units for rural youth, courses, workshops, field days, volunteer community work days, and workshops).

As in any community work, the existence of different groups with different, and sometimes conflicting, characteristics and needs would be considered. In this regard, the component's effort would be oriented based upon organizational development work that is focused on personal growth, in which groups would receive advice on human – social and ethical - and organizational development for self-management.

Component 4 – Project Management, Monitoring and Evaluation (US$ 2.28 million, 15.6% of total project cost)

Participatory Management of the Project. This subcomponent will support technical assistance, office equipment, administrative and operational aspects necessary to ensure the effective implementation of project activities and management of resources. The structuring and implementation of a Project Management Unit under the aegis of SEAAPI is proposed, through its Directorate of Microcatchment Development (*Superintendencia de Microbacias* - SMH). For a detailed description of the proposed approach and structure for project management, see further Section C.4 and **Annex 7**.

Monitoring and Evaluation. This subcomponent would be under the responsibility of the PMU and would be implemented through three operational mechanisms: (i) physical and financial monitoring of the project; (ii) socioeconomic and environmental monitoring in pilot microcatchments; (iii) overall project evaluation.

To complement the *Rio Rural* impact monitoring program in pilot microcatchments, the GEF would support the development and implementation of a monitoring system whose objectives would be to: (i) compare the results of project actions, through previously established indicators; (ii) evaluate the positive impacts of the integrated management of ecosystems on the increase in regional biodiversity and carbon stocks in agricultural and livestock; (iii) support planning, and when necessary reorient actions; (iv) provide information necessary for the intermediate and final evaluation of the project; and (v) form a database that shows the program's evolution and improvement.

Continuous project monitoring would measure trends over time to determine whether the project (and management) would be achieving the desired results, or would need to be adjusted or changed. This would provide the basis for a series of adaptive and systematic project evaluations, and for two overall project evaluations (at mid-term and at the end of project implementation). All these evaluations would provide feedback to adjust both the project interventions and future management interventions. The project's M&E system would use participatory mechanisms to enable stakeholders to share their feedback. For a detailed description of the project approach for the M&E system, see **Annex 4**, **Appendix 3** on M&E (for inputs indicators, see **Annex 4**, **Appendix 1,** and for impact indicators, see **Annex 1**).

*Project Dissemination***.** This sub-component support the design and implementation of the project information dissemination strategy, providing the basis for knowledge transfer and, subsequently, increasing the potential for repeating project lessons and transferring experience at state, national and international levels. It would include the sharing of information both within and outside the project, involving those beneficiaries, people, communities and institutions, governmental or not, who are interested in the project and who can learn from and make use of the experience, expanding it and making the idea useful to the public throughout the Atlantic Forest region and beyond, particularly to other Latin American countries.

2. Key policy and institutional reforms to be sought:

Based on experience under SEAAPI's on-going rural development programs, the existing policy and institutional framework is considered adequate to permit project implementation, provided modifications are introduced. During project preparation, an assessment of the institutional and legal framework at the state and local levels will be supported to identify any constraints or incentive issues related to the transition from conventional to sustainable natural resources management approaches. The policy, plans and regulations sub-component of the proposed project would support activities to harmonize existing laws (particularly the incentive legislation that created the State Socio and Economic Development Fund -FUNDES), regulations and other incentives consistent with project objectives.

3. Benefits and target population:

Benefits

The project would achieve environmental, financial, institutional and social benefits at four levels: individual farmers and farmers groups; rural communities living in project-supported watersheds; municipal and regional offices and individuals and groups that they service and state offices; and the civil society living in the NNWF regions. Environmental benefits would include: (i) the conservation and sustainable use of biological diversity of global importance, as well as the equitable sharing of the benefits from biodiversity use; (ii) reduction of net emissions and increased storage of greenhouse gases in terrestrial ecosystems; and (iii) reduction of soil erosion via improved land management. With regard to financial benefits, participating farmers would benefit from project activities through increased incomes derived from more sustainable land management. This would be facilitated by the availability of financial incentives to help cover the initial capital and transaction costs associated with more integrated approaches. This would help minimize actual or perceived economic risks that relate, particularly, to innovative

approaches and technologies. Institutional benefits would include: (i) improved coordination among sectoral institutions at the community and production ecosystem levels; (ii) increased capacity to develop public/community/private sector partnerships in support of sustainable land management objectives; and (iii) behavioral change of stakeholders, supporting SLM and IEM. Social benefits would include: (i) externalities associated with transfer of resources from communities that benefit from ecosystem services (e.g. ecotourism) to those that help to maintain them; (ii) increased participation in activities important to local communities (e.g., soil management and monitoring); and (iii) increased social capital and community empowerment.

Target Beneficiaries and Area of Coverage
Specific direct and indirect beneficiaries were identified via a Social Assessment carried out during project preparation (see **Annex 10**). Primary beneficiaries of the proposed project (watershed/ecosystem managers) would include small farmers and other stakeholders who depend on the sustainable use of natural resources to support their livelihoods. Secondary beneficiaries are those individuals and communities who receive indirect "goods and services" from a more sustainably managed watershed/ecosystem.

The NNWF regions cover an area of 15,000 Km2 with a population of about 1 million inhabitants. Within these regions, the project covers 5 watersheds (6,570 Km2 or 44% of the NNWF area) and 24 municipalities (two of these municipalities belong to the *Região Serrana*) with a population of 1 million. Using the area of influence of the municipalities and watersheds to define project coverage, 50 microcatchments would be selected in PY1 to form a pilot initiative covering an area of about 100,000 ha (15% of the total for the 5 watersheds), with 4000 rural families (16,000 people). There are approximately 200 microcatchments within the project area. For details regarding area of coverage, see **Annex 4, Appendix 1.**

Selection of target watersheds and microcatchments. Targeting of project watersheds and microcatchments is based on the application of criteria that combines social and environmental considerations. Watersheds selection criteria include: environmentally sensitive or critical areas, particularly those which are highly vulnerable to erosion; land use patterns; presence and size of sites considered as national conservation priorities; presence of Protected Areas; natural vegetation cover; rural poverty; percentage of rural population; and the percentage of small producers among all producers. Criteria for selection of microcatchments are also detailed in **Annex 4, Appendix 1**, and include: (i) significance of the candidate microcatchment's biodiversity and degree of threat to biodiversity; (ii) presence of springs or other sources of surface or ground water critical to the protection of the watershed; (iii) concentration of small producers; (iv) local public and political support and existing level of community organization; and (v) land use and soil management aspects.

4. Institutional and implementation arrangements:

Implementation period. The proposed project would be implemented over a period of five years.

Project oversight, management and interagency coordination. Project management and implementation would be the overall responsibility of SEAAPI, working through the *Rio Rural*¸ *Frutificar* and *PRONAF* Projects. However, given the importance of developing broader community consensus in the development and implementation of watershed and microcatchment development plans and consistent with SEAAPI's current programs, it is expected that municipal governments and a broader cross-section of civil society will play a more active role in the GEF-supported activities. A Project Management Unit – PMU (*Secretaria Executiva do Projeto – SEP*) to be established through the SEAAPI´s Microcatchment

Directorate (SMH), considered the most appropriate SEAAPI unit to coordinate activities across programs and levels of government. SMH's responsibilities would include preparation of general guidelines and procedures for project implementation. The execution of the project would be decentralized and would be supported by the government and non-government institutions (project co-executors), including regional and local offices of the participating State agencies – EMATER (rural extension), PESAGRO (agricultural research), FEEMA (environment), IEF (forestry and PAs), DRM/mineral resources and the State Attorney's Public Defence Office) –, as well as municipalities, EMBRAPA Soils, and four non-government institutions (SOS-Mata Atlântica, Conservation International/CI-Brasil, VivaRio and Coppetec). A participatory/consultative structure of the project would be established at the state, municipal and microcatchment levels, following a scale appropriate to their levels in the pyramid. At State level, this consultative structure would include a Project Steering Committee - PSC (*Comissão de Acompanhamento – CA)* composed by representatives from the State Sustainable Rural Development Council (CEDRUS) and each of the project co-executors (see **Figure 1, Annex 7**). The PSC would monitor and evaluate progress, and review and endorse project implementation policy and priorities, annual operational plans and fund allocations proposed by the PMU. It would also seek to resolve conflicts between stakeholders and endorse sub-projects/grants, as well as ensure coordination and collaboration among partner institutions. The PSC would be chaired by the Project Manager (or Project Executive Secretary). For details on project management and institutional arrangements for each component, see **Annex 7**.

The PMU would oversee, coordinate, administer and monitor the project. The PMU would have two small departments dealing with technical management and administration (financial management and procurement), and the operation of the Incentive Program (see **Figure 2, Annex 7**). The PMU would be staffed mainly by secondment of senior staff from the partner executive organizations (particularly EMATER) but technical assistance would be hired temporarily to strengthen the capacity of the PMU. The executive branch would also maintain small multi-institutional units comprised of teams representing partner executive organizations (particularly the State agencies EMATER, PESAGRO, FEEMA and IEF), one in each of the two EMATER regional offices of the North and Northwest Fluminense. EMATER's regional and municipal offices would serve as the project's executive units dealing directly with the microcatchment stakeholders.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

Expected Outcomes of Baseline Activities and Justification for Project Design

Baseline activities are defined as the existing or projected State and Federal Government's rural development activities (rural infrastructure, community organization, agricultural research and extension, training, rural credit) in the selected project watersheds, or which could form the basis for additional activities with an integrated ecosystem management focus. A preliminary estimate of the cost of these baseline activities limited to potential areas of interventions (i.e. NNWF) financed by the State and Federal Governments, and small holders themselves under the *Rio Rural* (Microcatchment State Program for Rural Sustainable Development), the *Frutificar* (State Program for Fruit Production and Diversification), the PRONAF (National Smallholder Agriculture Program) and the State Regular Program of Environmental Legislation Enforcement totals US$ 34 million over the next five years[1]. The expected outcomes of these baseline activities are:

(i) public policies adjusted to the reality of the smallholder agriculture subsector;

(ii) increased albeit limited environmental protection;

(iii) necessary rural infrastructure put in place to improve the productive performance and quality of life of the rural population;

(iv) raising the level of training of smallholder producers, aimed at attaining new technological and management patterns;

(v) expanding access to product and input markets by smallholder producers and their organizations;

(vi) access to land ownership guaranteed to smallholder producers;

(vii) increased income of smallholder families;

(viii) sustainable rural development of communities located in microcatchments, whose agriculture is family-based; and

(ix) greater level of rural organization.

The existing baseline results in increased promotion and adoption of more sustainable production techniques and increased beneficiary incomes at the individual farm and Microcatchment level, focusing on family farm and poverty alleviation. It will achieve the following *national environmental benefits*: (i) retention and protection from soil erosion through erosion control works at the farm-level and along rural roads, as well as technical assistance and capacity building for improved land management and soil conservation, resulting in a reduction in the loss of biological diversity associated with soils in productive lands; (ii) increased vegetation cover (and hence reduced soil erosion) by supporting small scale reforestation in productive lands (for timber and charcoal production) and introduction of improved agricultural practices; and (iii) improved water infiltration through technical assistance and capacity building.

Benefits not Contemplated in the Baseline. The baseline reflects national priorities through supporting activities primarily aimed at promoting the adoption of sustainable land use practices. However, it does not cover the rehabilitation and restoration (with native species) of non-productive public and/or fragile lands including degraded riparian forests. Moreover, the baseline program does not plan, design, and support activities through an ecosystem framework, resulting in reduced efficiency and lost opportunities to generate global benefits (e.g., through addressing climate change issues through the implementation of carbon sequestration strategies supporting the protection of whole watersheds containing remnants of Atlantic forest, and promoting the concept of an integrated system of connected natural areas to protect biological diversity).

The institutional arrangements under *Rio Rural*, *Frutificar* and PRONAF are basically limited to the agricultural, agro-industrial and sanitation sectors and do not embrace a comprehensive and cross-sectoral approach to support sustainable land use practices through an ecosystem approach. The major environmental threats to the ecoregions of the Atlantic forest -by major ecosystems- and constraints impeding the adoption of such an approaches been previously mentioned (Section B.2).

Reversing this situation and trends will require investments in the development of appropriate strategies that take into account global environmental values and institutional frameworks, including incentives for incorporating global environmental concerns into the actions of public and private actors. It will also require the adaptation of appropriate technical models for smallholders and monitoring and evaluation activities that demonstrate results and benefits to local as well as regional, national and global stakeholders. In light of the area's exceptional biodiversity value, at the local, national and global scales and the magnitude and number of threats, associated with the sheer size of the Atlantic forest, degree of fragmentation, and complexity of issues, the State Government of Rio has expressed its interest in securing

assistance from the GEF to formulate an associated project that would support the achievement of incremental benefits related to the *Rio Rural, Frutificar* and PRONAF programs which comprise the baseline scenario. Interest in the conservation of some of the country's environmental assets such as the Atlantic forest reaches beyond Brazil as these provide positive international externalities (in this case, biodiversity and carbon sequestration).

Activities under the GEF Alternative

The GEF alternative project would support incremental and shared costs associated with the adoption of integrated and cross-sectoral approaches that would lead to sustainable landscapes. Under the GEF Alternative, the baseline activities would be complemented by community information programs and facilitation for broader-based organization leading to the preparation of sustainable land management plans for each project site. Technical assistance providers would be trained to assist communities and individual small holders with the identification, preparation and implementation of investments consistent with addressing ecosystem management issues identified in the watershed strategies and microcatchment implementation plans. Communities would be trained to directly implement monitoring and evaluation activities. In addition, the GEF alternative would support policy studies and information campaigns in support of SLM, and development of an aggregated ecosystem management information system to provide a database for developing methodologies to implement, monitor and evaluate ecosystem management in the context of rural development activities. Moreover, it would support the integration of programs and policies at the local level, capitalizing on the existing coordination mechanisms, particularly through the State and Municipal Rural Development Councils. Given the expected win-win nature of most activities at the producer or community level, over 80 percent of the cost of these investments is included under the baseline scenario without GEF funding. Expected outcomes of the GEF Alternative are:

- a strengthened institutional/legal, financial and social structure designed to promote integrated approaches to Sustainable Land Management (SLM) and Integrated Ecosystem Management (IEM);
- investments supporting the implementation of SLM and IEM objectives; and
- rural community organizations and organizational models that support SLM objectives suitable for replication in other areas with similar ecological characteristics within and outside the country.

Alternatives Considered.

No project alternative. If no project were implemented, efforts to reverse land degradation, conserve biodiversity, and reduce CO2 emissions would most likely continue at the same level. It is possible that some reforestation and biodiversity conservation efforts would take place in the NNWF region as part of the i) the GEF-supported Critical Ecosystem Partnership Fund (that foresees possible financing to implement the *Serra do Mar* biodiversity corridor), and iii) the *Programa Pró-Mata Atlântica* (KfW-financed, to strengthen the *Desengano* State Park located in the NNWF and to establish a Biological Reserve in the *Mata do Carvão area*, which is located in one of the proposed project-selected watersheds). However, these programs would primarily support sites located within the limits of protected areas (particularly the *Desengano* Park and *Mata do Carvão*) and there is no guarantee that they would cover highly degraded or unique production-based ecosystems located outside the limits or buffer zones of the *Desengano* Park. In addition, the baseline programs would not create an enabling environment to facilitate the adoption of SLM approaches in local and state development planning; and would not create incentive and provide resources to strengthen institutions and increase capacity to identify opportunities and to formulate policies in support of SLM approaches.

A GEF project associated with a Bank Loan. This GEF proposal was initially conceived as a blended operation to complement a proposed Bank loan. The request for a Bank loan was first submitted to the

Federal Government (SEAIN) and the Bank in mid 1999. However, due to State creditworthiness, the proposed "*Carta Consulta*" to request Federal authorization to solicit Bank financing is pending evaluation. The Bank has confirmed its unconditional support to the GEF proposal given its strategic value within the context of similar activities supported by the Bank, the GEF and other partners in the region. The Bank has also indicated that it is prepared to negotiate a loan once the State has secured Federal authorization to seek Bank support. Therefore, the proposed current baseline is for a smaller project-area than originally envisioned in the blended operation. However, in view of the improved macroeconomic situation and given GoRJ firm interest in a Bank loan, the project will emphasize activities that would provide the basis for the scaling-up and replication of project activities, such as development of replicable sustainable production modules, dissemination of experiences and lessons learned throughout the state.

Footnote:

1 The *Rio Rural* and *Frutificar* are funded by the State Government's own resources (State Treasury), with an annual budget of about US$ 200,000 and US$ 4 million, respectively; the major source of financing for the PRONAF/PPA is the National Fund in Support of Workers - *Fundo de Amparo ao Trabalhador* (FAT), which revenues are derived from various national sources, including contributions from a large national fund created under the Social Integration Program (PIS/PASEP), which is funded by companies contributions throughout the country, trade unions, and others. FAT resources are made available to the PRONAF through the National Socio-Economic Development Bank (BNDES). For the period 2004-2008, the estimated PRONAF budget for the North and Nortthwestern regions of the State of Rio de Janeiro is about US$ 13 million.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Strategic value of the Project in the regional context (South-Southeast Brazil) and linkage with other planned or on-going Bank loans

Currently, all the on-going microcatchment projects of the South and Southeast Regions of Brazil (SC, PR, SP, RGS e RJ) are integrated in an informal/technical manner, through the organization of seminars, meetings, and field visits, as well as through the continuous exchange of electronic information. Though the Microcatchment Program of Rio de Janeiro (Rio Rural) is the only initiative without a Bank loan, it is part of this network of coordinated programs. This coordination fully fits with the World Bank strategy of working on a regional approach (for the purposes of the WB work, the States of RGS, SC, PR, SP and RJ belong to a single region and are denominated the "South Projects"). The proposed GEF project has been integrated into this network during the current preparation phase. Moreover, the project fits (or complements) with the strategies of GEF and other development agencies supporting Brazil such as the KfW, the latter financing the strengthening of Protected Areas in Rio de Janeiro, Minas Gerais and Santa Catarina. In Rio de Janeiro, the KfW supported-program *Pró-Mata Atlântica* is highly complementary to the proposed project, as it aims at strengthening two state protected areas of the NNWF - the *Desengano* State Park and the proposed *Mata do Carvão* reserve, both located in the area of watersheds selected by the proposed project. It will also strengthen the State environmental monitoring and enforcement system in the NNWF (particularly around these PAs), which is essential to complement the activities proposed by the project. The executing agency for this initiative – State Forestry Institute (IEF) – is also a co-executor of the proposed project.

The project is also coordinated with other initiatives such as the Rainforest Pilot Program (PPG7) and the National Forest Program (PNF). The National Forest Program (PNF) objectives related to the Atlantic Forest biome are: (i) to stimulate the sustainable use of native and planted forests; promote reforestation

activities; (ii) to recover areas of permanent preservation, legal reserves and other altered areas; (iii) to support economic and social initiatives by traditional and indigenous peoples who live in the forests; (iv) to control deforestation and predatory extraction of forestry products and by-products, and (v) to prevent and contain forest fires and other kinds of burning. The PNF is coordinated by the MMA, and will be executed by the various stakeholders in the forest sector: the Brazilian Institute for the Environment and Renewable Natural Resources (IBAMA), the states, municipalities, NGOs, business sectors, research and training institutions. Different potential sources of financing are foreseen to make up the financing structure for the implementation of the PNF: the National Treasury; the Multi-Year Plan (PPA), National Environmental Fund (FNMA), credit and financing lines, private sector, national and international programs and technical cooperation.

It is expected that these two new initiatives - Atlantic Forest Subprogram and the PNF - will provide significant contribution to ensure adequate protection and conservation of the Atlantic Forest remnants, particularly in strengthening the Protected Areas system, the enforcement of environmental and forest legislations, and to control forest fires (and hence reducing the deforestation rates mentioned before). However, much remains to be done to address land degradation in the surroundings of remaining Atlantic forest fragments, and to arrest and reverse encroachment into the forest.

Linkage to GEF IA programs

In order to avoid the possible overlap of activities, the criteria for selection of project areas explicitly excludes areas in which other GEF projects are already active or have identified similar activities for possible support.

The proposed project relates to the GEF-financed National Biodiversity Project (PROBIO, WB as IA), as it has identified among the priority actions in the Atlantic Forest biome, the high priority for biodiversity conservation of all remaining primary vegetation of North-Northwestern *Fluminense*.

The project is in accordance with the GEF-supported Climate Change Enabling Activity Project (UNDP as IA), which resulted in the preparation of the National Communication, involving the establishment of a greenhouse gases emission inventory and presenting details of what actions are being taken to the concentration of these gases in the atmosphere. The proposed project would be in line with the National Communication as it introduces enhanced carbon sequestration activities through the control of soil erosion and the adoption of sustainable soil management practices. It should be pointed out that past and on-going GEF activities in Brazil associated with Climate Change FA support capacity building, technical assistance and investments (demonstration projects) in the areas of energy efficiency, biomass and other sources that offer opportunities for cost-competitive renewable energy and GHG emissions reduction.

It is also in conformity with the objectives of the National Biodiversity Strategy and Action Plans (NBSAPs) which, with GEF support, is now in the final stages of preparation of the action plans for the different areas of intervention identified in the strategy (UNDP as IA).

Another GEF initiative, through WB, with which linkages would also be established is the "Brazilian Biodiversity Fund" (FUNBIO). Lessons learned from the FUNBIO would be incorporated, particularly in the design and implementation of the incentive program (Component 2), given that FUNBIO is supporting studies on the identification of incentive mechanisms to involve the private sector in biodiversity protection.

Exchange of experiences and collaboration would also be developed between the proposed project and five other GEF-funded projects under preparation or implementation in other Brazilian States, supporting

biodiversity conservation of the Atlantic Forest biome: (i) in Santa Catarina, the medium-sized Biodiversity Conservation and Ecosystem Rehabilitation in Tabuleiro State Project (WB as IA); (ii) in Paraná, the full-sized Paraná Biodiversity Conservation Project (WB as IA), and the Guarequecaba Biodiversity Conservation Medium-Size Project/MSP (UNDP as IA); (iii) in Minas Gerais, the UNDP/GEF Pilot Program for Reforestation of the Atlantic Forest in Eastern Minas Gerais (MSP); and (iv) in São Paulo, the UNDP/GEF Conservation of the Interior Atlantic Forest in São Paulo State MSP. In the field of watershed management, the project would also exchange experiences with the following GEF-supported projects on the integrated management of the water resources: (i) upper Paraguay Watershed (including a strategy for biodiversity conservation of the Pantanal and its aquatic ecosystems – UNEP as IA); (ii) the Brazilian portion of the Amazon Watershed (including the development of watershed management plans of water resources and freshwater biodiversity – WB as IA); and (iii) the São Francisco Watershed (integrating the watershed and coastal zone – UNEP as IA). In addition, it would coordinate with the UNDP/GEF Demonstrations of Integrated Ecosystem and Watershed Management in the Caatinga Project, under implementation in North-east Brazil.

On a general level, the proposed Project will follow the recommendations for greater cooperation that will come out in the GEF Strategy for Brazil, currently being developed under leadership of the GEF Focal Point in Brazil. On a more specific level, the project will work closely with staff from the FUNBIO Project, especially in relation to the design of a financial incentive program/fund for sustainable agriculture in the State of Rio de Janeiro. The lessons and experiences of FUNBIO will be the starting basis for designing such incentive program/fund. The project will also coordinate with other relevant GEF projects, mostly the Paraná and Santa Catarina ones, especially where specific project activities identified during project preparation could benefit from the experience of those two other projects that are also located in the Atlantic Forest. One specific product from project preparation activities, using PDF-B funds, was the identification of mechanisms to foster continued coordination once the Rio Project enters into its implementation phase.

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
Biodiversity conservation: GEF-financed	Paraná Biodiversity Conservation Project (70522-BR)		
	Brazilian Biodiversity Fund –FUNBIO (44597-BR)	S	
	The Critical Ecosystem Partnership Fund (A Global Development Fund executed by Bank, GEF and CI—73195)	S	S
Biodiversity protection (financed by the Rain Forest Trust Fund, the German government and the European Commission)	Ecological Corridors Project - Rain Forest Pilot Program PPG7 (6572-BR)	S	S
Community-based rural development and natural resources management	Land Management III São Paulo (6474 -BR)	S	S
	Rural Poverty and NRM	S	S

	Project-Paraná (4060-BR)		
	Natural Resources Management and Rural Poverty Reduction - Santa Catarina (43867-BR)	S	HS
	NRM and Rural Poverty Project-Rio Grande do Sul (43868-BR)	S	S
Strengthen environmental institutions	NEP I Project (6446-BR) NEP II Project (35741-BR)	S	HS
Strengthen agricultural research institutions, and develop and transfer agricultural technology	Agricultural Technology Development Project for Brazil (43873-BR)	S	S
Other development agencies			
KfW (Biodiversity)	Pro-Atlantic Forest Program (Programa Pró-Mata Atlântica) – Strengthening of the Desengano State Park, Mata do Carvão reserve (proposed PA) and Três Picos State Park		
UNDP/GEF	Pilot Program for Reforestation of the Atlantic Forest in Eastern Minas Gerais		
UNDP/GEF	Conservation of the Interior Atlantic Forest in São Paulo State		
IDB (Environment)	National Environment Fund		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in proposed project design:

The proposed project would draw from and build on the lessons learned from implementing environmental and natural resources management projects in Brazil, particularly from the above-mentioned operations. Some of these lessons that will be incorporated during the continued preparation of the project are:

- *The use of a natural, physical unit, such as a micro-watershed, for planning purposes gives viability to conservation measures that produce limited impact on individual farms.* The proposed project would define natural physical units – watersheds and micro-watersheds - as the basis for the integrated production ecosystem planning approach in order to demonstrate the interdependence of all farm units within the physical unit, an approach which treats small and large farmers as complementary elements of a single, expanded system;

- *To be successful, investments in soil conservation must be based on technical changes that bring recognizable and early productivity benefits to farmers.* The project intends to focus on technologies that provide direct benefits to farmers; for this reason, there is little allocation of GEF funds to support investments;

- *Continued political support and integration of project activities with the various rural development programs contributed to enhance project impact.* SEAAPI's rural development activities have proven resilient in the face of significant political changes at both the state and local levels. Integrating the proposed project activities with these existing programs provides greater

likelihood of sustainability;

- *Extensive training and re-training, emphasizing group and participatory approaches, may be necessary to change the "mindsets" of public sector research and extension staff.* Both the baseline rural development projects and the proposed GEF-supported program include substantial training in participatory approaches;
- *Improved land management generates important external benefits. Project design should ensure the inclusion of adequate socio-economic and environmental monitoring activities to provide the necessary basis to quantify these externalities.* The proposed project includes a strong component on agro-environmental and socio-economic monitoring for the measurement of project impacts on the generation of externalities, including national and global benefits; and

The project also builds on the following key lessons learned from the implementation of IEM approaches by other agencies *(Ecosystem Management: Lessons from Around the World, A Guide for Development and Conservation Practitioners,* IUCN):

- *Approaches must be flexible to adapt to continually changing situations and conditions* - the proposed project, acknowledging inevitable changes beyond the scope of the project to influence or fully mitigate, would provide the primary stakeholders - small holder producers and communities - wide latitude in how they implement the activities, while maintaining focus on monitoring and evaluation activities focused on achieving program objectives.
- *Economic, social and cultural factors are crucial* - project preparation places emphasis on *a priori* stakeholder analysis in order to identify key economic, social and cultural conditions in order to ensure that participatory planning activities incorporate these dimensions and benefit from local knowledge in the identification of plan goals and activities in the context of knowledge-based adaptive management.

Participation of stakeholders at all stages of project development and implementation is imperative - project identification has already involved stakeholders in commenting and providing input into site selection criteria and preliminary project design. The project preparation plan requires significant consultation and collaboration in design of activities. Stakeholders will participate in the approval of project activities, oversight and evaluation.

4. Indications of borrower and recipient commitment and ownership:

The proposed GEF Project Concept and Block B request were prepared by SEAAPI, using its own funds, with technical assistance from the FAO-World Bank Cooperative Program. Workshops were held with representatives from SEAAPI's rural development projects, EMBRAPA, local governments and NGOs from the ecoregions to be included in the Project. The workshops reviewed the proposed Project's goals and objectives and the associated baseline scenario. The group identified the principal ecologically-sensitive areas and critical environmental problems in the North and Northwestern *Fluminense* (as part of the Atlantic Forest biome), prepared a preliminary list of candidate physical units/watersheds and ecosystems within the Project area and identified some of the key institutional actors involved and potential activities to improve ecosystem management. The workshops' findings provided the basis for the Block B Grant proposal. A first endorsement letter (on the Concept note) from the Secretariat of International Affairs (SEAIN) as GEF Focal National Focal Point was received by the World Bank on January 23, 2002. A second letter from SEAIN (on the Proejct Biref) was received by the World Bank on September 29, 2003. Both before and after Block B approval, the State Government, through SEAAPI, is committing its support to the Project through concrete actions, which are briefly listed below:

- Meeting of the State Governor (together with the Secretaries of Agriculture and of Planning and Control) with the former World Bank task manager, where she clearly expressed the Government's interest in the Project;
- Compliance with all issues agreed in the preparation missions' Aide-Mémoires;
- Approval of the law which authorized receipt of Block B resources;
- Release of state financial counterpart funds for preparation of the GEF Project;
- Support for project preparation by various state agencies;
- Full staffing of the preparation coordination team;
- Availability of budgetary and financial resources for the execution of the Rio de Janeiro State Program of Sustainable Rural Development in Microcatchments – *RIO RURAL*;
- Selection of *RIO RURAL* Program as one of the three priority programs within SEAAPI's Strategic Plan;
- Budgetary and financial resource outlook for *RIO RURAL* under the State Government's PPA; and
- Development of efforts to systemize existing information, inventories, preliminary diagnostics and consolidation of a geo-referenced project data, with resources from the State and partners involved in the Project;
- A series of project preparation meetings and workshops with local and state stakeholders, such as a meeting held in July 2003 (with 150 participants) and two project workshops held in August 2003 (72 participants), both in the NNWF region, with the participation of 24 municipalities of the proposed project's area of coverage, with their respective Municipal Secretaries of Agriculture and Environment, local and state government experts in agricultural extension and research, community leaders and rural producers, representatives of rural labor unions, Municipal Rural Development Councils, and other partner entities.

In addition to the aforementioned actions, it should be point out that, during the Bank PCD Review Meeting held on 24 July 2003, the Task Team also noted that the commitment of the RJ State government is solid. They have secured co-finance for the GEF and been committed to their on-going activities in this project such as sending the personnel to Santa Catarina to learn from their earlier experiences. The impact in RJ will be great even without a new loan. The new federal government (EMBRAPA, MDA/PRONAF) is also committed. It should also be pointed out that, during the above-mentioned PCD meeting, it was a general consensus that the project design is of high technical quality, which is also a result of government commitment through the support to the availability of highly competent staff for project preparation and implementation.

5. Value added of Bank and Global support in this project:

For many years, rural poverty reduction and natural resources management have been key elements of the World Bank's Country Assistance Strategy for Brazil, mainly through financing of specific investment projects as well as economic and sector work. As these themes have emerged as priorities in Brazil in recent years, the Bank has facilitated the incorporation of international experience into the design of policies and programs. In addition, the Bank's involvement has resulted in broader dissemination of Brazil's experience and innovations, both within the country and to the international community. The Bank's involvement in supporting the proposed project provides Rio de Janeiro with greater access to the broad spectrum of Bank-supported, community-based natural resources management programs. It also helps to ensure broader dissemination of results to the extensive network of Bank-supported rural development programs worldwide. Perhaps of even greater importance is that Bank and GEF involvement in the proposed project provides an opportunity to develop, demonstrate and evaluate mechanisms to mainstream a new, sustainable approach to rural development. In addition, GEF support will be securing the protection

of important global biodiversity resources and the enhancement of carbon sequestration in the agricultural landscape, through effective management of critical ecosystems within the Atlantic Forest biome.

E. Issues Requiring Special Attention

1. Economic

☒ Summarize issues below ☐ To be defined ☐ None

Economic evaluation methodology:

○ Cost benefit
○ Cost effectiveness
● Incremental Cost
○ Other (specify)

The project preparation team undertook the following activities associated with the incremental cost analysis: establishment of appropriate baseline; full identification of expected benefits (global environmental and domestic benefits); estimate of baseline and incremental costs over the 5 year life of project, broken down by project component; identification of methodology and data requirements for economic value of local and global public goods benefits; identification of additional co-financing and appropriate cost-sharing with beneficiaries, and identification of cost recovery mechanisms that would encourage environmental responsibility and financial sustainability in the absence of continued GEF support (for details, see Incremental Cost Analysis in Annex 2).

2. Financial

☒ Summarize issues below ☐ To be defined ☐ None

Total project cost is estimated to be US$ 14.59 million, divided into: (i) Planning for SLM Actions (US$ 1.49 million); (ii) Incentive System for SLM (US$ 7.86 million); (iii) Organization and Capacity Building for SLM (US$ 2.97 million); and (iv) Project Management, M&E, and Information Dissemination (US$ 2.28 million). Financial resources to fund this project would come from: GEF, State Government of Rio de Janeiro, Federal Government (EMBRAPA Soils and PRONAF/MDA), local stakeholders, NGOs (Conservation International-Brazil, SOS Mata Atlântica and VivaRio) and one research institution with the status of private sector (Coppetec).

Financial sustainability. Project preparation included extensive discussions and studies on the development of strategies to ensure that the activities to be financed by the GEF are sustainable over time. It examined the existing incentive legislation and identified the most appropriate financing mechanisms to be used for implementation a the financial incentive program proposed under Component 2 (i.e. through the State Socio and Economic Development Fund - FUNDES); it also developed (under Component 1) a proposal for the creation of an environmental services fund to facilitate financial sustainability beyond the project implementation.

3. Technical

☒ Summarize issues below ☐ To be defined ☐ None

Selection and adaptation of project methodology for developing integrated SLM plans; development of capacity building program for producers, extension staff and other stakeholders; identification of priorities for applied research; identification, adaptation and development of appropriate approaches and technologies that provide local and global benefits; and design of monitoring and evaluation framework which addresses technical needs and which can be largely implemented by beneficiaries.

4. Institutional

4.1 Executing agencies:

Project implementation would be the responsibility of SEAAPI, supported by the aforementioned governmental and non-governmental agencies (see Section C.4; for details, see Annex 7). A first assessment of institutional capacities was carried out during project preparation with the objective of identifying the strengths and shortcomings of these main institutional agents that are expected to participate in project execution. This was the basis for agreeing on a proposal for project management structure which is presented in C.4 and detailed in Annex 7. In addition, the technical capacity of the main executing agencies is adequate to implement the project; however, knowledge of Bank financial and procurement procedures would and needs to be updated and enhanced. A more detailed assessment of institutional capacities (including capacity for financial management, procurement and disbursement) will be carried out prior to appraisal by the Bank team's concerned specialists, to determine any scale-up requirements for administration (procurement, financial management and reporting) of GEF resources and oversight of GEF-funded activities.

4.2 Project management:

A Project Management Unit (PMU) would be established through the Microcatchment Directorate (SMH), reponsible within SEAAPI to coordinate the *Rio Rural* Program and other watershed and environmental management matters. The head of the PMU and its departments would be appointed by an act of the Governor prior to Grant Negotiations. It would be staffed mainly by secondment of senior staff from the partner executive organizations (particularly EMATER). Moreover, a team building training program, involving project managers and technicians will be undertaken between GEF Work Program submission (foreseen for November 2003) and Grant Negotiations. During this period, the project will also put in place the national collaborative mechanisms needed for project implementation.

The execution of the project would be decentralized and would be supported by the regional and local staff of the participating agencies. Project management would imply inter-agency coordination by the PMU/SMH at state and regional levels, particularly between SEAAPI and other concerned State Secretariats (particularly Environment), as well as other potential project partners, including municipalities and NGOs. Project preparation has ensured that coordination would capitalize on the existing mechanisms, particularly through the State and Municipal Rural development Councils. Management responsibilities have been agreed during preparation (see Annex 7); however, they will be more detailed into the appraisal, and may take into consideration additional lessons learned from the other Bank and GEF-supported projects in the country involving the rural, environment and natural resource sectors. The management responsibilities to be defined in more details will also include application procedures for the project's annual planning and budget cycle, grant administration and accounting, procurement procedures, and responsibilities for monitoring and evaluation. This information will be put together in a Project Operations Manual. A first draft of this Manual will be submitted by SEAAPI during the appraisal mission.

4.3 Procurement issues:

Procurement issues would be identified and addressed prior to appraisal by the team's procurement specialist and a procurement plan prepared by the Government.

4.4 Financial management issues:

The PMU at SMH would be responsible for providing technical leadership, and for procurement, disbursement, and keeping the special account. It would maintain and operate an adequate management information system (MIS). The SMH office currently does not have an MIS that meets Bank requirements. Further preparation (between GEF Work Program submission and Grant Negotiations) would ensure that an appropriate action plan be agreed with the PMU to satisfy the Bank's requirements for project effectiveness and to obtain a certification of the project's financial management system. A Bank financial management specialist would review the arrangements prior to appraisal.

5. Environmental

5.1 Summarize significant environmental issues and objectives and identify key stakeholders. If the issues are still to be determined, describe current or planned efforts to do so.

The project would be very positive from an environmental standpoint and few of the proposed project activities are likely to have potential environmental impacts would mostly be those financed the financial incentive program for sustainable agriculture (Component 2) that would be implemented to promote packages of improved environmental management and sustainable agricultural practices, such as organic agriculture, eco-tourism, small-scale processing of farm products, traditional crafts, as well as of mitigation measures to arrest and revert reverse on-farm and off-farm erosion and sedimentation. The impacts of the majority of these packages would be positive or neutral: for example, from the introduction of on-farm soil conservation and soil stabilization measures, and re-vegetation and reforestation of riparian forests utilizing native species. In any case, environmental impacts are expected to be localized and preventable through responsive mitigation measures.

5.2 Environmental category and justification/rationale for category rating: **B - Partial Assessment**

Project is proposed as a category B designation, based on the above assessment of potential impacts. The Bank PCD (which forms the basis for this document) was reviewed by the QAT (24 July, 2003). The QAT members stated that they "concur with the proposed environmental Category "B" and "S2" ratings, and none of the Bank's social safeguards are triggered by the project as currently designed". The QAT also "agree that the project would be highly positive from an environmental standpoint, if implemented as planned." (Source: QAT Memo dated July 24, 2003)

5.3 For Category A and B projects, timeline and status of EA

EA start-up date: October 2003
Date of first EA draft: December 2003
Expected date of final draft: February 2004 (before Appraisal)

5.4 Determine whether an environmental management plan (EMP) will be required and its overall scope, relationship to the legal documents, and implementation responsibilities. For Category B projects for IDA funding, determine whether a separate EA report is required. What institutional arrangements are proposed for developing and handling the EMP?

Despite the likelihood that most "sub-project" activities financed under Component 2 would have either a positive or neutral impact on the environment, an appropriate EMP would be needed. This requirement would be met by the EA report under which an EMP would be prepared as per World Bank OP 4.0 provisions for category B projects with minor environmental impact. It is foreseen that a draft EA/EMP would be submitted by the grant recipient in December 2003. Mitigation measures would be integrated into the screening, evaluation, approval, and monitoring procedures for small investments/"sub-projects" supported under Component 2.

