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IMPLEMENTATION COMPLETION AND RESULTS REPORT
(TF-55091)

ON A

GRANT FROM THE
GLOBAL ENVIRONMENT FACILITY

IN THE AMOUNT OF US\$ 7.75 MILLION EQUIVALENT

TO THE

STATE OF SÃO PAULO

FOR A

ECOSYSTEM RESTORATION OF RIPARIAN FORESTS IN SÃO PAULO PROJECT

October 27, 2011

Sustainable Development Department
Brazil Country Management Unit
Latin America and Caribbean Region

CURRENCY EQUIVALENTS

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Currency Unit = Real (R\$)

R\$ 1.00 = US\$ 0.633

US\$ 1.00 = 1.579

FISCAL YEAR

January 1 to December 31

ABBREVIATIONS AND ACRONYMS

APP	Areas of Permanent Preservation
BNDES	National Development Bank
CATI	State Rural Extension Company
CBRN	Coordination for Biodiversity and Natural Resources (of SMA)
CETESP	Sao Paulo Environmental Sanitation Technology Company
CONSEMA	State Environmental Council
FEHIDRO	State Water Resources Fund
GEF	Global Environment Facility
GEO	Global Environmental Objective
MTR	Mid-term Review
PDO	Project Development Objective
PEMC	Riparian Forest Restoration Program
PEMBH	Land Management III Project: Sao Paulo
PES	Payment for Environmental Services
PMU	Project Management Unit
PRMC	Riparian Forest Restoration Project
PROANG	State Program of Support for NGOs
GoSP	State Government of Sao Paulo
LM III	Land Management III Project: Sao Paulo
SAA	State Secretariat of Agriculture and Supply
SAF	Agro-forestry System
SAFF	Financial Monitoring System
SEE	State Secretariat of Education
SIG	Geographic Information System
SLM	Sustainable Land Management
SMA	State Secretariat of Environment
SoSP	State of Sao Paulo
UC	Conservation Unit (Protected Area)

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BRAZIL

ECOSYSTEM RESTORATION OF RIPARIAN FORESTS IN SÃO PAULO PROJECT

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1. Project Context, Global Environment Objectives and Design

1.1 Context at Appraisal

1.1.1 **Country and sector background:** In the early 1990s, macro-economic stabilization concerns dominated the Federal Government's policy agenda but increasingly the focus was shifting towards agriculture, the environment and rural poverty. Government began to withdraw certain incentives fostering agricultural expansion into ecologically unsuitable areas while opportunities created by MERCOSUL prompted farmers to seek more cost-effective and environmentally benign technologies.

1.1.2 São Paulo was at appraisal (and remains), Brazil's richest and most populous state with a massive industrial sector, and an important agriculture sector contributing about 15% of national agricultural output. However, successive agricultural booms and agricultural intensification characterized by unsustainable agricultural practices had caused severe land degradation and increasing strain on the natural resource base. Policies directly or indirectly promoting the cultivation of flood plains and other riparian areas to boost crop productivity had resulted in the disappearance or degradation of virtually all native riparian vegetation in productive agricultural areas. About 1.0 million hectares of riparian zones lacked any significant forest cover causing soil erosion and the movement of organic matter and sediment into aquatic ecosystems.¹ About 40% of the state territory was classified as highly or very highly susceptible to erosion. Official studies estimated annual soil losses to be some 200 million tons. Native forest degradation along with the unsustainable use of riparian zones had seriously affected the structure and function of the State's ecosystems and led to a range of negative ecological and socio-economic consequences including erosion and gully formation, sedimentation of reservoirs, headwaters and springs, and to soil degradation. Low income farmers, who often settle in riparian zones, were disproportionately affected due to their lack of mobility and inability to afford fertilizers, aggravating the socio-economic barriers they faced.

1.1.3 **Constraints on conservation:** Addressing these issues in São Paulo faced several constraints: (i) difficulty in engaging rural landowners, especially small farmers, concerned about losing productivity due to the obligation to sequester productive lands for conservation purposes; (ii) insufficient mechanisms to raise and channel funds for restoration and inefficient use of available resources; (iii) inadequate supply and quality of seeds/seedlings of native species to meet rising demand for restoration; (iv) inadequate knowledge of restoration techniques for the state's diverse state ecological and socio-economic realities/conditions; (v) need for efficient instruments for the integrated planning and monitoring of riparian restoration programs; and, (vi) society's lack of recognition of the importance of riparian forests, incipient level of restoration achieved or underway at the time, and difficulties involved in large-scale mobilization and training of agents/stakeholders. The Project, commonly known as PRMC from its name in Portuguese sought to systematically address these constraints.

1.1.4 **Bank support for the sector:** Responding to this critical land management situation and to address rural poverty issues, the Bank was already financing the Land Management III Project (LM III, 4238-BR) to increase and sustain agricultural production, productivity and farm incomes and support the conservation of natural resources by providing incentives to adopt sustainable

¹ The Brazilian Forest Code defines riparian corridors 30-200 meters wide (depending on the width of the waterway) as areas of permanent preservation (APP) whether or not covered by native vegetation.

land management practices.² The LM III was intended to co-finance the GEF operation, specifically the adoption of sustainable land management (SLM) practices, using the same incentives scheme, provision of seedlings of native tree species to build long-term supply, and training/capacity building for project executors/rural extension agents in the rehabilitation and restoration of riparian forests (see 1.5.2 and Annex 2). The Bank had already financed innovative natural resources management (NRM) and micro-watershed development projects in the southern States of Parana, Santa Catarina and Rio Grande do Sul which were viewed as validating the micro-watershed approach to NRM both in Brazil and other parts of Latin America.

1.1.5 Rationale for Bank assistance: The complementary nature of the objectives of the PRMC and the existing LM III, and the degree of collaboration needed between the State Secretariats of Environment (SMA) and of Agriculture (SAA), presented a unique opportunity for joint preparation and implementation. The two operations were inter-dependent and complementary, covering the same geographic areas and beneficiary populations, and fostering close collaboration across a range of technical and operational elements, with the added advantage that the LM III would provide most of the co-financing required for the PRMC. The Bank also had substantial, recent experience with similar projects in southern Brazil, as well as with projects in other parts of Latin America seeking to establish payment for environmental services (PES).³

1.1.6 Federal Government actions: The Government of Brazil (GoB) had responded to SLM issues in São Paulo and other states by mainstreaming sustainable development into national public policy; establishing the National Forest Program; and creating the Atlantic Forest Sub-program under the Pilot Program to Conserve the Brazilian Rainforest (PPG 7). These efforts provided a strong basis for other related programs to arrest and/or reverse degradation of the Atlantic Forest and Cerrado biomes, especially on productive lands. Further, the Ministry of Environment had developed a National Bio-diversity Strategy in 2002, *inter alia* paving the way for PES, and the PRMC supported its implementation. The Project area overlapped formally-designated national priority areas for conservation of biodiversity in the Atlantic Forest and Cerrado biomes, among 25 global hot-spots for world biodiversity conservation as defined by Conservation International.⁴

1.1.7 State Government actions: In addition to its support for the LM III operation described elsewhere, Government had backed a KfW-funded Atlantic Forest Protection Project (US\$20 million) supporting implementation of Protected Areas and strengthening the State's enforcement system throughout the State's Atlantic Forest. The State had also created the State Forum for Climate Change and Biodiversity in early 2005 - underscoring its commitment to the objectives of the GEF project - with a technical chamber dedicated to defining the methodology for preparing riparian forest rehabilitation projects that could also generate carbon sequestration credits.

1.2 Original Global Environment Objectives (GEO) and Key Indicators (*as approved*)

² See Implementation Completion Report No. 0000676, June 1, 2009.

³ This partnership already generated benefits for the ongoing LM III during PRMC preparation due to SMA gaining a deeper understanding of the mechanisms and objectives of the Bank loan which in turn facilitated the process of obtaining environmental licenses for certain investments such as restoration/control of gullies.

⁴ Seven of the State's 13 Atlantic Forest fragments and five of the 14 Cerrado savannah priority areas were covered by project-supported watersheds.

1.2.1 **GEO:** As stated in the PAD, the GEO was “to arrest and reverse land degradation processes in riparian ecosystems and adjacent agro-ecosystems by increasing on-the-ground investments and strengthening the policy, regulatory, economic, and institutional incentive framework to encourage sustainable land management, hence increasing carbon sequestration and restoring ecosystem stability, functions and services”.

1.2.2 **PDO:** The PAD included a Project Development Objective (PDO) “to support long-term and large-scale restoration of riparian forests of the Cerrado and Atlantic Forest biomes through development and harmonization of policy, regulatory, economic and technological tools and mechanisms, while providing opportunities for improved livelihoods and economic wellbeing of rural communities”.⁵

1.2.3 The Key Performance Indicators (KPI) supporting the GEO and PDO were:

- Key technical, financial, economic and institutional frameworks are in place to support long-term restoration of riparian forest ecosystems;
- Rural communities continue to adopt SLM practices and to participate in restoration of riparian forests (at least 900 farmers and 150 micro-watershed communities adopting improved practices);
- Increase in the area of land under sustainable land management practices and of riparian forests rehabilitated to preserve and restore ecosystem stability, functions and services (at least 30,000 ha, including 1,500 ha of restored riparian forests);
- Increased awareness and capacity among communities in 150 micro-watersheds to rehabilitate and conserve riparian forest ecosystems;
- A long-term Riparian Forest Restoration Program (PEMC) designed and implementation plan formulated by end-project.

1.3 Revised GEO, PDO (as approved by original approving authority) and Key Indicators, and reasons/justification

1.3.1 Neither the GEO nor PDO was revised. A KPI was changed by reducing the number of hectares of riparian forest to be restored from 1,500 ha to 500 ha. The Mid-term Review found that, given the project’s pilot nature, the demonstration effects could be judged from the smaller area. Further, cost per hectare of restoration activities was proving to be higher than expected. The number of new riparian forest rehabilitation systems tested and publicly disseminated was considered more relevant and the project was on track to meet that indicator.

1.4 Main Beneficiaries

1.4.1 Project stakeholders were classified into two groups - national and local - of broad composition.⁶ The primary target group was small- and medium-scale farmers whose agricultural production would increase through long-term productivity gains and improved land use. The planned incentive framework was designed to foster their adoption of conservation practices, sustain them through the initial period of high cost conservation investments and ensure that they shared the benefits generated by those practices at the micro-watershed level.

1.5 Original Components (as approved)

⁵ This deviated from the GEO in its explicit support for community economic development and wellbeing whereas similar meaning is inferred from the GEO. The inclusion of the PDO is discussed in Section 2.

⁶ National stakeholders included federal, state and municipal institutions, as well as national and international NGOs, the private sector and universities/research institutions. Local/beneficiary stakeholders included rural producers, school teachers, students and rural youth, local micro-watershed and producers’ associations, local environmental and cultural groups, and local NGOs.

1.5.1 The PRMC had five components comprising 13 sub-components and was to be implemented in five priority river basins representing the State's diverse physical, biotic and socio-economic situations, encompassing an area of about 113,000 km² with a population of 9.3 million but focusing on 150 micro-watersheds covering 450,000 ha and 13,500 farmers. On-the-ground investments in riparian forest rehabilitation would be implemented in 15 micro-watersheds (three in each of the five basins, covering 30,000 ha) and involving 1,500 families. The PAD described selection criteria for the target areas. Investments co-financed by LM III focused on SLM activities such as reducing soil erosion and restoring soil productivity, while GEF resources targeted the rehabilitation of riparian forest ecosystems. Total project cost was estimated at US\$19.52 million of which GEF contributed US\$7.75 million. Project components are summarized below with details in Annex 2.

(a) **Component 1: Policy Development** (US\$1.67 m, 8.6% of total cost, of which GEF US\$1.06 m) to establish realistic legal, technical, financial and economic frameworks for the future implementation of a state-wide riparian forests restoration program. Sub-components: (i) Development of PES and other funding mechanisms; (ii) Formulation of the State Program for Restoration of Riparian Forests.

(b) **Component 2: Support to Sustainable Riparian Forest Restoration** (US\$1.76 m, 9.0% of total cost, of which GEF US\$0.78 m) ensuring the development and field testing of techniques for riparian forest rehabilitation and restoration, and improved market supply of native seeds/seedlings of the required quantity and quality to achieve long-term restoration goals. Sub-components: (i) Development and dissemination of technologies for riparian forest restoration; (ii) Support to seed and seedling production.

(c) **Component 3: On-the Ground Investments in SLM Practices** (US\$10.38 m, 53.2% of total cost, of which GEF US\$2.32 m) financing the promotion and dissemination of tested SLM practices (zero-till agriculture, terracing, gully stabilization etc), and pilot restoration activities via on-the-ground investments in selected micro-watersheds. Sub-components: (i) On-the-ground adoption of agro-pastoral, sustainable land management practices; (ii) Pilot projects for on-the-ground adoption of riparian forest rehabilitation.⁷

(d) **Component 4: Environmental Education and Training** (US\$2.52 m, 12.9% of total cost, of which GEF US\$1.87 m) establishing the basis for participation of local populations in planning and implementing local/regional development and conservation activities focusing on better quality of life from the use of SLM. Sub-components: (i) Environmental education in schools; (ii) Stakeholder mobilization at basin level; (iii) Training of project executor groups; (iv) Capacity building for beneficiaries in SLM practices.

(e) **Component 5: Project Management, Monitoring and Evaluation, and Information Dissemination** (US\$3.20 m, 16.4% of total cost, of which GEF US\$1.73 m), financing the coordination, management and monitoring of project activities at the state, regional and national levels. Sub-components: Project management and institutional coordination; (ii) Monitoring and evaluation of project activities and impacts; (iii) Information dissemination.

1.6 Revised Components

⁷ The LM III project financed in parallel sub-component 3.1 incentives for the adoption of SLM practices (which overlapped similar activities in that operation); the portion of 3.2 concerning the provision of seedlings of native tree species; and, sub-component 4.3 concerning training and capacity-building in the rehabilitation and restoration of riparian forests for project executors, especially rural extension agents.

1.6.1 Project components were not revised in substance but several targets were reduced (see 1.7.1).

1.7 Other significant changes

1.7.1 The Credit Agreement was amended (mainly on recommendations of the Mid-term Review) effective December 16, 2009 as follows:

(a) Three new definitions were added to Section 1.02 consistent with revisions in 2006 to the World Bank Consultant Guidelines, Procurement Guidelines and the Project Procurement Plan (the Grant Agreement was signed in 2005);

(b) The Project Closing Date was extended by 15 months to April 27, 2011 to permit completion of key activities, e.g., the tree planting program, and full integration of lessons learned from the PRMC into public policies, including the then-proposed São Paulo: Sustainable Rural Development and Access to Markets Project;

(c) The number of seed production centers was reduced from two to one, in line with the State's new policy to promote seed production by the private sector instead of publicly-run centers and to reduce costs,⁸ and,

(d) The area for adoption of sustainable riparian forest rehabilitation practices was reduced from 1,500 ha to 500 ha.

2. Key Factors Affecting Implementation and Outcomes

2.1 Project Preparation, Design and Quality at Entry

Background analysis:

2.1.1 Project design drew on the experiences and lessons in SLM and biodiversity conservation in southern Brazil, as well as the ongoing LM III operation, stressing: the micro-watershed as the optimal unit for conservation planning and implementation; the important trade-off between direct, farm-level benefits and the sustainability of natural resource conservation interventions; stakeholder participation at all stages of the project cycle and collaborative approaches integrating the environmental and agricultural sectors; continuous attention by farmers to conservation and mechanisms to sustain such activity after project completion; and, flexibility in projects and programs to restore degraded lands and adopt SLM practices, to allow for specific circumstances. These lessons were reflected in project design through: (i) a defined set of micro-catchments; (ii) use of incentives to promote adoption of SLM practices directly on farmers' land; (iii) legislative changes and plans/frameworks designed to institutionalize SLM and biodiversity conservation long-term; and, (iv) educational programs and wide dissemination of project results/findings to build long-term adherence to conservation.

Assessment of project design:

⁸ Another factor was US Dollar devaluation which led to re-focusing some project activities – the estimated cost of the second seed center was US\$95,000. Also, despite the reduction to one seed center, the seeds indicator target was not reduced, and nor is there any mention in the file record of the Project starting to work with the private sector as a result of the shift away from public seed production. However, SMA's Botanical Institute did conduct an important state-wide survey of the status and production capacity of private nurseries as a direct result of this shift in emphasis.

2.1.2 **Objectives and indicators:** The PDO was consistent with the Country Assistance Strategy (CAS) of 2001-07, contributing to long-term country goals of better water quality and water resources management, as well as SLM, forests and biodiversity and directly supported the CAS' Environment and Natural Resource Management pillar.⁹ The GEO was consistent with the GEF Operational Strategy and specifically with the Operational Program (OP) for SLM (OP15), supported both SLM Strategic Priorities (targeted capacity-building and implementation of innovative SLM practices), and was relevant to OP3 on Forest Ecosystems.

2.1.3 When SMA first approached the Bank to propose this operation, their intention was to prepare a fully-blended project including IBRD loan and GEF financing, but were informed by the Secretary of Finance that the State had reached its borrowing ceiling. As such, the option was a GEF project with 100% financing from the State including parallel financing from the LM III Project already under implementation. The resulting Project appears to be a GEF standalone operation but was viewed informally by the Bank and country teams as a partial blend, including separate GEO and PDO with KPI divided among both sets of objectives. This structure was typical of similar projects approved at that time. Another factor in the final design was that towards the end of preparation, the GEF began to require projects to demonstrate real impact on people's welfare and include appropriate indicators, resulting in the PDO sub-objective seeking improved livelihoods and wellbeing.¹⁰ Only one KPI supported the PDO; this was insufficient to capture its breadth and there was no indicator for the social element. The GEO was quite sweeping for the corresponding results to be effectively measurable or in some cases, even observable at the time of project completion, and their indicators – as is often the case - were more “local”. Lastly, output indicators were too numerous, fragmented and duplicative, with limited utility in some cases (see Annex 2).

2.1.4 The fundamental objective of this project was to provide the State of São Paulo with the capacity and tools to tackle future restoration of about 1.0 million ha of degraded riparian forests by establishing an appropriate legal and technical foundation – and that was very clear to the State and Bank teams. It was an experimental operation which never intended, despite its ambitious objectives, to demonstrate the actual impact of riparian forest restoration on water quality or aquatic eco-systems biodiversity, or the actual socio-economic impact of adopting SLM practices on the livelihoods and wellbeing of poor farming communities. All the pilots and demonstration projects were meant to test, never to show the full impacts of, these activities since those could only come in the longer run. This needs to be understood when assessing the overall success of this operation. See also 3.2.1 and Annex 2.

2.1.5 **Components and organization:** The five components (comprising 13 sub-components) sought to address each of the major constraints facing conservation efforts described in para. 1.1.2. There was a somewhat unrealistic expectation that the relationship between Components 2 and 3 would be sequential - researchers would test models under controlled circumstances (Component 2) and then successful models would be tested under real conditions in the micro-catchments (Component 3). In practice, research took much longer while practitioners and farmers were coming up with their own ideas for field testing of existing research without first going through the formal “controlled test plot” methodology. The Project faced tough technical, socio-economic and cultural challenges (see 1.1.2). The organizational need for inter-institutional

⁹ The Project was relevant to the three themes: (i) natural resource management, including water, forests and land; (ii) environmental protection and management including building stakeholder coalitions around environmental assets; and (iii) global environmental externalities including carbon sequestration and biodiversity.

¹⁰ There was no direct indicator to measure this sub-objective and the Bank and Government project teams never expected to achieve measurable poverty impacts within the life of a pilot GEF operation. One Output Indicator 4.4.3 called for “training courses for income generation (organic agriculture, medicinal and ornamental plants, beekeeping, food and nutrition)”.

and inter-sector integration - both vertical and horizontal - was as complex as the Project itself and entailed challenges in aligning targets, objectives, timetables and levels of commitment from numerous participating entities. In its training, environmental education and awareness-building activities under Component 4, and some aspects of Component 5 such as monitoring and evaluation, project design tended to be duplicative and over-dimensioned.¹¹

2.1.6 Financing: Total project cost of US\$19.52 million was partially financed by the GEF grant of US\$7.75 million, and “co-financed” by US\$7.34 million from the ongoing LM III Project. The project implementation strategy was described in the PAD as highly cost-effective because of its integration with LM III which would reduce the GEF’s cost because the Bank loan would finance part of the investments needed to achieve project objectives. No funds actually flowed from one project to the other. Initially, after learning that obtaining IBRD funds was not possible, the State decided to provide 100% of co-financing. However, during preparation, the GEF increased the requirements on minimum co-financing co-efficients and the proposed project had to meet those requirements.¹² The Recipient contribution of US\$11.77 million as presented in the PAD incorporates this co-financed amount as well as another US\$3.30 million in State counterpart funding and US\$1.14 million from participating farmers and community organizations. Additional co-financing was expected to come from leveraged resources obtained from the State Government’s environmental compensation program but the amount and timing of such resources could not be foreseen at the time.

2.1.7 Safeguards: Because some project activities – mostly under Component 3 – had the potential for small, negative environmental impacts, the Project triggered OP/BP/GP4.01 for which an Environmental Assessment (EA) and an Environmental Management Plan (EMP) were prepared, as well as OP 4.09 (Pest Management) and OP/BP 4.36 (Forests). The Project’s *raison d’être* was sound, sustainable conservation and land management models supported by an improved legislative and regulatory foundation and greater public awareness. It was designed to have a direct, positive effects on the environment: improved soil fertility and water quality, and greater biodiversity within riparian zones. The Project represented the vanguard of a more extensive, scientifically-based and economically rational approach to riparian forest restoration and broader environmental conservation incorporating the concept of sustainable use of Protected Areas in small rural properties, governed by Federal Law 4771/65.

