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**PROJECT PERFORMANCE ASSESSMENT REPORT**

**Brazil**

**RIO DE JANEIRO SUSTAINABLE INTEGRATED ECOSYSTEM  
MANAGEMENT IN PRODUCTION LANDSCAPES OF NORTH-  
NORTHWESTERN FLUMINESE PROJECT  
(TF-54999)**

**June 30, 2014**

**IEG Public Sector Evaluation**  
*Independent Evaluation Group*

## Currency Equivalents (annual averages)

*Currency Unit = Currency Unit = Real (R\$)*

2005	US\$1.00	R\$2.43
2006	US\$1.00	R\$2.18
2007	US\$1.00	R\$1.95
2008	US\$1.00	R\$1.83
2009	US\$1.00	R\$2.01
2010	US\$1.00	R\$1.65
2011	US\$1.00	R\$1.58

## Abbreviations and Acronyms

COGEM	Micro-catchment Management Committee
COREM	Regional Micro-catchment Council
EMATER	The State Rural Extension Agency
EMBRAPA	Brazilian Agricultural Research Enterprise
GEF	Global Environment Facility
GEO	Global Environment Objectives
IBRD	International Bank for Reconstruction and Development
ICR	Implementation Completion Report
IEG	Independent Evaluation Group
IEGPS	IEG Public Sector Evaluation
IEM	Integrated ecosystem management
MIS	Management Information System
NNWF	North and Northwestern Fluminense Administrative Regions
PESAGRO	State Agricultural Research Agency
PEM	Microcatchment Development Plan
PES	Payment for Environmental Services
PID	Individual/Farm-level Development Plan
PPAR	Project Performance Assessment Report
SLM	Sustainable land management
UENF	State University of North Fluminense

## Fiscal Year

Government: January 1 - December 31

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## Principal Ratings

	ICR*	ICR Review*	PPAR
Outcome	Satisfactory		Moderately Unsatisfactory
Risk to Development Outcome	Moderate		Moderate
Bank Performance	Moderately Satisfactory		Moderately Unsatisfactory
Borrower Performance	Moderately Satisfactory		Moderately Satisfactory

\* The Implementation Completion Report (ICR) is a self-evaluation by the responsible Bank department. The ICR Review is an intermediate IEGWB product that seeks to independently verify the findings of the ICR.

## Key Staff Responsible

Project	Task Manager/Leader	Division Chief/ Sector Director	Country Director
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Completion	Marianne Grosclaude	Ethel Sennhauser	Deborah L. Wetzel

**IEG Mission: Improving World Bank Group development results through excellence in evaluation.**

### **About this Report**

The Independent Evaluation Group assesses the programs and activities of the World Bank for two purposes: first, to ensure the integrity of the Bank's self-evaluation process and to verify that the Bank's work is producing the expected results, and second, to help develop improved directions, policies, and procedures through the dissemination of lessons drawn from experience. As part of this work, IEG annually assesses 20-25 percent of the Bank's lending operations through field work. In selecting operations for assessment, preference is given to those that are innovative, large, or complex; those that are relevant to upcoming studies or country evaluations; those for which Executive Directors or Bank management have requested assessments; and those that are likely to generate important lessons.

To prepare a Project Performance Assessment Report (PPAR), IEG staff examine project files and other documents, visit the borrowing country to discuss the operation with the government, and other in-country stakeholders, and interview Bank staff and other donor agency staff both at headquarters and in local offices as appropriate.

Each PPAR is subject to internal IEG peer review, Panel review, and management approval. Once cleared internally, the PPAR is commented on by the responsible Bank department. The PPAR is also sent to the borrower for review. IEG incorporates both Bank and borrower comments as appropriate, and the borrowers' comments are attached to the document that is sent to the Bank's Board of Executive Directors. After an assessment report has been sent to the Board, it is disclosed to the public.

### **About the IEG Rating System for Public Sector Evaluations**

IEG's use of multiple evaluation methods offers both rigor and a necessary level of flexibility to adapt to lending instrument, project design, or sectoral approach. IEG evaluators all apply the same basic method to arrive at their project ratings. Following is the definition and rating scale used for each evaluation criterion (additional information is available on the IEG website: <http://worldbank.org/ieg>).

**Outcome:** The extent to which the operation's major relevant objectives were achieved, or are expected to be achieved, efficiently. The rating has three dimensions: relevance, efficacy, and efficiency. *Relevance* includes relevance of objectives and relevance of design. Relevance of objectives is the extent to which the project's objectives are consistent with the country's current development priorities and with current Bank country and sectoral assistance strategies and corporate goals (expressed in Poverty Reduction Strategy Papers, Country Assistance Strategies, Sector Strategy Papers, Operational Policies). Relevance of design is the extent to which the project's design is consistent with the stated objectives. *Efficacy* is the extent to which the project's objectives were achieved, or are expected to be achieved, taking into account their relative importance. *Efficiency* is the extent to which the project achieved, or is expected to achieve, a return higher than the opportunity cost of capital and benefits at least cost compared to alternatives. The efficiency dimension generally is not applied to adjustment operations. *Possible ratings for Outcome:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

**Risk to Development Outcome:** The risk, at the time of evaluation, that development outcomes (or expected outcomes) will not be maintained (or realized). *Possible ratings for Risk to Development Outcome:* High, Significant, Moderate, Negligible to Low, Not Evaluable.

**Bank Performance:** The extent to which services provided by the Bank ensured quality at entry of the operation and supported effective implementation through appropriate supervision (including ensuring adequate transition arrangements for regular operation of supported activities after loan/credit closing, toward the achievement of development outcomes. The rating has two dimensions: quality at entry and quality of supervision. *Possible ratings for Bank Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

**Borrower Performance:** The extent to which the borrower (including the government and implementing agency or agencies) ensured quality of preparation and implementation, and complied with covenants and agreements, toward the achievement of development outcomes. The rating has two dimensions: government performance and implementing agency(ies) performance. *Possible ratings for Borrower Performance:* Highly Satisfactory, Satisfactory, Moderately Satisfactory, Moderately Unsatisfactory, Unsatisfactory, Highly Unsatisfactory.

## Preface

This is a Project Performance Assessment Report (PPAR) of the Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of North-Northwestern Fluminense Project (TF-54999). The project was approved on May 5, 2005 and became effective on December 30, 2005. The total project cost at appraisal was US\$ 14.95 million. It was financed by a Global Environment Facility Grant of US\$6.75 million. At project closure US\$6.50 million had been disbursed (96 percent of the grant amount). US\$0.25 million of the original grant amount was cancelled. The project closed on November 30, 2011, one year after the original closing date of November 30, 2010. The extended time was required to make up for implementation delays that occurred during the first three years of implementation.

This report is based on a review of project documents, including the Implementation Completion and Results Report, the Project Appraisal Document, legal documents and project files, and on discussions held with Bank staff involved in the project. It is also based on an IEG assessment mission to Brazil that was conducted from February 25 to March 8, 2013. IEG held meetings in Rio de Janeiro and conducted site visits in Campos dos Goytacazes, Saquarema, São José de Ubá, Itaperuna, and Varre Sai to interview beneficiaries and partner organizations. The mission expresses its appreciation for the generous time and attention of the Borrower and all concerned parties. A list of persons met during the IEG mission is in Annex B.

IEG selected this project for a field assessment in order to verify its results and assess their sustainability. The evaluation also provided input into the IEG Country Program Evaluation of Brazil.

Following standard IEG procedures, copies of the draft report will be sent to government officials and agencies for their review and comment. Borrower comments will be presented in Annex C.



## Summary

This Project Performance Assessment Report reviews the experience and lessons from the Rio de Janeiro Sustainable Integrated Ecosystem Management in Production Landscapes of North-Northwestern Fluminense Project (2005-2011) in Brazil. The project's global environment objectives were "to: (i) 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."

The project supported implementation of the Rio Rural program which promotes sustainable development in rural areas of the State of Rio de Janeiro by employing a participatory approach to promote integrated ecosystem management. The project succeeded in putting in place a system to enhance stakeholders' organizational capacity for sustainable land use planning, which in turn has encouraged the adoption of sustainable land management practices by beneficiary land holders. It also contributed to strengthening the policy environment in support of sustainable land management practices by catalyzing the signing of a decree that obligates the State to financially support a Payment for Environmental Services system within the State's Water Resources Management Policy. However, at the time of the assessment mission, one year after the project closed, there was little available evidence to demonstrate that the sustainable land management interventions financed by the project have generated the global environmental benefits that the project set out to achieve.

The project's objectives were substantially relevant to national priorities and to the Bank's past and current country assistance strategies. The relevance of design in meeting the objectives as stated was modest. While many activities included in design were relevant to achieving the project's objectives, the broadly stated Global Environment Objectives were overambitious in comparison to the scale of project activities and its timeframe.

With respect to the first objective, addressing threats to biodiversity of global importance, participating land holders adopted practices aimed at increasing native forest vegetation cover across the agricultural landscape adjacent to a globally significant ecosystem but the project only measured the number of hectares in which such practices were carried out. It did not measure the extent that regeneration actually occurred as a result of these practices or an alternative measure of biodiversity related outcomes resulting from the adoption of improved agriculture practices. The second global environment objective, reversing land degradation in agricultural landscapes, could not be demonstrated due to challenges in measuring the project's ambitious soil and hydrological indicators. For the third GEO, enhance carbon sequestration, there were estimates of the amount of carbon sequestered under rotational pasture, one of the land uses promoted through the projects on farm investments, which exceeded the appraisal target but it is not possible to assess if this is an enhancement over the amount of carbon sequestered prior to the intervention due to the lack of a baseline. With respect to the fourth GEO, increased awareness at all levels of the value of adopting an integrated ecosystem approach in the management of natural resources, the project made considerable effort to collect and disseminate best

practices among project beneficiaries and to the public at large but no systematic assessment was made to demonstrate that the awareness of the value of this management approach has increased as a result of receiving this information. Consequently, the project's efficacy is assessed as modest overall.

Efficiency was substantial. Economic analyses show that the most frequently selected subprojects were profitable. In addition each of these practices have the potential to generate environmental benefits above and beyond the financial returns reported. There were some inefficiencies in the management of project funds including a three year delay in the start of field activities but the project was able to overcome this and disbursed all of its funds by project closure. Taking into account the substantial relevance of objectives but modest relevance of design, modest efficacy and substantial efficiency ratings, the overall outcome rating of the project is moderately unsatisfactory.

The risk to development outcome is moderate. The main risk to project gains is that farmers will not continue implementing the sustainable practices adopted under the project. A number of factors potentially reduce this risk. The project provides continued technical assistance for four years following release of financing and a follow on IBRD project is ongoing that works with the same communities and providing an opportunity to consolidate capacity gains and further productivity gains. Economic analysis indicates that the land management practices were profitable. Some practices have been replicated with farmers own resources. There are also a number of sources of funding in the State that farmers can potentially access to further implement activities in their land management plans. In recent years the government of Brazil has increased its efforts to enforce compliance with environmental legislation which may contribute to sustainability of activities aimed at restoring forest cover. Sustainability is also enhanced by legally binding Codes of Conduct that were adopted in several communities to enhance compliance with the environment code. The risk to Rio Rural as a long term program stem from its dependence on strong project leaders and the need to strengthen the arrangements for multi-institutional collaboration but both are addressed under an ongoing follow on operation.

The Bank's performance was moderately unsatisfactory. The project preparation team drew on decades of experience from Bank financed micro-catchment development projects in Southern Brazil. The project's technical analysis was strong but the capacity limitations of the implementing agency and the steep learning curve that multiple implementation partners faced in grasping the project's concept and methodology were overlooked. Project design also relied heavily upon partnerships but the roles and responsibilities of the various implementation partners were also insufficiently spelled out. This later proved problematic. Supervision missions were frequent, benefitting from a follow on operation being prepared in conjunction with the same implementation unit. During supervision the Bank team worked closely with the project management unit to improve financial management and procurement performance. However, progress ratings were overoptimistic in the initial years of implementation when disbursements and achievements were low, the reporting of missions was uneven and some targets were overly ambitious and were not revised.

Government performance was moderately satisfactory. The State government's commitment was strong in that it took the lead on preparing and financing the project's preparation before GEF funds were available and kept the project implementation team intact across changes in government administration. But release of counterpart funds was delayed in the initial years of implementation due to the States constrained fiscal environment. The project implementation unit assumed strong and effective responsibility for implementation and continuity. Its procurement and financial management performance was uneven, due to lack of experience with WB procedures, but improved over time.

The project experience yields the following lessons:

***Working through multiple institutional players can enhance policy and operational outcomes but it requires that mechanisms are developed upfront to formalize institutional partnerships with well-defined roles and responsibilities and common targets.*** In this case, the project worked with twelve partner agencies and leveraged additional co-financing from a host of entities that were implementing their own programs in the project areas. While the partner agencies signed agreements with the Ministry of Agriculture, the agreements lacked sufficient details on each partner's roles and obligations. Commitments depended on individual relationships. As a result there was uneven engagement across agencies, with some agencies following their own modus operandi and objectives. The benefits intended to be leveraged through co-financing were compromised to some extent because the activities financed by Rio Rural/GEF and those of co-financed programs essentially ran in parallel. The co-financiers were not obligated to use the organizational or financial instruments developed by the project to empower farmers and guide their investment planning. In addition co-financiers were not obliged to share their project data with the project management unit.

***Demonstrating achievement of objectives that require scientific measurement can be compromised if technically competent entities are not brought in at the design stage.*** In this case the plan for monitoring biophysical impacts of the project was designed by an externally contracted firm and the technical agency responsible for the actual monitoring, was not brought on board until after project preparation phase, at too late of a stage to design an alternative plan. Some indicators could not be measured because of flaws in the placement of monitoring stations. Other impacts could not be demonstrated because of insufficient information in the baseline survey.

***Formulation of global environment objectives should take into account the project time frame and available resources.*** In this case the project's official objectives were stated in terms of ambitious global environment objectives. But the project was designed largely as a pilot to lay the foundation for a larger program to be scaled up in the future.

On-farm investments were implemented on a pilot scale more suitable for demonstration purposes than for achieving the ambitious impact implied by the objectives statement.

Richard G. Scobey  
Acting Director-General  
Evaluation

## 1. Background and Context

1.1 The state of Rio de Janeiro comprises a large urban population concentrated around the capital city of Rio de Janeiro and large expanses of rural areas. Approximately 9 percent of the national population resides in the state and 90 percent of this population lives in urban areas. The economy is driven largely by the industrial and services sectors, accounting for 51 percent and 42 percent of state GDP, respectively. The agriculture sector contributes a comparatively small proportion to the State's GDP but it plays a key role in the rural economy, accounts for a large percent of rural employment, and for a large portion of total land use. The agricultural sector contributes to a very small proportion of overall state GDP (0.5 percent). Outside of the metropolitan area of the city of Rio de Janeiro, however, agriculture's contribution to GDP rises to nearly 5 percent, and when included with agro-industrial activities, agriculture represents over 25 percent of state GDP. The agriculture sector accounts for over 40 percent of rural employment (an estimated 157,492 individuals). Approximately 60 percent of the state's total land area is dedicated to agricultural activities.

1.2 The state contains a large portion of the remaining tracts of the Atlantic Rainforest, a globally significant biome identified as one of the five biodiversity "hottest hotspots" among the world's twenty-five top priority conservation areas due to the high level of endemic species it harbors and degree of threat.<sup>1</sup> The North and Northwest Fluminense (NNWF) administrative areas have the largest stands of remaining forest in the state. Most of the large tracts of remaining forest are conserved in protected areas but there are many smaller forest fragments dispersed throughout the region on private lands.

1.3 The NNWF region is the largest agricultural producing region in the State and has the highest rates of rural poverty, land degradation and deforestation. Most farms in the NNWF region are small scale family farms or agrarian reform communities. The predominant farming systems are monocultures of sugarcane or coffee and extensive cattle raising with low technical inputs. Most farms depend on manual labor, lack corrective measures to address soil fertility, make little use of technical assistance and have modest organizational capacity. (World Bank 2005)

1.4 The region's natural resources are under severe pressure from deforestation and land degradation. Land conversion and charcoal production are drivers of the state's high levels of deforestation. Past agricultural policies, favoring mono-cropping, and overgrazing have contributed both to deforestation and large tracts of degraded land. 80 percent of the region's land has suffered a moderate to severe degree of erosion. Pasture degradation, soil erosion and the reduced availability of water have in turn reduced agricultural productivity and contributed to outmigration.

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<sup>1</sup> The Atlantic Forest is the most threatened and over-exploited biome in Brazil, in terms of vegetation loss and deforestation. The State of Rio de Janeiro has the highest percentage of Atlantic Forest with respect to total area among all states in Brazil.

1.5 The project was conceived to support the long-term conservation and rehabilitation of agro-ecosystems through an integrated ecosystem management (IEM) approach<sup>2</sup> to the conservation of the Atlantic Forest, and would include the development and implementation of sustainable land management (SLM) practices that provide environmentally and socially sustainable economic opportunities for rural communities. It sought to address the following constraints affecting the adoption of IEM and SLM in the NNWF region: (i) insufficient human and institutional capacity and weak community organizations at the local and state levels; (ii) producers' lack of capital to undertake the fairly heavy, up-front investments needed to adopt SLM techniques; (iii) limited number of SLM practices adapted to specific agro ecological conditions of the NNWF region; and (iv) insufficient organized data and information available to decision-makers to incorporate eco-system level considerations into productive activities.

1.6 The project aimed to strengthen and develop the foundations of the State Micro-catchment Program for Rural Sustainable Development (Rio Rural) which provides rural extension and infrastructure to rehabilitate micro-catchment resources. Rio Rural aims to (i) raise awareness among small farmers, local managers, technicians and stakeholders about global environment issues and their role in biodiversity conservation, water protection and climate change mitigation and (ii) long term support to small farmers to transition to eco-friendly productive systems.

1.7 The project built on decades of World Bank support for sustainable land management projects in other states in southeastern Brazil that employed a participatory process to reverse land degradation and improve watershed health using the micro-catchment as a physical unit for planning purposes. Intervening at the micro-watershed level takes advantage of geographical units of a more manageable size, linked by hydrological processes; stronger social cohesion within micro-watersheds; ease of monitoring and measuring results; and ease of scaling micro-watershed management projects to other areas, such as downstream communities. Although prior rural development projects implemented by the State Secretary of Agriculture had included environmental sustainability and natural resources management, they were targeted at the farm or sub-community levels, with little attempt to link them within a broader planning framework based on an ecosystem approach. This was the first attempt in the State to intervene at the micro-catchment scale.

## **2. Objectives, Design, and their Relevance**

### **Objectives**

2.1 This was a stand-alone GEF project and had both global environment objectives and project development objectives. The Global Environment Objectives (GEOs), as stated in the

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<sup>2</sup> Integrated Ecosystem Management is a strategy for the integrated management of land, water and living resources that places human needs at its center. It is a holistic and participatory approach to land use that balances and manages ecological, social, and economic components of ecosystems to ensure that biodiversity and ecological processes can be sustained under development pressure and social change. (IUCN)

Project Appraisal Document (pg. 6) were to: “(i) 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. The desired principal outcomes for the global environment are: (i) conservation and sustainable use of biological diversity, and (ii) increased carbon storage in terrestrial ecosystems”.

2.2 The project development objectives, as stated in the grant agreement (pg.18) were: “to promote an integrated ecosystem approach to guide the development and implementation of sustainable land management practices in Micro-catchments located in the Recipient’s NNWF Region.” The PAD (pg. 5) set forth the following project development objective: “to promote an integrated ecosystem management (IEM) approach to guide the development and implementation of sustainable land management (SLM) practices in the North and Northwest (NNWF) regions of Rio de Janeiro State. The desired principal outcomes for the primary target group (smallholder families and communities) are: (i) improved capacity and organization for NRM, and (ii) increased adoption of IEM and SLM concepts and practices.”