The EMP would also include specific responsibilities for EA and institutional arrangements, as well as provisions for strengthening EA capacity within SEAAPI and to establishing mechanisms to monitor

implementation and measure impacts. According to the QAT review, "the EMP, part of the EA report, should indicate the eligibility criteria and screening procedures which the project would use to ensure that the financial incentives program (Component 2) would support only those rural activities which are environmentally beneficial or relatively benign."

5.5 How will stakeholders be consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed EMP?

This would include (i) reviews of safeguard concerns, as well as practical operational modalities for implementation; (ii)participation of farmers in the design of Component 2 (environmental and production small investments); and (iii) stakeholders' workshops for validation and dissemination of project design. Three NGOs (CI-Brazil, SOS Mata Atlântica and Viva Rio) are participating in project preparation; local groups/NGOs were consulted during the socio-economic and ecological surveys of the area carried out between March and August 2003. These surveys were undertaken by SEAAPI and the following project partners: (i) State agencies: EMATER (rural extension), PESAGRO (agricultural research), FEEMA (environment), IEF (forestry and PAs), DRM/mineral resources and the State Attorney's Public Defense Office); (ii) Federal agencies: EMBRAPA Soils; four non-government institutions (SOS-Mata Atlântica, Conservation International/CI-Brasil and VivaRio) and one private sector institution (Coppetec). As noted in the QAT review of the PCD, project preparation involves substantial consultation with NGOs and other stakeholders, which also cover the project's environmental aspects, in a manner consistent with the Bank's Environmental Assessment Policy (OP 4.01).

5.6 Are mechanisms being considered to monitor and measure the impact of the project on the environment? Will the indicators reflect the objectives and results of the EMP section of the EA?

- Monitoring and measurement of environmental impacts is an explicit project output (see Annexes 1 and Appendix 3 to Annex 4);.
- Positive environmental impacts are the objective of the project.

6. Social

6.1 Summarize key social issues arising out of project objectives, and the project's planned social development outcomes. If the issues are still to be determined, describe current or planned efforts to do so.

A comprehensive social assessment and consultation process were carried out in the five watersheds proposed for support under the project, to identify main social issues and possible impacts arising from the project. The main results from this analysis are summarized below (see Annex 10 for more detail and the project files for complete documentation under social characterization in the project area).

A major social issue in the NNFW is the **growing rural exodus**. An analysis of this issue provides, in all the communities studied throughout the five project watersheds, an explanation for the phenomenon of rural migration, especially that of rural youth, whereas limitations related to lot size (smallholdings), barriers to land access in light of the new economic activities prevailing on large farms, and the lack of job opportunities in rural areas are added to other social pressures, such as: the lack of educational and leisure infrastructure, the attraction of jobs in the oil fields, the urban experience of young rural students, and the influence of their urban fellows who transmit to them a world view in which rural areas are associated with hard work that does not pay well.

In addition, the observations made in the areas researched in more detail for the preparation of the socioeconomic diagnostics of the Imbé Watershed (Annex 9, Appendix 2) highlight the existence of groups of stakeholders with different social and economic interests and strategies, different levels of participation in rural community affairs and of awareness of environmental issues. The increasing importance of beef cattle, drastically reducing the number of rural jobs, exercises a strong pressure on (a) the aforementioned rural exodus; and (b) the loss of importance of income from agricultural activities compared to that from municipal civil service positions, pensions and the non-agricultural activities of an increasing number of

residents in rural communities. Under this scenario, the general acceptance of payments for converting pasture land into forest areas has arisen more as a symbol of the precarious living conditions in rural areas, than as a process of awareness of environmental issues.

6.2 Participatory Approach: How will key stakeholders participate in the project?

Stakeholders of the project include national and beneficiairy stakeholders. National stakeholders comprise the following: state institutions (Environment, Agriculture, Water Resources, Public Defender's Office and Universities); federal institutions (Embrapa, National Water Agency, Ministries of Environment and Agrarian Development, and Universities), municipal organizations (Sustainable Rural Development Councils, Municipal Secretariats of Agriculture and Environment), national and local NGOs and private sector. Key beneficiaries include small and medium farmers, rural youth, school teachers, and community leaders (see Annex 7 of Project Brief for more detail). During project preparation, national and beneficiary stakeholders were identified by the local Rio Rural Program during the initial phase of the social diagnostic study (see Annex 10 of Project Brief) subsequent to which they participated in numerous consultations associated with the later phases of the Socio-Economic and Environmental Diagnostic Studies and the Social Assessment. In addition, the project team organized a series of project preparation meetings and workshops with key state, municipal, and beneficiary stakeholders, including a meeting held in early July 2003 and two project workshops held in early August 2003. These workshops were attended by some 220 participants including 34 municipal Secretaries of Agriculture (20) and Environment (10), project co-financing institutions (public, NGOs, and private sector), and representatives from universities (2) and rural worker, producer, and farmer associations (4). During project implementation, national stakeholders will participate through: (i) representation in the Project Steering Committee, responsible for: (a) monitoring and evaluating progress, (b) reviewing and endorsing project implementation policy and priorities, (c) approval of annual operational plans and associated fund allocations proposed by the PMU (for details, see Annex 7 of Project Brief); and (ii) the existing Municipal Suatainable Rural Development Councils (functioning in the 24 project municipalities), which will: (a) endorse the PEMs and the select municipal micro-catchments receiving project support, (b) contribute to the dissemination of the project, and (c) mediate conflicts between local stakeholders. The Steering Committee will include key members from the State Sustainable Rural Development Council and each of the project co-executors (participating State agencies in the areas of Environment, Agriculture, Water Resources and Public Defender's Office, Embrapa Soils, Conservation International Brazil, VivARio, SOS Mata Atântica and,Coppetec). Participation of key municipal and beneficiary stakeholders and NGOs will be ensured through project support for two major activities: (i) participation in the review and updating of existing Watershed Management Strategies which had been prepared, with stakeholder involvement, during project formulation; and (ii) preparation and collective implementation of Microwatershed Development Plans (PEMs). The PEMs would be implemented in 50 microcatchments to be identified during the early stage of project implementation from the five project watersheds, according to criteria developed during preparation (see Section C.3 of the Project Brief). The preparation of PEMs and endorsement of group and individual sub-projects steming from the PEMs will be carried out by new or existing micro-catchment groups, composed of local stakeholders represented by committees by members selected by these groups. More specifically, the project will bring economic and social benefits to the target population, particularly through the provision of appropriate training, technical assistance and supporting incentives to rural producers and stakeholder groups leading to adoption of improved environmental and production practices. Both training and implementation support for beneficiary stakeholders would emphasize the mechanisms, entitlements, obligations and skills implicit in fully participatory development. Project operational procedures would rely upon demand-driven mechanisms in order to ensure a participatory mode of operation.

6.3 How does the project involve consultations or collaboration with NGOs or other civil society

organizations?

- Information was shared with key stakeholders (national and state government agencies, producer representatives, NGOs), who were involved in the discussion and preparation of the initial project concept, development of criteria for selection of project areas, and this project document. In addition, the results of the workshops were used by GoRJ to prepare this project document.

- Consultative workshops and above-mentioned social analysis throughout preparation and implementation will provide NGOs and other civil society organizations (including those not directly involved in project implementation) with the opportunity to participate in reviews of project implementation and outcomes in order to receive feedback to improve the project as well as disseminate results. In addition, three NGOs – SOS *Mata Atlântica*, CI-Brazil and Viva Rio – who participated in the preparation of the Socio-Economic and Environmental Diagnostic Studies and related Watershed Strategies, are proposed in the project management structure are project executors/partners (see management structure in Figure 1 of Annex 7).

- Collaboration with NGOs and producer groups organizations will take place: (i) as intermediaries between government and beneficiaries in implementation of field activities, (ii) in monitoring and evaluation activities, and (iii) at the existing coordination mechanisms that would be capitalized by the project, , particularly the State and Municipal Rural Development Councils (Municipal Councils are the advisory bodies of the PRONAF project).

6.4 What institutional arrangements are planned to ensure the project achieves its social development outcomes?

The results and recommendations of the Social Assessment were incorporated into the project design. In addition, the project would support: (i)community- and demand-driven approaches; (ii) participatory planning to establish financing priorities; (iii) attention to collaborative decision-making and conflict management; (iv) strengthening of existing local organizations' ability to plan and implement their own development; and (v) decentralized implementation mechanisms.

6.5 What mechanisms are proposed to monitor and measure project performance in terms of social development outcomes? If unknown at this stage, please indicate TBD.

The proposed approach for project Monitoring and Evaluation system includes measurements of impacts on people and on institutional performance (see Annex 4, Appendix 3 on M&E). Social and economic baseline information has been developed for management information system for periodic tracking and monitoring. Local stakeholders would participate in carrying out some aspects of monitoring and analysis.

In addition, Project Operations Plans (POAs) would be prepared by the PMU for submission and no objection to the Bank. Bi-annual p*rogress reports* would be prepared and submitted to the Bank in advance of Bank supervision missions and would be combined into a single Annual Progress Report. A Mid-term Review (MTR) and Implementation Completion Report (ICR) would be carried out, at which time stakeholder workshops would be held to share and review project progress and outcomes/impacts, including social outcomes. Where necessary, modifications based on monitoring and evaluation recommendations would be made to the Project Operational Manual.

7. Safeguard Policies

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	● Yes ○ No ○ TBD
Natural Habitats (OP 4.04, BP 4.04, GP 4.04)	● Yes ○ No ○ TBD
Forestry (OP 4.36, GP 4.36)	● Yes ○ No ○ TBD
Pest Management (OP 4.09)	○ Yes ● No ○ TBD

Cultural Property (OPN 11.03)	○ Yes ● No ○ TBD
Indigenous Peoples (OD 4.20)	○ Yes ● No ○ TBD
Involuntary Resettlement (OP/BP 4.12)	○ Yes ● No ○ TBD
Safety of Dams (OP 4.37, BP 4.37)	○ Yes ● No ○ TBD
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	○ Yes ● No ○ TBD
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)*	○ Yes ● No ○ TBD

7.2 Project Compliance

(a) Describe provisions made by the project to ensure compliance with safeguard policies which are applicable.

Environmental Assessment. . The project was classified for a Category B designation. It was being designed to ensure compliance with the requirements of the Bank umbrella policy on Environmental Assessment (OP 4.01). Despite the largely positive or neutral project impacts anticipated, submission of an EA and respective EMP was considered prudent to ensure conformity with the aforementioned Bank policy.

Natural Habitats - The proposed project would support natural habitat conservation and improved land use by integrating into regional development programs the conservation of natural habitats and the maintenance of ecological functions as well as promoting the rehabilitation of degraded natural habitats. Project activities would not significantly modify or degrade natural habitats. In terms of policy dialogue, the project would assist the GoRJ in incorporating into its rural development strategies, analysis of any major natural habitat issues, including identification of important natural habitat sites, the ecological functions they perform, the degree of threat to the sites, priorities for conservation, and associated recurrent-funding and capacity-building needs.

The proposed project would take into account the views, roles, and rights of groups, including local non-governmental organizations and local communities, affected by the project, and would involve these stakeholders in planning, designing, implementing, monitoring, and evaluating the project.

Forestry - The proposed project supports basically environmentally protective activities and those which are supportive of small farmers (e.g., farm and community forestry).

(b) If application is still to be determined, describe current or planned efforts to make a determination.

Once project areas and probable activities are identified during preparation, the application of the Indigenous Peoples Safeguard Policy will be evaluated and any issues identified (none expected) will be reviewed with QAT and results reflected in the PAD.

8. Business Policies

8.1 Check applicable items:

☐ _ Financing of recurrent costs **(OMS 10.02)**
☐ _ Cost sharing above country 3-yr average **(OP 6.30, BP 6.30, GP 6.30)**
☐ _ Retroactive financing above normal limit **(OP 12.10, BP 12.10, GP 12.10)**
☐ _ Financial management **(OP 10.02, BP 10.02)**
☒ _ Involvement of NGOs **(GP 14.70)**

8.2 For business policies checked above, describe issue(s) involved.

Some NGOs are already involved in project preparation. They will continue to participate in further project preparation and implementation processes, and are expected to be an important source of implementation services. As such, Bank guidelines regarding both the selection of NGOs and procurement through NGOs

may apply under the project.

F. Sustainability and Risks

1. Sustainability:

The strategies to ensure that the activities to be financed by the GEF are sustainable over time, would be based on the following principles: (i) creation of a collective awareness of local, national and global environmental problems and of the role of the SLM and IEM of local agro-ecosystems in addressing land degradation issues, maintaining biodiversity and in minimizing impacts on global climate changes, through a heavy investment in the training of small farmers and their families, technicians working in local and state governments and in the private sector, and promotion of community organization, diagnostics and participatory planning, enabling local actors to become managers of natural resources, aiming at the integrated management of agro-ecosystems; (ii) improvement of the income of small farmers and their families, through the introduction of new production management models and the diversification of economic activities, expanding agricultural and non-agricultural income alternatives by adding value to production and by certifying products stemming from the sustainable management of natural resources; (iii) the creation of a favorable environment through the establishment of policies, standards and guidelines and institutional strengthening to plan future interventions, aimed at the continuation of actions needed for the integrated management of ecosystems; (iv) establishment of financial mechanisms to maintain funding to support the integrated management of ecosystems, enabling the contribution of resources to support investments needed to transform and/or maintain the landscape as sustainable productive ecosystems; and (v) access to citizenship and improvement of the quality of life of smallholders through baseline programs (*Rio Rural*, *Frutificar* and PRONAF), ensuring access to basic sanitation infrastructure, rural electrification, productive investments, and land ownership.

With respect to the aforementioned improvement in beneficiaries' income through greater productivity of their existing systems, diversification of activities, and expansion of agricultural and non-agricultural income alternatives, on a pilot basis, these would increase returns to their family labor and the limited cash resources they can afford to commit to agriculture. These gains would, for the most part, be achieved relatively soon in the 50 pilot microcatchments, and in the medium term throughout the NNWF and the whole State, as a result of project-supported capacity building that, among other activities, would promote replication of project lessons and transference of experience. Evidence from other WB-supported land management and poverty reduction projects in South-Southeast Brazil suggests that when these conditions are met, farmers continue to apply the improved technologies on which gains are based—i.e., the economic gains and the external benefits that derive from land management changes are sustained. The empowerment of the target group, its increased social capital and much greater influence over access to and use of development support, would reinforce economic and environmental sustainability. The gains would, however, be exposed to risks arising from further declines in the overall profitability of farming in Rio de Janeiro. This threat to sustainability would be minimized as part of the project's technical strategy as the project would seek to assist farmers to produce quality and distinct products and access market niches that could be ready to pay premium prices for food security and quality and distinct products. The Incentive Program (Component 3) would be instrumental in inducing these changes.

1a. Replicability:

The project would support the design and implementation of the project information dissemination strategy, providing the basis for knowledge transfer and, subsequently, increasing the potential for repeating project lessons and transferring experience at state, national and international levels. The subcomponent 4.3 would specifically address this issue. It will support the sharing of information both within and outside the project

area, involving those beneficiaries, people, communities and institutions, governmental or not, who are interested in the project and who can learn from and make use of the experience, expanding it and making the idea useful to the public throughout the Atlantic Forest region and beyond, particularly to other Latin American countries.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Integrated ecosystem-based watershed and micro-watershed management plans do not lead to sufficient individual and collective action	S	This will be addressed through support for participatory, adaptive management planning based on Rio Rural and PRONAF programs and permit building on success in early years which will be broadened as experience is gained.
Stakeholder groups and Government are unable to work together toward conservation goals	M	Participatory and decentralized implementation mechanisms to be used; communications and promotion campaigns to be pursued in project areas.
Political commitment is not sustained	M	Protection of critical watersheds and rural poverty alleviation are national priorities. Bank has verified the high priority and GoRJ interest, and ensured coordination (through the SEAAPI/SMH) with key agencies working in the five project watersheds. In other words, the risk is addressed in that the project reflects national priorities and close coordination (through the SEAAPI) with key agencies working in the five project watersheds.
Local and institutional capacity is not sufficiently developed to manage project activities	M	Increasing existing institutional capacity is being addressed by baseline programs implemented by SEAAPI (w/ municipalities through PRONAF) and State Environmental Agencies. Project implementation will be backstopped by national and international expertise.
Project management unit would not be able to function in a complex multi-institutional environment	M	PMU would be established through the Microcatchment Directorate (SMH), responsible within SEAAPI to coordinate the Rio Rural Program and other watershed and environmental management matters as related to rural development; project management would capitalize on the existing coordination mechanisms, particularly through the State and Municipal Rural Development Councils; training and technical assistance to the PMU.
The protection and conservation of project watersheds is not sustainable.	M	The issue of sustainability is addressed through the development of environmental “goods and

Monitoring and evaluation not taken into account in developing methodology or in building support for approach	M	services" schemes targeting key watersheds. Strong participation of direct stakeholders and interested agencies in M&E.
From Components to Outputs		
Participants in the project watersheds are not sufficiently motivated to adopt new practices and technologies	M	This is addressed by emphasizing a participatory approach and extensive training of project participants.
Political commitment is not sustained	M	See above mitigation measure associated with risk of "political commitment not sustained".
Budgetary resources are not available on a timely manner	M	See above mitigation measure associated with risk of "political commitment not sustained".
Overall Risk Rating		

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

There are no existing or envisaged controversial features of this project.

G. Project Preparation and Processing

1. Has a project preparation plan been agreed with the borrower (see Annex 2 to this form)?

☒ Yes - date submitted: ☐ No - date expected:

Expected to be submitted by 09/30-03

2. Advice/consultation outside country department:

☐ Within the Bank:
☒ Other development agencies:
☐ External Review

3. Composition of Task Team (see Annex 2):

Alvaro Soler (Task Team Leader); Maria Isabel Braga (Environmentalist); Judith Lisansky (Anthropologist); Claudio Mittelstaedt (Financial Analyst); Alexandre Borges de Oliveira (Procurement Specialist); Susana Amaral (FMA, Disbursement Specilist).

4. Quality Assurance Arrangements (see Annex 2):

Team includes Ms. Maria Isabel Braga (Environmentalist) and Ms. Judith Lisansky (Anthropologist)

5. Management Decisions:

Issue	Action/Decision	Responsibility
PCD Meeting (July 24, 2003)	PCD review	CMUDR

Total Preparation Budget: (US$000) 527.6 **Bank Budget:** 262.0 **Trust Fund:** 265.6
Cost to Date: (US$000) 109.0
☒ **GO** ☐ **NO GO** **Further Review** [Expected Date]

Alvaro J. Soler	Abel Mejia	Vinod Thomas
Team Leader	**Sector Manager**	**Country Manager**

Annex 1: Project Design Summary

BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

Hierarchy of Objectives	Key Performance Indicators	Data Collection Strategy	Critical Assumptions
Sector-related CAS Goal: Rural poverty and inequality reduced through a selective focus on environmental sustainable development	**Sector Indicators:** Incidence of poverty reduced in project microcatchments	**Sector/ country reports:** Poverty assessments from ex-ante, mid-term and ex-post evaluation reports based on State and National statistics , project M&E and structured interviews	**(from Goal to Bank Mission)** Long-term political commitment and financial support at the state level for improved watershed management and rural poverty alleviation within the NNWF
GEF Operational Program: Promote an integrated ecosystem (IEM) approach to guide the development and implementation of sustainable land management (SLM) practices while providing environmentally and socially sustainable economic opportunities for rural communities living in the North and Northeast *Fluminense* administrative regions of Rio de Janeiro State (RJS).	**Outcome / Impact Indicators:**		
Global Objective: (i) to address threats to biodiversity of global importance, (ii) to reverse land degradation in agricultural landscapes,	**Outcome / Impact Indicators:** • Change in total land area characterized by biodiversity-friendly agricultural practices that enhance soil structure stability in micro-catchments (X ha by PY 5) • Total area of riparian and other indigenous forests rehabilitated for biodiversity conservation and hydrology stabilization objectives (X ha, equivalent to X million seedlings by PY5, with 25% planted by PY3)	**Project reports:** Remote sensing (local, catchment/ecosystem level) and field reports Same as above	**(from Objective to Goal)** Continuing political and financial support for the Project. Benefits of conversion to more sustainable land use patterns are clear to potential beneficiaries and coordination with baseline programs carried out efficiently.

(iii) to enhance carbon sequestration, and	• Area of biodiversity conservation-friendly land use mosaics established on private lands supporting corridor connectivity in project watersheds, particularly in those including part of the Desengano and Mata do Carvão PAs (X ha by PY5)	Remote sensing (local, catchment/ecosystem level) and field reports	
(iv) to increase awareness at all levels of the value of adopting an IEM approach to achieve the sustainable management of natural resources.	• Reduction in erosion (X % by PY5) and downstream sedimentation (Y % by PY5) rates in at least 5 micro-catchments	Field surveys for monitoring sedimentation and erosion	
	• Amount of GHG sequestered (X tons of CO2 ha-1 by PY5)	Field surveys	
	• Creation of coordinating bodies characterized by significant stakeholder representation from micro-catchment, municipal and state levels (No. by PY 1)	Project Management Reports (PMRs) and M&E reports	
	• Rural community organizations and organizational models created that have adopted and implemented IEM objectives in 50 micro-catchments No x PY4)	Baseline studies, socio-economic assessments, and independent evaluations, involving structured interviews and questionnaires	
	• Education, training and awareness of beneficiary stakeholders (3,000 by PY5), project executors (200 by PY4), and schools (25 by PY4 Best practices and lessons learned disseminated through 30 workshops/events in the NNWF region (20 by PY3 and 30 by PY 5), national workshops (4 by PY5), media campaign (3 by PY5) and homepage (1 by PY 1)	PMRs and M&E reports	
Output from each Component:	**Output Indicators:**	**Project reports:**	**(from Outputs to Objective)**
1. *Planning for IEM Actions*			
Output 1.1. A strengthened policy and legal institutional framework at state and local	• Development of 5 WMS (Block B phase and update throughout the Life of	PMRs and M&E reports Project supported analytical,	Plans identify appropriate actions and result in sufficient individual and collective

levels to support IEM approaches designed to promote sustainable rural development and the protection of critical ecosystems Output 1.2. The design of an incentive fund/system of sustainable agriculture to cover the transition costs associated with shifting to the adoption of SLM practices beyond project implementation	Project) • Design of an incentive fund system of sustainable agriculture and environmental services fund in PY1 • Development of at least 5 studies from PY1 to PY3 • Identify actions to implement the Serra do Mar Biodiversity Corridor in project watersheds • Development of Microcatchment Development (PEM) and related farm-level plans (PIDs) in at least 35 microcatchments • Develop EECs in at least 10 microcatchments	institutional and sector studies Bank supervision reports	action, and continuing GoRJ / Environmental Agency support of project and its approach to planning and management of natural resources.
2. *Incentive System for IEM* Output 2.1 Technical and financial assistance provided to participants in pilot microwatersheds to facilitate the adoption of IEM principles and Sustainable Land Management (SLM) practices	• On-the-ground investments supporting the implementation of SLM objectives in at least 35 pilot microcatchments • Technical assistance and supporting incentives received by rural producer and stakeholder groups leading to the adoption of improved production and environmental management practices (and certified products), in at least 35 project microcatchments (at least 1,000 producers/150 groups)	PMRs and M&E reports Bank supervision reports Project supported analytical, institutional and sector studies Independent assessment	Stakeholder groups and Government are able to work together towards conservation goals. Adopted management practices would be sustained. No significant political interference in targeting of incentives.
Output 2.2. Adaptive research to overcome specific technical and environmental constraints developed in project microcatchments	• At least 15 improved agro-ecosystem management practices tested and validated (average of 10 producers/test), including those addressing human settlements in fragile and vulnerable areas		
3. *Organization and Capacity Building for IEM*			
Output 3.1 Increased local organizational capacity	• Review of existing community organizations in	PMRs and M&E reports	Local and institutional capacity is sufficiently

Output 3.2. Increased managerial and technical capacity of local and state officers and NGOs to manage natural resources Output 3.3 Improved farm- and community-level capacity to manage natural resources	35 microcatchments and pilot activities implemented in at least 20 microcatchments • Information and communication system implemented in at least 15 microcatchments before end of PY3 • At least 200 project executors trained throughout the life of project • At least 3,000 participants in environmental education events, including stakeholders from 5 project watersheds (24 municipalities) • At least 3,000 stakeholders trained, including farmers, municipal and community leaders, technicians • Number of environmental "monitors" operating at the community level Minimum of 20 environmental projects prepared in local schools before end of PY3	Bank supervision reports Project supported analytical, institutional and sector studies Independent assessment	developed to absorb capacity building effort and manage project activities.
4. *Project Management, M&E, and Information Dissemination*			
Output 4.1. Adoption of IEM principles in other relevant programs Output 4.2. Project progress and impacts monitored and evaluated Output 4.3. Project information disseminated	• Project Management established in SEAAPI/SMH, effectively facilitating project implementation • Project reports prepared and submitted on a timely basis over the life of the project • Work plans, procurement and budgets prepared on a timely and systematic basis • Establish and operate effective M&E systems • Develop project	Bank supervision missions PMRs and M&E reports Mid-term Review Project supported analytical, institutional and sector studies Independent assessment	Efficient project management permits high-quality implementation M&E lead to improvements and broader acceptance of project methodology

	webpage and other media mechanisms disseminated at local, national and international levels		
Project Components / Sub-components:	**Inputs: (budget for each component)**	**Project reports:**	**(from Components to Outputs)**
1. *Planning for IEM Actions*	**US$ 1.49 million**	Field management reports	Waterhsed stakeholders are sufficiently motivated to participate.
1.1. Development of Policies, Regional Plans	US$ 0.21 million	Bi-annual monitoring reports	
1.2. Local Land Management Planning	US$ 1.28 million	Financial management, evaluation, and quarterly and annual reports	
		SEAAPI reports	Timely availability of budgetary resources.
		Copies of contracts	
		Supervision missions the World Bank	Political risk can be managed, such that critical PMU staffing is stable.
2. *Incentive System for IEM*	**US$ 7.86 million**		
2.1. Financial Incentive Program	US$ 7.43 million		
2.2. Support to Adaptive Management Practices Watershed Planning	US$ 0.43 million		
3. *Organization and Capacity Building for IEM*	**US$ 2.97 million**		
3.1. Community Organization	US$ 0.64 million		
3.2. Training of Project Executors	US$ 0.49 million		
3.3. Training and Environmental Education of Beneficiaries	US$ 1.84 million		
4. *Project Management, M&E*	**US$ 2.28 million**		
4.1.Participatory Management of the Project	US$ 1.22 million		
4.2. Monitoring and Evaluation 4.3. Project Dissemination	US$ 0.67 million US$ 0.39 million		

Annex 2: Incremental Cost Analysis
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

Overview

The **development objectives** of the proposed project are to promote an integrated ecosystem (IEM) approach to guide the development and implementation of sustainable land management (SLM) practices while providing environmentally and socially sustainable economic opportunities for rural communities living in the North and Northeast *Fluminense* administrative regions of the Rio de Janeiro State (RJS).
The **global objectives** are: (i) to address threats to biodiversity of global importance, (ii) reverse land degradation in agricultural landscapes, (iii) enhance carbon sequestration, and (iv) increase awareness at all levels of the value of adopting an IEM approach in the management of natural resources. These objectives would be achieved primarily through promoting the adoption of an integrated ecosystem approach in rural areas compatible with Operational Programs (OP) on Integrated Ecosystem Management (OP 12) and Sustainable Land Management (OP 15), and by directly addressing the identified threats and constraints that are preventing the adoption of these approaches in Rio de Janeiro, which are also identified in other parts of Brazil, particularly in the Atlantic Forest ecoregions. The project would be implemented in five watersheds representative of the four major ecosystems of global significance in the Atlantic Forest biome situated in the North and Northeast administrative regions of Rio de Janeiro State, known as the North and Northwestern *Fluminense* (NNWF) regions. These ecosystems are: (i) floodplain forests; (ii) tropical semi-deciduous forests; (iii) tropical moist broadleaf forests; and (iv) coastal ecosystems.

The principal **outputs** will be: (i) Policy, legal and planning framework strengthened at state and local levels to support sustainable rural development and to protect critical ecosystems and watershed services; (ii) Incentive systems successfully adapted and adopted to introduce sustainable improvements in watershed management; (iii) Adaptive research to overcome specific technical and environmental constraints developed in project microcatchments; (iv) Local organizational capacity reviewed, developed and piloted in project-supported microcatchments; (v) Training in the self-management of natural resources provided, and local and state awareness of ecological significant of watersheds enhanced; (vi) Project management structure established, functioning, and able to coordinate project actions with those of other programs in State Secretariat of Agriculture (SEAAPI) and agencies in the North and Northwestern *Fluminense* **(** NNWF) regions of Rio de Janeiro State; and (vii) Project progress and impacts monitored and evaluated, and information and progress disseminated throughout the general public.

Environmental Threats, Underlying Causes and Government Response

The State of Rio de Janeiro is unique in Brazil for having the highest percentage of Atlantic Forest with respect to total area among all of the country's states. It holds a large portion of the *Serra do Mar* Corridor, considered one of the richest and globally important biodiversity areas in the Atlantic Forest.

In addition, the region's smallholder agriculture sector constitutes a rich source of *agro-biodiversity* in subsistence crops such as manioc, sweet potato, corn, beans and rice. Moreover, the Atlantic forest also plays an important role in the *global carbon cycle*. The total land area under the remaining Brazilian

Atlantic forest is about 8 million hectares (of which 841,000 ha are located in the Rio de Janeiro State – see **map of forest remnants** in **Annex 9**). The protection of this forest will serve to store significant amount of carbon and thus reduce the net emission rate of CO_2 into the atmosphere. In addition to the forest, other natural systems and productive landscapes and improved agro-sylvo-pastoral systems, can make substantial contributions in carbon storage.

Major **threats** to Brazil's Atlantic Forest are deforestation (for logging and charcoal production) and agricultural expansion. The State of Rio de Janeiro has the highest index of Atlantic Forest deforestation in the past 10 years, and the NNWF are the State's administrative regions that suffered the most deforestation over this period of time. Despite the characteristic richness of the region's agrobiodiveristy, the smallholder agricultural sector also poses a threat to the biome's biodiveristy. The major threats associated with the smallholder agriculture are: (i) deforestation of the floodplain forests and grasslands attributable to the introduction of conventional mono-cropping agriculture (mainly sugar cane), and consequent loss of soil fertility and soil erosion; (ii) deforestation of the remaining tropical semi-deciduous forests associated with the advance of the agricultural frontier into marginal areas (slash and burn, fuelwood and logging), and subsequent erosion of agricultural lands (mainly due to overgrazing); (iii) unsustainable and illegal forest exploitation and poaching in the remaining tropical moist broadleaf forests and montane grasslands; and (iv) deforestation of restingas and mangroves and subsequent advance of the agriculture frontier into these and other coastal ecosystems, through the introduction of irrigated horticulture by small farmers.

Several **constraints** limit the adoption of measures to address these issues, hence impeding the implementation of integrated and cross-sectoral approaches that would lead to sustainable landscapes. Among these are:

(i) Limited scope of existing policies that promote sustainable human settlement patterns and support the adoption of integrated approaches;
(ii) Limited technical assistance and the need for additional financial incentives for sustainable land use;
(iii) Limited financial resources to support targeted research important for biological diversity conservation and enhanced carbon storage;
(iv) Lack of alternative livelihoods for local communities residing in globally important biological sites (such as buffer zones) and environmentally sensitive areas;
(v) Lack of integration of conservation and development efforts around protected forests (and those proposed for protection) and protected coastal formations;
(vi) Lack of systematized data and information necessary for decision-makers to incorporate ecosystem-level considerations into production activities; and
(vii) Unequal land distribution, leading rural workers and landless people to focus on meeting short-term economic needs, to the detriment of the environment, particularly forest remnants.

In light of this situation the State and Federal Governments have taken the first steps to recover degraded rural areas, through a number of recent actions focusing on efforts to identify new production systems that incorporate environmental considerations as well as other measures such as erosion control, soil conservation and/or recovery, water regulation, sustainable forestry and biodiversity conservation. In support of this new policy, the GoRJ is carrying out the Microcatchment State Program for Rural Sustainable Development (*Rio Rural*) and the State Program for Fruit Production and Diversification (*Frutificar*). These Programs are designed to promote economic development through harnessing market forces, reducing regional inequalities and social pressure on urban areas, placing greater emphasis on the agriculture sector in an attempt to make it easier for people to remain in rural areas, and rehabilitating and conserving the State's renewable natural resources. In addition, the Federal Government (GOB), through the National Smallholder Agriculture Program (PRONAF), has supported an increase in infrastructure

programs such as road repair and rural electrification, and has facilitated specific credits for smallholder agriculture.

With regard to policies and strategies to address specific biodiversity issues and threats to the Atlantic Forest, the State Government of Rio de Janeiro has committed itself to providing additional support and implementing conservation initiatives to address many of the previously identified threats to the region's biodiversity and support the transition to livelihood options built on biodiversity friendly activities. In the NNWF, the main initiative is the KfW-supported Pro-Atlantic Forest Program, aiming at the strengthening of two Protected Areas (PAs) of the region, including support to the existing enforcement system in and around these PAs. The GOB is particularly committed through the implementation of two recently launched initiatives, the National Forest Program (PNF) and the Atlantic Forest Subprogram, the latter under the Pilot Program to Conserve the Brazilian Rain Forest (PPG7). In addition, the GOB has completed the National Biodiversity Strategy and Action Plans (NSAPs). However, much remains to be done to address land degradation in the surroundings of remaining Atlantic forest fragments, and to arrest and reverse encroachment into the forest.

Baseline Scenario

The calculation of the baseline was based on an initial screening of on-going and future programs/projects (scheduled for implementation in the next 3-6 years) relevant to the proposed project objectives. Once identified, they were evaluated to the component/activity level and compared with components of the proposed project. Only those component/activities of the previously identified baseline programs/projects relevant to the proposed project component objectives were costed and included as part of the baseline. All the projects identified are or will be implemented by public institutional and/or national NGOs with field experience in rural development and natural resources management. Identified funding included: (i) public resources (national and state); (ii) bi-lateral financing and (iii) NGOs. These have been presented in Table 1 and briefly described below.

Table 1. Major Baseline Activities

	Proposed Project Components			
Baseline Projects	**Planning for SLM Actions**	**Incentive System for SLM**	**Organization and Capacity Building**	**Project Management, M&E**
State funded *Rio Rural*: Microcatchment State Program for Rural Sustainable Development	x	x	x	x
Frutificar: State Program for Fruit Production and Diversification		x		
Regular Program of Environmental Monitoring and Enforcement and Regular Program of Research	X			x
Federally funded PRONAF: National Smallholder Agriculture Program	x	x	x	x

1. Planning for Integrated Ecosystem Management (IEM) Actions

Under the baseline scenario, four programs would focus on policy and capacity development for environmental planning. Through the provision of technical assistance for participatory municipal and microcatchment development planning, the *Rio Rural* and the *Pronaf* (Gov-funded) would assist in strengthening the policy and planning framework to support sustainable rural development. The KfW-supported *Pro-Mata Atlântica* would finance technical assistance and other investments to protect the *Desengano* Park and *Mata do Carvão* Reserve's biodiversity and their ecosystem services[1]. Some degree of enforcement and monitoring (financed by GoRJ) would be undertaken under the State Environmental and Forestry institutions FFEMA/IEF's regular programmes. The baseline costs for these activities are calculated as US$ 445,000.

2. Incentive System for Integrated Ecosystem Management

Three on-going initiatives are relevant to introduce sustainable improvements in the rural landscape: the Pronaf, *Frutificar* and *Rio Rural*. Rural infrastructure, micro-credit, research and other investments at community level would be supported under these programs to increase productivity and commercial values of agricultural products. The baseline costs for these activities are calculated as US$ 28.55 million.

3. Organization and Capacity Building for Integrated Ecosystem Management

Local organizational capacity would be developed in the *Rio Rural* project-supported microcatchments. Training in agro-business would be supported under the Pronaf. And training of Park field staff would be provided under the Pro-Mata Atlantica. The baseline costs for these activities are calculated as US$ 590,000.

4. Project Management, Monitoring and Evaluation

Management and monitoring experience would be acquired by SEAAPI for the management of Pronaf and *Rio Rural*, as well as by Feema to undertake its regular program of water quality monitoring (with baseline contribution if US$ 150,000).

Summary Baseline Costs and Benefits

Baseline Costs. In the absence of additional GEF funding, the implementation of the aforementioned on-going and planned programs/projects will contribute to the project goal. The estimated costs of baseline activities amount to US$ 29.735 million. Sources of assistance vary and consist of State Government revenues, Federal Government (Pronaf Credit and Infrastructure), private sector (Coppetec) and NGOs (Conservation International-Brazil, SOS Mata Atlântica, Viva Rio).

Baseline Benefits. The baseline program would mainly achieve benefits at the national level including the adoption of more sustainable land and water management practices, increased beneficiary incomes, better understanding amongst the rural community of agro-environmental issues, and reduced degradation of natural resources for productive purposes. It would also go some way in generating global benefits by increasing biological diversity of soils, enhancing carbon sequestration in productive lands and conserving biological diversity in PAs. It would finance technical assistance, rural infrastructure, research, support for land regularization and credit for initial capital, small infrastructure and services to small farmers. However, the baseline would not address more far-reaching interventions funded by global transfers, as it would not support e.g. the rehabilitation and restoration of non-productive public and/or fragile lands within the watersheds, and the connection of fragments of natural forest across the landscape.

GEF Alternative

The **GEF alternative** would achieve significantly greater protection of endangered biodiversity of global importance in selected watersheds representative of the four major ecosystems of the Atlantic forest in the NNWF. Increased community participation and organization which supports SLM objectives and compliance with environmental legislation fostered by the alternative strategy will in turn increase sustainability of interventions. The benefits of supporting the transition to livelihood options built on biodiversity friendly activities increased storage of greenhouse gases in terrestrial ecosystems, and enhanced protection of ecosystems of global importance, occur predominantly at the global level and therefore warrant GEF funding. The GEF alternative would reorient the agricultural baseline through the introduction of a cross-sectoral approach in support of sustainable land use practices defined within an ecosystem framework. It would include i) the rehabilitation and restoration (with native species) of non-productive public and/or fragile lands, and ii) the implementation of carbon sequestration strategies supporting the protection of whole watersheds containing remnants of Atlantic forest, and iii) the concept of an integrated system of connected large natural areas to protect biological diversity.

GEF resources would cover the incremental costs associated with: (i) the development of appropriate strategies for the adoption of integrated and cross-sectoral approaches that would lead to sustainable landscapes and promote integrated ecosystem management; (ii) the inclusion of climate change and biodiversity issues in the microcatchment planning process, and consequently in the small farmers' routine activities; (iii) education and community engagement efforts to facilitate the creation of environments favorable to the formation and strengthening of rural organizations for self-management of natural resources; (iv) building of increased capacity among technicians and local leaders, project managers and executors, focusing on the internalization of global environmental concepts; (v) the design and establishment of an incentive program for SLM, and provision of incremental resources to support the transition to sustainable livelihood activities financed by the program; (vi) applied research for the identification and development of alternative and appropriate technologies and systems to respond to different sustainable land uses, consistent with improved agro-ecosystem management; and (v) monitoring and evaluation activities which demonstrate results and benefits to local as well as regional, national and global stakeholders.