2.1.8 Participatory processes: Project stakeholders were involved in project identification and preparation and made significant contributions to project design, especially through workshops to develop the project concept and Results Framework, and to identify future implementation partners. The final project preparation workshop included national, state and local interests including government, NGOs, academia, environmental groups, and technicians. Proceedings were posted on the project website. Further, 14 meetings with River Basin Committees from the five involved watersheds agreed on how the pilot micro-watersheds would be selected. Finally, meetings were held with State energy and water supply entities and others interested in riparian forest restoration, and the project proposal was submitted for review to the State Environmental Council (CONSEMA).

¹¹ Such details might have been better-defined over the course of the project, with proper attention to identifying needs as they arose, thus avoiding inflated and/or low-value targets unrelated to real needs and/or difficult to meet. Project execution showed that some activities needed a clearer idea of the target population on the ground and the tangible results sought from the intervention.

¹² The PRMC was prepared and finalized well into the implementation of the LM III and the agreement was that the State Rural Extension Company (CATI) would facilitate the scaling up of the PRMC lessons and activities to other micro-watersheds, as part of their capacity-building program. The additional co-financing from LM III project was mostly represented by additional field support from CATI to implementation of the PRMC since CATI was the implementing agency for the LM III project, and had the field offices and technical staff that the State Secretariat of Environment (the agency responsible for the PRMC) did not.

2.1.9 STAP Roster Review: The STAP described the PRMC as an ambitious and complex exploratory operation in terms of the problem and solution and in the range of scale addressed, i.e. from localized, individual land management decisions to regional environmental concerns (chiefly sedimentation), to global environmental concerns (biodiversity and carbon sequestration). The Review expressed some concerns about the underlying analysis of linkages between farmers with erosion problems and actual riparian forest loss, how PES would be formulated, sustaining new SLM practices once the incentives stopped, and the types of indicators needed to judge success in fostering SLM adoption.

Adequacy of Government's commitment:

2.1.10 State Government Actions: There was a high priority for, and interest in project objectives on all sides of the political spectrum. The State Government was fully-committed to the PRMC and had already taken important steps detailed in para. 1.1.7. In addition, the State: (i) established a high level Inter-Agency Coordination Committee to facilitate integration between the PRMC and the LM III; (ii) mobilized stakeholders including the State Environmental Council (CONSEMA) and five multi-sector river basin committees to establish water resources management priorities in their respective basins; (iii) promoted collaboration between SMA and SAA on project preparation; and (iv) included the PRMC and LM III projects in the State's Portfolio of Priority Projects, attracting government's special attention and support for the release of project funds, monitoring and impact evaluation, and other aspects. The State's strong counterpart funding performance throughout project execution and full support for efforts to introduce PES underscored its sustained commitment.

Risk assessment:

2.1.11 The main risks identified concerned rural landowners' lack of interest in restoration/conservation projects, wavering political commitment, and unstable staffing of the Project Management Unit (PMU) and executing agencies. These risks were realistic and their suggested mitigation measures were rational, but the assessment might have gone further to include the risk that the diverse stakeholders involved in implementation would not or could not effectively collaborate and/or communicate due to certain inherent differences of approach, relative capacity, or varying levels of commitment to a particular activity. Also, risks were implied by the requirement that technical activities on demonstration plots be supervised and monitored given that the theoretical and practical basis for such monitoring needed to be generated by the demonstration activities themselves.

2.2 Implementation

Major factors affecting implementation and their resolution/outcome:

2.2.1 Collaboration between the PRMC and LM III operations: Some 95% of funding released up to end-2007 from the LM III Incentives Fund (Component 3) was concentrated in just five micro-catchments, and four more had not yet participated. The assistance offered to farmers was variable in type, quality and quantity without a strong unifying strategy, theme or standard set of practices integrated by property and micro-catchment. Time spent working in each micro-catchment was not directly correlated with actual results. Bank missions urged CATI to ensure that access to the Incentives Program financing "lines" was democratic and that for each micro-catchment, a minimum package of interventions was designed to serve as an example/model for the rest of the State and beyond. Minimum requirements were instituted for the 15 micro-catchments involving stricter technical, operational and managerial integration between the two projects through joint scheduling of meetings and activities, joint preparation of Micro-catchment

Plans (PGMs), and the updating and equating of Individual Property Plans (PIPs). Marked improvement followed: technical and operational interventions proposed by the PRMC and LM III were complementary and synergistic; joint teams were used for planning, implementation, monitoring, supervision and communications, and training of beneficiaries and other stakeholders was jointly-organized. Extension of the LM III closing date (to end-November 2008) was expressly intended to permit further progress under the PRMC operation because the Incentives Fund was legally tied to LM III and could not be extended independently from it.

2.2.2 Institutional and technical challenges: The Project had five components and multiple sub-components, involved several institutions and agencies both within and outside SMA and SAA, and depended heavily on partnerships. While this arrangement benefited the Project by incorporating the necessary multi-disciplinary approach and cross-sector collaboration, it needed strong coordination to make the shared framework of responsibilities work well. The challenges of this approach registered in the slow evolution of synergies and organized inter-action, and difficulties in aligning the priorities, timetables and information/data flows of/between different teams. Over time, alternative strategies were adopted and conflicts were reduced or mitigated. The PRMC pioneered close dialogue between SMA and CATI, two institutions with distinct histories and cultures, and fostered better relations between their respective technical teams. CATI's decentralized structure for delivering technical support was of fundamental importance for reaching farmers, as was CATI's provision of data for the demonstration projects which facilitated the micro-catchment diagnoses and implementation of pilots. These collaborations were fruitful, including joint preparation of the follow-up Sustainable Rural Development Project in Sao Paulo.¹³In contrast, the desired convergence between SMA's Coordination for Biodiversity and Natural Resources (CBRN) and the Environmental Education Department in SMA was not smooth (see 2.2.5) and the performance of the Component 4 environmental education activities fell short in some respects.

2.2.3 Personnel management and capacity: At project start-up, SMA had insufficient technical and administrative personnel, affecting the execution of important activities and becoming a key driver of partnership formation. Initial project design aimed to address this shortcoming through the contracting of specialized consultants, one for each of the five river Basins, and equipping them with vehicles to provide local support to project implementation. However, this strategy could not be implemented because, at project effectiveness, (i) the State was being pressured by labor unions to stop hiring long-term consultants to implement government activities; and (ii) a new decree prohibited non-government staff from driving vehicles belonging to the State due to liabilities related to accidents and abuse of such vehicles. As such, actual project implementation was severely delayed until a new implementation strategy involving a large contract with a consulting firm was devised and agreed with Government authorities and the Bank. Further, in the initial years, few institutions involved or technicians contracted had experience in riparian forest restoration, and some had no experience of rural extension. The restructuring of SMA in 2008/2009 helped to alleviate this problem through the contracting of a 150 technicians (paid by State budget, not the Project) half of whom were stationed in regional centers to be trained and to operate closer to the farmers. These new staff brought appropriate skills and experience, adding value to the Project team overall, but their time was divided with other SMA activities which - combined with significant rotation of SMA's technical staff - reduced the continuity of certain activities.

¹³ In isolated cases, the partnership with CATI did not work so well, especially at the local level and due to difficulties in aligning SMA activities with the work plans and schedules of CATI extension technicians.

2.2.4 Environmental education and training: Environmental education/training activities under Component 4 were to operate over multiple fronts to overcome the lack of engagement of rural landowners and the general population with riparian forest issues. First, while the MTR reported good progress on training using traditional media instruments (courses, workshops, radio programs and a widely distributed newsletter), local stakeholders expressed concerns that the Project was still not reaching sufficient producers and communities. There was also stakeholder concern that educational activities were better implemented before the Demonstration Projects (DP, Component 3) prompting larger numbers of farmers to participate. Also, SMA tended to focus more on limited local issues such as the DPs and not enough on directly explaining the big project ideas to farmers; for farmers, the Project was the DPs. In addition, lack of a legal agreement formalizing a partnership between SMA and the State Secretariat of Education (SEE) delayed joint training in state and local schools until 2010 when Decree 55.385 instituted the State Environmental Education Program, permitting progress but too late to achieve critical mass/impact.¹⁴ SMA's Final Report (2011) notes the duplication, fragmentation and redundancy of many Component 4 activities, and lack of a clear sense of the different "markets" for messages or the end-result desired.¹⁵ By end-project, component disbursements were only 42% of the original estimate.

2.2.5 Monitoring, evaluation and dissemination: Establishing effective monitoring of project activities and results was challenging. The project's ability to project its successes to the state and national level *ex-post* and to overcome technical, methodological and policy barriers were critical and heavily dependent on systematic M&E and dissemination. It was believed essential to integrate the PRMC M&E with CATI's Physical and Financial Monitoring System (SAFF), but this was incompatible with project complexity and SMA's management structure. This had a material impact on the project's ability to detect and resolve critical issues affecting project execution and to support future large-scale efforts: monitoring the coordination and evolution of inter-sector interventions within government; aligning objectives and targets across the large number of directly and indirectly involved institutions/entities; governing the flow of data between involved entities (also a communications issue); promoting project objectives to farmers using convincing data/materials; improving planning; and, monitoring results and impacts to detect the longer-term success and sustainability of restoration programs/systems. SMA gained control of its M&E system and associated activities over time, but the dissemination stage, albeit proactive and wide-reaching, needed more sophisticated, differentiated strategies to advance the cause of a larger-scale restoration program.¹⁶ The unanticipated complexities of the M&E process including dissemination, associated with an important and innovative, experimental project saw its final cost almost double the appraisal estimate.¹⁷ See section 2.3 for the products of M&E.

2.2.6 Fluctuation in USD/Real exchange rates: The devaluation of the Real through mid-2009 increased the value of grant resources but this "good effect" was offset by domestic inflation, resulting in a net decline in the Project's purchasing power. After June 2009, devaluation of the USD and continued domestic inflation further reduced the resources effectively

¹⁴ Subject matter arising from project experiences was inserted in school teaching materials so that teachers and students could understand and help implement the range of disciplines related to land degradation, de-forestation, and sustainability of the Atlantic Forest and *Cerrado* biomes.

While results were less than expected in key activities, this does not reflect lack of effort to implement the massive slate of activities under this component but rather the overly traditional/outdated approaches used, uneven knowledge of local municipalities and conditions, problems in defining priority activities and target groups, and institutional collaboration issues.

¹⁶ The first real attempt to improve project indicators was not until 2008, followed in 2009 by a compendium of ideas to overcome barriers to large scale riparian forest restoration, an evaluation methodology in 2010, and a final study in 2011.

¹⁷ Component 5 costs, as shown in Annex 1, include project management, but the point about the unanticipated complexity also holds. The counterpart team was unable to provide a breakdown of costs by sub-component, as explained in footnote to Table 2.3, Annex 2.

available to the Project. This was partly responsible for reductions in two project targets (one of the two planned seed distribution centers was cancelled and the area targeted for riparian forest restoration was reduced by 66%). Measures were also introduced to reduce the costs of the demonstration pilot projects (an MTR recommendation) by exploiting the potential for natural regeneration, and using agro-forestry systems for income generation. Additional resources were also leveraged for the demonstration projects from private and public entities.¹⁸

2.2.7 Project at risk status: The Project was not at any time declared at risk; implementation progress (IP) and GEO ratings never dipped below Moderately Satisfactory.

Mid-term Review (MTR):

2.2.8 The MTR was conducted in January 2009 and was a relatively brief and tightly-focused exercise, importantly due to a series of Bank/Client consultations on the Project's primary bottlenecks and issues in the previous year. Field visits were conducted to several micro-watersheds. The MTR mission found that implementation progress was generally good and that the Project was receiving adequate institutional and political support. Field visits showed increasing buy-in by small-holders in the pilot projects and good relations between the Project and its local partners. However, the Project needed to: (i) find costs savings for riparian zone restoration activities to encourage their larger-scale adoption; (ii) strengthen the dissemination and communication of project results and lessons; (iii) promote and coordinate systems for payment for environmental services; and (iv) seek new sources of funding to continue the installation of Demonstration Projects. The Borrower team was also advised (in relation to project objectives and indicators) to finalize the design, implementation strategy and financing for the proposed Riparian Forest Restoration Program (PEMC); train school teachers in SLM concepts/practices; and, implement policies to promote an increased supply of native species seeds. Follow-up was tracked closely by the Bank team. Recommendations led *inter alia*, to amendment of the Credit Agreement (see Data Sheet Section H and 1.7.1).¹⁹

2.2.9 The evaluation study intended originally to support the MTR mission was published in final form in December 2009.²⁰ The strength of this study is its analytical focus on the implementation experience, challenges and lessons, by component and considerations affecting sustainability. While its lateness limited its immediate utility to the MTR itself, the study was influential in prompting a broad exchange of ideas and experiences between local associations resulting in a consolidation and standardization of best practices, re-design of some activities and improved management, as well as the formation of a network of associations and regular dialogue.²¹ The study's findings were also disseminated at a major seminar in 2010 and

¹⁸

These included: arrangements with Petrobrás to install projects in Paraibuna municipality; incorporation of 600 ha in Jaú in the Areas Available for Restoration stock list (*Banco de Areas*) from which the NGO known as Green Initiative (supporting voluntary compensation for carbon emissions) "adopted" two areas; financing of a demonstration project in Pacaembu by the State Water Resources Fund (FEHIDRO); and, a zero tillage project in the Garça micro-watershed, financed by DER Environmental Compensation Funds; and agreements with the sugar/alcohol sector to restore some 270,000 ha.

The State Government proposed/adopted several other changes: inclusion of one additional micro-watershed to pilot payment for agricultural services (PES); refocus the seedling sub-component from increasing Government capacity to provide seeds of native species to the market, to strengthening private sector capacity to respond to market demand for such products and services; and, to cancel activities involving training on riparian forest conservation for teachers in the state school system because the State decided to focus exclusively on improving teacher capacity in reading and math, where the State was falling behind nationally.

²⁰ Contracting of this study was delayed as there was little interest from consulting firms who considered the task too small, and because of some bureaucratic issues with the procurement process.

²¹ The MTR study influenced the following: (i) testing of new practices: use of local inputs; joint cropping of native and other short-cycle crops; green manure; no till seeding with native species; and experimentation with SAF; (ii) ongoing maintenance of newly-planted areas was stressed, as was ongoing data collection to build long-term databases. Local technicians were given information on each demonstration property including technologies used, maintenance instructions, disease prevention options, as well as information on how much had been invested in the property by the Project to reinforce the role of the partner (the farmer) and the community in monitoring the innovations collectively.

contributed to a broader, more inclusive learning opportunity than as a purely internal reference for corrective actions.

2.3 Monitoring and Evaluation (M&E) Design, Implementation and Utilization

2.3.1 Planned: The PAD contained a detailed and well-conceived monitoring and evaluation strategy based on the Results Framework, lessons learned from SLM projects in southern Brazil, and ongoing experimental projects in degraded land restoration in the state. Monitoring was to be participatory and cover progress and impacts. A Monitoring and Evaluation Plan was included in the Operational Manual. Sub-component 5.1 financed the establishment of a Physical and Financial Monitoring System (SAFF) adapted from the LM III model and would allow online Web-based follow-up of project progress for executors, financiers, beneficiaries and other stakeholders. The Project Impact Monitoring Plan was ambitious, seeking to provide information on the results and effectiveness of activities under each component, focusing on the DPs and leading to conclusions on the methodology needed for large-scale restoration of riparian forests.²² M&E issues as a factor in project implementation are summarized in 2.2.6 above.

2.3.2 Achievements and dissemination: The MIS was established and included financial management, managerial and progress data. The Project produced an MTR evaluation (Plural Cooperativa, 2009), a Final Report (SMA 2011), an environmental perception study supporting the PES Pilot Project, and a final evaluation.²³ As noted, the results of the MTR study were disseminated via a special seminar before project closing to a diverse audience, and another brought together PES practitioners from throughout the country to share lessons. In addition to the above, the Project financed an impressive body of good quality research studies, papers, diagnoses and guidance notes supporting field practices, monitoring methodologies and policy formulation (see list Annex 9). Dissemination was conducted through national, regional and local symposia, workshops and seminars and through various media instruments for both specialist and lay audiences (see Annex 6). A book compiling the results of the synthesis workshop to disseminate lessons learned about PES is to be published. See 2.2.5 and Annex 2.

2.4 Safeguard and Fiduciary Compliance

2.4.1 Safeguards: The Project triggered OP/BP/GP 4.01 Environmental Assessment, OP 4.09 Pest Management and OP/BP 4.37 Forests. The Project's fundamental thrust was to establish the policy and practical foundation for long-term SLM and specifically riparian forest restoration, with both local and global implications. The Project team included the senior environmental specialist who had prepared the Project and supervision of compliance with triggered Safeguards was thorough and consistent, aiming both to avoid and /or minimize any potential negative impacts and enhance planned outcomes. Supervision found that the identification and implementation of activities on the ground followed recommended practices consistent with the project's Environmental Management Plan, reduced the need for pesticides and fertilizers, avoided further deforestation of riparian/other areas within the 15 pilot micro-catchments, and promoted re-planting of these same areas.

²² Evaluation of the PRMC Component 3 co-financed activities was to take into account the methodology selected and data obtained from evaluation of the complementary LM III experience in the same 15 pilot micro-watersheds.

²³ (a) Monitoramento Socio-econômico e de Percepção Ambiental em Micro-bacias Piloto: Projeto de Pagamento por Serviços Ambientais – Instituto Terra Mater/SMA, 2009; (b) Avaliação de Efetividade do Projeto de Recuperação de Matas Ciliares do Estado de São Paulo: T. H. Kanashiro, E. Fonseca Casazza/SMA, São Paulo 2011.

2.4.2 **Fiduciary compliance:** (i) Procurement performance was uniformly rated satisfactory by supervision missions for the duration, a rating trend reflecting the results of a series of Procurement Post-Review missions. No significant procurement issues arose or affected the Project; and (ii) Financial management (FM) was rated satisfactory or moderately satisfactory (delayed audit delivery) throughout the Project with no significant issues raised by regularly-conducted FM supervision missions. The Project's FM performance was rated as strong due *inter alia*, to its well-prepared FM team and secure computerized systems. Audit reports were, with two exceptions, delivered to the Bank on time, opinions were generally unqualified/qualified exception with no serious accountability or control issues raised by auditors. Any issues requiring Recipient follow-up were resolved promptly.

2.4.3 **Project costs:** Total project cost was US\$19.52 million at appraisal and US\$21.77 million at closing, an overrun of about 11.5%. While Components 1, 2 and 4 were just 55%, 60% and 42% of their appraisal estimate respectively, Components 3 and 5 exceeded their original estimates by 23% and 88% respectively. US Dollar/Real exchange rate fluctuations contributed to the dollar-denominated GEF Credit being 102% of appraisal, at Closing. The GoSP counterpart contribution exceeded the appraisal estimate by some 47% due to an under-estimation of Component 3 activities at appraisal – cost containment became a constant theme of supervision missions and analytical documents – and cost inflation in Brazil in the final years for materials and equipment. The co-financing element (designated in the Client's Final Report as GoSP/World Bank – see Annex 2 including Table 2.3) was 99% of its initial estimate.

2.5 Post-completion Operation/Next Phase

2.5.1 **Follow-on operation:** Preliminary evidence that environmentally sound land management practices including riparian forest restoration/conservation adopted at the micro-watershed level by organized small farmers can boost productivity, increase economic wellbeing and restore degraded rural lands has resonated with the State Government. The new Sustainable Rural Development and Access to Markets Project approved in May 2010 and now effective, a US\$130.0 million total cost with a Bank loan of about US\$78.0 million, is designed to increase the competitiveness of family agriculture in priority areas of the State of São Paulo, while improving its environmental sustainability. The new operation is consistent with the Brazil CPS (2008-11) in stressing competitiveness, equity and sustainability. It applies lessons from the PRMC and extends the scale and reach of key PRMC outcomes/outputs by: (i) expanding PES arrangements; (ii) strengthening environmental education; and (iii) enhancing the State structure for the supply of seeds and native species, using lessons from the PRMC. It also seeks to improve the quality, productivity and environmental sustainability of small farmers' agricultural production systems, scaling up the use of no-till agriculture, green fertilizer, terracing, fencing of water springs and stream/riparian margins, stabilization and restoration of gullies and rotational pasture practices initiated under Component 3 of the PRMC.

2.5.2 **Operation and maintenance (O&M):** While there is strong evidence that farmers and other groups are continuing to expand the use of project-supported technological improvements on their land, no formal data captured the extent to which beneficiary farmers were maintaining or intended to maintain actual improvements introduced on their land by the Project.

3. Assessment of Outcomes

3.1 Relevance of Objectives, Design and Implementation

3.1.1. Project objectives remain highly relevant to country and global priorities and to the Bank's assistance strategy for Brazil. The Country Partnership Strategy (CPS) for FY2012-2015 emphasizes among its four strategic objectives, the further improvement of sustainable natural resource management and enhanced climatic resilience while contributing to local economic development. The Bank group would expand support for sustainable development in the Amazon, the *Cerrado* and fragile eco-systems - the latter two particularly relevant to the State of São Paulo.

3.2 Achievement of Global Environmental Objectives and Project Development Objectives

3.2.1 Following the example of the project Implementation Status and Results Reports (ISR), which uniformly reported only the GEO and applied all five key indicators when measuring its achievement, the ICR emphasizes achievements supporting the GEO but reports separately on the PDO's objective "providing opportunities for improved livelihoods and economic wellbeing of rural communities", the major element differentiating the PDO from the GEO. Annex 2 provides additional details, while Annex 5 summarizes the findings of the final evaluation study (Kanashiro and Fonseca/SMA, 2011).

