

Lessons from the Rain Forest

*Experiences of the Pilot Program to Conserve the
Amazon and Atlantic Forests of Brazil*

Ministry of the Environment (MMA) - Brazil
Secretariat for Coordination of the Amazon (SCA/MMA)

Pilot Program to Conserve the Brazilian Rain Forest
Monitoring and Analysis Project (AMA)

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Preface

Since it was first launched in the early 1990s, the **Pilot Program to Conserve the Brazilian Rain Forest** has served as a laboratory for experimenting with innovative strategies aimed at the protection and sustainable use of natural resources in the Amazon and Atlantic Rain Forest, with due attention to the livelihood needs of local populations.

A major challenge for the Pilot Program is to identify and disseminate lessons learned that contribute to public policies in Brazil, especially in terms of “mainstreaming” successful initiatives. At the same time, such strategic learning provides an important basis for exchange with similar initiatives in other countries of the world.

This publication provides an overview of some of the most innovative experiences and important lessons learned within the Pilot Program over the past several years. Undoubtedly, it will serve as an invaluable reference for the planning of future actions in the Pilot Program, and a contribution to the dissemination of its strategic lessons among other countries where similar efforts are underway to protect and sustainably manage the Earth’s endangered tropical forests.

As a result of collaborative efforts between the Pilot Program’s Monitoring and Analysis Project (AMA) within the Ministry of the Environment and the World Bank’s Brazil Rainforest Unit, this document itself exemplifies the partnerships that have become a trademark of the Pilot Program.

Mary Helena Allegretti
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Introduction

This publication provides a brief analysis of innovative experiences and lessons learned within four major areas of action of the Pilot Program: protection and management of indigenous lands and conservation units; experimentation and demonstration; institutional strengthening for environmental management; and science and technology. In addition to its focus on project case studies, one of the sections is dedicated exclusively to the issue of civil society participation in the Pilot Program.

This document is based on research carried out by the Pilot Program's Monitoring and Analysis Project (AMA) and World Bank's Brazil Rainforest Unit. In particular, it draws upon studies conducted by the AMA project on lessons learned in the Pilot Program, as well as research carried out by World Bank staff and consultants on "best practices" and civil society participation in the program.

As a truly joint effort, this publication has received contributions from a large number of colleagues involved in the Pilot Program. In particular, we gratefully acknowledge the contributions of: Judith Lisansky and Loretta Sprissler, whose research provided the basis for the sections on indigenous lands, extractive reserves and civil society participation; Rebecca Abers, who coordinated a Bank study with Judith Lisansky on civil society participation in the Pilot Program; Olympio Barbanti, Jr. and Marta de Azevedo Irving, who co-authored an earlier AMA publication on lessons learned in the Pilot Program, and Alice Guimarães, for her contributions to the section on Demonstration Projects.

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The data, interpretations and conclusions in this publication are the responsibility of the authors and should not be formally attributed to the

Government of Brazil or to the World Bank, its affiliated organizations or its Board of Directors, as well as the countries whom they represent.

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THE RAIN FORESTS OF BRAZIL

The Amazon

The Amazon basin covers some 600 million hectares in nine countries, over half of which are located within Brazil's national boundaries. The largest hydrographic basin in the world, the Amazon is the source of 20% of all the fresh water on the planet.

A striking characteristic of the Amazon region is its tremendous biodiversity, which includes an estimated 50,000 species of plants, 3,000 species of fish and over 400 known species of mammals. To date, scientists have classified 467 species of reptiles and 516 species of amphibians. Nearly 2,000 known species of birds and the majority of the world's primates are endemic to Amazonia.

An estimated 20 million people currently live in the Brazilian Amazon, the majority in urban areas. The region is home to over 170 indigenous groups with distinct cultures, in various levels of contact with the outside world. A variety of social and economic groups are also part of the rural landscape, including rubber-tappers, Brazil nut gatherers, riverine populations, migrant settlers, placer miners, loggers and cattle ranchers.

In Brazil, it is useful to distinguish between the "Legal Amazon" and the Amazon forest itself. The Amazon forest covers some 4.1 million square kilometers or 48% of the national territory. The "Legal Amazon", a geopolitical region defined by the federal government in the 1960s to administer fiscal incentives and other regional development policies, encompasses five million square kilometers or 58% of the country's total area. It encompasses all or part of nine Brazilian states (Acre, Amapá, Amazonas, western Maranhão, Mato Grosso, Pará, Rondônia, Roraima and Tocantins) and includes extensive areas of savannah vegetation and transitional forests to the south.