Costs. The total cost of the GEF Alternative is estimated at US$ $44.33 million, detailed as follows: (i) US $ 1.93 million to strengthen Policy, Legal and Planning frameworks Frameworks for SLM; (ii) US$ 36.42 million in Incentives for the adoption of SLM; (iii) US $ 3.56 million to build Capacity for Natural Resource Management and Increasing Environmental Awareness; and (iv) US $ 2.43 million in support of Project Management, M&E, and Information Dissemination.

Benefits. Under the GEF Alternative, the GoRJ would be able to undertake a challenging program encompassing both national and global benefits. It would enhance protection of vulnerable and globally important ecosystems and assist the country with the effective implementation of its existing/revised sustainable rural and environmental policies. Benefits generated from this comprehensive approach would include national benefits - such as increased sustainability and improved management of aquatic and terrestrial resources, and improved information flow from project and other rural landscapes located in the Brazilian Atlantic Forest Eco-region Caribbean (see complete list of national benefits in the Incremental Cost Matrix below), as well as to the South American countries - as well as global benefits. Global benefits include: (i) increased storage of greenhouse gases in terrestrial ecosystems, which would be primarily achieved through the adoption of improved land management (to a lesser extent, carbon would also be sequestered through the restoration and further protection/conservation of degraded natural forests, and

hence increasing forest biomass, particularly degraded riparian forests; (ii) conservation and sustainable use of biological diversity, by (a) supporting the implementation of the *Serra do Mar Biodiversity Corridor* through the adoption of SLM and IEM in selected watersheds; (b) promoting public and private protected areas and conditions for their sustainable management in sites containing remnants of the Atlantic Forest biome; (c) adopting improved agricultural practices that enhance soil biodiversity (non-till systems, legume crop rotation, mulching, and other conservation agriculture practices); and (d) promoting conservation of agrobiodiversity; (iii) protection of watersheds in areas of global importance; (iv) improved funding for controlling land degradation, hence reducing pressure on ecosystem integrity in areas of globally significant biodiversity, and enhancing carbon sequestration and storage in the agricultural landscape; improving sequestration of soil carbon and reduction of dioxide emissions; (v) increased opportunities for generating income while at the same time reducing pressure on biological resources; and (vi) transition to more sustainable livelihoods by supporting pilot activities in agro-ecosystem management and outreach and involvement of civil society and the private sector in the planning, management and sustainable use of natural resources. The funding from NGOs and private sector (CI-Brazil, SOS Mata Atlântica, Viva Rio and Coppe) would cover incremental costs of technical assistance, training, workshops, equipment and subsistence allowances in support of project Components 1, 3 and 4.

Incremental Costs

The difference between the costs of the Baseline Scenario (US$ 29.74 million) and the GEF Alternative (US$ $44.33 million) is an estimated US$ 14.59 million (including taxes and physical & price contingencies). The matrix below summarizes the baseline and incremental expenditures during the five years project period. Co-financing of this increment has been mobilized as follows[2]: (i) US$ 5.84 million from the State Government of the Rio de Janeiro; (ii) US$ 1.2 million from the Federal Government (from the Pronaf Credit and Infrastructure (tentative) and Embrapa Soils, the latter as kind-contribution of US$ 0.2 million); and (iii) US$ 0.261 from NGOs and private sector (Conservation International-Brazil, SOS Mata Atlântica, Viva Rio and Coppetec); and (iv) US$ 0.56 million from project beneficiaries/producers.

The total requested GEF contribution amounts to US$ 6.73 million (excluding the Block B donation). Out of this total US$ 1.24 million would strengthen Policy, Legal and Institutional Frameworks for NRM in the NNWF region; $ 1.78 mi in Incentives for the adoption of SLM, covering five watersheds representative of the four major ecosystems of global significance in the Atlantic Forest biome situated in the (NNWF); $ 2.32 million to build Capacity for Natural Resource Management and Increasing Environmental Awareness; and $ 1.03 million to support Project Management, M&E, and Information Dissemination. The aforementioned GEF-support would cover incremental costs of technical assistance, training, workshops and other services such as public awareness media campaigns, small infrastructure, minimum equipment and travel and subsistence allowances.

Incremental Cost Matrix

Component	Cost Category	US$ Million	Domestic Benefit	Global Benefit
Comp 1 Planning for Integrated Ecosystem Management (IEM) Actions	Baseline	$0.44	Increased (thought limited) capacity for local land use planning, at the micro-watershed level. Though with limited scope, there has been improvement in policies that promote sustainable development and SLM.	Limited global benefit. Increased conservation of biodiversity within Pas of the NNWF regions
	With GEF Alternative	$1.93	An improved legal, policy and planning/institutional framework for SLM management, providing the basis for the effective adoption of more sustainable on-farm practices and off-farm interventions. Increased community commitment in the	Land degradation issues mainstreamed into the local and national development process. An improved approach developed to plan and promote more sustainable land use, hence reducing pressure on

	Incremental	1.49	*Note: GEF contribution of US$ 1.24; GoRJ of $0.28; and $0.01 from NGOs*	
Comp 2 Incentive System for IEM	Baseline	$28,56	Increased demand for activities promoting enhanced productivity and yields in selected areas of the North-Northwest Fluminense. Attempts at poverty reduction. Limited experience on identification and adoption of sustainable land management practices that reduce pressure on natural resources.	Limited control of land degradation and limited biodiversity conservation (partial conservation of globally significant biodiversity). Constrained funding for addressing land degradation and protecting biodiversity threatens globally important ecosystems. Increased storage of greenhouse gases in terrestrial ecosystems, which would be primarily achieved through the adoption of improved land management Carbon sequestration through the promotion of incentives to restore and further protec/conserve degraded natural forests (and hence increasing forest biomass), particularly degraded riparian forests
	With GEF Alternative	$36.42	Same as above, though with significant number of rural communities and NGOs developing experience in the sustainable use of natural resources for economic revenues. Closer linking of natural resource condition / considerations to development priorities.	Transition to more sustainable livelihoods by supporting pilot activities in sustainable land management. Improved funding for controlling land degradation, hence reducing pressure on ecosystem integrity in areas of globally significant biodiversity, and improving sequestration of soil carbon and reduction of dioxide emissions. Increased opportunities for generating income while at the same time reducing pressure on biological resources. Conservation and sustainable use of biological diversity, by adopting improved agricultural practices that

				enhance soil biodiversity (non-till systems, legume crop rotation, mulching, and other conservation agriculture practices), and promoting conservation of agrobiodiversity.
	Incremental	$7.86	*Note: GEF contribution of US$ 2.14; GoRJ of $4.17 (Rio Rural and Frutificar programs); Fed. Gov of $ 1.02 (Pronaf Credit & Infrastructure); and Beneficiaries of $ 0.52.*	
Comp 3 Organization and Capacity Building for IEM	Baseline	$0.59	Limited and *ad hoc* adoption of participatory methods and community organization activities. There has been increased though limited awareness of environmental issues through various programs; Better trained staff, though skills in state agencies need strengthening; Limited project management skills in national resource management agencies; Uncoordinated and fragmented training; limited and inadequate training provided; target groups for training tend to be restricted to public sector agencies.	Some Limited awareness of importance of environmental protection, including broad knowledge of major land degradation issues.
	With GEF Alternative	$3.56	Preparation of a broad range of stakeholders for SLM and improved livelihood opportunities. Development of appropriate tools and techniques for SLM in priority ecosystems of global importance. Increased national and local awareness of the ecological, economic and social significance of natural resources.	Improved understanding and appreciation for biodiversity conservation and mitigation of climate change issues, and livelihood opportunities available from such conservation and mitigation. Improved protection of biodiversity , sequestration of soil carbon and reduction of dioxide emissions.
	Incremental	$2.97	*Note: GEF contribution of US$ 2.33 ; GoRJ of $0.43; Beneficiaries of US$ 0.03; and $ 0.18 from NGOs.*	
Comp 4 Project Management, Monitoring & Evaluation, and Information Dissemination	Baseline	$0.15	Limited capacity to manage agricultural and natural resources management projects. Inadequate monitoring and evaluation undertaken at the local and state levels. Water quality database maintained (and *ad hoc* collection of info on fauna and flora), and use of information to guide water quality management and conservation decisions. Local communities are infrequent target groups for awareness campaigns.	
	With GEF Alternative	$2.43	Improved Project and Management skills at local and national levels; monitoring and evaluation system in place and operational, and project results, best practices and lessons learned disseminated.	Increased capacity for effective facilitation of SLM for control of land degradation, biodiversity conservation, and mitigation of climate change issues.
	Incremental	$2.28	*Note: GEF cont. of US$ 1.03; GoRJ of $1.0; Fed. Gov of $0.18; $ 0.07 from NGOs.*	
Totals	**Baseline**	**29.74**		
	With GEF Alternative	**44.33**		
	Incremental	**14.59**	*Note: GEF contribution of US$6.75 milion; GoRJ of $5.85; Fed. Gov of $ 1.20; Beneficiaries of $ 0.52 and $ 0.26 from the NGOs*	

Endnotes

1 Activities financed by the KfW-supported Pro-Mata Atantica program (US$ 6.9 million) are mentioned in this analysis to indicate the full extent of activities underway in the NNWF region; nonetheless, they are not considered as part of financing of the Baseline Scenario.

2 These values may be slightly changed in view of a more detailed estimate to be undertaken between GEF Council Submission and Appraisal Mission.

Annex 3: STAP Roster Technical Review
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

Changes Since Pipeline Inclusion

Since pipeline entry stage OP-15 has become available, which focus fits better the reality of the geographical area where the project will be implemented. Thus, project design has been streamlined to target SLM much more focusedly and activities have switched from being centerd solely on OP-12, to being multifocal, mostly OP-15 but also OP-12.

STAP Review

INTRODUCTION

The Project Developmental Objectives are: to promote the sustainable management of natural resources and to improve the subsistence level of the family based rural communities in the regions North and Northwestern of the State of Rio de Janeiro.

The Project Global Objectives are: (i) to address threats to biodiversity of global importance (ii) enhance carbon sequestration and (iii) reverse land degradation in public and/or fragile lands
In its Annex 9 the project presents Socio-Economic, Environmental & Legal Diagnostic related to the process which through centuries gradually contributed to the deforestation of the Mata Atlantica in the State of Rio de Janeiro; not different from what has taken place in other eastern States; to the point that from 110 million hectares, the Atlantic Forest is now reduced to 7.5% of this original area, around 8.5 million km2. Many activities contributed to this actual level of ecosystem degradation: uncontrolled agriculture and animal husbandry expansion, logging for lumber, charcoal and other products, urban demographic pressure and lack of adequate legal enforcement are amongst the most significant ones. To have a historical view of this process we recommend *Biodiversidade População e Economia – Uma Região de Mata Atlântica (Universidade Federal de Minas Gerais, Julho, 1997).*

STRONG ASPECTS OF THE PROJECT

The objectives are consistent with the Convention of Biological Diversity (CDB), UN Framework Convention on Climate Changes (UNFCCC) and GEF Operational Strategies, particularly its Operational Framework on Sustainable Land Management (OP15), irrespective of the maximum world priority given to conserve the Brazilian Atlantic Forest, recognized as one of the richest biological diversity regions of the planet. The State of Rio de Janeiro is unique for having the highest % of Atlantic Forest with respect to the total area among all country states (841,000 hectares) and simultaneously the most threatened fraction of the remaining primary vegetation, encompassing an area of 15,000 km2 and a population of 1 million inhabitants.

Despite of all ongoing efforts in the State of Rio de Janeiro, from 1990 to 2000, deforestation was particularly aggressive and estimated by the National Institute for Space Research (INPE) to be of the order of 1 million hectares, the highest deforestation rate (16.7%) among nine case studies analyzed, almost 40 % higher than the second ranked. Associated and at the root of this problem is rural poverty. The project mentions that 440,000 people, 27 % of the total rural State population, are poor (twice the level verified in

urban areas of the State) and in the Project areas considered this percentage rate rises to almost 40%. Reduction of poverty can be an important instrument to revert deforestation.
So, it is unquestionable the need for an urgent, **innovative, financially, sustainable action** to address this issue, which is believed by the authors to be approached by this Proposal. The project aims to apply and overall US$ 14.59 million during five years (from 2005); US$ 6.73 million of this total, proposed as a grant from the Global Environment Facility.

The Annex 1 - Project Design Summary - properly presented in a Log Frame format, has its highest hierarchic **Goal**: **Rural poverty and inequality reduced through a selective focus on environmental sustainable development.** The Project Development Objectives would, according to the authors, be accomplished through: **integration, monitor & evaluation of ongoing State actions (extensively described in the Proposal), capacity building, incentives and education. Planning of Sustainable Land Management** is basic for this strategy, translated in the Outputs of the Project.
Although these activities are necessary on a long term basis to revert the deforestation process of the Atlantic Forest we believe and will argument next that **they are not innovative and financially sustainable and as such they are insufficient to revert the deforestation process and reduce poverty in the region, major goal of the project, and as such the strongest element to accomplish the Project Development Objective.**

WEAK ASPECTS OF THE PROJECT

Biological Diversity Conservation is extremely expensive and it is unfortunate to verify that the world is gradually losing the battle that leads to deforestation of the planet. A clear indication of this fact was the effort by the Biological Diversity Convention after 1992 which emphasized the term **sustainable** implying **the need for long term strategies** to revert this scenario. This is demonstrated by the pilot scope of the project which will cover only 100 thousand hectares, 15% of the total 5 watersheds. The NNWF region as mentioned covers an area of 15,000 km2, with a population of 1 million inhabitants. This pilot effort will be applied to 4,000 rural families; 16,000 people: a demonstrative strategy.
The poverty of these families result from the fact that they essentially depend on crops that have no aggregate value: cassava; sweet potato; corn; beans and rice. These are subsistence crops which will never constitute a solid financial means to revert the poverty situation experienced by these families. **Unless there is an alternative to additionally aggregate value to the products coming from the populations residing in Atlantic Forest, deforestation can not be reverted**. **Incentives and education are but are not enough.**

I will mention a couple of examples of products with aggregate value which are gradually reverting the poverty of other rural populations in Brazil, particularly in the Northeast of Brazil, which might be considered by the project. One is honey and sub products. The city of Picos, in the State of Piaui, became a large honey producers exporting extensively. Organic honey is very appealing in Europe and Brazil is benefiting from the fact that insecticide was found in honey coming from other market suppliers. The biological diversity richness of the Atlantic Forest opens a good possibility for this area. Another is mushroom. The Genetic Resources and Biotechnology (CENARGEN) center at EMBRAPA in Brasilia offers freely courses to train small family business entrepreneurs on the Juncao Technology we introduced from China. A third one is a palm popularly known as “pupunha“ which is being introduced strongly in many regions of Brazil particularly in the South of Bahia. It is a good alternative for the heart of palm produced from *Euterpe spp*, which is being aggressively exterminated from the Atlantic Forest by the “palm hunters”.

What however is mostly surprising is that the project recognizes the richness of the Atlantic Forest in terms of Biological Diversity but despite of mentioning repeatedly the need for conservation makes no proposal

for the use of this biological diversity as a major instrument for long term conservation. In fact, one of the weakest aspect of the project is the almost entire absence of science and technology as an instrument to revert the poverty and deforestation. The project ignores the historical scientific competence developed in the State of Rio de Janeiro in the area of natural resources for pharmacological purposes. The national development of these areas in Brazil started with Walter Mors who founded The Natural Products Nucleus decades ago at the Federal University of Rio de Janeiro (UFRJ). Gotlieb and Gilbert, additionally, have written the history of using bio active substances from the Brazilian Biological Diversity. There are companies, such as EXTRACTA, being established at the Technological Park at UFRJ, which are specialized in high throughput screening of bio active substances from plant extracts. Many other groups are competent in these areas at UFRJ. It is essential that the project open the possibility for **a scientific initiative to identify functionally bio active substances from the Atlantic Forest, to attract the pharmaceutical private sector to invest and generate a fund to support biological diversity conservation. This brings innovation to the proposal.** This idea is outlined for the Amazon as a case study in "Sustainable Use Of Biodiversity – Components Of A Model Project For Brazil" (de Castro, L . A .B. in Brazilian Journal of Medical and Biological Research; 29(6) 688-699; 1996), which suggests how rural communities can be involved in this process. This scientific paper offers additional information about other scientific articles on the use of biological diversity. Bio Keepers Rights a strategy to stimulate "*in situ* " conservation of biological diversity is described in de Castro, L. A B. (1997) "Workshop On Transboundary Movement Of Living Organisms Resulting From Modern Biotechnology: Issues And Opportunities For Policy Makers". Aarhus, Denmark, 1996, July 19-20. Proceedings 215 pp. Edited by Kalemani Mulongoy.47-60. Opportunities for the private sector participation on the strategy to be built from the project are needed and are the only assurance of financial sustainability of this investment. The proposal Financial Plan presented excludes the participation of the private sector. So, in addition to the just mentioned Sc&T project above, other possibilities should be considered and exist such as: carbon sequestration and ecotourism, the latter mentioned briefly in the proposal.

These are my comments. The project can be reviewed to include the proposed initiatives.

Luiz Antonio Barreto de Castro

Response to STAP Comments by the Project Team

The project team is grateful to the STAP reviewer fro comments to strengthen the contents and presentation of this proposal. Below is a description of specific actions taken in response to the STAP comments (answers in italic following the original STAP comment).

Project reviewer: Mr. Luiz Antonio Barreto de Castro, PhD, Member of the Brazilian Academy of Sciences.

1. STAP comment: financial sustainability and **innovative aspects** of the project. The reviewer feels that project activities "are not innovative and financially sustainable and as such they are insufficient to revert deforestation process and reduce poverty in the region, major goal of the project, and as such the strongest element to accomplish the project development objective".

Response by the project team: *the project has not been designed to support innovative technologies (neither to be innovative in the source of financing). However, it does intend to bring innovations in the establishment of a participatory strategy to implement existing /adapted/alternative technologies. In other words, one of the major project emphases is the adoption of an organizational structure aiming at the self-management of natural resources by rural communities. It is believed that this self-management*

approach results in addressing environmental issues (such as deforestation and erosion/low productivity) through actions that go beyond the productive and commercial points of view. Rather, by adopting the aforementioned approach, the project intends to broaden the rural communities perception of the environment (of e.g. water, soils and biodiversity richness), hence improving natural resources management (and, indirectly, the commercial and production management in the small holder's rural sector).

In addition, the project itself is an innovative initiative of the State Secretariat of Agriculture (SEAAPI), as it has been designed in close cooperation with the State Secretariat of Environment and two environmental NGOs (CI Brazil and SOS Mata Atlântica), the latter (NGOs) with strong biodiversity conservation work in the Atlantic Forest. In addition, the project introduces global concerns (such as climate change and biodiversity) into the planning and implementation of sustainable rural development activities at micro-watershed level (to address land degradation and poverty), an approach being successfully implemented in the country for more than two decades. With respect to financial sustainability of project activities, see also response to comment 2 below.

2. STAP comment: need for **long term conservation strategies** to address biodiversity issues. The reviewer feels that, "despite of mentioning repeatedly the need for conservation , [the project] makes no proposal for the use of this biological diversity as a major instrument for long term conservation. In addition, also related to this subject, he noted that "one of the weakest aspects of the project is the almost entire absence of science and technology as an instrument to revert poverty and deforestation".

Response by the project team: *This point has been made more explicit in the document (further information has been provided in Section C.1 and Annex 4). The team would like to stress that, particularly two of the project elements (Subcomponent 3.1 on capacity building for community organization and Subcomponent 1.1's activity on the design of a new incentive system) incorporate the aforementioned view of a long term conservation strategy.*

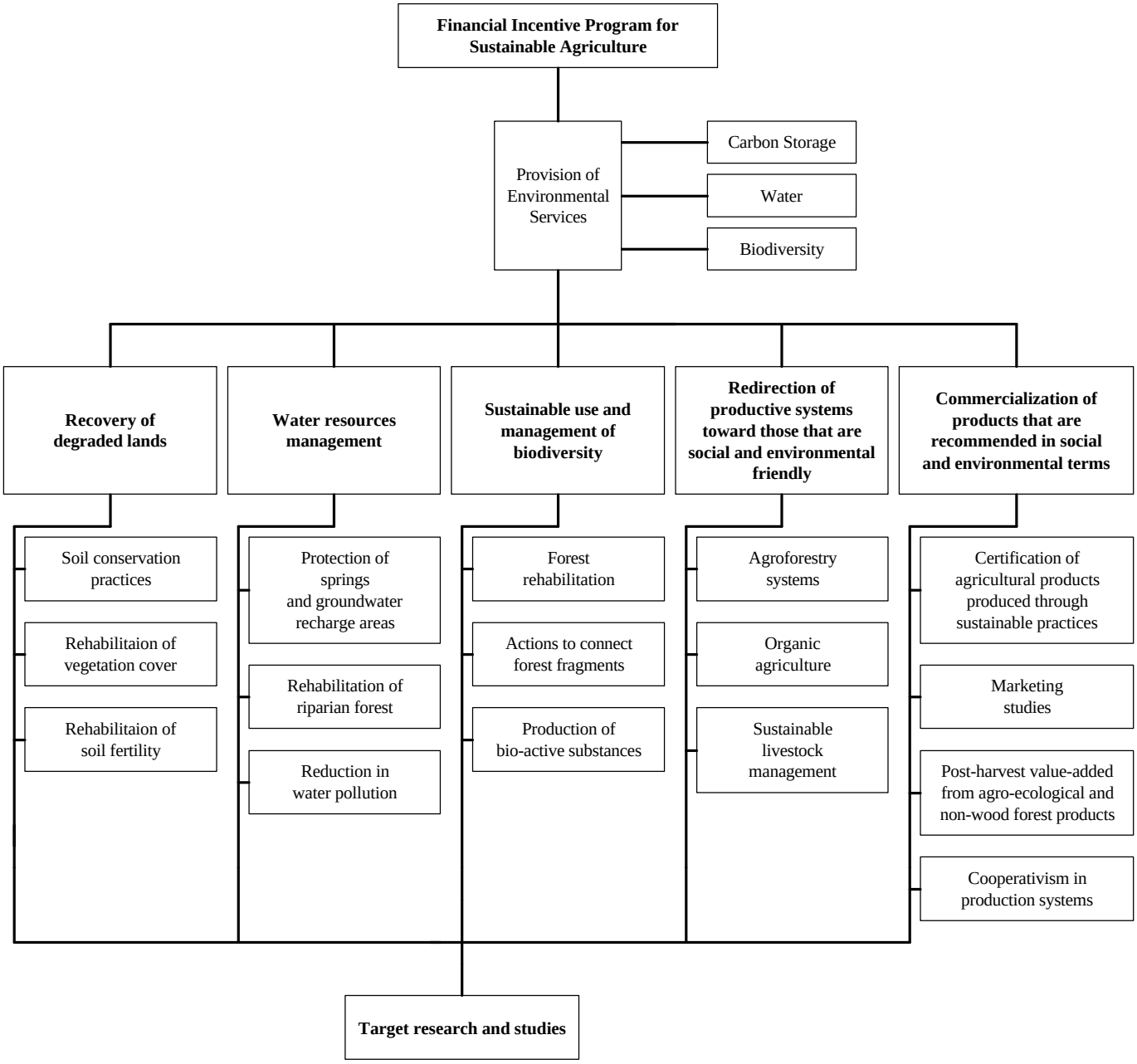
Capacity building for community organization and self-management of NR will be implemented through a methodology developed by the COPPETEC (private institution attached to the Federal University of Rio de Janeiro -UFRJ), who is a project partner and co-financier and will coordinate (and partly execute) the implementation of this activity. This is one of the examples where the project will i) count on scientific and technological (S&T) support (in this case, support to community organization), and ii) will implement a process of community organization which is not linked to the government administration period of fours years.

The new incentive system to be designed under Subcomponent 1.1 would ensure ongoing financial support for sustainable activities which create significant environmental benefits at the local, regional and global level without further GEF involvement (GEF funds would not be used on a recurrent basis, but would help jump start other self-sustaining financial mechanisms). In addition, the incentive system will seek to reduce financial dependence on government resources (and also on government schedules and deadlines).

3. STAP comment: need for **increased post-harvest value-added** from agro-ecological and non-wood forest products. The reviewer commented that "unless there is an alternative to additionally aggregate value to the products coming from populations residing in the Atlantic Forest, deforestation can not be reverted. Incentives and education are [important] but are not enough."

Response by the project team: *Agreed. This point had already been incorporated into project design but*

perhaps it was not clearly presented. It has been addressed and made more explicit in the document (further information has been provided in Section C.1 and Annex 4). Sub-component 2.1 on Incentive System for Sustainable Land Management had already included incremental actions that will include technical assistance, small investment and information needed to increase post-harvest value-added from agro-ecological and non-wood forest products. These actions will complement and improve the current production systems supported by the baseline programs, which are based on the following systems prevalent in the region: (i) conventional systems: sugar cane, coffee, extensive livestock, manioc, corn, beans and rice; (ii) recently introduced systems: fruit production and olericulture/vegetable growing. The incremental activities would support the integration and harmonization of local development and productive support for the planning of the same farms and microwatersheds supported under the baseline programs , aimed at the sustainable management of natural resources. These activities are also aimed at ensuring that practices linked to the principal lines of action are effectively implemented. They are: a) recovery of degraded lands; b) redirection of productive systems towards systems that are social- and environmental-friendly; c) commercialization of products that are recommended in social and environmental terms; d) management of water resources; and e) sustainable use and management of biodiversity. For each pilot microwatershed, these practices would be defined in a participatory way, during the preparation of the Microwatershed (PEM) and Individual/farm level (PID) Plans . For the purposes of budget and concept formulation, the project team has prepared a preliminary proposal of eligible activities for support under Subcomponent 2.1 (see Figure 1- Fluxogram, included in Annex 4, Section 2.1 on Detailed Project Description). The team consider eligible all the examples suggested by the reviewer: for example, incentives to the production of organic honey would fit under organic agriculture type of activity; of "pupunha" palm, under agroforestry systems; of post-harvest value-added from agro-ecological and non-wood forest products, under certification of agricultural products; and the production of bio active substances, under sustainable use and management of biodiversity.



Response to GEF Comments

Project Design: Project components and activities have been fully developed.

Sustainability: The strategies to ensure that the activities to be financed by GEF are sustainable over time are summarized in section F.1. One way to foster financial sustainability is to stimulate the beneficiaries to adopt practices that will improve their incomes through greater productivity of their existing systems, diversification of activities, and expansion of agricultural and non-agricultural income alternatives. The project will support the adoption of environmentally sustainable practices that can provide gains relatively soon in the 50 pilot microcatchments, and in the medium term throughout the whole project area. Evidence

from other WB-supported land management and poverty reduction projects in Southern Brazil suggests that when such gains are achieved by the beneficiaris early in the life of the project, farmers will continue to apply the improved technologies on which gains are based.

Replicability: Among other activities, subcomponent 4.3 would specifically address this issue. It will support the sharing of information both within and outside the project area, involving those beneficiaries, people, communities and institutions, governmental or not, that are interested in the project and who can learn from and make use of the experience, expanding it and making the idea useful to the public throughout the Atlantic Forest region and beyond, particularly to other Latin American countries.

Stakeholder Involvement: Approximately US$ 2,700,000 have been allocated to stakeholder involvement activities, through components C.1, C.3, and D.1.

Monitoring and Evaluation: M&E issues are addressed throughout the document, and the M&E Plan is more speciffically addressed in Annex 1, Annex 4 - Appendices 1 and 3, and in Appendix 10, item 5. The final M&E plan is currently being refined and will be fully developed prior to CEO Endorsement.

Financing Plan: The project Financial Summary is provided in Additional GEF Annex 6, showing the amounts and sources of financing for years 2005 to 2009.

Core Commitments and Linkages: Letters from the various partners area attached.

Council: In order to avoid the possible overlap of activities, the criteria for selection of project areas explicitly excludes areas in which other GEF projects are already active and have identified similar activities for possible support. Exchanges of experiences and collaboration are also being developed and strengthened between the proposed project and other GEF-funded projects (see Section D.2) under preparation or implementation in other Brazilian states, especially those in the states of Santa Catarina and Paraná, where specific project activities identified during project preparation could benefit from the experience of those two projects that are also located in the Atlantic Forest.

Additional GEF Annex 4: Detailed Project Description
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

General Aspects

The main objective of the project is to increase and sustain the production, productivity and farm income of small farmers in the North-Northwestern Fluminense, and help them make sustainable use of natural resources. The project will be implemented over a five-year period in four components.

1. Planning for Sustainable Land Management Actions (SLM)
   Subcomponent 1.1 - Development of Policies, Regional Plans and Regulations
   Subcomponent 1.2 - Local Land Management Planning

2. Incentive System for Sustainable Land Management
   Subcomponent 2.1 - Financial Incentive Program for Sustainable Agriculture
   Subcomponent 2.2 - Support to Adaptive Management Practices

3. Organization and Capacity Building for Sustainable Land Management
   Subcomponent 3.1 - Community Organization
   Subcomponent 3.2 - Training and Environmental Education for Project Executors
   Subcomponent 3.3 - Training and Environmental Education for Project Beneficiaries and other Stakeholders

4. Project Management, Monitoring & Evaluation, and Dissemination
   Subcomponent 4.1 - Project Participatory Management
   Subcomponent 4.2 - Monitoring and Evaluation
   Subcomponent 4.3 - Project Dissemination

The total estimated cost of the project is $14 million, to which the GEF will contribute $6.7 million. The proposed interventions will be in the north and northwest of the State (i.e. the North-Northwestern Fluminense), which has an area of 1,515,260 ha and a population of 1 million inhabitants. There are 24 municipalities within this area (two of which are located in a mountainous region). Five watersheds in the North-Northwestern Fluminense[1] were chosen as the basis for selecting socioeconomic and environmental criteria.

Using the municipalities and watersheds as references, a pilot project was defined to include 50 microcatchments (of the 200 found within the North-Northwestern Fluminense), covering approximately 100,000 ha, and with a contingent of 4000 rural families (16,000 people). Appendix 1 to this Annex describes the criteria adopted by the project for selecting the five watersheds (from which the 50 microcatchments were chosen), and Appendix 2 summarizes proposed project targets.

The project was prepared in such a way that the components (either separately or in synergy) would support interventions that minimize or eliminate the following limitations that presently impede the adoption of the SLM in the State of Rio de Janeiro, as well as in other parts of Brazil:

- *Land degradation* - the search for solutions to land degradation problems, drops in productivity

and losses for farmers, are a project priority. The main project instruments for the implementation of these solutions are training (organizational, managerial and technical), technical assistance and incentives.

- *Lack of information and systemized data* - required by managers, planners and decision-makers, so that considerations regarding ecosystems may be incorporated into farming activities: the project will implement participatory monitoring and dissemination of results, best practices and lessons learned, and furnish material for distribution among project beneficiaries and society in general;

- *Limited impact of policies* - meant to promote the sustainable development of rural communities and support the implementation of SLM, thus establishing a favorable external environment for the behavioral changes required if conventional agricultural practices are to be transformed into more sustainable ones in support of SLM. The project will work towards the preparation of an Incentive Program to support the sustainability of SLM actions, and the preparation of demand-led additional studies required to build knowledge and develop the tools and methodologies to support the main players (public and private) in the formulation of policies to facilitate the adoption of SLM;

- *Insufficient human and institutional capacity* - a project priority will be the adoption and implementation of integrated approaches to the management of natural resources, involving support for training actions, exchange courses and field trips to improve human and institutional capabilities within the project area;

- *Insufficient financial resources and technical assistance* – the project will provide technical assistance, financial incentives and information to reduce risks and facilitate decision-making by financial managers, leading to the adoption of strategies for non-traditional land management as support to SLM;

- *Rural poverty* - as low agricultural production and productivity, associated with soil erosion and the loss of fertility and biodiversity, are determining factors in increasing rural poverty and worsening subsistence conditions, the project will provide various types of support for small farmers - technical assistance, financial incentives and information - required to increase the aggregated value of agricultural products and facilitate certification of origin.

The strategic focus of the proposed project is to develop mechanisms that will complement specific components of ongoing projects. These incremental activities would introduce a wider approach to development, focusing on the sustainability of ecosystems. Due to the fact that a number of investment activities have the potential to create local and global benefits, GEF funding will be limited to support facilitating conditions (information, tests, collective action, access to technical assistance and inputs, monitoring and evaluation) that would empower farmers to make better decisions regarding the management systems capable of reducing biodiversity loss and soil degradation.

The project will encourage the integrated planning and management of specific agro-ecosystems in the pilot microcatchments, giving support to the implementation of this approach in two adjacent eco-regions of major importance - the Atlantic Coastal Forest (*Mata Atlântica*) and the Brazilian Inland Forest (*Mata Atlântica Interior Brasileira*). Within these eco-regions, and based on social and ecological criteria, five watersheds were selected to receive project support (see Appendix 1 and this Annex for a description of the criteria).

The project will be carried out in five watersheds over a five-year period (see Map 1 at the end of this Annex), and cover 24 municipalities in the North Northwestern Fluminense (two of these municipalities are located in a mountainous region).

In the project context the interventions will occur at three levels:

(I) Watershed, including the following activities: development of management strategies for the watersheds; support for implementation of the Serra do Mar biodiversity corridor in the North-Northwestern Fluminense; monitoring, evaluation and dissemination of the project; and coordination with watershed plans and committees;

(ii) Municipal, where the following activities are planned for the 24 municipalities: implementation of training and environmental education programs to improve local capacity and increase public support for the conservation and sustainable use of natural resources, and the preparation of a proposal for the creation of a sustainable agricultural fund (SAF) at State level, which would benefit farmers in all municipalities; and

(iii) Microcatchment: within each of the five watrersheds, 50 microcatchments will be selected as project targets. Activities will include the preparation of Microcatchment Development Plans (PEMs); support for incentives leading to the adoption of best practices in management; applied research to support the adaptation of existing soil management practices and technological solutions to local agro-ecological conditions; and training of farmers and other local people. The use of incentives (technical assistance grants and small investments) will be community demand-driven and a consequence of the PEMs and other individual/thematic-related plans.

The role of the Government of the State of Rio De Janeiro - in a manner consistent with existing rural development projects managed by SEAAPI - will be mainly regulatory (application of selection criteria, operating mechanisms, monitoring and supervision), and administrative (procurement and accounting), and as the liaison among the various parties involved (farmers, agro-industry, local and national governments, NGOs, international assistance) and as the disseminator of results and lessons learned. Project implementation will occur, to a great part, through partnerships with NGOs, farmers' associations, specialized consultants and local government agencies.

The project will capitalize on existing research capacities regarding natural resources and agriculture (State and national institutions for agricultural research - Pesagro and Embrapa, universities and private institutions), training services (State agencies/EMATER, municipalities, NGOs, private sector), local organizations (municipalities, NGOs, farmers and community organizations), and project management experience (financial administration, procurement, accounting). In this manner the project will seek to implement an ecosystem approach to rural development actions at all levels, from decisions made by local communities and individual farmers, to State strategic planning level. Monitoring and evaluation activities will play an important role, as the Government needs to ensure the feasibility and viability of this approach before its implementation statewide.

Detailed Description of Components

1. Planning the Sustainable Management of Natural Resources (US$1.49 million; 10.2% of total project cost)

1.1 Description of Component, Subcomponents and Activities

Objective. The objective of this component is to refine existing sectoral, legal and institutional policies in support of sustainable agriculture and the implementation of Agenda 21, by providing essential knowledge,

instruments and mechanisms with a view to the establishment of a favorable participatory environment for the implementation of responsible practices by farmers with regard to the sustainable management of natural resources.

Expected results. This component will carry out studies and formulate programs, plans and community statutes that will facilitate the sustainable management of natural resources by rural communities. By the end of the second year, together with the design of a incentive program to facilitate the financial sustainability of project actions, five additional studies will be carried out that are necessary to support the implementation of policies to strengthen the sustainable management of natural resources and one other study to refine, review and update SLM strategies proposed for the project watersheds. This component, based on the criteria identified in Annex 1 for the prioritization of the Microcatchments that are to receive project support, will select 50 pilot Microcatchments for the participatory preparation of 50 Microcatchment Development Plans (PEMs) involving State and municipal government specialists, together with private sector specialists, and 4,000 farmers, as well as 2,000 Individual/Farm Level Development Plans (PIDs) and 25 Terms of Community Conduct for the Responsible Use of Natural Resources (ECCs) to regulate the use and sustainable management of natural resources in the pilot microcatchments.

Geographic impact. The studies, together with the programs, tools, and plans, will be applicable throughout the State of Rio de Janeiro, and may be reproduced in other states, principally those that use the microcatchment as a planning and intervention unit in promoting sustainable rural development. They may even be reproduced in other developing countries that wish to develop agriculture in a sustainable manner.

Target public. This component will seek to reach managers and other institutional partners (State Secretariats of the Environment, Planning and Mineral Resources; public defenders; development and research institutes; federal and State, public and private universities; NGOs), State and municipal project executors, and rural communities within the benefited microcatchments.

Subcomponents. The component will be implemented through the following subcomponents and activities:

Subcomponent 1.1 - Development of Policies (Regional Plans and Regulations) (US$0.21million)

This subcomponent will facilitate the establishment of a favorable external environment for changes in attitudes and behaviors required to move from conventional to more sustainable agriculture in support of SLM, and which effectively reduces soil degradation and increases biodiversity and carbon stocks in productive landscapes. Resources would be used to design an incentive program that provides support and sustainability to SLM actions, in greater terms than those established to be implemented in the incentive component involving other sources of funds and actions to be carried out by rural communities and other important managers of natural resources in the pilot microcatchments. The project will also support the preparation of additional studies as required, and necessary to increase knowledge and development of concepts, mechanisms and methodologies to aid public and private, State and municipal managers and executors; rural communities; NGOs; universities; research institutes and other relevant actors involved in the formulation of policies that facilitate the adoption of SLM, review studies and update proposed strategies for the project watersheds. The implementation of this subcomponent, together with Scubomponent 3.1. on Community Organization , would be part of a long term strategy to biodiversity conservation in the project area.

Activities. The activities planned under this component are to: (i) prepare, negotiate and propose an incentive program for the sustainable management of natural resources; (ii) prepare studies to support the

implementation of SLM policies, and (iii) revise and update watershed strategies.

Subcomponent 1.2 - Local Land Management Planning (US$1.28 million)

This subcomponent will support activities leading to the identification and prioritization of project intervention actions, defined through participatory planning and the regulation of farmers' conduct in relation to the sustainable and responsible use and management of natural resources. The proposed manner of implementing these activities is through the democratic participation of local stakeholders and rural communities, motivating their involvement in all phases of project execution, to enhance community representation in the decision-making process.