Global Environment Objective:

3.2.2 *Overriding objective: To arrest and reverse land degradation processes in riparian ecosystems and adjacent agro-ecosystems.*

This objective was achieved: Based on legislative achievements, demonstration and pilot experiences, and on studies conducted by the LM III in the same micro-catchments, successful outcomes provide a roadmap for future, larger scale efforts. As concluded by the final evaluation (Kanashiro and Fonseca/SMA, 2011), the two most important and durable achievements were: (i) the development of legal, strategic and technical tools to facilitate scaled up riparian forest restoration and sustainable land management; and (ii) their proven potential to physically reduce and reverse land degradation in riparian ecosystems and adjacent agro-ecosystems state-wide. While the GEO's vision went well beyond what was intended to be measured or even what could be measured (or even observed) in a five-year project, the likelihood of its achievement at larger-scale in the future is quite high.

The following factors are also important to the aggregate effort: (i) Greater awareness among diverse stakeholders of the economic and social importance of SLM and riparian forests; (ii) Demonstrated propensity/commitment of sector institutions and stakeholders - public and private - to collaborate on addressing land degradation in riparian and agro-ecosystems; (iii) Availability of scientific, technical and economic studies based on successful project field experiences and adaptive research, available for dissemination to support large-scale activities; (iv) Demonstrated interest among stakeholders to expand coverage of the Project methodology and lessons through independent projects, activities, networks and financing sources; and, (v) The results of preliminary economic analysis which shows that arresting and reversing land and forest degradation is economically and socially beneficial.

3.2.3 *Sub-objective 1: Increasing on-the-ground investments:*

This objective was achieved. (i) Some 317 farm families - about 35% of the target but about 27% of all farm properties in the 15 selected micro-catchments - adopted sustainable agriculture and pasture management practices (zero till agriculture, crop rotation, erosion control, integrated pest management, green fertilizer) on 32,868 ha (110% of target), thanks to the Project's incentives; (ii) About 400 ha of riparian forest were restored (80% of target) and another 1200 ha are under restoration, prompted by the Project's multiplier effects and financed by other entities

(BNDES, Petrobrás and FEHIDRO) as envisaged at appraisal; (iii) Individual farmers, producer cooperatives and associations, NGOs and agro-industrial interests (e.g., sugar/ethanol) are both expanding the adoption of SLM practices and avoiding deforestation, well beyond the Project's targeted areas and using project methodologies; and, (iv) Some 182 micro-catchments (121% of target) had Micro-catchment Plans prepared, providing a roadmap for their future, environmentally sustainable economic and social development.

3.2.4 Sub-objective 2: Strengthening the policy, regulatory, economic and institutional incentive framework to encourage sustainable land management:

This objective was achieved. (a) The Project provided the regulatory and substantive basis for statewide use of PES to address conservation problems by: (i) supporting the introduction of legislation, approved in late 2009, enabling the use of PES (hitherto barred by legal constraints) and (ii) field-testing PES in two micro-catchments in partnership with the Federal “*Produtor de Água*” program, local authorities, TNC, and the PCJ river basin committee (which contributed US\$0.4 million). Thanks to these advances, by end-project the State Government had committed an initial R\$5.0 million (about US\$3.0 million) to implement the *Mina de Água* PES program in 21 pilot municipalities state-wide (with the support of the follow-up Sustainable Rural Development and Access to Markets Project) and additional such programs are being planned. The initial US\$1.0 million that GEF had provided for policy development under the PRMC thus had already generated over 3.4 times as much funding by end-project. (b) A long-term Riparian Forest Restoration Program (PEMC) was also designed and instituted by a State Resolution, and an Implementation Plan was formulated after an inclusive and exhaustive research, diagnostic and consultative process. The PEMC is supported at the highest political level, was already in place before project closure, and has been instituted with indicative budget allocations within the State's Multi-year Development Plan;²⁴ (c) As detailed in the final evaluation (Kanashiro and Fonseca/SMA 2011), the Project spawned an impressive body of law/regulation in three categories: those related directly to the operations and management of the Project itself; innovative regulations establishing new methodologies and financial incentives facilitating/requiring collaboration between Government, the municipalities and civil society to jointly-activate riparian forest restoration and SLM programs; and, improvements to existing laws/regulations to insert riparian forest concerns into a broader legal spectrum (see Annexes 2 and 5); and (d) The Project also successfully established new institutional partnerships and *modus operandi* coalescing around integrated conservation, socio-economic and sector goals.

3.2.5 Sub-objective 3: Increasing carbon sequestration and restoring eco-system stability, functions and services:

This objective was achieved. About 400 ha of riparian forest (vs. amended target of 500 ha) were restored in 15 micro-catchments, increasing carbon sequestration, and improving ecosystem functionality, stability and services. From the beginning, the objective of this project was to prepare the State of Sao Paulo to tackle the future challenge of restoring 1.0 million ha of degraded riparian forest areas. It was well understood by the Bank and counterpart teams that the amount of riparian forests actually restored under the Project would be insufficient to show actual impact on water quality or biodiversity. Further, the project implementation time would not be sufficient for those areas to grow into well-formed forests. The Project might also have had a noticeable impact if all areas restored were concentrated in the same micro-catchment but the

²⁴ Institution of the PEMC posed a problem for the project team since they did not yet have all the answers from the PRMC. In the interests of taking political advantage of the moment, the PEMC was designed to allow for flexibility as more learning from the PRMC became available. The new, follow-on project is a result of the successful implementation of the LM III project but it incorporates key lessons from the PRMC.

areas were dispersed in five distinct river basins to test restoration techniques under very different geographic, soil, biodiversity and social conditions. Studies in other areas where restoration was done, in conjunction with the adoption of erosion control in areas beyond the riparian zone, have shown positive impacts on water quality by reducing sediment load and coliform counts.²⁵

Carbon sequestration from plantings in the Demonstration Projects was estimated at 414 tons of CO₂ per ha (Martins et al, 2009) resulting in the potential sequestration of about 148,000 tons of CO₂ and 172,000 tons of biomass in the area restored under the Project and an additional 497,000 tons of CO₂ in areas where restoration is being financed by other entities. Under the “Green Ethanol” program, a State initiative influenced directly by the PRMC and designed to foster the sustainable production of ethanol, certified agro-industries (principally the sugar/alcohol industry), have formally agreed to restore some 273,000 ha of riparian forest. This is an essential collaboration given that this industry alone uses 22% of agricultural land state-wide.

While the PRMC did not meet its unrealistically high seedling targets – *inter alia*, the complexity of the seed/nursery sector was under-estimated - the Botanical Institute (SMA) noted that the production and availability of native species seedlings rose sharply from mid-decade. In 2003, 13 million seedlings were produced of 30 native species in 55 nurseries; by 2008 production had reached 33 million in over 100 nurseries with most producing 80 or more native species. Studies indicate that the PRMC’s impact on demand, the changing public policy framework supporting forest restoration, and the multiplier effects of field demonstration and dissemination - a positive indicator of longer-term eco-system stability - were major factors. An important finding of forest restoration activities was their high cost, the need to formulate and activate mechanisms to both reduce unit costs and compensate farmers for performing the conservation and restoration function, and the critical importance of building a local, specialized labor force for reforestation.

Project Development Objective:

3.2.6 The PDO’s overriding objective and first sub-objective to “support long-term and large-scale restoration of riparian forests of Cerrado and Atlantic Forest through the development and harmonization of policy, regulatory, economic and technological tools and mechanisms” was successfully achieved, (see 3.2.2 and 3.2.3, and Annexes 2 and 5. However, the PDO’s livelihood/wellbeing sub-objective was not formally monitored, but the results of economic analysis of the completed LM III project provide a proxy - same micro-catchments, target population and SLM activities - along with other supporting information (see 3.3, and Annex 2).

3.2.7 *Sub-objective 2: Providing opportunities for improved livelihoods and economic wellbeing of rural communities:*

This objective was achieved. There are promising, preliminary indications of the potential of the SLM techniques adopted over some 32,000 ha to improve livelihoods and wellbeing. Economic and financial analysis conducted by the Food and Agriculture Organization (FAO 2008) for the LM III project ICR (Report No. 0000676) studied SLM activities also included in

²⁵ Case studies (Rabello and Baptistella, 2007, and Bassi 2007) identified declines ranging from 10-50% in the turbidity of waterways in LM III micro-catchments benefited by similar investments, measured at points monitored by the Sao Paulo Environmental Sanitation Technology Company (CETESP). The cost of water treatment for human consumption declined by 15%. Further, research conducted under both the PRMC and LM III operations demonstrated the local benefits that riparian restoration can generate. One study estimated the annual savings in terms of reductions in the cost of water treatment and dredging of reservoirs in 10 representative micro-catchments (within the project area) in São Paulo covering a total of about 586 km² of between R\$0.4 million and R\$0.8 million, depending on the extent of the area conserved (Cabral, 2010).

the PRMC under the co-financed, Sub-component 3.1. These activities were found to be economically and financially profitable with the income of farmers who adopted them increasing by 16% to as much as 157%, equivalent (at that time) to some US\$1,400 to US\$6,600 per year, per farmer. Yield increases ranged from 23.5% (cotton) to 100% (dairying) over five years.

Although the number of participating farmers in the PRMC was relatively low due to its pilot nature, the follow-on operation (see 2.5.1) will extend access to these now proven techniques to a much larger number of farmers. This new operation will improve the quality, productivity and sustainability of small farm production systems. Improved livelihoods and poverty reduction are also an expected outcome of a scaled up application of the PES, from the employment and income opportunities associated with re-forestation, and by creating alternatives for the sustainable exploitation of degraded areas. Further, while environment and agriculture were not initially easily integrated, the strategically important SMA/CATI partnership was crucial for rural development; the collaboration generated many benefits and importantly, promoted an increase in social benefits as perceived by local involved populations. Lastly, the final evaluation found that the LM III project achieved better results in areas where the PRMC Demonstration Projects were also implemented. In cases analyzed, where there was synergy between the LM III and the PRMC, public management performance improved, and environmental conservation and agricultural production were, in tandem, associated with better quality of rural life.²⁶

3.3 Efficiency

3.3.1 As noted, the SLM activities supported by the LM III and the PRMC were found by the LM III ICR to be financially and economically viable, with an IRR of 27%. A similar analysis was not undertaken on the PRMC-financed riparian restoration activities. Rather, the focus in these activities was to pilot cheaper restoration techniques to substitute for the expensive, traditional *plantio total* thus reducing the cost of a future, statewide restoration program. The new techniques piloted under PRMC were found to offer savings compared to *plantio total* ranging from 10 to 20% (*adensamento, enriquecimento*) to over 50% (*semeadura direta*). While *plantio total* is likely to remain the primary option for restoring the most degraded areas, substantial savings can be achieved given the large areas requiring restoration. If 30% of riparian zones were to be restored using *enriquecimento* for example, the savings would be R\$0.8 billion. No ex-post project IRR was estimated for the project as a whole.²⁷ Use of PES to pay farmers to undertake restoration, rather than contracting firms to do the work, is likely to result in further savings. This was not possible during PRMC implementation, but adoption of a legal framework for PES thanks to PRMC support makes it possible in the future.

3.4 Justification of Overall Outcome Rating

Rating: **Satisfactory**

3.4.1 This rating is based on the following: (i) The development priority and project objectives were and remain, highly relevant to the environmental conditions affecting thousands of small and medium-scale farms in the State of São Paulo, and to related global conditions; (ii) The Project's GEO and PDO were largely achieved when viewed - as intended at appraisal - as the critical legal, technical and operational framework for future, more extensive efforts; (iii) Direct evidence of multiplier effects indicating strong public and private commitment to larger-scale riparian forest restoration efforts, and new institutional coalitions at all levels for addressing

²⁶ The only caveat associated with this sub-objective is the shortfall in achievement under sub-component 4.3 "training courses for income generation" (Table 2.1, Annex 2) indicating the need to reinforce such activities under the new operation.

²⁷ It was not possible to provide an IRR for the GEF-financed portions as benefits were not measured, only costs, as is typical in GEF projects.

them, both factors enhancing the policy and operational context; (iv) Full disbursement with a 15-month extension of the closing date; (v) Economic analysis indicates that substantial cost savings would be possible from using the new technologies tested by the Project (see 3.3.1 and Annex 3); and, (vi) Project achievements have good likelihood of sustainability.

3.5 Overarching Themes, Other Outcomes and Impacts

(a) Poverty Impacts, Gender Aspects, and Social Development

3.5.1 Micro-catchments were carefully selected at appraisal to reflect the most fragile, degraded lands and these tend to contain many of the State's poorest rural communities. The vast majority of beneficiaries were small-scale farmers and as noted in 3.2.7 above, experienced increased incomes thanks to marked productivity gains. Further, farmers' general level of organization and capacity for collective action were improved; social capital gains were evident. Better-organized farmers with micro-catchment and farm plans now have greater potential to access and benefit from a range of public programs, and Government's targeting of such programs is likely to improve.

(b) Institutional Change/Strengthening

3.5.2 The Project had a marked and durable impact on institutional capacity. A collaborative dialogue evolved between the environment and agriculture sectors through the new relationship between SMA and SAA/CATI. SMA developed partnerships with many institutions and entities including The Nature Conservancy, and many decentralized partnerships with municipal authorities, academia, and NGOs. At the decentralized level, institutionalization of the Project concept was evident including by Water Basin Committees incorporating riparian forest restoration targets in their Watershed Plans from 2005 on. Such collaboration was contemplated in project design, given the complexity and diversity of project activities and inability of SMA to coordinate or implement such projects/programs alone, especially under a larger-scale program (PEMC). Project technical teams gained understanding of administrative and financial processes.

3.5.3 A new management "culture" evolved in SMA including greater control over the timing of activities and the quality of projects' physical and financial management. Restructuring of SMA and its affiliated CBRN unit in 2009 had many positive effects. Improved management and monitoring instruments resulted in formalized systems, common terminology across agencies, faster problem-solving and, better relationships between partners, technical and administrative teams. CBRN was strengthened through its new Regional Program and Project Centers which were authorized to execute projects, programs and activities in biodiversity protection and sustainable development. The Project's major difference from similar programs was Component 1 requiring project institutions to prepare public policy proposals, accelerating the maturation of such proposals into effective public policy, while promoting institutional growth. SMA staff were actively responsive to the State Government, helping through technical briefings, analytical exercises and numerous consultations – including with local/municipal governments – to craft amendments to the Climate Change Law authorizing the use of PES. See Annexes 2 and 5.

(c) Other Unintended Outcomes and Impacts

3.5.4 The most striking, unanticipated outcomes were the PRMC's multiplier effects: (i) By end-project, numerous micro-catchment communities, NGOs and municipal governments were already developing riparian forest restoration projects based on project experiences and models and using other public and private funding (see Annex 2); (ii) Micro-catchment Plans (and individual farm plans) prepared for project activities integrated with the LM III, established a

roadmap for matching demand to appropriate federal, state and local programs, facilitating the integrated provision of public services in rural areas, helping farmers initiate restoration activities within a logical framework, and potentially guiding future PES and PEMC-related decision-making; (iii) Riparian forest restoration was institutionalized in the State Government's Multi-year Development Plan (PPA, 2008-11) as a critical strategic environmental element with the potential for funding support from carbon credits or voluntary compensation and has similar status in the State's new draft PPA (2012-2015); and, (iv) the Project was the stimulus for the "Riparian Areas Communication" tool designed to register and monitor the status of riparian areas on private properties. Farmers must indicate when registering that they understand the need to preserve such lands and that they will at minimum, leave them unutilized and under regeneration. This register now contains some 400,000 ha. See Annex 2.

3.6 Summary of Findings of Beneficiary Survey and/or Stakeholder Workshops

3.6.1 Beneficiary survey: A semi-structured survey of diverse project stakeholders (Kanashiro and Fonseca/SMA, 2011) showed that: (i) the PRMC contributed to a body of important legal norms, regulations and public policies, while incorporating concerns about forest sustainability into the strategies of numerous public and private institutions across sectors; (ii) interviewees were generally very positive about key instruments developed for diagnosis, selection of technologies and monitoring of restoration areas; (iii) the harvesting of native species seeds for restoration faces constraints associated with lack of local skilled labor, financial and structural issues. Similarly, while nurseries producing native species seedlings also face many constraints, the supply situation improved markedly over the course of the Project and is now projected adequate to reforest the potential 1.0 million ha in an estimated 63 years, not the 200 years projected at the start of the decade; and (iv) while 62% of farmers interviewed said they had been introduced to the Project via SMA's partnership with CATI, implying that such partnerships are good for local network building and the capillarity of public programs, 90% of farmers understood "the Project" as the Demonstration Projects, i.e. SMA had not conveyed directly/effectively to farmers, the Project as precursor of a large-scale, future restoration program.

3.6.2 PES Workshop: This workshop (held in March 2011) and financed under Component 1, attracted some 360 PES specialists, public authorities and interested private stakeholders from many states. It provided a forum for comparing PES efforts underway in Sao Paulo with PRMC support and in many other states. Despite being relatively recent, the Brazilian experience is rich with examples at different scale (from micro-catchments to entire states), different contexts (from frontier forests to the peri-urban areas of big cities such as Sao Paulo), and in approach (including direct payments by users, sales to carbon markets both voluntary and regulated, and government funds). An evaluation of the impact of the PES pilot project (known as *Mina de Agua*) is being conducted under the follow-on Sustainable Rural Development and Access to Markets Project. The challenge is to replicate and proportionally expand efforts in PES in order to achieve much greater impact. The case studies presented at the workshop will be published as a book, thus helping to disseminate the lessons learned. See Annex 6.

4. Assessment of Risk to Development Outcome

Rating: **Low**

4.1.1 The following factors are expected to boost sustainability: (i) legal, regulatory and planning framework - including the field-tested PES and the PEMC - supporting riparian forest restoration and wider environmental conservation; (ii) strengthened institutional relationships, notably between SMA and SAA/CATI, benefiting the longer-term sustainability and expansion of

such programs state-wide; (iii) likely sustainability/consolidation of these relationships as the PES and PEMC come onstream; (iv) project multiplier effects and impact on social capital formation; (v) local cooperatives increasing involvement in riparian forest restoration activities; (vi) adherence/sustainability promoted by the dependence of restoration activities on a specialized, locally-sourced labor force which can generate employment/income and commitment to conservation activities/vision while absorbing surplus labor from the sugarcane industry;²⁸ and (vii) the Sustainable Rural Development and Access to Markets Project financing of environmental sustainability activities, extending the reach and influence of the PRMC approach. See also 3.5.3 above.

4.1.2 This should be tempered by the following: (i) the effective participation and adherence of farmers to both restoration and the maintenance of restored areas is challenging; solutions include reduced restoration costs and more effective communications strategies to convince farmers of the economic and social benefits of restoration; (ii) effective M&E systems are fundamental to determining/predicting the likely sustainability of scaled up programs based on good data bases capturing localized demonstration and pilot activities; and (iii) while a massive audience was reached by project environmental education activities, the type and content of these activities was not optimal, and achievements were short of targets in key cases. More strategic, differentiated approaches to communicating results to segmented “markets” of stakeholders are essential and this also depends on quality M&E and dissemination.

5. Assessment of Bank and Borrower Performance

5.1 Bank

(a) Bank Performance in Ensuring Quality at Entry

Rating: **Moderately Satisfactory**

5.1.1 This rating takes into account the following: (i) innovative project seeking to capitalize on burgeoning Government interest in modern land management technologies complemented by a solid legal and policy foundation; (ii) strong technical skills mix in the project preparation team and sound conceptual and physical foundation for the medium and longer-term goals, although some aspects of the scientific and financial analysis/assumptions may have been questionable; (iii) the Project’s timeliness and strong effort to address specific, defined constraints on forest restoration/conservation through a framework of linked activities; (iv) alignment of the Project with the LM III to achieve cost savings and important synergies; (v) but, the M&E and dissemination framework was flawed; and, (vi) overall technical, institutional and operational complexity of project design affected project implementation: while *prima facie* rational and designed to be responsive to the main constraints, it operated on too many fronts simultaneously, and required a high level of institutional coordination (horizontal and vertical), technical capacity and manpower.

(b) Quality of Supervision

Rating: **Satisfactory**

5.1.2 This rating reflects the following: (i) consistently good operational and technical oversight of a difficult project, maintaining continuity despite four Task Team Leaders in five and one-half years; (ii) supervision of Safeguards policies and practices was consistent and

²⁸ This fact was noted by the NGO Pro-Terra which came to routinely use former sugarcane workers including women in its riparian forest restoration/planting teams.

satisfactory, and of financial management and procurement was regular and thorough with satisfactory outcomes; (iii) the Bank's effective collaboration in the PES formulation process with a senior Bank environmental economist providing continuous technical support to studies, field testing, seminars, legislative proposals and training; (iv) effective Mid-term Review conducted over a one-year period through a consultative process; and (v) field supervision within Bank norms through the mechanism of formal missions combined with informal supervision via multiple, shorter meetings with State project counterparts combined with other missions to Brazil, using São Paulo's locational advantage as first stop-off point for Bank missions to Brazil.

(c) Justification of Rating for Overall Bank Performance

Rating: **Moderately Satisfactory**

5.1.3 This rating reflects design issues - the multiplicity of demanding activities, unrealistic quest for measurable results on beneficiaries within a GEF operation, and inadequate Results Framework - balanced by a solid supervision performance which maintained good technical and operational oversight of the Project despite frequent turnover of Bank project team leaders.

5.2 Borrower

(a) Government Performance

Rating: **Satisfactory**

5.2.1 Government supported this Project and was firmly committed to the envisaged scale up of its key elements under the follow-on operation, and to supporting the necessary legal and regulatory framework which established the PES, the PEMC and other institutional instruments designed to facilitate/finance riparian forest restoration and SLM state-wide and at much greater scale (see Annex 2). The significance of this can only be fully-grasped in the context of the State's mega-status as Brazil's agricultural powerhouse and the potential economic downside and even the political price of supporting sweeping conservation reforms on productive lands. Counterpart funding performance was very good, in fact exceeding original estimates by some 47%. Use of State resources through access to the LM III co-financing was close to 100% of expectations. Riparian forest restoration was institutionalized in Government's environmental strategy and agenda, as reflected in its Multi-Year Development Plan 2008-2011 and new draft plan for 2012-15. The proactive State Secretary/Secretariat of Environment facilitated/promoted important policies, supported consistently good counterpart funding performance and assumed ownership of the riparian forest restoration concept. In short, Government embraced the Project conceptually, politically and institutionally and has already multiplied/leveraged the project's influence through many new/improved programs for which public funding and incentives are available.

