IMPLEMENTATION COMPLETION MEMORANDUM (ICM)
Revised Template version May 2007

A. BASIC TRUST FUND INFORMATION

TF Name: Formoso River: Integrated Watershed Management and Protection Project
TF Number: TF055326
Task Team Leader Name/TF Managing Unit: Judith Lisansky (LCSSO)
TF Amount *(as committed by donors):* US$974,910 (grant)
Recipient of TF funds: Fundaçao Candido Rondon (Recipient)/EMBRAPA-Soils (Executing Agency)
Type of TF: Free-standing
Single/Multi Donor: Single
Donor(s) Name(s): TF 602001
TF Program Source Code: GEFIA (GEF/IBRD as Implementing Agency)
Purpose of TF: Co-financing
TF Approval/IBTF Clearance Date: 06/27/2005
TF Activation Date: 10/12/2005
TF Closing Date(s): 10/31/2010
Date of ICM Submission to TFO: 04/30/2011

Table 1: Costs and Financing

Co-financier	**Original (US$)**	**Actual (US$)***
GEF	974,910	986,477
IBRD	----	----
Recipient	1,176,781	986,032
Other	----	30,309**
Total:	**2,151,691**	**2,002,818**

*Utilizing an average exchange rate for the project period (2006-2010) of US$1.00=Real 1.97 applied to total costs in *Reais.* See Annex D.
**FUNARBE–Project Sensor (see Section C4)

Table 2: Rating Summary

Category	**Rating**
Overall TF Outcome	Satisfactory
Overall Risk to Development Outcome	Moderate
Bank Performance	Satisfactory
Recipient Performance	Satisfactory

B. TRUST FUND DEVELOPMENT OBJECTIVES AND DESIGN

1. Original (and Revised) Trust Fund Development Objectives

As stated in the Initial Trust Fund Brief (IBTF), the project's over-riding objective was to contribute to the conservation and sustainable use of biodiversity of global importance, including agro-biodiversity, and to promote the control of land and water degradation in

the Formoso Watershed by addressing directly the identified threats to the watershed's biodiversity.

Project interventions were to focus on the relatively pristine upper/middle sections of the Formoso Watershed and would promote increased public support and participation through public awareness-building, involvement and education. The project was expected to benefit about 150 farmers with holdings of less than 100 ha - involved primarily in livestock and crop-based agriculture - and other key stakeholders in the watershed. The project was among the first three MSPs to follow the new Bank procedures on Safeguards Policies.

Specific project development objectives (PDO) were:

(i) Promote the strengthening of local environmental and agricultural institutions and communities by providing them with land-use planning tools for the formulation and initial implementation of an integrated watershed management plan;

(ii) Promote the integrated management of existing public and private protected areas;

(iii) Support the implementation of sustainable livelihood activities on a pilot and demonstrative basis that would reduce pressure on key natural resources, and rehabilitate natural habitats, particularly riparian and savannah-like vegetation.

Project objectives were not revised.

2. Original (and Revised) Trust Fund Activities/Components

Project components and activities were as follows:

Component 1: Participatory planning and management for the conservation and sustainable use of biodiversity

Activity 1.1: Development of a watershed management plan and promotion of integrated management of protected areas in the Formoso Watershed.

Sub-activity 1.1.1: Formulation of the Formoso watershed management plan
Sub-activity 1.1.2: Formulation of a strategy for integrated management of protected areas
Sub-activity 1.1.3: Formulation of detailed watershed management plans for two critical watersheds
Sub-activity 1.1.4: Harmonization of existing regulatory framework for integrated watershed management and biodiversity conservation

Activity 1.2: Environmental education and community participation

Component 2: Development of sustainable activities in pilot areas

Activity 2.1: Development of alternative activities based on the sustainable use and management of natural resources.

Sub-activity 2.1.1: Implementation of the Support Center for Rural Activities and Agricultural Production
Sub-activity 2.1.2: Transformation and use of organic solid residues
Sub-activity 2.1.3: Development of pilot units and multi-functional land use

Activity 2.2: Capacity-building and training in conservation and sustainable use of biological resources.

Component 3: Project Management, Monitoring and Evaluation and Information Dissemination.

Activity 3.1: Participatory Project Management and Organization

Activity 3.2: Project Inputs and Output Monitoring System

Activity 3.3: Project Impact Monitoring System

Sub-activity 3.3.1: Monitoring of soil and water indicators
Sub-activity 3.3.2: Monitoring of terrestrial biodiversity indicators
Sub-activity 3.3.3: Monitoring of social and economic indicators

Activity 3.4: Project Outreach and Information Dissemination

3. Outcome Indicators

(a) Expected Project Outcomes

Project activities were expected to have the following five major outcomes:

(a) An integrated watershed management plan developed with stakeholders for the entire Formoso Watershed, complemented by the development and initial implementation of two detailed plans for critical micro-watersheds, and with inputs from a project-supported strategy for the integrated management of protected areas, and an improved/harmonized regulatory framework.

(b) Sustainable development and integrated eco-system management training and education program for community members developed and implemented, and project staff from relevant agencies trained to integrate biodiversity management concepts into their routines.

(c) Pilot sustainable economic activities implemented and results disseminated, to serve as a model for reducing pressure on key natural resources.

(d) Participatory project management structure established and functioning, lessons learned, and watershed management model disseminated to other parts of the region (Paraguay, Parana, and Plata Watersheds).

(e) Monitoring and evaluation program established and project dissemination strategy finalized and implemented.

4. Other Significant Changes in Trust Fund Design

4.1 *Extension of the Closing Date:* The project closing date was extended for one year, to October 31, 2010 to enable: (a) activities integrating the Rio Formoso Watershed Plan with the development of the Bonito Municipal Plan coordinated by the Mayor; (b) integration and dissemination of project results to the Rio Miranda Hydrographic Watershed Committee, the only watershed committee in the State of Mato Grosso do Sul, with power to implement instruments for managing water resources catchment-wide; (c) project-supported planned changes in state environmental law; (d) continued monitoring of key impact indicators; and (e) consolidation of the Organic Composting Unit (UCO) and training of local operators.

4.2 *Reallocation of Funds:* The project was restructured in 2010 via a reallocation of US$140,400 from expenditure categories Goods (US$51,000) and Non-allocated (US$89,000), to Consultants (US$35,200), Operational Costs (US$73,100), and Travel (US$32,100) due to original project allocations (formulated between 2000 and 2002) not reflecting conditions on the ground in the final year of the project.

4.3 *Institutional arrangements:* The Andre Tosello Foundation (ATF) was earmarked during project preparation as co-executor of the GEF due inter alia, to its ongoing agreement with Embrapa as the financial arm of Embrapa-coordinated projects (including the Bank-supported PRODETAB agricultural research project). However, ATF went out of business and finding another foundation took time. The Candido Rondon Foundation – a competent and committed institution but less experienced in dealing with international organizations – was selected via a Bank-supervised, competitive process.

C. OUTCOME

1. Relevance of TF Objectives, Design and Implementation

1.1 The project was originally developed in the context of a large Inter-American Development Bank (IDB) loan for conservation of the Pantanal (later cancelled) and a planned Bank micro-watershed project in the State of Mato Grosso do Sul (which did not proceed due to the State's fiscal difficulties). The nearby Bodoquena National Park was created around the time of project effectiveness, helping to conserve its watershed and protected Atlantic Forest fragments. This prompted a participatory seminar/reassessment of the baseline situation of the project soon after effectiveness, but no significant changes were made to project design or arrangements.

1.2 The project's over-arching goal was to support the conservation and sustainable use of biodiversity of global importance and to promote controls on land degradation in the Formoso Watershed. The project was linked to and consistent with the 2001 Brazil Country Assistance Strategy (CAS) which sought to protect priority eco-systems while developing sustainable income generating activities for local populations using responsive, participatory methodologies. The project also complemented a series of existing and planned operations: Federal and State watershed management projects and important sub-basin-scale interventions supported by the World Bank/UNDP PRODEAGRO program; IDB-financed sustainable development of the Pantanal Region; and, other GEF operations of the period using an eco-systems approach to integrating biodiversity conservation with development, also in the Pantanal.

1.3 Project design was technically outstanding, sophisticated and operationally complex. This was assumed to be manageable given the project's anticipated close linkages to the IDB Pantanal and Bank-supported micro-watershed operations mentioned above, but in their absence this innovative pilot was "orphaned" within a different and more challenging technical and operational context to what was originally envisaged.

1.4 The project's objectives were consistent with the Bank's follow-on Country Partnership Strategy (CPS, 2007-2011) which targeted greater support for protected areas, sustainable agriculture in deforested areas, and natural resource-based growth through the sustainable use of resources. The project could also be considered a vanguard for Strategic Objective #4 of the proposed new draft CPS (2012-2015) - the "green" pillar on Sustainable Resource Management and Conservation - which is focused on protected areas and biodiversity conservation, clean agriculture and livestock productivity, integrated water resource management, and sustainable environmental management.