The participatory methodologies used by the Rio Rural Program will be updated for use in the preparation of microcatchment and property plans, integrating knowledge, information and tools for the definition of suitable approaches to land management, biodiversity conservation and ways to increase carbon stocks in productive landscapes, in the analysis and prioritization of problems and the identification of possible actions by SLM to be implemented in the pilot microcatchments. The formulation of community statutes for the responsible use of natural resources will receive incentives and support in accordance with policies and relevant laws at State and municipal levels, with the aim of guiding farmers' conduct with respect to the sustainable management of natural resources. The statute, in a participatory manner, will establish principles and standards of conduct to be followed for the conservation, management and sustainable use of natural resources, and for use in the resolution of conflicts and for decision-making. Each community within the microcatchments should have its own Statute, in order to increase farmers' level of environmental awareness with regard to local, national and global environmental problems, increase the project's chances of success, and help in monitoring it in terms of current environmental legislation.

Activities. By means of motivation and awareness meetings, public (State/municipal) and private professionals, municipal councils and farmers throughout the microcatchments may be involved in the following activities: selection of the pilot microcatchments, preparation of Microcatchment Development Plans (PEMs) and Individual/Farm Level Development Plans (PIDs) for farm units throughout the pilot microcatchments, formulation and formalization of Term of Community Conduct for the Responsible Use of Natural Resources (ECCs) in the microcatchments benefited by the Project.

2. Incentive system for sustainable land management
(US$7.86 million; 53.8% of total project cost)

2.1 Description of Component, Subcomponents and Activities

Objective. The main objective of this component is to encourage behavioral changes among farmers so they may adopt production systems that consider productive, social and environmental aspects in an integrated manner in terms of sustainable natural resource management – SLM and changes in how rural credit funding is used in terms of the overall planning of properties and microcatchments, with the pilot use of incentives.

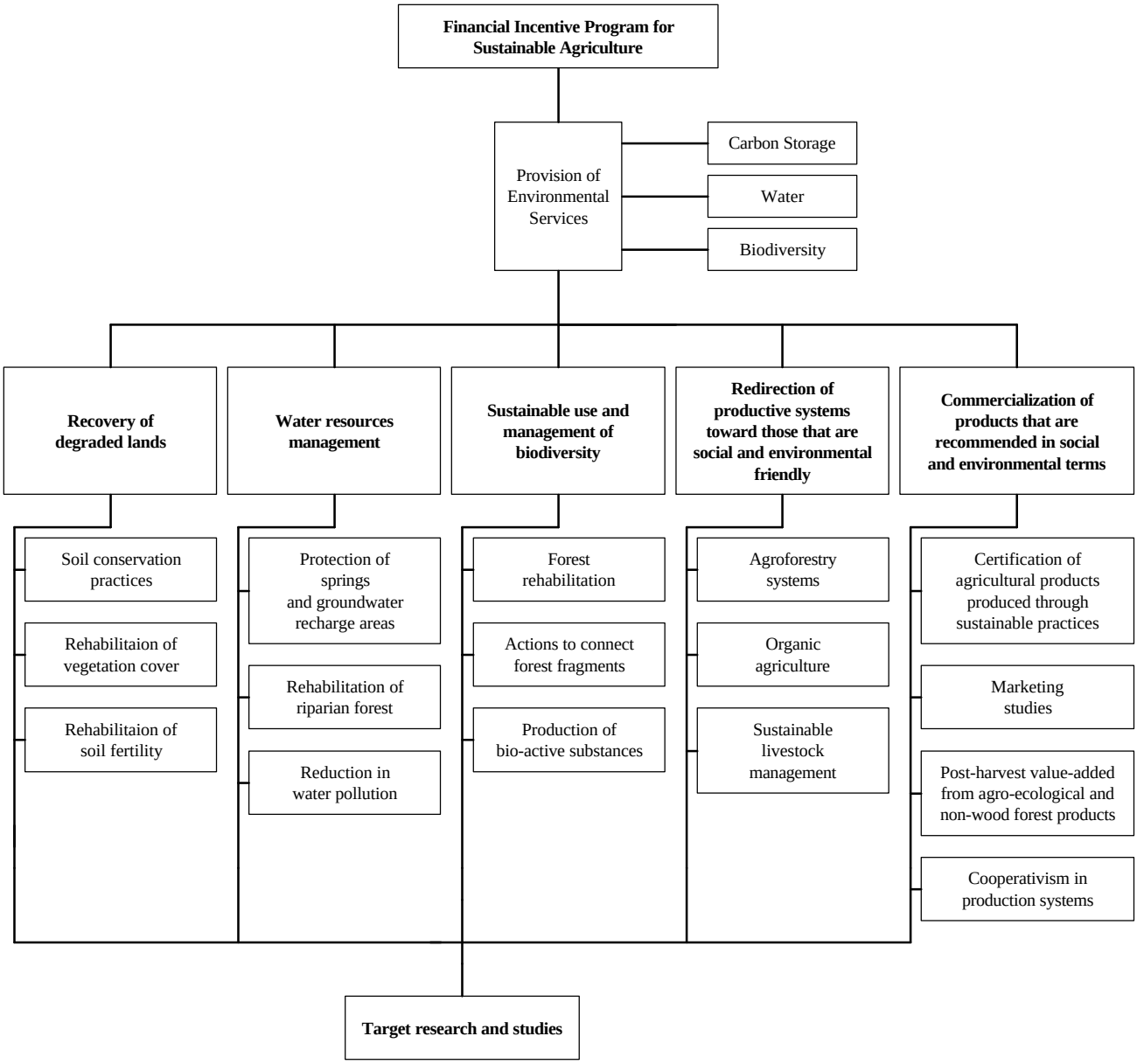
Results expected. The main results for this component are: (i) the offering of incentives to induce changes in behavior and the adoption of SLM in local productive and development practices; and (ii) adaptive research carried out in the pilot microcatchments to eliminate technical and environmental limitations.

Geographic impact. Incentive component actions will be aimed at the five watersheds selected and located

in the North-Northwestern Fluminense, involving 24 municipalities. Within these watersheds/municipalities, 50 pilot microcatchments will be chosen for the preparation of project designs and individual development plans for the existing farm units in which the incentive component will be applied. The PEMs and PIDs will thus act as references for the application of incentives. Work will begin in 15 microcatchments in the first year, with the other 35 to be carried out in the following years.

Target public. The farmers in the first subcomponent will be direct beneficiaries, individually or in groups, of the incentives to be offered by the project and from lines of credit presently used by federal and State governments. In the second subcomponent farmers and groups of farmers within the microcatchments will be direct beneficiaries. Demonstration units will be selected, on which farmers demonstrate leadership qualities, are ready to implement and maintain the proposed studies and research, and will open their land for the dissemination of results and for public visits. All farmers within the project's area of influence will be beneficiaries through field visits and field trips to show the results obtained.

Figure 1: Fluxogram



Subcomponents

This component is divided into two subcomponents. The first subcomponent will encourage farmers (individually or as a group) within the selected microcatchments to implement technologies and production systems that meet project objectives, i.e., to integrate the rural population, and the investments presently being made by the federal and State governments, with the efforts being made to recover degraded lands, conserve biodiversity and reduce the effects of climate change, thereby increasing the number of environmental services in the farm areas covered by the project.

In conclusion, the second subcomponent seeks to develop studies and adapt research, following a demonstration format, on subjects identified during preparation of the Microcatchment Development Plan (PEM) as being existing technological gaps. As such, instead of developing new practices, this action

should concentrate on adjusting and validating SLM practices already in use, in research and other technological institutes, and on farms and in microcatchments.

Subcomponent 2.1 Financial Incentive Program for Sustainable Agriculture (US$7.43 million)

This subcomponent includes the development of two activities:

Activity 1 relates to financial incentives for the implementation of local productive and development incentives for the farms and microcatchments by the project. These funds (investment and maintenance) will be disbursed using existing lines of credit provided by the Federal Government through the PRONAF, and by the *Rio Rural* and *Fruticar* Programs, being carried out by SEAAPI, an of the Government of the State of Rio de Janeiro. These actions will be considered as counterparts in the proposed project.

Activity 2, to be supported by GEF funds, will work towards the integration and harmonization of local development and productive support for the planning of the same farms and microcatchments mentioned in Activity 1 above, aimed at the sustainable management of natural resources. These resources will be used in coordination with those of Activity 1, i.e., as a complement to baseline actions, this activity will provide direct technical and financial support to farmers and groups of farmers encouraging the adoption, on a pilot basis, of SLM practices and activities, integrating and harmonizing the investments funded by existing credit lines offered by PRONAF, *Rio Rural* and *Frutificar*. Through this technical/informational and financial support, it would also provide support needed to increase post-harvest value-added from agro-ecological and non-wood forest products. The baseline actions to be complemented under this activity are based on the following systems prevalent in the region: (i) conventional systems: sugar cane, coffee, extensive livestock, manioc, corn, beans and rice; (ii) recently introduced systems: fruit production and olericulture/vegetable growing.

This activity is also aimed at ensuring that practices linked to the principal lines of action are effectively implemented. These are: a) recovery of degraded lands; b) redirection of productive systems towards systems that are more adequate in social and environmental terms; c) commercialization of products that are recommended in social and environmental terms; d) management of water resources; and e) sustainable use and management of biodiversity. These main lines should be considered when the PEMs and Individual/Farm-level Development Plans (PIDs) are being prepared and especially in the preparation and implementation of Credit Plans for productive and local development (maintenance and investment) when directed towards farmers who will receive incentives from project funds. The Project Operational Manual, to be ready before project negotiations, will include the following items: (i) rules for access to funds from Activity 2 of Subcomponent 2.1: (ii) limits for individual and group support; (iii) selection criteria; (iv) technical strategy; and (v) operational strategy.

Subcomponent 2.2 - Support to Adaptive Management Practices (US$0.43 million)

Under this subcomponent, the project will prepare, in pilot form, participatory studies and adaptive research. The analysis of existing technological gaps, which could be the subject of new studies and research, will take place during the preparation of the Microcatchment Project Designs, and will be subject to analysis by the Technical Coordination Unit of the Project's Executive Secretariat. As such, this action should be limited to the adjustment and validation of SLM practices that involve the five main lines of action listed in the previous subcomponent and whose techniques are already used by research institutes. The studies and research will be carried out in farming areas, where the farmers themselves will demonstrate the work to the other project beneficiaries. The practices for this are listed in the training component. Farmers selected to act as demonstrators will be identified during the microcatchment project

design preparation phase; this selection will take into account their situation within the community and openness to new technologies.

The Project Operational Manual will include the following items: (i) rules to make the subcomponent operational; (ii) eligibility criteria; (iii) limits (average of US$20,000 per study and/or research work); (iv) technical strategy; and (v) operational strategy.

3. Organization and capacity building for sustainable land management
(US$2.97 million; 20.3% of total project cost)

3.1 Description of Component, Subcomponents and Activities

Objective. The objective of this component is to improve local capacity to manage natural resources in a sustainable manner, especially in agricultural areas (agro-ecosystems), by means of educational and training activities and community organization. Component actions will promote the creation and strengthening of rural organizations to manage natural resources, in addition to production and local development activities supported by Rio Rural and PRONAF. The work will strengthen existing social capital as a basis for on-farm socio-environmental work, and will promote environmental discussion and the management of collective interests and solutions, to achieve the integrated management of natural resources.

Expected results. The main result of this component's actions will be an increased capacity in terms of the sustainable management of natural resources, involving 16,000 people (or 4000 rural families) residing in the 50 microcatchments benefited by the project, as well as 270 State and municipal technical staff involved in project implementation. Specific results include: (i) improved community organization capacity in terms of managing natural resources; (ii) improved capacity to manage natural resources through educational actions, training and increased environmental awareness.

Geographic impact. The actions of this component will occur on two levels:

- Municipal: 24 municipalities within the project area will benefit through environmental education efforts; and
- Microcatchment: technical staff, rural families and community organizations from the 50 pilot microcatchments will benefit from community organization efforts, management training, and in preparation for the adoption of social and environmental actions, on-farm, and in the microcatchments.

Target public. Direct beneficiaries of this component will be small farmers, young people and other residents of the 50 pilot microcatchments, totaling approximately 16,000 people (or 4000 families). Specifically, training and environmental education will benefit: (i) the aforementioned 4000 families; (ii) the 270 technical staff responsible for project implementation; and (iii) teachers and students from 50 municipal or State schools located in the microcatchments (or surrounding areas). Environmental education activities will reach society in general, i.e., residents of both rural and urban areas of the 24 municipalities within the project area. Organizational capacity activities will benefit existing groups and community organizations in the 50 pilot microcatchments, as well as NGOs operating in these microcatchments. The events to disseminate the results and best practices in sustainable management will reach farmers throughout the project area (i.e. 24 municipalities).

Subcomponents. The component will be implemented through the following subcomponents and activities:

Subcomponent 3.1 - Community Organization (US$0.64 million)

Activities. The following activities will be implemented under this subcomponent: (i) carrying out a diagnostic analysis of community organizations and natural resources management, and formulating an operational plan for the 15 pilot microcatchments (and training technical staff in the methodology of carrying out a diagnostic analysis); (ii) monitoring the diagnostics carried out by technical staff in the 35 remaining microcatchments and following up on the actions to implement community self-management efforts in the 50 microcatchments; and (iii) implementing a communications/information system for community self-management (satellite dish, Internet provider, subscription, equipment, etc.).

Subcomponent 3.2 - Training of Project Executors (US$0.49 million)

Activities. By means of training and environmental awareness efforts this subcomponent will implement the following activities: (i) carrying out management capacity training programs with 270 project technical executors; (ii) carrying out sustainable development capacity training programs with 180 technical executors; and (iii) carrying out specific capacity training to support the implementation of socio-environmental actions, on-farm, and in microcatchments.

Subcomponent 3.3 - Training and Environmental Education for Project Beneficiaries and other Stakeholders (US$1.84 million)

Activities. This subcomponent will support the following activities: (i) meetings for motivation and involvement in the microcatchments; (ii) carrying out specific capacity training to support the implementation of socio-environmental actions, on-farm, and in microcatchments; (iii) events for promoters to share their experiences; and (iv) promoting educational projects in schools.

4. Project management, monitoring & evaluation, and dissemination (US$2.28 million; 15.6% of total project cost)

4.1 Description of Component, Subcomponents and Activities

Objective. The objective of this component is to manage, monitor and disseminate the project in an efficient and coordinated manner with other national, State and local actions and programs.

Results expected. The principal result of the actions of this component is an increased capacity of the State to manage, monitor and evaluate projects and programs in the areas of agriculture and natural resources. Specific results include: (i) the implementation and functioning of the project's participatory management structure; (ii) improved project management capacity, leading to better performance by the State in managing natural resources; (iv) improved project monitoring and evaluation capacities, incorporating global aspects in monitoring programs: (v) dissemination of project information, providing the basis for repeating project lessons and transferring experience at local, State, national and international levels.

Geographic impact. This component's actions in management, project monitoring and evaluation will cover the 24 municipalities within the project area. Efforts to disseminate information resulting from the project will be carried out at community, microcatchment, municipal and State levels as well as nationally and internationally.

Target public. The direct beneficiaries of this component will be: (i) State workers who will improve their knowledge of project management and evaluation, (ii) farmers, young rural residents, and rural and urban residents of the 24 municipalities within the project area (approximately 1 million people), who will have access to information disseminated by the project; and (iii) society in general and the scientific community at national and international levels.

Subcomponents. The component will be implemented by means of three subcomponents. The *Project Management* subcomponent will set up and operate a project management unit at State level (Executive Secretariat within SMH/SEAAPI), and in each of the project's administrative regions (North and Northwest technical/operational management units, respectively). EMATER regional agencies will act as executive branches together with the project actors, in participatory planning, training and technical assistance efforts at local and microcatchment levels. For details on the management and coordination aspects of the project, see **Annex 7** on Project Management and Institutional Arrangements. The evaluation and participatory monitoring of the project will be supported by the *Supervision, Monitoring and Evaluation* subcomponent (for details, see **Appendixes 2** and **3** to this Annex). The *Project Dissemination* subcomponent will support support the design and implementation of the project information dissemination strategy, providing the basis for knowledge transfer and, subsequently, increasing the potential for repeating project lessons and transferring experience at state, national and international levels. It would include the sharing of information both within and outside the project, involving those beneficiaries, people, communities and institutions, governmental or not, who are interested in the project and who can learn from and make use of the experience, expanding it and making the idea useful to the public throughout the Atlantic Forest region and beyond, particularly to other Latin American countries.

Subcomponent 4.1 - Project Management (US$1.22 million)
Activities. The following activities will be implemented under this subcomponent: (i) consolidating and strengthening the project management team; (ii) strengthening the project management unit in SEAAPI/SMH with minimumn equipment and furniture; and (iii) carrying out the project's coordination, administrative and physical/financial management. (see details on project management in **Annex 7**).

Subcomponent 4.2 - Monitoring and Evaluation (US$0.67 million)

Activities. Using technical assistance and equipment, this subcomponent will implement the following activities: (i) designing and implementing/maintaining the project's physical/financial supervision information system; (ii) testing and implementing the monitoring system for project activities, results and impacts, and preparing supervision and monitoring reports; and (iii) carrying out ex-ante, mid-term and ex-post project reviews. For details on the M&E aspects of the project, see **Appendixes 2** and **3** to this Annex.

Subcomponent 4.3- Project Dissemination (US$0.39 million)

This sub-component support the design and implementation of the project information dissemination strategy, providing the basis for knowledge transfer and, subsequently, increasing the potential for repeating project lessons and transferring experience at state, national and international levels. It will support the sharing of information both within and outside the project area, involving those beneficiaries, people, communities and institutions, governmental or not, who are interested in the project and who can learn from and make use of the experience, expanding it and making the idea useful to the public throughout the Atlantic Forest region and beyond, particularly to other Latin American countries.

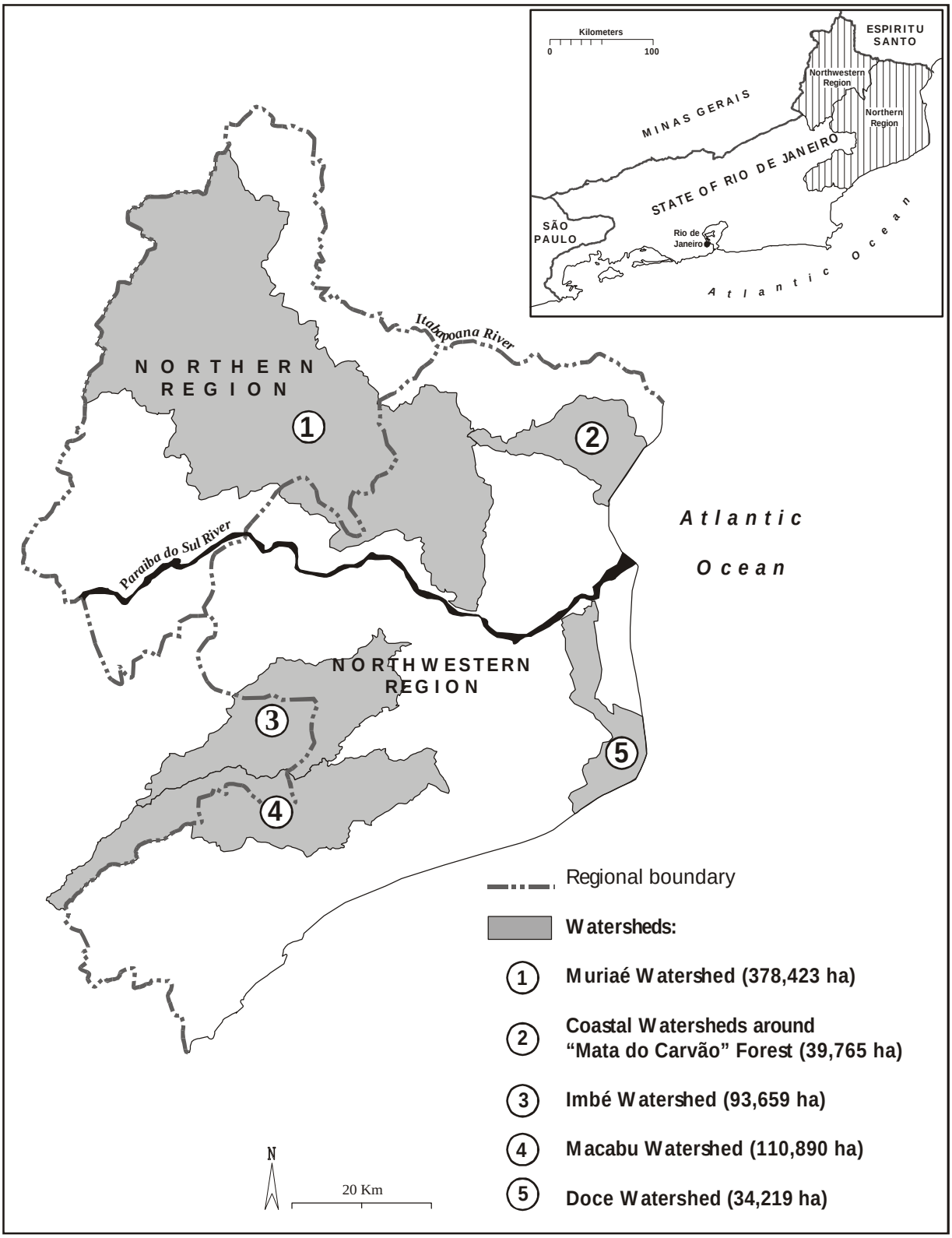
Activities. Specifically, this subcomponent will support the following activities: (i) development of a web site for the project (to be designed during the first six months of the project); (ii) creation and dissemination of the Project's Newsletter; (iii) production and provision of dissemination material to project executors and beneficiaries, and to society in general; and (iv) disseminating results, best practices and lessons learned, at local, State and international levels, through media campaigns, workshops, conferences, publications, homepage. In addition to day-to day project information, all evaluation studies and other relevant project reports will be made available through the project website. This subcomponent complements Subcomponent 3.3 (Training of Beneficiaries) which will promote events to share experiences among farmers.

Project Schedule and Targets

The table in **Appendix 2** to this Annex presents performance targets and indicators for each of the activities mentioned above.

Annex 4, Appendix 1

Area of Coverage, Targeting Population and Selection Criteria for Project Areas



Area of coverage and intervention - to define the area of coverage and intervention of the project the following steps were, and will continue to be, followed:

1. The North and Northwest Fluminense region was chosen as the project area (1,515,260 ha) due to the fact that degradation of natural resources and loss of biodiversity were most critical in this region in terms of their impact on the returns from smallholder farming;

2. Division of the region in watersheds - the region was divided into the following eight watersheds (see Map above): a) Imbé watershed (within the Lagoa Feia basin); b) Doce/Quitingute watershed (within the Paraíba do Sul and Lagoa Feia basin complex); c) Macabu River watershed (within the Lagoa basin); d) São Pedro River watershed (Macaé Watershed); e) Muriaé River watershed (Paraíba do Sul Watershed); f) Guaxindiba River and its watersheds; g) Pomba watershed (Paraíba do Sul Watershed); h) Rio Grande/Dois Rios watershed (Paraíba do Sul Watershed).

3. Selection of watersheds - The following criteria were used: (a) proportion of local population in relation to total; (b) proportion of farms with fewer than four modules in relation to total number of rural establishments; (c) proportion of low-income/nearly no-income small farms in relation to total number of farms; (d) areas needing protection and recuperation; (e) presence of conservation units and/or hotspots; (f) susceptibility to erosion; (g) land use; and (h) soil cover. Five watersheds were selected, in order of priority, for work to begin on:

Muriaé River watershed (Paraíba do Sul Watershed) - 378,423 ha;
Imbé River watershed (Lagoa Feia Basin) - 93,659 ha;
Doce/Quitingute River watershed (Paraíba do Sul and Lagoa Feia basin complex) - 34,219 ha
Coastal watersheds around the Mata do Carvão (or Guaxindiba River and its watersheds) - 39,765 ha
Macabu River watershed (Lagoa Feia Basin) - 110,890 ha

4. The project area is shared by 22 municipalities, with two more in the mountainous region because the rivers that feed the watersheds are born in these two municipalities. Thus totaling 24 municipalities with a population of 1 million inhabitants, 83% of whom live in urban areas and 17% in rural areas.

5. Using the area of influence of the municipalities and watersheds to define project coverage, 50 microcatchments would be selected in PY1 to form a pilot project covering an area of about 100,000 ha (15% of the total for the 5 watersheds), with 4000 rural families (16,000 people). There are approximately 200 microcatchments within the project area.

6. The selection of the 50 microcatchments to comprise the pilot project will be carried out in two phases: the first will define the number of microcatchments per municipality, and the second will select the microcatchments within the municipalities.

7. Definition of how many microcatchments will be worked per municipality - to which effect the following were considered (a): each of the 24 municipalities should have at least one microcatchment to be worked; (b) two microcatchments will be worked in 18 municipalities belonging to the five watersheds; and (c) the eight remaining will be located in the municipalities with the highest farm densities.

8. Selection of microcatchments within the municipality - the following criteria will be taken into consideration:

a**)** **Biodiversity criterion**

One point for those microcatchments with no remaining native vegetation

Two points for those microcatchments with at least one area of native vegetation

Three points for those microcatchments that contain unbroken native vegetation area with conservation units.

b) Presence of springs or other surface and ground water sources critical for the protection of the watershed

One point for those microcatchments where there are no springs (or where no one depends on local water supply) or do not include groundwater recharge areas;

Two points for those microcatchments where there is at least one spring (or with at least one community depending on local water supply) or include one groundwater recharge area;

Three points for those microcatchments where there is more than one spring (or that supply water to the urban population) or include a significant groundwater recharge area.

c) Community organization criterion

One point for those microcatchments with at least one community organization

Two points for those microcatchments with representative on the municipal council for sustainable rural development (CMDR), or for water resources management.

Three points for those microcatchments with representative on the CMDR and minimum experience (presenting reasonable success) in the management of projects or community physical structures/buildings.

d) Farm concentration criterion

One point for those microcatchments with fewer than 40 smallholder families

Two points for those microcatchments with between 40 and 70 smallholder families

Three points for those microcatchments with more than 70 smallholder families

Annex 4, Appendix 2

Activities	Unit	Indicator					Total Target
		PY1	PY2	PY3	PY4	PY5	
Subcomponent 1.1							
- Prepare, negotiate and propose an Incentives Program for Sustainable Management of Natural Resources	No. Reports	1					1
- Prepare studies to support implementation of SLM policies	No. Reports	1	2	2			5
- Prepare the review and updating of watershed strategies	No. Reports			1			1
Subcomponent 1.2.							
- Select pilot microcatchments	No. Micro-catchments	15	35				50
- Prepare Basic Diagnostic (BD) – preparation of new BD or updating of 24 existing DRPs - Microcatchment Project Designs (PEMs) in pilot microcatchments	No. MPDs	15	35				50
- Prepare Individual Development Plans (IDPs) on farms within pilot microcatchments	No. IDPs	500	700	800			2000
- Formulate and formalize Community Conduct Statutes (ECCs) for responsible use and management of natural resources in pilot microcatchments.	No. CCSs			10	15		25
Subcomponent 2.1							
Activity 1: - preparation and implementation of PRONAF projects	No. Farms	100	300	300	300		1.000
- preparation and implementation of FRUTIFICAR and Rio Rural projects	No. Farms	20	60	60	60		200
Activity 2: provision of complementary incentives for the adoption of SLM in pilot microcatchments	No. Farms/ Groups	100/ 15	100/ 15	100/ 15	100/ 15		1.000/ 150
Subcomponent 2.2							
- Studies and research	No. Studies and Research Works	5	5	10			20
Subcomponent 3.1							
- Carry out diagnostic of community organizations and natural resource management and prepare operational plans for 50 microcatchments	Nº Plans	15	15	20			50

- Monitor the diagnostics prepared by executors in 35 remaining microcatchments and supervise implementation of community self-management efforts in the 50 microcatchments	Nº Plans		50	50			50
- Implement a communications/information system for community self-management (satellite dishes, provider, subscription, equipment, etc.)	Nº Micro-catchments	5	10	10			25
Subcomponent 3.2.							
- Carry out management training programs for project technical executors (9 courses)	Nº Staff	90	60	60	60	-	270
- Management training of SMH/SEP:							
- Field trips/inter-state ($1200 each)	Nº field trips	8	8	8	8	8	40
- Field trips/international ($3200 each)	Nº field trips		1	1	1		3
- Courses ($3000 each)	Nº courses	1	2	2			5
- Carry out sustainable development training programs for 180 technical executors	Nº courses	2	1	1	1	1	6
- Carry out specific training programs in support of socio-environmental actions, on-farm, and in microcatchments	Nº courses	10	10	10	10	10	50
Subcomponent 3.3							
- Meetings in microcatchments for motivation and involvement	Nº Meetings	250	250	250	250	250	1250
- Carry out specific training programs in support of socio-environmental actions, on-farm, and in microcatchments	Nº Courses	30	100	100	100	100	430
- Promote events to share experiences	Nº Events	10	10	10	5	-	35
- Promote environmental education projects in schools	Nº Schools	-	20	15	15		50
Subcomponent 4.1							
- Consolidate and strengthen project management team	Nº Staff Hired	1	1	1	1	1	1 (for 2 years)
	Nº Admin. Assist. Hired.	2	2	2	2	2	2 (for 2 years)
	Nº Staff Allocated	8	8	8	8	8	8 (for 5 years)
	PC + printer						

- Strengthen management unit at SEAAPI/SMH with equipment, vehicles and furniture	Vehicle	4					4
	Audiovisual Kit	3	1				4
	Field equip. (Camera, camcorder, GPS, binoculars)	x	x				varies: 1 to 4 unit.per team.+ 20 GPS
	PalmPilot						
	Software	1					1
	Movie Kit	4					4
		10					10
Subcomponent 4.2.							
- Design and implement/maintain physical/ financial supervision information system for project;	Software	1	1	1	1	1	1 system imple-mented
- Test and implement monitoring system for activities/results/project impacts, and prepare monitoring and evaluation reports;	Monitoring Network	1	1	1	1	1	1 n/work imple-mented
- Carry out ex-ante, mid-term and ex-post project evaluations	Evaluation	1		1		1	3
Subcomponent 4.3							
- Provide material for executors to disseminate among project beneficiaries and society in general;	Brochures	250	250	250	250	250	1250
	Bulletins/ Printouts	30	100	100	100	100	430
	Dissemi-nation kits (posters, brochures, etc.)	x	x	x	x	x	various
- Disseminate results, best practices and lessons learned at local, State and international levels:	Campaign	1	1	1	1	1	5
-Local and State news media	Homepage	1					1
-Homepage	Nº Events			10	10	10	30
-Dissemination of best practices	Nº Events				1	3	4
-Dissemination of lessons learned							

Annex 4, Appendix 3

Monitoring and Evaluation Aspects of the Project

The following paragraphs describe the approach adopted by the project team, based on the project logical framework and on the discussions among project partners and meetings with rural communities held during the social assessment and diagnostic studies. It also took in consideration the lessons obtained from WB-supported Natural Resources and Poverty reduction projects in South-Southeast Brazil, which adopt the microcatchment as a unit for planning and monitoring.

The project's M&E system would use participatory mechanisms to enable stakeholders to share their feedback.
The PMU would be responsible for coordinating monitoring (see Annex 7 on Project Management), with EMATER and other co-executing agencies providing support and technical assistance as necessary. Key groups of stakeholders, particularly those small farmers living in the pilot microwatersheds, would also participate actively in data collection and other sampling activities to monitor social and environmental aspects of the project.

In addition to support to monitoring and evaluation of results and impacts, the project would also include the installation and implementation of a Management Information System - MIS. The MIS would allow tracking the physical and financial execution of the project. A draft proposal of the system will be discussed and agreed at Appraisal; and presentation to the Bank of the revised TORs for the design of an MIS software will has been established as a condition of GrantNegotiations, while condition of Grant Effectiveness would be the need to initiate implementation of the system. To facilitate interface between the project, service providers and beneficiaries, the project would establish a web-based information system. In addition, given the decentralized nature of the project, and to ensure timely budgetary and expenditure information to the Bank and other stakeholders, the MIS would incorporate internal controls, records of project assets, procurement, accounting, auditing and means to reconcile the project's Special Account that would conform with the Bank's Financial Accounting, Reporting and Auditing Handbook (1995), the Bank's Operation Policy and Procedures 10.02 (July 1996) and revised financial management standards as in OP/BP 10.02 (August 1997). Moreover, special attention would be given to design a performance-oriented and user friendly MIS. It would also include the following elements:

- Reporting from project staff (particularly extensionists) who would monitor implementation of productive, social and environmental improvements;
- Reports from beneficiaries, in particular communities and rural producer groups from benefited (see below how beneficiaries would also report on progress on the project and on the Microcatchment Development Plan -PEM);
- Recording of all planned and executed activities (physical, financial and procurement information), in accordance with the directives in the Operational Manual at all levels (state, regional, municipal and microcatchment);
- Financial Management Reports (FMR) reports from periodic audits and other relevant PMRs; and
- Partner and independent institutions that will undertake project impact evaluations.

Appendix 2 to this Annex provides the basis for establishing the parameters (inputs and outputs) needed to carry out **project monitoring**. Monitoring results would be inserted into the MIS, thus allowing a real-time tracking of microcatchment plans and related sub-projects being implemented on the ground.

Given that the component 2 constitutes the bulk of project expenditures (US$7.86 million), with GEF contribution of US$ 1.78 million, the monitoring of this component will be more detailed and intense. Based on output indicators listed in Appendix 2 of this Annex, the monitoring activities would track a number of features related to the implementation of sub-projects financed under this component, such as the number and type of sub-projects (since the process is demand-driven) and which types are in more demand; type of beneficiary benefited under the fund (i.e., individual or group, small farmer, community-based organization, etc); etc. Progress reports specific for the incentive program would be available for the various features which may be deemed necessary, e.g. by geographical distribution (by municipality, microcatchment), land surface (of riparian forest replanted, conservation practices adopted, improved soil management practices), etc.

In addition to physical/project-based and financial monitoring and related MIS, the M&E sub-component would also support the continuous monitoring of socioeconomic and environmental aspects in **pilot monitoring microcatchments**. It would include monitoring of: (i) water quality and quantity (around 10-15 parameters to be measured systematically in 5 pilot monitoring microcatchments located in each of the five project-supported watersheds and ecosystems); (ii) other environment-related indicators: vegetation cover, pesticide use reduction, soil-water content, soil biodiversity, adoption of agriculture conservation practices by farmers; (iii) socioeconomic aspects (see detailed list of social indicators in **Annex 9**): effective participation and empowerment of communities in project-related decision-making process, farmers perception of environmental issues, improvement in family living conditions; and (iv) additional qualitative and quantitative parameters to compute the economic value of *external impacts* of SLM (both national and global impacts), such as the value of increased CO2 stored, reduced sedimentation, reduced threats to biodiversity, reduced pesticide runoff and other environmental impacts on downstream users.

Moreover, M&E would involve two levels: internal and external. At the first level, rural communities and producers organizations within each of the 50 microcatchments to be selected for project support will assess the implementation of project activities at the microcatchment level, and evaluate the achievement of objectives, environmental impacts (on water and soil quality, presence of wildlife, etc.), and how they affect their process of organization. This activity will be carried out at least once a year and could be facilitated by NGOs with the participation of technical staff of state agencies.

At the second level, progress reports (or PMRs) will be prepared at least twice a year as an input for the project manager's supervision. This external monitoring and evaluation will take into consideration inputs from the internal evaluation of the communities. The evaluation methodology will use both quantitative and qualitative tools and techniques. Among the topics to be included are: determination of benefits provided by the project in terms of quantity and quality, effect of the project on community organizations, the level of awareness over sustainable land management (and global environmental issues) and adoption of new technologies.

Specific input, output and impact indicators will be reviewed by the benefited communities upon selection of microcatchmetns in PY1. However, a number of social development indicators have been identified during project preparation (see **Annex 10** on Social Assessment). They are the basis for measuring the broader indicators of social impact of the project specified in the logframe (**Annex 1).**

Project impact evaluations would complement the above-mentioned monitoring activities (which would allow the measurement of actual performance with expected performance) by measuring the effectiveness of actual performance (i.e. impact), hence providing feedback and helping improve the effectiveness of the project. Most of the indicators for impact evaluation are laid out in Annex 1, under Sector Indicators.

These indicators imply a series of quantitative and qualitative parameters that would be applied to determine how closely the project has attained them.

This activity would include ex-ante (year 1), mid-term (year 3) and ex-post (year 5) evaluations. The structure of these evaluations will be based on parameters and indicators as defined in the project objectives (Annex 1), focusing on socioeconomic, environmental and policy aspects. The ***ex-ante evaluation*** will be based on information obtained in the social and environmental studies carried out during preparation (see Annex 9) and other specific surveys TBD during the first year of the project. Baseline information obtained during the early stage of project implementation (ex-ante evaluation) would be compared with progress at a mid-term review and at completion. The ***mid-term evaluation*** will be based on a two-stage field survey of project watersheds and microcatchments. It will be the first detailed review of progress and a prognosis of the likely effects of the project, and it is intended to identify project design problems and timely solutions. The ***ex-post evaluation*** will also be based on M&E results and specific surveys (TBD), and it will include a final assessment of the project's effects and their potential sustainability. The mid-term and ex-post evaluations will also consider the results from monitoring of pilot monitoring microcatchments to assess more specific socioeconomic and environmental impacts, including the aforementioned *external impacts* of SLM (both national and global impacts), including off-farm public goods benefits, so as to design appropriate compensation mechanisms.

Bank supervision missions would review project implementation at least every six months on the basis of approved annual operating plans and semi-annual progress reports. The content of the progress reports will be agreed at Appraisal and would build on the experiences of the Bank-supported microcatchment projects in neighboring states and GEF projects in Brazil.

Endnote

1 The watersheds include: (i) the Muriaé River watershed, with 378,423 ha (part of the Paraíba do Sul Watershed); (ii) the Imbé River watershed, with 93,659 ha (part of the Lagoa Feia basin); (iii) the Doce/Quitingute River watershed, with 34,219 ha (part of the Paraíba do Sul River and Lagoa Feia basin) ; (iv) coastal basins around the Mata do Carvão, with an area of 37,765 ha; and (v) Mucabu River watershed (Lagoa Feia basin), with an area of 110,890 ha.