(b) Implementing Agency or Agencies Performance

Rating: **Satisfactory**

5.2.2 The Client worked hard to execute a difficult project, the complexity of which was the direct outcome of the State's multiple concerns regarding land degradation. Joint project implementation - SMA as lead agency with SAA/CATI - was difficult but ultimately successful, representing a pioneering effort in inter-institutional collaboration and dialogue with important long-term implications for environmental conservation. Institutional teams were able to overcome technical, administrative, managerial and policy-based challenges with sustained collaboration and capacity-building, the fruits of which are benefiting the follow-on operation. The capacity and performance of SMA, after an initial period seriously hampered by lack of sufficient

technical and administrative personnel to implement a very complex project, improved steadily following restructuring in 2008/2009. The PMU went through a steep learning curve while having to simultaneously coordinate the Project, but the full mainstreaming of the Project within SMA - it was not an isolated unit of consultants – significantly enhanced local capacity. CATI's role was fundamental, leveraging its extensive rural extension experience and capillarity to bring farmers into the project and support their field adoption of the Project's core technical messages.

(c) Justification of Rating for Overall Borrower Performance

Rating: **Satisfactory**

5.2.3 The Satisfactory overall Recipient performance rating reflects the State's demonstrated, sustained commitment to the Project's core principles and vision, combined with the willingness and success of the implementing agencies and their many partners to combine forces in a way which will advance the larger-scale efforts essential to restoring riparian forests and inducing/incentivating sustainable land management state-wide.

6. Lessons Learned

6.1.1 The Project generated many lessons, the following being among the more important:

Mechanisms must be designed up front for formalizing partnerships and integrating inter-sector efforts for environmental conservation projects which experience demonstrates, tend to require shared implementation. This includes clearly-defined targets and timetables to reduce delays and erosion of interest and commitment. Such mechanisms need to be agreed between partners and tailored to their particular, inherent characteristics, including different bureaucratic, managerial and operational structures. Successful institutional partnerships, horizontal and vertical, can greatly enhance the policy and operational context and outcomes.

Monitoring, evaluation and dissemination can have a material impact on a project's ability to detect and resolve critical issues affecting immediate execution and to support future, large scale efforts. This is especially so for an experimental project with widely-dispersed activities affecting data collection, storage and usage. There is a need for early consensus on monitoring the coordination and evolution of inter-sector interventions within government: aligning objectives and targets across multiple involved institutions and groups; governing the flow of data between those entities; promoting project objectives to farmers convincingly; improving planning; and, monitoring results and impacts to detect/predict the longer-term success and sustainability of conservation efforts.

Related to this, project teams need to focus intensively on the developmental objectives of GEF operations and ensuring that key indicators adequately capture their intent and are measurable.

Further, there should be a clear distinction between pilot projects with demonstration/foundational goals vs. those needing to show the full measure of development. Expecting both puts strain on the team and is difficult to deliver/achieve. Design of the Results Framework is a critical exercise. Output indicators merit similar focus, building in flexibility depending on project evolution, while maintaining relevance to the higher-level, expected results.

The project demonstrated early on that a standardized approach to SLM and riparian forest restoration activities breeds delay and inhibits innovation. Areas for restoration need early diagnosis and flexible, adaptable packages of technical interventions formulated with a strong emphasis on cost-effectiveness and appropriateness for a selected area/region. Related to this,

building a local, specialized labor force is critical and can have a major impact on employment and income generation - including by absorbing excess labor - and in building commitment to reforestation activities/programs. In particular, tree planting activities hold potential for absorbing female and younger workers.

Traditional media can play an important role in fostering farmers' participation in and adherence to riparian forest restoration but they are not necessarily the most efficient. Careful differentiation of particular target groups for mobilization and education is essential. Innovative approaches are needed to soften resistance. It important to understand whether the farmer “does not know about, does not want or is unable to restore his riparian forest” (Plural Cooperativa, 2009) and a degree of empathy is appropriate. Information dissemination to farmers/stakeholders calls for integration with other key activities including in the field, and for more sophisticated, differentiated strategies.

Intensive support to policy-makers using field-based experiences and results is essential for the development of targeted legal and policy frameworks and builds institutional capacity. SMA staff were actively responsive to the State Government, helping through technical briefings, analytical exercises and numerous consultations - including with local/municipal governments and private sector representatives/farmers - to craft amendments to the Climate Change Law authorizing the system of Payment for Environmental Services and in supporting development of the PEMC. This process also translated into an important institution-building opportunity for SMA.

7. Comments on Issues Raised by Borrower/Implementing Agencies/Partners

(a) Borrower/implementing agencies: See Client's letter in Annex 7, Part B. The Client expressed general satisfaction with the Bank's report.

(b) Cofinanciers: N/A

(c) Other partners and stakeholders: NA

Annex 1. Project Costs and Financing

(a) Project Cost by Component (in USD Million equivalent)

Components	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
A. Policy Development	1.67	0.92	54.98
B. Support to Sustainable Forest Restoration	1.76	1.05	59.83
C. Investments in Sustainable Land Management	10.38	12.73	122.57
D. Environmental Education and Training	2.52	1.06	42.05
E. Project Management, M&E, and Information Dissemination	3.19	6.01	188.20
Total Baseline Cost	19.52	21.77	111.51
Physical Contingencies	0.00	0.00	0.00
Price Contingencies	0.00	0.00	0.00
Total Project Costs	19.52	21.77	111.51
Project Preparation Facility (PPF)	0.00	0.00	0.00
Front-end fee IBRD	0.00	0.00	0.00
Total Financing Required	19.52	21.77	111.51

(b) Financing

Source of Funds	Type of Cofinancing	Appraisal Estimate (USD millions)	Actual/Latest Estimate (USD millions)	Percentage of Appraisal
Borrower		11.77	14.02	119.11
Global Environment Facility (GEF)		7.75	7.75	100.00

Annex 2. Outputs by Component

2.1 Drawing on the project archive including the Client's Final Report (SMA, 2011) and the Mid-term Review study (Plural Cooperativa, 2009), the following summarizes the main achievements/outputs under individual components and sub-components. Table 2.1 shows main output targets by components/sub-component and end-project results.

2.2 **Component 1: Policy Development** (US\$1.67 m, 8.6% of total cost, of which GEF US\$1.06 m) to establish realistic technical, financial and economic frameworks for the future implementation of a state-wide riparian forests restoration program. New frameworks and the program itself would be based on the existing knowledge base, results of project-financed studies, and on project lessons/results. Expected outcomes included a Riparian Forest Restoration Program (PEMC), including a policy and regulatory framework supporting the development of mechanisms for inserting project beneficiaries in markets for environmental services rendered by riparian forests, and defined payment instruments focusing on the needs of small farmers. Geographic scope was expected to be statewide but with field research mostly in the demonstration micro-catchments. The targeted group included policy-makers, farmers and the state private sector.

2.3 *Sub-component 1.1: Payment for Environmental Services and other funding mechanisms*

Development of the PES was underpinned by a major effort: seminars, workshops, training, field testing, and a flexible approach capturing farmers' perceptions and fostering acceptance. Themes/topics included formulation of a PES Fund, and implementation and management of Agro-forestry Systems (SAF). Design alternatives/methodologies were tested in two micro-catchments based on local priorities and development needs: (i) water quality and monitoring systems linked to improved soil usage; and (ii) a monitoring system for measuring impact on biodiversity of improved soil use.

Studies were done to support PES systems and to prepare carbon sequestration projects: (i) adjustments to allometric equations for carbon; (ii) economic evaluation of agro-forestry systems (SAF), native forests and Protected Areas; (iii) economic costs of inserting farmers in project Demonstration Projects; (iv) research studies on structuring a PES Fund and on public perceptions of environmental services; (v) evaluation of the bio-mass of reforestation of riparian forest; (vi) criteria and procedures for selection and supervision of projects contemplating sustainable use of bio-diversity; (vii) diagnosis of areas of interest or with environmental restrictions; (viii) economic benefits of changing soil use in micro-catchments; (ix) study of the erosion potential of micro-catchments; (x) study on the correlation between the cost of water treatment for human consumption and forest coverage in micro-catchments; and, (xi) feasibility/viability of riparian forest restoration in relation to carbon credits. Studies are listed in Annex 9 and their content is summarized in the Client's Final Report (SMA, 2011).

The PES Pilot: The pilot was implemented in the catchment area of the Piracicaba, Capivari and Jundiá rivers, through a partnership between SMA, The Nature Conservancy (TNC), SAA/CATI and the National Water Agency (ANA). This pilot, which paved the way for State Law 13.798, was designed to pay farmers who use SLM/conservation practices and improve the distribution of forest cover on their properties, thereby contributing to increased water filtration, reduced erosion and sedimentation, and increased biodiversity. The Recipient's Final Report (SMA 2011) explains that most such schemes world-wide have adopted mechanisms for negotiation and

payment based on pre-established prices defined according to diverse factors including opportunity cost. The Project tested an alternative “reverse auction”, an economic instrument which could be applied to negotiated values. This is a little-known instrument which lacks a track record in Brazil but has been applied for many years in other countries. Following rules under ANA’s Incentives Program for Water Producers, farmers selected projects from three categories: (i) soil conservation; (ii) ecological restoration in Areas of Permanent Preservation (APP); and (iii) conservation of forest fragments. Participation was entirely voluntary and farmers could get relevant training from CATI. Payments were through a contract with the farmer based on a defined project, with progress monitored 6-monthly by CATI and SMA and upon which payment to the farmer would be based.

Evaluation of the PES pilot: An evaluation of the field-tested PES pilot (Iamamoto, 2010) reached important conclusions. The pilot was executed in the micro-catchments of Ribeirao do Moinho in Nazare Paulista and Ribeirao de Cancan in Joanopolis, selected for being classified as high priority areas for water production and because they integrated the 15 Demonstration Projects and were part of the LM III Project of SAA/CATI. Institutional execution used a bidding process based on rules/standards set by the Incentives Program for Water Producers and designed to select projects which could provide environmental services in soil conservation, ecological restoration in Permanent Preservation Areas, and conservation of forest fragments. The evaluation found:

- Local context is important for the adoption of economic instruments for PES;
- Given PES’ pioneering nature, pilots need to work with different beneficiaries and economic instruments appropriate to local socio-environmental conditions;
- Success of PES requires a long time horizon and should target farmers with close productive links to the land permitting the State to help generate environmental and socio-economic benefits;
- PES payments are strengthening the farmer and should be targeted to farmers with real potential to transform the environment;
- Criteria for selection of participating farmers do not appear to have taken into account locational aspects, especially of farmers located at the head of the micro-catchment (i.e., at the water production source), and low priority was given to criteria which would increase environmental services based on the scale of a micro-catchment;
- Different PES payment mechanisms are needed for different situations or distinct groups of beneficiaries;
- Additionality is a determining factor of PES success and thus it is important to evaluate the opportunity cost of a certain activity compared to PES to define competitive rates for PES and direct limited resources to areas where a real difference can be made;
- PES should be used only in areas where it can make a difference and where there are not already the technical and economic conditions to make the desired changes, i.e., only provide PES where the producer lacks the conditions to do SLM independently;
- Education and communication are crucial to PES success and should be conducted concurrently with PES activities; and
- PES projects require monitoring of social and cultural impacts, and changes at the level of the farm, catchment and landscape, and should take into account efficiency of technologies adopted for water production and which forms of PES are most efficient to guarantee continuity of SLM activities.

2.4 **Sub-component 1.2: Formulation of the State Riparian Forest Restoration Program**

This sub-component financed the design and formulation of a State Riparian Forest Restoration Program (PEMC) and implementation plan, based on proposals generated by sub-component 1.1 and other project components. Studies were done to determine state-wide priority areas for restoration and the intensity of restoration needed (depending on whether the goal was conservation of biological biodiversity or partial restoration to establish biological corridors, sustainable agro-forestry and erosion control). It also developed and tested an integrated GIS to support planning and monitoring under the PEMC, taking into account synergies between existing initiatives such as LM III.

Main achievements:

- The Riparian Forest Restoration Program (PEMC) created in 2007 as one of SMA's strategic programs, instituted by Resolution 42/2008;
- A payment for environmental services (PES) system, created through State Law 13.798/2009 (State Climate Change Policy), regulated by Decree 55.947/2010 under which the Forest Remnants Program envisaged *inter alia*, payments to conservation-willing farmers, as well as economic incentives and voluntary policies to reduce deforestation and promote environmental protection. Workshops and seminars attended by specialists from academia, the public and private sectors opened a broad discussion of the PES, most recently through the project-sponsored, national Seminar/Workshop on "Experiences in Payment for Environmental Services in Brazil" in March 2011 before project closing.
- Resolution 30/2007 establishing the "*Banco de Areas*" for forest restoration designed to identify, survey/register and disseminate information about areas available for reforestation projects, now totaling about 4,000 ha. in some 350 areas state-wide;
- Resolutions 44/2008 and 08/2008 defining criteria and procedures to implement and exploit Agro-forestry Systems (SAF), and provided guidelines on heterogeneous reforestation systems in degraded areas. These resolutions were important in introducing/permitting more flexible restoration models and alternative income generation models. The latter were seen as attracting greater farmer participation in the restoration activities. Dissemination was assessed by the MTR study as inadequate and efforts were made to improve their communication within SMA itself and to participating farmers and other project partners.
- Resolution 68/2008 establishing rules for the collection and use of seeds from the State Conservation Units. See also Table 2.1.

2.5 **Component 2: Support to Sustainable Riparian Forest Restoration** (US\$1.76 m, 9.0% of total cost, of which GEF US\$0.78 m) ensuring the development and field testing of methodologies/models for riparian forest rehabilitation/restoration, and improved market supply of native seeds/seedlings of the required quantity and quality to achieve long-term restoration goals. Expected outcomes include riparian rehabilitation systems developed and tested on farms, and seedlings production capacity improved to support future implementation of the State Riparian Forest Restoration Program. Implementation would be conducted in the five major river basins with results applicable state-wide. Information dissemination would foster adoption of results beyond the basins along with improved availability of seeds and technical assistance. The target population included farmers, the private sector, policy makers and researchers.

2.5 *Sub-component 2.1: Development and Dissemination of Technologies for Riparian Forest Restoration*

This sub-component financed adaptive research and field testing of 10 new or alternative riparian forest restoration systems in areas selected based on diagnostic studies in the 15 demonstration micro-watersheds. Project would foster inclusion of plant species of importance to biodiversity in field activities for riparian forest rehabilitation.²⁹

Main achievements:

Ten models commonly-utilized in the State of Sao Paulo were selected from the literature, but they were considered too rigid with little capacity for adaptation to local conditions. Opinions diverged as to how to proceed with some team members preferring a more flexible approach which could ultimately service demand at larger scale. The Project opted to open up the decision-making process and go with more heterogeneous, flexible methodologies depending on proximity to forest fragments and on soil conditions.

- Ten models were implemented and field tested: *plantio total*; enrichment; isolation; *adensamento*; agro-forestry systems (SAF); nucleation; use of hydrogel (water fixation); green fertilizer; management of invasive species; and, herbicide use to control grasses;
- Also tested for riparian forest restoration were: inter-planting; managed re-generation; utilization of marsh areas; and direct seeding;
- This process was supported by a monitoring plan using a project-created reference base, the Guide for Monitoring Riparian Forest Restoration in São Paulo State. Due to the newness of the areas, there were insufficient elements to validate the tested models within the life of the Project. Monitoring models created for the various technologies will provide data feedback for future validation of the 10 models;
- Legal tools: Resolution SMA 08/2008 guides heterogeneous reforestation of degraded areas, improving on existing regulations by reflecting the diversity of native vegetation by planting seedlings using alternative technologies (e.g., nucleation, natural regeneration etc). The Resolution includes the so-called “decision-making key for the restoration of degraded areas” (*chave para tomada de decisão*), a dynamic tool which can be continuously improved, and is used by specialists to diagnose degraded areas and to select the best options for restoration;
- Database developed listing 700 species showing where they occurred naturally in biomes and eco-systems state-wide, and describing their dispersion and threatened status. The goal was to geo-reference this database for internet availability;
- Many activities under Component 2 were linked to activities under Component 4 (environmental education and training), i.e. through the need to disseminate the results of the former via technical circulars/guides, and workshops designed to select appropriate monitoring indicators to capture results.
- Impressive results were achieved with the mobilization of local communities to engage in a dialogue about and direct involvement in riparian forest restoration activities whether acting jointly with local NGOs, through cooperatives, farmers and rural property owners and/or with municipal authorities. Component 3 in particular, fostered a broad dialogue about degraded lands and restoration programs. See Table 2.1.

²⁹ An official list of 1,020 threatened flora species included some 500 considered virtually extinct. The project made a concerted effort to use such species in Component 2 (increased supply of seeds and seedlings; Component 4 (development of local capacities through environmental education and training; Component 3 (rehabilitation of riparian zones); Component 2 and 5 (development of methodologies for forest management and monitoring).

2.7 **Sub-component 2.2: Support to Seed and Seedling Production** financed Regional Reference Centers for seed production in São Paulo and Mogi-Guaçu, involving small works to improve existing installations; conduct studies; strengthen three regional support units to serve as local information and support centers for local farmers and project implementation; and, support preparation of a proposal to regulate seed collection in Conservation Units.

Main achievements:

The Sao Paulo Degraded Area Restoration Base (BRAD) was renovated to provide adequate conditions for seed analysis. The State Government changed its strategy mid-stream for meeting demand for native species, deciding that large-scale seed production was a private sector responsibility/role, not public. The State's role was more correctly to guarantee minimum quality standards and genetic/species diversity, i.e., a market regulator role. Further, the general evolution of the seedling sector, some shortage of resources and other factors indicated that the second planned reference Base for Restoration of Degraded Areas (BRAD) center in Mogi-Guaçu could be dropped. The former's resources were re-allocated to strengthen the existing State structure for seed collection and processing. Further, Inter-institutional efforts resulted in Resolution SMA 68/2008, regulating the harvesting of seeds in Conservation Units (CU) and resulting ultimately in better quality seedlings of native species for riparian/other restoration.

The Project target of 3 million seedlings produced and 25,000 kilos of seeds harvested was revisited during the final supervision mission. The Botanical Institute/SMA collected and supplied to the market under the auspices of the Project some 11,545 kg of seeds (about 11.5 tons, 46% of target) and 530,000 seedlings (18% of target); investments were made in upgrading seed production research facilities including acquisition of equipment and in training seed collection technicians. A Botanical Institute/SMA survey in 2010 found marked growth state-wide in seedling production of native tree species: in 2003, production was 13.0 million of 30 native species in 55 nurseries but by 2008, annual production was 33 million seedlings (with installed capacity up to 40 million) in 100 nurseries with most producing 80 or more native species and with production concentrated in private nurseries. Perceived growing demand and a policy environment favoring reforestation were important factors (Kanashiro and Fonseca/SMA, 2011).

Seed distribution was found to need improvement. The regulation of seed distribution remains problematic and seed production is a somewhat marginal legal issue which generates inaccuracies in production data. Also, as reported by the MTR study, seedlings and seed supply in São Paulo are subject to disagreement on whether seed collection is limited by the lack of forest remnants for adequate seed collection vs. those who believe the seed supply can expand as demand grows.

2.8 **Component 3: On-the Ground Investments in Sustainable Land Management Practices** (US\$10.38 m, 53.2% of total cost, of which GEF US\$2.32 m) financed the promotion and dissemination of tested methodologies for SLM (zero-till agriculture, terracing, gully stabilization etc), and pilot restoration activities via investments on-the-ground in selected micro-watersheds. Main outcomes expected were sustainable land management practices adopted by some 1,200 farmers in 150 micro-watersheds (30 in each of the five river basins), and 15 demonstration micro-watersheds (about 30,000 ha) transformed into centers for training and dissemination of tested models, methodologies and technologies for sustainable land management practices, including the restoration and conservation of degraded riparian forests. Technical assistance would be provided by the State Rural Extension Company (CATI) of SAA, the primary implementation entity responsible for similar activities under the LM III.

2.9 *Sub-component 3.1: On-the-ground Adoption of Agro-pastoral, Sustainable Land Management Practices*

This sub-component, co-financed by the LM III and PRMC project beneficiaries, supported on-the-ground adoption of known SLM practices already tested elsewhere, e.g., zero till agriculture, green manure, terracing, fences to isolate water springs and stream margins, gully stabilization and restoration, and adoption of pasture rotation. The Project benefited from changes introduced in the Incentives Fund in 2006. Initial launching of the Fund under the LM III in 1998 saw the limited types of incentives permitted under the Soil Conservation Law versus the real demands of farmers, and inflexible percentages of financing permitted versus a more individual approach by micro-catchment had been hindering the use of the Fund under LM III. Efforts to amend the Fund had floundered because it was relatively newly-regulated and there was little enthusiasm for change. However, the State assembly finally approved a revised version in 2005, signed by the Governor in 2006, and use of the Fund accelerated sharply benefiting both the LM III and the PRMC.

Main achievements:

As described in the MTR Study (2009), this component proved challenging to implement in terms of its technical difficulty, social organization, and institutional integration. An important goal was to source execution capacity locally, e.g., organized farmer groups, and to ensure that project resources would be used in local economies. Initially, there were few local entities with the skills or structure to qualify under public management rules to become project partners. The Project had to find and train the local skills it needed, delaying key activities. Various strategies adopted included: training NGOs to contract local labor; contracting local facilitators with strong community roots in local agricultural activities; and, stimulating farmers and communities to prepare technical projects for the areas to be restored. These strategies generated positive socio-economic results but their impacts were variable due to different realities in each micro-catchment. Another challenge was the different rates of farmer adherence to the Project: in some regions there were waiting lists of farmers who already had registered their lands in the *Banco de Areas*; in others, adherence was modest. There was a difference between adherence and genuine participation, the latter suffering among communities which had not grasped the substance or significance of the forest restoration processes underway in their areas.