2.3 This review used the global environment objectives as the basis of assessment as the project was a stand-alone GEF-financed project implemented by the World Bank but received no IBRD finances. This is in accordance with OPCS/IEG harmonized guidelines.

## **GEOGRAPHIC SCOPE OF THE OPERATION**

2.4 The project area covered the North and Northwestern Fluminense (NNWF) administrative regions in the State of Rio de Janeiro. This project area encompasses 22 municipalities covering an area of 15,000 km<sup>2</sup> and with about 30,000 family farms and harbors the largest stands of remaining Atlantic Forest in the State. (World Bank 2012)

2.5 Selection of targeted watersheds and micro-catchments was based on social and environmental considerations. The selection criteria for watersheds included: environmentally sensitive or critical areas, particularly those which are highly vulnerable to erosion; land use patterns; presence and size of sites considered 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. The specific micro-catchments within each watershed were selected according to: the significance of the micro-catchment’s biodiversity; the presence of springs or other sources of surface or ground water critical to the protection of the micro-catchment; the concentration of small producers; the existing level of community organization; and land use and soil management aspects.

## **Relevance of objectives**

2.6 The project's objectives were substantially relevant to past and current World Bank country assistance strategies, the operational strategies of the Global Environment Facility and national priorities set forth in national strategies and international conventions to which Brazil is a signatory.

2.7 The GEOS are aligned with the pillar for improving environmental sustainability in both the FY 2004-2007 and FY2008-2011 Country Partnership Strategy. As well as the long-term country strategy goals of better water quality and water resource management, and more sustainable land management, forests and biodiversity. The objectives remain relevant to the FY2012-2015 Country Partnership Strategy objective of furthering improvement of sustainable natural resource management and enhanced climatic resilience while contributing to local economic development. The GEOS were also consistent with the Global Environment Facility's Operational Programs on Integrated Ecosystem Management (OP 12) and Sustainable Land Management (OP 15).

2.8 In terms of aligning with national priorities, the project was one of several programs intended to implement the Rural Development Strategy of the Government of Rio de Janeiro. The targeted implementation areas overlap with national priority areas for the conservation of the Atlantic Forest identified in the National Program for Biological Diversity. The project was also relevant to various national policy documents and environmental laws that pertain to deforestation, soil erosion and control, and facilitating the adoption of sustainable agricultural production practices. In addition the GEO's are fully consistent with the provisions of the Convention on Biological Diversity and the UN Framework Convention on Climate Change.

## **Design**

### **Components**

2.9 The project comprised the following four components (and 10 sub-components):

2.10 Component 1: Planning for Integrated Ecosystem Management Actions (Estimated US\$0.94 million; Actual US\$1.33 million) The component financed studies to influence policy-making and strengthen state and local frameworks to facilitate adoption of IEM principles and SLM practices, based on lessons learned from land management investment activities. It comprised two sub-components: (i) Strengthening of IEM Incentive Structure and Ecosystem Management Systems; and (ii) Local Land Management Planning.

2.11 Component 2: Support Systems for the Adoption of IEM/SLM Practices (Estimated US\$8.8 million; Actual US\$8.94 million) The component financed technical and financial support to small farmers to carry out subprojects to assist in the transition from non-sustainable farming practices to sustainable livelihood activities to improve biodiversity, reduce or reverse land degradation, and increase carbon sequestration. It comprised two subcomponents: (2.1) Financial Support for Sustainable Natural Resources Management. This subcomponent provided technical and financial support to farmers to carry out subprojects to assist in the transition to sustainable livelihood activities which enhance biodiversity conservation and carbon sequestration in agricultural landscapes. Five categories of investments were eligible for project financing: (i) recuperation of degraded areas; (ii) use and sustainable management of biodiversity; (iii) management of water resources; (iv) re-orientation of productive systems to sustainable systems; and (v) commercialization of socio-environmentally sustainable projects. Sub-component (2.2) Support to Adaptive Management Practices. This subcomponent supported demand driven adaptation of existing soil

management practices or adequate technological solutions to unsustainable land use issues. The activities included: (i) adaptation and validation of cropping, forestry, agroforestry, and pasture management systems to increase carbon stocks and biodiversity; and (ii) implementation of pilot units to improve the use of rural space in environmentally fragile and vulnerable areas or in the buffer zones of Protected Areas.

**2.12 Component 3: Organization and Capacity-Building for Integrated Ecosystem Management** (Estimated US\$2.47 million; Actual US\$1.53 million) The component financed training, education and community engagement efforts to facilitate the formation and strengthening of rural organizations for self-management of natural resources and the sharing of project implementation experiences and lessons with stakeholders at all levels, to broaden project impact. It comprised three sub-components: (i) Community Organization; (ii) Training of Project Executors; and (iii) Training and Environmental Education of Beneficiaries.

**2.13 Component 4: Project Management, Monitoring and Evaluation** (Estimated US\$2.74 million; Actual US\$3.28 million) The component financed participatory management and monitoring activities to leverage project impact, effective project implementation and coordination, and results dissemination. It comprised three sub-components: (i) Participatory Management of the Project; (ii) Monitoring and Evaluation; (iii) Project Dissemination.

### **Implementation arrangements**

**2.14** The State Secretary of Agriculture was the principal implementing agency responsible for the project but project management was carried out through a multi-tiered structure comprising both executing bodies and coordination forums at the central, regional, municipal, and local levels.

**2.15 Executing bodies.** A central project management unit was set up within the Ministry of Agriculture's Micro-catchment Directorate and charged with project preparation, overall project management and implementation. The central project management unit was supported by two regional project implementation sub-units responsible for implementation of project activities in each of the target administrative regions. Working agreements were also signed between the primary implementing agency and other regional and local implementation partners with an active presence in the region. This arrangement was intended to leverage the operational capacity of the each partner and mainstream the project approach within the partner agencies programs in the target areas. Implementation of projects activities at the municipal level was carried out by local offices of the State Rural Extension Agency (EMATER) and municipal governments. Civil society organizations active in the project areas were also expected to play a role in supporting municipal level implementation of project activities.

**2.16 Coordination Forums.** Steering committees were established to provide external coordination to facilitate the integration of project activities with those being carried out by other projects and program, overall guidance and address potential conflicts. At central level, the Project Steering Committee was established in the preexisting State Council for Rural Development, comprising representatives from various project – relevant state secretariats,

rural workers and farmers trade unions, civil society and fishermen's associations. The role of the Project Steering Committee was to oversee general project implementation progress, facilitate integration of the project with state and national rural development strategies and integration among partner institutions.

2.17 At the regional level, a Regional Micro-catchment Council (COREM) was established to represent the entire North-Northwestern administrative regions covered by the project. The COREM played a deliberative role in the project, contributed to monitoring and evaluation, reviewed and endorsed the project's implementation policy and priorities, its annual operational plans and approved fund allocation proposed by the center project management unit for each micro catchment. It was also charged with resolving conflicts among project stakeholders, endorsing subproject grants, and ensuring collaboration among partner institutions.

2.18 At the municipal level, the preexisting Municipal Rural Development Council (CMDR) served as a project coordinating body. The CMDR comprised representatives of municipal government, rural communities, NGOs, rural workers' trade unions, small farmers associations and rural extension institutions. The role of the CMDR was to endorse the selection of micro catchments prioritized for project support, review implementation of the micro catchment land management plans (PEMs), contribute to dissemination of the project's objectives and results, and mediate potential conflicts among stakeholders.

2.19 At the local level, Micro-catchment Management Committees (COGEM) were established in each participating micro-catchment. The COGEM served as representative of the various micro-catchment groups supported by the project. The COGEM was responsible for local planning and management of project activities. They approved the PEMs prepared by the various micro catchment groups in collaboration with project executing institutions. They approved the project's local level annual operating plans and statutes of community conduct, endorsed Individual Farm-level Development Plans (PIDs), and managed and monitored and evaluated PEM implementation.

### **Implementation of farm level investments**

2.20 The project was designed to work at three levels. At the watershed level it would develop watershed management strategies. At the municipal level it would implement training and environmental education programs to enhance local capacity, increase public support for conservation and sustainable use of natural resources, and formulate proposals for the creation of a system to support sustainable land management. At the micro catchment level the project would support the preparation of Micro catchment Development Plans, Individual Farm level development plans and provide financial and technical support for the adoption of improved management practices identified within these plans. The provision of grants for technical assistance and small scale investments would be provided on a demand-driven basis. Once awarded, grant funds would be transferred directly to beneficiaries. COGEMs and staff from the offices at municipal, regional and state level would be responsible for monitoring the use of the grants. Farmers received four years of technical assistance by EMATER technicians following the transfer of resources to implement their subprojects.

## Relevance of Design

2.21 Project design included many activities that were relevant for meeting the project's objectives but some of the objectives themselves were overly broad and too ambitious for the scale of project investments and the project timeframe.<sup>3</sup> The project was designed largely as a pilot to lay the foundation for a larger program to be scaled up in the future. A factor that may have contributed to the incongruence between the ambitious GEOs and the scale of project investments is that the project was originally conceived as a blended operation in which GEF financing would complement a proposed World Bank loan but the State's uncertain creditworthiness delayed Federal Government consideration of an IBRD loan. The project was then prepared as a GEF funded operation that covered a smaller project area than was initially envisioned. The project design was focused on foundational activities that could be scaled-up and replicated in the future. These activities are more relevant to a more modest pilot objective than to the project's stated global environment objectives. The following statement in the project completion report further underscores this disconnect between design and stated objectives and suggests that the Bank and implementation team were focused on meeting a de facto pilot objective as opposed to the projects actual objectives: "Despite the characteristic breadth of the GEO, the project did not seek to finance the actual large-scale implementation of IEM. It was a pilot/demonstration operation, emphasizing on-the-ground actions which could be replicated and provide the foundation for scaling up." (World Bank 2012, pg. 5) A similar statement is reported on pg. 19: "The project's GEO and PDO were substantially achieved when viewed - as intended at appraisal - as the technical, operational and institutional framework for more extensive efforts state-wide (and already under expansion through the Rio Rural/IBRD operation)."

2.22 Issues with individual GEO's and their associated results frameworks are discussed below. Two of the GEOs, *addressing threats to biodiversity of global importance* and *reversing land degradation in agricultural landscapes*, are stated in absolute terms and refer to long term processes beyond the projects timeframe. They lacked sufficient intermediate indicators that could indicate the likelihood that longer term objectives would be met.

2.23 With respect to the objective of *addressing threats to biodiversity of global importance* the project appraisal document indicates that the biodiversity targeted was the Atlantic Forest biome. The main threats are identified as: deforestation related to land conversion and charcoal production, agricultural expansion, and smallholder agriculture.<sup>4</sup>

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<sup>3</sup> In its guidelines for the content of the PAD, OPCS recommends that the project's development objective(s) should: "(a) be stated as concisely as possible; (b) indicate the primary target group(s) and the change/response expected from this primary target group as a result of project interventions; and (c) focus on outcomes for which the project can reasonably be held accountable. It should neither encompass higher level objectives beyond the purview of the project, nor be a restatement of the project's components or outputs." Similarly, OPCS guidance on writing Implementation and Completion reports notes that PDO/GEOs should be focused on the outcome for which the operation could reasonably be held accountable, given its duration, resources, and approach, without encompassing higher-level objectives that depend on other efforts outside the scope of the operation.

<sup>4</sup> The PAD identifies the major threats associated with the smallholder agriculture s: "(i)deforestation of the floodplain forests and grasslands attributable to the introduction of conventional monocropping agriculture (mainly sugar cane), and consequent loss of soil fertility and soil erosion; (ii)deforestation of the remaining tropical semideciduous forests associated with the advance of the agricultural frontier into marginal areas (slash

The project aimed to address the threats from smallholder agriculture by supporting the adoption of improved production and natural resource management practices. The practices specifically identified as generating biodiversity outcomes all relate to increasing forest cover.<sup>5</sup> But the project only tracked the number of hectares in which biodiversity friendly practices expected to lead to enhanced forest cover were implemented it did not track the extent to which regeneration was actually taking place.

**2.24** *Reversing land degradation in agricultural landscapes* is also a long term process. The ambitious intent of this objective is reflected in the key performance indicator of a 50% reduction of erosion and sedimentation in the watershed level. The project supported relevant practices to meet this objective but they were only supported on a pilot scale. As acknowledged by the project completion report, achievement of this scale of impact requires interventions on a larger scale and for a longer time frame.<sup>6</sup>

**2.25** At the other end of the spectrum, the objective of *increasing awareness at all levels of the value of adopting an IEM approach in the management of natural resources* is stated in terms of outputs of a process as opposed to an actual outcome. This is problematic as an operation's objective is meant to be a statement of what it intends to achieve, expressed in terms of an intermediate or final development outcome, as opposed to a financed deliverable (output). In this case the objective statement should have clearly indicated what change/response was expected from the primary target group as a result of increasing their awareness of the value of adopting an IEM approach. The key performance indicator associated with this objective does not provide any further clarification of the expected result

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) inappropriate agricultural practices leading to loss in soil biodiversity.” (PAD pg. 21)

<sup>5</sup> The list of subprojects eligible for project support (PAD pg. 52) under the category of conservation or sustainable use of biodiversity are: forestry management, reforestation of groundwater recharge, protection of groundwater recharge areas, isolation and rehabilitation of groundwater recharge areas. The project appraisal document (pg. 103) also includes a fluxogram of the various environmental services expected to be by the adoption of sustainable agriculture practices, indicating that “Sustainable Use and Management of Biodiversity” would be brought about by forest rehabilitation, actions to correct forest fragments, and the production of bioactive substances.

According to the project document presented to the global environment facility the threat that the project is addressing is habitat fragmentation and its strategy for addressing this threat was “to promote an integrated ecosystem management approach to conservation that would foster biodiversity –friendly activities in areas within and in proximity to the remaining forest remnants in the region that are already under some form of protection. As project implementation progresses, “micro-catchment clusters” (defined as significant numbers of farmers who adopt sustainable agricultural practices and biodiversity friendly approaches) will contribute to the gradual development of the biological corridor through linking protected areas and forest fragments.”(GEF 2003, pg. 3-4)

<sup>6</sup> The project completion report (pg. 5) states “Targets such as a 50% reduction in erosion and sedimentation at the micro-catchment level required longer-term and more massive interventions focused on changes in land use and management, difficult to achieve/measure from small-scale, dispersed demonstration efforts.” (World Bank, 2012)

as it is pitched at an output level: “education and training of beneficiary stakeholders (1,900 by PY5), project executors (150 by PY4), and schools (25 by PY4)

2.26 The relevance of the project’s design to meeting its objectives as stated is **modest**.

## **Monitoring and Evaluation Design**

2.27 The Project Appraisal Document outlined a comprehensive plan for monitoring and evaluation. The project log frame specified KPIs for both the PDO and GEO and multiple intermediate indicators and included time bound targets. The project completion report notes that “there was confusion and overlap in the wording, meaning and targets of key PDO, GEO and Intermediate indicators, too many of the latter and some of questionable relevance.” This led to confusion over what should be measured in some instances.<sup>7</sup> Some indicators were too ambitious. Such as the target of a 50 percent reduction in erosion and sedimentation at the micro-catchment level, requiring more intensive interventions at a larger scale and for a longer term than what was supported by the project. Other indicators were insufficient for measuring outcome level achievements. The KPI for the project’s biodiversity objective, for example, only tracked the number of hectares in which activities intended to lead to forest restoration were carried out but did not measure actual regeneration. In addition to the indicators in the project log frame there was a separate set of social impact indicators.

2.28 The monitoring and evaluation plan comprised a two-pronged approach. “Complete” or full monitoring would be carried out by technical partner agencies in a sample of three micro-catchments to assess environmental impacts that required more technical monitoring. This would be complemented by participatory monitoring that would be carried out by beneficiaries in all of the micro-catchments that receive project support. Beneficiaries would work with project technicians to assess the implementation of project activities at the micro-catchment level, and actively participate in data collection and other sampling activities to monitor select social and environmental aspects of the project’s interventions (water and soil quality, presence of wildlife, etc.). Participatory monitoring was also intended to solicit feedback, enhance local capacity, and generate information to mobilize the participation of other residents.

2.29 A Management Information System (MIS) would track the financial and physical progress of the project. The MIS was to be a user friendly web based system that would allow for real time tracking of implementation and facilitate interface between the project,

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<sup>7</sup> There was confusion over the number of proposals and farmers the project aimed to reach. The PAD mentions a target of 4,400 “proposals”. The project completion report argues this was “an indicative target within a demand-driven project framework - the first of its kind in this State. Farmer demand IEM/SLM investments, could not be projected with any accuracy. It should also be noted that a single PID could generate several proposals from an individual farmer for investments in different but complementary “practices” intended to maximize on-farm impact. A single subproject might constitute several “practices”. Moreover, the various investments incorporated in PIDs were to be financed from a variety of sources. The project was only one of these sources. Similarly the PAD Log frame refers to a target of 1,900 farmers adopting IEM/SLM practices. This was assumed to combine 1,450 individual farmers and 150 groups averaging three members. Whereas a target of 1900 PIDs is mentioned in the PAD’s “Arrangements for Results Monitoring” table. The project completion report notes that “technical assistance and financial support for on-the-ground investments under sub-component 2.1 targets “at least 1,000 producers and 150 groups”, not the 1450 individual farmers and 150 group combination (1900) for farmers and PIDs, and is an error.”

service providers and beneficiaries. A project portal would also be established to channel project information to policy makers and steering committees.

2.30 The central project management unit would be responsible for coordinating monitoring, with EMATER and other co-executing agencies providing support and technical assistance as necessary. Progress reports were to be prepared at least twice a year as part of project management supervision. Monitoring and Evaluation of the project was to include an ex-ante evaluation during the first year of implementation, a mid-term evaluation in the third year and an ex-post evaluation in the fifth year.

## **3. Implementation**

### **Changes to the Scope and Timing of Activities**

3.1 The project's objectives and components remained unchanged throughout implementation. The grant agreement was amended once on November 9, 2010, extending the project closing date by 12 months to November 30, 2011. The extension was made to permit full disbursement of the GEF Grant, and enable the completion of field activities that had been delayed during the first three years of implementation as well as key studies of the innovative instruments being piloted. The amendment also reallocated funds across various expenditure categories.<sup>8</sup>

3.2 The ceiling on the amount of subproject financing was adjusted in response to inflation in the price for inputs (materials, labor and equipment) and exchange rate fluctuations. When the project was approved in 2005, the ceiling for farm family subproject was R\$6,000 and R\$4,000 for other participating farmers subprojects. Of this value, the project would finance 80% for family farmers and 40% for others. When the project started to release incentives financing to beneficiaries in 2008-9, it became apparent that the ceiling was no longer adequate to implement the practices envisaged. Consequently, the ceiling was adjusted to R\$7,000 per family and R\$5,000 for others. In 2010, an additional adjustment was made, with the maximum for a family farmer increasing to R\$8,750 and R\$12,500 for others.

### **Planned versus Actual Disbursements**

3.3 The project appraisal document estimated total project costs of US\$14.95 million to be financed by a US\$6.75 million GEF grant, State Government contribution of US\$6.31 million, Federal Government contribution of US\$1.11 million, and a combined NGO and Beneficiary contribution of US\$0.95 million. Actual project costs were US\$18.31 million (23 percent higher than the appraisal estimate) and were financed by: US\$6.65 of the GEF

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<sup>8</sup> US\$ 715,000 from Category 6 Unallocated and US\$ 40,000 from Category 5 Incremental Operating Costs to Category 1 Goods (US\$ (US\$ 55,000), Category 2 Consultants' Services (US\$ 350,000), and Category 3 Training (US\$ 310,000).

grant<sup>9</sup>; a State Government counterpart contribution of US\$3.60 million; a Federal Government counterpart contribution of US\$ 4.80 million; NGO and Beneficiary contributions of US\$0.22 million and US\$3.04 million in co-financing contributions that the project leveraged from various public and private entities with environmental, social and cultural programs targeting the project areas.