1.5 Project preparation analyses showed that without the project, the conservation of natural habitats with relatively stable or intact conservation status would remain largely dependent on the existing state environmental management system which was severely under-budgeted and lacked an effective legal framework, strategic plan or an effective management strategy to conserve and sustainably use biodiversity. Interventions up till that time mostly targeted licensing and enforcement systems with little/no consideration for local participation or the integration of activities.

1.6 The project strategy embodied six key principles, consistent with/relevant to current, cross-regional approaches which promote the symbiotic relationship between biodiversity conservation and productive growth: (i) targeting of priority biodiversity-related problems; (ii) intense stakeholder involvement; (iii) integrated solutions exploiting the expertise and authority of multiple entities; (iv) federal, state, municipal and grassroots institutional capacity; (v) an improved regulatory framework; and (vi) monitoring/measurement of project progress and impact.

2. Achievement of TF Development Objective

Rated: Satisfactory

2.1 TF development objectives were quite complex involving institutional strengthening, new environmental legislation, ambitious integrated natural resource management (NRM) systems, natural habitat rehabilitation and behavioral changes. However, with a one year extension of the closing date, the project achieved most of its objectives and is rated Satisfactory overall. The ICM finds that specific objectives, outcomes and their component activities were selected, formulated and quantified in a rational and appropriate manner. However, presentation/organization of the Log Frame was complicated and duplicative, and the relationship between some elements was unclear.

2.2 The following summary of project achievements draws extensively on the findings of the excellent Final Project Report (Embrapa/Soils, December 2010). It incorporates the achievements of all activities (outputs) directly relevant to the project Outcome Indicators supporting the PDO (see Annex A):

Objective 1: ***Promote the strengthening of local environmental and agricultural institutions and communities by providing them with land-use planning tools for the formulation and initial implementation of an integrated watershed management plan.***

1.1 **Achieved:** Project-financed studies and mapping – conducted with appropriate community participation - supported formulation of the Rio Formoso Watershed Management Plan. This was complemented by the development and initial implementation of two detailed Management Plans for critical micro-watersheds (Sao Sebastiao and Angelica) in the Mimosa River sub-basin, a tributary of the Rio Formoso. These Plans – developed with the participation of relevant local stakeholders - were based on GIS data de-limiting/defining the Formoso Watershed using satellite images, mapping of soils and vegetative cover, land use, environmental vulnerability, priority areas for ecological corridors and Areas of Permanent Preservation (APP). All are accessible by internet through the spatial database (WebGIS).

1.2 Participatory events/workshops helped local stakeholders to participate in the management planning process, the results of which are being disseminated, including to the Rio Miranda Hydrographic Basin Committee, the only entity of its kind in the State.

1.3 Changes to the existing environmental regulatory framework, i.e., legislative harmonization, as an instrument for further integrating biodiversity conservation and watershed management concepts, were achieved to a more limited extent than envisaged at appraisal via a legislative proposal to regulate a state law of 1988 relating to the "use of permanent protection areas along water courses". The proposal was the product of a participatory consultative process and environmental education in Bonito Municipality, and a major, project-sponsored Seminar.

1.4 The proposal sought to regulate licensing laws to permit the re-composition of permanent protection areas along water-ways using agro-forestry systems, and to manage the watershed in an integrated manner. Even though Brazil and the State of Mato Grosso do Sul have wide-ranging environmental laws on the books, and Bonito Municipality has strict land use laws (requiring preservation of 150 meters of native vegetation along the Formoso River margins), most rural properties in the area were non-compliant. Farmers viewed such laws as prejudicial to economic development and most did not understand their intent. The project-sponsored Seminar was designed to resolve this dichotomy between production and preservation, and successfully compiled proposals from a participatory process to enhance the planned legislative changes. At closing, the proposal was under analysis by the State Environmental Secretariat.

Objective 2: ***Promote the integrated management of existing public and private protected areas.***

2.1 **Achieved:** The project contributed to the development of a strategy for the integrated management of protected areas with proposals to define ecological corridors including private reserves, riparian habitats and conservation units. A map of river margins, protected areas and public/private conservation units was formulated and integrated with the Watershed Management Plan and with the watershed's Environmental Vulnerability Map.

2.2 Sustainable development and integrated eco-system management training and education program/activities were developed and implemented for community members. Project technicians from partner agencies were trained to integrate biodiversity management concepts into their routines. The Final Project Report (2010) notes that some 293 agricultural and environmental technicians, rural producers from Bonito and neighboring municipalities participated in six courses in technologies and processes for sustainable natural resources management and conservation associated with better agro-livestock productivity. These courses were complemented by field days, technical visits, participation in agricultural fairs and demonstration events, accompanied by project team members.

2.3 Preliminary assessment of existing environmental education activities/programs showed that stakeholders should be integrated into the State's Environmental Education (EE) network to leverage greater impact. The project team accordingly developed a comprehensive two-module course on EE and community participation, and executed a project with local NGOs for integrating EE activities in Bonito Municipality. Training events also included the following: (i) an inter-active communications instrument via web portal developed by the State Environmental Education Network (REAMS); (ii) the "Bonito Forever" project developed by IASB (Institute for Waters of Serra Bodoquena) and UEAD/IMASUL (Environmental Institute of Mato Grosso do Sul) involving environmental education workshops, and technical visits by teachers/students to ecological sites state-wide; (iii) dissemination of project EE activities at the VI Brazilian Forum on Environmental Education in Rio de Janeiro which also served as a technical training opportunity for IMASUL agents on EE strategies and evaluation of effectiveness.

2.4 A participatory project management structure was fostered and utilized at all levels. All activities used participatory methods/practices, as well as local knowledge and interactive techniques to integrate the overall approach to biodiversity management. Inter-organizational partnerships were a notable and successful project feature, leveraging expertise, collaboration and in some cases, additional resources.

See Annex A for further details.

Objective 3: ***Support the implementation of sustainable livelihood activities on a pilot and demonstrative basis that would reduce pressure on key natural resources, and rehabilitate natural habitats, particularly riparian and savannah-like vegetation.***

3.1 **Achieved:** Pilot sustainable economic activities were implemented and results disseminated, to serve as a model for reducing pressure on key natural resources. Pilot demonstration units/areas for multi-functional land use were installed on two model farms located in critical micro-watersheds (Sao Sebastiao and Angelica) of both the Upper and Middle Rio Mimoso - a tributary of the Rio Formoso – to ensure representativity for potential future scaling-up of land management activities. A third site was located in the Santa Lucia Rural (land reform) Settlement. Soil conservation measures included mechanical and biological technologies, agro-forestry systems (SAF) for food, biomass and protected area restoration, and agro-forestry-pasture systems (SASP) for degraded pasture recovery associated with increasing biodiversity and soil fertilization.

3.2 *Pilot demonstration areas:* Successful execution of six SAF sites in Santa Lucia was followed by the creation of 1,400 meters of margins of the Rio Mimoso as Areas of Permanent Preservation (APP) in riparian areas. Further, measures to control soil erosion (56 ha of terraces), recover degraded gully areas, reconstitute soil organic material/content and recover/improve 1,400 m of rural roads were implemented in the two pilot units of Sao Sebastiao and Angelica. Some 3,250 native species tree seedlings were planted in the two areas. Dozens of property owners throughout the Rio Formoso Watershed have initiated the recuperation of riparian forest as a direct result of these project pilot/demonstration activities.

3.3 Economic activities were based on agro-forestry systems integrating fruit plantations, sustainable pasture management, soil conservation via minimum/zero tillage, use of organic fertilizers, production of rustic poultry, beekeeping, small-scale in-house agri-business, rural tourism and crafts. The State Agrarian Development and Rural Extension Agency (AGRAER) conducted activities to increase agro-industrialization of organic food products produced both via SAF or otherwise, providing an incentive for collective production and marketing. Agro-forestry systems for production combined with the re-composition of riparian vegetation, along with native tree plantation in pasture areas targeted biodiversity improvement, higher agro-livestock productivity, value-added activities and increased multi-functionality of farm properties.

3.4 *Bonito Municipal Plant Nursery:* The nursery was renovated and restructured to provide inputs to the agro-forestry and agro-forestry-pastoral pilot systems advocated and executed by the project. A longstanding obstacle to consolidating mixed tree-crop farming systems has been the availability of good quality seedlings. The nursery is currently producing 200,000 seedlings/year of native tree to support farmers, institutions and agencies involved in diverse reforestation activities. The nursery has become an important local support center for local and regional producers interested in/adopting sustainable land use practices.