Lack of social organization among farmers represented a constraint on progress under Component 3, especially technical. Also, the need to innovate and lack of knowledge on the part of executing entities became a contentious issue. Generally, regions with the most innovation tended to have greater farmer participation. Lack of local skilled labor, equipment, delayed arrival of seedlings, and disease, handicapped the Project's ability to achieve coverage of the targeted area planned at appraisal. Initial difficulties in implementing and testing innovative models also resulted from the lack of institutional integration, as well as difficulties in achieving smooth integration/interaction with CATI whose systems, methodologies and agenda were already well-established. These issues resulted in higher restoration costs than anticipated at appraisal and explain at least partly, the much higher than expected costs of Component 3.

Main achievements:

- Demonstration Projects in SLM became the principal project activity and were concentrated in areas where their socio-environmental benefits could be maximized.
- CATI/SAA took the lead of this sub-component as an essential partner, providing micro-catchment plans, individual property plans (PIPs) and most of the seedlings used for

reforestation activities. CATI's existing relationships with local farmers were invaluable for introducing the new PRMC operation to them, gaining their confidence and adherence, and fostering farmers' adoption of improved agricultural practices.

- This partnership structure – SAA/CATI with SMA – generated results as follows:

Micro-catchment	Implementation (ha)	Maintenance (ha)	Cercamento (m)
Aguapei	151.13	387.62	49,522
Mogi-Guacu	43.26	70.63	1,966
Paraiba do Sul	68.82	144.63	30,871
Piracicaba/Capivari/Jundiai	40.72	93.42	6,639
Tiete-Jacare	55.88	165.22	3,691
Total:	359.81	861.51	92,689

- 317 farm properties had Demonstration Projects executed vs. the targeted 900 (35%) or about 27% of the total 1,179 farms in the 15 selected micro-catchments (of which total area is 50,000 ha);
- Some 182 micro-catchments had Micro-catchment Development Plans prepared/approved (vs. target 150) providing *inter alia*, a roadmap for future development.

2.10 *Sub-component 3.2: Pilot Projects for On-the-Ground Adoption of Riparian Forest Rehabilitation*

This sub-component financed on-the-ground demonstration units of models and activities for differentiated riparian forest restoration as an element of the overall SLM equation but also expected to benefit biodiversity conservation and test potential alternatives for income generation associated with the rehabilitation and conservation of riparian forests. Proposals for restoration subprojects were prepared by universities and research institutions and selected in a participatory manner by the PMU and project stakeholders. Implementation was contracted out to NGOs, womens' groups, associations and cooperatives. Detailed criteria were in the Operational Manual. Each of the 15 demonstration micro-catchments was to share its experiences/lessons with farmers in nine neighboring micro-catchments, so that by end-project some 150 micro-catchments and about 13,500 families would have received some exposure to alternative technologies for riparian restoration. These 15 pilot micro-catchments were also priority areas for studies under Component 1, field development and testing of new riparian models under Component 2, and activities under sub-component 4.4.

Main achievements:

- Total area of the 15 demonstration micro-catchments was about 50,000 ha: at end-project, about 401 ha of riparian forest were under restoration by the Project, as well as 262 ha via restoration initiatives under the *Banco de Areas*; other areas of restoration were financed by Petrobras, FEHIDRO and BNDES;
- There was significant overlap between sub-components 3.1 and 3.2, and the component - and the project as a whole - came to be viewed as "Demonstration Projects" (MTR Study, 2009).
- The original target of 1,500 ha restored was reduced to 500 ha mainly due to a consensus that this was sufficient to test each of the 10 model riparian restoration technologies;

- The number of families benefiting directly was lower than anticipated – 317 vs 900 due to high average cost of restoration projects, complexity of the issues faced and slower pace of execution than envisaged at appraisal;
- Lessons demonstrated the importance of involving local populations and the need for social agents to be involved in organizing farmers and especially in fostering the integration of agricultural with environmental goals/practices;
- Among other achievements: training of a local labor force in forest restoration; strengthening of farmer/community associations; experimentation with alternative, heterogeneous forest planting models; employment opportunities for local people; and expansion of social networks.

In addition to the above:

- Numerous NGOs and municipal governments are, post-closing, developing riparian forest restoration projects based on project experiences and models, while Watershed Committees and the State Government have programs for riparian forest conservation including participation by SMA in the national movement “Pact for the Restoration of the Atlantic Forest (PACTO);
- Riparian forest restoration was institutionalized in the State Government’s Multi-year Development Plan (2008-2011) as a critical strategic environmental element with the potential for funding support from carbon credits or voluntary compensation and features prominently in the new draft PPA for 2012/2015;
- Additional budget resources for municipalities which demonstrate good environmental performance is another economic incentive adopted by the State to encourage them to participate in environmental policy. Municipalities are encouraged to establish targets for the coverage of native forest - an example is the State project “*Município Azul-Verde*” which promotes the conservation and restoration of forest remnants;
- The “Green Ethanol” program, another State initiative influenced by the PRMC, is designed to foster the sustainable production of ethanol, a major product of the State of Sao Paulo. Certified agro-industries, principally the sugar/alcohol industry, have formally agreed to restore some 273,000 ha of riparian forest. This is an essential collaboration given that this industry alone utilizes 22% of all agricultural land in the State; and
- A *Banco de Areas* (BA) of lands available for forest restoration was formally established in 2007 to identify, survey, and disseminate information supporting forest restoration projects. Farmers voluntarily register private lands but with no obligation to restore them, administratively or legally. This mechanism helps intermediate people with land available for restoration activities and entities with both the financial resources and interest in investing in such projects (environmental compensation, voluntary social responsibility projects etc). The BA also supports the mapping of such areas by the public sector so that restoration initiatives can be factored into policy decisions, programs or future projects.
- *Other multiplier effects:* (i) The Municipality of Garca obtained FEHIDRO resources under its Program of Riparian Forest Restoration in the Aguapei and Peixe River Basins, while also winning a public competition under the Petrobras Environmental Program for R\$678,000 to continue such works; (ii) an NGO in Joanopolis Municipality obtained resources from the National Social and Economic Development Bank (BNDES) to restore 580 ha of riverine Protected Area in the Atlantic Forest; (iii) several producer

associations trained forest planters to restore urban areas and riparian forest at springs based on experiences under the Project, enabling them to work for FEHIDRO initiatives and the National Water Supply Company; (iv) in Jaboticabal municipality, a sugar/alcohol-related cooperative which had participated in the Project's demonstration activities is supplying specialized labor to its members interested in forest restoration; and (v) an NGO in Cunha municipality has achieved synergies between the Project and the Federal Government's "Living with the Atlantic Forest Project", expanding the territorial reach of the Project concept and methodologies. Farmers have been educated in project principles and methods, and five agro-forestry systems were implemented with project and other financing.

2.11 Component 4: Environmental Education and Training (US\$2.52 m, 12.9% of total cost, GEF US\$1.87 m) establishing the basis for more visible and effective participation of local populations in planning and implementing local/regional development and conservation activities focusing on better quality of life from the use of sustainable land management (SLM).

This important component was designed to operate over multiple fronts to overcome the lack of engagement of rural landowners and the general population with riparian forest issues, but its execution was challenging. The MTR in January 2009 noted good progress via training of well over 6,000 people through courses and workshops, and another 200,000 through distribution of the Mata Ciliar Journal and radio programs. However, recurrent complaints during the MTR seminar a year later showed that the Project was still not well-known, and not reaching producers and communities to the extent desired. Of particular concern to participants, training and educational activities should have been conducted before initiation of the Demonstration Projects (Component 3) when they might have fostered the adherence of larger numbers of farmers to project objectives. Component cost was only 42% of its original estimate. The Recipient's Final Report (2011) notes the duplication, fragmentation and redundancy of many activities under Component 4, especially in awareness-building and training plans/targets, and without any clear sense of the different "markets" for messages or the end-result desired. However, while results were less than expected in key activities, this does not reflect lack of effort to implement the massive slate of activities under this component. See table 2.1.

2.12 Sub-component 4.1: Environmental Education in Schools

This sub-component financed mobilization, awareness-building and training for school teachers on topics related to sustainable use of natural resources and its relationship to quality of life in rural and urban communities, including SLM, eco-system services, riparian forests and biodiversity conservation. Main outcomes expected included about 900 teachers trained via 30 courses in sustainable natural resources issues, including land management, and subsequently transferring this knowledge/information to students living in the 150 micro-watersheds.

Main achievements:

Outputs fell short of goals with two teacher training courses of the planned 30 completed by end-project. The reasons for this shortfall included: (i) the State Government's decision to allocate greater priority to teachers' core professional skills in numeracy and literacy - areas where the State of Sao Paulo was showing weakness nationally; (ii) the protracted and ultimately unsuccessful negotiation between the Environmental Education Department in SMA and the State Secretariat of Education to reach agreement on working with teachers of the fifth through eighth grades; (iii) the multiple activities planned and complexity; (iv) operational issues: SMA did not get adequate personnel to conduct this sub-component until 2007 when a new law instituted the

State Policy for Environmental Education and SMA's education unit was restructured. The lack of personnel and of proper planning delayed local mobilization and organization activities, and disrupted the necessary synergy/synchronization with other components such as the Demonstration Projects; and, (v) the Project's search for new tools for conservation needed matching efforts under this sub-component to act across components in a "transverse" manner, i.e., almost all project activities needed mobilization, dissemination, education and training.

2.13 ***Sub-component 4.2: Stakeholder Mobilization at Basin Level*** sought to inform, raise awareness among and mobilize individuals and opinion-making institutions on the importance of biodiversity conservation, of riparian forests and water resource protection through local workshops, community meetings, awareness campaigns, radio programs and newsletters. A database would store/provide information on SLM and riparian forest conservation.

Main achievements:

- 12 workshops (target 10) were conducted on degraded area restoration.
- Some 37 mobilization and awareness-building events were held in different locations (target 60).
- 84 social mobilization campaigns (target 24) via the "Antena Verde" radio program.
- 16 mobilization campaigns (target 24) via the Mata Ciliar Journal (bi-monthly issues of 10,000 copies).
- Database established on SLM and riparian forest restoration experiences.

2.14 ***Sub-component 4.3: Training of Project Executor Groups***

This sub-component financed training for project executors especially rural extension agents and environmental agents associated with LM III on issues such as restoration and conservation of riparian forests, and eco-system services, and to strengthen their decision-making capacity. Expected outputs: trained executors in 150 micro-catchments.

Main achievements:

- 10 courses (100% of target) for Environmental Agents in 150 micro-catchments.
- 18 advanced training courses (target 25) for technicians and professionals in environment and forestry in 150 micro-catchments.
- Courses included – under the rubric Restoration of Degraded Areas – removal of invasive plants, SAF, nucleation, PES and use of glyphosytes in restoration.

2.15 ***Sub-component 4.4: Capacity Building in SLM Practices for Project Beneficiaries***

This sub-component financed awareness raising and dissemination of SLM practices for residents, rural workers and farmers; promotion and dissemination of local models of community organization to support socio-environmental responsibility; training local communities to develop and implement sustainable income alternatives; and, train producers for rehabilitating degraded areas and in seed collection techniques. Expected outputs included people, communities in 150 micro-catchments – especially the 15 project micro-catchments – benefiting from 150 courses, each with an average 30 participants totaling 4,500; and 76 Citizenship Workshops, each averaging 20 participants, totaling 6020 people.

Main achievements:

- Achievements were well below expectations: nine courses of the planned 150 in SLM agro-systems were conducted (e.g., agro-ecological systems for cattle-raising to recuperate riparian forest, and agro-forestry systems (SAF)). Planning for these courses was delayed and they were not inserted into the Annual Operating Plan until 2009. It is not known how many farmers were trained.
- 1,500 people participated in diverse events conducted under the rubric of “Citizen Participation”.
- The Client’s Final Report (SMA 2011) attributes low execution levels to two design errors: (i) over-dimensioned number of training events for farmers; and (ii) duplication of efforts in areas where CATI was also active delivering similar courses.

2.16 Component 5: Project Management, Monitoring and Evaluation, and Information Dissemination (US\$3.20 m, 16.4% of total cost, GEF US\$1.73 m), financing the coordination, management and monitoring of project activities at the state, regional and national levels, as well as dissemination of project results and lessons at the state, regional and local levels. A Monitoring and Evaluation system would be developed for ongoing evaluation. Outcomes expected: (i) Effective participation, including financial support, of government sector institutions, civil society, and the private sector in interventions associated with sustainable land management, especially the restoration and conservation of riparian forests; (ii) Project monitoring program under full implementation and where necessary, providing subsidies for gauging and improving the project implementation strategy; and, (iii) Project results and lessons disseminated through workshops, media campaigns, and the project website. Coordination, management and monitoring would occur at all levels of project execution from the State level to the micro-catchment. Implementation and dissemination would focus mainly in the area of the 15 micro-watersheds but later expand statewide and beyond. The target population was all individuals and organizations involved in project management, monitoring and information dissemination, and all potential users of the information and knowledge produced.

2.17 Sub-component 5.1: Project Management and Institutional Coordination

This sub-component financed coordination of the internal and external activities needed for project execution.

Main achievements:

- These activities were challenging, especially given the required decentralization and the need for partnerships and new inter-agency alliances - the business model was different and unfamiliar. Even within SMA, the need to work between/across departments and with decentralized units posed special difficulties.
- 910 project management staff were hired at junior and senior levels (target 456) and capacity was strengthened and consolidated.
- Equipment, furniture and vehicles were acquired.
- 6 management training courses were conducted (target 3), along with 16 training courses for technical staff (target 14).

2.18 Sub-component 5.2: Monitoring and Evaluation of Project Activities and Impacts

This sub-component financed the monitoring and evaluation of project implementation and progress towards achieving objectives. It would be supported by specialized consultancies and

participatory evaluation seminars and was considered of primary importance for institutional development, inter-sector coordination and project success, through the feedback process and database development over time.

Main achievements:

- M&E was initially slow/challenging to launch but improved markedly over time with many high quality analytical products generated, disseminated and utilized (see Annex 9).
- However, M&E needs to be a continuous focus from project preparation on and the design of indicators needs great care. M&E is critical to the evolution of scaled up programs over time and can impact on virtually all project activities in a project of this nature.
- The MTR resulted in certain agreed revised targets and design changes. The study was a year late but its important results and recommendations were successfully disseminated at a major seminar in 2010.
- A final evaluation (Kanashiro and Fonseca/SMA, 2011) of excellent quality was produced.

2.19 ***Sub-component 5.3: Information Dissemination***

This sub-component financed the dissemination of project activities, results and lessons learned to stakeholders and the broader public.

Main achievements:

- Dissemination events, media campaigns, publications and a project Website.
- Wide range of publications – guides, manuals and reference papers - targeting both the lay and technical public.
- Regional and state seminars, symposia and workshops.
- The Project brought to prominence and promoted a discussion about the economic value – monetary or otherwise – of eco-system services, i.e., the benefits that eco-systems generate and which are appropriated by society. This discussion in turn resulted in a new legal-institutional basis permitting the creation of the PES.
- A “Guide for Monitoring Reforestation for Restoration” was published in 2010, a manual in simplified language designed to facilitate the observation, evaluation and if needed, intervention in reforested areas including by non-specialist technicians.

2.20 **Summary of selected technical studies for improving the efficiency and effectiveness of riparian forest restoration:**

- **System for monitoring agro-forestry systems (SAF):** The objective was to develop a method for monitoring forest restoration projects based on SAFs. The study details a set of indicators along with recommended monitoring frequency. Guidance was provided to SMA technicians on how to use this method.
- **Development of indicators for monitoring nucleation:** Since *nucleation* was a relatively new technique compared to other restoration strategies such as *plantio total* indicators were developed to monitor its use. A series of ecological indicators were analyzed with recommendations for their field application.

- **Design for a system to monitor the impact of improved soil use on local biodiversity:** The study produced recommendations/guidance on how to prepare impact monitoring plans for biological biodiversity in PES zones.
- **Preparation of a State strategy for exotic, invasive species:** Based on this study, a database was developed on exotic invasive species in the State of Sao Paulo. A State-wide consultation of specialists helped update the list of such species, and training sessions were conducted in the subject. The National Environmental Council is preparing a state strategy based on this work.
- **Adjustment of allometric equations for carbon:** A joint team from the Forestry Institute and federal University of prana developed allometric equations on the biomass and carbon in trees planted for re-forestation of riparian and other areas, helping to effort to quantify environmental services provided by forests: the role of trees as consumers of carbon contributing to reduced levels of atmospheric CO₂. Information generated for this study will support policies and programs designed to promote restoration through the allocation of financial resources from state carbon credits (associated with achieving the emissions reduction targets established under the PEMC).
- **Economic evaluation of SAFs in native forests:** This study evaluated the legal, technical and economic/financial viability of exploiting native forest species in Sao Paulo, considering their lumber and non-lumber potential. The study looked at: nature of the market; selection of species and macro-localization potential in Sao Paulo. Models and technologies for forest management of selected species were proposed. Information was included on silvicultural activities for each species selected considering different models. Also presented were types of management and an estimate of the production cycle foreseen for each of the models and scenarios proposed by the study, along with an evaluation of their financial viability. The risks and opportunities in each case were defined from the viewpoint of state farmers who will in the final instance take the decision about planting native species on their land, and from the perspective of the government and society in general, represented by SMA as the primary catalyst for this process.
- **Diagnosis of areas of interest or with environmental restrictions:** This study started with a survey of activities conducted by family farmers in such areas, based on secondary data. The diagnosis also involved technical assistance, rural extension, teaching and research agencies, as well as farmer organizations active within the study territory with capacity to support the quality of the information collected and contribute to identifying innovative agricultural activities or those with positive impact on regional natural resources. Information was analyzed and recommendations presented on new agricultural activities and practices whose adoption could be promoted by SMA through partnerships with other institutions/entities, governmental or not. This study was done for the Alto Paranapanema catchment area and complemented implementation of the project as well as serving as a reference for diagnoses in other State regions.
- **Structuring a Fund to pay for environmental services:** This study focused on analyzing different scenarios and preparing recommendations to create a State Fund for Payment for Environmental Services, contemplating various arrangements in regard to legal, financial, operational and governance characteristics/structure.
- **Study of the potential for erosion in micro-catchments and study of the economic benefits of changes in soil use in micro-catchments:** These two studies combined

generated information to establish criteria for developing a PES associating the ecosystem functions of riparian forests and the use of conservationist practices to contain erosion and reduce the sedimentation of water. In addition, it established scenarios for the use and cover of land as a function of its greater or lesser capacity to conserve soils. These studies will support the implementation of PES programs and projects.

- **Field tests of alternative designs for PES mechanisms (reverse auction):** Most PES systems world-wide aiming to promote good environmental practices have adopted mechanisms based on pre-fixed prices defined according to diverse factors including opportunity cost. The Project tested a reverse auction mechanism, an economic instrument which can be applied to the negotiation of values to be paid under a PES system. This is a little-known mechanism with scant experience in Brazil but commonly used in other countries for many years. This study presented a theoretical review of other initiatives using reverse auctions in other countries. It also included the results of two simulations of reverse auctions conducted in two regions of the State and supported the future implementation of a PES.
- **Viability of riparian reforestation projects and related areas (tampao) envisaging the generation of carbon credits:** This study looked at the proposal and evaluation of the viability of reforestation projects associated with commercial activities in *tampao* areas capable of generating carbon credits. Proposals took into account environmental, social and economic conditions needed for their exploitation.

2.21 **Project costs and co-financing:** As shown in Table 2.3 below, total project cost was US\$19.52 million at appraisal and US\$21.77 million at closing, an overrun of about 11.5%. While Components 1, 2 and 4 were just 55%, 60% and 42% of their appraisal estimate respectively, Components 3 and 5 exceeded their original estimates by 23% and 88% respectively due to a combination of US Dollar/Real exchange rates, domestic inflation in the costs of materials and equipment, and under-estimation at appraisal of the costs of restoration activities. Exchange rate fluctuations also contributed to the dollar-denominated GEF Credit being 102% of appraisal, at Closing. The GoSP counterpart contribution exceeded the appraisal estimate by some 47% for the same reasons cited above. Cost containment for Component 3 activities is a repeating theme in supervision and other reports.

2.22 The co-financing element (designated in the Recipient's Final Report as GoSP/World Bank – see Table 2.3) was 99% of its initial estimate. The value shown as co-financing in the table was used by CATI to execute sub-components 3.1, 3.2 and 4.3 of the GEF project without any new responsibilities or rules. The only change was that PRMC beneficiary farmers were not governed by any limitation on the number of seedlings they could access (under LM III, the limit was 2,000 per farmer). The Client's Final Report notes that in agreement with the Bank, co-financing resources were never shown in project reports since they were being monitored through the Bank's supervision of the LM III. Monitoring of the relevant CATI activities just appeared as an indicator of physical achievement for the PRMC. Even though the co-financing was mostly an accounting mechanism, the physical activities were well-coordinated between the two projects and the involved institutions. Demonstration Projects were obliged to be installed in LM III micro-catchments, and any micro-catchments selected by the PRMC were automatically included by CATI in its activities; most seedlings were provided by CATI and technical staff from both SMA and SAA worked jointly. Micro-catchment Plans and Farm Plans prepared by CATI were reviewed to ensure inclusion of the environmental dimension and riparian forest elements. CATI played an important role in mediating with farmers to bring them into the PRMC for purposes of the Demonstration Projects.