3.4 Actual cost sharing differed from appraisal expectations for the following reasons. The State Government contribution was less than anticipated at appraisal due to the State's constrained fiscal situation, but this was compensated for by the Federal Government's contribution that was four times the original estimate. Contributions from beneficiaries and NGOs were about 28% and 3.2% respectively, of their original estimates. The beneficiary contribution was below appraisal estimates because financing for subprojects that focused exclusively on environmental practices was exempt from the State's requirements for beneficiary cost sharing.

**Table 1: Project Financing by Source (in USD million equivalent)**

SOURCE OF FUNDS	APPRAISAL ESTIMATE (USD MILLIONS)	ACTUAL/LATEST ESTIMATE (USD MILLIONS)	PERCENTAGE OF APPRAISAL
Borrower/Recipient	6.31	3.60	57
Global Environment Facility (GEF)	6.75	6.65	99
Federal Government of Brazil	1.11	4.80	432
Other Co-financiers	NA	3.04	NA
NGOs, Beneficiaries	0.95	0.22	23
<b>Total:</b>	<b>14.95</b>	<b>18.31*</b>	<b>123</b>

Source: World Bank 2012

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<sup>9</sup> There are inconsistencies between different project reports of the actual amount of GEF grant that disbursed. The internal data system indicates that US\$ 6.50 million had been disbursed (96 percent of the grant amount) and US\$ 0.25 million of the original grant amount was cancelled. Whereas the financing table in the project completion report shows that US\$ 6.65 million of the GEF grant disbursed.

## Planned vs. Actual Expenditure by Component

<b>Table 2: Project Cost by Component (in USD million equivalent)</b>			
<b>COMPONENTS</b>	<b>APPRAISAL ESTIMATE (USD MILLIONS)</b>	<b>ACTUAL/LATEST ESTIMATE (USD MILLIONS)</b>	<b>PERCENTAGE OF APPRAISAL</b>
<b>Planning for IEM Actions</b>	<b>0.94</b>	<b>1.33</b>	<b>141</b>
-Strengthening of IEM incentive structure and eco-system planning systems	0.15	0.16	106
- Local land management planning	0.78	1.17	150
<b>Support Systems for Adoption of IEM/SLM Actions</b>	<b>8.81</b>	<b>8.94</b>	<b>102</b>
- Financial support for sustainable NRM	8.43	8.53	101
- Support to adaptive management Practices	0.36	0.41	108
<b>Organization and Capacity building for IEM</b>	<b>2.47</b>	<b>1.53</b>	<b>62</b>
- Community organization	0.43	0.41	145
- Training of project executors	0.41	0.56	137
- Training and environmental education of beneficiaries	1.63	0.35	22
<b>Project Management, M&amp;E</b>	<b>2.74</b>	<b>3.28</b>	<b>120</b>
- Participatory management of the Project	1.81	2.41	134
- Monitoring and Evaluation	0.72	0.74	103
- Project dissemination	0.22	0.12	57
<b>Total project costs</b>	<b>14.95</b>	<b>15.08*</b>	<b>101</b>

Source: World Bank 2012

\*There is a discrepancy of USD 3.23 million in the total project costs reported in different tables of the project completion report. Actual amounts reported in the table on financing by source tally to USD 18.31, while those reported in the table of project costs by component add up to only USD 15.08. IEG was unable to determine the correct costs by component.

## Implementation Experience

3.5 Project implementation was challenged by the following factors:

3.6 **The project experienced a number of disbursement delays during the first three years of implementation due to change in State Government administration and the States constrained fiscal situation.** The launch of project activities coincided with a change in state government administration. The project experienced budget delays that are common in Brazil during the transition period between administrations: a lack of resources in the final year of the outgoing government, followed by a delay in the commitment of budget resources by the incoming administration until it adopts a project in its own policy agenda. Project supervision documents indicate that once the incoming government incorporated the project

into its own policy agenda, critical government support was provided for the remainder of the implementation period (see para 6.23). During this time the State was also attempting to negotiate an increase in its debt ceiling, it had reached its debt limit prior to the project's approval and the negotiation was intended to create fiscal space for a number of pending programs/projects. The project completion report (pg. 8) indicates that as a result "the GEF had to wait in line for funds, delaying key activities for several years." State budget resources were also drawn away from the project, as well as other state activities and programs, to finance completion of the new Metropolitan Urban Transit system in Rio de Janeiro that had run into financial difficulty due to the appreciating value of the Real to the US Dollar. The delayed release of counterpart funds resulted in the release of GEF resources being delayed until one year after project effectiveness. The project completion report indicates that the delayed release of State counterpart resources in the first two years disrupted Annual Operating Plans and sequencing. The erratic release of counterpart resources also affected farmers' decisions related to land management and agricultural activities as they depend on financing that is synchronized with seasonal production cycles.

**3.7 Many of the implementing agencies had to overcome capacity constraints.** The main implementing agency experienced administrative problems in part due to its inexperience in implementing externally funded projects. These issues were eventually overcome. Several of the implementing agencies linked to Department of Agriculture and EMATER PESAGRO (The State Agricultural Research Agency) went through an organizational restructuring shortly after the project field activities began which resulted in the removal of some technicians that were engaged as project executors. In addition, there was limited capacity in the regional offices of EMATER-RIO, the State rural extension agency that served as the project's interface with stakeholders in each micro-catchment. The project completion report notes that EMATER-RIO was technically outdated, it experienced a large turnover of extension agents due to implementation of an early retirement plan, and initially its management and staff demonstrated limited commitment to the project's concept and methodology of working in collaboration with stakeholders to meet the goals of their micro catchment plans. The project completion report states that EMATER's presence and effectiveness in the micro-catchments was uneven and its managers and technicians were unwilling to innovate or be held accountable to the project for their performance. The project implementing agency expressed concerns over the ability of EMATER-RIO to respond to the accelerated demand of subproject's that was expected under the follow on IBRD project. By this time the State administration had adopted the Rio Rural Program as a flagship development priority, and it approved a new public bidding process that led to the contracting of 150 new field technicians. In addition, special spreadsheets were developed to monitor technicians' performance and achievement of extension targets, and to hold managers accountable. Efforts were also made to build institutional commitment to the project approach. Supervision reports and IEG interviews indicate that EMATER-RIOs performance improved significantly over the course of implementation. However, a high level of turnover in extension agents persisted throughout project implementation and through the time of the IEG assessment mission (this issue is discussed in the section on risk to development outcome).

**3.8 Engaging local stakeholders was a lengthier process than anticipated.** The project completion report notes that a longer period than anticipated was required for local

stakeholders, including municipalities, executing partner agencies, and farmers to understand the project's rationale of focusing on the micro-catchment as the unit of planning and agree to engage. In addition the project had to overcome the initial skepticism of many landowners in the project area due to the legacy of previously failed State and local initiatives. The lag between implementation of the project's planning activities at the micro catchment level and funding of field activities is reported to have furthered this skepticism. IEG interviews indicate that participation in COGEMs increased once the initial project participants received financing for their subprojects and began to obtain results on the ground.

**3.9 Project implementation relied heavily on partnerships with the intent of maximizing project impact by leveraging co-financers operational capacity and mainstreaming the project's micro-catchment planning approach within their own programs but their roles and responsibilities were not sufficiently defined to ensure that these intentions would be realized.** A total of twelve partner agencies signed agreements with the Ministry of Agriculture but these agreements lacked sufficient details on each partner's roles and obligations. The project completion report indicates that in practice co-financing agencies followed their own rules and standards and were not obliged to follow the projects "key mechanisms" such as the use of PEMs and PIDs to guide investment planning, or participating in the micro-catchment council. In addition they were not willing to share basic data on their project operations and results. This posed a problem for the project team and the project completion report authors in terms of assessing the full extent of the project's outcome and impacts. In addition, the project completion report notes that the leadership of participating institutions showed uneven engagement with the project over time, some sought to impose their own modus operandi and objectives and restricted critical input aimed at improving their operations.

## **Implementation of Monitoring and Evaluation**

3.10 Implementation of project M&E was coordinated by a dedicated M&E team in the project management unit. The project MIS was set up as planned, and was reported to have functioned well. The project portal was accessed by a number of users. By project closure it had registered 42,000 visits. Data generated by the project's M&E system was incorporated in a number of dissemination materials that were distributed to a wide audience. The project also financed a digital inclusion initiative that installed computer centers in local schools and community centers in 13 micro-catchments, enabling farmers to access project information generated at the regional and state level and from the MIS.

3.11 The project completion report indicates that overall implementation of the project's complex monitoring and evaluation scheme was cumbersome, particularly for a first time implementing agency. The project's multi-institutional structure made it difficult to coordinate and operationalize monitoring activities. Many of the project's targets were aggregates to be reached by the combination of GEF-financed and co-financed activities. This proved to be problematic because there was no agreement with co-financing entities on data collection procedures and the project management unit had no access to co-financers databases, leading in turn to difficulties in reporting fully on the projects performance at completion. In addition, monitoring the social impact indicators identified at appraisal proved to be beyond the project's capacity, time and resources and was dropped.

3.12 The complete or full monitoring scheme was implemented in the three targeted micro-catchments but faced a number of difficulties. The project completion report indicates that there was a high cost associated with data collection and the production of technical materials relative to the benefits this information yielded. A baseline study was carried out that was characterized as time consuming and of mixed relevance to the project. EMBRAPA Soils, the agency charged with technical monitoring, reported to the IEG mission that the baseline was not well suited to the needs for monitoring. They noted a lack of classification/modeling of soil and water in different social contexts and the failure to take into account level of existing degradation. The project completion report notes that feedback of data generated from complete monitoring to the micro-catchment communities and technicians was delayed and in some cases deficient. Information collection campaigns were not synchronized with the subprojects so they did not benefit from the results and feedback.

3.13 Monitoring the soil erosion and sedimentation indicator was not possible due to the location of monitoring stations in relation to the intervention areas and the scale of interventions. In accordance with the project monitoring plan, hydro-sedimentology monitoring stations were installed on the outfall areas of the three micro-catchments designated for "complete monitoring". The stations were intended to detect changes in hydrologic variables resulting from sustainable natural resource management practices implemented by farmers. But the impact on reduction of sediments could not be detected because the erosion activities were adopted by a limited number of farmers in disbursed locations. To detect such changes in small areas, the monitoring equipment would have to be installed immediately adjacent to the treatment areas. This aspect of monitoring was designed by a firm that had been contracted during project preparation, while, the Brazilian Agricultural Research Enterprise/Soils Division, the technical agency responsible for the actual monitoring, was not brought on board until after the project preparation phase, at too late of a stage to design an alternative plan.

3.14 Monitoring of biodiversity was carried out through a partnership with the State University of North Fluminense (UENF). A number of research studies were conducted in the micro-watersheds where the project was active. Including the identification and study of forest remnants in the micro-catchments and their importance to biodiversity conservation. As well as studies that demonstrate the impact of pollinator species on economically important crops, and the importance of forest remnants to pollinator species. This information expanded the knowledge base on biodiversity in the project areas but it was less useful for demonstrating the outcomes of actual project activities. Although the research was conducted in micro-catchments where the project was active, UENF researchers reported to IEG mission that the research was not necessarily carried out on plots that received project support and were not designed to detect changes in biodiversity resulting from the project interventions.

3.15 Participatory monitoring was considered to be more successful. It was supported by a consultant who had extensive experience working on World Bank funded micro-catchment programs in other states. With technical support of the rural extension professionals farmers collected water for quality analysis, monitored soil conditions and production. Another tool employed for participatory monitoring was posting a wall panel in the landholders residences in which the family tracks economic, environmental, social welfare and life quality

indicators. Project implementers reported to IEG that it was more cost effective than complete monitoring and generated information that was of greater use to project implementation. Participatory monitoring also generated useful information for the economic efficiency analysis used in the project completion report. However, dissemination of the collected information could have been better. The project completion report notes that dissemination of information generated with the intent of mobilizing the participation of additional residents in the micro-catchment was not done consistently. The IEG mission notes that greater aggregation and use of the information collected through participatory monitoring should have been considered for inclusion in the completion report to fill gaps in knowledge on the projects results that were not detected through the more comprehensive monitoring scheme. The project completion report includes some data from participatory monitoring on soil and water quality in select micro-catchments but there appears to be a gap between the volume of information that is reported to have been collected through participatory monitoring<sup>10</sup> and its use in evaluating project outcomes.

### **Safeguards requirements and compliance**

3.16 The project was classified as Environmental Category B and triggered the following safeguards policies: OP4.01 on Environmental Assessment, OP4.09 on Pest Management, and OP 4.37 on Forests. Environmental Assessment and Environmental Management Plans were completed to ensure conformity with OP 4.01. Supervision reports indicate that the identification, preparation and implementation of activities on the ground followed the recommendations of the environmental management plan. The project's completion report notes that supervision of environmental safeguards was aided by the presence of both Bank and FAO environmental specialists in supervision missions. No safeguard issues were reported in the course of implementation and the IEG mission did not come across any issues in the field.

### **Fiduciary Management and Procurement**

3.17 The project completion report notes that financial management performance varied over the course of the project due to the implementing agencies lack of experience with Bank financial management procedures and human resource issues. Supervision reports indicate that many problems related to FM staffing, organization, archiving and reporting improved over the course of project implementation but internal controls were problematic throughout. Audit reports were often delayed, their quality was uneven and some had qualifications. All qualifications were resolved by project closure and the final audit, dated April 27 2012, was unqualified.

3.18 Procurement performance was also mixed. The implementing agency's inexperience with Bank procurement procedures resulted in a slow pace of acquisitions and consulting contracts. Procurement was also affected by conflicts between Bank and State procurement

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<sup>10</sup> Data collected through participatory monitoring was reported to have been analyzed locally on a yearly basis and used to update the overall micro-catchment plan but is not clear how much of this was passed on to the central project management team for aggregation at the project level. This may be partly due to the fact that the two monitoring schemes were designed for different purposes. The participatory monitoring was designed to play more of a role in local implementation whereas the complete monitoring scheme was intended to provide an assessment of technical impacts of the project as a whole.

norms, and the weak organization of procurement financial management functions and human resource issues. The PIU was subsequently provided training and guidance by Bank procurement specialists that resulted in the resolution of bottlenecks and acceleration of procurement processing. The project completion report indicated that by project closure procurement capacity met Bank standards.

## 4. Achievement of the Objectives

**4.1     *Overall outputs at the farm level intended to contribute to each of the projects global environment objectives are presented below followed by specific assessments of each individual objective.***

4.2     By project closure one Regional Micro-catchment Council (COREM) had been created (100 percent of the appraisal target) which represented micro catchment and municipal stakeholders at the regional level. 48 micro-catchment development committees (COGEMs) were established in 48 micro catchments (exceeding the appraisal target of 40) which represented stakeholders at the local level. 48 micro-catchment development plans were prepared (120 percent of the appraisal target of 40), one for each COGEM. 1,292 Individual Farm Development Plans (PIDs) were prepared by members of the COGEM. (68 percent of the original target of 1,900 and 89 percent of the revised target of 1,450). The targeted number of PIDs was revised downward in 2010 when it became apparent that due to exchange rate changes there would not be a sufficient amount of Brazilian Reais to finance the original target.

4.3     The project financed a total of 1,574 subprojects comprising activities identified in the PIDs. The number of subprojects exceeds the total number of PIDs because some farmers received financing for more than one subproject in their PID. Table 3 shows the distribution of the 1,574 subprojects financed by the five lines of support. The outcomes from the subprojects in turn were expected to contribute to the achievement of the project's global environment objectives. The project management teams in the Bank and the implementing agency explained to IEG that the agriculture and land use practices promoted by the project were drawn from a positive list of practices identified by the State agronomic research institute (PESAGRO) as having potential to generate positive environmental impacts. The selection of the activities was demand-driven. The State extension agency (EMATER) worked with farmers to ensure the quality of their subproject proposals and that the new practices had been fully adopted and implemented to the required quality standards.

**Table 3: Subprojects by Line of Support**

LINES OF SUPPORT	Nº OF SUBPROJECTS	VALUE (R\$)
1. Recuperation of Degraded Areas	238	311,922.00
2. Use and Conservation of Biodiversity	120	250,058.75
3. Water Resources Management	329	684,708.15
4. Re-orientation of Productive Systems to Sustainable Systems	730	2,082,324.90
5. Support for Commercialization of Socio-environmental Products	157	1,274,209.50
Total	1,574	4,603,223.30

## Objective 1 address threats to biodiversity of global importance

### *Outputs*

4.4 This objective was pursued by supporting sustainable land management activities, consisting of what were considered to be sustainable agricultural practices and biodiversity friendly approaches. It was expected that this would lead to an increase in native forest cover in the project areas and enhanced ability of the agricultural landscape to support biodiversity.

4.5 The project completion report indicates that biodiversity friendly agricultural practices were implemented on 31,650 hectares (just short of the appraisal target of 32,000), by the time of the IEG assessment mission this number had increased to 33,810 hectares. The increase reflects the fact that at the time of the writing of the project completion report the final round of subprojects had been approved for finance but had not yet disbursed. IEG interviews with the project management team indicate that this number was derived from multiplying the number of individual property management plans that had been approved by the average size of the area in which treatments occurred.

4.6 1,332 hectares of riparian and other native forests were reported to have been rehabilitated for biodiversity conservation and hydrology stabilization objectives (just short of the appraisal target of 1,400 hectares). This number represents the subset of activities reported above which specifically aimed at forest rehabilitation (agroforestry, systems, protection of springs, establishment of riparian forests). IEG interviews indicated that this number represents the number of hectares that had been treated to enable the forest to regenerate. It does not measure the extent to which regeneration actually occurred. The typical practice entailed fencing of an area and allowing natural regeneration to take place. In particularly degraded areas enrichment planting was carried out which involves planting native species in addition to fencing.

4.7 The project also contributed to this objective through the establishment of land use mosaics on private lands, aimed at enhancing connectivity between forest fragments. By

project closure land use mosaics had been established on 792 hectares. This was done by obtaining Private Natural Heritage Reserve (RPPN) status for existing forest fragments, a legal classification at the Federal level that maintains an area exclusively for conservation purposes in perpetuity. In addition connectivity between RPPNs and other forests in the area under protected status was enhanced through environmental practices that increase the tree component which then act as stepping stones for many forest species to traverse the agricultural landscape. Enhancing wildlife circulation helps in avoiding the isolation of family groups, which can bring consanguineous problems and increase the risks of extinction. The location for implementing these practices was determined by taking into account an optimal distance from the existing forest fragments. The number of hectares incorporated into land use mosaics was only 64 percent of the appraisal target. The number was below expectations because the process of establishing reserves on private lands proved to be a slower and more complex process than anticipated. The project was involved in enabling the application of the RPPN program to some of the participating municipalities for the first time.

4.8 An additional contribution to this objective was the project's role in the passage of a decree that obligates the State to financially support a Payment for Environmental Services (PES) mechanism. Interviews indicate that the project's results were instrumental in convincing the State to approve this decree. Development of a PES program will provide additional sources of revenue to landholders for providing environmental services in the future. At the time of the assessment mission the PES mechanism was being piloted by the Sao Joao River Basin Committee but was at incipient stages compared to more mature PES programs in other countries, such as those in Costa Rica and Mexico which issue contracts for landholders to maintain existing forest for four or five years duration. In contrast, the Sao Joao program issues one time grants for activities such as planting native species or other techniques that can lead to the generation of environmental services.

### ***Outcomes***

4.9 The performance indicators measured by the project are not sufficient to demonstrate the achievement of this objective at the outcome level. The on-farm activities implemented by the project in support of this objective were intended to result in the regeneration of forest cover. However the project has only measured the area in which treatments were carried out, not the actual extent of regeneration. And no other biodiversity outcomes were assessed.