3.5 *Multi-functional land use systems:* Those demonstrated included: corn, summer manioc and winter forage grown between terraces; high biomass trees suitable for animal feed planted to protect terraces; and, *guandu* beans planted on terraces as an erosion barrier, and to protect tree seedlings by promoting soil humidity. Tree planting in pasture areas is expected to increase herd quality due to better environmental conditions while more diverse food sources and habitats will promote biodiversity.

3.6 Technicians were trained at these sites in multi-functional cropping systems and the methodology fostered collective learning through demonstration. Local farmers adjacent to pilot areas visited the pilot sites, subsequently planting new agro-forestry systems on their own land. Dissemination activities involved visits to farm properties, identification of degraded areas needing intervention and exchanges of experiences between farmers and technicians from partner agencies within the municipality and outside.

3.7 *Organic Composting Unit (UCO):* The project established, in partnership with the Bonito Municipal Government, an Organic Composting Unit (UCO) utilizing organic residues from city trees, hotels and restaurants. UCO became a valuable demonstration tool for local awareness-building in using solid residues generated on and off-farm to produce high quality organic fertilizer/manure. The compost produced is being used by the Municipal Nursery in its seedling program, to recuperate degraded soils, and for organic agriculture. Technicians were trained to produce the compost and to promote its use/benefits to diverse local stakeholders. Public/private partnerships were established to sustain UCO post-project. An important constraint on UCO has been obtaining an adequate supply of input material and the logistics for its collection.

3.8 *Monitoring and evaluation:* A project monitoring and evaluation system was established. Soil (samplings in 2007, 2008 and 2010) and water resources (sampled every two months, between 2008 and 2010) were monitored in the two critical micro-watersheds and pilot units in the Santa Lucia Settlement. Water quality monitoring will continue at points defined under the IMASUL institutional program. Soil monitoring requires further field work. Positive improvements were measured for some key indices of soil and water quality but the consensus is that it is too early to see marked results. Bird and plant species were surveyed/listed as a foundation for subsequent biodiversity monitoring but the final monitoring phase did not occur before closing because the SASP needed to have a longer period to consolidate and mature to have measurable impact on local biodiversity. The Final Project Report (Embrapa/Soils 2010) notes that the project

"was of fundamental importance for monitoring superficial water sources and a pioneer in experimenting with artificial sub-strata for monitoring biological indications".

3.9 *Dissemination:* A project dissemination strategy was defined and implemented to the extent possible. A project website was launched and has, since closing, been incorporated into the Embrapa portal with all project reports and publications available to the public online. Various means were/will be used to disseminate project results including press releases, promotional "kits", bulletins, videos and an upcoming book. A successful final workshop was conducted with the participation of multiple stakeholders. There is no information available on whether the project watershed management model was disseminated to other parts of the region (e.g., Paraguay, Parana and Plata Watersheds). Also, limited monitoring in some cases meant few/no results to disseminate (see 3.9). Annex A summarizes soil and water monitoring results.

3. Efficiency

3.1 Annex A and the Annex C cost table show the project was cost-effective. The design of components and activities was generally appropriate for achieving project objectives albeit more modestly than envisaged in some cases. Project start-up was slow following effectiveness due to: (a) changes in the baseline situation since the project was prepared (including a newly-created protected area/park); (b) efforts needed to re-activate the project collaborative partnerships as well as more precisely define roles and responsibilities in view of the long gap between preparation and effectiveness; and (c) initial learning curve for the Candido Rondon Foundation (CRF) which lacked experience in the financial management of a Bank GEF operation.

3.2 The multi-partner project stock-taking workshop in 2006 updated work programs and clarified partners' roles. Embrapa/Soils (project executor) established a local project office/coordinator in Bonito, staffed by AGRAER, which accelerated implementation by bringing coordination down to the grass roots level. The project required a one-year extension of the Closing Date to end-October 2010 and a reallocation of grant funds in 2010 to ensure successful completion and consolidation of remaining key activities.

3.3 The CRF was able to leverage additional funds for the project totaling US$243,788 (see Section 4 below).

3.4 Disbursements were slow. In the third year of a four-year project, disbursements were only 47% of the Grant, but counterpart contributions were steady and adequate. Supervision budgets for MSPs generally tend to be modest but despite its small size, the project was complex and required monitoring of all aspects. Supervision resources were scarce however, especially for technical supervision, and efforts to secure additional Bank budget had only limited success.

3.5 When the Candido Rondon Foundation (Recipient) – inexperienced in the use of international funds - requested the one-year extension, they calculated their needs using the original US Dollar exchange rate instead of the then-current rate, resulting in

inadequate GEF funds for the final year's activities. The gap was filled with national counterpart funds and other grants held by Embrapa from the European Commission, along with economies such as closure of the local, rented, project coordination office in Bonito. Most scheduled work for the final year was completed and satisfactory.

3.6 No economic/financial rate of return was calculated at project appraisal and none has been calculated for end-Project.

4. Development Impacts, including those that are Unintended/Unrelated to TF Objectives

The main unanticipated outcomes and impacts were the following:

4.6 *Institutional collaboration and partnerships:* In the project's early stages, the focus was on consolidating the partnerships which were its essential technical and operational foundation. At that time, inter-institutional conflicts were resolved and there was a strengthening of the "consortia" of executing agencies to increase the sustainability and viability of project actions.

4.7 State institutions – AGRAER and IMASUL – were notable specialist participants which enhanced project quality and commitment, especially in the final years, via activities related to the implementation of alternative strategies for sustainable agriculture associated with rural training and environmental education. Similarly, the Secretary of Environment of the Municipality of Bonito and the NGO Conservation International of Brazil (CI-Brazil) became close collaborators and acted as executors of project sub-activities. In 2009, CI-Brazil left the project and was replaced by the Federal University of Mato Grosso do Sul (UFMS) which had been contributing to the project since the beginning. Other partners included the Water Institute of Serra de Botoquena (IASB), the Brazilian Service for Support to Small and Micro-Enterprise (SEBRAE), the State Secretary for the Environment, Cities, Planning and Technology (SEMAC), the Chico Mendes Institute for Biodiversity Conservation (ICMBio), and the State Secretary for Agrarian Development, Production, Industry, Commerce and Tourism (SEPROTUR).

4.8 These links between Federal (Embrapa and the Federal University of Mato Grosso do Sul (UFMS), which also cooperated on the project), state and municipal agencies and NGOs were very successful, and the results of this multi-institutional collaboration helped to integrate field activities such as demonstration units planted in critical micro-catchment areas, and monitoring activities.

4.9 In 2008, the Recipient project team won the Embrapa/Soils outstanding project award in the category of partnerships, a major accomplishment given the number of partners involved in project execution and the inherent challenges this posed.

4.10 *Resource mobilization:* The Project was able to leverage additional resources totaling US$243,790 from the following sources: (a) Partnership with SEBRAE valued at R$150,000 as contribution to the socio-economic diagnosis of Bonito Municipality; (b)

Partnership with the Ministry of Agrarian Development (MDA) through its Secretariat for Family Agriculture valued at R$40,000 as contribution to agro-ecological training for farmers in 2010 (c) Embrapa/Soils helped leverage an additional US$162,332 as follows: (i) CNPq resources totaling R$83,200 for a Visiting Researcher; (ii) CIAT-Embrapa funding totaling US$80,000 for capacity building of extension technicians to apply participatory methodology for integrating local and technical knowledge on soils and land management; and (iii) US$30,309 from the EU-funded Sensor Project to supplement some final project activities, mainly monitoring activities and participatory assessments. The Sensor Project develops tools for sustainability impact assessments of land use change.

4.11 *Replicable best practices:* The project generated best practices in participatory conservation, magnified by the strength of the technical expertise/collaboration on the ground to maximize results. These included: (i) development of the Bonito Municipal Seedling Nursery and its expanding role as a local support center, resource and catalyst to farmers' burgeoning interest in adopting improved land management practices; (ii) unexpected, innovative development of the Bonito Composting Unit and its use as a training facility for demonstrating the benefits of transforming organic residues into a productivity-enhancing input; (iii) richness of the participatory experience and awareness-building, and demonstration effects on neighboring farmers and into adjacent regions; and (iv) pioneering work of Embrapa/Soils in developing technical/scientific procedures for measuring bio-indications in soils.

5. Overall TF Outcome

Rated: Satisfactory

5.1 The overall outcome rating of Satisfactory based on the following:

(a) Achievement of most planned outputs as reported in Annex A, and thus key outcomes supporting project objectives, within the original financing package. Efficiency was satisfactory.

(b) Achievement of project objectives as discussed in Section C 4. See also Final Project Report, Embrapa/Soils, December 2010.

(c) Likely strong development impact with moderate sustainability risk, but too early to make definitive statements.