In the 1960s and 1970s, a rapid process of frontier expansion was initiated in the Brazilian Amazon, associated with cattle ranching, commercial logging, and creation of rural settlements, mining, road construction and hydroelectric projects. Over a period of four decades, approximately 78 million hectares in the Brazilian Amazon (15.3% of the total area) were cleared. About 70% of this deforestation has occurred along the southern flanks of the Amazon, in the states of Pará, Mato Grosso and Rondônia.

Currently, a major priority in Brazil is to reduce deforestation rates in the Amazon, as an integral part of strategies to promote environmental protection, sustainable use of natural resources and improved living conditions among local populations. The **Pilot Program to Conserve the Brazilian Rain Forest** plays a

significant role in meeting this important challenge.

The Atlantic Rain Forest

The Atlantic Rain Forest or “Mata Atlantica”, located along the coast and inland portions of northeastern and southern Brazil, is one of the most biodiverse of all rain forests on Earth, but also one of the most threatened. As the result of historical processes of occupation and economic exploitation, such as the expansion of sugar cane plantations that begin in the seventeenth century, only an estimated 7.8% of the original forested area of some 100 million hectares remains intact.

The coastal region of the *Mata Atlantica* is where the majority of Brazil’s population, urban centers and economic activity are concentrated. 120 million people live in the area of the Atlantic Rain Forest dominion. This biome helps to regulate the climate, temperature, humidity, and rainfall that affects 70% of Brazil’s population.

The Atlantic Rain Forest has the highest biodiversity of tree species of any forest in the world, reach 454 species per hectare in the southern part of Bahia State. Overall, the biome contains 1.6 million species, with 50% of the 20,000 plant species being endemic. The fauna of the Mata Atlantica includes such endangered species as the golden lion tamarin (*Leontopithecus rosalia*), spotted jaguar (*Panthera onca*) and the small blue macaw (*Cyanopsittae spix*).

While the Pilot Program was originally oriented towards the Brazilian Amazon, the Atlantic Rain Forest has increasingly become a focus of program activities.

About the Pilot Program

The **Pilot Program to Conserve the Brazilian Rain Forest** is a joint initiative of the government and society of Brazil, in partnership with the international community, aimed at developing innovative strategies for the protection and sustainable use of the Amazon and Atlantic coast rain forests, with due attention to the livelihoods of local populations.

Discussions resulting in the proposal to create the Pilot Program began at the 1990 summit of the “Group of Seven” (G-7) industrialized countries, in the wake of growing international concerns about rapid deforestation in the Amazon basin. In the following year, representatives of the G-7 countries and the European Commission formally approved support for the Program.

The agreement signed by the Brazilian Government and donor countries defined that the overall objective of the Program would be to “maximize the environmental benefits of the rain forest in accordance with Brazil’s development goals by implementing a sustainable development methodology that contributes to the steady reduction of deforestation”.

The Government of Brazil formally launched the Pilot Program in 1992, at the United Nations Conference on Environment and Development (Earth Summit) in Rio de Janeiro. The first projects were approved in 1994, with implementation beginning in 1995.

The Pilot Program is composed of a large portfolio of subprograms and projects within five major categories or lines of action:

✓ *Protection and management of conservation units and indigenous lands*, including buffer zones and other interstitial areas, with due attention to support for the sustainable livelihoods of local populations. The main projects of this type are:

- Protection for Indigenous Peoples and Lands in the Amazon (PPTAL)
- Extractive Reserves (RESEX)
- The Atlantic Rain Forest Subprogram and
- Ecological Corridors.

✓ *Experimentation & Demonstration* in sustainable production and resource management, involving activities in such areas as agro forestry, forest management and fisheries, with a particular emphasis on community-based initiatives. This line of action is being implemented through the following projects:

- Subprogram for Demonstration Projects – Type “A” (PD/A)
- Support for Sustainable Forest Management in the Amazon (PROMANEJO)
- Floodplain Natural Resource Management (PROVARZEA), and

- Mobilization & Training in Forest Fire Prevention in the Amazon (PROTEGER)
- ✓ *Institutional Strengthening* to increase the capacity of state and municipal governments to formulate and implement decentralized environmental policies. Support has also been provided for strengthening networks of civil society organizations, as a basis for active participation in the Pilot Program. The main projects of this type include:
- The Natural Resources Policy Project (NRPP), and
 - Institutional strengthening of the Amazon Working Group (GTA) and the Atlantic Forest Network (RMA), the two main NGO networks involved in the Pilot Program.¹
- ✓ *Support for applied research in science and technology* to better knowledge about the ecology of tropical forests and needs for the sustainable management of these ecosystem, in a manner that contributes to other Program activities. The Science & Technology Sub-Program (SPC&T) develops this line of action through the following projects:
- Science Centers
 - Directed Research
- ✓ *Identification and dissemination of strategic lessons*, with an eye towards influencing public policies, as well as the planning of future program activities. This is an important aspect of all projects within the Pilot Program, and the particular focus of the Monitoring and Analysis Project (AMA).