4.10 There is some anecdotal evidence that regeneration is beginning to occur but no systematic effort was made to quantify these results so it is not possible to determine the extent to which such results are being achieved. Supervision reports and field visits by the IEG mission found plots treated in varied stages of regeneration. The project completion report also includes anecdotal references that recuperation of native vegetation and of local biodiversity (in terms of greater species diversity) was observed in each of the 9 subprojects monitored through participatory monitoring. Beneficiaries interviewed for the case studies on the adoption of SLM practices reported that "the forest is growing and there are many new seedlings.

4.11 The project management unit provided IEG with a monitoring report that utilized high resolution satellite images to detect changes in vegetation cover, the extent of degraded pasture, and soil erosion in the three micro-catchments that were monitored under the complete monitoring plan. The images indicated an increase in areas in the initial to moderate stages of regeneration. While it is plausible that the project investments contributed to some of this, there is insufficient information to attribute this to the project because the project intervention areas were not delineated. The project task team in the World Bank clarified to IEG that these images were not used to assess the level of regeneration resulting from project activities.

<b>Table 4: Results of Analysis of changes in Land Use from Satellite Images</b>											
Land Use	SANTA MARIA			CAIXA D/AGUA			BREJO DA COBICA			% change	
	Year		% change	Year		% change	Year				
	2001 Ha.	2011 Ha.		2004 Ha.	2011 Ha.		2001 Ha.	2011 Ha.			
Forest remnants in primary state or advanced stage of regeneration	186,98	185,18	-1	131,36	131,06	0	1.403,60	1.404,00	0		
Forest remnants in initial/medium stage of regeneration	106,97	110,64	3,4	156,87	159,67	1,8	88,39	104,93	19		
Degraded Pasture	409,47	251,58	-39	44,11	12,25	-72	132,46	75,46	-43		
Soil Erosion	11,32	7,02	-38	3,88	1,06	-73	6,51	2,20	-66		

Source: Project Monitoring Report (Nov 2011)

4.12 Research on biodiversity in the project areas carried out through a partnership with the State University of North Fluminense (UENF), identified the potential for conserving biodiversity in the micro water sheds where the project was active. As noted in the discussion of M&E implementation, this information expanded the knowledge base on biodiversity in the project areas but it was less useful for demonstrating the outcomes of actual project activities. Interviews with staff at the UENF, responsible for monitoring of biodiversity indicators, indicate that insufficient time has passed to see an impact from project intervention on the fauna in the project area. The project implementation team informed IEG that the UENF team established an online database with funding from the project cataloguing information on biodiversity in the Atlantic Forest Region and that this information has been accessed by researchers interested in conservation of the region. They also note that the list of species inventoried in forest fragments in the watersheds in which the project was active have been of use to other actors who are attempting to create preservation areas or prepare restoration projects. The biodiversity studies conducted by the UENF with project support

were reported to have been utilized in the establishment of three protected areas in since project closure.

4.13 In summary, due to the absence of systematic data on the actual degree of regeneration or an alternative measure of biodiversity related outcomes resulting from the adoption of improved agriculture practices and tool and information introduced by the project it is not possible to judge the extent to which this objective has been achieved.

4.14 Overall achievement of the objective is ***rated modest***.

## **Objective 2 reverse land degradation in agricultural landscapes**

### ***Outputs***

4.15 The biodiversity friendly agricultural practices, forest restoration and corridor outputs reported above were also expected to contribute to reversal of land degradation in the project areas.

### ***Outcomes***

4.16 There is no evidence that demonstrates that land degradation has been arrested or reversed to the extent envisaged at appraisal. The key performance indicator selected to demonstrate this objective was a 50 percent reduction in erosion and 50 percent reduction in sedimentation in at least 3 micro-catchments. The project planned to measure this indicator by monitoring sedimentation in downstream areas from where project interventions took place. As discussed in para 3.13 it was not possible to measure impacts in this manner because the monitoring equipment was installed too far away from where project activities were implemented, creating difficulties in determining the source of any changes detected. Moreover, monitoring soil impacts in this manner requires a higher concentration of treatments. The project's small scale and dispersed interventions required a different monitoring approach to detect impacts.

4.17 EMBRAPA reported a reduction in the concentration of sediments in water runoff in two of the three micro-catchments monitored but due to the measurement issues noted above the information is not sufficient for determining the extent that reductions were due to project interventions versus other factors. Data was not obtained in the third micro catchment due because of damaged monitoring equipment. The micro-catchment of Santa Maria/Cambioco showed a 7 percent reduction in the average values of sediment concentrations in suspension and 8 percent in maximum concentrations of suspended sediments over the period 2009 to 2010. In the micro catchment Brejo da Cobiça there was a 26 percent reduction in the average values of sedimentation concentration and 31 percent reduction in the maximum sedimentation values from 2009 to 2011. However, this data should be viewed as preliminary as a one to two year timeframe is extremely short to pick up a trend.

4.18 EMBRAPA staff reported to the IEG mission that based on results they have observed in other projects implementing similar interventions, the project has potential to improve soils and hydrology but they were unable to determine the impacts of the Rio Rural/GEF project interventions as a whole due to measurement challenges. They confirmed that soil parameters were monitored in a limited number of project areas which indicated that pasture rotation has improved soil structure, reduced compacting of soil, reduced penetration and improved soil porosity. But no changes were detected in the soil parameters of the other project interventions. They noted that it is too early to detect an effect on soils from other interventions that were monitored, such as the use of organic manure. The project management team provided IEG with EMBRAPAs final report which detected an elevation

in some of the soil nutrients that were monitored but it was inconclusive for others and was insufficient for concluding that land degradation had been reversed.<sup>11</sup>

4.19 The project completion report notes that case studies were conducted at project closure based on participatory monitoring to assess soil quality improvements under a sample of six rotational grazing subprojects that suggests that some of the project interventions are having a positive impact on soils. Organic material and nutrients in the surface layer of soil were monitored over a three year period. The baseline, sampling methodology and depth at which the samples were obtained was not reported. Some localized improvement in organic matter and soil chemistry were detected: (i) increased organic material was found in four of the six subprojects averaging 5.04 g/dm<sup>3</sup> or 0.5% (the report does not explain whether there was a decline, no change or if no data was available for the other two subprojects); and, (ii) increased potassium and phosphorus was found in five of the six subprojects averaging 10.14 mg/ dm<sup>3</sup> for phosphorus and 2.14 mmol/dm<sup>3</sup> for potassium (the report does not explain what change if any was found in the sixth subproject). The authors are candid in noting, however, that these results cannot be extrapolated to other subprojects since each area has its own unique soil characteristics and each subproject its own management system.

4.20 Data from the analysis of high resolution satellite images (table 4) showed a decrease in erosion in the three catchments monitored. However, similar to the discussion of forest cover data in para 4.11, while it is plausible that the project investments contributed to some of this, there is insufficient information to assess the extent to which this is the case because the areas where the project investments were carried out were not delineated.

4.21 To summarize, there is some evidence to suggest that a small subset of the project's interventions are starting to have a positive impact on soil nutrients, organic matter, and the concentration of sedimentation but there is insufficient information to extrapolate to the project areas as a whole and the available evidence detects an impact that is well below appraisal expectations and targets.

4.22 Overall achievement of the objective is ***rated Modest***.

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<sup>11</sup> Physical and chemical aspects of soil quality were monitored in two watersheds at two depths. 0-20 cm and 20 to 40 cm. Soil structure and four soil nutrients were measured: Potassium, Phosphorus, Calcium, Magnesium. The following results were reported: Persimmon – increase in bulk density, increased penetration, increase in calcium and magnesium (no mention of the other nutrients). Banana – no change physical properties, increase in calcium from (.7 mol/kg to 6.57 mol/kg) (no mention of the other nutrients). Coffee – improved penetration, increased aggregation; no change in potassium or sodium, slight increase in calcium and magnesium. Pineapple inter cropped with Cassava combined with organic fertilizer– detected no effect on physical quality/ soil structure, decline in calcium and magnesium, increase in sodium and potassium. The technician concluded there was a need to increase dosage of organic fertilizer. Rotational grazing - In one watershed rotational grazing showed a reduction in soil compaction, greater aggregation and increase in all nutrients. In the other watershed rotational grazing plots had a reduction in soil compaction, slight increase in magnesium and sodium and increase in calcium. EMBRAPA concluded that although conditions of pasture were good at the baseline there was a marked improvement in both physical and chemical properties of the soil.

## **Objective 3 enhance carbon sequestration**

### **Outputs**

4.23 According to the project appraisal document, the theory of change behind meeting this objective was that protection of forest as well as the adoption of sustainable land management practices (such as crop rotation, mulching and pasture rotation) would contribute to the storage of carbon through an increase in above ground biomass and by rebuilding the amount of soil carbon. A list of the specific outputs associated with this objective was not reported.

### **Outcomes**

4.24 The project appraisal document includes two different targets for carbon sequestration. The key performance indicator was “1.5 tons of CO<sub>2</sub> per ha to be sequestered by project year 5”, whereas the log frame matrix indicates “additional annual amount of CO<sub>2</sub> sequestered in the project area by project year 5 = 34,000 tons.”

4.25 At project closure carbon sequestration estimates were reported for the areas in which rotational grazing was carried out.<sup>12</sup> Farmers who received project support to establish rotational grazing systems were also required to release part of their lands to forest restoration, to protect springs and riparian strips. On average, for each hectare of rotational grazing established, 1.5 ha are released for biodiversity conservation.

4.26 It was found that, on average, 80 tons of carbon/ha were sequestered in the soil and 5 tons/ha in the above ground vegetation in the pasture areas and an additional 28.2 tons/ha (on average) were sequestered in soils in the areas that had been released for biodiversity conservation. Resulting in an estimate of 28,515 tons of CO<sub>2</sub> sequestration for the entire intervention area covered by the 224 pasture rotation subprojects that were financed.

4.27 While the estimates of CO<sub>2</sub> sequestered per hectare, both under improved pasture (80 tons/ha) and in areas released for biodiversity (28.2 tons/ha), exceed the projects target of 1.5 tons/ha, the total estimate of 28,515 tons of CO<sub>2</sub> was 84 percent of the appraisal estimate (34,000 tons). However, it is not clear how any of the estimates compare to the amount of

<sup>12</sup> Rotational pasture management involves fencing into smaller paddocks and usually includes improving pasture with more productive forage species and the use of fertilizer. Cattle are confined to one area at a time and are moved in a rotation. However fixed stocking without rotation can also apply improved pasture species and more intensive input use. The assumption in project design was that rotational grazing would result in higher production, the recuperation of soils and allow the utilization of a smaller area of land than a more extensive grazing system. The assumed positive impacts were expected to arise from greater vegetative cover resulting from pasture recuperation combined with increased forage and concentrated waste load leading to improved soil quality, less erosion, and less impact on water resources such as springs. The global research evidence on the benefits of rotational versus fixed stocking is somewhat mixed. Pasture condition and productivity results can be location-specific and may depend on farm size, rainfall, soils, type of livestock, and especially management skills. Economics depends, among other things, on fencing and labor and management costs, the additional costs of improved, usually fertilized, pasture and whether hay is cut. While much of the literature shows that rotational may be somewhat more productive under good management and in intensive production systems, the net advantages in terms of environmental impact and farm profitability would need assessment. In this project, to get assistance, farmers were expected to give up 1.5 ha for land protection, particularly along streams and rivers and around springs and to gain assistance for 1.0 ha for fencing and more intensive rotational grazing.

carbon sequestered under the previous land uses because a baseline survey was not carried out. Therefore it is not possible to assess if carbon sequestration has in fact been enhanced. That said it is important to note that the absolute amount of carbon sequestered by all project investments could potentially be higher as the calculation presented above only takes into account a portion of the total subprojects financed.

4.28 The potential for the wider spectrum of project interventions to sequester carbon is suggested through the estimates obtained by FAOs Ex-Ante Carbon Tool which was applied to activities planned under the IBRD financed follow on project that is scaling up the activities supported by the GEF project. The Ex-Ante Carbon-Balance Tool is a land based accounting system that provides ex-ante measurements of the mitigation impact of agriculture and forestry projects<sup>13</sup>. The main output of the tool is an estimation of the carbon balance associated with adoption of improved land management options, as compared with a “business as usual” scenario. Results of applying the EX-ACT tool to the activities planned under the follow on found that the project has the potential to contribute to carbon sink of 564,399 tons of CO<sub>2</sub> after 20 years. Sensitivity analysis was also conducted to show the potential total carbon balance of project activities (the net of activities that enhance carbon sequestration and those that add to the release of carbon) under three scenarios: a pessimistic scenario (assuming decreased average adoption rate) of 0.52 Mt/ ha, the optimistic scenario (assuming increased adoption rate of improved livestock practices and additional mitigation from rehabilitation of rural roads) 1.02 Mt/ha and most likely scenario 0.77 Mt/ha. The mean was 0.85 Mt/ha.

4.29 To summarize, the project estimated the amount of carbon sequestered by a subset of project interventions but in the absence of baseline data it is not possible to determine if this is an enhancement over the amount of carbon in the project area prior to project intervention.

4.30 Overall achievement of the objective is ***rated modest***.

#### **Objective 4 increase awareness at all levels of the value of adopting an Integrated Ecosystem Management approach to the management of natural resources**

##### ***Outputs***

4.31 ***Training and Environmental Education.*** The project aimed to raise awareness of the value of adopting an integrated ecosystem management approach through various channels. The awareness of beneficiary land holders was expected to be raised in the course of preparing land use plans, implementing subproject interventions and benefiting from the results. Capacity building activities at the regional and watershed level were expected to raise awareness among municipal officials, NGOs and other regional stakeholders who participate in the COGEMs and COREMS. Environmental Education activities were aimed at raising awareness of the broader community.

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<sup>13</sup> The tool used the IPCC 2006 Guidelines for National Greenhouse Gas Inventories, complemented by other existing methodologies and reviews of default coefficients.

- Training was provided to 370 technicians to improve their managerial and technical capacity to manage resources adequately and communicate such messages to micro-catchment residents. 2,600 members of micro catchment communities participated in environmental education activities. Training and environmental awareness building activities were also conducted with 5,730 members of the wider regional community.
- Environmental education programs were conducted at twenty local schools (80 percent of the appraisal target of 25 schools).

**4.32 Dissemination and Outreach.** The project completion report also notes that consistent and intensive efforts were made to explain and disseminate the project and its emerging results and lessons to the wider public through numerous events, forums and media materials:

- Twenty dissemination workshops were conducted at the regional level (67 percent of the appraisal target of 30 workshops) and four workshops were conducted at the national level (100 percent of the appraisal target).
- Four media campaigns were carried out (exceeding the appraisal target of 3 campaigns).
- 1,204 articles were published in newspapers and online media.
- 184,000 copies of the Rio Rural newspaper (27 editions) were printed.
- Two primers and one book on NNWF's Atlantic Forest biodiversity richness, main threats and conservation strategies were published.

**4.33** A Project Portal (webpage) [www.microbacias.rj.gov.br](http://www.microbacias.rj.gov.br) was also established which contains a large amount of content on the project and the findings and results of studies in the project areas. The project completion report notes that by closure there were 2,720 monthly visits to the portal (mean 6 months; previous: 1.780). IEG was provided with additional information that shows that access to the RIO Rural website increased by 60.5% during 2012, and was split between returning new visitors and returning visitors.<sup>14</sup>

### ***Outcomes***

**4.34** There is insufficient information to assess the extent to which awareness of the value of adopting an IEM approach was actually increased as a result of the projects dissemination and information raising efforts. The objective was vaguely worded so it is not clear precisely whose awareness the project intended to increase or what result or behavior change the project intended to achieve by doing so, the key performance indicators selected for this

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<sup>14</sup> Portal Access was tracked by Google Analytics and linking of data from CMS. The profile of registered users of the portal showed that: 23% extensionists, 23% public server, 12% rural producers, 10% students, 9% fishermen, 7% media, 4% tertiary sector, 3% private sector, 9% other. The project team also noted that they tracked which articles were accessed most frequently.

objective are outputs that do not measure results at an outcome level<sup>15</sup>. The project completion report stated that stakeholders reported that project capacity-building initiatives were useful and rewarding, improving their understanding of the project approach integrating economic, environmental and social concerns but no evidence was provided to substantiate this claim. IEG interviews with the project implementation team indicated that while the team monitored the distribution and access of information, they did not track how the information was being utilized.

4.35 The project task team in the World Bank indicated the main groups targeted for this objective were: (a) small- and medium-sized farmers and community leaders in 40 pilot micro-catchments (about 4,000 beneficiaries), organized through their representatives bodies (the Micro-catchment Management Committees, COGEM); (b) project executors in the State Government agencies involved in the sector (including, in particular, SEAPEC, EMATER, PESAGRO); (c) municipal level institutions (the Municipal Rural Development Councils); and (d) schools.

4.36 At the community level, the number of Micro-catchment Management Committees (COGEMs) created exceeded the project's target (48 COGEMs, or 120 percent of the target). Each COGEM prepared and subsequently implemented, in a demand-driven, participatory manner, Micro-catchment Development Plans (PEM) including the adoption of the integrated ecosystem management practices supported by the project. 2,254 farmers in those 48 COGEMs have adopted on a demand-driven basis the improved land and water management practices promoted by the project (exceeding the project target by 119%). The implementing agency has continued to monitor the functioning of the 48 COGEMs under a follow on operation and found continued improvement of the functioning of the COGEMs. The World Bank team also reports that there has been a continued demand in those 48 micro-catchments for new subprojects dedicated to the adoption of the sustainable land management practices promoted under the project by participants active in the ongoing follow on project.

4.37 The World Bank Task team expressed to IEG their view that such achievements demonstrate that the project has increased farmers awareness of the value of adopting an IEM approach. It should be noted, however, that the establishment of COGEMs and the preparation of micro-catchment development plans were project requisites for obtaining project financing and technical support. While the information presented above demonstrates farmers' interest in participating in the project and that their organizational capacity has been enhanced, no evidence has been provided to demonstrate that participation in project activities has resulted from farmers' enhanced awareness of the value of adopting an IEM approach versus other factors.

4.38 Accounts from the beneficiary workshops carried out at project closure present a mixed picture of the extent to which awareness of environmental issues in general has been increased at the community level. The project completion report notes that during the beneficiary workshop COGEM members described their understanding of the benefits

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<sup>15</sup> The indicators were: 40 rural community organizations created that have adopted and implemented IEM strategies in 40 micro-catchments (by PY 4); Education and training of beneficiary stakeholders (1,900 by PY5), project executors (150 by PY5), and schools (25 by PY5); and, Best practices and lessons learned disseminated through workshops, events and media campaigns in the NNWF region.

resulting from project investments and that 40 percent of the COGEMs stated that environmental awareness did not exist prior to the project. The completion report does not explain the response of the remaining 60 percent of COGEMs. Mixed views were expressed with respect to the level of farmer engagement and buy-in of the project's environmental goals: "Farmers in many micro-catchments had grasped the importance and urgency of the project's environmental goals more broadly, while in others, farmers' still-fragile engagement was evident."

4.39 At the level of schools, the World Bank project team reported to IEG that awareness raising activities carried out by the project has resulted in a request from schools for further support for the actual implementation of environmental education activities. In response, the follow-up Rio Rural IBRD project has introduced a new category of subprojects for Environmental Education that supports activities aimed at providing students with direct experience in the implementation of IEM practices and demonstrating the benefits of such practices. No evidence has been provided, however, to demonstrate that the schools demand for funding for environmental education activities has been brought about by virtue of the project having enhanced their awareness of the importance of adopting the IEM approach. It is equally plausible that the schools were well aware of the value of IEM prior to the project but merely lacked the funding to implement such activities.