Table 2.2: Project Output Indicators, Targets and Actual by end-Project

Activities by Component/Sub-component	Unit	Target	Actual
Component 1: Policy Development			
<i>Sub-comp 1.1: Payment for Environmental Services and other funding mechanisms</i>			
1.1.1: Conduct studies to support on-farm decisions	# Reports	11	11
1.1.2: Conduct studies on macro-economic management instruments	# Reports	9	11
1.1.3: Seminar on environmental services	Seminar	2	6
<i>Sub-comp 1.2: Formulation of a State Riparian Forest Program (PEMC)</i>			
1.2.1: Studies to indicate priority areas for riparian forest restoration, to formulate ecological corridors	# Reports	1	3
1.2.2: Develop and test integrated monitoring system for riparian forests in one watershed	System implemented	1	1
1.2.3: Structure a riparian forest monitoring unit with the use of SIG	Monitoring unit	1	1
1.2.4: Formulate a State Riparian Forest Program	Program	1	1
Component 2: Support to Sustainable Forest Restoration			
<i>Sub-comp 2.1: Development and validation of forest restoration methodology</i>			
2.1.1: Conduct adaptive research to propose riparian forest restoration models in 10 pilot units within 5 watersheds	# Projects # Reports	10	10
2.1.2: Conduct diversified research in 4 pilot areas	# Reports	4	3
<i>Sub-comp 2.2: Support seed collection and production of native species seedlings</i>			
2.2.1: Establish two Seed Reference Centers and support restoration of degraded areas in municipalities of Mogi-guacu and Sao Paulo	# Centers	2	1
	Tons seeds	25	11.5
	# associated nurseries	20	na
	# Reports	4	na
2.2.2: Implement three Regional Support Units for the Project	# Units	3	0
	# Reports	4	0
2.2.3: Prepare a proposal to regulate seed collection in Conservation Units – working group formed	Minutes of meetings	6	18
	# Reports	3	4
Component 3: On-the Ground Investments in Sustainable Land Management Practices			
<i>Sub-comp 3.1: Investment in agriculture and pasture areas</i>			
3.1.1: Adapt Micro-catchment Plans (MCP) to project implementation	# Plans approved	150	182
3.1.2: Carry out actions contemplated in MCP	# MC with conservation practices	150	182
<i>Sub-comp 3.2: Implementation of Demonstration projects for riparian forest restoration</i>			
3.2.1: Select pilot Micro-catchments	# Micro-catchments	15	15
3.2.2: Review MCP and prepare basic plans (BP)	# PB	15	15
3.2.3: Implement Demonstration Projects for riparian forest restoration	# Projects	15	15
3.2.4: Prepare annual monitoring reports	# Reports	60	31
Component 4: Training and Environmental Education			
<i>Sub-comp 4.1: Formal environmental education</i>			
4.1.1: Purchase equipment to support Component 4 activities	Set of computer, sound and image equipment purchased	1	1

4.1.2: Carry out Environmental Education Training courses	# Courses	30	2
4.1.3: Prepare Thematic Video Collection “Biodiversidade Paulista”	# Videos (5 titles)	765 copies	1 video, multiple copies
<i>Sub-comp 4.2: Mobilization and dissemination to stakeholders and populations in catchments</i>			
4.2.1: Workshop on degraded area restoration	# Workshops	10	12
4.2.2: Conduct campaigns for mobilization and social awareness – traveling events	# Events	60	37
4.2.3: Campaigns for social mobilization - “Antena Verde” radio program	# Bi-monthly programs	24	84
4.2.4: Conduct campaigns for mobilization and social awareness – Mata Ciliar newspaper	Bi-monthly issues of 10,000 copies	24	16
<i>Sub-comp 4.3: Qualification of Environmental Agents (project executors)</i>			
4.3.1: Conduct training courses for Environmental Agents	# Courses	10	10
4.3.2: Training courses for technicians and professionals in environment and forestry (advanced)	# Courses	25	18
<i>Sub-comp 4.4: Training for sustainable management of micro-catchments</i>			
4.4.1: Basic training courses for degraded area restoration	# Courses	10	13
4.4.2: Training courses for producers, residents and regional workers (advanced)	# Courses	25	30
4.4.3: Training courses for income generation (org. agriculture, beekeeping, food and nutrition)	# Courses	150	9
4.4.4: Training events for citizen participation and formation (Palavra de Mulher, art education workshops)	# Workshops	76	37
Component 5: Management, Monitoring and Evaluation, Dissemination of Information			
<i>Sub-comp 5.1: Project coordination and management</i>			
5.1.1: Consolidate and strengthen project management staff	Jnr techs hired Admin employees hired	240 216 (456 total)	910 total
5.1.2: Strengthen management units with equipment, vehicles and furniture	Set computing equipment Notebook Set field equipment Set furniture Sedan vehicles Van vehicles	6 2 5 10 5 1 (29 total)	91 total
5.1.3: Management training	# Courses for management team	3	6
5.1.4: Individual courses for staff technicians	# Courses	14	16
5.1.5: Software development maintenance	Software	1	1
<i>Sub-comp 5.2: Project monitoring and evaluation</i>			
5.2.1: Monitor project impacts in three micro-catchments	# Reports	8	5
5.2.2: Monitor actions conducted under other components	# Reports	2	14
5.2.3: Mid-term Review and <i>ex-post</i> project assessments	# Reports	2	2
5.2.4: Local evaluation seminars in micro-catchments with Development Plans	Local seminars	20	18
5.2.5: Conduct project assessment seminars	Seminars	2	4

<i>Sub-comp 5.3: Information dissemination</i>			
5.3.1: Strengthen SMA's publishing and dissemination staff	Set computing equipment	1	1
5.3.2: Disseminate materials to project beneficiaries and to general society	Folders, bulletins, posters	Na	37
5.3.3: Conduct media campaigns at local and state levels	Campaigns	2	2
5.3.4: Create and update a Project Webpage	Webpage	1	1
5.3.5: Conduct regional and state seminars for project dissemination, to share experiences/information	# Events	5	16
5.3.6: Conduct a national seminar for project dissemination and information sharing	# Events	2	2

Table 2.3: Types of Incentives financed by LM III under the Co-financing Arrangements

A. Incentives: Component 2
Mudas (Doacao)
B. Incentives: Component 3
Abastecedouro Comunitario Tipo I e II
Adubo Verde – Aquisicao
Associations: Plantio Direto
Basins: Caixa de Captacao
Calcario Agricola
Cercas: Protecao de Vocorocas
Cercas: Protecao Mananciais
Cercas: Protecao Mananciais - MO
Controle de Vocorocas
Controle Erosao- Tractor Pneu/Esteira
Distribuidor de Calcario
Distribuidor de Calcario: Tracao Animal
Escarificador
Faixas de retencao
Fossa Septica
Manutencao 1° ano (APP)
Rocadeira
Rocadeira Costal
Semeadora Plantio Direto – Tracao Animal
Sistema de Divisao de Pastagens
C. Incentives: Component 4
Associacoes - Informatica

Table 2.4: Project Costs by Component and Cost-sharing - Appraisal vs. Execution by End-of-Project

Comp ³⁰	GoSP			GoSP/PEMH ³¹			Beneficiaries/PEMH			GEF			Total		
	Appr.	Exec	%	Appr.	Exec	%	Appr.	Exec.	%	Appr.	Exec.	%	Appr.	Exec.	%
1	614.20	65.87	10.72	0.00	0.00	0.00	0.00	0.00	0.00	1055.00	851.83	80.74	1669.20	917.70	54.98
2	710.30	351.84	49.53	270.10	274.93	101.82	0.00	0.00	0.00	777.90	425.18	54.66	1758.30	1051.95	59.83
3	71.00	35.23	49.62	6852.50	6821.19	99.55	1142.10	1754.94	153.67	2317.70	4115.53	177.57	10383.30	12726.89	122.57
4	430.60	430.60	7.53	213.00	180.15	84.58	0.00	0.00	0.00	1872.40	845.40	45.15	2516.00	1057.95	42.05
5	1468.90	4347.71	295.98	0.00	0.00	0.00	0.00	0.00	0.00	1727.00	1667.01	96.53	3195.90	6014.72	188.20
Total	3295.00	4833.05	146.68	7335.60	7276.27	99.19	1142.10	1754.94	153.67	7750.00	7904.95	102.00	19522.70	21769.21	111.57

³⁰ Values by sub-component are not available. The Financial Management System used up to the 2007 exercise was the SAFF (Physical and Financial Monitoring System). Monitoring effected by SAFF showed financial execution by component and sub-component only for the GEF Credit. To obtain data by sub-component since 2006 would have entailed a laborious exercise which the recipient did not have manpower to perform.

³¹ Values for this column and the next beneficiaries/PEMH refer to expenditures co-financed by resources from the LM III implemented by CATI/SAA. Part of these resources were applied in micro-catchments through the direct intervention of GEF Credit resources: Component 2 (seedlings), Component 3 (sub-component 3.1 on-farm SLM), and Component 4 (Information Technology for associations).

Annex 3. Economic and Financial Analysis

3.1 The PRMC combined activities financed by GEF with activities financed from a World Bank loan under the Land Management Project ("PEMBH"). The GEF financed-activities included most of Components 1 (policy development), 2 (support to sustainable riparian forest restoration), 3.2 (pilot projects for on-the-ground adoption of riparian forest rehabilitation), 4 (environmental education and training), and 5 (project management, monitoring and evaluation, and information dissemination). The PEMBH financed component 3.1 (on-the-ground adoption of agroforestry sustainable land management practices).

Reduction in cost of restoration

3.2 The economic analysis in Annex 3 of the PRMC PAD conducted a cost-effectiveness analysis of the activities financed by GEF, focusing primarily on the activities to be conducted under component 3.2, and summarized the results of the Economic and Financial analysis conducted for the PEMBH PAD of the activities in component 3.1. As the PEMBH (LM III) ICR has already conducted a detailed economic and financial analysis of its activities, which were found to be both economically and financially viable (with an ex-post IERR of 27% compared to an estimate of 19% at appraisal), and robust to changes in assumptions, this annex focuses solely on the GEF-financed activities.³²

3.3 The economic analysis in the PRMC PAD is primarily a cost-effectiveness analysis from GEF's perspective. The main issue of concern in such an analysis is whether the proposed activities would be a reasonably cost-effective way for GEF to achieve biodiversity objectives. This is usually accomplished by comparing their cost to some kind of benchmark value, either of riparian restoration elsewhere, or to other biodiversity restoration activities. Instead, the PAD focuses on the potential for the project to reduce the high costs of riparian restoration, which would make future restoration efforts much cheaper. As São Paulo has about 1 million ha of riparian corridors in need of restoration, even a small reduction in average costs could have a substantial impact on total costs of a statewide restoration campaign. The PAD cites average restoration costs of US\$1,000-5,000/ha prior to project implementation, and used an average of US\$2,000/ha (about R\$5,200/ha at the time) in its calculations (p.82). At the time, restoration was undertaken almost solely using a technique called *plantio total* in which vegetation in the plot to be restored is completely cleared, and the plot is then planted with trees. The work was always done by contractors.

3.4 In principle, the PRMC could have reduced restoration costs either by reducing the costs of the *plantio total* technique, or by developing cheaper restoration techniques, or both. The PRMC focused primarily on piloting cheaper restoration techniques that could be used instead of *plantio total*. Table A3-1 shows the average cost of implementing each technique used in the project, across the project's sites, as reflected in the value of the contracts issued to local farmers' associations to implement them.

3.5 Several aspects of these data should be noted. First, contracts for restoration work were awarded on a single-source basis to local farmer organizations. Payments for each technique were based on a payment formula (*planilha*), based on expected input levels, labor requirements, and other parameters. This approach clearly provides very little incentive to contractors to reduce

³² Although not clearly-stated in the PRMC PAD, the internal rate of return (IRR) estimate applied only to the Component 3.1 activities that were actually LM III activities (sustainable land management). It is not possible to provide an IRR for the GEF-financed portions as benefits were not measured – only costs – as is typical with GEF projects. The PRMC PAD was incorrect in labeling its IRR estimate "for the project as a whole", and the estimate may have been taken from the LM III PAD.

their costs. Second, the choice of technique and its costs of implementation vary based on the characteristics of the areas to be worked on. Some of the differences in costs shown in the table thus reflect differences in the areas being worked on rather than differences in the costs of the techniques themselves.

Table A3-1: Average costs of riparian restoration techniques implemented under the PRMC (R\$/ha)

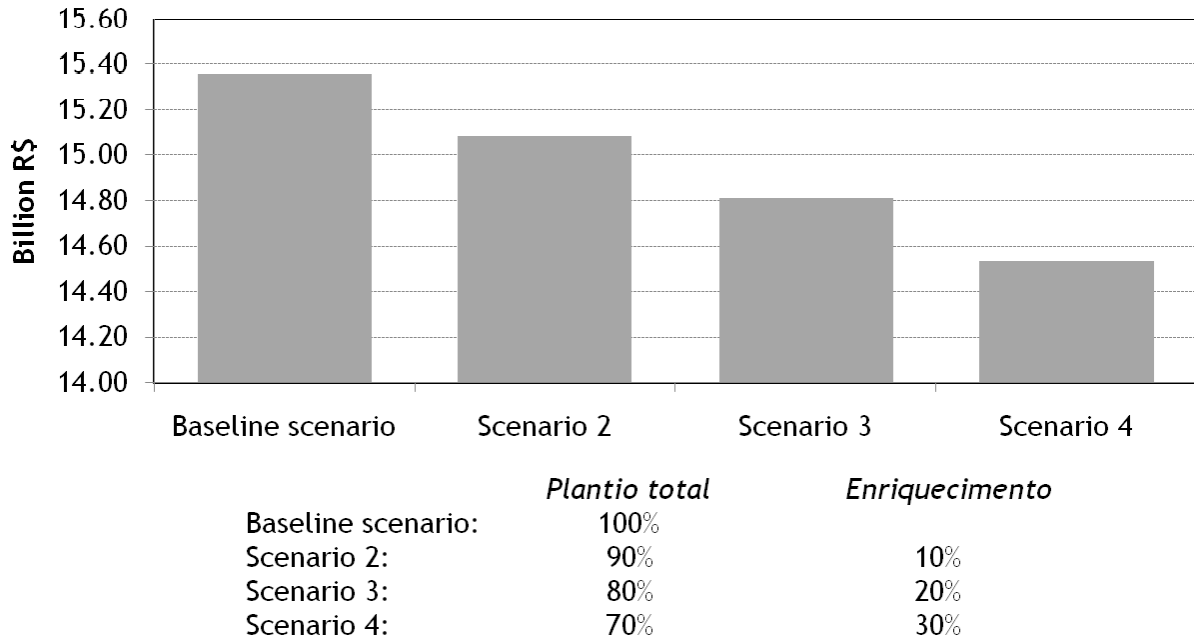
<i>Technique</i>	<i>Establishment</i>	<i>Initial maintenance</i>	<i>Value of seedlings</i>	Total	<i>% of plantio total</i>
Adensamento	2,600	4,400	600	7,600	89
Enriquecimento	2,400	4,400	200	7,000	82
Nucleação	2,800	5,000	600	8,400	97
Plantio total	3,400	3,200	2,000	8,600	100
Semeadura direta	3,300	400	0	3,700	43

Note: Agroforestry systems (SAF) were also implemented in several cases, but there was too much variation for a meaningful average cost to be estimated.

Source: PRMC data, via SMA

3.6 Based on these data, the most attractive of the new techniques is *semeadura direta*, which costs less than half what *plantio total* would cost. *Adensamento* and *enriquecimento* provide more modest savings of 10-20%, while *nucleação* provides virtually no savings. It should be noted that not all techniques will be applicable in each case. In particular, *plantio total* is likely to remain the primary option for the most degraded areas.

Figure A3-1: Projected costs of a statewide riparian restoration program



Source: SMA projections, based on PRMC data

3.7 Even though the savings achieved are relatively modest in per hectare terms, they can result in substantial total savings given the large area requiring restoration in São Paulo. Figure A3-1 shows the impact that the availability of the new techniques would have on the estimated cost of a statewide riparian restoration program, based on the cost estimates in Table A3-1. The

projections are based on estimates of the degree of degradation of riparian corridors in each basin (UGRHI). The baseline case reflects the strategy that would have been adopted prior to the PRMC, with *plantio total* being used in all areas needing restoration. The alternative scenarios assume that *plantio total* is used in the most degraded areas and that *enriquecimento* is used in the less degraded areas. Depending on the degree to which the alternative techniques can be used, savings of several hundred million reais can be realized. If 30 percent of riparian zones can be restored using *enriquecimento*, for example, the savings on a statewide restoration strategy would be about R\$0.8 billion. These estimates are conservative; to the extent that techniques such as *semeadura directa* could be used on at least some of the areas to be treated, total costs would fall even further. These techniques could also be used in neighboring states facing similar problems, generating additional savings there.

3.8 In addition to testing new techniques, the PRMC was also hoping to test whether farmers could undertake restoration themselves at a lower cost than contractors. This effort was stymied during the course of the project itself, however, by legal constraints that barred SMA from making direct payments to landholders. Thanks in part to the PRMC’s support to the development of a state policy on Payments for Environmental Services (PES), this constraint has now been lifted. This change will benefit future restoration efforts, but came too late to benefit the PRMC’s work on the ground. How much of a cost reduction this will provide remains to be seen.³³

Development of Payments for Environmental Services

3.9 The economic analysis in the PAD did not attempt to estimate the benefits of the PRMC’s support to the development of a statewide PES strategy under component 1. As the PAD stressed the potential for GEF funding of PRMC to leverage substantial additional funding, it is worth noting that the initial US\$1.1 million from GEF for component 1 activities has already helped attract financing from TNC and the PCJ Comite de Bacia for the Produtores de Água no PCJ pilot in Nazaré Paulista and Joanópolis; and (b) a R\$5.0 million (some US\$3.0 million) commitment from the state for the Mina d'Agua PES pilot being implemented in 20 pilot municipalities statewide, as well as additional in-kind contributions from local municipal authorities. There are also good prospects for significant additional funding for this strategy in future years. As noted, this approach may well also result in additional cost reductions for restoration.

3.10 Research conducted under PRMC and PEMBH also helped demonstrate the local benefits that riparian restoration can generate. One study estimated the annual savings in terms of reductions in the cost of water treatment and dredging of reservoirs in 10 representative microwatersheds in São Paulo covering a total of about 586 km² of between R\$0.4 million and R\$0.8 million, depending on the extent of the area conserved (Cabral, 2010).

Annex 4. Bank Lending and Implementation Support/Supervision Processes

(a) Task Team members

Names	Title	Unit	Responsibility/ Specialty
Lending			

³³ A partial answer to this question will be obtained in late 2011: A survey of landholders in several areas of the state will include questions about their willingness to accept compensation for undertaking restoration. This is an outgrowth of the PRMC work on development of a PES strategy

Maria Isabel Junqueira Braga	Senior Environmental Specialist	AFTEN	Environmental
Jose Augusto Carvalho	Consultant	LCSPT	Lawyer
Tulio Henrique Lima Correa	Financial Management Specialist	LCSFM	Financial
Judith M. Lisansky	Sr Anthropologist	LCSSO	Social
Anemarie Guth Proite	Procurement Specialist	LCSPT	Procurement
Loretta Sprissler	Social Development Specialist	LCSSO	Social
Supervision/ICR			
Susana Amaral	Financial Management Specialist	LCSFM	Financial
Maria Isabel Junqueira Braga	Senior Environmental Specialist	AFTEN	Environmental
Laurent Debroux	Sr Natural Resources Economist	LCSAR	Natural Resources
Nicolas Drossos	Consultant	LCSFM	Financial
Alvaro Soler	Rural Development Specialist		Rural Development
Erick C.M. Fernandes	Adviser	LCSAR	Natural Resources
Carolina J. Cuba Hammond	Program Assistant	LCSAR	Team Support
Jose C. Janeiro	Senior Finance Officer	CTRFC	Finance
Grace Menck De Oliveira Figuero	Junior Professional Associate	MNSEN	Project Analyst
Marta Elena Molares-Halberg	Lead Counsel	LEGES	Lawyer
Anemarie Guth Proite	Procurement Specialist	LCSPT	Procurement
Karen J. Ravenelle-Smith	Senior Executive Assistant	GFDRR	Team Support
Timothy S. Valentiner	Junior Professional Associate	LCSAR	Project Analyst
Luciano Wuerzius	Procurement Specialist	LCSPT	Procurement
Diana Rebelledo	Language Program Assistant	LCSAR	Team Support

(b) Staff Time and Cost

Stage of Project Cycle	Staff Time and Cost (Bank Budget Only)	
	No. of staff weeks	USD Thousands (including travel and consultant costs)
Lending		
FY04	8.86	54.73
FY05	10.23	70.85
Total:	19.09	125.58
Supervision/ICR		
FY06	11.11	58.81
FY07	12.84	69.02
FY08	15.88	73.03
FY09	19.54	92.96
FY10	8.72	57.70
FY11	7.97	61.59
FY12	na	na
Total:	76.06	413.11

Annex 5. Beneficiary Survey Results

5.1 The project financed many high quality studies, including a final impact evaluation, and a study capturing perceptions of public policy on the environment, the concept and practices of riparian forest restoration, and of the idea of payment for agricultural services (PES). The

following summarizes main conclusions from the end-project evaluation. The full slate of studies is available on the project Website <www.ambiente.sp.gov.br/mataciliar>

Evaluation of the Effectiveness of the Riparian Forests Restoration Project in the State of Sao Paulo (Kanashiro and Fonseca/SMA 2011)

5.2 The objective of this study was to define and document the changes which had occurred in riparian forest management in Sao Paulo as a result of the GEF project. It was not intended as an exhaustive analysis but directed at certain project initiatives and at the efficiency of the instruments adopted and tested by stakeholders. The guiding question was whether important concerns surrounding forest conservation had been addressed and whether the instruments developed had been or were being incorporated in public policies actually being implemented by the State. A large number of farmer associations, cooperatives, NGOs, regional project coordinators and technicians, involved research entities, CBRN regional centers and the Project Management Unit were interviewed by the study team, which included the Bank. The study considered only the Project's final results, and used the Strategic Analysis of Environmental Management (SAEM).