Additional GEF Annex 5: Estimated Project Costs
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

Project Cost By Component/Subcomponent	(US$ '000)			%	% Total
	Local	Foreign	Total	Foreign Exchange	Base Costs
A. Planning for SLM Actions					
1. Development of Policies, Regional Plans and Regulations	207.6	-	207.6	-	1
2. Local Land Management Planning	1,242.9	6.5	1,249.3	1	9
Subtotal Planning for SLM Actions	**1,450.4**	**6.5**	**1,456.9**	**-**	**10**
B. Incentive System for SLM					
1. Financial Incentive Program for Sustainable Agriculture	7,250.8	-	7,250.8	-	51
2. Support to Adaptive Management Practices	400.0	-	400.0	-	3
Subtotal Incentive System for SLM	**7,650.8**	**-**	**7,650.8**	**-**	**54**
C. Organization and Capacity Building for SLM					
1. Community Organization	620.0	3.8	623.7	1	4
2. Training of Project Executers	479.6	-	479.6	-	3
3. Training and Environmental Education of Beneficiaries	1,788.0	-	1,788.0	-	13
Subtotal Organization and Capacity Building for SLM	**2,887.6**	**3.8**	**2,891.3**	**-**	**20**
D. Project Management, M & E					
1. Participatory Management of the Project	1,163.2	15.4	1,178.6	1	8
2. Monitoring and Evaluation	620.0	2.6	622.6	-	4
3. Project Dissemination	367.2	-	367.2	-	3
Subtotal Project Management, M & E	**2,150.5**	**17.9**	**2,168.4**	**1**	**15**
Total BASELINE COSTS	14,139.3	28.1	14,167.4	-	100
Physical Contingencies	88.2	1.4	89.6	2	1
Price Contingencies	333.2	-	333.2	-	2
Total PROJECT COSTS	**14,560.6**	**29.5**	**14,590.2**	**-**	**103**

Project Cost by Category	Total Amount (US$ '000)	%	For. Exch.	Local (Excl. Taxes)	Duties & Taxes
			(US$ '000)		
I. Investment Costs					
A. Investment categories					
1. Goods					
a. Vehicles	69.4	0.5%	13.8	45.2	10.4
b. Equipment	159.5	1.1%	15.8	119.8	23.9
Subtotal Goods	**228.9**	**1.6%**	**29.5**	**165.0**	**34.3**
2. Consulting Services and Studies	1,533.9	10.5%	-	1,288.5	245.4
3. Subprojects (Incentive Program)	7,385.0	50.6%	-	7,385.0	-
4. Training and Workshops	2,601.9	17.8%	-	2,601.9	-
5. Technical Assistance	1,660.3	11.4%	-	1,394.7	265.6
Total Investment Costs	**13,410.0**	**91.9%**	**29.5**	**12,835.0**	**545.4**
II. Recurrent Costs					

A. Recurrent costs categories					
1. Materials	156.2	1.1%	-	139.1	17.2
2. Contracted Services	195.7	1.3%	-	174.2	21.5
3. Salaries	519.3	3.6%	-	389.5	129.8
4. Subsistence Allowances	205.1	1.4%	-	182.5	22.6
5. O & M	103.8	0.7%	-	92.4	11.4
Total Recurrent Costs	**1,180.2**	**8.1%**	**-**	**977.7**	**202.5**
Total	**14,590.2**	**100.0%**	**29.5**	**13,812.7**	**747.9**

Additional GEF Annex 6: Financial Summary
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

	Years Ending December 31					
	2005	**2006**	**2007**	**2008**	**2009**	**Total**
Total PROJECT COSTS	1,913.4	4,197.6	4,145.7	3,469.1	864.4	14,590.2
Total Investment	1,725.3	3,945.6	3,901.5	3,222.4	615.2	13,410.0
Total Recurrent Costs	188.1	252.0	244.2	246.7	249.2	1,180.2
Financing Sources						
Governo do Rio de Janeiro	420.3	1,713.7	1,715.7	1,564.1	278.5	5,692.2
Governo Federal	75.4	370.6	374.4	347.1	36.7	1,204.2
GEF	1,279.2	1,855.5	1,797.4	1,376.1	525.1	6,833.4
Beneficiários	63.7	180.6	180.2	166.2	8.4	599.1
ONG's	74.8	77.2	78.0	15.5	15.7	261.2
% of total project costs						
Governo do Rio de Janeiro	22.0%	40.8%	41.4%	45.1%	32.2%	39.0%
Governo Federal	3.9%	8.8%	9.0%	10.0%	4.2%	8.3%
GEF	66.9%	44.2%	43.4%	39.7%	60.7%	46.8%
Beneficiários	3.3%	4.3%	4.3%	4.8%	1.0%	4.1%
ONG's	3.9%	1.8%	1.9%	0.4%	1.8%	1.8%

Additional GEF Annex 7: Project management and Institutional Arrangements
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

A. Project Management Structure

Project management and implementation would be the overall responsibility of a Project Management Unit – PMU (*Secretaria Executiva do Projeto – SEP*) to be established through the SEAAPI´s Microcatchment Directorate (SMH). The execution of the project would be decentralized and would be supported by the government and non-government institutions (project co-executors), including regional and local offices of the participating State agencies (EMATER, PESAGRO, FEEMA, IEF, DRM and the State Attorney's Public Defense Office), EMBRAPA Solos, and four non-government institutions (SOS-Mata Atlântica, CI-Brasil, VivaRio and Coppetec). A participatory/consultative structure of the project would be established at the state, municipal and microcatchment levels, following a scale appropriate to their levels in the pyramid. At State level, this consultative structure would include a Steering Committee (*Comissão de Acompanhamento – CA)* composed by representatives from the State Sustainable Rural Development Council (CEDRUS) and each of the project co-executors (see **Figure 1)**.

1. Project Participatory/Consultative Structure

1.1. Project Steering Committee – PSC (Comissão de Acompanhamento – CA)

The Steering Committee (CA) would monitor and evaluate progress, and review and endorse project implementation policy and priorities, annual operational plans and fund allocations proposed by the SEP. It would also seek to resolve conflicts between stakeholders and endorse sub-projects/grants, as well as ensure coordination and collaboration among partner institutions. The CA would be chaired by the Project Manager (or Project Executive Secretary).

1.2. Municipal Sustainable Rural Development Councils (CMDRs)

The existing CMDRs (created under the PORNAF), composed by representatives from the concerned municipal government, rural communities, NGOs, rural workers' trade-unions, small farmers´ associations and rural extension institutions, would validate and endorse the Microcatchment Development Plans (PEMs) and the select municipal microcatchments to be benefited by the project. It would also contribute to the dissemination of the project and mediate conflicts between local stakeholders.

1.3. Microcatchment Groups

New or existing of formal/informal microcatchment groups, composed by the local stakeholders (small producers, women, youth, rural workers, etc.) would be represented by a formal or informal committee to be set up for each microcatchment, with members selected by these groups. This committee would be responsible for the preparation of the PEMs, in cooperation with the project executing institutions. The committee would also approve the groups and individual sub-projects, as well as manage, monitor and evaluate the PEM implementation.

2. Project Executive Structure

2.1. Project Management Unit (PMU)

A PMU (*Secretaria Executiva do Projeto – SEP*) would be set up under the authority of SEAAPI´s Microcatchment Directorate (SMH) to oversee, coordinate, administer and monitor the project. The PMU would have small departments dealing with technical management and administration (financial management and procurement), and the operation of the Incentive Program (see **Figure 2**). The head of the PMU and its departments would be appointed by an act of the Governor prior to Grant Negotiations. The PMU would be staffed mainly by secondment from the partner executive organizations (particularly EMATER) but technical assistance would be hired to strengthen the capacity of the PMU. The executive branch would also maintain small multi-institutional units comprised of teams representing partner executive organizations, one in each of the two EMATER regional offices of the North and Northwest Fluminense. EMATER's regional and municipal offices would serve as the project's executive units dealing directly with the microcatchment stakeholders.

2.1.2. Technical Management Unit

The Technical Manager of the Project would be the overall coordinator of project Components 1, 2, and 3, as well as the M&E subcomponent of component 4 (and each component would have a coordinator). He/she would plan, coordinate and control all technical activities (i.e. training, rural extension, target research, environmental education, etc.) and the management of the incentive program supported under Component 2 (see Figure 2).

2.1.2. Administrative and Financial Management Unit

The Administrative and Financial Manager would be responsible for project administration and for procurement, disbursement and special account keeping (see Figure 2). The unit would incorporate staff with experience in financial, procurement and disbursement matters, and would hire one administrative assistant and two consultants, specialized in procurement and financial management matters, respectively. The PMU would also contract out the design, and thereafter would maintain and operate an adequate MIS. Draft TORs for the design of the MIS system would be presented and reviewed during Appraisal. The final version of the TORs would be presented at GrantNegotiations. To initiate implementation of the system would be a condition of Grant Effectiveness.

2.2. Regional and Local Project Management Units

Two regional units would be set up at the Regional level, one in each of the two EMATER regional offices of the North and Northwest Fluminense. EMATER's regional and municipal offices would serve as the project's executive units dealing directly with the microcatchment stakeholders. These units would be responsible to monitor the project at the municipal and microcatchment levels, and would prepare and sistematize iformation and reports requested by the project, as well as execute and monitor project activities at the microcatchment, municipal and regional levels.

B. Institutional Arrangements for Project Implementation

1. Institutional arrangements for the Implementation of Component 1

The general coordination of Component 1 will be under the responsibility of the Executive Secretariat of the Project - Superintendency of Microcatchments of SEAAPI, which will be in charge of hiring services and/or institutions responsible for the execution of sub-components. The consultancy services for the execution of the foreseen studies of subcomponent 1.1, will be contracted by PMU/SMH, which will have a technical committee to define the topics and evaluate da quality of the proposals.

The consultancy services for the design of the Incentive Program for SLM will be done by a senior consultant, while the services for the elaboration of specific complementary studies, identified on a demand basis, and the studies on the update of the project's subwatersheds will be undertaken by research institutions and both state and non-state universities. Subcomponent 1.2 will be executed by the Rural Extension Agency for the State of Rio de Janeiro (EMATER), with the activities of selection and planning of microcatchments being executed in partnership with the Agency for Research in Agro and Cattle Raising of the State of Rio de Janeiro (PESAGRO), municipal agricultural secretariats and local NGOs. In the specific case of creating and formalizing community statutes, the project would also have partnership with the Public Defender's Office.

2. Institutional Arrangements for the Implementation of Component 2

The Component's management will be through a responsible party allocated in the Technical Coordination of the integrating sector of the structural design foreseen for the Project Executive Secretariat - SEP. This Executive Secretariat, will be located next to the Superintendency of the Microcatchments of SEAAPI.

Field operations will be under EMATER's responsibility, with collaboration of technicians from PESAGRO, Universities, Municipalities and NGOs.

The financial incentive program for sustainable agriculture (subcomponent 2.1) would initially operate under the existing incentive legislation enacted in 1975 (State Socio and Economic Development Fund – FUNDES), to facilitate the adoption of the project strategy within the benefited microcatchments. The *Activity 1* of this subcomponent has already its own mechanisms of finance (PRONAF, Rio Rural and Frutificar). However, these would be monitored and coordinated with the *Activity 2*, proposed for GEf funding. GEF resources for this Activity 2 would be managed by the SEP, through a Support Group to be set up before project effectiveness (and after project approval by the GEF CEO and WB Board, respectivelly).

3. Institutional Arrangements for the Implementation of Component 3

The capacity building component for the adoption of SLM will be managed directly by the integrated Technical Coordination of the PMU or SEP (Executive Secretariat of the Project).

SEP will establish partnerships (contracts and covenants) with EMATER, COPPETEC and NGOs for the execution of planned activities such as the diagnosis and monitoring of organizations; specific, conceptual and managerial capacity building; and capacity building of schools (teachers and students).

As for the implementation of specific motivational activities for producers, carrying out field days and organizing field trips that involve Project executors and beneficiaries, SEP will have a formal agreement with EMATER.

4. Institutional arrangements for the implementation of Component 4

Component 4 will be managed directly by the Executive Secretariat of the Project (SEP) which will be located next to the Superintendency of Water Resources (SMH) of SEAAPI. Management and physical-financial activities of the project will be executed by the coordination of SEP, through an Administrative and Financial Sector within SEP. The coordination of monitoring, evaluation and dissemination will be performed by a coordinator allocated in the Technical Coordination Unit of the project, with EMATER and other co-executing agencies providing support and technical assistance as necessary. Key groups of stakeholders, particularly those small farmers living in the pilot microcatchments, would also participate actively in data collection and other sampling activities to monitor social and environmental aspects of the project.

Figure 1. Project management Structure

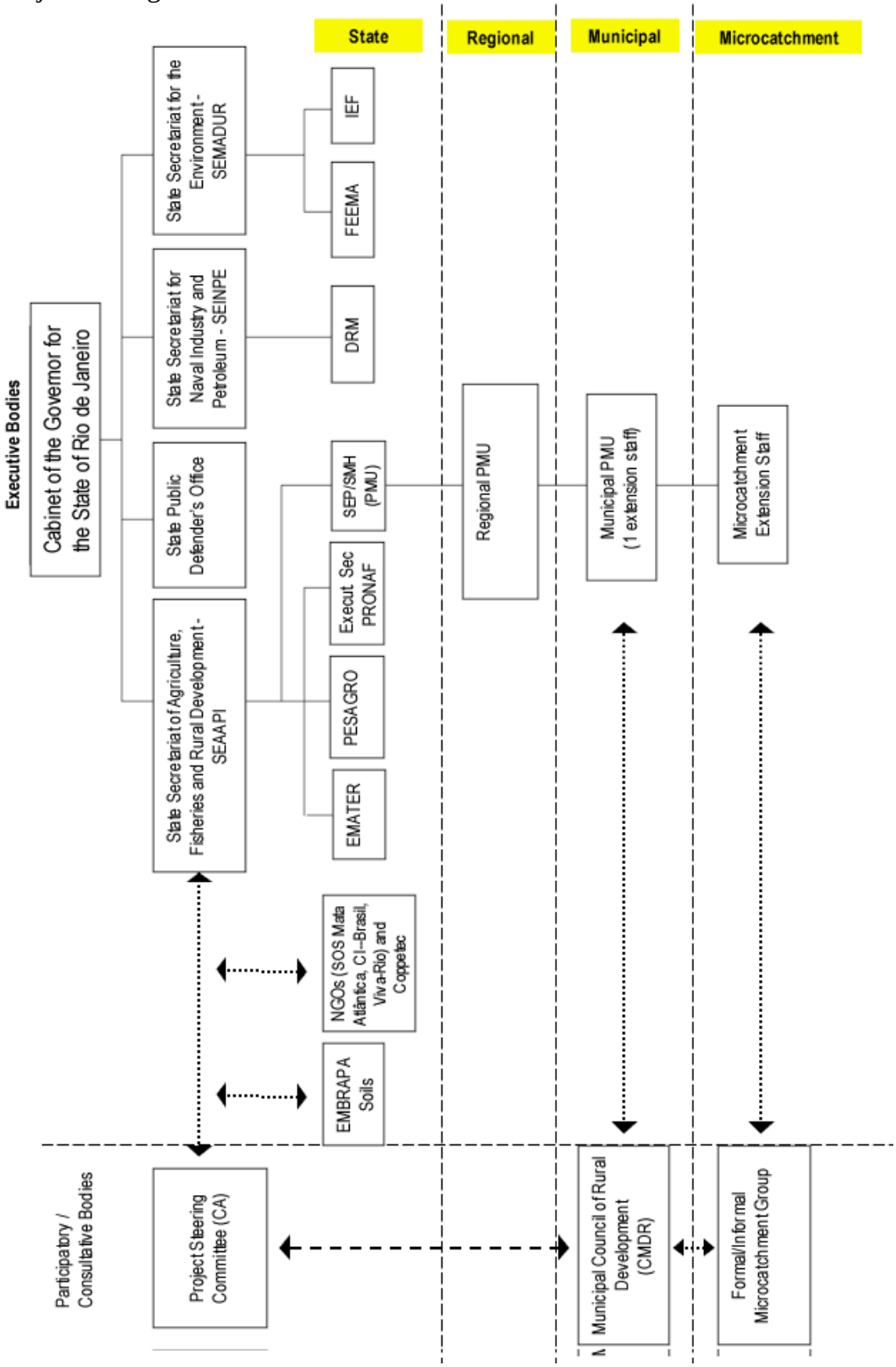
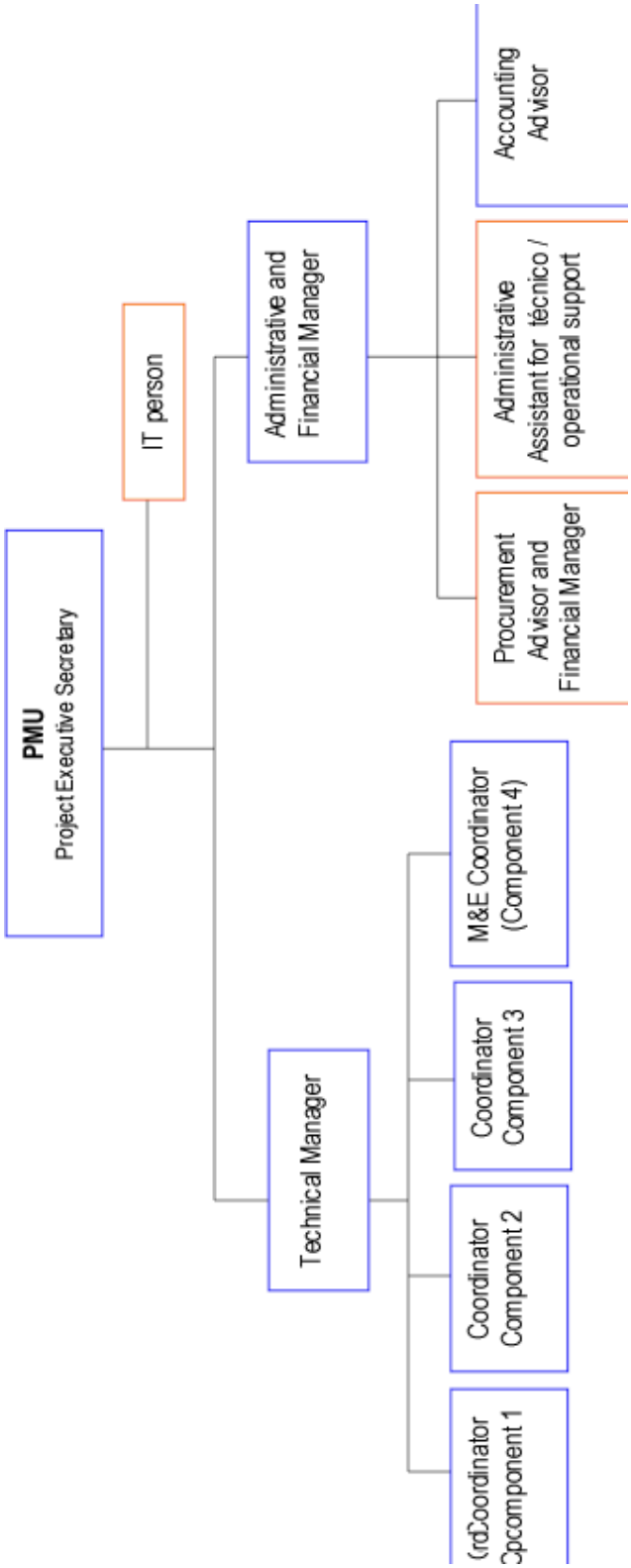


Figure 2. Project Managing Unit Structure (PMU)



Additional GEF Annex 8: Project Processing Schedulte
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

Project Schedule	Planned	Actual
Time taken to prepare the project after Block B grant approval (months)	15 months	20 months
First Bank mission (identification)	January 2002	April 2002
Appraisal mission departure	March 20, 2004	
Negotiations	May 15, 2004	
Planned Date of Effectiveness	January 1, 2005	

Prepared by:
SEAAPI: State Secretariat of Agriculture, Fisheries and Rural Development of Rio de Janeiro (Staff from SMH, EMATER, PESAGRO, and SEAAPI Consultants)

SEMADUR (Staff from FEEMA and IEF)

EMBRAPA Soils (Staff)

DRM (Staff)

NGOs: Conservation International (CI-Brasil), SOS Mata Atlântica, Viva Rio and COPPTEC

Preparation assistance: FAO/CP Team, composed of: Kátia Medeiros (FAO Sr. Environmental Specialist); Nestor Bragagnolo (Agronomist and Microcatchment Specialist, Consultant); Francisco Guimarães (Rural Economist, Consultant), Waldir Pan (Agronomist, Consultant); Marta Irving (Environmental Education Specialist, Consultant); and Arthur Sofiatti (Historian and Ecologist, Consultant).

Bank staff who worked on the project included:

Name	Specialty
Alvaro Soler	Task Team Leader (from July 2003)
Graciela Lituma	Task Team Leader (until July 2003)
Maria Isabel Braga	Environmentalist
Claudio Mittelstaedt	Financial Specialist
Keiko Ashida	Operations Analyst
Karen Ravenelle	Language Program Assistant
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Additional GEF Annex 9: Bio-physical, Socio-Economic, and Legal Characteristics of the Project Area
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

Introduction

The global objectives of the proposed Sustainable Land Management in Productive Landscapes of the North-Northwestern Fluminense project are threefold: (a) to address threats to biodiversity in Brazil's coastal tropical rainforest (*Mata Atlantica*), (b) enhance carbon sequestration in the adjacent agricultural landscape, and (iii) reverse land degradation. The project area would cover 5 watersheds which in aggregate represent an area of 6,570 km2 overlapping with 24 municipalities. In addition, within the project area 50 microcatchments would be selected to implement on-the-ground pilot initiatives covering an area of about 100,000 ha *in toto* and 4,000 rural families. This Annex provides brief descriptions of the bio-physical, socio-economic, and legal characteristics of the project area.

The North and Northwest Fluminense Region

Location

The proposed project would be implemented in the watersheds of the Imbé, Doce/Qutingute, Macabu and Muriaé Rivers and the Costeira do Entorno da Mata do Carvão. Most of these are located in the North and Northwest Fluminense regions of Rio de Janeiro State. To include the entire drainage area of the Imbé watershed, two additional municipalities from the Serrana region, Trajano de Moraes and Santa Maria Madalena, were also included in the project area.

Physical Characteristics

The North and Northwest Fluminense regions represent a wide diversity of landscapes which were formed through the unique interaction among the region's geology, climate and biology, which over time contributed to the region's geomorphology and the characteristic vegetation. These characteristics, which have been modified by wide variety of land use patterns which have included livestock-raising and itinerant monocropping (sugar cane, coffee, cattle).

The Northern Fluminense landscapes are notable for the extensive lands that are susceptible to the flooding of the river-delta plain of the Paraíba do Sul and the lower reaches of the Imbé, Prata and Macubu Rivers, comprised of a complex mosaic of river, lagoon and marine environments. This environment, dominated by soils with excess salt and/or sulfur, is fragile, especially with regard to the expansion of extensive cattle-raising and the implementation of urban sites. Further inland, well-drained lands consist of tablelands or low hills, both with gentle slopes and low to moderate susceptibility to erosion before terminating in the Serra do Mar, where the Desengano State Park (PED) is located, which is characterized by steep slopes which in turn have abrupt rocky banks, highly susceptible to mass movements and falling boulders.

In contrast, the Northwest region is characterized by the predominance of dry and low hills interspaced with staggered mountain ranges. This region exhibits a dramatic scenario of environmental degradation, with generalized removal of forest cover, even in a large part of the mountain areas, a situation that is aggravated by the insufficient and irregular rainy season, causes severe water deficits.

In general the climate is hot with annual rainfall ranging between 750 and 2000 mm. There is an accentuated annual water deficit in the region, over 150 mm, except for a very small strip of land in the extreme Northwest region with higher precipitation. In recent years the drought periods have lasted up to 8 months, leading to the migration of springs and the disappearance of small streams. The situation appears to reflect the lack or insufficiency of water availability during periods of low precipitation in the regions'rural areas.

Increasingly, this appears to be contributing to water use conflicts. Generally, rural land-owners who are closer to the water intake or who have springs on their property, use them without concern for the rational use and conservation of this resource, oftentimes to the detriment of water supply for downstream users. In addition, the importance of underground aquifers in the Campos Basin is undeniable, due to high rates of flow associated with good water quality which makes this region the most important one in the State in terms of groundwater. At the same time, one should also pay heed to the vulnerability of several aquifers which is considered to be very high.

Water pollution by different sources is another source of concern. The removal of natural vegetation, especially gallery forests and vegetation in aquifer recharge areas, and the disorderly occupation and inadequate management of soils, has led to an increase in surface runoff and consequently to processes of erosion that facilitate the entry of organic and inorganic material into bodies of water. This fact also contributes to the process of silting and eutrophication of rivers.

Another common feature permeating the region's water resources are changes in natural patterns of watershed drainage, radically altered over the years by poorly planned engineering works. Various lagoons were completely drained, becoming marshes or being incorporated into production areas. Some lagoons remain however and need to be maintained (e.g., the Salgada Lagoon is notable for being hyper-saline with recent stromatolites and has been proposed as a UNESCO Global Heritage Site). However, even these are threatened by environmental problems (e.g., lagoons in proximity to the Paraíba do Sul River are mostly related to industrial pollution, sanitary depletion and erosion).

Socio-economic Characteristics

The North Fluminense Region encompasses nine municipalities and a total area of 9,767 Km2, with a population of 698,783 (4.9% of the State's population) and 18.3% of the State's rural population. The urbanization rate in this region is 85.1%, and 66.7% of the municipalities have fewer than 50,000 inhabitants. The Northwest Fluminense Region includes 13 municipalities, with a total area of 5,385.6 Km2 and a population of 297,696. The region has only 2.1% of the State's population, but distinguishes itself for having 10.9% of the rural population. The average urbanization rate is the lowest in the State (79.2%), reaching a minimum in the municipality of São José de Ubá -- 36.3%, and 92.3% of the municipalities have fewer than 50,000 inhabitants.

The two regions have the lowest socio-economic indicators in Rio de Janeiro States. The Human Development Index indicates that the majority of municipalities from the project regions fall in the State's lowest quartile for human development, education, and income. Similarly, the Quality Index of Municipalities, an index that measures municipal capacity to attract investments, indicates that most project municipalities fall in the lower two quartiles of the State; a characteristic that is even worse in those municipalities with fewer than 50,000 inhabitants and lower urbanization rates. Other indicators include higher than average State illiteracy rates and infant mortality coefficients.

The reasons most commonly cited for these relatively low socio-economic indicators with respect to the rest

of the State include: (a) the still significant rural character of the regions; (b) economic dependence on a still rudimentary agricultural sector based largely on monoculture and extensive cattle ranching; (c) the incipient nature of regional industrialization and agro-industrialization processes; and (d) the reform of agricultural policy instruments and the opening of the market to competition with highly subsidized international products in the early 1990s, and to the continued linkage to the regional economy.

Agriculture and livestock continue to constitute the principal occupation and source of income for a significant portion of the population in the project's regions, although its importance in terms of state and regional Gross Domestic Product and their contribution to the formal labor market are small.

In terms of land tenure structure, the two regions are characterized by a large concentration of farms with sizes representing fewer than 10 ha (approximately 50% of all farms). Many of these farms can be classified as generating little to no income and are of special relevance to the proposed Project as they: (a) represent a large contingent of the rural population, (b) have traditionally lacked receiving assistance through government programs, and (c) represent a major source of pressure (due to needs for obtaining firewood, animal protein, extractive practices) on the region's already very fragile natural resources.

Biodiversity

The North/Northwest Fluminense is within the domain of the Brazilian Coastal Tropical Rainforest or Atlantic Forest *(Mata Atlântica)*. In Brazil, generally the devastation of the *Mata Atlântica* is a reflection of increased human settlement and the disorderly exploitation of its natural resources. Land use does not respect the physiographic differences among its compartments and consequently the current landscape has undesirable aspects from the standpoint of soil and biodiversity conservation.

In the State of Rio de Janeiro, the most critical remaining areas of Atlantic Forest are located in the project region with a severe loss of forest cover and a high degree of degradation. Of the region's original forest cover, only 6.1% and 7.3 % remain in the Northwest and North regions, respectively. The *Mata Atlântica* encompasses at least 5 different typologies, considering patterns of animal and plant distribution, proximity to the coast or levels of altitude (Hueck, 1982). A number of compilations of distribution lists attest to the *Mata Atlântica's* relevance as a priority biome for conservation on global terms[1].

Two forest typologies are recognized in the region; humid (or ombrophyle) forests and dry (seasonal) formations. Humid ombrophyle formations encompass the edges of Desengano State Park towards the south in the watersheds of the Imbé and Macabú Rivers. The region also contains the variations in altitude existing in this typology, encompassing marshy (alluvial) forest and lowland forests up to cloud formations and altitude "fields." The amount of area covered is residual at low altitudes, increasing as the terrain becomes dynamic and unsuitable for agricultural use. These areas are of extreme biological importance, with over 18 species of globally endangered animal species such as the maned three-toed sloth (*Bradypus torquatus*), the wooly spider monkey (*Brachyteles arachnoides*), the red-browed Amazon parrot (*Amazona rhodochorytha*), the black-headed berryeater (*Carpornis melanocephalus*) and the solitary tinamou (*Tinamus solitarius*). The watershed of the Doce River (Quitingute canal) is a plant mosaic of small marshlands and forest regenerations of *restinga* and dry forest. Waterlogged areas form part of the lagoon complex of the North Fluminense, important as a resting and feeding place for northern migratory birds such as *maçaricos* (shore birds) and *marrecas* (wild ducks).

Seasonal deciduous formations include fragments of tableland forests in the North Fluminense, with the best preserved being Mata do Carvão in São Francisco do Itabapoana, whose drainage constitutes one of the watersheds target by the project. This area was identified as being of high biological importance by

National Program for Biological Diversity - PRONABIO (Area 248 ha) because of its populations of red-browed Amazon parrot. The last tableland forest within the territory of the State of Rio de Janeiro, this region is considered the boundary for the distribution of Amazon rainforest plant species, with wood species such as "peroba" being important for conservation purposes. This classification also includes semi-deciduous dry forest to the North/Northwest of the edges of Desengano State Park, in the municipalities of Campos and São Fidélis, moving along the boundaries of the states of Minas Gerais and Espírito Santo. Formations to the Northwest in Laje do Muriaé and Miracema were listed by PRONABIO as being highly important because they are home to the globally endangered species plumbeous antvireo and the buffy tufted-ear marmoset (*Callithrix aurita)*. This typology encompasses almost the entire catchment of the Muriaé watershed, with some exceptions in mountainous formations on the catchment's boundaries.

Priority areas identified for biodiversity conservation through the National Program for Biodiversity Conservation, proposed for inclusion in the proposed project are the following:

Priority Area for Conservation No & Name	**Municipalities**	**Category**	**Thematic Group Treated**	**Inclusion in Project Area**
247 Porciúncula / Raposo / Miracema	Porciúncula, Natividade, Itaperuna, Laje do Muriaé, Miracema	High biological importance	Mammals, Birds	Total
Biodiversity: Occurrence of *Callithrix aurita*, an endangered primate and the only fragment in the State of Rio de Janeiro where *Dysithamnus plumbeus*, a globally endangered bird species, occurs.				
Priority Action Recommended: Forest recovery				

Priority Area for Conservation No & Name	**Municipalities**	**Category**	**Thematic Group Treated**	**Inclusion in Project Area**
248 Mata do Carvão	São Francisco do Itabapoana	Much biological importance	Birds	Total
Attributes: Last fragment of relevant tableland forest in the North Fluminense. Residual populations of *Amazona rhodocorytha.* Boundary for distribution of plant species of the Amazon rainforest region.				
Priority Action Recommended: Creation of Protected Area				

Priority Area for Conservation No & Name	**Municipalities**	**Category**	**Thematic Group Treated**	**Inclusion in Project Area**
400 Middle Paraíba do Sul River	Municipalities of the Middle Paraíba do Sul River	Extreme biological importance	Flora, Fish, Human Pressure	Partial
Attributes: Composition of flora, although little-known, contains elements of forests of the Serra do Mar chain, Mantiqueira and interior formations (seasonal forests) – it is therefore an area of floral confluence. Highly degraded remnant areas, representative of a type of forest that once occupied a very large area in the Paraíba Valley, currently restricted to small fragments. Extreme human pressure due to forest clearing, extensive cattle-raising, increasing urbanization, and erosion. Great wealth of fish with considerable bio-geographic importance.				
Priority Action Recommended: Creation of conservation unit				

Priority Area for Conservation No & Name	Municipalities	Category	Thematic Group Treated	Inclusion in Project Area
401 Jurubatiba	Macaé, Carapebus, Quissamã	Very high biological importance	Birds, Amphibians and Reptiles, Mammals, Protected Areas, Human Pressure	Total
Attributes: Remnant area representative of restinga forest. Occurrence of endemic species of reptiles, amphibians and plants. Presence of endangered bird species. Floral composition with elements of *restinga* of Northeastern Brazil and Espírito Santo, with distribution boundaries to the North of Rio de Janeiro. Need to implement and expand the Jurbatiba National Park (only federal-level conservation unit of indirect use for *restingas* in Brazil).				
Recommendations: Biological inventory				

Legal and Policy Assessment

The proposed Project should directly involve communities, predominantly those of farm families, which often improperly use natural resources for their survival, and indirectly involve society as a whole which contributes to the degradation of these resources. Within this context, the following instruments and legislations are highlighted, in support of the Project and relevant to disciplined management, conservation and use of natural resources at state, national and global level.

State Instruments and Legislation in Support of the Project[2]

Constitution of the State of Rio de Janeiro (CERJ). The CERJ (art. 8º) states that everyone has the right to live with dignity, and that it is the State's duty to ensure everyone a quality of life compatible with human dignity, ensuring education, health services, food, housing, transportation, basic sanitation, drainage, paid labor, leisure and economic activities, and budget allocations should give preference to such activities, in accordance with Government plans and programs. The State Charter (art. 31) protects the ownership of small rural properties, provided they are farmed by families, and keeping them from being seized for payment of debts stemming from productive activities, and calls for controls to regulate the financing of these farms' development. The CERJ recognizes that microregions should receive planning and execution of public functions and services of common interest (art. 75), which is in line with the provision on water resources management formulated by the watershed system. Likewise, CERJ's art. 214 stipulates that the State and municipalities shall endeavor to carry out economic development and social justice, favoring the primacy of labor and of productive activities and those that distribute wealth, for the purpose of ensuring an increase in the level and quality of life and well-being of the population. The authority to legislate on natural resources belongs to both the Central Government and member-states, but on the subject of water it is the sole domain of the Central Government. It is the joint duty of the Central Government, the States, the Federal District and municipalities to register, monitor and enforce rights granted for researching and exploiting the water and mineral resources in their territories. Administrative responsibility for water resources is joint and also assigned to member-states.

Use of Fire. With regard to the use of fire, note the existence of Decree nº 2.661, dated 7/8/1998, which regulated the single paragraph of art. 27 of Law nº 4.771/1965 (Forest Code), through the establishment of standards of precaution regarding the use of fire in agro-pasture and forestry practices, and provided other provisions, instituting what it called controlled burning, and established a five-year period for the gradual reduction of the use of fire in agricultural and pasture activities, revoking Decree 97.635/1989 (D.O. dated 7/9/1998). The decree does not authorize pollution. In truth, it functions along the same lines of a Term of

Conduct Adjustment (TAC). It acknowledges the existence of the fact (use of fire in agriculture) but also cannot prohibit it without a transition period, to allow farmers to adjust to regulations. IBAMA Administrative Rule (Portaria) 94 – N, dated 7/9/1998 regulates controlled burning as a production and management factor in areas of agricultural, grazing or forestry areas, as well as for purposes of scientific and technological research, to be executed in areas with pre-established physical boundaries (DO dated 7/10/1998).

State Legislation on Water Resources. A Decree from 2003 provided a rule regulation of art. 47 of Law nº 3.239, dated August 2, 1999, which authorizes the Executive Department to institute the State Fund for Water Resources - FUNDRHI. This Fund, which deals with accounting matters and has no time limit, was instituted by means of a Decree issued in 2001. FUNDRHI's aim is to develop government water resources programs in which the multiple and competitive uses of water remain compatible. FUNDRHI's resources may be used as grants or as loans, the latter with certain financial conditions, according to decisions by Watershed/RiverBasin Committees, in programs, projects, works and actions that alter the quality, quantity or flow regime of a body of water. A Decree from 2003 dealt with the State Council for Water Resources -- CERHI, instituted by state law in 1999. The CERHI is a joint agency, under the scope of the State Secretariat of Sanitation and Water Resources, a member of the State System of Management and Water Resources, with regulatory, consultative and decision-making functions, in charge of supervising and promoting the implementation of the State Water Resources Policy's guidelines.

Federal and Global Instruments and Legislation in Support of the Project

Federal Constitution (FC). The 1988 FC was a milestone in integrated planning because it brought the environmental issue to the forefront of decision-making, either by decreeing that an ecologically balanced environment is the right of all (art. 225), or by imposing environmental defense on the economic and financial order (art. 170). There is a boundary that must be well demarcated: the difference between the ownership of the environment and that of the assets that comprise it. Environmental law respects ownership because it knows that this is subject to the Principle of the Socio-Environmental Function of Property. The Constitution also requires the Brazilian State to be ruled, in its international relations, by the principle of the "prevalence of Human Rights". The result of this new constitutional directive was Brazil's adherence to International Agreements, especially those which preserve the environment.

Sustainable Development. The dichotomy between preserving and developing is solvable if the parties in this incoherent battle proceed correctly and without extremes, but with good sense and respect for regulations. This manner translates into the principles that rule **sustainable development** or **eco-development,** which arises to make both sides compatible: progress and environmental preservation.Within this context, the International Agreement on Economic, Social and Cultural Rights was adopted; it was created by Resolution nº 2.200-A of the United Nations General Assembly on December 16, 1966. This agreement was approved by a Legislative Decree from 1991, and Brazil signed it on 1/24/1992. It was enacted by Decree in 1992.

Biodiversity. Biological diversity is valued as leverage for the development of human knowledge and also because life forms deserve to be preserved. The Convention on Biological Diversity (CBD), signed on 6/5/1992 during the Rio/92 Conference, was approved by Legislative Decree nº 02, dated 2/3/1994, and became internationally effective on 12/29/1993. However, it was only incorporated into the legal system by Decree nº 2.519, dated 3/16/1998. Provisional Measure nº 2.052, dated 7/28/2000 dealt with access to genetic patrimony.

National Environmental Policy. Law nº 6.938, dated 8/31/1981, instituted the National Environmental

Policy. In the context of the Project, the following will be important: establishment of environmental quality standards; environmental zoning; environmental impact assessments; licensing and the review of activities that actually or potentially cause pollution; incentives for the production and installation of equipment and the creation or absorption of technology, aimed at improving environmental quality; creation of protected territories; a national environmental information system; disciplinary or compensatory penalties for non-compliance with measures needed for preservation or correction of environmental degradation. These instruments should preferably be utilized in the strategies to be adopted by the Project. Of great relevance is § 1º of art. 14 of this law which decreed objective civil responsibility in environmental damage; the CF determined that civil, penal and administrative responsibilities are autonomous.

Agricultural Policy. Agricultural policy was instituted by Law nº 8.171, dated 1/17/1991, founded on the supposition that agricultural activity encompasses physical, chemical and biological processes, where the natural resources involved should be utilized and managed, and they should be subject to regulations and principles of public interest, so that the socio-environmental and economic function of ownership can be complied with. The agricultural sector consists of segments such as: production, inputs, agroindustry, commerce, supply and related segments, which respond differently to public policies and market forces. As an economic activity, agriculture should provide, to those working in it, profitability that is compatible with that of other sectors of the economy, since an adequate food supply is a basic condition to ensure social tranquility, public order and the economic and social development process.