4.40 There is some anecdotal evidence that suggests that the project has been instrumental at raising awareness of the value of the IEM approach among municipal and state level institutions. The project completion report notes that during the beneficiary workshop held at the end of the project 84 percent of the participating municipalities reported that environmental awareness, though not specifically the IEM approach, has increased as a result of the project. The project implementation agency team reported to IEG that the project has increased the awareness of micro-catchment management approach at the municipal and state level and that this has been enhanced by virtue of working in partnership with farmers, government agencies and NGOs. They note that prior to the project there was no organized discussion of micro-catchment management issues at the municipal and State levels. The project completion report argues the following actions and policy changes are indicative of the State Government's awareness of the value of the IEM approach. The State Government's approval of the Rio Rural/IBRD operation that scales up the activities piloted under the GEF project to a state wide operation.<sup>16</sup> The State enacted by Decree and established a Payment for Environmental Services (PES) mechanism, as a direct outcome of project supported activities, and as a joint initiative of Secretary of Agriculture and the Secretariat for Environment. The project completion report argues that this is a significant policy change for the State of Rio de Janeiro and demonstrates a new understanding, at the level of government institutions, of the role of agricultural producers as stewards of natural resources in production landscapes. The World Bank project team also reported to IEG that the State Secretariat of Agriculture and Livestock has further established the approach and institutions created under the Rio Rural as a platform for coordinating all other agricultural support programs executed by the State. But no evidence was provided to substantiate this statement.

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<sup>16</sup> The IBRD loan amount is US\$139,5 million (original loan and additional financing) and is backed by counterpart resources of US\$79.5 million.

4.41 Due to the lack of documented evidence of outcome level achievements at all levels, the overall achievement of the objective is *rated modest*.

## 5. Efficiency

5.1 A formal calculation of economic efficiency was not conducted at appraisal. At project closure a cost-benefit analysis was carried out for the four most frequently selected on-farm investments and found that the rate of return on such investments was positive. Though it is not known how the return on project activities compares to the returns of competing land uses. Rotational grazing yielded an IRR of 59% and its profitability ranged from R\$ 0.11 to R\$ 0.48 per Real invested. Poultry kits yielded an IRR of 26% and its profitability ranged from R\$ 0.52 to R\$ 0.84 for each Real invested. Beekeeping subprojects resulted in an IRR of 33% and its profitability ranged from R\$ 0.50 to R\$ 0.90 per Real invested. The fourth subproject type was the protection of water sources or springs. The economic efficiency of this type of investment was calculated by assessing the indirect economic benefits from utilizing the increased availability of water for irrigated pineapples and pasture. In the case of irrigated pineapple cultivation, the project found that farmers were able to increase the irrigation period on one hectare, leading to a 12 percent increase in production. This resulted in a return of R\$0.77 per Real invested. For pasture, the project calculated the expected returns from irrigating pasture in the future compared with actual production without irrigation. This calculation assumed an increase of 5,300 liters of milk and 1.5 arrobas of meat per year, generating a return of R\$ 1.40 per Real invested. These calculations were based on data collected from a sample of 14 farmers who had information available from the participatory monitoring exercise.

5.2 In addition to financial returns, each of these practices has potential environmental benefits, though documented evidence of this is limited. The project completion report notes that rotational grazing yielded a 66.6% increase in organic material for the subprojects monitored by participatory methods, with an average increase of 5.04 g/dm<sup>3</sup> or 0.5%. To enhance the environmental returns from production oriented subprojects, such as rotational grazing and apiculture, farmers receiving support for such interventions were required to release a portion of their land for biodiversity conservation. For rotational grazing 1.5 hectares were released and 2 hectares were released for apiculture. Rustic poultry kits that were monitored were estimated to have generated an annual production of 2,475 tons of organic fertilizer, which is reported to have decreased the application of chemical fertilizers. Participatory monitoring and anecdotal reports to the IEG mission indicate that water source protection has resulted in the increases availability of water improvement in water quality.

5.3 The project's appraisal document indicates that several cost effectiveness considerations were taken into account in the project's design by integrating project activities with complementary ongoing public and private efforts such as those that supply technical assistance and distributing the target number of pilot micro-catchments in a manner that maximized the representation of the diversity found within the five intervention watersheds. The following cost effectiveness criteria were also taken into account in approving subprojects for financing: the degree to which on-farm structures needed to be changed; low

labor requirements; low requirements for the acquisition of external inputs; little need for sophisticated equipment, and the use of low cost, easily learned and applied technologies; and, the subprojects potential for replication and sustainability.

5.4 The project completion report also suggests that there were efficiency gains from working through partnerships in terms of avoiding duplication of efforts, sharing costs and expanding the project's reach beyond what it could do on its own. However, it is not clear how the benefits leveraged by working in partnership compare to the costs of coordinating such partnerships. The project completion report indicates that coordination costs associated with the large number agencies with own priorities and procedures was exacerbated by the absence of formal agreements between agencies but neither costs nor the benefits were quantified.

5.5 Total project costs in dollar terms exceeded the appraisal estimates by 23 percent but project funds were disbursed in Brazilian Reais and there were fewer Reais available than anticipated owing to changes in the exchange rate. The total number of subprojects financed was less than planned in part due to the exchange rate changes and because the average cost of subprojects was higher than anticipated. It should be noted that the higher than anticipated subproject costs was due to inaccurate initial estimates rather than actual over-runs.

5.6 The rating for efficiency also takes into account efficiencies and inefficiencies in project management. There was a three year delay in the start of many project activities as result of the change in government administration and longer than anticipated time to mobilize institutional partnerships. The project overcame these initial implementation delays and ended up disbursing all of its funds by the end of a one year extension. However, inefficiencies occurred due to the fact that the release of counterpart funds was not in sync with the agricultural calendar. According to the project completion report, the erratic release of funds affected farmers land management decisions.

5.7 Overall efficiency of the project is ***rated Substantial***.

## 6. Ratings

### Outcome

6.1 The project's objectives were substantially relevant to country conditions at the time of appraisal, and to the Bank's current Country Partnership Strategy. The relevance of design in meeting the objectives as stated was modest. While many activities included in design were relevant to achieving the project's objectives, the broadly stated Global Environment Objectives were overambitious with respect to the scale of project activities and its timeframe. Achievement of the project global environment objectives was modest due to insufficient evidence of outcome level achievements. Efficiency was substantial. Economic analysis shows that the benefits generated by the most frequently demanded subprojects exceeded their costs. There were some inefficiencies in the management of project funds including a three year delay in the start of field activities but the project was able to

overcome this and disbursed all of its funds by project closure. Taking into account the substantial relevance of objectives but modest relevance of design, modest efficacy and substantial efficiency ratings, the overall outcome rating of the project is **moderately unsatisfactory**.

## Risk to Development Outcome

6.2 The principal risk to the project's on-farm investments is that farmers will discontinue the land use practices adopted under the project but several factors moderate this risk. Economic analysis carried out for the project completion report indicated that those four interventions supported by the project and analyzed were profitable, though it is not known how the return on project activities compares with the returns of competing land uses. IEG interviews with the project management team suggest that maintenance requirements are minimal. For example, the main activities required to maintain areas that were isolated for biodiversity purposes are to maintain fencing, maintain any enrichment plantings by monitoring and controlling for ants and weeding until trees are tall enough to shade out the grasses, and create firebreaks of 3 meters in width.

6.3 IEG interviews and the project completion report also indicate that beneficiary farmers received tailored training from the project's technical executors to implement and maintain their investments. Operation and maintenance was a standard element the training and technical assistance provided on the implementation of sustainable land management practices. Farmers received four years of technical support from project technicians following the release of financing to implement their subprojects. During this time technicians visited every six months to assess implementation progress and provide recommendations on adjustments to improve the intended results. The project completion report notes that supervision and participatory monitoring reports routinely discussed operation and maintenance progress and performance. A follow on IBRD financed project is ongoing and continues to work in the same areas with the same COGEM's, providing an opportunity to further strengthen the farmers capacity to adopt and maintain sustainable management practices.

6.4 The Rio Rural Program has also launched an environmental awareness campaign to promote spring protection under the slogan "Clean Water For the 2016 Olympics". The campaign encourages farmers to protect springs on their property and register them with the Rio Rural program. The registered springs are then monitored using Google imaging tools.<sup>17</sup> All of the spring protection subprojects supported by the project have been registered and the implementing agency reported to IEG that all were intact at the time of the assessment mission.

6.5 Farmers reported anecdotally to both the Project Completion Report authors and the IEG mission that they are interested in maintaining the techniques they adopted and

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<sup>17</sup> The project team informed IEG that 349 springs were protected with support of the GEF project. At the time of the assessment mission 635 springs were under protection, 24 were supported by Rio Rural (IBRD loan) incentives and 262 by farmer's own funds. The results of the campaign can be viewed on the Rio Rural Website: [http://www.microbacias.rj.gov.br/campanha\\_rio\\_olimpico.jsp](http://www.microbacias.rj.gov.br/campanha_rio_olimpico.jsp)

replicating additional techniques. Interviews conducted as part of the project completion report analysis found that 70 percent of farmers interviewed intended to continue implementing the practices that they had adopted under the project. IEG interviews with the implementation staff also provided anecdotal reports that during project implementation some farmers had begun replicating some techniques introduced by the project with their own resources. There was particular interest in techniques such as rotational grazing and the protection of springs that had yielded tangible benefits to farmers in a relatively short period. The implementing agency also provided IEG with additional information to show that the process of forming a mosaic of protected areas has continued. Since the project's closure three additional preservation areas have been established in the watersheds in which the project was active.

6.6 There are multiple sources of financial support potentially available to farmers to help them expand adoption sustainable practices.<sup>18</sup> The project management team, co-financing entities and other stakeholders interviewed by IEG expressed the view that the fact that participating farmers now have individual property management plans can facilitate farmer's access to these funds. The State's payment for environmental services program, discussed in 4.8, is expected to generate an additional source of financing for the adoption and maintenance of practices that lead to environmental services.

6.7 The policy environment is also more conducive to promoting sustainable land management practices than it was at the project's start. In recent years Brazil has stepped up efforts at enforcement of environmental legislation. National environmental legislation now requires landowners to register their property in a rural environmental registry and comply with the provisions of the forest code within five years. Failure to comply will make landowners ineligible for state credit and other forms of government support. Once all of the country's rural properties are registered in the system, in theory, Brazil's government will be able to (a) more easily identify and track illegal deforestation through satellite monitoring, and (b) develop land use plans, creating alternatives for farmers and ranchers thereby contributing to the protection of land and waters. Failure to comply will make landowners ineligible for state credit and other forms of government support, including agricultural credit which many small farmers in the region access. The registry represents a significant step forward in enforcing compliance with environmental legislation and may ensure that project interventions such as the protection of springs and restoration of riparian areas will be maintained.<sup>19</sup>

6.8 The project also supported an innovation to increase compliance with environmental legislation through a partnership with the public defender's office to educate communities on

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<sup>18</sup> The National School Feeding Programme and the National Food Purchase Programme, obligate school feeding programs to source food that is produced locally under sustainable practices and both are active in the project area. Brazilian Law also requires that corporations' environmental impacts of infrastructure projects are compensated with environmentally friendly practices. Many private companies have corporate social programs to finance environmentally friendly activities on private lands in order to comply with the legislation.

<sup>19</sup> The forest code requires 20 percent of farms to be forested. Spring heads and areas within 15 meters of rivers and streams are considered to be legally protected as Permanent Preservation Areas - land that must be set aside with the exclusive goal of conserving biodiversity and ecosystem services for society at large, and cannot be used for direct economic benefit by land owners.

what is required per environmental legislation. Communities then had the option to voluntarily develop specific actions that they could do to ensure greater implementation of the legislation within their communities. Once agreed these “Statutes of Community Conduct” became legally binding. By project closure ten community codes of conduct were signed. The number had increased to 16 by the time of the IEG assessment mission.

6.9 There are several risks to the institutional gains achieved by the project. Rio Rural is a state program and its importance to government was signaled during project implementation by its identification as a key mechanism for implementing the State’s Rural Development Strategy. However, to date World Bank projects (the GEF project under assessment, the follow on IBRD project and additional financing) have played an important role in financing the Rio Rural Program. It is not clear to what extent State resources will cover Rio Rural’s budgetary needs once the Bank funding ends.

6.10 That said there is some interest at the national level in replicating the model the project supports, which could potentially lead to further resourcing in the future. The IEG mission met with the Secretariat for Strategic Affairs in the President’s office, which has indicated its interest in potentially building the Rio Rural model into a program that can be replicated in other states. They expressed interest in the programs potential to protect the environment, raise incomes and keep families in the area (preventing rural exodus). They noted that at this stage the actual impact on poverty and environment is unknown but they are engaging with the IBRD follow up project to conduct an impact evaluation over the next five years to determine the project’s actual impact<sup>20</sup>. At the time of the assessment mission they were in the process of collecting baseline data.

6.11 The ability of the program to implement farm level activities is at some risk due to the high turnover of EMATER staff. While EMATER’s capacity was enhanced to some extent during project implementation through restructuring and expanding the total number of technicians hired, turnover of extension staff remains a significant problem. IEG interviews indicate that low wages of technicians are a significant factor. During the IEG assessment mission EMATER technicians were on the verge of strike due to the fact that they have not received a wage increase in 10 years.

6.12 There is also a need to strengthen multi-institutional collaboration and to mainstream the project’s methodologies into other programs. The project was designed to complement activities from ongoing programs in the sector and region, and leverage their co-financing. This was partly intended to enhance the sustainability of project gains. As noted in the discussion of implementation experience, the extent to which co-financing entities adopted project mechanisms was uneven. The project completion report notes that the informal nature of inter institutional collaboration is a potential risk.

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<sup>20</sup> The Office of Strategic Issues of the Federal Government (SAE) is a department in the President’s office devoted to conducting policy research to formulate public policies aimed at long-term national development. At the time of the assessment mission they had submitted a proposal to 3ie for additional resources to finance the impact evaluation.

6.13 Finally the program has relied on very strong individuals in its leadership team within a weak but evolving institutional environment and is at risk in the event that the leadership is disbanded. The project completion report notes this is common in many states in Brazil.

6.14 The ongoing IBRD project aims to further strengthen the Rio Rural program and is specifically attempting to address each of the institutional risks noted here.

6.15 The risk to development outcome is rated ***Moderate***.

## **Bank Performance**

### **Quality at Entry**

6.16 The project was prepared on the basis of solid technical analysis. Project preparation drew on decades of Bank experience addressing land degradation in other states in Southern Brazil through micro-watershed development projects. Lessons from earlier projects that were reflected in the project design were: (1) the use of the micro-catchment as the unit of planning to enhance biophysical impact of interventions and facilitate the organization of farmers; (2) a focus on technologies that can bring early benefits to farmers; (3) integrating project activities with other development efforts to enhance impact and sustainability; and, (4) providing extensive training approached to public sector extension staff in participatory approaches. Socio-economic and environmental diagnostic studies were also conducted during preparation to identify bottlenecks to changing land management practices. The project appraisal document identified many of the key risks to project success and set forth adequate mitigation measures.

6.17 However, project design did not match the overambitious objectives and the institutional analysis carried out at appraisal was insufficient. Project design was complex and required a high degree of institutional coordination but the capacity of the implementing agency was not sufficiently assessed and the roles and responsibilities of the other implementation partners were insufficiently spelled out, contributing to implementation problems later. The project's complexity was not identified as a risk at appraisal and the challenges the many implementing partners faced in understanding the project's overall concept and its implementation methodologies were not anticipated. The project's M&E framework was also weak.

6.18 Overall the Bank's performance in ensuring quality at entry is rated ***moderately unsatisfactory***.

### **Quality of Supervision**

6.19 Supervision reports indicate that the project required intensive supervision<sup>21</sup> due to the many implementation challenges it faced. There was an initial period when supervision

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<sup>21</sup>In 2006, when project implementation began, internal supervision reports called for a greater degree of supervision than typically required, at least three one week missions a year with the entire supervision team present at the same time to maximize synergies.

missions were not as frequent as needed. Subsequently missions were frequent and fielded by teams with an appropriate skill mix. Project supervision overlapped with the preparation of a follow on operation that was to be managed by the same implementation team. This contributed to greater interaction between the Bank and the project management unit. The project had a total of four task team leaders but one individual was in place for the majority of the project implementation period, aiding continuity of supervision. During supervision the Bank team worked closely with the project management unit to improve financial management and procurement performance. Supervision reports indicate that financial management supervision was intensive throughout implementation, in particular during the initial years when problems were greatest. The Bank provided training to resolve bottlenecks and was effective at accelerating procurement. Internal supervision reports also indicate that the Bank was proactive in helping the implementing agency address organizational and technical issues that arose. Safeguards were adequately supervised by a team of Bank and FAO environmental specialists. Finally, the Bank demonstrated flexibility in extending the closing date to provide space for meeting output targets in light of the disruptions to implementation in the first three years.

6.20 There were some shortcomings in supervision. Supervision reports indicate that progress ratings were overoptimistic in the initial years of implementation when disbursements and achievements were low and the extent of documentation of missions was uneven. Some targets were overly ambitious and were not revised. By 2009, when the project's field activities were ready to begin, there were fewer Brazilian Reals available than planned due to exchange rate changes. In addition once implementation began the team discovered that the costs per sub-project were higher than estimated. These factors limited the total number of sub-projects that the project could finance. The project completion report indicates the target for the number of individual farm plans was reduced from 1,900 to 1,450 but the resulting outcome targets, such as the number of hectares in which biodiversity friendly activities were carried out, were not revised. In addition the flaws in the M&E framework were not sufficiently addressed during supervision.

6.21 The Bank's performance in supervision is rated ***moderately satisfactory***.

6.22 Taking into account the ratings for quality at entry and supervision, as well as the overall outcome rating<sup>22</sup>, the overall Bank performance is rated ***moderately unsatisfactory***.

## Borrower Performance

### Government Performance

6.23 The government demonstrated a high level of ownership and commitment to the project by taking the lead on preparation activities and financing them before GEF funds became available, keeping the project management team intact despite changes in government administration in 2006, providing a higher amount of overall counterpart

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<sup>22</sup> IEG OPCS harmonized rating criteria indicates that when one dimension of Bank performance is the satisfactory range and the other in the unsatisfactory range, the overall Bank performance rating is determined by the outcome rating.

contributions than anticipated at appraisal<sup>23</sup> and leveraging additional financing from implementation partners. Following the change in government administration in 2006 there was a period when political commitment to the project waned as the new government familiarized itself with the goals of the project, but project supervision reports indicate that once the project was adopted as part of the incoming government's own policy critical project support was provided for the remainder of the implementation period. The government supported project implementation through its support of the central-regional project structure and efforts to improve the counterpart funding situation. It also took steps to resolve the bottleneck in available technical personnel by authorizing a public bidding process to contract new technical executors for EMATER/Rio. In addition the government contributed to an improved enabling environment for the project goals by passing legislation to enable payment for environmental services. Moreover, the government expressed its continued support for the project goals by supporting a follow on operation with a request for financial support through an IBRD loan.

6.24 The key shortcoming in government performance was the delayed release of counterpart commitments during the first three years of implementation due to the state's constrained fiscal space and the transition between government administrations. Government performance also could have been stronger in terms of providing greater political pressure to foster more effective engagement of state institutions as implementation partners.

6.25 Government Performance is rated ***moderately satisfactory***.

### **Implementing Agency Performance**

6.26 The implementing agency was highly committed throughout project preparation and implementation and in the preparation of the follow on project. Project supervision reports indicate that the project management team consistently sought out measures to keep the project moving in the face of the various implementation challenges. The team was proactive in introducing bunched training sessions of shorter duration when the training activities originally planned were found to be "protracted, duplicative and linear". It worked with Bank specialist to improve its procurement and financial management performance, which was initially uneven due to lack of experience with World Bank procedures. Supervision reports found satisfactory safeguards performance throughout project implementation. The main shortcoming in the implementing agencies performance was the weaknesses in the project's M&E system.

6.27 The Implementing Agency's Performance is rated ***moderately satisfactory***.

6.28 Taking into account the ratings for government and implementing agency performance, the overall Borrower Performance is rated ***moderately satisfactory***.