(d) High degree of ongoing relevance - to Mato Grosso do Sul, other Brazilian states and global conservation goals - of the project methodology to control land degradation through upstream methods for directly addressing identified threats, in collaboration with grassroots stakeholders/land users.

(e) Continued relevance of Project objectives to Bank country strategy over time, including the "green" pillar of the draft Brazil CPS for 2012-2015 – Sustainable Resource Management and Conservation.

5.2 Annex A updates through end-project the original Log Frame output indicators by component and activity/sub-activity, showing that the vast majority were successfully achieved.

D. Risk to Development Outcome

1. Follow-On Results and/or Investment Activities

Activity/Investment:
na Recipient/Other Investment; **na** Grant Project/Program; **na** Bank Project; **na** IFC Financial Project/Activity

1.1 The State of Mato Grosso do Sul had prepared a project with the World Bank on sustainable rural development and natural resources management well before this project but due to the State's credit and general fiscal situation/other issues, the loan was never negotiated. Since then, the State has on several occasions indicated its interest in another Bank operation but nothing definitive has developed related to the Rio Formoso operation. A roads project was subsequently approved for Mato Grosso do Sul.

2. Replicability

2.1 The Trust Fund is rated **Satisfactory** for generating valuable lessons and methodologies which can/should be replicated in other sectors and/or regions. The lessons are described in Section F and the effectiveness and replicability of the methodology are discussed in Section C Outcomes and in Annex A.

3. Overall Risk to Development Outcome

Overall risk to development outcome is rated **Moderate.**

3.1 The project's participatory planning instruments, successful and replicable inter-institutional partnering experiences, and proven demonstration effects of the pilot agro-ecological activities, are expected to contribute to the sustainability of most project activities/achievements. Despite the project's small size, it had numerous synergistic effects and impacts that have the potential to leverage more profound impacts over time.

3.2 The moderate rating however signals the fact that these effects, while having a strong likelihood of longer-term duration, cannot be guaranteed, and that at closing many activities were too "young" to have absolute predictive value. Also, as with most ecological/environmental programs and activities, they depend on political will, stakeholder ownership and budgets. In the case of agro-ecological behavior changes induced by the project, sustainability depends to a great extent on farmers' perception

that new land management practices will benefit their bottom line and this entails a period of consolidation and maturation of the activities implemented (see Annex A, 3.3).

E. PERFORMANCE

1. Bank

This ICM rates the Bank's performance under the Trust Fund as follows:

(a) *Grant approval (MS):* Technical preparation was excellent and the project was in many ways a model of its kind. However, the project preparation and approval period was excessively long for which the Bank and Embrapa/Soils share responsibility. This affected the speed and efficiency with which project activities could be launched following effectiveness.

(b) *Supervision (S):* First, the project was supervised as effectively and regularly (including financial management and procurement) as the limited supervision budget permitted; most supervision missions occurred in tandem with other missions to save resources, which tended to curtail the time available to address specific project issues/needs. The Bank team was unable to attend the final evaluation workshop due to lack of resources. Second, several problems which occurred over the life of the project could have been addressed/resolved faster with closer supervision, e.g., providing more guidance to CRF on the reallocation of resources, and on broader project financial management (as part of a training package for an institution with no prior exposure to the Bank or GEF), potentially avoiding the exchange rate-related resource shortages affecting the project's final year.

(c) *Financial Management (S):* The Bank's FM performance was sound/satisfactory with detailed reporting of FM supervision missions. However, FM missions might also have shared responsibility for providing better guidance to CRF on matters mentioned in (b).

(d) *Technical aspects (S):* The Bank's technical oversight and follow-up - to the extent possible - was satisfactory. As noted elsewhere, the project benefited materially and methodologically from many successful partnerships to leverage technical and operational expertise, supported and fostered by the Bank.

(e) *General performance:* Overall performance is rated Satisfactory on balance.

2. Recipient (for Recipient-executed TFs only)

2.1 *Candido Rondon Foundation: (Recipient):* The performance of FCR was satisfactory overall. In the project's early years especially, FCR took a strong interest in the project and handled much more than the fiduciary aspects (FM, audit and procurement), helping to leverage additional resources for the project, contributing directly to certain studies, and participating on the Project Executive Committee (PEC). Political stresses reduced FCR's role in later years and its technical role decreased but its administrative functions continued to be well-conducted and it was responsive to

Embrapa/Soils and other project partners. The Bank and Embrapa were pleased with FCR's performance, as validated by good results on audits, procurement reviews and FM supervision. The only caveats relate to the exchange rate issue and slow processing of project resource reallocation which are discussed elsewhere.

2.2 *Embrapa Soils (Executor):* Embrapa/Soils' (ES) performance is rated Satisfactory overall. ES was interested, enthusiastic and committed. Its technical and professional competence is indisputable and was of great value to the project. However, performance during preparation is rated Moderately Satisfactory – the project's 2-3 year delay was due in part to ES' delay in finding a foundation to conduct the FM function. The project might also have benefited from a field-based project coordinator but ES compensated for this in various ways by using local staff (mainly AGRAER) and collaborative arrangements, operating in a flexible manner out of a local, rented office in Bonito.

2.3 ES merits commendation for its astute leveraging of partnerships, for which it won a prize. ES submitted a high quality Final Project Report (2010) focused on the technical aspects and outcomes/results of all project components and activities. The report might have benefited from a wider analysis covering key non-technical aspects (e.g., experiences, institutional arrangements, sustainability, institutional performance, and lessons learned) but ES' pro-activity and responsiveness to the Bank's requests for information/clarification during ICM preparation compensated fully.

F. LESSONS LEARNED / RECOMMENDATIONS

The following are among the more important lessons learned:

Bank:

(a) Protracted project preparation, as well as delayed effectiveness, can deflate and outdate a project, requiring considerable effort and time to re-engage and re-energize relevant people and organizations, and impeding its efficient launching and implementation. Changing the Bank TTL at such a time – as occurred - can also be problematic. Under such circumstances, key design features and implementation arrangements may need review and updating prior to Board presentation to ensure validity, timeliness and commitment.

(b) Recipients with little/no experience with international funding need Bank support/training to fully understand Bank procedures. The Candido Rondon Foundation made important contributions to the project but its lack of familiarity with internationally-financed projects meant it did not perceive the impact of the changing US Dollar/Real exchange rate on project resource availability for the project's final year, causing the curtailment of certain planned activities. Its handling of the reallocation of resources was also slow for much the same reasons.

(c) For an MSG operation totaling just US$2.15 million to be implemented in four years, the ambitious development objectives, technical parameters and multiple activities/sub-activities suggest the project was over-designed. However, this may be explained by the fact that the Rio Formoso project was (as stated earlier) strongly linked to and intended to complement the IDB-financed Program for the Sustainable Development of the Pantanal - which included several baseline activities for the Rio Formoso GEF operation – and the proposed Bank micro-watershed loan. It is to the credit of the Bank project team – in close collaboration with the project's institutional and private stakeholders at all levels - that the vast majority of planned activities were completed to a high standard with a one-year extension of the closing date.

(d) Project supervision requirements are much the same whether a project is large or small. Small projects merit adequate supervision budget to leverage the potentially high impact of such operations which often test and validate important methodologies appropriate for scaling-up under much larger projects. The Bank no longer does Medium-sized Projects in Brazil – Rio Formoso was the last to be approved – which limits the innovative, high impact and replicable work which can be done by small projects such as this one.

Recipient:

(a) There are risks associated with recruiting a relatively inexperienced Recipient such as the Candido Rondon Foundation at the outset of project execution, but the important institutional capital formation which occurred as a result of its major role in a complex Bank-supported operation was a valuable development.

(b) Given the complexities of several government agencies managing and internalizing project resources, many government agencies in Brazil are using foundations and social organizations to facilitate the financial, administrative and procurement functions of projects. The foundation becomes the legal Recipient, providing a set of complementary fiduciary services which relieve partner agencies of certain associated difficulties. Embrapa has worked successfully with this model – including under the Rio Formoso operation - while assuming the role of project executor.

Technical Coordination:

(a) The major obstacle for project coordination was the distance between the Coordinator's office, executing agencies in Mato Grosso do Sul, and field operations in Bonito. Most of this difficulty was mitigated by the decentralized project management system with local and regional coordination offices (Bonito AGRAER office and Embrapa Beef Cattle office in Campo Grande, respectively) as well as greater autonomy for the activity and sub-activity coordinators who managed their expenditures according to the Annual POA. However, urgent decisions needed from the Project Coordinator were hampered by distance and communication difficulties. Thus, efficiency would be greatly enhanced if the Technical Coordination office were located in the same region as field activities and executing agencies.

Other:

(a) The Project demonstrated the value of a project coordination structure governed/led by a prominent, experienced institution with technical, operational and managerial expertise – in this case Embrapa/Soils (Executor) – complemented by partnerships with specialized sector agencies to leverage maximum benefits for the project.