National Policy on Water Resources (Law nº 9.433/97). The 1988 Charter determined that water is included among natural resources and is a common good of the people; private ownership of water was abolished. Water is a public good, a limited natural resource with economic value; its management should provide for its multiple usage and the watershed should be used as a territorial unit (art. 1º of Law nº 9.433/97). A body of water means a water course, artificial or natural reservoir, lake, lagoon or underground aquifer, in the form of a clause from an Regulatory Instruction issued by the Ministry of Environment (MMA). Art. 12 of Law nº 9.433, requires authorization to dump into a body of water sewage and liquid or gaseous waste, treated or untreated, for the purpose of diluting them, transportation or final disposal, which returns state responsibility for pollution in case of omission. The State of Rio de Janeiro's Law nº 3.239 dated August 2, 1999 institutes the State Policy on Water Resources, creates the State System for Water Resources Management, regulates the State Constitution's article 261, and stipulates other provisions. Decree nº 27.208, dated 10/2/2000, deals with the State Council on Water Resources and stipulates other provisions. 1997 Law nº 9.433 initiated a new means of addressing water resources through the Watershed/RiverBasin Committee system (similar to the Franch system), with considerable decentralization in resource management. It was innovative in terms of incorporating the concept of the user-payer of environmental resources, promoting rational and environmentally correct use while simultaneously discouraging behavior that goes against these principles.This same legal document also created the National Water Resources Council, regulated by a Decree from 1998. The Law also calls for the Secretariat of Water Resources to have executive authority.

National Water Agency – ANA. The State is a regulatory agent that limits rights or freedom in the search for the common good. Brazil opted to create Agencies. Water Agencies are private foundations, instituted and controlled by a Watershed/RiverBasin Committee(s), with an undetermined period of existence, and are members of the National System of Water Resources Management (SNGRH). Law nº 9.984, dated 7/17/2000, created an autonomous agency under a special regime, with administrative and financial autonomy, associated with the Ministry of Environment, the National Water Agency (ANA), integrating the SNGRH, with the authority to promote the linkage of national, regional, state and user-sector planning. ANA differs from other agencies because the use of water resources does not constitute, per se, either a public service or an economic activity, and the others constitute regulatory agencies for public services or

economic activities. It is possible to create Water Agencies with the same area of operation as one or more Watershed/RiverBasin Committee(s), in the form of art. 41 of Law 9.433/97. Watershed/RiverBasin Committees were created by Law 9.433/97 (art. 37), with a defined area of operation: an entire watershed, a watershed of a tributary of the basin's principal body of water, or a tributary of such tributary, or a group of contiguous watersheds or watersheds.

National Policy on Environmental Education. Education is a subjective public right of citizens through which they assume their full dignity and redeem their citizenship. Human rights, recognized by the international community, play a role. It cannot be denied to any member of society. Art. 205 of the Federal Constitution determined that education is the right of all people and the duty of the State and the family, and it should be promoted and encouraged with the collaboration of society, with a view to a person's full development, his preparation to exercise his citizenship and his qualification to work. Law nº 6.938/1981 determined that Environmental Policy must obey various principles, including the incentive to study and to research technologies aimed at the rational use and protection of environmental resources and environmental education for all levels of learning, with the objective of providing training for active participation in defense of the environment. Environmental Education is essential for setting an environmental policy in developing countries, as a means of expanding the Principles of Prevention and Precaution. It was called for in art. 225 of the FC, which assigns to Public Authorities the responsibility for promoting Environmental Education at all levels of learning. Law nº 9.795, dated 4/27/1999, regulated by Decree nº 4.281 dated 6/25/2002, defines environmental education as the "processes by which the individual and society construct social values, skills, attitudes and abilities aimed at the conservation of the Environment, a good of common use by the people, essential to the healthy quality of life and its sustainability".

The State of Rio de Janeiro issued Law nº 3.325, dated 12/17/1999, dealing with Environmental Education and instituting the State Policy on Environmental Education as a complement to Federal Law nº 9.795/99.

Environmental Crimes Law (ECL). The ECL brought polemic new issues to our legal system: the penal responsibility of a legal entity and a new modality of a socially accepted criminal: the environmental delinquent. Law nº 9.065/1998 permitted criminal transactions as well as trial suspension. The ECL modified the treatment given to environmental types, making them bondable, increased some penalties such as misdemeanors for mistreatment of animals, created new types such as the "pichação" (graffiti), but basically it chose to adopt educationally-based alternative penalties, subjecting the defendant to restrictions of his rights, especially in consideration of the criminal's profile. Old practices such as hunting (art. 29), the use of fire (art.41), fishing in prohibited periods or places (art.34), forest clearing (art. 39), etc., were typified as crimes and our penal legislation did not exclude responsibility for error of type, i.e., unawareness of the law does not exonerate the person from criminal responsibility, even though Law nº 9.605, dated 2/12/1998, considered the person's low level of education as a mitigating factor (art.14, I).

Other instruments to be utilized by the Project

Term of Behavioral Adjustment (or Term of Adjustment of Conduct). The objective of the Public Administration is to achieve the common good; for this reason it frequently faces the situation of having to decide between two legally protected goods. On the one hand it has the duty of preserving and impeding pollution activities, but on the other hand, it cannot throw one segment of society, in the case of business owners or workers, into economic chaos. Between the principle of inalienability and reasonability, there arises the possibility of making behavior flexible, by means of the **Term of Commitment to Adjust** (TCA). § 6º, art. 5º of Law 7.347/1985 allows legitimized public agencies, together with interested parties, to enter into a commitment to adjust behavior to legal requirements, which if not complied with will act as

an “extra-judicial title.” This term may be signed prior to the proposal of a Civil Public Action, a hypothesis in which the interest to act, acknowledged by the debtor, will not be considered, implying something in the way of “auto-composition.”

At the environmental level, institute renewed its activities after the issuance of the LCA and the Provisional Measures that followed it, nº 1.710, dated 8/7/1998, adding nº 79-A, which foresees this possibility for people who need a transition period to adjust their pre-existing activities to preservation-oriented concepts. Decree nº 3.179/1999 also foresees the term of behavioral adjustment in art. 60, which would suspend the liability of fines foreseen in that legal document. The TCA, at administrative level, makes the time period flexible so that business owners can adjust their activities to the regulations imposed and to new sustainability standards. This is the spirit of this law which aims to protect nature and not punish indiscriminately. It is once again the principle of environmental education being put into practice.

The jurisdictional limits of these agreements should be carefully examined so that the frameworks of legality are not exceeded, under a complex procedure of setting satisfactory mechanisms for the protection of wide-ranging interests. The TCA, with the force of extra-judicial executive title, is aimed exclusively at allowing the second sector to be able to promote the necessary corrections to its activities, in order to meet the demands imposed by relevant environmental authorities, with contractual fines being imposed stemming from non-compliance with agreed obligations. This is therefore a *Legal transaction on wide-ranging and collective rights.*

Endnotes:

1. These include Fonseca, 1985 for mammals, Sick, 1997 for birds; Jackson, 1978 for reptiles, McNeely, 1990 for amphibians, Brown,1979 for butterflies, and Mori, 1981 for plants. Also considering criteria for endemic species, Whitemore and Prance, 1987 differentiate six areas of the Atlantic forest.

2. Detailed numbers of laws, decrees and their specific articles mentioned under this study are on project file (Portuguese version of this assessment).

Annex 9, Appendix 1

Table 1 – General Project Strategies

Thematic Area: ***Physical Aspects***

Environ-mental Problem	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
ECO-TECHNICAL PROCESSES WITH IMPACT (EROSION, SILTING, WASHOUT)	·Lack of integrated, conservation-oriented planning in critical areas (properties and microcatchments)	·Soil mapping and soil use planning at regional level	·Absence of instruments to regulate adequate use of soil in rural area, compatible with local and regional planning ·Guidance for producers; ·Training of technicians; ·Development of adequate models	·Participatory local planning on farms, microcatchments for adoption of SLM. ·Prepare proposed legislation of soil use in rural areas ·Implementation of socio-technical network to combat land	·Planning for SLM ·Training of technicians
	·Absence of vegetation cover	·Implementation of research units to recover degraded areas with improved pastures	·Unsuitability of conservation practices in light of farmers' socioeconomic conditions ·Observance of conservation of APPs and Legal Reserve	·Participatory research focused on adaptation of conservation practices and optimization of productive systems with species adapted and/or with potential for "*cilagem*" of water and nutrients already existing in technological stock.	·Adaptive research
	·Improper pasture management (overgrazing)	·Introduction of pasture rotation systems	·Unawareness of alternatives to diversify the productive system with native species and change in pasturage; ·Guidance for producers	·Training in conservation systems for technicians and farmers ·Dissemination of good practices	·Training ·Dissemination of information
	·Inadequate land management and low level of adoption of conservation-oriented practices	· Introduction contour cropping systems and implementation of research units to control erosion in critical areas	·Decapitalization of farmers; ·Guidance for producers; ·Lack of understanding by technical staff of public agencies and others in the context of erosion control; ·training events without an integrated focus; ·Lack of Conservation Manual; ·Unawareness of impacts on soil biodiversity, and of ecosystem stability, function and services	·Financial incentives for implementation of conservation practices and recovery of the productive capacity of lands ·Monitoring of impacts on biodiversity of soils and stability, functions and services of ecosystems ·Training of technicians and producers	·Incentives for introduction of SLM in socio-environmental and productive aspects; · M&E; ·Training
	·Absence of conservation-oriented approach in soil preparation and in rural road maintenance	·Mechanized patrolling to maintain roads and prepare soil for planting	·Unpreparedness of technicians and local governments with regard to conservation-oriented approaches	·Training of technicians (public and private) and machinery operators on conservation-oriented approaches in soil preparation and rural road maintenance	·Training
	·Expansion of extraction of ornamental rocks	·Environmental licensing tied to Environmental Recovery Plan	·Low aggregated technology and management without business-oriented nature	·Design of financial incentive system for SLM through the use of PRADs and of environmental compensations ·Training for self-management.	·Incentives for introduction of SLM in socio-environmental and productive aspects ·Training of executors

Thematic Area: ***Physical Aspects***

Environ-mental Problem	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
WATER POLLUTION	·Water erosion	See previous item (“Erosion”)	See previous item (“Erosion”)	See previous item (“Erosion”)	See previous item (“Erosion”)
	·Dumping of household and agro-industrial waste; watering of animals directly in streams and rivers	·Implementation of individual modules of sanitation, environmental enforcement and educational campaigns to raise awareness	·Limitation of private and public financial resources and minimum enforcement structure	·Local planning for adoption of SLM approach in microcatchments ·Training of local stakeholders for integrated participatory planning of natural resources in microcatchments ·Design of a regional rural sanitation program	·Planning for SLM; ·Training
	·Absence of gallery forest	·Educational campaigns and a few projects in discrete areas for gallery forest revegetation	· Absence of financial incentives to restore gallery forest vegetation; · Action in discrete areas, low diversity of species, and unsuitability of environmental legislation; · Lack of environmentally sustainable agro-silvo-pastoral alternatives.	·Financial incentives for implementation of gallery forests ·Implementation of adaptive research units for recomposition of gallery forest vegetation (with diversity of species); ·Preparation of community conduct statutes	·Incentives for introduction of SLM; ·Planning for SLM
	·Intensive use of agrochemicals and proper dumping of packaging	·Implementation of research units with agroecological systems and MIP	· Lack of knowledge of agronomic and economic indicators of integrated management systems for pest and disease control and agroecological systems	·Implementation of adaptive research units for integrated management of pests and diseases and agroecological systems ·Monitoring of performance indicators of productive systems; ·Study the implementation of a packaging collection and recycling system.	·Adaptive research; ·M&E; ·Incentives for introduction of SLM ;
	·Low level of environmental primary care	·Environmental education in rural schools and hiring of community health agents	· Precarious hygiene, health and educational conditions	·Training in environmental primary care and notions of classes of water, together with schools; ·Training of professionals in guidance to the population.	·Training ·Dissemination of information
	·Absence of environmental quality indicators at regional and local level	·Monitoring of water quality by environmental agency	· Limited monitoring network with low density of sampling	·Dissemination of SLM’s good practices ·Implementation of community monitoring systems for self-management of natural resources ·Training of microcatchment population	·Dissemination of information ·Organizational training ·Training of technicians

Thematic Area: ***Physical Aspects***

Environ-mental Problem	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
WATER SHORTAGE	·Deforestation in water recharge areas, excessive drainage of canals and unprotected springs	·Control of flow rate, permission for deep tubular wells and protection of springs	·Lack of understanding of relationship of plant cover to the functioning of the entire water cycle and consequently to ecosystems	·Implementation of adaptive research units for revegetation and/or isolation of water recharge areas and springs with native species ·Financial incentives for revegetation of water recharge areas and springs with native species ·Implementation of system to monitoring flow rate and surface and ground water recharge	·Adaptive research; ·Incentives for introduction of SLM ·M&E
	·Use of unsustainable non-irrigation methods	·Construction of collective reservoirs for water storage ·Research units with more efficient irrigation systems	·Lack of understanding of impact of interventions on the functioning of ecosystems ·Unsuitability of irrigation systems to producers' socioeconomic and environmental conditions	·Participatory research units for new, alternative irrigated systems ·Financial incentive to implement alternative irrigation systems adjusted to SLM	·Adaptive research; ·Incentives for introduction of SLM
	·Disorderly intake/dumping in water resources	·Community management of local water use conflicts	·Low capacity for self-management of conflicts over water use ·Lack of understanding of types of uses and volumes of water drawn from watersheds ·Lack of financial compensation mechanisms among residents of the middle and lower sections of watersheds	·Participatory monitoring of microcatchments' water balance ·Implementation of self-management systems in microcatchments, compatible with the instruments of the National Water Resources Policy ·Preparation of community conduct statutes in local microcatchment planning ·Training of conciliators in rural communities ·Design of financial mechanism for self-management of natural resources ·Public Defenders Course	·M&E ·Organizational training ·Construction of Community Conduct Statutes for responsible use of NR ·Environmental education

Thematic Area: ***Physical Aspects***

Environ-mental Problem	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
FLOODING	·Deforestation	·Dredging of canals and drainage of *várzeas*	·Lack of information on impacts in the functioning of ecosystems	·Financial incentives for reforestation with native species and/or natural regeneration	·Incentives for introduction of SLM
	·Erosion			·Participatory planning of soil and water use and management on farms and in microcatchments, for adoption of SLM; ·Implementation of conservation practices for reduction of surface runoff	·Local planning for use of SLM (soil and water); ·Incentives for introduction of MSR
	·Silting			·Implementation of warning system and flood map	·Local planning for use and

					management of SRN and soil
	·Improper occupation of *várzeas*			·Regional and community monitoring	·M&E ·Local planning for sustainable use and management of NR
	·Infrastructure works (poorly-proportioned bridges and culverts clog rivers)			·Flood control works	

Thematic Area: Biodiversity

Environ-mental Problem	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
DEFOREST ATION	·Extraction of sawn wood, stakes and firewood	· Increase in enforcement actions by government agencies · Reforestation with exotic species	·Minimal enforcement structure; ·Limited dissemination of monitoring results	· Regional and local planning of priority areas for forest replacement; · Incentive for reforestation and/or adoption of agro-silvo-pastoral systems; · Training for self-management	·Planning for SLM; ·Incentives for introduction of SLM; ·Training for environmental education
	·Bio-piracy	· Expansion of protected areas	·Lack of energy alternatives for low-income populations	· Promotion of the creation of RPPN, legal reserve and APPs	·Incentives for introduction of SLM
	·Selective extraction of non-wood forest resources	· Monitoring of forest remnants · Educational campaigns	·Lack of financial incentives for implementation of RPPN, Legal Reserves and APPs; ·Little incentive for production of native species; ·Lack of training	· Validate and promote sustainable alternatives for replacing forest inputs with extractivism; · Strengthening of monitoring of forest remnants of the *Mata Atlântica*; · Implement financial mechanism to support reforestation; · Incentives for certification of non-wood forest products; · Training for sustainable management of forest and lumber products; · Preparation of community conduct statutes; · Training of Public Defenders and Community Conciliators	·Incentives for introduction of SLM ; ·M&E; ·Training and environmental education; ·Construction of Community Conduct Statutes for responsible use of NR; ·Planning for SLM and local institutional strengthening

Thematic Area: Biodiversity

Biodiversity Threat	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
USE OF CINEGENETIC RESOURCES	·Lack of animal protein the diet of needy populations	·Restrictive legislation	·Minimal enforcement structure	· Validate and implement sustainable alternatives to replace forest	·Adaptive research ·Incentives for

				inputs and animals	introduction of SLM
	·Sport and professional hunting	·Environmental education	·Unawareness of sustainable alternatives	· Training and environmental education	·Training and Environmental education
	·Loss of subsistence crops		· Lack of information on traditional culture of populations · Lack of understanding by local populations of importance of biodiversity	· Diagnose general alternatives for community subsistence · Disseminate the potential of local biodiversity to communities	·Local planning ·Dissemina-tion of information
EXCESSIVE USE OF FISHERY RESOURCES	·Professional fishing	·Restrictive legislation ·Environmental education	·Low level of awareness among fishermen populations ·Lack of conservation focus on aquatic biodiversity in fishery resource management	· Planning of sustainable use of fishery resources	·Planning for SLM
	·Lack of protein the diet of needy populations	·Repopulation with exotic species		· Financial incentive for implementation of systems for sustainable management of fishery resources · Implementation of research units for systems of sustainable management of fishery resources · Management training	·Adaptive research; ·Incentives for introduction of SLM; ·Training
INTRODUC-TION OF EXOTIC SPECIES	·Direct impact on native species and extinction of sensitive ones	·Restrictive legislation	·Minimal enforcement structure	· Diagnostic and participatory local planning · Training and provision of options utilizing native resources	·Local planning for SLM; ·Training
	·Lack of understanding of the potential of native species	·Studies limited to discrete areas	·Larger amount of information and dissemination aimed at exotic species	· Investments for implementation of sustainable systems with native species	·Incentives for adoption of do SLM
			·Lack of sustainable alternatives	· Validation of sustainable systems with native species	·Adaptive research

Thematic Area: Biodiversity

Biodiversity Threat	Causes	What has been done?	Underlying causes and Constraints	Strategies for the SLM	Type of Intervention Recommended
BREAKING OF SANITARY BARRIERS (INTRODUC-TION OF DOMESTIC ANIMALS)	·Loss of original crop and increased information on alternatives	·Increased enforcement of hoof-and-mouth eradication program restricted the transportation of animals	·Minimal enforcement structure	· Human resources training	·Training and Environmen-tal education
	·Little incentive to produce native species (excessive bureaucracy)	·Monitoring of introduced species		· Adaptation of productive systems with native species and financial incentives for their implementation	·Adaptive research; ·Incentives for introduction of SLM
	·Lack of flexibility in administrative regulations			· Monitoring, evaluation and dissemination of results	·M&E; ·Dissemina-tion of Information
ALTERA-TION OF HABITATS	·Drainage of *várzeas*	·Restrictive legislation	·Lack of understanding of legislation ·Minimal enforcement structure	· Local planning on farms and in microcatchments, with regard to sustainable	·Planning for SLM

				alternatives	
	·Structural alteration of forests	·Enforcement of relevant agencies	·Lack of understanding of biodiversity	· Test sustainable practices for pasture management agricultural systems	·Adaptive research
	·Opening of roads ·Erosion		· Lack of understanding of sustainable management alternatives for the functioning of ecosystems	Monitoring of ecosystem function	·M&E
				· Dissemination of information on local ecosystems in the *Mata Atlântica*	·Dissemina-tion of information
BURNING	·Utilization of fire as a pasture management system and practice of slash and burn	·Restrictive legislation ·Enforcement of relevant agencies ·Study and development of alternatives to use of fire in pasture management and conservation	·Limited enforcement capacity ·Traditional culture ·Lack of low-cost alternatives	· Human resources training to combat forest fires; · Adapt technologies and implement sustainable systems to management and modify pastures already existing in the technological stock; · Monitor burning	·Training and Environmen-tal education; ·Adaptive research; ·M&E
			·Lack of financial incentives for adoption of sustainable practices in pasture management	· Implementation of community fire-fighting programs · Facilitate the sharing of experience and disseminate technologies	·Training and Environmen-tal education; ·Dissemina-tion of information
				· Prepare community adjustment statutes	·Construction of Terms of Community Conduct for responsible use of NR

Annex 9, Appendix 2

Bio-physical, Socio-Economic, and Legal Characteristics of the Imbé Watershed

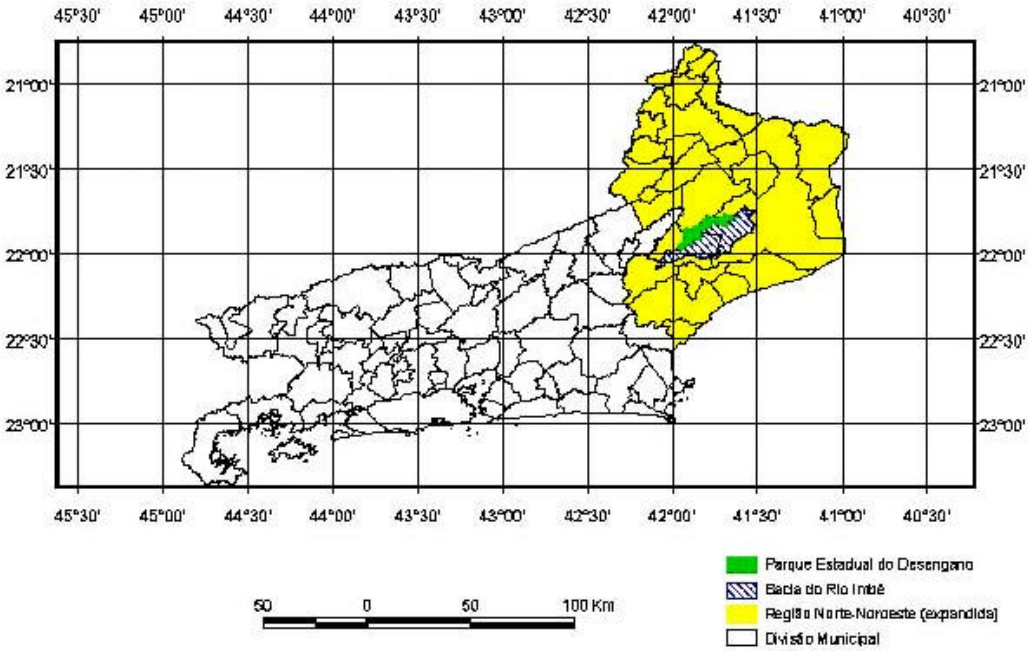
General Characterization

Location. The Imbé Watershed is located in the Northern Fluminense region and has an area of approximately 936.59 km2 (see **Map 1** below). The watershed is one of the catchments feeding the Lagoa Feia, from where its waters flow to the Atlantic Ocean. The Imbé River rises in the mountain range with the same name, in the Municipality of Trajano de Moraes (Serrana region) its course extending along 70 km, during which it cuts through the Municipality of Santa Maria Madalena and the southwest of the Municipality of Campos dos Goytacazes (see proportion of area in Table 1). The Imbé River flows over various falls to its confluence with the Santo Antônio Stream. It then continues more lazily for about 58 km, to enter the Cima Lagoon, which drains into the Lagoa Feia.

Table 1. Proportion of Imbé River's Watershed Area in each Municipality

Municipality	% of watershed area per municipality	% of area of municipality covered by watershed
Campos dos Goytacazes	55.57	12.70
Santa Maria Madalena	43.33	48.88
Trajano de Morais	1.10	1.72
Total	100.00	---

Map 1. Imbé Watershed



Geology and Topography. The northern region of the state has a large variety of landscapes and environments, formed by the interaction between the geological, climatic and biological aspects that defined present regional morphology and plant life. Part of the Serra do Mar mountain range, the Imbé Watershed (and its upper valley or Serra do Imbé) is within this northern region. Formed from pre-Cambrian igneous rock, the Serra do Imbé stands out in the landscape due to its sheer escarpments and rocky heights. The varying relief of the topography reflects the geology, with large differences in altitude, from the smooth hills and vast floodplains of the lowlands, to the mountains and escarpments of the Serrana region.

Soil. The soil in the Imbé Watershed has limitations due to its reduced fertility, high acidity, excessive humidity and susceptibility to erosion. It is suitable for alternative management systems adapted to meet different situations, including soil and water conservation practices that involve minimal exposure and movement of the soil, and increased productive capacity through the use of essential nutrients and the neutralizing of elements that are toxic to crops.

Climate. The north of the State of Rio de Janeiro has low rainfall and high evaporation rates. Some parts may even lose more water annually from evaporation than is replaced through rainfall. However, the humid and mesothermic climate of the Imbé Watershed is strongly influenced by the topography. With relatively abundant rain all year round, the Serrana region has an average annual rainfall of 1,500mm, a direct result of the mountain wall with its high peaks meeting the rain-soaked winds that sweep in from the coast. In the lowlands, temperatures are higher and there is a pronounced dry season.

Surface Water Resources: The watershed is formed by the Imbé River (river flow (Q 7,10) of 0.3 m3/s), which receives water from various streams, among them the Sossego (0.6 m3/s) and the S. Antônio do Imbé (0.6 m3/s). The flood-flow for a 10-year return period was estimated at 21 m3/s (35 m3/s in 100 years). Even with such high flood-flow rates, human impact actions have caused water volumes in the watershed to fall over recent years. Among these actions were the large drainage works in the Lower Imbé Valley (*Baixada Campista*), carried out by the now extinct National Department of Works against Drought (DNOCS) from the 1930s to the 1950s, together with local civil works such as the draining of the riparian areas (*várzeas*), the alteration of water courses, and the removal of most of the vegetation cover (including the aquifer recharging areas and surrounding forest) and the inadequate use of land within the watershed. The volume of water in many rivers and streams has been reduced, drying up in some sections during the dry season. Inadequate land management, leaving the soil exposed for long periods, favors erosion, with soil being washed away to sink as sediment to the bottom of the rivers, silting them up. Water volumes are also affected by the quality of the water. Few municipalities have a sewerage system to treat domestic sewage. Some residences have septic tanks, while others discharge their sewage directly into watercourses.

Groundwater Resources. Along the central section of the Imbé river valley, the rock walls on both sides have very little soil on them, in contrast to the valley floor, which is heaped with sediments. There, the alluvial deposits appear thicker, which favors the buildup of groundwater, especially along the lower section of the Imbé River where a porous aquifer is more important than a fissured one. However, the water may have high salinity and/or iron levels, limiting its consumption by humans and animals.

Solid Waste. In areas with high population densities, solid wastes are found near to, or even in, the rivers that make up the Imbé Watershed, both in urban and rural areas, as seen, for example, on the outskirts of the Municipality of Trajano de Morais and in the Dr. Loretti district (in the Municipality of Santa Maria Madalena).

Agricultural Land Use and Vegetation Cover. Most of the agricultural land in the Imbé Watershed has

been made into pasture, with dairy farming as the main activity in the region. Tilling and planting of crops are basically only carried out in the settlements, where sugarcane, bananas, cassava, and annual crops such as beans and corn are cultivated together with reforesting, using eucalyptus. Outside the settlements, sugarcane is being planted and reforesting is being done on only a few farms. Disorganized occupation and inadequate soil management in the region have resulted in a drastic reduction in natural vegetation cover in areas near watercourses and on steep hillsides, and also through erosion.

Biodiversity. Even with all the human impact interference it has been subjected to, important fragments of the natural vegetation in the Imbé Watershed still remain, together with secondary forest cover in an advanced stage of regeneration and the remains of riparian forests, and may be considered one of the most preserved areas in the region, although most of these fragments are restricted to the steeper hillsides, especially in the area of the Desengano State Park and surroundings.

Socio-economic aspects. The socioeconomic diagnostic of the Imbé Watershed identifies groups of stakeholders with distinct economic and social reproduction interests and strategies, different levels of participation in the life of the rural communities and awareness in relation to environmental matters. The growing importance of cattle raising, which by radically reducing the number of farm jobs, is a strong factor in: (a) reducing rural population numbers, affecting mainly the young, and (b) the fall in importance of income from agricultural activities in relation to income from municipal public service, pensions, and non-agricultural activities of a growing number of the residents of rural communities. Within this scenario, the generalized acceptance of payment for the reconversion of pastures to forest areas appears to be more a symbol of the precariousness of living conditions in the rural areas, than the result of increased environmental awareness.

Methodology for the Diagnostic Studies

Physical and Biodiversity Aspects

The diagnostic of the Imbé Watershed was carried out taking into account the distinct regional differences in terms of physical aspects, land-use and vegetation cover, in order that these differences in local needs should be highlighted during the definition of the proposed sustainable land management strategies. The methodology adopted thus brought together aspects of the physical environment in order to obtain homogenous units, which were characterized and their individual features described.

Initially, digitalized data was obtained from specific and ordinance survey maps[1], given a uniform scale and added to a digital database (scale 1:250,000). After organizing the database, data on soil and geomorphology were integrated and analyzed to identify area units with similar characteristics, called morphopedological units. A new analysis of these units, based on their main characteristics, led to their regrouping in larger units for strategic planning purposes, or **agro-ecological zones**. These agro-ecological zones were then described using available data, complemented with information collected during a field trip made to the watershed.

The intention of the fieldwork, carried out by a multidisciplinary team, was to see if the proposed zones were representative of the diversity of environmental aspects within the watershed; to identify land uses, survival strategies/main activities, problems and conflicts related to the use of natural resources, and provide data for a preliminary evaluation of the stakeholders' perceptions in terms of the socioeconomic and environmental problems encountered.

At the same time as the base maps were being prepared in conjunction with other institutions, the following methodological steps were adopted for the diagnostic study of the *biological aspects*:

(i) Analysis of Existing Data: the SOS Mata Atlântica provided a copy of the Atlas of the Atlantic Forest (*Atlas da Mata Atlântica*), prepared in conjunction with the National Space Research Institute (INPE), and containing the following information: cartographic data (from satellite imagery), specific data (information on forest cover, mangrove swamps and land spits, prepared to a scale of 1:50,000, based on visual interpretation of satellite imagery taken in 2000);

(ii) Land-use update of the Imbé watershed (see **land use map - Map 2 -** at the end of this **Annex - Appendix 2.1**): information from the Atlas was updated, through on-screen visual interpretation of satellite imagery, to a scale of 1:50,000. This was used to create the statistics and maps of the region required for the data analysis and to obtain an understanding of regional problems;

(ii) Forest remnants update of the Imbé watershed (see **forest remnants map - Map 3 -** at the end of this **Annex – Appendix 2.1**): adoption of methodology similar to the aforementioned land us map.

(iii) Collecting of secondary information;

(iv) Carrying out reconnaissance flights / over flights (by helicopter)*;*

(v) Interaction with teams from partner institutions: holding meetings with the project's technical coordination, with partner institutions, taking part in integration seminars; and,

(vi) Preparation of maps and landscape descriptions: preparation of maps using a GIS (e.g. vegetation, use and occupation, conservation units/priority conservation areas), descriptive data on landscape typologies, occasional support for integration dynamics. Preparation of statistics and organization of system using field data (integration of points identified by GPS and photographs).

Socioeconomic Aspects

During the diagnostic study of the socioeconomic aspects of the Imbé Watershed, qualitative and participatory research were carried out in the more densely populated areas of the three municipalities cut by the Imbé River: two rural settlement areas implemented by the agrarian reform process, and about which more secondary data is available - Novo Horizonte (in the municipality of Campos) and Santo Inácio (in Trajano de Morais) - and five rural traditional communities in the Serrana Municipality of Santa Maria Madalena - Sossego do Imbé, Alto do Imbé, Cruzeiro, Santo Antônio do Imbé and Dr. Loretti. A meeting was also held with the medium and large farmers' association (from the right bank of the Imbé River).

The quantitative, qualitative and participatory research activities included: (a) the use of household questionnaires on themes related to household structure, access to public services, productive activities and sources of income, perception of environmental and social issues, participation in organized bodies and in collective activities (involving motivating factors and effectively implemented strategies); and (b) meetings with community leaders and, when possible, with groups of community residents to discuss similar subjects based on a semi-structured agenda.

The research and analysis of secondary sources and material was complementary to the fieldwork.

Results of the Studies of the Imbé Watershed

1. Aspects of the Physical Environment

For the effects of this diagnostic study and identification of land management strategies, the Imbé Watershed was dismembered into 5 distinct **agro-ecological zones**. A detailed description of each zone follows:

Agro-ecological zone 1: Floodplains. This zone includes a group of floodplains formed from sandy-clay sediments of fluvial and lakebed origin, that extend from around and just above the Cima Lagoon (into which the Imbé River flows), as far as midway along the course of the Imbé river, including the floodplains of its main tributaries. This zone covers 9,809 hectares, i.e. 10.47% of the area of the watershed. There are three communities in the zone. Large construction works have affected the hydrological dynamics of the floodplains within the Imbé Watershed. The dynamics of these drained areas has also been altered by the removal of almost all the original vegetation cover, the silting-up of the rivers, made worse by the inadequate use made of land, and by localized surface drainage works to build semi-covered canals and underground drains, a common practice throughout the study area. Of all the Imbé Watershed, this agro-ecological zone is the most vulnerable in terms of water resources, building-up pollutants and the sediment that come down from upstream regions.

Groundwater. The aquifers are free and shallow with limited potential and risk of contamination. The favorable hydrogeology of this zone is dependent on the locations with the thickest layer of sediment. Aquifers may meet the domestic requirements of communities, and also those to irrigate small crops.

Soil Potential. The soil is normally badly drained, with accumulation of clay and organic material. As the original material is sedimentary in nature, these soils are rich in nutrients and contain high levels of toxic elements such as alumina and soluble salts. Toxicity limits their use to crops that are adapted to/or can tolerant them (pastures, rice). However when drained and within certain toxic levels, these soils may be used for shallow root system crops or for crops that are adapted to the presence of water (bananas, rice). These soils do not appear to be suffering erosion, but due to the excessive drainage associated with their inadequate use, soil horizons have become very poor. A soil management system with strict criteria in terms of soil movement and drainage is a prerequisite if this soil is to be managed in a rational manner.

Loss of native vegetation and root causes. The original vegetation of this zone was evergreen forest and marshlands, the area of both of which diminished as cattle raising expanded, until only fragments remained, mainly in the initial and median stages of regeneration, showing varying degrees of human impact alteration. The riparian forests are restricted to the remaining strips, found mainly on the Lower Imbé River. Macrophytes are to be found in the permanently flooded areas.

Cropping systems. Pastureland, of semi-spontaneous or seeded grass types, dominates the landscape of this agro-ecological zone. Agricultural activity is basically limited to rural settlements. Though agriculture, due to its small production, has little weight in economic terms, it has considerable social importance as it is option available for the smallholders in the settlements In this context, part of these areas is being used for annual, perennial and semi-perennial crops. Among the annual crops are: corn, beans and vegetable cultivation, while fruit and bananas (these in complete decline today) are the perennial crops. The municipal administrations are implementing projects to encourage aquaculture in the region and have built various ponds to this end with the support of the Rio Rural Program.

Agro-ecological Zone 2: Smooth hills. This vast area in the center-southeast of the Imbé Watershed, takes up 23,040 hectares, equivalent to 24.6% of the watershed area. As well as the narrow strip of hills on the left of the Imbé River, it includes the smooth hill country that extends to the right, including the entire watershed together with the adjacent floodplains of three tributaries. There are two communities in this area. The area is basically one of smooth hills (crystalline rock). In this undulating topography, gradients vary between 25% and 45%.

Soils. The soils are deep, porous, permeable and well-drained soils. In general, they have a clayish or very clayish texture, with unfavorable chemical conditions and low fertility; frequently, with high concentrations of alumina causing a strong acid reaction. However, they have good physical properties, making them suitable for agricultural use after the soil has been corrected.

Soil Potential. The agricultural use of these areas is restricted to crops that justify the use of technologically advanced cultivation management methods. Local farmers are accustomed to using a pair of

oxen and a plough to prepare the soil. However, as the gradient gets lower, toward the southeast of the watershed, more extensive cultivation methods may be employed, together with the necessary soil conservation measures. On the steeper slopes, silvipastoral and agroforestry activities are recommended.

Degree of erosion and root causes. Susceptibility to erosion can be classified between slight and strong requiring the use of conservation techniques on the higher slopes that are unlikely to be economically viable. The smooth undulating lowlands where the more intensive farming takes place, used either for cattle raising or for sugarcane, show advanced stages of sheet and rill erosion, severe cases of which are to be found on the steeper slopes of isolated hills where appropriate soil management techniques have not been employed. When used as pastures, these areas are often subject to overgrazing, which makes the recovery of grass cover difficult. When used for agriculture, soil preparation and management techniques have led to severe desegregation and soil exposure. Soil preparation in the rural communities of the lower watershed settlements, normally involves the use of blade or disc ploughs and various gradings, a process that breaks down the soil structure. Oxen- or tractor-drawn ploughs are used, and in the latter case the tractor normally works in a downhill movement. The crops are weeded frequently and the residue collected, bound and burned. In the case of cassava cultivation there is a long period of time when the soil is unprotected.

Sedimentation. Sedimentation has led to the silting up of rivers, and is a direct result of inadequate practices where alterations to the hydrological dynamics of slopes have caused increased surface runoff, reducing water infiltration into the soil, impacting on the recharging of the aquifers. This panorama requires the adoption of sustainable land management to incorporate soil and water conservation techniques.

Groundwater issues. There are inumerous springs and ground water recharge areas in this zone. The aquifer is of the fissural type, but the clayish impermeable nature texture of the soil, together with large-scale clearance of forest cover in the recharge areas result in an unfavorable hydrogeological condition.

Cropping systems. The smooth hills are the scene of more intensive farming methods on larger farms where inputs, technology and capital are used for large-scale cattle raising, sugarcane cultivation and eucalyptus growing. On the family farms along the lower Imbé, these hilly areas are used for pastures, semi-perennial crops such as sugarcane and cassava, and to a lesser degree, for perennial crops such as bananas. In general, these production systems lack the required agro-economic planning to ensure their sustainability.

Recommendations. This terrain can support from medium to high load capacity, indicating conservation agriculture as the most suitable, together with actions to recover the Atlantic Rainforest, the degraded areas and the riparian forests.

Agro-ecological Zone 3: Hills. This agro-ecological unit is located mainly in the southwestern part of the watershed, to the left of the middle section of the Imbé River. Covering 10,793 hectares, this unit corresponds to 11.52% of the watershed area. Its main feature is the presence of a series of hills and foothills with convex-concave slopes and rounded or elongated tops, smooth gradients and less than 100 m from valley floor to hilltop. Drainage density is average and the standard is variable.

Soils. The soils are deep, well drained and porous to impermeable. Reduced fertility, relief features and susceptibility to erosion can be highlighted as the principal factors limiting the adoption of productive systems. Suitability for agriculture was classified as restricted for crops that require high levels of technology and unsuitable for the level without capital or access to technology. Due to the varied relief, the suitability of this land for agriculture is restricted, irrespective of the technological level considered, and only the more gentle slopes and flatter hilltops should be used. On the less inclined slopes, the soils are adequate for pastures and perennial crops managed using conservation practices. The implementation of silvipastoral and foresttry systems is also recommended.