Principal Results

(a) Development of public policies for Riparian Forest restoration

I: Laws related to riparian forest restoration:

- The study notes that not all legal instruments can be attributed exclusively to the GEF which was one of several actors, but frequently the proponent, convening agent, catalyst and organizing force;
- The Project contributed to legal and regulative norms in three categories: those related to project operation and management (9); innovation-related, establishing new methodologies for convening the State, municipalities and civil society for implementing riparian forest methodologies (11); and regulation/improvement of existing laws to include riparian forest concerns (13);
- Among the 11 innovative norms creating new disciplines to promote riparian forest restoration:
 - (i) *Banco de Areas para Recuperacao Florestal (SMA 30, 2007)*: to identify, register and disseminate information about areas available for restoration to persons or institutions interested in or legally obligated to restore forests. An estimated R\$1.0 million were applied in four years of its existence, financing the recovery of about 92 ha, modest in relation to the 3.4 million ha now available through the "bank" for restoration but viewed by the evaluation as a promising avenue for future cost-sharing of restoration activities;
 - (ii) *Riparian Forest Communication (SMA 42, 2007)*: register of riverine areas of permanent preservation (APPs) stimulating farmers and rural landowners to inform SMA about the situation of riparian areas under their control;
 - (iii) *Voluntary Restoration Communication (SMA 42, 2007)*: instrument to reduce bureaucratic and financial barriers for those interested in voluntary reforestation;

- (iv) *Strategic Riparian Forest Project (SMA 42, 2007)*: forerunner of the State Riparian Forest Program;
 - (v) *Strategic Project for Green Municipalities*: seeking decentralization of environmental policy, with economic incentives for municipalities with good environmental management policies;
 - (vi) *Regulation to Implement Agro-forestry Systems (SAF) including in APPs*: The evaluation concludes that this norm did not contribute significantly to increasing areas being restored and its procedures were not established until the second semester of 2010, too late to have much impact within the Project. However, it introduced SAF legally in protected areas, an advance for the recuperation of degraded areas;
 - (vii) *Regulations for Seed Collection in Conservation Areas (SMA 68 2008)*;
 - (viii) *Induced demand* for projects financed by the State Water Resources Fund (FEHIDRO) in 2009, to revitalize water catchments (CRH Deliberation 95, 2009);
 - (ix) *Inventory of emissions from voluntary planting of forests* for partial or total compensation of gas emissions (SMA 30, 2009);
 - (x) *Targets for riparian forest restoration in municipalities* participating in the Waters Pact, a commitment by municipal mayors to improve water quality and availability associated with the World Water Forum of 2009;
 - (xi) *State Climate Change Policy, via the Forest Remnants Program*, fostering forest demarcation, restoration and preservation: this institutionalized new instruments via the GEF project including economic (PES) (State Law 13.798, 2009). The first project under this law was the Pilot *Mina d'Agua* designed to protect water springs.
- The Project supported the incorporation in State legislation of concerns about forest sustainability, and provided incentives for alternative, facilitating methodologies and shared management. While not all these new norms are attributed exclusively to the Project, it was a primary catalyst in most cases;
 - This body of legislation was innovative even by Federal standards, and SMA sought consultations with specialists and partnerships with public and civil society organizations to keep improving it.

II: Tools for diagnosis, selection of technologies and monitoring of restoration areas:

- The Project helped to create two instruments: the “Decision-making key for restoration of degraded areas” and the “Guide for monitoring reforestation for restoration” working with SMA’s Botanical Institute and Forest Institute and universities.
- The “Key” was evaluated by SMA technicians, NGOs, and private specialists and institutions: 65% of those interviewed knew of the key; while 84% of interviewees who knew of it already had some experience with restoration, about 64% of those who did not know of it also had such experience; NGOs were the primary users.

- A majority of those using the Key, connected to SMA or not, said it was very helpful in diagnosing both problem and solution and contributed to development of restoration projects;
- Even though the tool was disseminated widely within SMA it was external entities involved in conservation who used it most; it was considered an effective instrument which performed the function for which it was designed but it needed constant updating to remain effective.

Bio-physical monitoring of restoration areas:

- The “Guide” was developed by the Forestry Institute/SMA due to difficulties in objectively evaluating the degree of development of restoration in the 15 Demonstration Projects and difficulties in formulating adequate indicators; the Guide enabled non-specialist technicians to observe, evaluate and if needed, intervene in restoration areas.
- The Guide was used in 13 of the 15 DPs and evaluated by 17 environmental agents.
- 94% of respondents said they had no difficulty using it and 82% said it was useful for forest management activities; 65% said the indicators were adequate for effective evaluation; 100% of agents said the Guide was a good quality instrument.
- The one weakness apart from its late publication (2010) was lack of dissemination outside SMA.

III: Seeds and seedlings of native species:

Collection of seeds in Conservation Units (Protected Areas):

- Resolution SMA 68 of 2008 contemplated improving seed collection and consequent increase in seedling quality of native forest species produced for the purposes of reforestation. CUs were obliged to follow its guidance in all respects;
- The Resolution was important in bringing the issue of seed collection in UCs to prominence, and defining how to improve quality without causing negative impacts on the UCs;
- Seed collection experiences following the new rules were scarce at the time of the evaluation and little data was available on effectiveness; in fact there were few UCs with any seed collection activities of any kind, mainly because of lack of human resources/labor for harvesting, followed by financial issues and/or the UC’s structure;
- Another reason was lack of knowledge outside SMA of the possibility of using seeds collected in UCs; the Resolution was published during a period when management plans for UCs were still being prepared and few were ready to start implementing the new norm;
- The Resolution is assessed as partially effective.

Native plant nurseries in the State of Sao Paulo:

- Some 208 nurseries were identified and registered distributed in 125 municipalities; 66% had only one nursery; only 34 nurseries had native species being produced and/or

marketed; of these nurseries, native species represented 85% of the total species commercialized;

- The Botanical Institute noted that growth in the availability of native species had occurred since 2003 and especially since 2005; in 2003, 13 million seedlings were produced of 30 species in 55 nurseries. By 2008, production reached 33 million in over 100 nurseries with most producing 80 or more native species; production was concentrated in larger private nurseries;
- These numbers do not reveal the complexity and diversity of situations; also, many nursery owners said they had difficulties increasing the number of species produced ranging from the availability of specialized labor to finding areas available to collect healthy and varied seeds;
- Some seed producers found the Resolution complex, bureaucratic and non-viable in attending the requirement for genetic variation; others had issues with the procedures for regularizing nurseries and inscription in the National Seed Register; some 85% of nurseries are not regularized or lack adequate documentation to achieve it, implying that a high proportion of seeds marketed are irregular and potentially subject to legal sanction;
- Most seeds produced and marketed are for environmental restoration under various agencies/programs; spontaneous reforestation faces many challenges and impacts negatively on those producing native species;
- Even so, the evaluation (citing Barbosa 2011) sees a supply situation adequate to reforest the potential 1.3 million ha in 63 years, not the 200 years projected at the beginning of the decade.

IV: Involvement of communities and linkages between organizations:

Partnerships and their benefits for environmental projects:

- Some 50 partnerships were evaluated, 31 with government entities, 16 with NGOs and 3 with private entities.
- Under the first category, the most notable was the partnership between CATI/SAA via the LM III project (PEMH) in all 15 municipalities with Demonstration Projects, designed to facilitate dialogue between farmers and technical assistance/rural extension teams and to provide native tree seedlings for restoration activities;
- CATI's involvement varied among the 15 micro-catchments in part due to its decentralized structure; in 44% of the DPs, CATI's involvement was complete, while in 38% it was sporadic (at least once per year), and in 18% it was occasional. In one third of DPs, CATI's involvement was "proactive" and in 60% of cases the partnership was without difficulties/regular;
- While environment and agriculture were not easily integrated, the strategic importance of the SMA/SAA-CATI partnership was crucial for rural development; the collaboration generated benefits for all concerned and – importantly – promoted an increase in social benefits perceived by local involved populations;
- The evaluation found that the LM III project achieved better results in areas where the GEF Demonstration Projects were also implemented;

- In cases analyzed, with synergy between the LM III and the GEF, public management performance improved, and environmental conservation and agricultural production in tandem were associated with better quality of life for rural populations;
- Other collaborations brought many benefits: municipal mayors were invaluable intermediaries with landowners/farmers; partnerships with higher education entities were also of high value: the Project was supported in developing restoration technologies and in the analysis of public policies (e.g., University of Sao Paulo, and the Technology Faculty (FATEC) in Jau), and in voluntary monitoring of areas under restoration;
- These partnerships with learning institutions were invaluable for the formulation, implementation and evaluation of public policies.
- NGOs were essential in developing the Demonstration Projects and in enabling the Project to work closely with farmers; benefits included their assistance with the implementation and maintenance of the DPs, the training they themselves received from the Project as well as local labor for reforestation.
- In general, partnerships with NGOs were rated excellent or good.
- Overall, partnerships helped the Project/SMA overcome identified barriers to riparian forest restoration, helped with confronting socio-educative barriers and the difficulty in engaging farmers. The SMA/SAA collaboration was especially productive, given that they both work with the same unit – the rural property;
- Partnership experiences highlighted the finding that the high costs of environmental restoration cannot be borne by small and medium farmers alone – the benefits of conservation are shared, i.e. a partnership with society.

Participation of rural landowners and NGOs in the Demonstration Projects:

- 63 farmers, 15 executive contracted organizations and with representatives of CBRN and SMA's Environmental Education Coordination were interviewed to gauge the effectiveness of local participation;
- 62% of farmers said they had been introduced to the Project through CATI/SAA and the municipal *Casas de Agricultura*, the latter contacted by SMA in all 15 municipalities with DPs to explain the Project followed by numerous meetings with farmers and local institutions;
- The conclusion is that these types of partnerships (SMA/SAA and local groups) are an excellent strategy for establishing networks, linkages and for building capillarity for public programs and enhancing local participation;
- The main motive for local actors/farmers engaging with the Project is related to natural resource conservation and socio-cultural reasons (including awareness of environmental issues, possibility of “helping the planet” etc), i.e., most farmers engaged with the Project for their own reasons and a certain sensitivity to the environmental cause;
- For the main executing entities, the primary motivation was that the Project theme was closely related to their organizational mission and the Project gave them the opportunity to grow, gain structure, and experience; local authorities saw the Project as giving them the experience to become involved in a future scaled-up program;

- 90% of farmers interviewed understood project objectives as directly related to targets for riparian forests within the DPs; none cited any knowledge of SMA's central objective to build a public policy for the longer-term, at greater scale;
- Public entities involved however, had a much broader understanding of project objectives possibly because SMA put greater effort into explaining them to local institutional players than directly to the farmers; this was possibly inconsistent with promoting riparian restoration through greater social participation; SMA could have had local institutions approach farmers with the totality of project objectives enabling them to engage more thoroughly with public policy and not only within the local context of the DPs;
- Many courses, workshops and field days were conducted for farmers and local players – farmers perceived these activities to be more about restoration than to generate mobilization around a cause; however, they also saw them as opportunities to meet local authorities and actors;
- 66% of interviewees confirmed that these events increased their knowledge of the technical aspects of riparian restoration and sustainable agriculture;
- 80% saw the events as giving project executors a better understanding of local socio-environmental problems; and 73% said they allowed the executors to meet more potential partners.
- Research showed that for most of the farmers interviewed, the possibility of continuing to participate in riparian restoration was unclear; they lacked an appreciation of the future, larger picture and thought in local terms only of the DPs;
- About half of the farmers interviewed (47%) said they would have liked to participate more in the Project – in meetings, courses, and planting activities; the evaluation highlights the sustainability potential in this statement, if the Project activities could be expanded and continued within these micro-catchments;
- Nine of 15 representatives of executing institutions said their institution had participated fully across diverse activities; the rest said they would like to have done this but their lack of structure prevented it;
- The study concludes that the intention of opening a dialogue with local society on public policy formulation was somewhat limited; the main reasons were that participation, social mobilization and environmental education were not project priorities from the beginning resulting from the fact that the planning of the Project was not compatible with the structure of SMA for project implementation, e.g., participatory planning with local actors was envisaged but it was only in 2008 that that an Environmental Education Coordination unit was structured in SMA with sufficient staff to take on this task;
- Another limiting factor was the lack of internal communication within SMA among its different units; the Project ended up being coordinated mainly by CBRN which had no history or experience in working with socio-educative issues – it was mainly a technical body; once SMA was restructured in 2009, the Project was nearing its end;
- An important lesson is for a larger scale program to find ways of minimizing factors which limit participation; this requires integrated planning, internally and externally to

institutions involved in the Project and needs to be coherent with existing structures. Absolute clarity is needed as to the responsibilities of each sector and staff/functionary.

Effects of the Demonstration Projects (including PES):

- To evaluate whether the Demonstration Projects had multiplier effects, the evaluation studied the number of voluntary restoration projects registered in the Regional Technical Centers of CBRN and other factors;
- This showed that there was an increased number of voluntary restoration projects in areas where there were Demonstration Projects³⁴ implying also differentiated distribution of the direct benefits of reforestation as well as differences in popular absorption of the riparian forests “theme”.
- This carries over into the experience in implementing the PES Pilot;
- An initial evaluation of the impact of adopting a PES system on farmers’ intentions in providing/supplying areas for permanent preservation and riparian restoration showed an increase in the area available for restoration following adoption of the PES compared to before; this indicate that the PES mechanism had an impact on the tendency/willingness of farmers to provide areas for restoration;
- The evaluation lists numerous examples of independent, voluntary restoration activities, already mentioned in Annex 2 and the Main Text and constituting evidence of strong multiplier effects.
- An important multiplier impact is seen in the Project’s alliance with FEHIDRO in 2009 whereby 20% of its 2009 investment budget (some R\$10.0 million) would be reserved for the revitalization of water catchments. FEHIDRO gave priority to requests for financing from projects in locations with a predominance of small family farms and in priority areas for biological corridor formation, thereby associating with Project strategies favoring restoration on small properties in priority catchments for biological conservation.

Recommendations:

(a) Conceptual aspects of public environmental management:

- It is the responsibility of Government - but not solely - to promote the importance of the environment, within an inclusive view of development not restricted only to economic growth;
- Shared conflict resolution is essential, and the roles/responsibilities of partners should be clearly delineated and understood by all stakeholders;
- Bureaucratic rules should be clear, training is essential for all stakeholders, and the maintenance of restored areas should be shared by local players with the property owner;
- NGOs associated with public projects need to carefully follow strategic planning directives, ensure their work is well-founded and establish productive partnerships;

³⁴ This was a project goal. Ten additional restoration “clients” were expected to arise from the areas around each DP.

- The State needs sufficient human resources to achieve its environmental tasks and to offer incentives to retain project teams and avoid discontinuity and delays;
- The use of standard “packages” of technologies in completely distinct areas is unrealistic;
- Popular support is fundamental to publicly-managed projects; and
- Lessons and recommendations of biodiversity conservation need to be reported and disseminated.

(b) *Alternatives for obtaining financial resources:*

- Various alternative sources of financing for forest restoration exist: (i) Fehidro – resources for diagnosis, planning and recuperation based on Basin Committee priorities; (ii) PRONAF (National Program for Family Agriculture) which invests in agro-forestry systems and related activities; (iii) other programs such as Produsa (program to Stimulate Sustainable Agro-livestock Production, BNDES (National Development Bank) Forestry, various foundations and firms such as Petrobras.

(c) *Partnerships:*

- Partnerships are best established with entities who share the same “mission” and not advisable with opportunistic entities; the shared mission is more important than shared organizational objectives;
- The partnership between SMA and SAA resulted in an expansion of the benefits – potential and actual – perceived by rural populations;
- An even more valuable partnership would be between Education and Environment;
- Other sectors such as planning, energy, public works, health and culture should also be integrated to establish a coherent biological conservation policy;
- Synergy between institutions, intra and inter-sector, is essential for development; the cases of success where partnerships were a feature demonstrated the State’s need to develop sustainable policies closely linked to communities, and which are not extinguished when resources dry up. When other projects/programs adopt the theme of riparian forest restoration, local authorities start to join the search for new resources.

(d) *Participation:*

- Stakeholder participation in the strategic, tactical and operational stages of a project tends to strengthen its medium and longer-term effects;
- Non-profit organizations perform best when they have a formal structure, formal goals but informal activities: e.g., non-bureaucratic socio-environmental organizations; and farmer associations with standardized working plans but under external oversight such as rural extension agencies;
- The social mobilization initiated by the Project, according to 47% of beneficiaries interviewed, is a high quality input promoting sustainability or expansion of biological conservation projects;

- Larger scale riparian forest restoration programs need to minimize factors limiting participation; this requires integrated planning and coherence with existing structures for project execution;

(e) *Communication, information and education strategies:*

- Subjective factors, e.g., sympathy, empathy, confidence and attention can be more important for establishing the basis for a dialogue and the involvement of farmers in a project than technical factors directly related to the main theme (environmental conservation); socio-educative approaches need to be incorporated in planning training for technical teams;
- There is still much work to be done to include educational instruments in public policies for conservation; while regulations and economic instruments have made notable advances, the major potential of information instruments has not been exploited. Such instruments could introduce economies and efficiency into conservation programs;
- Communication instruments need greater use: communications plans, press agents, to ensure capillarity of activities;
- Communication has to be seen as an intrinsic part of project management, and where the opening of space by divulging selected content strengthens and improves management and integrates various publics in the effort to reach targets;
- Instruments without a dissemination plan have little chance of success.

(f) *Monitoring and evaluation of activities:*

- Planning for M&E systems must flow from the objectives and targets established in the initial stages. Well-designed objectives simplify the task of selecting parameters and procedures. This is especially important for complex projects like the GEF;
- Delaying the consolidation of an M&E plan leads to loss of the “productive logic” of activities;
- Monitoring is a critical part of project execution and permits periodic corrections;
- Evaluation enables the project’s lessons to be learned and permits the sound use of resources;
- Permanent monitoring systems should be participatory, involving those directly responsible for results; organized procedures for collecting and processing information should be under consideration from the conceptual phase and throughout the project cycle;
- Importantly, the monitoring of results and impacts should continue well beyond project completion/closing.

Annex 6. Stakeholder Workshop Report and Results

No formal report was prepared following the PES Workshop in March 2011 but proceedings and recommendations are currently being compiled in a book in Portuguese, Spanish and English for publication. The following is a summary of informal reports on this Workshop.

6.1 **PES Seminar, March 2011:** The objective of this workshop – which attracted some 360 PES specialists, public authorities, beneficiaries and interested private stakeholders from many states and was financed under Component 1 - was to provide a forum to compare efforts underway in many states to pilot/scale up variants of PES mechanisms. Despite being relatively recent, the Brazilian experience is rich with examples at different scale (from micro-catchments to entire states), different contexts (from frontier forests to the peri-urban areas of big cities such as Sao Paulo), and in approach (including direct payments by users, sales to carbon markets both voluntary and regulated, and government funds).

6.2 There are some distinct differences in the Brazilian experience from its peers in Latin America: (i) While most PES mechanisms in Latin America use flat payments per hectare (generally distinguishing different soil uses with different payments), almost all PES systems in Brazil use a formula to determine payments. Thus, payment levels tend to be more exact proportionally to the expected benefits; (ii) Brazilian PES mechanisms have conducted a lot more prior research than the vast majority of other Latin American countries, but have limited the focus to estimating the benefits of changes in soil use among desired benefits, e.g., a map of erosion risk is not the same as an erosion reduction curve. In relative terms, there has been little focus on how to “sell” environmental services to users; and (iii) The approach known as “Forest Pocket”, for paying landowners differs substantially from the universal practice of making payments on a per hectare basis. Many analysts observe the difficulty in utilizing PES in frontier forests such as Amazonia. The “Forest Pocket” approach is an option for overcoming this limitation and should be carefully studied.

6.3 Further, procedures adopted in many PES pilots in Brazil show high technical quality but are frequently very complex, making it difficult to increase/expand scale in proportional terms. Technical quality needs to be reconciled with administrative execution and with cost: (i) Most PES pilots are based on detailed environmental management plans prepared by a technical team for each PES participant which becomes very costly and a major burden for the technical team; and (ii) Payments are frequently divided into several parts – in some cases they are monthly (in contrast, virtually all PES mechanisms in other Latin American countries make a single payment). In many cases, each payment is linked to an inspection. Here too, high costs are incurred.

6.4 Methodologies for monitoring and evaluation of most PES pilots are also weak. An evaluation of the impact of the PES pilot project (known as *Mina de Agua*) is being conducted under the Micro-catchment II Project. In Sao Paulo and the rest of Brazil, the challenge is to replicate and proportionally expand efforts in PES in order to achieve much greater impact. Replication is already underway (the Oasis Project in Apucarana in the State of Parana) and Sao Paulo is using the lessons of its pilot project in Joanopolis and Nazare Paulista (developed by the GEF) as the bases for the design of a much larger project, the *Mina de Agua* Project (to be developed under the Micro-catchment II Project).

6.5 Next steps include (i) case studies prepared by seminar participants covering a standard list of questions, to be compiled into a book for publication in English, Portuguese and Spanish; (ii) a virtual discussion group – to be established online also - was established to continue the dialogue especially on problems encountered by practitioners; (iii) various institutions have offered to be the location for future, similar meetings to exchange experiences and lessons. Future events are envisaged exploring key issues in greater depth.

Annex 7. Summary of Borrower's ICR and/or Comments on Draft ICR

A. Executive Summary: Recipient's Final Report (Informal Translation)

7.1 The Riparian Forest Restoration Project (PRMC) proposed to understand and resolve the difficulties in recuperating riparian forests in the State of São Paulo. Thus, its principal objective was to develop instruments, strategies and methodologies to enable riparian forest restoration and other similar initiatives, statewide and long-term. The PRMC was initiated in 2005 with a credit from the Global Environment Facility (GEF) and resources from the State Government of São Paulo, and closed in April 2011.