(b) Related to this, the project worked because of successful public-private collaboration at all levels. The project demonstrated that participatory decision-making and technical piloting and validation methodologies work well for projects of this type, especially given the need to build long-term grass roots commitment to core ecological principles, and to establish comfortable relationships/partnerships between rural people on the environmental front lines and responsible environmental agencies/stakeholders.

G. ICM PROCESSING AND COMMENTS

1. Preparation

TTL at Approval: Graciela Lituma (LAC Region)
TTL at Closing: Judith Lisansky (LCSSO)

Comment of TTL at Closing: ***JL
Prepared by (if other than TTL): Anna Roumani
Date Submitted to Approving Manager: April 04, 2011

2. Approval

Manager:
Date Approved by Manager:
Manager's Comment:

3. TFO Evaluation of ICM Quality

TFO Reviewer:
TFO Rating on the Quality of ICM *(Satisfactory or Unsatisfactory):*
Comment and Justification for Rating Given by TFO:

Annex A: Updated Logical Framework – Project Components, Activities and Results at End-project

Project Activities	Objectively Verifiable Indicators	Results
Component 1: Participatory planning and management for the conservation and sustainable use of biodiversity		
Activity 1.1: Development of a watershed management plan and promotion of integrated management of protected areas in the Formoso Watershed		
Sub-activity 1.1.1: Formulation of the Formoso Watershed management plan	**1.1.1:** Formoso Watershed management plan formulated with appropriate community participation, and endorsed by the Project Deliberative Committee (PDC) and other relevant local stakeholders	**1.1.1:** The Formoso Watershed Management Plan was formulated and sent to the project team/stakeholders for review/adjustment and application to the planning and regulation of land use and management in the Bonito Municipality. The Plan was based on GIS data delimiting/defining the Formoso Watershed using satellite images, mapping of soils and vegetative cover/use, environmental vulnerability, priority areas for ecological corridors and Areas of Permanent Preservation (APP). The database was inserted in Embrapa Soil's GeoPortal System for internet availability to the public. See Final Report (2011) for details including maps.
Sub-activity 1.1.2: Formulation of a strategy for integrated management of protected areas	**1.1.2:** Strategy for integrated management of protected areas formulated and endorsed by the PDC and other relevant local stakeholders, and partially implemented in one or more pilot areas of corridors which	**1.1.2:** A map of river margins, protected areas, and public and private conservation units (CU), was formulated and integrated with the Watershed Management Plan, and with the Watershed's environmental vulnerability map. Analysis of APPs and areas of forest remnants indicated areas suitable for ecological corridors (EC) integrating the CUs. The EC activity was incomplete at project closing. Further

	would connect existing public and private protected areas (affecting approx. 9,500 ha of protected areas).	fieldwork is needed to validate these regions as well as the results achieved from laboratory testing. A study is also ongoing to pinpoint/propose specific ecological corridors. Additional CUs on vulnerable low-lying lands are also contemplated.
Sub-activity 1.1.3: Formulation of detailed watershed management plans for two critical micro-watersheds	**1.1.3:** Two detailed management plans for critical micro-watersheds (approx. 9,000 ha located in upper/middle sections of the Formoso Watershed) formulated and approved by community members.	**1.1.3:** Management plans for two critical micro-watersheds (Sao Sebastiao and Angelica in the Mimosa River sub-basin – a tributary of the Formoso) selected for project intervention, were developed based on detailed diagnoses of soil use/erosion, vegetative cover/connectivity, biodiversity, water pollution and natural vulnerability. During this process, project intervention options were discussed with and approved by local farmers and a wide range of partner entities prior to implementation. Agro-ecological farming systems and incremental biodiversity preservation actions were a priority. (See Annex B for diagnoses and actions recommended for the two critical areas). Preliminary execution of these in the selected critical micro-catchments had positive results (detailed in the Final Report (2011)) and summarized below.
Sub-activity 1.1.4: Harmonization of existing regulatory framework for integrated watershed management and bio-diversity conservation.	**1.1.4:** Regulatory measures drafted to incorporate biodiversity conservation and integrated watershed management concepts.	**1.1.4:** Initial surveys of rural communities in Bonito Municipality on the environment as well as environmental law and its enforcement by relevant agencies demonstrated widespread dissatisfaction, lack of understanding/knowledge of communities' relationship with the environment, and evidence of inequitable criteria for the treatment of smaller vs larger farmers by environmental enforcement entities. Local knowledge of environmental law and its application was weak. Given that successful integration of productive activities with biodiversity conservation depends on farmers/stakeholders better understanding of key concepts, the need to harmonize existing laws with regional characteristics and to provide technological options for minimizing

		environmental impact, generating income and reconstituting biodiversity, were recognized. In this context, a proposal was developed in collaboration with local farmers and diverse public/private stakeholders to regulate licensing legislation to enable/permit the re-composition of permanent protection areas along water-ways using agro-forestry systems and to manage the watershed in an integrated manner. The proposal was based on technical visits to sustainable land use demonstration areas and on the initial diagnoses supporting the Formoso Watershed management plan. This proposal was under analysis by the State Environmental Secretariat at closing. Preparation of a booklet concerning environmental laws and information on responsible agricultural practices, and to mobilize farmers in the areas delineated, was planned under the project-sponsored Environmental Education activities of IMASUL but was put on hold due to lack of resources.
Activity 1.2: Environmental education and community participation		
	1.2: Six courses and participatory workshops implemented in the first 30 months, directed to community awareness providers (community leaders, school teachers and tourism guides) with the participation of at least 180 local people.	**1.2:** Preliminary assessment of ongoing or recently implemented environmental education (EE) activities revealed that the focus should be on integrating the actors involved/associated with the State EE network. The project team developed a comprehensive course on EE and community participation in two modules and implemented a project with local NGOs for integrating EE activities in Bonito Municipality. Some 293 participants were involved in EE activities including courses and participatory workshops. Other EE activities included:

		(a) An inter-active communication instrument via web portal was developed by the Mato Grosso do Sul Environmental Education Network (REAMS), and funds were being sought to sustain this portal after project closing; (b) IASB and UEAD/IMASUL developed the "Bonito Forever" Project involving three main activities: environmental education workshops; technical visits by teachers and students to ecological/other relevant sites across the state; and, preparation of an ecological calendar based on themes of water, riparian forests, waste/residues and climate change. (c) Project EE activities were disseminated at the VI Brazilian Forum on Environmental Education in Rio de Janeiro which also served as a technical training opportunity/exercise for IMASUL agents in EA strategies and evaluation of effectiveness. (d) Through a partnership with the NGO Brazil Bonito and the Municipal Secretariat of Education, some 470 school children visited the project-supported organic composting facility and learned about the ecological and economic advantages of the facility and processes.
Component 2: Development of sustainable activities in pilot areas		
Activity 2.1: Development of alternative activities based on the sustainable use and management of natural resources		
Sub-activity 2.1.1: Implementation of the Support Center for Rural Activities	**2.1.1:** The Support Center for Rural Activities and Agricultural Production (SCRAAP) established and	**2.1.1:** The Bonito Municipal Plant Nursery was renovated and restructured to act as the SCRAAP and to provide inputs to the agro-forestry and agro-silvi-pastoral pilot systems advocated and executed by the project. A longstanding obstacle to consolidating

	implemented/operational.	mixed tree-crop farming systems has been the availability of good quality seedlings. The nursery is currently producing 200,000 seedlings/year of native tree species – fruit, wood or simply for reconstituting degraded areas - to support farmers, institutions and agencies involved in reforestation activities including riparian, recovery of degraded land/pasture and establishment of agro-ecological systems, including such activities financed by the project. The nursery has become an important local support center for local and regional producers interested in/adopting sustainable land use practices.
Sub-activity 2.1.2: Transformation and use of organic solid residues.	**2.1.2:** Organic solid residues collected in Bonito and analyzed periodically; a 30% increase in the adoption of organic farming in the region's subsistence crops.	**2.1.2:** Initial survey of organic residue availability in Bonito Municipality showed that rather than just collection and analysis, transforming this residue into organic compost for use as fertilizer would be more effective, leading to the creation of a pilot composting unit. The project restructured an area of the Municipal Garbage Processing Plant for pilot activities. This was an innovative activity. During the period in which collections were conducted, entry into the Bonito sanitation system of some 83 tons of organic residues from hotels and restaurants and over 200 tons of tree pods was avoided. The resulting organic compost was of excellent quality. Key members of Bonito community (470) were informed about the benefits and trained to maintain continuous operation of the composting activity. AGRAER incorporated the composting unit and associated activities into its institutional Project on Agro-ecological and Sustainable Production. It should be noted that a difficulty in installing demonstration units