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<sup>23</sup> The State contribution was USD 2.7 million less than the appraisal estimate, due to the State's constrained fiscal environment, but the Federal Government contributed USD 3.7 million more than its appraisal estimate. The combined government counterpart contribution was 13 percent higher than what had been planned at appraisal.

## Monitoring and Evaluation

6.29 **Design.** A comprehensive plan for monitoring and evaluation was outlined at appraisal comprising a two tiered monitoring approach. Complete monitoring of technical outcomes would be carried out in three select micro-catchments and participatory monitoring would be carried out with farmers in all of the beneficiary micro-catchments. Output and outcome indicators were identified but there was inconsistency in targets specified within and between different project documents. This led to confusion over the meaning of several indicators and their targets and what should be measured. The project also had social impact indicators that proved to be overly ambitious to monitor and of limited utility and were dropped during implementation.

6.30 **Implementation.** The complete monitoring plan was costly to implement and less useful than anticipated. Monitoring of soil and hydrology indicators was compromised by the positioning of monitoring stations in relation to intervention areas and scale of the intervention area and the failure to bring on board the technical agency charged with implementing this aspect of the monitoring plan during the design stage. The project also experienced difficulties with the collection of data from various implementation partner organizations. Participatory monitoring was cost effective and no significant implementation issues were reported.

6.31 **Utilization.** M&E was used as a tool to evaluate status of activities throughout implementation but was less useful in demonstrating the full scale of project results. The lack of access to co-financers' data bases caused problems with ex-post evaluation. Participatory monitoring generated information that was used by project participants and important for the economic analysis prepared at project closure but this information was not consistently disseminated to others so it not as useful at mobilizing the participation of other micro-catchment members as had been envisaged at appraisal. Greater use could have been made of the information collected through participatory monitoring to fill gaps in knowledge on the projects results that were not detected through the more comprehensive monitoring scheme.

6.32 Overall, the quality of M&E is rated ***modest***.

## 7. Lessons

7.1 The project experience yields the following lessons:

7.2 ***Working through multiple institutional players can enhance policy and operational outcomes but it requires that mechanisms are developed upfront to formalize institutional partnerships with well-defined roles and responsibilities and common targets.*** In this case, the project worked with twelve partner agencies and leveraged additional co-financing from a host of entities that were implementing their own programs in the project areas. While the partner agencies signed agreements with the Ministry of Agriculture, the agreements lacked sufficient details on each partner's roles and obligations. Commitments depended on individual relationships. As a result there was uneven engagement across agencies, with

some agencies following their own modus operandi and objectives. The benefits intended to be leveraged through co-financing were compromised to some extent because the activities financed by Rio Rural/GEF and those of co-financed programs essentially ran in parallel. The co-financiers were not obligated to use the organizational or financial instruments developed by the project to empower farmers and guide their investment planning. In addition co-financiers were not obliged to share their project data with the project management unit.

**7.3 *Demonstrating achievement of objectives that require scientific measurement can be compromised if technically competent entities are not brought in at the design stage.*** In this case the plan for monitoring biophysical impacts of the project was designed by an externally contracted firm and the technical agency responsible for the actual monitoring, was not brought on board until after project preparation phase, at too late of a stage to design an alternative plan. Some indicators could not be measured because of flaws in the placement of monitoring stations. Other impacts could not be demonstrated because of insufficient information in the baseline survey.

**7.4 *Formulation of global environment objectives should take into account the project time frame and available resources.*** In this case the project's official objectives were stated in terms of ambitious global environment objectives. But the project was designed largely as a pilot to lay the foundation for a larger program to be scaled up in the future; on farm investments were implemented on a pilot scale more suitable for demonstration purposes than for achieving the ambitious impact implied by the objectives statement.

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## Annex A. Basic Data Sheet

### RIO DE JANEIRO SUSTAINABLE INTEGRATED ECOSYSTEM MANAGEMENT IN PRODUCTION LANDSCAPES OF NORTH-NORTHWESTERN FLUMINESE PROJECT (TF-54999)

#### Key Project Data (amounts in US\$ million)

	Appraisal estimate	Actual or current estimate	Actual as % of appraisal estimate
Total project costs	14.95	18.31	123
Loan amount	6.75	6.50	96
Cofinancing	NA	3.04	NA
Cancellation	NA	0.25	NA

#### Cumulative Estimated and Actual Disbursements

	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12
Appraisal estimate (US\$M)	--	1.49	3.18	4.76	6.14	6.75	--	--
Actual (US\$M)	--	0.66	0.82	1.70	2.59	4.55	5.69	6.50
Actual as % of appraisal		44	26	36	42	67	84	96

Date of final disbursement: 03/01/2012

#### Project Dates

	Original	Actual
Initiating memorandum	05/30/2003	07/24/2003
Negotiations	04/11/2005	04/13/2005
Board approval	05/31/2005	05/31/2005
Signing	NA	06/30/2005
Effectiveness	NA	12/30/2005
Closing date	11/30/2010	11/30/2011

**Task Team members**

<i>Names</i>	<i>Title</i>	<i>Unit</i>	<i>Responsibility/ Specialty</i>
<b>Lending</b>			
Alvaro Soler	Agricultural Economist	LCSER	Task Team Leader (from 07/2003)
Graciela Lituma	Consultant)	LCSER	Task Team Leader (to 07/2003)
Maria Isabel Braga	Environmental Specialist	LCSEN	Environment
Judith Lisansky	Sr. Anthropologist	LCSEO	Social Assessment
Claudio Mittelstaedt	Financial management Specialist	LCOAA	Fin. Management
Emilio Rodriguez	Procurement Specialist	LCOPR	Procurement
Keiko Ashida	Operations Analyst	LCSES	Operations
Susana Amaral	Financial Management and Disbursement	LOAG3	FM/Disbursement
Katia Medeiros	Sr. Environmental Specialist	FAO	Environment
Nestor Bragagnolo	Micro-catchment Spec. (Cons)	FAO/CP	
Francisco Guimaraes	Rural Economist (Cons)	FAO/CP	
Waldir Pan	Agronomist (Cons)	FAO/CP	
Marta Irving	Env. Education Specialist (Cons)	FAO/CP	
Arthur Sofiatti	Historian/Ecologist (Cons)	FAO/CP	
Dana Frye	Junior Professional Associate	LCSER	Operations
<b>Supervision/ICR</b>			
Maria Isabel Junqueira Braga	Sr Environmental Specialist	AFTEN	
Nestor Bragagnolo	Consultant	LCSAR	
Joao Vicente Novaes Campos	Financial Management Specialist	LCSFM	
Matthew Cummins	Junior Professional Associate	LCSAR	
Nicolas Drossos	Consultant	LCSFM	
Judith M. Lisansky	Sr Anthropologist	LCSSO	
Graciela Lituma	Consultant	LCSAR	
Katia Lucia Medeiros	Environmental Management Specialist	FAO/CP	
Claudio Mittelstaedt	Consultant	LCSFM	
Paula Silva Pedreira de Freitas	Operations Analyst	LCSEN	
Anemarie Guth Proite	Procurement Specialist	LCSPT	
Emilio H. Rodriguez	Consultant	LCSPT	
Luciano Wuerzius	Procurement Specialist	LCSPT	
Anna Roumani	Consultant	LCSES ICR	

### Staff Inputs (staff weeks)

<i>Stage of Project Cycle</i>	<i>Staff Time and Cost (Bank Budget Only)</i>	
	<i>No. of staff weeks</i>	<i>USD Thousands (including travel and consultant costs)</i>
<b>Lending</b>		
FY02	2.44	12.56
FY03	6.47	34.37
FY04	15.43	69.30
FY05	18.66	104.50
<b>Total:</b>	<b>43.00</b>	<b>220.73</b>
<b>Supervision/ICR</b>		
FY06	10.62	55.37
FY07	15.03	70.00
FY08	14.39	59.25
FY09	8.42	48.91
FY10	9.59	66.82
FY11	3.41	32.13
FY12	5.20	19.21
<b>Total:</b>	<b>66.66</b>	<b>351.69</b>

### Other Project Data

Borrower/Executing Agency:

#### Follow-on Operations

<i>Operation</i>	<i>Credit no.</i>	<i>Amount (US\$ million)</i>	<i>Board date</i>
The Rio de Janeiro Sustainable Rural Development Project	8200-BR	39.5	September 10, 2009
Additional Finance Loan	8200-BR	100.0	November 6, 2012

## Annex B. List of Persons Met

### World Bank

Marianne Grosclaude, Senior Agriculture Economist, TTL at closure  
Adriana Moreira, Senior Environmental Specialist

### Global Environment Facility

Carlo Carugi, GEF Evaluation Office

### National Government

Rodrigo Martins Vieira, General Coordinator for External Financing Ministry of Planning and Budget Management, Secretariat for International Affairs  
Ricardo Paes de Barros, Subsecretaria de Ações Estratégicas Presidência da República - Secretaria de Assuntos Estratégicos  
Rosane Silva Pinto de Mendonca, Directora Subsecretaria de Ações Estratégicas Presidência da República - Secretaria de Assuntos Estratégicos

### State Government

Lauro Bassi, Independent Consultant to Rio Rural  
Marcelo Monteiro da Costa, Head of Monitoring, Rio Rural  
Nelson Teixeira Alves Filho, Superintendent of Sustainable Development and Project Coordinator, Rio Rural  
Helga Hissa, Technical Coordinator, Rio Rural  
Sergio Siciliano, Outreach Coordinator, Rio Rural  
Mônica Sobreira, EMATER staff responsible for sócio-economic monitoring  
Carlos Minc, State Secretary of Environment  
Rosa Maria Formiga Johnsson, Waste and Land Management – Director, State Environmental Agency  
Walter Figueiredo de Simoni, Green Economy Superintendent – Secretariat of Environment  
Luiz Firmino Martins Pereira, Undersecretary Executive – Secretariat of Environment  
Rachel Bardy Prado, EMBRAPA  
Ademir Fontana, EMBRAPA  
Alexandre Ortega, EMBRAPA  
Geraldo Luis Monteiro, Regional Technician, EMATER  
Luiz Carlos Teixeira Guimaraes, EMATER-RJ Regional Norte  
Ederson Costa, Technician, EMATER (in charge of 3 municipalities: Natividade, Varre-Sai, Porciuncula)  
Manoel Duarte Ramos Filho, Executive Technician, EMATER (in charge of 3 municipalities: Natividade, Varre-Sai, Porciuncula)  
Norma Lúcia Vieira dos Santos, Technician, EMATER São José de Ubá

### **Local Beneficiaries/ Project Participants**

Sergio Vargas, Coffee producer  
 Marcos Fernando Pelegrini Menezes, Coffee and milk producer in the municipality of Porciuncula  
 Paulo Ricci, Coffee and banana producer in the municipality of Porciuncula  
 Luiz Maria Vianei Menezes, Coffee and milk producer in the municipality of Porciuncula  
 Leonardo Dias Figueiredo do Carmo, EMATER, Executor technician, micro-catchment  
 Caieté and Ribeirao da Onça  
 Everardo Oliveira Ferreira, Mayor of Varre-Sai  
 Helio Martins dos Santos, Small landowner at Rio Preto micro-catchment  
 Genilson de Sousa Pinto, Small landowner at Rio Preto micro-catchment  
 Ivanete Medeiros, Producer, COGEN member – Rio Uruai micro-catchment  
 Getúlio Siqueira, Producer, COGEN member – Rio Uruai micro-catchment  
 Luciana Silva Andrade, producer, Microbacia de Santa Maria in the municipality of São José de Ubá  
 José Francisco Andrade Filho, producer, Microbacia de Santa Maria in the municipality of São José de Ubá  
 Carlos Marconi de Souza Resende, Technician in charge of the environmental education in the Northeast region  
 Roberta Ferreira Pinheiro, student at the Environmental Technical School - Itaperuna municipality  
 Prof Marcia Adriana, Chequer Jorge State School- Association of the farmers of the Experiemtal farm in Italva minucipality  
 Marina Glória da Costa, Francisdo Ligiero Municipal School  
 Regiane Moraes Gonçalves, Francisdo Ligiero Municipal School.  
 Natalia Ribeiro, Saquarema – Rio Roncador Micro-catchment, Lago São Joaos Consortium (FUNBOAS) [www.lagossaojoao.org.br](http://www.lagossaojoao.org.br)  
 Gabriel CorreaSaquarema – Rio Roncador Micro-catchment, Lago São Joao Consortium (FUNBOAS)  
 Wellington Magalhães, Agriculture Secretary of Saquarema/RJ  
 Maria Cristina Gaglianone, State Fluminense University  
 Adriana Martins de Matos, Professor of the Technical School at Rio Preto micro-catchment  
 Nilza franco, Coordinator of the Technological Incubator for Popular Entrepreneurship

### **Co-Financiers / Non-Government Implementation Partners**

Edmar Coelho Borralho, LLX  
 Luiz Paulo Pinto, International Conservancy  
 Mario Mantovani, SOS Mata Atlantica

### **Other Technical specialists**

Carlos Nobre, Presidente da Comissão de Coordenação das Atividades de Meteorologia,Climatologia e Hidrologia Esplanada dos Ministérios

## Annex C. Borrower Comments

### Resposta da SEAPEC ao relatório do IEG sobre o projeto Rio Rural GEF

#### 1. Considerações iniciais

Agradecemos ao IEG a oportunidade de esclarecer os pontos que, na nossa ótica, foram interpretados equivocadamente ou que a sua classificação foram desproporcionais aos fatos ocorridos, no intuito assim, de contribuir para melhoria dos processos de avaliação realizados pelo Banco Mundial.

A primeira consideração diz respeito ao tempo decorrido entre a missão do IEG ao Projeto e a conclusão do relatório. Passaram-se mais de dois anos desde que recebemos a visita da equipe e nesse tempo, as dúvidas que aparentemente surgiram e que serão adiante esclarecidas, poderiam ter sido sanadas se houvesse um fluxo de informações mais efetivo entre os avaliadores e os demais atores envolvidos.

Por outro lado, questionamos o efeito prático da referida avaliação, tendo em vista que nesses mais de 2 anos o cliente e o Banco Mundial ampliaram de forma significativa seus compromissos através da contratação de nova operação de financiamento, superior ao financiamento original.

Com relação a possíveis dúvidas sobre o caráter piloto do projeto, sustentamos que todo o desenho e implementação foram concebidos para realmente testar, de forma piloto e demonstrativa, com mencionado no PAD, estratégias inovadoras a fim de aprimorar as políticas públicas de desenvolvimento rural sustentável, com base na metodologia de microbacia hidrográfica que vem sendo apoiada pelo Banco Mundial em diversos estados do Brasil e também em outros países há mais de 30 anos. Nesse aspecto, destacamos o êxito desse projeto piloto, que a saiu de um patamar de US\$14 milhões, atuando com 4.000 agricultores em 24 municípios e 48 microbacias, para uma atuação na forma de política pública estadual, hoje abrangendo todas as regiões, 72 municípios e 366 microbacias e beneficiando 78.000 agricultores. Assim realizar uma avaliação de um projeto piloto, encerrado há 3 anos, sem levar em conta o que resultou desse projeto e suas ações é a nossa ver um grande equívoco.

Além da ampliação em termos de abrangência, o projeto Rio Rural GEF foi responsável pela introdução de abordagens inovadoras amigáveis a biodiversidade e a conservação dos recursos naturais, que se quer foram objeto de análise do IEG. Como exemplo, destacamos, o simulador de gestão sustentável das terras em microbacias, o sistema de sustentabilidade financeira, o estatuto comunitário de conduta, o monitoramento participativo e a autogestão sustentável dos recursos naturais pelas comunidades rurais. Mais ainda, a alavancagem de recursos de co-investimento, da ordem de US\$3 milhões, proveniente de um trabalho de articulação de iniciativas multissetoriais, ONGs, governos em diferentes níveis e iniciativa privada foi analisada apenas burocraticamente pelo IEG, sem observar seu mérito enquanto

estratégia inovadora para sustentabilidade das ações a longo prazo. Essa inclusive foi uma das principais apostas do GEF por ocasião do desenho do Projeto.

O sistema de monitoramento do projeto, alvo de críticas no relatório do IEG, foi concebido a luz das lições aprendidas de diversos projetos de microbacias desenvolvidos nos anos 80-90 no país, os quais compreendiam desenho clássico de M&A que forneceria resultados óbvios quanto a melhorias de solo e água. O Rio Rural GEF inovou nesse aspecto, introduzindo o monitoramento da biodiversidade e do carbono nos métodos científicos, e o monitoramento participativo. Assumindo riscos de uma proposta inovadora, o projeto procurou implementar um sistema de M&A exequível em termos financeiros e que ao mesmo tempo apoiasse a tomada de decisão dos atores locais (agricultores, técnicos e gestores públicos) por meio de sua efetiva apropriação das mudanças e resultados que a gestão sustentável dos recursos naturais propicia. Ressaltamos, outrossim, que o sistema de M&A do projeto continua se aprimorando, incluindo atualmente a avaliação de impacto padrão ouro, com a introdução de sorteio de beneficiários e de análises que vão além do econômico e ambiental, inserindo o de capital social.

Entendemos que a classificação dada ao projeto pelo IEG foi subjetiva, confusa e pouco transparente. Como um projeto realizado por equipe considerada moderadamente satisfatória pôde ser avaliado como moderadamente insatisfatório? Quais critérios foram analisados e que graus foram adotados para que os resultados do projeto fossem considerados modestos? Não conseguimos entender os indicadores utilizados para classificar o projeto. Somente fomos informados do resultado da classificação, que vai desde o altamente satisfatório ao também altamente, mas insatisfatório, sem termos acesso aos índices que compõem as diferentes classificações.

Consideramos que o IEG perdeu uma oportunidade única de direcionar sua análise na verificação se os instrumentos propostos pelo projeto estão corretos e que auxiliarão na construção de DRS. Muito mais que a preocupação somente com os números, até porque estes nos são altamente favoráveis, com todas as metas físicas cumpridas. Gostaríamos de termos uma análise mais inovadora por parte de uma instituição que detém o conhecimento, de mais de 30 anos, do mesmo tipo de projeto que estamos executando. Poderia o IEG começar sua avaliação da seguinte forma: A metodologia de microbacia é uma estratégia eficiente de construção de DRS para pequenos agricultores ou ainda se a referida metodologia consegue responder de forma adequada as preocupações globais atuais? Quem, se não o próprio Banco poderia responder a esta indagação, lastreado na sua larga experiência no tema.

## 2. Resposta às principais críticas

### 2.1 Com relação ao alcance dos objetivos globais

#### 2.1.1 Combater as ameaças à biodiversidade de importância global

Com relação ao Primeiro Objetivo Global de combater as ameaças à biodiversidade de importância global da mata atlântica, o relatório do IEG conclui que “proprietários de terras adotaram práticas que visam aumentar a cobertura vegetal de mata nativa em toda a paisagem agrícola adjacente a um ecossistema de importância global, mas o projeto só mediu o número de hectares em que tais práticas foram realizadas. Ele não mediu a extensão de que a regeneração realmente ocorreu como resultado destas práticas. Imagens de satélite mostraram um aumento das áreas em regeneração de três das micro-bacias onde o projeto estava ativo, mas esta informação é para a microbacia como um todo. Não está claro na medida isso pode ser atribuído às ações do projeto.