7.2 The PRMC was integrated with other projects and programs, including the Micro-catchment Program (Land Management III Project) of CATI/SAA (PEMH) and had participation of various units within the State Secretariat of Environment (SMA), in addition to counting on various partnerships to develop its activities. Project implementation involved direct interventions in five priority considered representative for the development of studies and proposals for the State as a whole.

7.3 To restore riparian forests, a joint effort is needed between government and society which covers a series of activities across vary diverse fronts, seeking the sustainable use of natural resources. With this direction, the PRMC developed, among others, activities such as information dissemination, social awareness-building and training for different social actors. Their focus of activities (components) were: (i) development of public policies; (ii) support to sustainable restoration activities; (iii) demonstration projects; (iv) training, environmental education and skills-building; (v) management, monitoring and evaluation, and dissemination. The most important results and lessons learned are listed below by theme.

Overall Results and Financial Execution

7.4 Results indicators show that, despite the challenges encountered, the main expected results were achieved (see items 2^a and 2 B and see Annexes 1 and 3 of the Final Report (SMA 2011)). The PRMC depended on resources from different sources to execute its activities. GEF funding was valued at US\$ 7.75 million, and SMA financing totaled US\$ 3.29 million. The Project also had co-financed resources totaling US\$ 7.33 million from the CATI/SAA Land Management III Project (PEMH). In financial terms, it can be confirmed that the PRMC showed excellent results, closing with GEF resources reaching 102% of the original total (US\$/Real exchange fluctuations). This demonstrates that the Project constantly overcame difficulties, mainly by improving the compatibility of public administration procedures with those of the Bank, and in improving instruments for supervision, monitoring and control of PRMC activities and through the reallocation of resources.

2) Economic and institutional aspects related to the restoration of riparian forests

7.5 *A. The Sustainable Rural Development Project (PDRS):* A portion of the results of the PRMC contributed to the preparation and execution of the PDRS. This project envisaged supporting the economic, social and environmental sustainability of family agriculture seeking to reconcile business development/entrepreneurship with nature conservation. Among its various activities, the PDRS supports the restoration and conservation of riverine Permanent Preservation Areas (APPs), fundamental for environmental equilibrium. The Project is structured so that small rural proprietors have access to markets, and that these benefit them in a manner which values the

farmer as an individual and an environmental actor who effectively has the greatest influence over the management and environmental quality of his property. The role which the PRMC had in supporting initial development of PES in São Paulo is continuing under the PDRS.

7.6 *B. Payment for Environmental Services (PES):* The PRMC furnished the basis for preparing the State decree 55.947/2010, regulating the Forest Remnant Program (FRP) created under the State Climate Change Policy (PEMC, created by State Law 13.798/2009). The FRP envisaged payment for environmental services (PES) to conservationist rural landowners, as well as voluntary economic and political incentives to reduce deforestation and protect the environment. Thus, it was due to the PRMC that the State came to have the possibility of paying farmers who conserve or restore forests, especially riparian forests.

7.7 Also in regard to PES, one of the results of PRMC activities was Resolution 123/2010, defining the rules for executing the *Mina D'água* Project – Project for Payment for Environmental Services, under the water source protection item, within the Forest Remnants Program. This project is designed to protect water supply springs. Another important result was the implementation of the PES pilot called the Water Producer Program (Programa Produtor de Água), with resources from charges for water usage in the river valleys of Moinho and Cancan (municipalities of Nazaré Paulista and Joanópolis, São Paulo). The project envisaged payments to rural producers who contributed to increasing the filtration of water and for the effective combatting of erosion, sedimentation and increase in biodiversity through conservationist practices and management techniques, as well as improved distribution of forest cover inlandscapes. This project was the product of a partnership between the SMA, The Nature Conservancy, the Secretariat of Agriculture and Supply (SAA), and the National Water Agency (ANA). Introduction and wideranging discussion on this theme of the PES was promoted through diverse technical events involving specialists from academia, the public sector and interested groups from general society. Examples include: “Workshop on Payment for Environmental Services and Water Use” (2005); and, “1st Sao Paulo Seminar on Payment for Environmental Services” (2009). More recently, in March 2011, a Seminar and Workshop were conducted on “Experiences in Payment for Environmental Services (PES) in Brazil”.

7.8 *C. Production of studies:* Also noteworthy was the production of studies permitting, based on their application, improved efficiency in efforts to restore riparian areas whether by adopting more suitable technical practices in each case, improving different technologies and their application, reducing the costs or time involved in restoration, or whether through improving results. Examples include:

- a) Systems for monitoring SAF (agro-forestry systems)
- b) Development of indicators to monitor nucleation
- c) Preparation of a State strategy on exotic invasive species
- d) Adjustments to allometric equations for carbon
- e) Economic evaluation of SAFs and native forests
- f) Diagnosis of areas of interest or with environmental restrictions
- g) Structuring of a Fund for PES
- h) Study of the potential of erosion in micro-catchments and study of the economic benefits of changes in soil use within micro-catchments
- i) Field tests of alternative designs of PES mechanisms (reverse auction)
- j) Feasibility of riparian and buffer area reforestation projects envisaging generation of carbon credits

7.9 *D. Legal Instruments:* Various norms were created through activities of the PRMC, being useful tools for public policies; besides those described earlier, others are also noteworthy: (i) Resolution SMA n° 30/2007, which instituted the Bank of Areas for Forest Restoration under the Riparian Forest Project; (ii) Resolution SMA 08/2008, providing guidelines for heterogeneous reforestation of degraded areas; (iii) Resolution SMA n° 44/2008, defining criteria and procedures for implementing agro-forestry systems (SAF).

3) Forest Restoration – Riparian Forests

7.10 *A. Demonstration Projects:* Among the field activities, including the physical execution of restoration projects and activities related to the adoption of sustainable soil management practices, certain results are notable. Some 317 farm properties had demonstration projects implemented. The demonstration projects functioned like a laboratory for the application of various models for the restoration and consolidation of methodologies for recuperation which could be replicated under different initiatives. Various techniques were implemented such as adensamento, nucleation, zero tillage, enrichment, natural regeneration, SAF and direct seeding. Some 360 ha were planted, 861.51 ha were maintained, and 92,688.6 meters of fencing installed. Practical and theoretical knowledge of restoration evolved. In social terms, especially impressive results were achieved in community mobilization to promote their engagement in the recovery of riparian areas. Results also involved the formation and strengthening of local networks and the technical and administrative improvement of partner agencies, executive entities and farmers, resulting in the insertion of these organizations in a new working network.

7.11 *B. Models implemented and tested in the field:* The following models were implemented and tested in the field: *Plantio total*, Enrichment, Isolation, Adensamento (increasing forest density), SAF, Nucleation, Use of Hydrogel (for water retention), Green Fertilizer, Management of Invasive Species, and Use of herbicide for control of elephant grass. This enabled both the evolution of the use of alternative technologies and stimulating their adoption, as well as the preparation and improvement of tools. Among those, we note the “Key for decision-making for the restoration of degraded areas” which facilitated the preparation of technical-executive projects for restoring degraded areas.

7.12 *C. Seeds and seedlings:* One of the PRMC targets was to get involved in issues related to the regional supply of seeds and seedlings. To understand the scenario of organizations involved in the production of seeds and seedlings of native species, a diagnosis of nurseries in Sao Paulo was conducted. The main result was the notable increase in the supply of seeds and seedlings in the past 5 years. However, it is still necessary to improve the distribution of seeds.

4) Environmental Education

7.13 Among the activities which envisaged strengthening and increasing the participation of local populations in planning and activities in conservation and environmental recuperation, based on the idea of sustainable development, the following were included: training of educators, technicians and farmers; community mobilization and training for citizenship; and the generation of diverse instruments for training, mobilization and dissemination. These last items are particularly important for multiplying among students, teachers and the general public, the principles and knowledge relating to the restoration of riparian forests.

5) Dissemination of Information

7.14 The dissemination of information involves different strategies such as technical events, training, publications and the digital portal. Throughout this project, diverse events and meetings were promoted with the participation of about 9,000 people. In addition, various publications were prepared and or printed and disseminated throughout the period of the PRMC, destined for both the technical and lay public. There were also results associated with the availability of resources advanced for the management of riparian areas and natural resources more generally, such as satellite images of part of the State Territory to support areas for the geo-referencing and enforcement activities of SMA.

6) Management and Coordination

7.15 The decentralization envisaged by dividing the PRMC into components imposed a huge challenge. In addition, the PRMC was conceived in a way to be linked as much internally and inter-institutionally. A structure based on partnerships, while bringing benefits – such as the exchange of information and experiences – also needed adaptation in the management of the Project, resulting in a distancing of some collaborators. The preparation and carrying out of a project generates essential learning whose fruits are the strengthening of management capacity of the PMU members. This is evidenced from the results achieved, as well as the execution of 100% of resources available.

7) Monitoring and evaluation

7.16 The monitoring of activities and results was done in an unsatisfactory way during the initial phase of the project but improved and was performed well by end-project. Since preparation of the monitoring plan was delayed, its implementation was not easy in the sense that information was not easily retrieved and results applied/utilized. However, valuable lessons were extracted and effective evaluation concluded, which ought to be incorporated in new programs and projects. According to the mid-term review (MTR) evaluation, even though there were difficulties in its execution, the PRMC made important contributions to the establishment of technical, methodological and policy foundations (institutional, administrative and legal) for the State program to restore and conserve riparian forests. The existence of these programs and the percentage increase in native forests in Sao Paulo show that the PRMC has contributed to generate impacts and positive externalities. A series of recommendations were made; a major part have already been noted during the MTR between the PMU and the Bank which took place before the consultancy was contracted. According to the final evaluation of the PRMC, the project provided an important advance in longer-term ends: to strengthen the development of tools and mechanisms to facilitate the restoration of riparian forests, in this way contributing to the reduction and reversal of degradation of lands in the State. Related to this is the way in which the knowledge generated by the PRMC was absorbed by other, larger policies and projects.

8) Positives impacts of the PRMC and potential for expansion of results

7.17 In evaluating the effectiveness of the PRMC, in general the project was positive according to the different stakeholders approached for their views. Below are some of the positive impacts mentioned by them:

- Promotion of an increased popular and governmental knowledge concerning the importance of riparian forests;

- Preparation and dissemination of instruments for planning and monitoring areas under restoration;
- Creation of the legal and normative which instituted information and economic instruments;
- Integration with research institutions which promoted/was favorable for the technical-scientific foundations of project activities and products;
- Expansion of the dialogue at the local level;
- Stimulated partnerships;
- Construction of synergistic relationships with other projects, programs and institutions which created the conditions for sustainability;
- Renovation of expansion of activities for riparian forest recuperation in the catchments where the project was active;
- The PRMC stimulated and promoted local social mobilization, and included the participation of executor entities in the demonstration projects;
- Expanded the use of management tools and improved instruments for monitoring and control of physical and financial periods and execution of the project, internalizing a new culture of project management for SMA staff;
- Brought technical and administrative teams closer to develop work programs and project activities.

9) Principal lessons learned

7.18 An important result was the incorporation of various lessons learned into the PDRS, conducted by SAA in partnership with SMA. The lessons learned and instruments developed were incorporated in the design of the PDRS and the Forest Remnants Program of the PEMC. Besides this, one of the programs in the PPA 2012/2015 will directly reflect the results and conclusions of the PRMC. The relationship between SMA and CATI technicians was better-defined under the PDRS which ought to reduce the possibility of conflict. The teams of the two institutions are being trained jointly for project execution.

7.19 Also learned was that environmental conservation depends on the involvement of diverse social agents, trying to avoid a dichotomy between environment and agriculture. To the contrary, mutual involvement is sought. The inter-institutional arrangement can bring benefits as well as problems. To minimize problems, a strong mutual commitment should be sought (from the planning phase on) with the balanced distribution and sharing of responsibilities and activities.

7.20 It is known that many traditional instruments of public policy – especially those of command and control – do not function in isolation to promote recuperation of particular areas. In this way, stimuli to the adoption of conservationist practices through the PES incentive and through other public policy tools were shown to be highly positive.

7.21 Another lesson learned was that the planning phase in the development of projects needs to be especially valued and receive sufficient time and dedication. This is important because it will result in projects with better-defined targets and timetables, which could reduce problems with timing, the need to repeat tasks, and exhaustion.

7.22 In the original design of the PRMC, there was a large number of indicators, many of them redundant or conflicting, dispersed in different official documents (PAD, Operational Manual). This made the monitoring of targets and activities difficult. Prioritization and constant review of targets and indicators could have minimized this effect.

7.23 Even in the original design, many activities were excessively detailed before starting project execution. It would be more productive to not detail initially so many activities proposed (in quantity, depth, basic/advanced, and in so many sub-divisions of types of events and courses for example, but rather to better-define different target populations/groups and the expected results from the interventions. Such detailing could be done throughout the project through constant evaluation to model activities more realistically.

7.24 In regard to the monitoring and evaluation of projects: concern over the formulation of a monitoring and evaluation plan with their projects and indicators to monitor results should be present since the formulation of the intended project objectives, during the execution of action plans, and finally, for impact evaluation. It is also important that the results and impacts of projects are monitored beyond their formal/financial closing. This applies as much to technical management, as to administrative and financial management. The PRMNC showed that it is important to develop and maintain a good stock results, intended for dissemination and to be incorporated in other similar experiences.

7.25 The principal lessons in forest restoration are linked to participatory regulation which considers all segments in regulations/norms capable of promoting improved restoration of degraded areas, stemming from a better understanding of and consideration for biodiversity in restoration processes.

7.26 It was important to learn that the engagement of rural landowners is not a major obstacle to the recuperation of riparian forests, as was assumed initially. The development of projects with technical assistance, developed with the participation of local actors was a functional strategy to incentivate farmers' adherence to environmental conservation initiatives.

7.27 Another aspect identified was the importance of preparing a diagnosis of the area where work is to be conducted to guarantee the success of recuperation. This is because it creates essential support for the adoption of the best interventions possible (with the optimization of resources) including taking regional differences into account.

7.28 Another important lesson on restoration was to identify the importance of specialized labor being locally-sourced, in this way generating income and employment as well as commitment to the conservation tasks, and excess labor from other industries such as sugar-cane, can be utilized.

7.29 There was also an evolution in theoretical and practical knowledge of restoration resulting from the demonstration projects, e.g., use of SAF on small farms including inter-planting with short cycle crops.

B. Client's letter commenting on the Bank's draft ICR:



SECRETARIA DE ESTADO DO MEIO AMBIENTE
COORDENADORIA DE BIODIVERSIDADE E RECURSOS NATURAIS
UNIDADE DE COORDENAÇÃO DO PROJETO DE
RECUPERAÇÃO DE MATAS CILIARES

Prezado Erick Fernandes,

O relatório apresentado é bem completo e explicativo, compreendendo os principais resultados e alcances do PRMC.

A Secretaria do Meio Ambiente, por meio da Gerência Executiva do PRMC, concorda com o teor apresentado.

Gostaríamos de ressaltar o que segue:

O PRMC impulsionou a criação de ferramentas de políticas públicas, a pesquisa de metodologias, assim como a adoção de práticas que juntas irão facilitar a restauração em larga escala de matas ciliares degradadas.

Um aspecto importante foi a construção de relações sinérgicas com outros projetos, programas e instituições, que criaram condições de sustentabilidade. Um destaque importante é a incorporação de várias lições aprendidas durante o PRMC no planejamento e implantação do Projeto de Desenvolvimento Rural Sustentável (PDRS), conduzido pela SAA em parceria com a SMA.

O caráter inovador do PRMC esteve presente na criação de bases legais e de normas que instituíram instrumentos econômicos. O PRMC exerceu um papel fundamental para que o estado de São Paulo passasse a contar com a possibilidade de pagar por serviços ambientais a proprietários rurais que conservem ou recuperem florestas, em especial matas ciliares. Isso porque o PRMC forneceu os subsídios para a elaboração do decreto estadual 55.947/2010, que regulamentou o Programa de Remanescentes Florestais (PRF) criado pela Política Estadual de Mudanças Climáticas (PEMC), criada pela Lei Estadual 13.798/2009. O PRF prevê o pagamento por serviços ambientais (PSA) aos proprietários rurais conservacionistas, bem como incentivos econômicos a políticas voluntárias de redução de desmatamento e proteção ambiental.

Os efeitos positivos das ações realizadas durante a vigência do PRMC permanecerão após o término de sua execução, pois vários de seus objetivos foram de longo prazo e grande abrangência.

Cabe ressaltar que as realizações do PRMC foram possíveis pelos recursos disponibilizados, mas também pelo apoio e orientação constantes da equipe do Banco Mundial.

São Paulo, 18 de outubro de 2011.


Daniela Petanon Kunitschik
Gerente Técnica do PRMC


Helena Carrascosa von Glahn
Gerente Executiva do PRMC

Annex 8. Comments of Cofinanciers and Other Partners/Stakeholders

N/A

Annex 9. List of Supporting Documents

Project Appraisal Document, Report No. 32151-BR

GEF Credit Agreement

Supervision Aide Memoires

Implementation Status Reports (ISR)

Annual audit reports

Financial Management Supervision Reports

Procurement Post-review Reports

Implementation Completion and Results Report: Land Management III Project – Sao Paulo, Report No. ICR0000676, June 1, 2009

Recipient's Final Report (SMA 2011)

Mid-Term Review Study (Plural Cooperativa, 2009)

Final Evaluation: Avaliacao da Efetividade do Projeto de Recuperacao de Matas Ciliares do Estado de Sao Paulo, (Kanashiro and Fonseca/SMA, Sao Paulo 2011)

Perception Study: Monitoramento Socio-economico e de Percepcao Ambiental em Micro-bacias Piloto: Projeto de Pagamento por Servicos Ambientais (Intituto Terra Mater/SMA, 2009)

Estudo sobre Beneficios Economicos da Mudanca do Uso do solo em Microbacias

(See also Appendix 1)

Appendix 1:

Other Studies financed by the Project:

- Ajustes de Equações Alométricas para Carbono
- Avaliação Econômica de SAFs e Nativas Florestais
- Análise de Possíveis Fatores Condicionantes do Sucesso na Restauração de Matas Ciliares
- Avaliação do Processo de Implantação de Projetos Demonstrativos para a Recuperação de Matas Ciliares
- Estudo sobre Sistema de Monitoramento de SAF
- Elaboração de Estratégia Estadual sobre Espécies Exóticas Invasoras
- Elaboração de Projetos de Capacitação em SAF (Sistema Agro-florestal)
- Uso de Herbicidas na Recuperação de Áreas Ciliares (Parte 1)
- Caracterização da Importância Relativa das Áreas de Preservação Permanente
- Contratação de Serviços Técnicos de Consultoria para Elaboração de Critérios e Procedimentos
- Contratação de Serviços Técnicos de Consultoria sobre Políticas Públicas
- Diagnóstico de Áreas de Interesse ou com Restrição Ambiental
- Estruturação de um Fundo para Pagamento por Serviços Ambientais
- Estudo sobre Potencial de Erosão em Micro-bacias
- Testes em Campo sobre Desenhos Alternativos de Mecanismos de Pagamento por Serviços Ambientais
- Viabilidade de Projetos de Reflorestamento Ciliar e Áreas Tampão, visando a Geração de Créditos de Carbono
- Desenho de Sistema de Monitoramento dos Impactos que Melhorias no Uso Agrícola do Solo podem ter na Biodiversidade Local
- Lei No. 13.798/2009 – Política Estadual de Mudanças Climáticas – PEMC (Programa de Remanescentes Florestais)
- Chave para a Tomada de Decisões para a Recuperação de Áreas Degradadas: Modelagem para Restauração
- Avaliação de Três Formas de Enriquecimento em Área Ciliar Revegetada junto ao Rio Mogi-Guaçu SP
- Avaliação Florística e de Aspectos da Estrutura da Comunidade de um Reflorestamento com dois Anos e Meio de Implantação no Município de Mogi-Guaçu, São Paulo
- Dinâmica de População Arbórea em Eco-unidades de Cinco Fragmentos de Floresta Estacional Semi-decídua no Interior do Estado de São Paulo e Consequências para a sua Conservação
- Diagnóstico e Avaliação da Produção de Sementes e Mudas no Estado – Análise do Diagnóstico de Viveiros e de Produção de Sementes Setorial
- Vídeo Documentário: “Mata Ciliar – Uma Experiência Socio-ambiental”
- Programas de Rádio: Sintonia Verde (84 programas para 120 estações)
- Estabelecimento de Critérios, Metodologias e Roteiros de Avaliação para Análise de Projetos de Recuperação de Matas Ciliares em São Paulo
- Caderno da Mata Ciliar 1: Preservação e Recuperação das Nascentes de Água e Vida
- Caderno da Mata Ciliar 2: Estimativa de densidade de biomassa potencial com uso de SIG no Estado de São Paulo
- Caderno de Mata Ciliar 3: Espécies Exóticas Invasoras
- Caderno de Mata Ciliar 4: Monitoramento de Áreas de Recuperação
- Caderno de Educação Ambiental: Matas Ciliares
- Dietrizes para Conservação e Restauração de Biodiversidade
- Guia de Peixes de Água Doce: Ameaçadas de Extinção no Estado de São Paulo
- Manual de Recuperação de Matas Ciliares para Produtores Rurais

- Manual de Recuperação de Vegetação de Cerrado
- Matas Ciliares e o Meio Ambiente Rural
- Nos Caminhos de Biodiversidade
- Referencial de Conceitos e Ações de Restauração Florestal: Pacto pela Restauração da Mata Ciliar
- Restauração Ecológica: Sistemas de Nucleação
- Roteiro para a Elaboração de Projetos de Recuperação Florestal para o FEHIDRO
- Sistemas Agro-florestais em Espaço Protegidas
- Transcrição e Adaptação Evento sobre PSA (PES)

Annex 10. IBRD Map 38873 – Ecosystem Restoration of Riparian Forests in São Paulo Project