		for composting in rural areas is obtaining sufficient primary material to attend the fertilization needs of rural producers in the area. Note: While many farmers in the region adopted organic fertilization of subsistence crops due to training and demonstration effects, the percentage was not measured.
Sub-activity 2.1.3: Development of pilot units of multi-functional land use.	**2.1.3:** Two to three sustainable activities implemented on model farms located in critical micro-watersheds during the first 36 months of the project.	**2.1.3:** Soil conservation measures using mechanical and biological technologies, agro-forestry systems (SAF) for food, biomass, and protected area restoration, and agro-silvi-pastoral systems for degraded pasture recovery associated with increased biodiversity and soil fertilization were implemented in at least three different sites in the Formoso Watershed. Two of these were critical watersheds (Sao Sebastiao and Angelica) and at least one in a Rural Settlement (Santa Lucia). Following the successful implementation of six agro-forestry systems (SAF) in the Santa Lucia Settlement, some 1,400 meters of margins of the Rio Mimoso were established as APPs in riparian areas. Measures to control soil erosion (56 ha of terraces), recover degraded gully areas, reconstitute organic material (in soils) and recover/improve 1,400 m of rural roads were executed in the two pilot units (Sao Sebastiao and Angelica) located in the medium and high hydro-graphic basins of the Rio Mimoso. Some 3,250 native species seedlings were planted in these two areas. Multi-functional land use systems were demonstrated, for example: during the 2-3 year tree growing period, corn, summer manioc and winter forage crops were sewn between terraces. High biomass trees suitable for animal feed also protected the terraces. *Guandu* beans – a multi-purpose crop with many positive qualities - were planted as

		an erosion barrier on terraces while also increasing soil humidity/coolness and protecting the tree seedlings. In the medium to long-term, tree planting in pasture areas will increase herd quality due to better environmental conditions – pasture conservation and temperature control. More diverse food sources and habitats will also promote biodiversity. Technicians were trained at these sites in multi-functional cropping systems, and the methodology promoted collective learning through demonstration. Local farmers adjacent to the pilot areas showed interest and visited the pilot sites. New agro-forestry systems were planted on neighboring sites due to the demonstration effects of the project-supported systems. Dozens of property owners throughout the Rio Formoso watershed have initiated the recuperation of riparian forest as a direct result of project example/influence. Activities to disseminate the agro-ecological technologies implemented were conducted through visits to properties, identifying degraded areas needing intervention and exchanges of experiences between farmers and technicians from partner agencies within the municipality and outside. AGRAER conducted activities to increase the agro-industrialization of organic food products produced via SAF or not, providing an incentive for collective practices for production and marketing. All activities were guided by participatory processes, and used local knowledge and interactive techniques. Through the collection, exchange and distribution of seeds for "green" fertilizer, interest was raised in producing and using natural fertilizers on degraded lands. Seeds of native species seedlings were

		collected and taken to the Municipal Nursery to maintain seedling production. Two areas totaling 26 ha were used to plant demonstration units for Agro-silvi-pastoral systems (SASP), using especially native trees with economic potential (see above). The systems implanted were integrated with soil and water conservation activities in the two intervention areas, co-planting corn, followed by pasture with beans, and tree species both over and at the base of terraces. Final activities involved field days with farmers to discuss the maintenance of systems implanted. In riparian zones of the Mimoso sub-basin, the implantation of SAFs accompanied by fence construction has permitted the natural regeneration of vegetation. On five properties, an aggregate 70 has. are being recuperated. In partnership with the Institute for Waters of the Serra do Bodoquena, some 2,800 seedlings of diverse native species (obtained from the Bonito Municipal Nursery) were planted. Illustrative workshops with technical assistance benefited 30 family farmers; technical meetings organized by the municipal rural union also promoted SAF adoption to another 40 families. See Final Report (2011).
Activity 2.2: Capacity building and training in conservation and sustainable use of biological resources.		
	2.2: Six seminars implemented during the first 18 months, directed to at least 50 project participants including executing agencies' staff, community leaders and small farmers; at	**2.2:** The project's capacity building component consisted of eight training courses on key subjects and multiple field demonstration events involving 208 participants from local, state and federal government and non-governmental organizations (NGO), local farmers, rural extension workers and community leaders.

	least 6 field courses on alternative sustainable activities held on model farms; at least 150 farmers trained in biodiversity conservation and integrated watershed management.	Activities conducted in the first three years already covered project indicators in terms of training for technicians and farmers. As noted above, the final years of the project held off further field training until the pilot activities on demonstration units were completed. Financing was leveraged for these activities from executing agencies and the Bonito Prefecture (Mayor's Office). The AGRAER Training Unit, in partnership with Embrapa and FCR, provided training courses on agro-ecological approaches/alternatives to farming and land management to local farmers, NGOs, the Bonito Municipal Council and Environmental Agency, SEMAC/IMASUL and IBAMA. Courses included: (i) Participatory methodologies for development planning; (ii) Technical visits to RJ on composting practices and to MS state agro-forestry demonstration areas; (iii) Technical training in the forestation of pasture and croplands; (iv) Methods and techniques for training to implement agro-forestry systems (SAF); (v) Participatory methodologies for integrating local and technical knowledge on soil quality indicators; (vi) Soil and water conservation; and (vii) Field demonstration days. See also 2.1.3 above.
Component 3: Project Management, Monitoring and Evaluation, and Information Dissemination		
Activity 3.1: Participatory project management and organization		
	3.1: The Project Deliberative Committee (PDC) and Project Executive/Technical Committee	**3.1:** (a) The **PDC** was established at project outset (October 2005). Its members comprised official representatives of each executing agency (Embrapa/Soils, IMASUL, AGRAER, Bonito Municipality,

	(PEC) established and operational	the Candido Rondon Foundation, and Conservation International Brazil, as well as Municipal Sustainable Development Committees and Tourism Committees, NGOs and local Universities. The Director of the Bodoquena National Park and the Head of the Bonito Municipality public attorney's office were also invited to join due to their importance in regional land use planning and management. The PDC's regime consisted mostly of annual meetings to discuss project progress, results and integration of executing agencies and stakeholders. PDC members evaluated Annual Operating Plans and the potential need for changes in activities. The PDC met seven times during project execution, four of which in the project's first year to facilitate integration, understanding and harmonization of the project concept, structure and management. (b) The **PEC** was established and comprised the project's general coordination group (technical, financial, local and regional), and the coordinators of project components, activities and sub-activities. The PEC was frequently mobilized to discuss specific issues/activities. The PEC also met formally three times, in 2007, 2008 and 2010. The PEC adopted emergency measures to minimize the impact of the abrupt reduction of project resources in 2009, e.g., closing down consultant and service contracts, and maintaining only essential activities. The local coordination office in Bonito was moved from rented premises to AGRAER.
Activity **3.2:** Project Input and Output Monitoring System		
	3.2: Project reports prepared by	**3.2:** All project reports were sent to the PDC for appraisal,

	the Technical Project Coordinator/Project Manager (PEC) and analyzed by the PDC annually, and upon completion of the project.	comments and development adjustment recommendations. Financial management contracted the annual audit and attended to recommendations/advice received. Procurement followed established Bank rules and quarterly/annual SOEs were sent to the Bank. The Candido Rondon Foundation (CRF) prepared monthly financial oversight reports with all expenditures by component/sub-activity. As noted in the main text, the CRF was informed in late 2009 that the initial US Dollar exchange rate had been maintained throughout project execution. Given that GEF funds were in USD, remaining funds in the project account were exceedingly limited.
Activity 3.3: Project Impact Monitoring System		
Sub-activity 3.3.1: Monitoring of soil and water indicators	**3.3.1:** Soil biological, chemical and physical indicators evaluated before, during and after implementation of pilot sustainable activities; monitoring results published in bulletins and available on the project website.	**3.3.1:** Soil (sampled in 2007, 2008 and 2010) and water resources (sampled every two months between 2008 and 2010) were monitored in the critical micro-watersheds (Sao Sebastiao and Angelica) and project pilot units in the Santa Lucia Settlement, relative to zero. The results will be shown and discussed in project reports available in the project website, once the site is updated and incorporated in the web portal of Embrapa Soils. Recommendations were also made including preventing cattle access from negatively affecting water quality near monitoring points on the Taquara stream on the Santa Marta estate. Water quality monitoring will continue at points defined under the IMASUL institutional program. Soil monitoring requires further fieldwork. Available results are summarized selectively as follows: Soils: While improved soil management/recuperation were only initiated in the two micro-catchments and the Santa Lucia Settlement some 22 months prior to tests, positive changes were evident even in