**RESPOSTA SEAPEC:** Concordamos que o tempo de vida do projeto limita a obtenção de resultados mais qualitativos sobre os processos de regeneração visando a conservação da biodiversidade, os quais serão alcançados a longo prazo. Provavelmente por esse motivo, a medida de área restaurada foi proposta e aceita pelo GEF como indicador de resultado do alcance desse objetivo global. Isto porque a medida de área é por si só um indicativo importante, pois aponta tendências de reversão do processo de desmatamento e aumento de cobertura florestal nas áreas de intervenção do projeto. Nesse sentido consideramos o alcance do resultado satisfatório e nos baseamos nos seguintes argumentos, além dos próprios resultados alcançados:

- Além da medida de áreas conservadas e/ou restauradas, desde 2009 o projeto avalia o desenvolvimento e manutenção dos processos de regeneração e/ou restauração florestal das intervenções do projeto nas 3 microbacias monitoradas. A continuidade das ações com recursos do financiamento do Banco Mundial permitiu ainda que o monitoramento da biodiversidade tivesse continuidade e se estendesse nos anos subsequentes ao término do Projeto até a presente data. Assim, foram selecionadas para monitoramento da biodiversidade pela equipe da UENF e estão sendo desde a implantação em 2009, 14 áreas com subprojetos de recuperação de mata ciliar e proteção de nascente implantados nas 3 microbacias monitoradas, distribuídas da seguinte forma: seis na microbacia Valão de Santa Maria (São José de Ubá, RJ), seis na microbacia Brejo da Cobiça (São Francisco do Itabapoana, RJ) e 2 na microbacia Caixa d' água (Trajano de Moraes, RJ). Os relatórios de monitoramento da biodiversidade de 2013 e 2014 apontam que, com exceção da Microbacia Caixa D'Água, as áreas de intervenção têm apresentado bons resultados em termos de regeneração, com bom desenvolvimento das espécies e boa resposta ao isolamento. Os produtores têm se mostrado satisfeitos com resultados e interessados em dar continuidade aos subprojetos. Além disso, a presença de uma diversidade de espécies frutíferas nos sistemas agroflorestais implantados na restauração da mata ciliar

propiciaram uma maior presença e diversidade de polinizadores que agregam positivamente e aceleram o processo de regeneração da floresta.

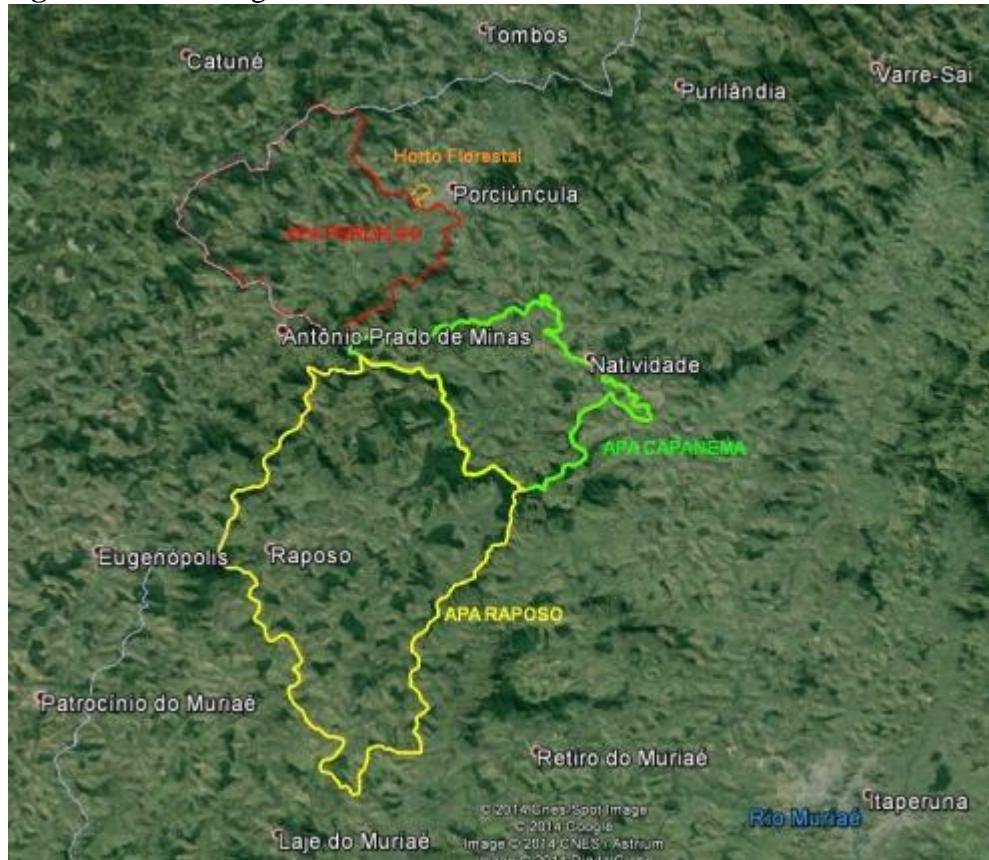
- Paralelamente ao monitoramento, a UENF elaborou uma lista de espécies identificadas em levantamentos realizados em remanescentes florestais circundantes às microbacias monitoradas, visando apoiar o enriquecimento dos processos de restauração. Informações pessoais de pesquisadores da UENF indicam que a referida lista tem sido objeto de consulta por diversas instituições públicas e privadas e está auxiliando aos órgãos ambientais, proprietários de terras e ONGs na restauração florestal de áreas de preservação permanente (APPs), áreas de proteção ambiental (APAs) adjacentes a Unidades de Conservação e na implantação de 500 ha que serão restaurados como medida compensatória de megaempreendimentos industriais e de infraestrutura instalados na região. Além disso, os pesquisadores relataram que o estabelecimento de um banco de dados online com recursos do Rio Rural GEF, contendo informações sobre a biodiversidade da Mata Atlântica regional, tem sido constantemente acessado por pesquisadores nacionais e internacionais com interesse no tema e com certeza subsidiou o desenvolvimento de outras pesquisas em apoio a conservação da Mata Atlântica.
- Os estudos de biodiversidade coordenados pela UENF serviram ainda de base para consubstanciar a criação de 3 Unidades de Conservação de Uso Sustentável na região Noroeste Fluminense. A primeira, criada em 2012, a Área de Proteção Ambiental – APA Microbacia Hidrográfica Capanema /Marambaia, com uma área total de 4.301,70 hectares e 44 remanescentes de florestas totalizando 637,24 ha, sancionada pela Lei Municipal 606/2012. Posteriormente, seu nome foi alterado para APA Preguiça de coleira pela Lei Municipal 621/2013. A segunda, pertencendo o município de Porciúncula, se insere na Microbacia Hidrográfica da Perdição, com uma área total de 6.241,0 ha, sendo 1.593 ha em florestas nativas (25,94 %), sancionada pelo Decreto nº 1360 de 05 de junho de 2013. A terceira, denominada Área de Proteção Ambiental – APA Raposo, no distrito de Raposo, município de Itaperuna, abrange parte da Microbacia Campinho, sancionada pelo Decreto nº 3362 de 29 de Janeiro de 2014, totalizando 6.170,06 hectares, com aproximadamente 1.789 hectares em florestas (28,93%).

Assim, consideramos que os estudos da biodiversidade realizados com recursos do projeto, desdobraram ações concretas para conservação da biodiversidade de importância global da mata Atlântica Brasileira na Região Noroeste Fluminense, altamente fragmentada e ameaçada, se constituíram na criação de 3 Unidades de Conservação de Uso Sustentável. A criação dessas Unidades de Uso Sustentável garantirá a conservação e o uso sustentável da biodiversidade, em uma área total 16.712,76 hectares, além de viabilizar o aumento da receita dos municípios com o ICMS Verde (<http://www.rj.gov.br/web/sea/exibeconteudo?article-id=164974>) e

colaborar na captação de recursos através de projetos, como por exemplo, os apresentados pelos municípios de Natividade e Porciúncula na Câmara Técnica de Compensação Ambiental do Estado do Rio de Janeiro. O co-investimento do setor ambiental as microbacias citadas é de R\$368.446,00 (trezentos e sessenta e oito mil e quatrocentos e quarenta e seis reais) para Natividade ([http://download.rj.gov.br/documentos/10112/1466527/DLFE-62283.pdf/Delib\\_CCA\\_40.pdf](http://download.rj.gov.br/documentos/10112/1466527/DLFE-62283.pdf/Delib_CCA_40.pdf)) e R\$ 360.806,00 (trezentos e sessenta mil e oitocentos e seis reais) para o município de Porciúncula ([http://download.rj.gov.br/documentos/10112/2096486/DLFE-69129.pdf/Ata\\_47\\_CCAordinaria.pdf](http://download.rj.gov.br/documentos/10112/2096486/DLFE-69129.pdf/Ata_47_CCAordinaria.pdf)).

Além disso, o projeto incentivou a participação de proprietários rurais em editais do Fundo de Parcerias para Ecossistemas Críticos (CEPF da sigla em inglês para Critical Ecosystem Partnership Fund) coordenados por essas ONGs visando o estabelecimento de Reservas Particulares do Patrimônio Natural (RPPNs) em suas propriedades. Esse processo inaugurou um processo de formação de mosaico de áreas protegidas que instalou cerca de 600 ha de RPPNs no município de Varre Sai que hoje estão sendo conectadas com apoio do programa Florestas do Futuro da ONG SOS Mata Atlântica e ainda reverte parte do ICMS Ecológico como incentivo para os proprietários manterem suas florestas.

**Fig 1.** APAS na Região Noroeste

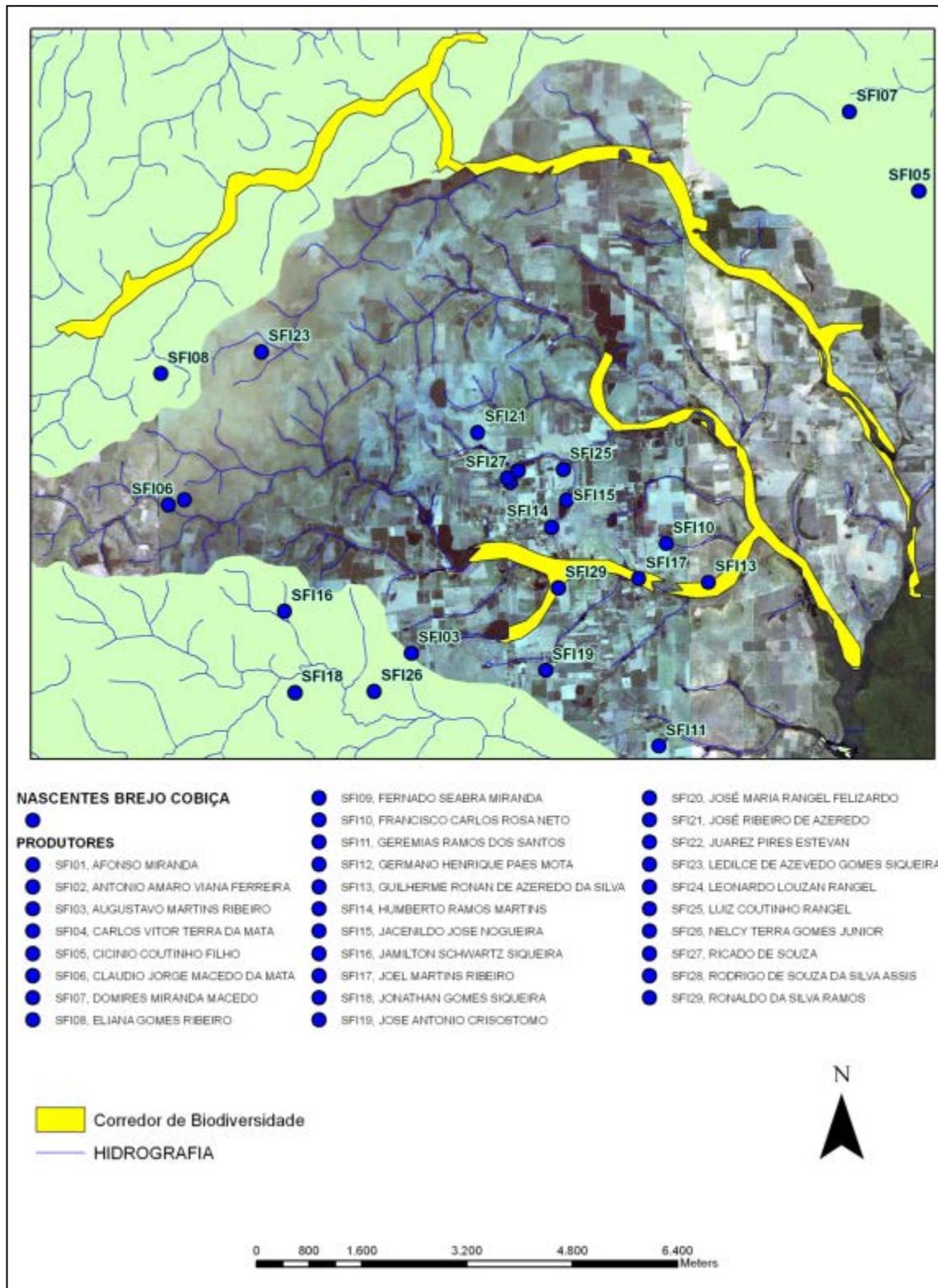


- O projeto foi fundamental ainda no desenho e implantação do mecanismo de Pagamento por Serviços Ambientais (PSA) para o estado do RJ. A SEP, EMATER e beneficiários participam ativamente nas discussões e grupos de trabalho formados pelo órgão ambiental no âmbito do Conselho estadual de Recursos Hídricos (CERHI). Além disso, recentemente o Ministério da Ciência, Tecnologia e Inovação do Governo federal brasileiro está negociando com o GEF através do Banco Interamericano de Desenvolvimento um projeto que destinará recursos para implantar e avaliar diferentes mecanismos de PSA na bacia do Paraíba do Sul envolvendo os 3 estados da federação na qual se insere: São Paulo, Minas Gerais e Rio de Janeiro. No caso do RJ, a maior parte dos recursos do GEF, da ordem de US\$4 milhões, serão destinados a PSA a agricultores do Noroeste Fluminense, que implantarem com recursos de contrapartida do Rio Rural as ações de conservação ambiental para manutenção dos serviços dos ecossistemas. Os agricultores poderão ainda utilizar os recursos do PSA para promoverem o salto tecnológico, visando a adoção de práticas produtivas sustentáveis que propiciarião um aumento de produtividade e renda que garantirão no longo prazo a continuidade das ações conservacionistas.
- Outra conclusão importante que reforça a importância das ações de restauração do projeto na conservação da biodiversidade, extraída de uma das teses de doutorado da UENF realizadas com apoio do projeto (ABREU, 2013), é que os pequenos fragmentos florestais do Norte-Noroeste Fluminense, de forma geral, apesar de em sua maior parte estarem em estágio intermediário de sucessão, apresentam elevada diversidade e composição florística peculiar, com ocorrência de espécies novas e ameaçadas de extinção, que justificam a sua conservação e a necessidade de mecanismos de apoio na recuperação dos mesmos. A autora destaca a urgente necessidade da adoção de medidas que visem o aumento da conectividade dos remanescentes da região, devido ao alto grau de fragmentação a qual os mesmos estão submetidos. De fato, a conexão dos fragmentos foi adotada como uma ação prioritária desde o desenho do projeto em reforço a iniciativas em curso de ONGs parceiras - CI e SOS Mata Atlântica. Nesse sentido, o projeto apoiou o estabelecimento do Corredor de Biodiversidade da Serra do Mar utilizando os mesmos municípios no recorte geográfico das estratégias de conservação da biodiversidade e conectividade de fragmentos florestais da mata Atlântica no Norte-Noroeste Fluminense.
- Com intuito de demonstrar se as intervenções ambientais do Projeto estavam de fato apoiando a conectividade dos fragmentos florestais, a SEP realizou em 2011 um estudo simulando as áreas prioritárias para implantação de corredores ecológicos nas 3 microbacias monitoradas, com base nas informações de uso do solo, hidrografia e cobertura florestal. De acordo com esse estudo, de um modo geral a maior parte das

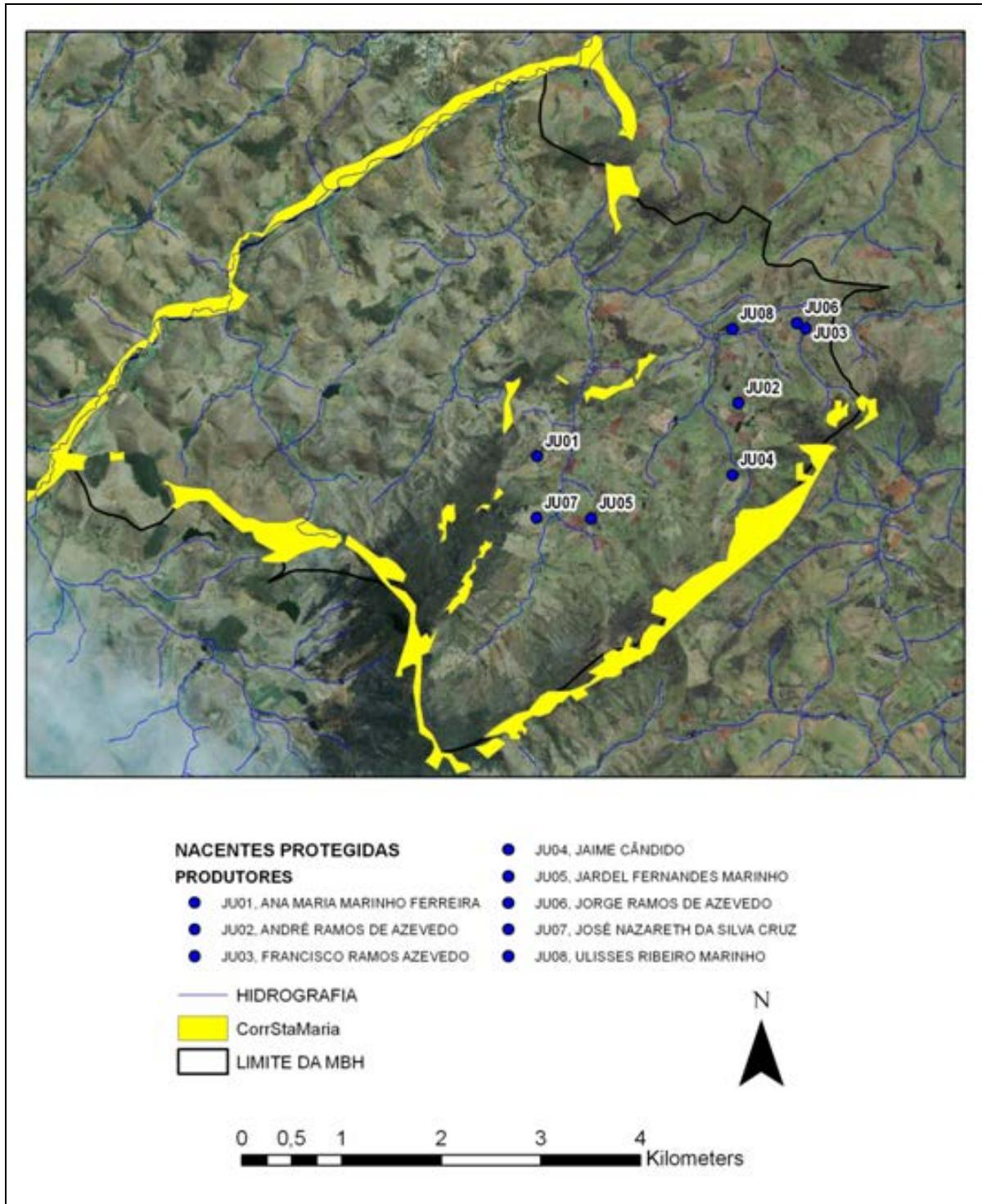
áreas priorizadas para formação dos corredores prioritários são os topos de morro e divisores de água e as APPs dos rios (matas ciliares e nascentes). Esse resultado indica que mesmo sem ter o georeferenciamento e acompanhamento sistemático de todas as intervenções conservacionistas realizadas pelo projeto (o que de fato seria inviável devido ao alto custo do monitoramento) as áreas de conservação e restauração florestal realizadas como intervenções ou subprojetos ambientais com recursos projeto estão alinhadas com a formação dos corredores ecológicos propostos. Para exemplificar podemos observar nas figuras 2 e 3 a seguir que um grande nº de subprojetos de proteção de nascentes localiza-se próximo aos corredores ecológicos, demonstrando que as estratégias adotadas no projeto Rio Rural/GEF e mantidas no Programa Rio Rural /BIRD, podem favorecer o aumento da biodiversidade através da conexão dos principais fragmentos da microbacia e dos fragmentos do entorno.