Vegetation. The original vegetation was composed of evergreen forest. The natural vegetation in these areas was cut down as a result of the expansion of cattle raising. Only small fragments of the original vegetation cover can be observed on the higher sections of the land and on some of the steeper slopes.

Degree of erosion and root causes. As a result of the continuous erosion of the poorly managed soils, land in this area runs a high risk of suffering gully erosion, although in reality the rate of occurrence has been low. They can be classified as sediment producing areas, which are carried by surface run-off to the bottom of the main watercourses, contributing towards the silting up of downstream bodies of water. The presence of pastures degraded by accentuated sheet erosion together with rill erosion is common in this area, with the more fertile horizontal surfaces partially affected. Overgrazing has been observed in these areas, making recovery of the grassland difficult, especially during the dry season, worsening erosion. When used for agriculture, soil preparation and management processes have facilitated erosion because of high levels of soil exposure and desegregation. Soils have gradually been depleted by continuous cultivation and by cattle raising resulting in the impoverishment of soil and water resources.
Recommendations. Recovery of the Atlantic Forest, on the steeper sections, and of riparian forests and drainage headwaters are priority actions. Environmental control of mining activities and the recovery of degraded areas are needed. On steeper sections, the risk and control of landslides should be taken into account.

Agro ecological Zone 4 - Mountainous relief. Composed of small and discontinuous areas distributed in the extreme southeast of the Imbé Watershed area, this zone forms part of the areas of the inter-mountain valleys of the upper course of the Imbé River and its tributaries, including the areas close to its source. The rural settlements of Santo Antônio do Imbé, Dr. Loretti and Morro do Estado are located in this area, as well as the town of Trajano de Moraes, forming the most densely populated area. This zone covers 8,225 hectares, which corresponds to 8.78% of the area of the watershed.
Soils and Potentialities. The soils in these areas are similar to those of Zone 3 (see above), highlighting the good physical properties and low natural fertility resulting from acidity due to excess alumina, low retention capacity and shortage of nutrients. These are soils that can be exploited by means of agro-silvipastoral systems, provided that strict soil and water use planning is adopted, given the evident limitation of the steep topography.
Vegetation and Land use. The natural vegetation is concentrated on the tops of the hills and mountains in the steeper areas, and fragments of riparian forest can still be observed on certain sections of the rivers. This zone was occupied more intensely from 1860 with the start of the coffee cycle in the region, predominantly on the middle slopes of the deep valleys of the upper course of the Imbé River, up to 1965, when the coffee plantations were eradicated in the region. During this process many areas were cleared for coffee plantations and for this reason it is not unusual to find steep slopes devoid of any of the original vegetation, today almost totally occupied by pastures planted for dairy cattle.
Cropping System and Erosion. Currently the area used for coffee planting is much reduced, and has become inexpressive. The coffee growing methods used in the past, involving no soil conservation measures, and the inadequate management of the subsequent pastures reinforced the erosive processes, very present on the mountain slopes. Erosion varies from slight to strong as a function of usage and the steep slopes inherent to the local relief. These are areas prone to landslides. Combined patterns of sliding followed by rill erosion are frequent on the steeper slopes. Currently the land in this area is mainly used for pastures for dairy farming, and this hilly region is basically set over to milk production.
Water resource issues and root causes. In this mountainous area, problems of water shortages are not common, principally in the rainy season, when water volumes increase considerably. However most of the population of the Imbé Watershed lives in this zone, threatening groundwater quality and recharging. From the Imbé River springs, passing through the town of Trajano de Morais as far as the community of Dr. Loretti, the river forms narrow and discontinuous flood plains that have suffered considerable human impact, related with agricultural activities or urban expansion. As there is no sewage treatment in these areas, the river is polluted. In the town of Trajano de Morais, with approximately 3,500 inhabitants, sewage is partially discharged into septic tanks and partially directly into the Imbé River. The excess of organic effluents derived from domestic sewage can lead to processes of eutrophication of the downstream

reservoirs and the Cima Lagoon. The most notorious example is the dam (for hydropower) built 60 years ago in the Imbé River at Trajano de Morais, currently used for recreation, which now has a high degree of eutrophication and sedimentation and is partly covered by aquatic macrophytes and grass. In the district of Santo Antônio do Imbé, part of the sewage is discharged into septic tanks and part is discharged in the open, where it can pollute rivers and groundwater tables. In addition, there is a high potential for increased pressure on the natural resources of this zone, in view of the high number of mining license applications made to the National Department of Mineral Resources (DNPM). This zone is favorable from a hydro geological point of view.

Agro-ecological Zone 5 - Escarpments. This agro-ecological zone, at approximately 24,831 hectares, takes up the largest part of the Imbé Watershed, representing 26.51% of its total area. Extending in a SW-NE direction, parallel to the axis of the watershed, this zone goes the length of the left bank of the Imbé River, from its source to the confluence with the Cima Lagoon, making up the north face of the watershed. It includes the municipalities of Campos dos Goytacazes, Santa Maria Madalena and Trajano de Morais. The hamlet of Sossego is located at the foot of the Serra do Sossego (mountain), beside the Desengano State Park. This zoen has a prominent relief which stands out from the surrounding hills. A steep mountainous terrain with a low recharge capacity, thin soil cover and projecting rocks make it highly susceptible to erosion and landslides.

Soils and Potentialities. Agriculture potential s limited by the rocky, stone-strewn ground, covered with shallow and incipient soils. Fertility, though not very high, varies depending on the origin of the material and the condition of the rock.

Vegetation cover and Cropping Systems. Part of this zone has extensive areas covered with natural vegetation. The main land uses are for pastures and banana growing. These are areas, in the majority, that are inadequate for agriculture or cattle raising, with forest cover in varying stages of regeneration over a rugged topography. However, the lower areas of these escarpments have been almost completely cleared of forest and are used for pasture or bananas or eucalyptus. More intensive agriculture and cattle raising is to be found, using capital and technology; alongside subsistence or low-income farming, in small cleared areas (*roçados*) where cassava, corn, beans and various kinds of fruit trees are grown.

Water resource issues. According to local residents the volume of water that comes from the sources of the Imbé River has diminished in recent years due to forest clearing, even taking into account the dry season. From the point of view of water resources, this zone cmprises an environmental unit of great relevance, as these escarpments contain numerous springs running into the drainage network that contributes to the Imbé River. Their preservation is of the utmost importance if the springs are to be preserved and the aquifers recharged, ensuring the hydrological cycle and continued water resources. The main tributaries of the Imbé River are located in this area. In the small community of Sossego do Imbé, with about 40 families, part of the sewage is discharged into septic tanks and part directly into the Sossego Stream.

Loss of native vegetation and root causes. This is a region of transition between the floodplain and the Serrana plateau where the Desengano State Park is located, these surrounding areas being important to this conservation unit. Due to the rugged topography, human occupation is difficult and that is why these areas possess dense vegetation at medium to advanced stage of forest succession. Even so, in the areas where pasture has been planted or where there are small agricultural activities, erosion problems have occurred due to the very steep slopes. These critical areas need to be rehabilitated through e.g. the adoption of conservation agriculture and afforestation, taking into consideration the principles of soil and water conservation.

Recommendations. The permanent preservation of these areas should be paramount, as a refuge for wildlife and to protect water sources. Measures to recover degraded areas and to preserve/recover the Atlantic Forest should be implemented. Because of its extraordinary scenic beauty, this is a region with great potential for eco-tourism, but before this kind of activity becomes more intense, this district needs to implement: environmental planning, an appropriate water resources management, and a program to increase awareness in relation to the importance of conserving the biodiversity of the area. The supply and

dimensioning of demand for water, the discharge of sewage and disposal of residual waste are all important points that have to be considered. The need to protect springs and preserve biodiversity highlights the importance of this zone.

2. Biodiversity

The Imbé Watershed may be considered highly important in biological terms, not only nationally but also globally. This importance comes from the presence of some of the remaining sections of Atlantic Rainforest containing threatened typologies and species and restricted endemism.

The original cover contained small sections of seasonal forest and entire rainforests. The seasonal forest formations, dominated by deciduous trees such as *jacaré* (*Piptadaenia sp*), occur in certain regions of the watershed, for example, along the lower Imbé, between the Cima Lagoon and the River Preto. Commonly found among these formations are *angicos* (*Anadenanthera sp*) and *brejaúva* (*Astrocaryum aculeatissimum*) as well as important fauna such as macaws (*Propyrrhura maracana*) and toucans (*Ramphastos vitellinus*). In the past, rainforest dominated the Atlantic forest types in the State of Rio de Janeiro. The presence of introduced tree species (*Araucaria angustifolia*) created doubts about the existence of mixed rainforest in the higher areas of Santa Maria Madalena, although indicators of autochthonous occurrence were missing.

The proximity to the Imbé river and its periodically inundated floodplains were favorable to diversified forest formations in the low areas around the Municipality of Campos. One type of formation found in these floodplains is the paludose forest. It is important to note the presence of “mar de caixetais” (*Tabebuia aff. cassinoides*) in the Brinco region of this forest, where its resurgence has led to the growth of small secondary forest areas. Groups of sedges and grasses, food for various species of amphibians and even fish such as Rivulus sp, are found at the water's edge.

The lowland forests, present on the southern and eastern spurs of the Almas and Penação mountains, are among the **most important for biodiversity conservation**. These woods, with their 30-meter high canopy, contain magnificent examples of “jequitibás” (*Cariniana legalis* and *Cariniana estrellensis*) and tropical trees (*Platymenia foliosa*) which are home to animals from the Amazon Rainforest such as the red-headed manakin (*Pipra rubrocapilla*) and various low-altitude species that are endangered worldwide such as the white-tailed cotinga (*Xipholena atropurpurea*), the white-eared conure (*Pyrrhura leucotis*), the blue-throated conure (*Pyrrhura cruentata*), the maned sloth (Bradypus torquatus), the black-headed berryeater (*Carpornis melanocephalus*) and the red-browed Amazon parrot (*Amazona rhodocorytha*). Species that are threatened locally in the State of Rio de Janeiro, such as the mealy parrot (Amazona farinosa), are found in small isolated groups. The presence of Desengano State Park does not protect any of these species, as its boundaries begin above the altitude where they occur.

Above 200 meters in altitude the topography has more movement, with forest cover and humid mountain typologies, nebular formations and "fields" at 1500 m. Relevant species for environmental conservation have been encountered such as the russet-winged spadebill (*Platyrinchus leucoryphus*) and the wooly spider monkey (*Brachyteles arachnoides*).

The use of forest resources over the past centuries has modified the region in different ways. On the upper Imbé, the planting of coffee until the first half of the XIX century removed the forest from the mountainsides, remaining only in inaccessible areas. The end of the coffee-growing period reduced the impact on natural areas so that, with the remaining areas of forest acting as genetic banks, they were able to regenerate themselves. These large and biologically rich secondary growths are also found within

Desengano State Park.

On the lower Imbé, the expansion of the sugar cane plantations practically removed any forest remnants from its right bank. The remaining forest sections on the left bank were relatively protected until the 1980s when a general shortage of timber caused a run on forested areas. Inadequate evaluations and poorly planned public policies moved rural populations onto settlements in preserved and biologically important areas which, without the necessary information, have been pressuring the remaining forest areas and causing the extinction of threatened cinagenetic species. The remaining areas are of extreme biological importance and are still used for extractivism. Primitive techniques for using forest areas are still found in the region, such as slash-and-burn for planting.

Another **threat to the biota** of the watershed is the breaking up of the forest area. The small areas remaining are like islands of natural vegetation and are incapable of maintaining their original biodiversity. Large cinegenetic species (the Brazilian tapir - *Tapirus terrestris* and the white-lipped peccary – *Tayassu pecari*), species at the top of the food chain (the harpy eagle - *Harpya harpyja* and the jaguar (*Panthera onca*) and species dependent on specific micro-habitats that are easily altered (the Eleutherodactylid frog - *Eleutherodactylus sp*) have already disappeared. Forest species in the isolated remnants are unable to cross the areas used for monocropping or pastures and are slowly becoming extinct in the region (the unicolored antwren - *Myrmotherula unicolor*). This fragmentation also breaks major biological cycles such as the interaction of specialized fruit-eating species and the growing of "taquara" grass (*Guadua sp, Merostachys sp* and *Chusquea sp*) and the purple-winged ground-dove - *Claravis godefrida*) or large emerging low population-density forest types (sapodilla - *Manilkara sp* and black-headed berryeater - *Carpornis melanocephalus*).

Another threat to the biota of the watershed is the breaking up of the forest area. The small areas remaining are like islands of natural vegetation and are incapable of maintaining their original biodiversity. Large *cinegenetic* species (antas- *Tapirus terrestris* e queixadas - *Tayassu pecari*), species at the top of the food chain (Uiraçu - *Harpya harpija* and panther *(Panthera onca*) and species dependent on specific micro-habitats that are easily altered (Rãs-de-folhiço - *Eleutherodactylus sp*) have already disappeared. Forest species in the isolated remnants are unable to cross the areas taken up with monocultures or pastures and are slowly becoming extinct in the region (*Myrmotherula unicolor*). This fragmentation also breaks great biological cycles such as the interaction of the specialized frugivors/fruit-eaters species and the growing of “taquara” grass (*Guadua sp, Merostachys sp* e *Chusquea sp* and the rola-espelho - *Claravis godefrida*) or great emerging low population density forest types (Massaranduba - *Manilkara sp* e cochó - *Carpornis melanocephalus*).

The upper Imbé River, in Trajano de Moraes, brings the environmental degradation, a result of its proximity to urban and periurban areas, to the reality of the watershed. The original native forest at the source of the river has been replaced by exotic monocultures, such as banana and “pupunha” fruit, and the margins occupied. In Trajano, the Imbé River receives the discharge of untreated domestic sewage, making it impossible for many species to survive in that environment.

In general terms, the watershed represents the already known environmental picture of the State of Rio de Janeiro: continuous and growing direct use of the autochthon biological resources on unsustainable bases, with no short- or long-term benefit for the population, and acting as a factor in the creation of pockets of rural poverty.

A more detailed/specific description of **environmental issues and constraints** in Imbé watershed

is available in the project files.

3. Socioeconomic Aspects

3.1. The Regional Context

A characteristic of the topography of the North and Northwest of the State of Rio de Janeiro are the steep hillsides that, due to inadequate planting and soil management systems show clear signs of degradation, with soil erosion and a generally poor aspect. These two regions stand out also because of::(a) the significant percentage of the rural population who live there and the importance of the rural area; (b) the still important role of agriculture and cattle raising, even with its lack of dynamism, its rudimentary nature and low technological standards, in terms of the regional economy, as the main activity and means of survival/source of income for an important part of the regional population; (c) the precariousness of the living conditions and vulnerability of the rural population shown in the paradigmatic indicator results for quality of life (HDI-M, illiteracy rate among the adult population, infant mortality rate, concentration of families in the lower income groups, precariousness of the basic sanitation services, mainly in the rural area, etc.); and (d) the seriousness of the environmental problems resulting from human impact factors (forest clearing, soil degradation and erosion, pollution of springs and reduction in their water production).

3.2. Location and General Characteristics of Local Communities

Section 4.1 (Areas Researched) of **Annex 10** on Social Assessment describes the location and general characteristics of the local communities and rural settlements anlaysed during the socio-economic diagnostic study, which include the great majority of the watershed's communities and settlements.

3.3. Changes in Economic Life

See Section 4.2 of **Annex 10** on Social Assessment.

3.4 Production Systems

See Section 4.3 of **Annex 10** on Social Assessment.

3.5. Social Issues

See Section 4.4 of **Annex 10** on Social Assessment.

3.6. Perceptions of the Environment and Efforts of Government Environmental Agencies

See Section 4.5 of **Annex 10** on Social Assessment.

3.7. Community Organization

See Section 4.6 of **Annex 10** on Social Assessment.

3.8. Resistance to Technological Innovations or their Unsuitability

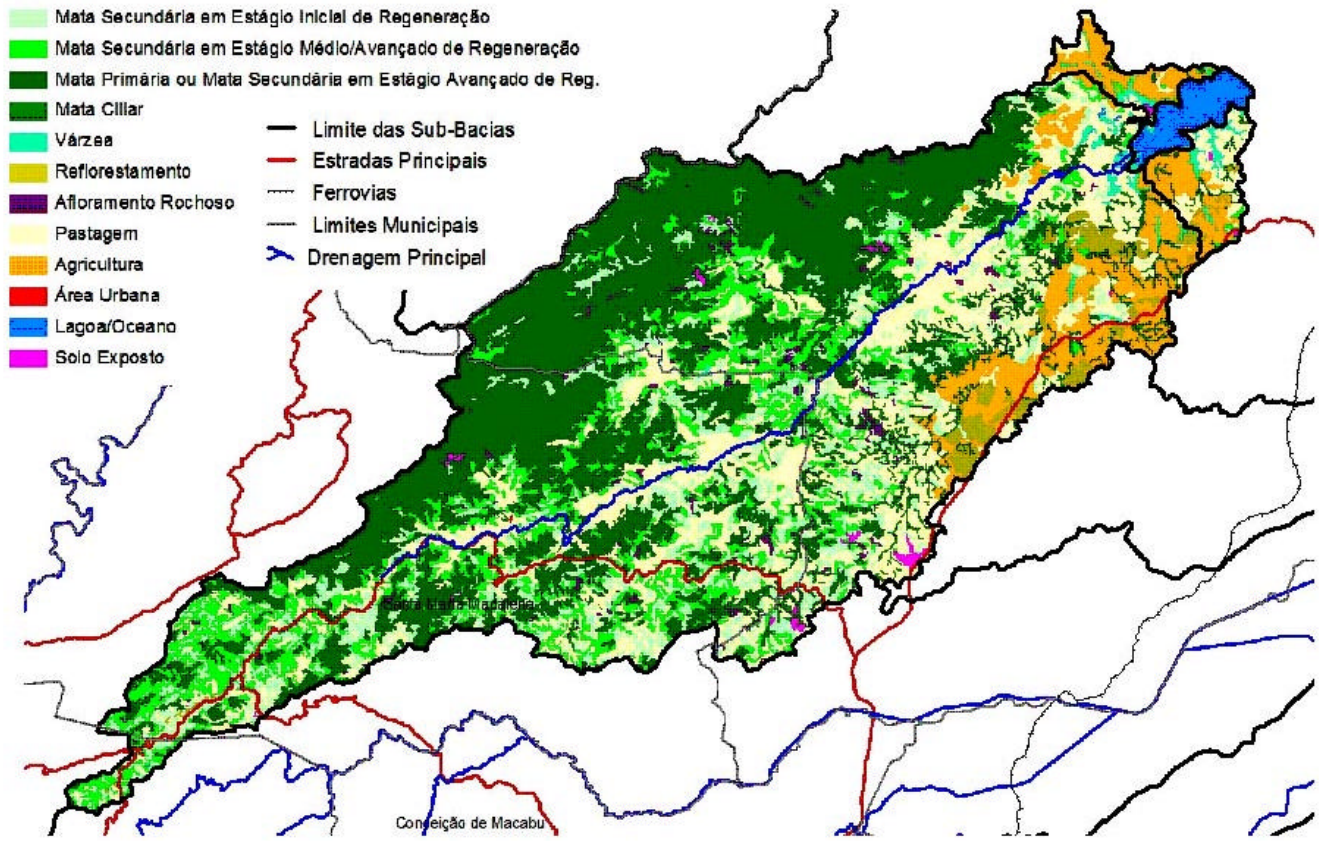
See Section 4.7 of **Annex 10** on Social Assessment.

Endnotes:

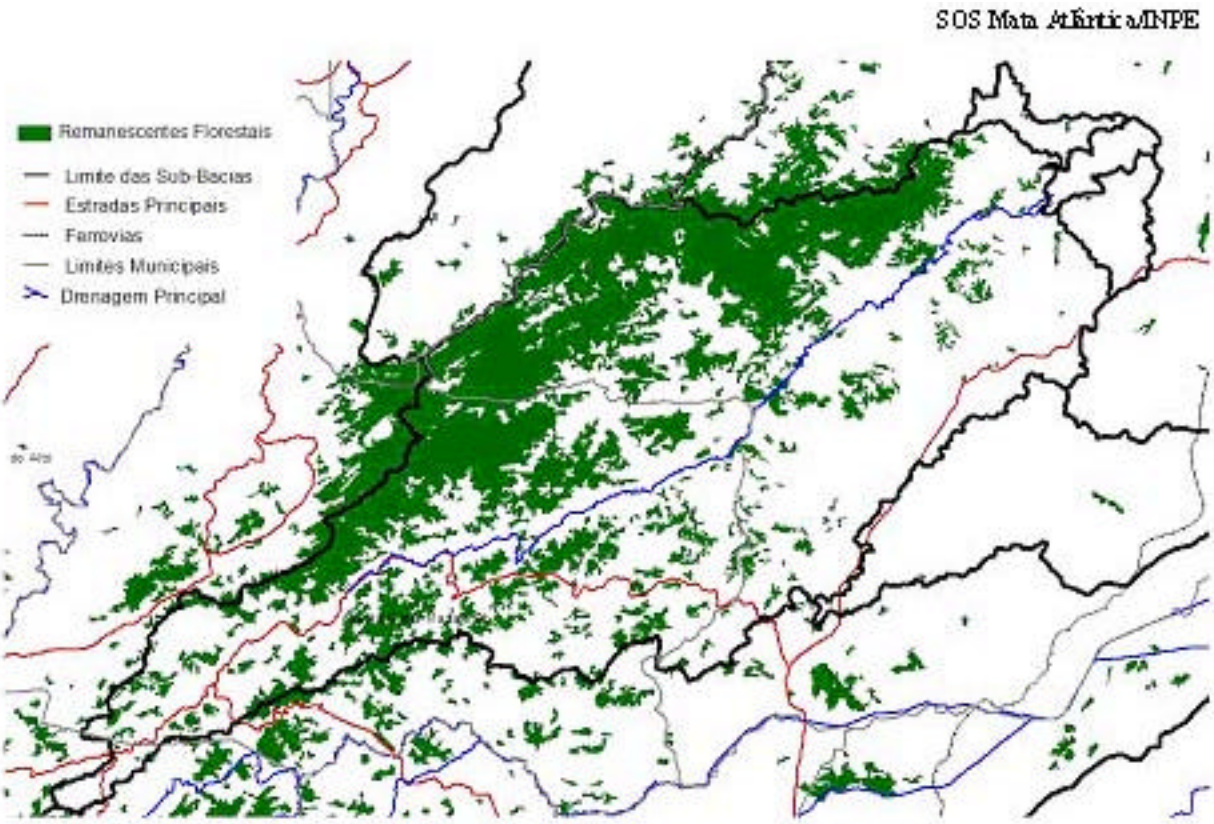
1. Sources: Scale maps that varied from 1:50,000 to 1:250,000, drawn up by the IBGE (road network, waterways and municipal roads), CPRM (geology, geomorphology and annual rainfall curves), EMBRAPA (soils and agricultural aptitude of land) and IEF (conservation units), CIDE Foundation (use and occupation of land), respectively. As well as the maps, PESAGRO furnished data on average monthly and annual temperatures and on rainfall (the month with most rainfall and the driest trimester).

Annex 9, Appendix 2.1

Map 2. Land Use Map of the Imbé Watershed (updated in July 2003)



Map 3. Atlantic Forest Remnants in the Imbé Watershed (updated in July 2003)


SOS Mata Atlântica/INPE
Remanescentes Florestais
Limite das Sub-Bacias
Estradas Principais
Ferrovias
Limites Municipais
Drenagem Principal

Additional GEF Annex 10: Social Assessment
BRAZIL: Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of the North-Northwestern Fluminense (GEF)

1. Introduction

The Sustainable Land Management in Productive Landscapes of the North/Northwest Fluminense (NNWF) Project will cover the watersheds of the rivers Imbé, Doce/Quitingute, Macabu, Muriaé and Costeira do Entorno da Mata do Carvão. The area of influence of these watersheds is mainly in the North/Northwest Fluminense regions, and includes a small part of the Serrana region. The present diagnostic will describe and analyze prevailing socioeconomic conditions.

1.1. Methodology for the Diagnostic

Two complementary activities were carried out during the socioeconomic diagnostic process. First, documentation and statistics regarding municipalities within the North/Northwest Fluminense regions were studied[1]. Later the Imbé Watershed was chosen as a case study, including the municipalities of Trajano de Morais and Santa Madalena (Serrana region) and the district of Morangaba in the municipality of Campos dos Goytacazes (North Fluminense region).

The Imbé Watershed case study included quantitative, qualitative and participatory research, covering: (a) the use of household questionnaires on themes related to household structure, access to public services, productive activities and sources of income, perception of environmental and social issues, participation in organized bodies and in collective activities (involving motivating factors and effectively implemented strategies); and (b) meetings with community leaders and, when possible, with groups of community residents to discuss similar subjects based on a semi-structured agenda.

In Trajano de Moraes, activities were carried out in the Caixa D'Água community, which includes the Santo Inácio settlement and the area of the headwaters of the Imbé River. In Santa Maria Madalena, activities extended to the Sossego do Imbé, Cruzeiro do Imbé, Alto do Imbé, Santo Antonio do Imbé and Dr. Loretti communities. Finally, in the municipality of Campos dos Goytacazes, activities were concentrated on the communities of Aleluia, Batatal, Cambucá and Conceição do Imbé, within the Novo Horizonte settlement. A meeting was also held with the entity representing medium and large landowners from the right bank of the Imbé River - the Rural Producers Association of South Campos (the localities of Caxeta, Elesbão, Itibioca, Lagoa de Cima, Maruí, Pedra Negra, Pernambuca, Rio da Prata, Santa Rita and Sentinela).

2. State Context

Covering an area of 43,864.3 km2, the State of Rio de Janeiro has 91 municipalities, distributed among 6 meso-regions[2], with a population of 14,391,282 (2000 Demographic Census); it has a demographic density of 328.1 inhabitants per km2 and one of the country's highest urbanization rates, equivalent to 96%. Its urban population is 30,821,466 and the rural population is 569,816. From 1991 to 2000, the population growth rate in the State of Rio de Janeiro was lower than that of the rest of the country.

Between 1991 and 2000 the HDI of the State of Rio de Janeiro rose from 0.750 to 0.802, placing it in the high human development category and in fifth place among Brazilian states. However, education, health,

housing, sanitation and income indicators showed a wide gap between urban and rural areas in the state.

Thus:

a. Illiteracy is higher among the rural population, with a 12.9% difference in the literacy rates of rural and urban populations (94.2% of the urban population are literate compared to 81.3% of the rural population). While only 7.2% of urban heads of households are illiterate or have only one year of schooling, in the rural area this figure rises to more than one-quarter. In urban areas 36.7% of heads of households have, at the most, 4 years of schooling; more than three-quarters of heads of rural households are not in this condition

b. From 1989 to1998, the infant mortality rate in the State of Rio de Janeiro fell from 33.66/1,000 to 25.25/1,000 (a variation of -25%), but it varies in inverse proportion to the increase in the urbanization rate of each municipality Source: Estimativa da Mortalidade Infantil por Microrregiões e Municípios, www.datasus.gov.br.

c. Based 1991 Demographic Census data, a CIDE Foundation study showed that the State of Rio de Janeiro is characterized by the fact that its housing deficit: (i) is higher in rural areas than in urban areas, and (ii) is concentrated more notably among lower-income groups[4].

d. In 1991, 57% of permanent households had adequate basic infrastructure (lighting, water supply, sanitation and trash disposal). 2000 Demographic Census data, in turn, show major distortions between rural and urban areas with respect to: (i) service through the general water supply network (difference of 64.2%); (ii) availability of sanitary installations in permanent private residences (difference of 7%); (iii) inadequacy of the sanitary sewer system (14% in urban areas and 64.5% in rural areas); and (iv) appropriate trash disposal (difference of 53.1% between urban and rural areas).

e. With regard to income, the 2000 Demographic Census of 2000 showed that in the State of Rio de Janeiro there is a significant number of heads of households with incomes of less than 5 minimum salaries and that this is more noticeable in rural areas. In urban areas 60% of heads of households families earn less than 5 minimum salaries and one-third of them earn less than 2 minimum salaries, while in rural areas 83.1% of heads of households earn less than 5 minimum salaries and nearly two-thirds earn less than two minimum salaries.

In 2000 the State of Rio de Janeiro had a GDP equivalent to R$147 billion, 64% higher than that of 1996 and representing a per capita GDP of R$9,159. The sectors that grew the most in terms of their participation in the GDP were: communications (143%)[5], water transportation (124%), extractive and processing industries (78%)[6] and gas distribution (59%). The sectors whose participation decreased the most were public administration (-28%), water and sanitation (-11%), civil construction (-8%), agriculture and livestock (-6%) and financial institutions and rents (-4%). The agriculture and livestock sector represents only 0.4% of the state's GDP.

According to the 1995-1996 Agriculture and Livestock Census, the State of Rio de Janeiro had 53,680 establishments working an area of approximately 2.4 million ha. The State has a large number of farms with “fewer than 10 ha” (53% of total farms) and with “10 to fewer than 100 ha” (37.3% of all farms). However, there is an enormous amount of land on farms with more than 100 ha (67.7% of all agricultural land within the State belongs to only 9.7% of all farms). In terms of producers: 93% own the land, 4% are tenant farmers, 1.5% are sharecroppers, and 1.5% are squatters. 63.9% of farm land is used for pasture,

14% for temporary and permanent crops, and 14.5% is either jungle, native forest, or reforested land.

From 1995 to 1996, in the State of Rio de Janeiro, about 170,000 people worked on farms. 92.9% of this work force were age 14 years or older, 79.2% were men and 20.8% women. 45.2% of farms used manual labor exclusively in soil preparation and crop management. 33.1% of these farms had access to technical assistance and rural extension, and only 27.6% were members of any association. The use of fertilizers and soil correction practices was more generalized, on 51.1% of farms.

In Rio de Janeiro family farming comprises the immense majority of the State's farms, but estate farms contain most of the agricultural land. Family farms are more dependent on the exclusive use of manual labor, have less access to electricity and technical assistance, and have lower indices of the use of fertilizer and corrective practices and of links to organized institutions (associations and cooperatives) than estate farms. Family farms employ nearly twice as many people in agricultural activities, requiring a little over one-quarter of the area that estate farms require for each person employed. However, estate farms are responsible for a more significant percentage of gross production value (GPV). Average GPV and estate farm income are many times higher than those of family farms, but the latter produce more income and profit per unit area (a difference of 47.8%). All this suggests that Fluminense family agriculture is competitive in relation to estate farms.

3. The Regional Context

The North Fluminense Region includes 9 municipalities: Campos dos Goytacazes, Carapebus, Cardoso Moreira, Conceição de Macabu, Macaé, Quissamã, São Fidélis, São Francisco do Itabapoana and São João da Barra. Together, these nine municipalities total 9,767.0 km2 and have a population of 698,783 inhabitants (a demographic density of 71.5 inhab/km2). 4.9% of the State's population live in this region, which is home to 18.3% of the State's rural population. The urbanization rate of the North Region is 85.1%. 11.1% of the region's municipalities have a population of fewer than 10,000 inhabitants and 66.7% have fewer than 50,000 inhabitants[7].

The Northwest Fluminense region includes 13 municipalities: Aperibé, Bom Jesus do Itabapoana, Cambuci, Italva, Itaocara, Itaperuna, Laje do Muriaé, Miracema, Natividade, Porciúncula, Santo Antônio de Pádua, São José de Ubá and Varre-Sai. Together these municipalities have an area of approximately 5,385.6 km2 and a population of 297,696 inhabitants (a demographic density of 55.3 inhab/km2). The region holds only 2.1% of the State's population, but is home to 10.9% of the rural population. The average urbanization rate is, at 79.2%, the lowest in the state, and in the case of the municipality of São José de Ubá, it is as low as 36.3%. 23.1% of the region's municipalities have fewer than 10,000 inhabitants and 92.3% of them have fewer than 50,000 inhabitants.

The NNWE Project's area of coverage also includes two municipalities in the Serrana region: Trajano de Moraes and Santa Maria Madalena, which are traversed by the Imbé River. The population of the former is 10,038 inhabitants and of the latter, 10,476. The rural population of Trajano de Moraes is 6,354 and of Santa Maria Madalena 4,946 inhabitants. The former has an urbanization rate of 36.7% and the latter 52.8%.

From 1991 to 2000, the population of the North Fluminense (at 1.46% per annum) grew faster than that of Rio de Janeiro (1.28% per annum), essentially because of the attraction of the oilfields. The Northwest Fluminense was the region that grew least in the State (0.96% per annum). In fact, although they contain a large part of Rio de Janeiro's rural population (29.2%) and have lower urbanization rates than those

prevailing in the rest of the State (85.1% and 79.2%, respectively), the North/Northwest Fluminense Regions have experienced a more pronounced decrease in rural population than the rest of the country, the Southeast, or the State itself. While the decrease in the rural population in the North Fluminense is nearly three times higher than that found in the rest of the State, the rate in the Northwest Fluminense is nearly five times higher. In contrast, urban population growth rates in the municipalities that comprise both regions are higher than those in the State or the Southeast.

The NNWF are the two regions of the State of Rio de Janeiro with the worst performances in relation to various socioeconomic indicators. In 2000, 85% of the municipalities in the Northwest region and 89% of the municipalities in the North region (as well as the municipalities of Santa Maria Madalena and Trajano de Moraes) had HDI-M below the average for the State's municipalities. The lowest rate among municipalities in both regions is that of Varre-Sai (0.679) and the highest is that of Macaé (0.790), which places the region's municipalities among the group of municipalities with average human development. The region's weak results in terms of the paradigmatic indicators of quality of life (HDI-M, illiteracy rate among adults, infant mortality rate, concentration of families in lower income levels, precarious basic sanitation services, principally in rural areas, etc.) reflect the especially precarious living conditions of the rural population and their vulnerability.

The two regions stand out because of the disparities between the grades that students study at in school and their age, which are higher than for the State as a whole, both at grade school and high school levels. While for the State, the grade/age is 64.3% in grade school and 79.6% in high school, in the North Fluminense these are 68.7% in grade school and 82.2% in high school, and in the Northwest Fluminense, as high as 70.3% in grade school and 81.0% in high school. The NNWF's illiteracy rates are higher than the State average. As occurs at State level, both regions show a strong disparity between urban and rural illiteracy rates. This phenomenon is more marked among the rural population, and even more so in those of the Northwest and North Fluminense where it totals 21.9% and 23.9%, respectively, of the population age 10 or older. Illiteracy is higher in the female rural population than among men. In the North Fluminense, this pattern is repeated in relation to the urban population. In the NNWF there are proportionally more heads of urban and rural households with a lower level of schooling than that found in the State of Rio de Janeiro. This is also accentuated in the rural area, where heads of households with less than one year of schooling represent 42.0% in the Northwest region and 40.4% in the North Fluminense, and heads of households with up to 4 years of schooling total 82.2% in the Northwest Fluminense and 84.8% in the North Fluminense.

From 1989-1998, infant mortality rates in the NNWF remained higher than those in the State, falling slightly less than those for the State as a whole (a difference of 1.8% in the Northwest and 2.5% in the North Fluminense). The predominant causes of infant mortality in both regions are: infections, parasites, respiratory infections, and illnesses originating in the perinatal period. These cause 75% of the deaths that occur in the municipalities in the Northwest Region and 70% of the deaths that occur in the municipalities in the North Region.

With regard to the housing deficit, in 1991 the situation of the North and Northwest Regions was similar to that of the State as a whole. However, because of overcrowding or the lack of access to basic infrastructure (electricity, water supply, sanitation and trash disposal), the rates for substandard housing were well above those for the State. While in the State 57% of permanent households had adequate basic infrastructure services, in the Northwest Region this rate fell to only 36% and in the North region to 33%. The 2000 Demographic Census shows that in terms of urban areas, the Northwest Region is better served than the State as a whole, with fewer than 5% of houses considered substandard. The situation is more precarious in the North Fluminense, where shortages affect 22% of households. However, water supply to the rural areas of both regions is predominately from wells and springs, which are made extremely

vulnerable by environmental issues related to drought and desertification. With regard to the availability of sanitary installations, there is a significant difference between urban and rural areas, 7.7% in the Northwest Fluminense and 13.1% in the North Fluminense, where nearly one-fifth of homes and rural residents lacked bathrooms in 2000. In terms of the sanitary sewer structure, 86.8% of urban households in the Northeast Fluminense and 69.4% in the North Fluminense are either connected to the general system or to septic tanks, but this is only the case in 17.3% and 15.1%, respectively, of rural households. The sanitary sewer issue in even more serious in the North Fluminense than in the Northwest Fluminense region. Finally, with regard to trash disposal, the discrepancy between urban and rural areas, already high at State level, is even greater at regional level: 69.4% in the North Fluminense and 81.1% in the Northwest Fluminense. Substandard basic sanitation services in rural areas and the comparative disadvantage in relation to the region's urban areas are factors contributing to the urban concentration of the region's population, as well as representing environmental risks and the increased vulnerability of rural living conditions.

Family income levels in the North and Northwest regions are lower than those for the State, but they repeat the predominant statewide pattern of major distortions between urban and rural populations. In urban areas the number of heads of households earning less than 5 minimum salaries is 72% in the North Fluminense and 78.1% in Northwest Fluminense. In the North Fluminense, nearly half of them earn up to 2 minimum salaries, and in the Northwest Fluminense more than half are in this income category. In rural areas, the number of heads of households in lower income categories is even greater. In the North Fluminense, nearly 90% earn less than 5 minimum salaries and more than three-quarters earn less than 2 minimum salaries. The situation is a slightly more serious in the Northwest Fluminense, where 90% earn less than 5 minimum salaries and nearly 80% less than 2 MS.

The reasons pointed out in the literature for the comparatively weak performance of the NNWF in terms of socioeconomic indicators, the substandard living conditions and the vulnerability of the population reflected by them, and also for the various environmental problems that these region face to differing degrees, include:

(1) the still significant weight of the regional population's rural characteristics;
(2) the strong link of municipal economies to the agriculture and livestock sector, and consequently their still significant importance, despite their lack of dynamism, their rudimentary nature and low technological standards, either in the regional economy or as a principal activity, as these are the survival conditions and the source of income for a significant portion of the regional population;
(3) the incipient nature of regional industrialization and agro-industrialization processes; and
(4) the break-up of agricultural policy instruments and the opening of the market, in the beginning of the 1990s, to competition from heavily subsidized foreign imports, and continued dependence on the regional economy.

In the agricultural and livestock sector, which is still regionally relevant, the following are prevalent: (a) monocropping, with the historic cycles of sugar-alcohol and coffee activities, leading to the vulnerability of the region's rural economy and to the contingencies of the commercial cycle of both commodities, to the devastation of native forests to open new areas for planting at peak periods, and to the abandonment and degradation of soils when market prices are low; and (b) extensive cattle raising, incorporating little in the way of new technologies, resulting in the progressive loss of competitiveness due to low productivity; falling prices paid to producers; competition from other regions and countries; lack of pasture recovery, non-introduction of new types of animal feed; and the impact of natural and environmental factors, especially reductions in the availability of water resources[8].

Agriculture and livestock continue to be the main occupations and sources of income for a significant

portion of the NNWF population, although their importance in terms of state and regional GDP and their contribution in terms of the formal job market are small, because the most of the jobs on farms in the regions and throughout the State are filled by family members.