		the short period. Soil organic matter had increased in areas of SASP introduction in Angelica and Sao Sebastiao. Soil fertility also improved in both areas from nitrogen and potassium applications. Soil mass/volume showed variable results. Water: Test samples showed water quality (in terms of dissolved oxygen) was improving; however, heat-tolerant coliforme bacteria remained above acceptable limits possibly due to the access of cattle to the Taquara stream margins; phosphorus levels remained below legal limits over time while fixed solids measures tended not to improve over time following project interventions. Suspended solids started to improve in some areas from mid-2009 onwards. Overall, gains in water quality at monitored points on Rio Mimoso and the Taquara stream were positive but still modest, in part due to the effects of heavy rains and also because of the short time since implementation of project-supported technical changes. Results between pilot areas, for specific indicators, and over time, varied significantly. The Final report (2011) notes that the "project was of fundamental importance for monitoring superficial water sources but was also a pioneer in experimenting with artificial sub-strata for bio-indications, in addition to enabling the profile of the Formoso Watershed to become better-understood which will support future studies and decision-making related to environmental licensing and conservation". Due to the uniqueness of this region, different to the eco-systems for which the BMWP indicators were developed, the report recommends that the state continue monitoring activities, in

		partnership with other institutions, to support future studies to develop an integrated water quality index. Invaluable information was collected on the watershed, prompting the National Water Agency to finance the acquisition of specialized equipment for measuring outflow. IMASUL provided 10 laboratory technicians as counterpart resources. Publication of results in bulletins did not occur due to the delay in starting project execution which resulted in monitoring activities being finalized late in the implementation period. Results will be published in technical bulletins and a book to be edited by the executing agencies. (See Final Report (2011) for detailed results).
Sub-activity 3.3.2: Monitoring of terrestrial biodiversity indicators	**3.3.2:** Bird diversity and vegetation cover evaluated before and after implementation of pilot sustainable activities; monitoring results published in bulletins and available on the project website.	**3.3.2:** Bird and plant species in the critical areas were surveyed/listed prior to the execution of project activities, as the basis for subsequent biodiversity monitoring, The final monitoring phase was not conducted before project closing because the agro-forestry-pastoral systems (SASP) needed to be established for a longer period to have measurable impact on local biodiversity. The monitoring of vegetative diversity was discontinued due to the departure of the research team executing this activity. New projects designed to continue monitoring activities are under preparation to assess impacts on biodiversity. Thus, there are not yet any monitoring results for publication/dissemination.
Sub-activity 3.3.3: Monitoring of social and economic indicators	**3.3.3:** Simulations of profit margins carried out in model farms where pilot activities will	**3.3.3:** An economic analysis of the main agricultural production systems (beef cattle, dairy cattle, commodity crops, and family agriculture) was conducted at project outset, and suggestions to

	be implemented, and socio-economic data of properties surveyed during the PDF-A phase updated upon completion of the project; questionnaires applied to evaluate changes in environmental perception of land users.	enhance the economic sustainability of farm properties in Bonito Municipality were prepared following stakeholder participation/consultation. Three Embrapa technical publications were prepared, and are available on the Embrapa website. The project's duration, and delayed start of field activities, prevented the project from determining the impact of changed production systems on economic performance. New projects are expected to evaluate this aspect, after monitoring the resulting carrying capacity and forage production on the pilot units. <u>Perceptions of urban and rural communities about the environment,</u> project objectives, conceptual approach and activities, were monitored through 49 structured and semi-structured interviews in 2007 and again in 2010 – land-owners, renters and day laborers. Preliminary results are discussed in the Final Report (2011) and will be uploaded to the project website in due course. They are summarized briefly as follows: <u>Quantitative:</u> (i) a majority felt the environment had improved, mainly due to legal prohibitions on deforestation of riparian areas, and reduced degradation of other natural resources; (ii) over 60% thought vegetative cover had improved due to greater awareness and better enforcement; (iii) in the case of river quality, whereas in 2007 a massive 85% saw the river as poor/very poor quality, this had dramatically reversed by 2010 – only 21% had this opinion - and despite a drought at the time; (iv) 38% thought environmental degradation had diminished and 45% saw no real change; and (vi) 65% of interviewees knew about the project and its objectives by

		2010. Qualitative: Interviews revealed tensions concerning perceived unequal application of the environmental laws to small farmers vs larger. Smaller farmers felt victimized and unable to complain about environmental violations by larger farmers even when affected directly. They also felt they were penalized for minor, even irrelevant infractions and felt alienated from conservation messages. Many expressed the wish that public agencies would intervene and mediate environmental relationships between the two groups. The tourist industry was depicted as both a negative and a positive factor in this situation, in the latter case as prime instigators of better environmental practices/laws. Obtaining environmental licenses was generally described as costly, bureaucratic and difficult. Information available on the laws was described as inconsistent, partial and unclear on rights and responsibilities. The laws themselves were seen as inconsistent with local realities. Lack of understanding of the laws reduced confidence in them.
Activity 3.4: Project outreach and information dissemination		
	3.4: Project website developed; project initiatives, results and impacts disseminated through the project website, newsletters, bulletins and workshops.	**3.4:** A project website was launched: www.gefrioformoso.org.br with information, press releases, notices of events, and facts about the project. Following project completion, the website was discontinued and was incorporated into the Embrapa portal with all project reports and publications available to the public online. Promotional "kits" were distributed to representatives of governmental and non-governmental organizations/entities involved

		in agro-ecology, environmental management on rural properties, sustainable land use, and natural resource conservation. Further informational bulletins were published. An institutional video was prepared and released on You Tube. A book is being prepared relating project experiences and results with guidance for the analysis of inter-disciplinary and multi-institutional projects focused on the sustainable management of watersheds in areas where agro-livestock systems predominate. A successful Final Workshop was conducted with participation of multiple stakeholders.

Annex B: Participatory Diagnoses and Recommended Actions for Inclusion in Integrated Management Plans - Selected Critical Micro-catchments (MBHC)

MBHC Angelica		MBHC Sao Sebastiao	
Diagnosis	**Recommendation**	**Diagnosis**	**Recommendation**
General characteristics, both MBHC: High susceptibility to erosion not only due to soil class and relief/topography, but also due to inadequate management of the original vegetative cover, and to unsuitable agricultural methodologies since these areas were opened for development. Livestock and poorly-managed, extensive pasture, as well as the historical lack of conservationist practices, have been major contributors. Farmers did not understand the need to maintain vegetative cover in key areas, e.g., along drainage channels, in corridors for animal transit, or the systematic drainage of rainwater resulting in biodiversity loss, reduced productivity and intensive soil losses. This may have induced the steep decline in replenishment of subterranean canals which preserve the local water table and maintain water sources (nascentes).			
1. **Mata:** Original mata (forest) is in a good state of preservation.	Maintain.	1. **Crop/feedstock:** This is a naturally fertile, elevated area of weeded cultivation protected by a system of terraces.	This area could cultivate species such as sugar-cane, animal supplements, using level plantings/seedings and minimum tillage
2. **Recomposition of the mata:** Most of the remaining forest on the more elevated parts of farm properties is used periodically for animal supplement which has degraded its quality and reduced biodiversity. Gravel/rocks have been removed in some sections for road repairs. Soil and	Re-composition of forest species and recuperation of vegetation with a focus on areas where gravel has been stripped.	2. **Re-composition of Mata:** These farming areas have remnants of native mata covering the hills of the highest pasture areas and some local, specific areas. The vegetative cover is periodically used for animal feed which has generated a fall in quality and loss of biodiversity.	Re-composition of forest species is recommended and vegetative recuperation with an emphasis on farm areas located more in the center of the catchment and eastern areas.

vegetation in these areas needs recuperation.		Deforestation has occurred in some drainage areas.	
3. **SAF (agro-forestry systems):** These are strips of land on the lowest slopes or natural drainage areas, once covered with native forests with characteristics similar to mata.	Re-composition and recovery of these areas with agro-forestry systems comprising multiple species (fruit trees, native species, and shrubs) to attract the return of native animals/fauna and result in food products for human consumption. Re-composition of these areas will also establish an ecological corridor linked to riparian forest of the Taquara Stream to the hilly, forested areas.	3. **Re-composition of Mata Ciliar (riparian forest):** This is an area in large part covered with tree vegetation located along the right margin of the Rio Mimosa, in the MBHC Sao Sebastiao. It has come under strong pressure by human activity related to eco-tourism and in some locations has been severely anthropicized. Also, the vegetation has been used for animal feed, and a pig production unit is also located in the area. All this has prompted loss of biodiversity (flora and fauna) and degraded the quality of water from the spring.	Re-composition of the forest species is recommended and recuperation of vegetative cover, as per established legal norms. Swine production needs to be restrained and/or re-located to another area as suggested in the Plan for this micro-catchment.
4. **SASP (Agro-pastoral Systems):** These are areas in an advanced stage of degradation, heavily eroded and with low productivity. SASP envisages integrated production systems where short-cycle vegetative crops (corn, beans, ground	Correction or implementation of terraces, or maintenance of structures comprising a mechanical erosion-control system. Turn soil in all areas and apply fertilizers based on prior soil chemical analysis. Plant retention strips or	4. **SAF Drainage:** This is a long strip of land occupying areas near the principal drainage point of the Sao Sebastiao catchment area.	Needs re-composition and recuperation with agro-forestry systems (SAF).

cover, green manure) co-exist with long-cycle crops such as multi-use forest species and animal production (meat and milk).	protective crops (sugar-cane etc) planted in rows (3-5 lines) to protect the terraces and to produce animal supplements. Plant native species along the terraces with different objectives (wood, fruits, windbreaks, erosion control, shade for animals etc) using fertilizers in hollows. Cultivate commercial species in strips between terraces, increasing bio-diversity and improving physical, chemical and biological condition of the soil. Grow until 2 meters high. Adopt/practice minimum tillage. Control/manage cattle on a rotating basis. Rotate crops and pasture every 2-3 years.		
		5. **SAF RF:** Farming area extending along a ravine with conditions for future use as a natural flow-off/drainage canal.	For this purpose, this strip of land should be re-forested using SAF as previously described. Following reforestation, this area could be used as an ecological corridor, promoting conditions for increasing and improving biodiversity in the watershed.