Os subprojetos promovem o isolamento das áreas impedindo a entrada de gado nos fragmentos diminuindo a pressão na sucessão ecológica e permitindo o estabelecimento de espécies vegetais secundárias e clímax, que dificilmente se desenvolvem com a presença do gado. Estas áreas também funcionam como núcleo de atração para avifauna que procura estes refúgios devido à água e para construir ninhos.

Todas as 1.170 nascentes protegidas com recursos do projeto, das entidades parceiras ou próprios dos beneficiários estão sendo georeferenciadas para acompanhamento de seu desenvolvimento, em função da campanha visando o alcance da meta de 2016 nascentes protegidas até as Olimpíadas de 2016.



**Fig2.** Corredores ecológicos e subprojetos de proteção de nascentes na Mbh Brejo da Cobiça



**Fig3.** Corredores ecológicos e subprojetos de proteção de nascentes na Mbh Santa Maria.

### 2.1.2. Reversão da degradação das terras

Segundo o relatório do IEG, “Reverter a degradação do solo em paisagens agrícolas também é um processo de longo prazo. A intenção ambiciosa deste objetivo se reflete no indicadora-chave de uma redução de 50% da erosão e sedimentação no nível das bacias hidrográficas desempenho. O projeto apoiou práticas relevantes para atingir este objetivo, mas eles foram apoiados apenas em escala piloto. Como reconhecido pelo relatório de conclusão do projeto, a realização desta escala de impacto exige intervenções em uma escala maior e por um período de tempo mais longo.

**RESPOSTA SEAPEC:** A estratégia inicialmente de medir a redução das taxas de erosão e de sedimentação nos rios foi realmente prejudicada devido a problemas enfrentados com os sensores de medição. No entanto, a equipe de especialistas da EMBRAPA Solos responsável pelo monitoramento de água e solo utilizou-se de parâmetros indiretos para concluir sobre os efeitos benéficos das intervenções do projeto na reversão da degradação das terras. Vale ressaltar que as microbacias monitoradas foram caracterizadas ambientalmente com todo rigor científico a fim de permitir a aplicação e replicabilidade dos resultados em áreas sob clima, tipos de solos e usos semelhantes.

Assim, 2 anos após as intervenções utilizou-se para o monitoramento da qualidade do solo parâmetros químicos: cálcio, magnésio trocáveis, fósforo e potássio disponíveis, pH, alumínio, e saturação por bases (Embrapa, 1997) e indicadores físicos: densidade de solo, porosidade total, macro e micro porosidade, condutividade hidráulica, estabilidade de agregados em água (DMP, DMG) (Embrapa, 1997) e a resistência do solo a penetração. As amostras foram coletadas em três repetições, e em duas profundidades 0-20 cm e 20-40 cm. No caso das amostras físicas são amostras simples, e foram coletadas amostras indeformadas com anel volumétrico de 100 cm<sup>3</sup> para determinação da densidade do solo, porosidade total, macro e micro porosidade e condutividade hidráulica. Para a estabilidade de agregados foram coletados blocos de 10 x 10 x 5 cm. Já para textura e as propriedades químicas, foram coletadas amostras compostas com trado formadas por cinco amostras simples. No caso de encostas, coletou-se no terço superior médio e inferior, compondo assim as três repetições.

Na microbacia Caixa D’água em Trajano de Moraes, em áreas de latossolo Vermelho Amarelo sob cultivo do caquizeiro, onde foram realizadas intervenções de adubação verde e adubação orgânica, a avaliação da qualidade física do solo mostrou que, quando comparado ao marco zero, a densidade do solo diminui, reduzindo a resistência do solo a penetração e aumentando a porcentagem de agregados maiores que 2 mm. Isso demonstra que a adubação verde e orgânica está favorecendo a agregação e, consequentemente, a resistência do solo à erosão.

Com relação aos atributos químicos do Neossolo Flúvico sob Banana, na mesma microbacia do córrego da Caixa d’água em Trajano de Morais, é possível observar algumas diferenças marcantes antes e depois das intervenções. Todos os nutrientes apresentados, exceto o sódio, tiveram um aumento marcante do seu teor no solo, permitindo assim inferir que a adubação orgânica melhorou a qualidade química do

solo sob cultivo da banana. Pode-se inferir que a elevação do teor de Cálcio (de 0,7 mol/kg para 6,57 mol/kg) advindo da adubação orgânica está permitindo maior teor de nutrientes no complexo de troca do solo e, consequentemente, maior disponibilidade do mesmo para ser absorção das raízes, favorecendo uma maior produção da bananeira.

Já em áreas sob pastagens, a introdução do pastoreio rotacionado como intervenção pelo projeto aumentou o valor de densidade do solo que na profundidade 0-20 cm, que no marco zero era relativamente elevado ( $1,30 \text{ g/cm}^3$ ) no Latossolo, evidenciando possivelmente uma compactação inicial do solo. Os resultados demonstram que a prática de pastoreio rotacionado pode diminuir a compactação do solo, uma vez que produz menor pressão do gado sobre o solo. Resultados semelhantes foram obtidos em pastagens da microbacia Brejo Cobiça, em São Francisco do Itabapoana.

Como considerações finais, os pesquisadores ressaltam que após as intervenções foi possível verificar melhorias nas propriedades físicas e químicas do solo. A adubação e correção do solo, de um modo geral, favoreceram a melhoria da fertilidade do solo e, consequentemente, poderá levar a maiores produtividades das culturas. Os indicadores físicos de qualidade de solo utilizados, em sua maioria, foram sensíveis às intervenções, destacando-se: a condutividade hidráulica, a resistência à penetração, percentagem de agregados > 2 mm e a densidade do solo. Os indicadores químicos também foram sensíveis às intervenções, especialmente: pH, cálcio e magnésio, e alumínio. A intervenção com adubação orgânica levou a melhora da estrutura do solo, favorecendo a conservação de solo, nos usos e solos monitorados, tornando os solos menos susceptíveis à degradação, sobretudo erosão. O pastoreio rotacionado foi uma intervenção adequada para melhoria ou da qualidade do solo, sob pastagem, sendo uma prática que deve ser estimulada na região. A qualidade do Latossolo Vermelho-amarelo e do Neossolo Flúvico foi influenciada pela adubação orgânica, ocorrendo melhora das suas propriedades físicas e químicas.

Os resultados indicam que o alcance do objetivo foi **moderadamente satisfatório**.

### 2.1.3. Sequestro de C

De acordo com o relatório do IEG, as estimativas de CO<sub>2</sub> sequestrado por ha , tanto sob pastagem melhorada (80 tons/ha) quanto em áreas liberadas para a conservação da biodiversidade(28.2 tons/ha), excederam a meta de 1,5 ton /ha, embora a estimativa total de 28.515 ton CO<sub>2</sub> seja 84% da meta do appraisal (34.000 ton). Entretanto não está claro quanto cada uma das estimativas compara à quantidade de carbono sequestrado sob o uso anterior do solo, uma vez que o estudo da linha de base não foi elaborado. Por esse motivo, não é possível avaliar se o sequestro de C de fato foi alcançado. Dito isso, é importante notar que a quantidade absoluta de C sequestrado por todo o investimento do projeto poderia ser potencialmente maior , vez que o cálculo apresentado apenas levou em consideração uma parte dos subprojetos financiados

**RESPOSTA SEAPEC:** De fato, o projeto enfrentou dificuldades em encontrar um parceiro ou consultor que se dedicasse desde o início a construção da linha de base para o sequestro de Carbono. No entanto, essa dificuldade foi inicialmente contornada

com a decisão da equipe do Projeto em 2008-2009 de utilizar a ferramenta EX ACT desenvolvida por Bernoux e colaboradores com apoio da FAO na avaliação ex- ante do balanço de Carbono do projeto de financiamento Rio Rural BIRD. A ferramenta produz uma estimativa do balanço do potencial de Carbono a ser gerado a partir de cenários de mudanças de uso da terra com e sem o projeto, considerando melhorias de manejo a serem adotadas com os incentivos do Projeto. De acordo com os autores, as informações resultantes da análise também podem ser utilizadas em uma avaliação ex posta, ou seja, os resultados poderiam ser extrapolados para avaliar o potencial de sequestro do Projeto Rio Rural GEF, uma vez que as práticas analisadas são as mesmas, guardando-se as devidas proporções de abrangência em termos de área, dado o caráter piloto do projeto. As conclusões do estudo fundamentaram ainda a sinalização para a equipe gerencial do projeto a necessidade de priorizar o incentivo a adição de práticas que comparativamente sequestram mais carbono, como os sistemas agroflorestais e silvopastoris, além dos reflorestamentos/regeneração com espécies nativas.

Com a inclusão na equipe da EMBRAPA Solos de pesquisador com especialidade em Carbono, foi possível resgatar a ideia inicial de monitorar o C sequestrado. Essa estratégia prevê o foco do monitoramento nas pastagens melhoradas com incentivos do projeto, tendo em vista ser esse o uso mais representativo das terras na região e no estado. As medições na mata são ainda realizadas como referência de nível de carbono em áreas sem interferência antrópica. Essas aferições foram realizadas nas microbacias monitoradas em 2011 e 2012 e servirão de linha de base para acompanhar o efeito das intervenções de pastoreio rotacionado nos níveis de Carbono do solo e biomassa aérea. Os resultados iniciais dos estoques na microbacia monitorada de São José de Ubá, sob clima úmido tropical com estações bem definidas (Aw na classificação de Koppen) mostraram 125 MgC ha<sup>-1</sup>, dos quais 71 MgC ha<sup>-1</sup> no solo e 53 MgC ha<sup>-1</sup> na biomassa acima do solo. Também verificaram que os estoques de C do solo sob pastagem foi significativamente superior quando comparado a floresta (84 MgC ha<sup>-1</sup>), embora o estoque total na floresta seja maior. Os pesquisadores concluíram que, levando-se em consideração que a pastagem ocupa mais de 60% das terras, as intervenções para aumentar os estoques deverão focar nas áreas sob pastagem indicando que as ações do projeto Rio Rural tem um potencial para melhorar sequestro de C.

Dante dos esforços que o projeto vem realizando consideramos que a classificação de para o alcance desse objetivo foi **moderadamente satisfatória**.

#### **2.1.4. Ampliar a conscientização dos atores sobre a importância da conservação da biodiversidade**

Segundo o relatório do IEG, não existe informação suficiente para avaliar a medida em que a consciência do valor da adoção de uma abordagem IEM foi realmente aumentada como resultado da dos esforços de divulgação e informação do projeto. O objetivo foi explicitamente formulado por isso não está claro quem exatamente conscientiza o projeto destina-se a aumentar do que resultado ou comportamento o

projeto pretende alterar alcançar ao fazer isso, os principais indicadores de desempenho selecionados para este objetivo são produtos que não medem alcance a nível de resultado.

**RESPOSTA SEAPEC:** Realmente medir mudança comportamental é complexo e como tal não deve ser reflexo de apenas um indicador, mas um conjunto de indicadores que associados fornecerão uma análise mais realística do processo de mudança que se quer medir. E foi exatamente dessa forma que na avaliação final do projeto identificou-se a mudança de conscientização dos beneficiários, executores e demais atores relevantes com relação à conservação ambiental além das informações produzidas e eventos de disseminação realizados pelo Projeto. Diante dos resultados alcançados expressos abaixo, entendemos que a classificação do projeto para esse objetivo **foi satisfatória**.

Além das estatísticas de acesso ao portal, as publicações elaboradas pelo Projeto como Manuais Técnicos e Cartilhas da Biodiversidade, as quais são periodicamente solicitadas por produtores e pesquisadores, inclusive de fora do Estado, consideramos avaliar se a percepção das pessoas envolvidas, agricultores, professores, técnicos, gestores públicos realmente se apropriaram dessas informações e mudaram a percepção sobre a importância da conservação da biodiversidade e, mais importante, gerenciar os recursos naturais de modo a conservá-los para as gerações futuras, assumindo o compromisso de contribuir, a partir de uma ação local, ao enfrentamento de questões ambientais globais.

No estudo “*Avaliação da adoção de práticas de manejo sustentável de recursos naturais e sua sustentabilidade no alcance de benefícios globais e resultados no âmbito do Projeto Rio Rural/GEF*” realizado para subsidiar a avaliação final, foram analisados estatisticamente os resultados alcançados em termos de adoção de práticas (ou subprojetos incentivados), os quais foram associados a entrevistas com beneficiários e técnicos executores do projeto. O estudo aponta claramente como resultado do projeto a maior percepção desses atores sobre a importância das práticas ambientais na manutenção dos ecossistemas e na melhoria da qualidade ambiental, bem como a intenção de manter e expandir a adoção no futuro. Além disso, indica a organização dos produtores, tanto as existentes como as estruturas organizativas propostas pelo projeto, como fundamentais para a apresentação e discussão dos temas relacionados com a biodiversidade e o uso e manejo dos recursos naturais.

O papel do Comitê Gestor de Microbacias – COGEM e da percepção ambiental dos beneficiários forma analisados em 8 microbacias trabalhadas. com maior profundidade no estudo de Avaliação Final realizado pelo Cliente.

Na análise, o projeto foi considerado um estimulador da organização dos grupos sociais locais, contribuindo, através dos COGEMs, para a criação/manutenção de mecanismos locais de organização social, uma oportunidade de maior contato com técnicos prestadores de assistência, de acesso a informações, conhecimentos, de forma articulada, como um instrumento de capacitação dos agricultores. O COGEM

aparece ainda em alguns relatos como um instrumento para ações ambientais, de preservação, como um estimulador da conscientização ambiental.

A prestação de assistência técnica para as ações ambientais foi também relatada como uma característica distintiva do projeto Rio Rural/GEF. Da mesma forma, ações ambientais, como a proteção de nascentes, a recuperação da mata ciliar, ou ainda, o acesso à informações sobre o Código Florestal compõem o quadro de novidades aportadas pelo projeto. O relatório conclui que as ações do Rio Rural/GEF podem ser consideradas como propiciadoras ao menos da emergência da temática ambiental nas microbacias, como um passo inicial para ações futuras.

De fato, 88% dos representantes dos 48 COGEMS entrevistados durante reunião regional envolvendo os 24 municípios atuantes em 2011 disseram esperar a continuidade de projetos de conscientização ambiental e de uso adequado dos recursos naturais, além de solicitarem mais ações de caráter ambiental. Dezessete municípios (68% do total) citaram demandas por melhorias na proteção das nascentes e dos córregos, captação da água, saneamento básico, reflorestamento, plantio de mata ciliar e o cumprimento do Estatuto de Conduta Comunitária. Em quatro municípios o anseio pela eliminação do uso de agrotóxicos foi apontada, e em dois a necessidade de destinação adequada das embalagens dos mesmos.

## **2.2 Sistema de Monitoramento e Avaliação adotado no Projeto Rio Rural/GEF**

### **Contexto do Projeto**

A visão holística de manejo dos recursos é um processo de definição de objetivos, tomada de decisão, geração de conhecimento e informações, monitoramento e avaliação, que integra fatores ecológicos econômicos, sociais, políticos, culturais, gênero e geração, o qual se completa quando as lições aprendidas e as experiências positivas são efetivamente incorporadas nas políticas públicas.

Na busca do crescimento e desenvolvimento os moradores das microbacias utilizam e manejam os recursos naturais de acordo à sua condição socioeconômica e a partir de sistemas de produção que incluem a exploração de culturas e criações econômicas e de subsistência aplicando diferentes tecnologias.

Esta ação do homem sobre o meio pode, por um lado melhorar sua condição sócio-econômica e elevar seu nível de vida, porém quando feita sem uma visão e condição de longo prazo, pode degradar em diferentes níveis o ambiente colocando em risco a possibilidade futura de sobrevivência.

### **Desenho do Sistema de Monitoramento e Avaliação**

Dentro do contexto onde se inseriu o Projeto e das atividades desenvolvidas e resultados esperados, o Sistema de Monitoramento e Avaliação desenhado e executado no âmbito do Projeto Rio Rural/GEF teve o desafio de elaborar um diagnóstico inicial das microbacias selecionadas em relação ao uso e manejo dos recursos naturais e à condição socioeconômica dos beneficiários, acompanhar as ações do projeto dando visibilidade às experiências, fornecendo elementos para a

correção de rumos e proporcionando subsídios para a gestão e disseminação de conhecimento e lições aprendidas.

O desenho adotado para o **monitoramento completo** tem sido o fruto de experiências anteriores de projetos financiados principalmente pelo Banco Mundial em outros estados brasileiros [destacam-se: Santa Catarina, São Paulo, Rio Grande do Sul e Paraná]. As microbacias onde se desenvolveu foram selecionadas do universo das beneficiadas (tendo sido representativas das condições socioeconômicas e ambientais da área de intervenção do projeto) e serviram como **referência para medir com maior rigor técnico e científico** os resultados e impactos da estratégia técnica e metodológica sobre: dimensões ambientais (solo, água e biodiversidade) e dimensão econômica, social e organizativa, bem como a eficiência no arranjo institucional implementado.

Os indicadores adotados mantiveram uma relação direta com as atividades e objetivos do projeto tendo sido selecionados também de acordo a experiências de projetos anteriormente destacados nos quais estes indicadores se mostraram eficientes para medir a eficácia da estratégia técnica e metodológica que os referidos projetos utilizaram em sua estratégia operacional, sempre considerando que todos tiveram uma abordagem que utilizou a microbacia hidrográfica como unidade central de planejamento, ou seja, o âmbito de intervenção é comum para todos estes projetos e, portanto, foi possível adotar um sistema padrão de Monitoramento, uma vez que todos adotaram também, estratégias técnicas e metodológicas similares.

As metodologias de monitoramento também foram selecionadas a partir das experiências anteriores e ajustadas às condições locais, porém, mantiveram os princípios adotados nos projetos destacados.

O Sistema de Monitoramento completo adotado foi incluído no desenho do projeto como uma exigência do GEF, especialmente em relação ao monitoramento da biodiversidade [destaca-se que a biodiversidade foi um dos eixos centrais do projeto], onde também foram obtidos os melhores e mais completos resultados do monitoramento e onde foi realizado o maior número de estudos.

No desenho do Rio Rural o sistema de monitoramento completo foi mantido [acordado com o Banco Mundial], tendo sido aprimorado, destacando-se neste aprimoramento:

(a) Monitoramento da biodiversidade – além de estar sendo dado seguimento ao monitoramento da biodiversidade, a abordagem foi ampliada, como uma decisão do projeto, tendo em vista os excelentes resultados obtidos no Projeto Rio Rural/GEF.

(b) Monitoramento do carbono – o monitoramento do carbono que iniciou com o projeto Rio Rural/GEF, foi mantido no projeto Rio Rural/Bird como uma ferramenta

de averiguação da contribuição da estratégia técnica do projeto no sequestro de carbono e na melhoria da qualidade do solo.

(c) Monitoramento participativo – esta foi uma iniciativa diferenciada de monitoramento adotada pelo Projeto Rio Rural/GEF, tendo sido muito pouco utilizada em projetos desta natureza no Brasil. Os ótimos resultados e o aprendizado obtido estão permitindo que este sistema de monitoramento, além de completar e dar maior abrangência ao monitoramento completo se constitui numa excelente ferramenta de participação dos beneficiários e de planejamento de ações nas microbacias, além de permitir que o projeto seja acompanhado em suas ações nas microbacias a partir da visão dos moradores locais e dos Técnicos Executores

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