The Northwest Fluminense has 20.2% (10,818) and the North Fluminense 20.8% (15,208) of the State's farms, and 45.2% of the area taken up by agriculture and cattle-raising is in these two regions. Both regions also contain 51.3% of rural land-owners, 40.6% of squatters, 38.8% of sharecroppers, and 25.4% of tenant farmers within the State. The NNWF repeats the pattern seen throughout the State with a high concentration of land in the hands of a small number of landowners (100+ ha). In the North Fluminense there is an even higher concentration of farms with under 10 ha (55.3%). In the Northwest Fluminense there is a higher concentration of farms with 10 to fewer than 100 ha (45.6%). Thus 91.2% of the farms in the North Region and 91% in the Northwest have fewer than 100 ha. However, these farms occupy only 32.2% of the agricultural area in the North Fluminense and 43.8% in the Northwest Fluminense. With regard to land use, both the North and especially the Northwest Fluminense are characterized by large areas used for pastures and semi-extensive cattle raising. The pasture areas of farms correspond to 61.7% of total area in the North Fluminense and 77.3% in the Northwest Fluminense[9].

According to the 1995-1996 Agriculture and Livestock Census, nearly 29,000 people in the Northwest Fluminense were employed in agricultural and livestock activities, of whom 88.9% were men and 90.9% were age 14 or older. In the North Fluminense, over 41,500 people were employed in livestock activities; of this work force, 81.7% were men, and 94.8% were age 14 or older. In terms of available technology on farms in the Northwest and North Fluminense, in the 1995-1996 agricultural year the situation was favorable in relation to that of the State, with the exception of the use of fertilizers and corrective measures. Special note is given to: (a) the scope of the rural electrification network in both regions; and (b) the high percentage of farms in the Northwest Fluminense gegion linked to associations and/or cooperatives and receiving technical assistance.

The comparative situation between family and estate farming in the Northwest and North Fluminense is similar to that prevailing in the State of Rio de Janeiro. Even larger portions of farms belong to the category of family farming and occupy larger amounts of agricultural areas in both of these regions. Family farming occupies an even larger portion of the rural work force and requires an even smaller proportion of area for each job opportunity created. The difference in yield (GPV) per unit area, although smaller than that prevailing for the State as a whole, also points to the competitiveness of family farming in the North Fluminense and especially in the Northwest Fluminense, compared to estate farming in the region.

Note, however, that a large portion of family farming in both regions is distinguished by the low threshold of monetary and non-monetary income (low level of dynamism). Thus, in the classification of family farms proposed by the INCRA/FAO study[10] (farms with "higher income," "average income," "low income," and "nearly no income"), 73% of family farms in the North Fluminense and 63% in the Northwest Fluminense belong to the lower half of the classification. Farms with "low income" and "nearly no income" account for 46% of family farm land in the North and Northwest Fluminense and for nearly 25% of the gross production value of family farming in both regions, and employ 68% of people engaged in family farming in the North Region and 57% of people engaged in family farming in the Northwest Region[11]. These farms are distinguished by their even greater, exclusive dependence on manual labor (46% in the Northwest and 48% in the North) and by low levels of access to electricity (51% in the Northwest and 28% in the North), to technical assistance and rural extension (38% in the Northwest and 18% in the North), to associations (26% in the Northwest and 17% in the North) and to the use of fertilizers and corrective measures (41% in the Northwest and 31% in the North). Finally, they also have weaker results in terms of the profitability

indicators considered here. In the North Fluminense, farms with "low income" and "nearly no income" generate a gross production value corresponding to only R$121/ha and to R$1,334 per farm. These values are 45% and 66% lower, respectively, than that of regional family farming as a whole. In the Northwest Fluminense, they require 5.75 hectares per person employed and generate a gross production value of R$128/ha and R$1,773 per farm. In comparison to the results of regional family farming, these values are 45% and 60% lower, respectively. Moreover, these farms have the highest rate of persons employed per unit area. Thus, in the North Fluminense, they require only 5.3 hectares per person employed and, in the Northwest, only 5.7 hectares per person employed, i.e., they require amounts of area per person employed that are 32% and 19% lower than that required for family farming as a whole.

Finally, it should be noted that the North and Northwest of the State of Rio de Janeiro are regions characterized by low rainfall and high evaporation rates. In some parts, the annual water balance can even be negative, with more evaporation than rainfall. Most areas in the North and Northwest Regions of the State of Rio de Janeiro consist of rugged terrain, with strong slopes, which, due to inadequate planting and management systems, show evident signs of degradation, with eroded soils and overall impoverishment.

Both regions also have various environmental problems resulting from human factors, including: the insufficiency or absence of basic sanitation infrastructure, causing the pollution of rivers and water tables as well as the proliferation of diseases; deforestation which leads to accelerated soil erosion and to the jeopardization of springs; improper agricultural practices that affect soil quality and accelerate the processes of erosion and contamination of soils and water due to excessive use of agrochemicals; and inappropriate mining methods that cause losses and improper disposal and non-recycling of waste[12].

4. The Imbé Watershed Case Study

This section discusses the key socioeconomic aspects of the Imbé River's area of influence, which serve as an example of the key issues that characterize all rural areas of the North and Northwest Fluminense Regions.

The Imbé Watershed is one of the basins contributing to Lagoa Feia. The Imbé River begins in the mountain of the same name, in the municipality of Trajano de Moraes (Serrana region), and flows along a total course of 70 Km, in which it traverses the municipality of Santa Maria Madalena and the southwest region of the municipality of Campos dos Goytacazes. The Imbé River flows over a series of waterfalls to the Santo Antônio stream. It then flows more smoothly for about 58 Km, to the Lagoa de Cima. Along the left bank are its tributaries: the Valão Sossego, the Segundo Norte, the Mocotó and the Opinião; and along the right bank, the Santo Antônio stream and the Rio do Mundo.

The Imbé Watershed case study covered two rural settlement areas under the agrarian reform process, on which more secondary data are available – Novo Horizonte and Santo Inácio – and five traditional rural communities located in the mountain municipality of Santa Maria Madalena – Sossego do Imbé, Alto do Imbé, Cruzeiro, Santo Antônio do Imbé and Dr. Loretti.

Areas Researched

The part of the Novo Horizonte settlement that lies within the area of influence of the Imbé River may be described briefly as being formed by the communities of Aleluia, Batatal, Cambucá and Conceição do Imbé. Located in the district of Morangaba (Campos dos Goytacazes), these communities are comprised of 125 families who were settled there 15 years ago on small lots (an average of 10.3 hectares), working their

lots as family farm units. Economically, banana crops predominate in the communities of Aleluia, Batatal and Cambucá, and dairy cattle in Conceição do Imbé, although other productive systems are used (fruit, vegetables, manioc, corn, beans, poultry and pigs, dairy cattle and sugar cane as alternatives for areas whose soils could not be tilled or corrected). The marketing of agricultural or pasture products (in natural state or processed), mostly through the Farmers' Market in the city of Campos dos Goytacazes, is the main source of income for local families, although the number of retired people and municipal civil servants has grown considerably in recent years, due to locally created structures.

The community of Caixa D'Água is part of the Santo Inácio settlement where the headwaters of the Imbé River are located, in the municipality of Trajano de Moraes whose expropriation was signed in 1987 after a long period of conflicts. 46 families were settled on 443 hectares in this community. The main crops in the settlement area and the main sources of monetary income are bananas and eucalyptus, along with dairy farming and, with the primary objective of family consumption and the marketing of surplus, "soft" crops (corn, beans and manioc) and poultry and pig raising, which are usually grown by women.

The communities of Alto do Imbé and Cruzeiro are adjacent, sparsely populated rural areas. Crossed by the RJ-182 highway which links the municipal seat of Santa Maria Madalena with the district of Triunfo and to Conceição do Macabu, local municipal public services are concentrated in Alto do Imbé. Cruzeiro only has an elementary school. It is estimated that 45 families (25 are land-owners and the rest are settlers, sharecroppers, "*campeiros*" or "*retireiros*"[13]) reside in Alto do Imbé and farm areas average 28 hectares, with 6 farms measuring over 200 *alqueires* (approximately 560 hectares). 47 families live in Cruzeiro (of whom 13 are land-owners) and farms average less than 40 *alqueires*. Dairy or beef cattle raising, depending on the farm's size and its type of operation (family or estate farming), is now the main economic activity. Coffee and banana crops were important activities in the past.

The hamlet of Santo Antônio do Imbé is the seat of the 3rd District of the municipality of Santa Maria Madalena, covering a large area with an estimated population of nearly 200 families. As in the other rural communities studied, its demographics are shrinking. Nearly 40 families currently reside in this hamlet, but twice that number are estimated to have lived there until recently. Various businesses (pharmacy, bakery and butcher shop) have closed, but at the same time progress was made in public infrastructure: improvements to the school and in medical and dental treatment, opening of a telephone exchange and a post office, and improvements to access roads and bridges. In the past, coffee, logging and dairy farming were the principal economic activities. Since the 1980s, subsistence activities became diversified, the importance of the agricultural and livestock sector decreased, while that of commerce, civil service and the income of residents working in the oilfield area (the so-called "*embarcados*") decreased.

Located in the Serra da Morumbeca and 50 Km from the municipal seat of Santa Maria Madalena, the hamlet of Sossego do Imbé is the seat of the 6th District which elected a representative to Santa Maria Madalena's city council. The tiny hamlet has about 30 houses, with several businesses and public buildings, and is surrounded by large farms specializing in beef and dairy cattle. Its residents have no land and their main sources of income are sporadic jobs (known as "*empreitadas*") on nearby farms, the pensions of elderly residents, the wages of those who work as municipal civil servants or as "*embarcados*" on the oil rigs in the Campos Basin[14], but who keep their homes in Sossego do Imbé. Despite recent improvements in terms of available public services, there is a prevalent view that the community is vanishing. "Now only the elderly remain. Anybody who can, leaves. They go away to study or to work as embarcados. Lots of people have left."

Finally, located alongside the RJ-174 highway which links Trajano de Moraes with Conceição de Macabu,

Dr. Loretti is another community deeply affected by the rural exodus. Reflecting the community's abandonment, the small hamlet once had many businesses but today none remain. There is a prevalence of large farms on which banana crops have been almost completely replaced by beef cattle, although a recent phenomenon is the purchase of small lots and the construction of houses by residents of Macaé. It is estimated that about 70 families still live in Dr. Loretti as settlers or squatters. Since the end of the banana plantations, the local population's main alternatives for subsistence are civil service jobs with the municipality, pension payments, the work of some community members as *"embarcados"* or as day-laborers.

4.2. Changes in Economic Life

The land drained by the Imbé Watershed encompasses areas traditionally used for extensive and semi-intensive dairy and beef cattle, for the extraction of forest resources, for coffee plantations (in the Serrana region) and for sugar cane (Campos dos Goytacazes). At first, coffee and sugar cane where grown mainly on large plantations using slave labor, although these large farms coexisted with a social minority of small farmers who combined coffee crops with the production of subsistence goods.

In the municipality of Campos, sugar cane expanded during the XVIII century, expanding even more with the introduction of steam mills in 1830; by 1875 there were 3,610 plantation owners and 245 sugar mills. Like coffee, sugar cane was originally produced on large plantations that used slave labor and whose owners formed a powerful agricultural aristocracy with considerable influence on imperial politics. However, one of the peculiarities of sugar plantations was the existence of a large number of small farms alongside large plantations. In recent years, many of the old mills have been taken over by larger mills or have closed, so that production is now carried out by a smaller number of companies. The recent mechanization of the sugar cane economy helped to increase production capacity, led to the concentration of production on large plantations and decreased the number of people who made their living full-time through agriculture as well as subsistence crops, thus increasing the informal job sector and migration.

Coffee was the prevalent crop in the Serrana region, reaching its peak in the XIX and early XX centuries. With the abolition of slave labor in this region, a sharecropping system emerged, sometimes called the "colonist system," under which plantation owners made sure they had sufficient manpower to carry out productive activities on their estates without having to pay wages and by granting colonists (or residents) the "right of residence" and the "right to cultivate" in exchange for their providing days of labor to the plantation and payment of rent on production. With the decline in coffee production in the first half of the XX century and its collapse in the 1950s, coffee was gradually replaced by extensive cattle ranching, through which plantation owners used cattle as a means of guaranteeing and legitimizing their ownership of large amounts of land. This process gave rise to four social processes:

(a) The worsening of living conditions for the small farmer minority, for whom extensive cattle ranching was not an option, and whose situation became even more difficult by repeated divisions of their lands due to inheritance;
(b) The expulsion of most colonists or residents from lands where they worked and farmed, and the even greater exodus from rural areas and from small hill towns;
(c) The acceptance by "colonists" of ever more demeaning work systems such as that stemming from the adoption of the practice of "breaking-in pasture[15];" or
(d) The worsening of land conflicts, occurring mostly on abandoned areas of estates with absentee owners, where colonists remained, now considering themselves squatters and free from reciprocal obligations with large land-owners.

The living conditions of the populations, observed during field work, in the rural communities of Sossego

do Imbé, Cruzeiro do Imbé, Alto do Imbé, Dr. Loretti and Santo Antônio do Imbé, reflect to a large extent the worsening of living conditions among small farmers and residents, and the expulsion of rural populations. For its part, the history of the Santo Inácio settlement, to which the Caixa D'Água community belongs, located at the headwaters of the Imbé River, and that of the Novo Horizonte settlement, reflect the social process of the worsening of land conflicts.

In some areas, the decline of the two main crops and inheritance laws caused the fragmentation of farms; in others, all these changes occurred with land still being concentrated in the hands of a few land-owners. Thus, the area of influence of the Imbé River today encompasses sparsely populated large- and medium-scale farms, as well as more densely populated small farms, normally associated with rural settlements.

On large and medium farms, sugar cane and extensive cattle-raising now predominate. On these farms, the mechanization of the former and the gradual replacement of dairy cattle with beef cattle in the latter, causing a decrease in the demand for both full-time and temporary labor, contribute towards making residents' living conditions even more vulnerable and unstable, and increasing the rural exodus, heightened by new job opportunities or expectations in the Campos oil fields which are highly attractive to young, unemployed people in rural areas. This continues to occur, although some large and small land-owners, with the incentive of government programs in support of fruit production, have begun a process of diversifying their activities and making them more dynamic.

On small farms, population density is higher and production and subsistence strategies are different, although sugar cane in the Campos lowlands and dairy farming in the Serrana region also continue to be relevant productive practices. In both settlement areas considered – the community of Caixa D'Água (Santo Inácio settlement– municipality of Trajano de Moraes) and the communities of Aleluia, Batatal and Cambucá (Novo Horizonte settlement – municipality of Campos), productive systems are more diversified: banana production is the most common but it is associated with "soft" crops (corn, beans, manioc and vegetables) and a wide array of other economic activities and sources of family income (dairy farming, poultry raising, fish, beekeeping, fruit growing, eucalyptus, processing and marketing of agricultural products, door-to-door sales, leasing of portions of farm lots, employment and temporary services, pensions).

4.3. Production Systems

In settlement areas, small farmers predominate; their existence is directly and closely linked to the agricultural and grazing activities they carry out on their farms to support their family income, with extremely low requirements for outside labor. In the settlement areas studied, there was an increasing number of productive systems. A PESAGRO study in December 2001[16] characterized farms in Aleluia, Batatal, Cambucá and Conceição do Imbé in terms of their small size (an average of 10.3 hectares), the use of family labor (only 1.4% of full-time jobs were hired and over half of the farms did not hire outside help), the intensive of labor in field work, the very limited availability of machinery and tools and the hiring of paid or bartered animal traction services. This study also identified 31 agricultural and livestock production sub-systems, including, from a subsistence standpoint, extensive poultry raising, manioc crops, and cattle raising – especially for milk production – and, from an income standpoint, sugar cane (especially in the community of Conceição do Imbé) and bananas (on the slopes of the Serra do Imbé). In 2003, bananas predominated in the communities of Aleluia, Batatal and Cambucá, and dairy farming in Conceição do Imbé.

For commercial purposes, bananas and eucalyptus predominate in Caixa D'Água, along with dairy farming; to a lesser extent and with the objective of meeting subsistence demand and selling surplus, these are associated with manioc, corn, beans, vegetables and other fruits, along with poultry and pig raising (usually carried out by women). Bananas are essential because, besides their historic, cultural and emotional significance[17], they constitute a guaranteed monthly income. Like bananas, milk is also a regular source of income. Although eucalyptus is a product requiring a long growth period, its advantage is that it can be cut at the most commercially favorable time and acts as a sort of financial reserve. As Linhares noted (Linhares et al.: 2002), there is a latent conflict between growers of banana and eucalyptus. This conflict is based on the perception that the latter, more than coffee production, dries and exhausts the soil when planted continuously in the same areas; this places older producers in opposition to younger residents and technicians who encourage eucalyptus production as an expression of a more dynamic mentality and a more modern vision for rural areas.

In the traditional rural communities researched, small, medium and large farms were found, as well as a more differentiated group of stakeholders and economic activities. In these communities, with the failure of traditional crops such as coffee or bananas[18], most large and medium land-owners have converted their lands into pasture and are increasingly replacing dairy cattle with beef cattle[19].

Both successive changes have greatly reduced needs for agricultural labor. "The farmers don't want to give us jobs. They just raise cattle to send to the slaughterhouse and they don't need workers. You only need 3 residents for every 100 hectares." Thus, the large number of colonists, residents, sharecroppers, "*campeiros*", and "*retireiros*", who were traditionally needed for agricultural or dairy activities, have become expendable. Their situation, traditionally guaranteed by customary rights "to housing" and "to cultivate" due to payment of rents and days of service to the plantation, became totally unstable since "income decreased a lot and it became hard to support people." A portion of this population won ownership rights, while another lives at the mercy of mostly absentee land-owners, in a situation of constant insecurity that leads them to invest their efforts only in crops with quick yields. "Crop land is scarce but everybody plants a bit of corn, beans and manioc to survive." Consequently, the rural exodus increased and since 1980 a large number of residents, especially young people, have left the communities once and for all.

In parallel, small farmers have returned to dairy farming, in association with small areas used for subsistence crops. A small farmer's milk production averages about 60 liters/day. Colonists, residents and small farmers face similar social and economic pressures that lead to the exodus of younger generations. The proximity of the oil fields, with their job opportunities, is attractive and in some areas is an essential part of the income of families living there. The importance of pensions and of family members working in the civil service is also growing. In summary, subsistence activities have become diversified, the importance of the agricultural and livestock sector has decreased, and the importance of commerce, civil service and the income of residents ("*embarcados*") working in the oil fields has increased.

4.4. Social Issues

An analysis of the issue of the growing rural exodus shows, in all the communities studied, an explanation for the phenomenon of rural migration, especially that of rural youth, in which limitations related to lot size (smallholdings), barriers to land access in light of the new economic activities prevailing on large farms, and the lack of job opportunities in rural areas are added to other social pressures: the lack of educational and leisure infrastructure, the attraction of jobs in the oil fields, the urban experience of young rural students, and the influence of their urban colleagues in terms of giving them a world view in which rural

areas are associated with hard work that does not pay well.

In this regard, settlement areas are distinguished by the following facts: (a) the number of families descending from the owner of the lot and using it for their subsistence is often quite numerous; and (b) there is still a strong feeling and desire to keep intact the connections of younger generations with such hard-won land:

> "I feel like I have to do something to make my son stay here on the land. It's not just a question of him working. He has to earn his own money. Like everybody else, I want our children to stay on the land. They need to be made aware because here on our little farm we are better off than in the city. You have to start when your child is young. Showing him that that little piece of land is his, for him to plant. It has to give him some income, an incentive to stay here with us. He can't just study. He needs an incentive to work. He needs the incentive of earning his living from his own land." (Mr. R., Novo Horizonte settlement)

In traditional rural communities, the migration of young people and even of entire families is accepted with a greater sense of resignation and inevitability. There is an overall sense of the exodus from these rural communities. A good example is that of Sossego do Imbé: despite recent improvements in the availability of public services, there is a prevalent feeling that the community is dying out. "The only ones left are the elderly. Whoever can, leaves. They go away to study or to work as '*embarcados*.' Lots of people have left." (Mr. J., Sossego do Imbé.)

Despite the overall feeling of rural exodus (demographic and/or economic), the populations of most of the communities studied tend to think that there has been a recent improvement in the quality of life at local level. The improvement of infrastructure and public services is the main justification for this opinion. There was greater access to electricity; services improved in the areas of education, health, transportation and communications. The main deficiencies continue to affect the areas of sanitation and support to productive activities.

In 1996, for example, the four communities of Novo Horizonte emphasized social and productive priorities. Research for the preparation of this diagnostic showed that many of the social priorities indicated by the local populations were met, either by the effort and initiative of the community itself (rural electrification, housing improvements, drainage works), or with the support of government programs (pest control and adult literacy courses), or more intense efforts by the municipal government of Campos dos Goytacazes (construction of a medical unit, purchase of an ambulance, asphalting of access roads, availability of a bus and truck to transport people and produce to the Farmers' Market, the drilling of an artesian well and the implementation of a water supply system, the telephone exchange and school transportation)[20].

In all areas studied, however, basic sanitation remains substandard, with few residences having septic tanks and waste being dumped directly into streams. This situation places serious pressure on natural resources and is exemplified by the situation in the entire urban area of the municipal seat of Trajano de Moraes, whose waste is dumped directly into the headwaters of the Imbé River.

4.5. Perceptions of the Environment and of the Efforts of Government Environmental Agencies

The few studies of the impact of traditional productive activities on the environment in the area of influence of the Imbé River highlight their harmful aspects[21]. Focusing on the communities of Aleluia, Batatal, Cambucá and Conceição do Imbé, these studies agree that the continued cultivation of manioc on hillsides,

sugar cane in flat areas, cattle raising, the over-exploitation of areas used for livestock, and soil preparation and management techniques (utilization of animal traction with oxen and *aiveca* plows, frequent grading and hoeing so that crops remain "clean") favor erosion because they lead to heightened soil degradation and exposure, to decreased filtration and increased surface runoff. However, these soil degradation problems may be addressed by diversifying commercial crops (introduction of vegetable and fruit crops) which would use more labor and generate greater yields per unit area. Since the farms studied were characterized either by the absence of forests (in 96% of them) or by the presence of pastures and farmland (in 81% and 72%, respectively), it was noted that existing springs and streams may be drying up.

In 2003, these communities have undergone an effective process of becoming aware of the need to protect forest resources and adopt soil and water conservation practices (protection of springs, incentives for reforestation, utilization of bio-fertilizers and new cropping and soil management techniques, etc.). The agricultural practices used in Caixa D'Água also underwent a recent transformation with the replacement of intense use of herbicides, burning and limited soil correction practices by the use of natural defenses and soil protection techniques, leaving soils fallow, crop rotation, associating different crops, and green manure.

In Aleluia, Batatal, Cambucá and Conceição do Imbé there is concern with regard to the reduction in water levels, which local residents associate with deforestation as well as drainage works in the past, and to soil fertility which they associate with the long-term use of land for sugar cane. In Alto do Imbé e Cruzeiro, residents have noted a major reduction in water levels and an increase in soil degradation which they associate with the replacement of bananas by pasture in 1985. In Santo Antônio do Imbé, concern regarding the reduction in water levels may also be leading large land-owners to invest in fish farming, with two complementary objectives: raising fish and retaining water, since

> "With the water shortage causes by the draining of marshes and *várzeas* to create pastures, the animals no longer have water to drink and farmers are now seeing that this is causing a serious problem. They build dams and put fish in them; otherwise their animals won't have water to drink." (Mr. G., Santo Antônio do Imbé.)

Hunting for sport, by residents and/or outsiders, may represent a new pressure on environmental resources in Sossego do Imbé and Santo Antônio do Imbé.

In the areas studied, however, it is thought that deforestation and burning have decreased considerably and the initiatives adopted for the preservation of existing forests and for reforestation are highlighted[22].

There is also a general opinion that this is happening more as a repressive action by government environmental agencies (IBAMA and the Forest Police) than by raising awareness, since, as the president of the Cruzeiro community agency says: "The municipal secretary of agriculture has a spring protection kit (free fruit saplings to be planted to protect springs). I've spoken with everyone about this and no one was interested in getting one. It's free but even so, no one took it." (Mr. A., Cruzeiro.)

The work of environmental agencies is also the subject of varying degrees of criticism. Its highly repressive nature is questioned and the need for efforts to raise awareness is emphasized. The traditional leader of Caixa D'Água argues that: "IBAMA has been hitting hard. It has arrested some people, but it's no use. IBAMA didn't have to punish or fine people. They get angry and continue to do the same thing. They should come, give courses, stay to give talks, to show people what's right. But they come to a worker's back door with machine guns in their hands and kick the door in. That's no way to act. They act badly. I've already suggested that, when they want to inspect any area, they should go to the Union first and have

the director go with them. They didn't need to use guns." (Mr. A., Caixa D'Água.)

4.6. Community Organization

All the communities studied have organized, representative entities. The origin of most of these community associations is related to the work of technicians from the State Government's technical assistance and rural extension agency (EMATER-RJ) and their greatest motivation is the prospect of obtaining resources to meet local needs and implement community development projects. Competing for government resources is these entities' principal activity, sometimes becoming a source of conflicts among themselves (as in the case of the Novo Horizonte settlement and, to a lesser degree, between entities representing Alto Imbé and Cruzeiro, in Santa Maria Madalena). On the other hand and on the part of the municipal authority, partnerships with community entities seem to arise as a reasonably efficient strategy to co-opt their leaders.

Most of them also face major difficulties in keeping their members involved in the everyday activities of the entity at various levels. Frustration over the expectation of obtaining immediate results and promises made by government authorities contacted to respond quickly to demands sent to them, causes a feeling of mistrust that leads to discouragement among members and to disbelief in the institution's ability to give the expected answers.

The lack of turnover of members of the board of directors is another characteristic shared by these entities. This stems both from distrust on the part of most members and from the prevailing tendency among entities representing traditional communities to assign leadership positions to municipal civil servants. In this regard, there is a great difference compared to settlement areas where more traditional leaders seem to predominate and who were directly involved in the land disputes that gave rise to the settlement.

The younger population is generally not interested and does not participate. In settlement areas, the rule of representation by lot owners partly justifies this lack of interest. In other areas, it seems to reflect and express an estrangement between the younger generation and their community of origin, and to express the expectation by members of this generation that they will not spend their lives in the settlement. The entities of Sossego do Imbé and Cruzeiro, in Santa Maria Madalena, are exceptions; they were started and have been supported by the efforts of two young people who, however, share the common characteristic of being associated with the municipal civil service.

The entities existing in settlement areas have the unique feature of a network of institutional partnerships that is broader than those of traditional rural communities. While the latter are generally limited to partnerships with municipal governments and are often associated with favoritism by a local political leader (support to the entity or its control by a councilman seems to play a key role in its ability to establish partnerships with public authorities and to secure local investments), the array of institutional partnerships with entities representing settlement areas appears much broader, including various government agencies, national and international non-governmental organizations (particularly those related to the union movement and entities associated with churches).

These differences in the array of institutional partnership networks create major differences with regard to the ability of entities representing rural settlement areas and traditional rural communities to carry out and achieve their objectives. While most (if not all) of what the latter manage to do is linked to support from the municipal government, the former seem to have more alternatives in terms of obtaining financing for their efforts. Their prior experience with mobilization and cooperation in the struggle for land also makes them more capable of adding and bringing together locally available human and material resources to achieve their new objectives.

4.7. Resistance to Technological Innovations or their Unsuitability:

The issue of resistance to the introduction of new technologies and practices for crops and agricultural management is a widely-shared perception among those who provide technical assistance and rural extension services to farmers and residents in rural areas in the North and Northwest Fluminense. This resistance is pointed to as a major risk and a challenge to the introduction of conservation practices and as a relevant factor in the soil degradation and water pollution process. It is expressed by farmers' insistence on using *coivara* (slash-and burn) techniques and planting crops on land cleared by burning, on the use of hoeing and grading on hillsides, on traditional, low-yield crops, and on extensive cattle-raising and the predominance of monocropping. In some areas, this concept takes on ethnic overtones since the European or mixed-race origin of rural workers is often pointed to as a reason for the greater or lesser degree of dynamism, entrepreneurship and innovative capacity of certain communities.

In light of this situation, the key issue to be considered is: Why do farmers resist taking advantage of knowledge that would improve their production capacity, their yields and the quality of their lives? Their clinging to traditions is the reason most often expressed by technical staff and the local elite, who make numerous references to farmers whose argument to justify their resistance to innovations is that their fathers always planted that way.

However, when questioned, rural producers (large-, medium- or small-scale land-owners or residents) suggested different reasons for clinging to tradition. Large- and medium-scale producers along the right bank of the lower Imbé River, who have introduced fruit farming as a result of government project support, lament the lack or inadequacy of technical assistance and bemoan their inability to meet commitments with yields from their new crops. Small farmers– both in older areas and in recent settlement areas – disagree about access to technical assistance and rural extension services offered by government agencies (EMATER, municipal secretariats of agriculture) or by non-governmental organizations (Lumiar); they agree, however, that such services have greatly diminished in recent years.

They repeatedly point to the inadequacy of the technologies and new practices suggested to them (normally associated with obtaining loans and financing for new production), as well as (here echoing large and small farmers) the losses that their introduction have causes them[23].

5. Monitoring and Evaluation

It has been discussed and agreed with the project preparation team (including the GoRJ commitment) that monitoring and evaluation will involve two levels: internal and external. At the first level, rural communities and producers organizations within each of the 50 microcatchments[23] to be selected for project support will assess the implementation of project activities at the microcatchment level, and evaluate the achievement of objectives, environmental impacts (on water and soil quality, presence of wildlife, etc.), and how they affect their process of organization. This activity will be carried out at least once a year and could be facilitated by NGOs with the participation of technical staff of state agencies.

At the second level, progress reports will be prepared at least twice a year as an input for the project manager's supervision. This external monitoring and evaluation will take into consideration inputs from the internal evaluation of the communities. The evaluation methodology will use both quantitative and qualitative tools and techniques. Among the topics to be included are: determination of benefits provided by the project in terms of quantity and quality, effect of the project on community organizations, the level of

awareness over sustainable land management (and global environmental issues) and adoption of new technologies.

Specific input, output and impact indicators will be reviewed by the benefited communities upon selection of microcatchmetns in PY1. However, the following monitoring indicators are recommended, as a result of consultation made during project preparation. They are the basis for measuring the broader indicators of social impact of the project specified in the logframe (**Annex 1**):

- Number of farms adopting socio-environmentally suitable natural resources management practices and productions systems (changes in the pattern of soil use and production techniques);
- Number of "demonstration units" implemented and intensity of the process of locally replicating these endeavors;
- Increase in the marketing of products with certifications of origin;
- Improvement of agricultural and livestock yields;
- Improvement of income generated by on-farm (agricultural and livestock) and off-farm activities;
- Increase in access to and demand for technical assistance;
- Changes in socially-shared perceptions regarding rural areas (from a view that these areas are experiencing decay, lack of opportunities to earn a living, and abandonment, to a view that that they are good places to work and live);
- Changes in socially-shared perceptions regarding environmental protection policies: (a) from a perception that government agencies are punitive, to one in which they are educational and collaborative; and (b) from a view that local stakeholders are hurt by environmental protection policies, to a view that stakeholders can take an active role in these policies;
- Increase in local populations' participation in grassroots community organizations (size of institutional network, quality or intensity of participation, engagement in community activities related to decision-making and social control of public policies, etc.).

6. Final Observations

The observations made in the areas researched for the preparation of the socioeconomic diagnostic of the Imbé Watershed highlight the existence of groups of stakeholders with different social and economic interests and strategies, different levels of participation in rural community affairs and of awareness of environmental issues. The increasing importance of beef cattle, drastically reducing the number of rural jobs, exercises a strong pressure on (a) the rural exodus, mostly affecting the younger population; and (b) the loss of importance of income from agricultural activities compared to the weight of income from municipal civil service positions, pensions and the non-agricultural activities of an increasing number of residents in rural communities. Under this scenario, the general acceptance of payments for converting pasture land into forest areas has arisen more as a symbol of the precarious living conditions in rural areas than as a process of awareness of environmental issues.

Endnotes:

1. Due to the area of influence of the Imbé Watershed , the proposed project will include within its area of operation the Serrana region municipalities of Santa Maria Madalena and Trajano de Moraes which have socioeconomic characteristics similar to those prevailing in the North/Northwest Fluminense regions.
2. In 2001, Fluminense municipalities received a total of R$10.3 billion in revenue and R$2.5 billion in tax revenue, mostly concentrated in the metropolitan region of the city of Rio de Janeiro. Other Flunimense municipalities, like most Brazilian municipalities, have a rather low tax collection capacity and a strong dependency on inter-governmental transfers. (Source: State Audit Court)

3. Source: 2000 Demographic Census, FIBGE.

4. The CIDE Foundation developed the "IQM -Housing Needs" index. This indicator has three dimensions: (a) housing deficit, which corresponds to replacing precarious units and meeting demand; (b) shortage, which corresponds to the need to build new units to meet demographic growth; and (c) unsuitability, which indicates the need to improve housing units with specific deficiencies.

5. Due to the privatization processes and the implementation of cellular telephone networks.

6. The result of record growth in oil production (442%), equivalent to 70% of the state's GDP.

7. The 2000 Demographic Census of 2000 showed, for Rio de Janeiro and the country as a whole, a trend that correlates size of municipality to the quality of water supply, sanitation and trash collection services. Smaller municipalities present a higher rate for the inadequacy of these services.

8. Vanessa Lopes Teixeira, *Pluriatividade e Agricultura Familiar na Região Serrana do Estado do Rio de Janeiro*, Masters Dissertation. RJ, ICHS/UFRRJ, 1998. Paulo Roberto Alentejano, *Reforma Agrária e Pluriatividade no Rio de Janeiro*, Master's Thesis, RJ, CPDA/UFRRJ, 1997. Elizabeth Linhares et al., *Conhecendo Assentamentos Rurais no Rio de Janeiro*, RJ, CPDA/UFRRJ, 2002. Sérgio Gomes Tosto et al., *Diagnóstico Sócio-Econômico dos Municípios da Região Noroeste do Estado do Rio de Janeiro*, RADEMA/PRODETAB/EMBRAPA Project. Nelson Furtado, "Um Rumo para o Norte", *Boletim de Economia Fluminense*.

9. In the Municipality of Santa Maria Madalena, pasture land occupies 68.9% of the farm land, and 63.4% in Trajano de Morais.

10. "O Novo Retrato da Agricultura Familiar" (www.incra.gov.br/sade).

11. Farms with "low income" and "nearly no income" represent 62% of the State's family farms. In terms of family farming, they represent 45% of the area, account for only 8% of Gross production value and provide jobs 57% of those employed.

12. State Secretariat of Planning, Economic Development and Tourism, "Diretrizes para o Desenvolvimento da Região Noroeste Fluminense" – SEPDET – May 2002.

13. The term *"retireiros"* refers to residents or farm workers who are responsible for milking, while *"campeiros"* refers to residents or workers who drive cattle to pasture.

14. *"Embarcado"* is the local term for workers on the Campos oil rigs, who work 15 to 21 day shifts on oil drilling platforms, and have 15 days of rest on land.

15. "Plantation owners offered a certain area of forest (or *capoeira* – land covered by secondary growth) or even an old, abandoned, dirty crop area, so that colonists could plant a new crop, usually under a sharecropping system. The heavy work of clearing was then done, often including pulling up tree stumps and preparing the area for planting (breaking it in). And then after the one and only harvest, grass was sown and the area was turned into pasture. Nothing else was planted there." (Linhares et al., *Conhecendo Assentamentos Rurais no Rio de Janeiro*. Rio de Janeiro: CPDA/UFRRJ, 2002, p.127-128).

16. Luiz Aurélio Peres Martelleto et al., DIAGNÓSTICO E TIPIFICAÇÃO DOS PRODUTORES RURAIS –Imbé Watershed – Communities of Aleluia, Batatal, Cambucá and Conceição do Imbé – Campos dos Goytacazes – RJ. PESAGRO, 2001.

17. Banana growing may have been started by colonists to replace coffee. Bananas may have been chosen for three reasons: the crop's price at that time, the short production cycle, and the fact that, since workers had decided to plant banana trees, they did not feel obliged to pay rent on their production and, "in this regard, bananas helped to strengthen their sense of ownership and consequently the intensity of the conflicts that ensued." (Linhares et al: 2002, p. 133).

18. In Alto do Imbé and Cruzeiro, the rise and fall of banana production are associated with the formation and

failure of COOPERBANA, a producers' cooperative that first promoted production (which once reached 40 tons/month locally), then broke up the monopoly of middlemen on marketing this product, but about whose management there are serious suspicions. In Dr. Loretti, banana production was abandoned in response to major problems in the marketing process. "We stopped growing bananas because we just couldn't sell them. We went three years without selling anything. No middlemen, no candy factories...nobody wanted to buy them." The abandonment of banana production simultaneously caused the abandonment of "soft" crops.

19. Large and medium land-owners along the right bank of the Imbé River, in Campos dos Goytacazes, seem to be an exception to this rule which prevails in the Serrana region. On their farms, the traditional sugar cane crop is being associated with fruit growing and a process of diversifying their productive activities.

20. It should be emphasized, however, that municipal investments were concentrated in the community of Conceição do Imbé and consequently became a source of disagreements, confrontations and conflicts among the four áreas and their two representative agencies. Residents and leaders of Aleluia, Batatal and Cambucá feel abaondoned, neglected and particularly betrayed by Conceição do Imbé's leaders. They recall participating in the struggle for investments that were brought to the neighboring community and emphasize that the investments made do not benefit them directly. They accuse APROCI's leaders of co-opting people by distributing civil service jobs for the construction of new buildings:

> "That's why we don't want anything to do with Imbé. Because we held all the meetings there and everything went to Imbé but nothing to us. Everything is there. Imbé hás everything... Aleluia, Batatal e Cambucá have nothing. What we're angry about is that we went there to fight when they had nothing there and their people didn't go. And now everything is over there. Now they laugh at us, that they received this, that they took that."

21. Martelleto et al (2001) and Helga Restum Hissa Manzatto, André Vieira Ramos de Assis, Carmindo Solís Filho, Rodrigo P. Demonte Ferraz, Alex Faria de Figueiredo e Genilson Gouveia da Silva, Diagnóstico Ambiental Microbacias do Baixo Imbé River, Programa Rio Rural, Superintendência de Microbacias Hidrográficas do Estado do Rio de Janeiro/EMBRAPA/PESAGRO, 2002.

22. The exception is Dr. Loretti where some residents accuse land-owners of burning land for new pastures, without the need for large investments.

23. For example, the producer of raw sugar-cane candy (*rapadura*) in Santo Antônio do Imbé recalls that technicians showed him how to cultivate bananas with less spacing between trees and making sure that only one bunch of bananas would grow on each tree, but he convinced them that, since his area was new, by planting with more spacing he would have larger yields and use less manpower (a locally scarce resource) and grow three bunches per tree.

24. For the description of area of project coverage, selection of target watersheds and microcatchments, see **Section C.3** of main text and, for detailed selection criteria, see **Annex 2, Appendix 1**.