		6. **SAF RF2:** This area covers soils of variable depth, often sandy, fairly eroded, with significant loss of surface cover and presence of exposed gravel and rocks.	It should be re-covered with trees using SAF as described earlier.
		7. **SASP:** A major part of the Sao Sebastiao watershed comprises farm areas for which agro-pasture systems (SASP) are recommended. They show advanced degradation with intense erosion in laminar form, in canals and with the development of gully processes. This translates into low zoo-technical indices of productivity.	SASP would involve integrated systems of production, cultivation and pasture, very interesting in situations where the goal is to recuperate areas and promote overall sustainability of agricultural activity. Actions to be taken are the same as for Angelica.
		8. **Swine and Pasture:** Swine and pasture are suggested for this area, moving existing activities from the river margin to this area. Procedures to be used are already part of the local knowledge base, with successful examples available.	With the leadership of local rural extension services (AGRAER), technical visits should be made to these local examples so that the processes for this economic activity can be correctly learned.

Annex C: List of Reports, Diagnoses and Studies Financed by the Project

Final Project Report: Rio Formoso - Gestao Integrada de Bacias Hidrograficas – Relatorio Final, Heitor Coutinho, Embrapa/Soils, December 2010
Diagnoses of Rio Formoso Watershed:

- Report and Thematic Map: Survey of Soils in the Rio Formoso Watershed – Bonito, MS
- Report and Thematic Map: Actual Use of Soils in the Rio Formoso Watershed – Bonito, MS
- Report and Thematic Map: Agro-ecological Zoning of the Rio Formoso Watershed – Bonito, MS
- Report and Thematic Map: Model Systems of Agro-livestock Production in the Rio Formoso Watershed – Bonito, MS
- Report and Thematic Map: Analysis of the Regularization of Soils Use in the Rio Formoso Watershed – Bonito, MS
- Report and Thematic Map: Analysis of Environmental Vulnerability in the Rio Formoso Watershed – Bonito, MS
- Report and Thematic Map: Environmental Planning Units in the Rio Formoso Watershed – Bonito, MS
- Report: Directives for Planning in the Rio Formoso Watershed – Bonito, MS

Relatorio do Curso de Elaboracao e Gestao de Projetos Socioambientais, Modulo II, Fundacao Espaco Eco, 2008

Projeto de Educacao Ambiental “Bonito para Sempre”, Relatorio Parcial, K. B. Cerdoura, October 2008

Mapeamento de Uso e Cobertura do Solo na Bacia Hidrografica do Rio Formoso (Bonito-MS) – Relatorio Final, Prof. Dr. Antonio Conceicao Paranhos Filho, 2010

Mapa das Areas de Preservacao Permanente (APPs de Hidrografia e Declividade), Analise Multitemporal, e Mapa da Vulnerabilidade Ambiental – Relatorio Final, Prof. Dr. Antonio Conceicao Paranhos Filho, 2010

Plano de Manejo das Microbacias Hidrograficas Criticas, Luis Carlos Hernani, EMBRAPA Pecuaria, December 2010

Percepcoes do Meio Ambiente pela Populacao Rural de Bonito, MS – Uma Analise Quantitativa, Tamar Bajgielman, January 2008

Percepcoes do Meio Ambiente pela Populacao Rural de Bonito, MS – Uma Analise Qualitativa, Tamar Bajgielman, February 2008

Oficina de Revisao do Projeto GEF Rio Formoso – Bonito, August 2006, Moderador: Sergio Cordioli

Annex D: Project Costs – Appraisal Estimates and Actual at End of Project (US$)

Components and Activities	GEF	GOB Counterpart	Total	GEF (R$)	GOB Counterpart (R$)	Total (R$)
Component 1. Participatory Planning and Management for the Conservation and Sustainable Use of Biodiversity	**313,218**	**398,099**	**711,317**	**394,896 (US$200,455)**	**1,170,974 (US$594,403)**	**1,565,870 (US$782,935)**
1.1 Development of a watershed management plan and promotion of integrated management of protected areas in the Formoso Watershed	293,101	----	----	284,804 (US$144,570)	969,285 (US$492,023)	1,254,089 (US$636,593)
1.2 Environmental education and community participation	20,118	----	----	110,092 (US$55,884)	201,689 (US$102,380)	311,781 (US$158,264)
Component 2. Development of Sustainable Activities in Pilot Areas	**285,566**	**512,002**	**797,568**	**551,254 (US$279,824)**	**333,945 (US$169,515)**	**885,199 (US$449,340)**
2.1 Development of alternative activities based on the sustainable use and management of natural resources	251,125	----	----	454,860 (US$230,893)	273,725 (US$138,947)	728,585 (US$369,840)
2.2 Capacity-building and training in conservation and sustainable use of biological resources	34,441	----	----	96,393 (US$48,930)	60,220 (US$30,568)	156,613 (US$79,499)
Component 3. Project Management, Monitoring and Evaluation and Information Dissemination	**376,126**	**266,680**	**642,806**	**997,209 (US$506,197)**	**437,563 (US$222,113)**	**1,434,772 (US$728,310)**
3.1 Participatory project management and organization	235,483	----	----	561,042 (US$284,793)	244,312 (US$124,016)	805,354 (US$408,809)
3.2 Project inputs and output monitoring system	22,660	----	----	111,646 (US$56,673)	----	111,646 (US$56,673)
3.3 project Impact monitoring system and information dissemination	86,864	----	----	112,038 (US$56,872)	185,692 (US$94,260)	297,730 (US$151,132)
3.4 Project outreach and information dissemination	31,119	----	----	138,828 (US$70,471)	----	138,828 (US$70,471)

Total Cost – Implementation:	**974,910**	**1,176,781**	**2,151,691**	**1,943,359 (US$986,477)**	**1,942,483 (US$986,032)**	**3,885,842 (US$1,972,509)**

Source: Final data provided by Embrapa in Reais. Amounts are calculated using an approximate, average exchange rate for the project period, US$1.00 = R$1.97). This creates a discrepancy between the total GEF contribution provided by the Candido Rondon Foundation (US$1,170,698) and the amount derived from applying this average exchange rate.

Annex E: List of Acronyms

AGRAER	State Agricultural Extension and Research Agency
CEPA	Support Center for Rural Activities and Agricultural Production
CNPq	National Scientific and Technology Council
CPS	Country Partnership Strategy
CRF	Candido Rondon Foundation
EE	Environmental Education
EMBRAPA	Brazilian Agricultural Research Corporation
GEF	Global Environmental Facility
IASB	Serra Bodoquena Water Institute
IBAMA	Brazilian Institute for the Environment and Renewable Natural Resources
IDATERRA	State Agricultural Extension Agency
IMASUL	Mato Grosso do Sul Environmental Institute
MDA	Federal Ministry of Agrarian Development
MSP	Medium-sized Project
PDO	Project Development Objectives
PEC	Project Executive Committee
PDC	Project Deliberative Committee
PRODEAGRO	Mato Grosso do Sul: Natural Resources Management Project
PRODETAB	Agricultural Technology Development Project
REAMS	State Environmental Education Network
SAF	Agro-forestry Systems
SASP	Agro-forestry-pasture Systems
SDA	State Agrarian Development Agency
SEBRAE	Brazilian Service for Support to Small and Micro-enterprise
SEMA	State Secretariat for the Environment
SEPROTUR	State Secretariat for Production, Industry, Commerce and Tourism
UCO	Organic Composting Unit
UFMS	Federal University of Mato Grosso do Sul
UNDP	United Nations Development Program