This publication includes case studies drawn from the first four lines of action described above, with a particular focus on indigenous lands (PPTAL), extractive reserves (RESEX), demonstration projects (PD/A), fire prevention and control (PROTEGER), natural resources policy (NRPP) and Science and Technology (SPC&T).

With an initial budget of US\$ 280 million, the Pilot Program is funded by grants from the former G-7 countries, the European Union and the Netherlands, complemented by contributions from Brazilian government and civil society organizations. Among donors, the most important sources of financial and technical support for the program have been Germany, the United Kingdom and the European Union. The World Bank administers the Rainforest Trust Fund (a mechanism created to channel donor contributions) and provides technical assistance to the Program.

¹ The Amazon Working Group (GTA) is a network of 630 civil society organizations (CSOs), including representatives of social movements and environmental, human rights and grassroots support NGOs. The GTA was created in 1992 to mobilize CSOs in the Brazilian Amazon to participate in the Pilot Program and related development and environmental issues in the region. The Atlantic Forest Network (RMA) is composed of some 210 member organizations, mostly environmental and intermediary groups, whose activities focus largely on the protection of remaining forest fragments and sustainable agriculture.

Program Coordination

The Brazilian Ministry of the Environment is responsible for overall coordination of the Pilot Program. The planning and implementation of program activities involve partnerships among a wide variety of participants, including federal, state and municipal governments, civil society organizations and the private sector.

Strategic decisions in the Pilot Program are made at a “Participants Meeting” held every two years, and on a more regular basis through the Brazilian Coordination Committee (BCC) and the Joint Steering Committee (JSC), both chaired by the Ministry of the Environment (MMA). Both committees include civil society organizations and the latter includes representatives of the World Bank and donor countries. The international partners of the Pilot Program also coordinate their efforts through a Donor Coordination Committee (DCC). At the executive level, a coordinating unit that is headed by the Executive Secretariat of the BCC, with assistance from the Monitoring and Analysis (AMA) project, provides support for the program. The Pilot Program is also supported by an International Advisory Group (IAG), composed of Brazilian and international experts. The IAG carries out independent assessments of the program on a biannual basis, providing strategic advice aimed at improving its effectiveness.

Learning Lessons in the Pilot Program

In the context of the Pilot Program, the term “lessons learned” may be defined as knowledge acquired through practical experience about the conditions necessary to promote the protection and sustainable use of the Amazon and Atlantic Rain Forests, with due attention to the livelihoods of local populations.

Learning lessons provides essential feedback for the planning of future project activities and a fundamental basis for dissemination of innovative experiences. A major challenge for the Pilot Program is to disseminate lessons learned in ways that are accessible to various stakeholders, including decision-makers responsible for public policies related to the sustainable development of tropical forests.

When thinking about “lessons” in project management, it is useful to note that successful initiatives are often those characterized by the ability of participants to collectively learn by trial and error, in a manner that makes it possible to overcome obstacles and to move forward in creative new ways.

Participatory methods can be a useful tool in creating the conditions necessary to “learn lessons”, given the importance of valuing individual experience and collective knowledge, and the need to apply lessons learned to the everyday activities of those involved in projects.

1. *Developing an Innovative Approach to the Protection of Indigenous Lands*

Indigenous peoples have long developed elaborate systems of knowledge about the ecology and practical uses of flora and fauna resources as a basis for their livelihood strategies. Traditional knowledge of rain forest ecosystems is an important component of biodiversity conservation. Moreover, indigenous populations provide environmental services to society as a whole, given their role in the conservation of ecosystems.

Indigenous peoples have often been portrayed as “backward” and obstacles to modernization and economic development, especially when powerful interests have competed for access to and use of natural resources. On the other hand, some environmentalists have viewed indigenous peoples and other traditional populations as adversaries to the cause of ecological preservation.

Such views are increasingly becoming the exception in Brazil, with the support of initiatives such the Integrated Project for the Protection of Indigenous Peoples and Land in the Amazon (PPTAL) and the Extractive Reserves project (RESEX) of the Pilot Program. Through these projects, it has become increasingly apparent that traditional populations are an important part of a mosaic of solutions needed to promote environmental protection and sustainable development in the Amazon and other tropical forest regions.

The Integrated Project for the Protection of Indigenous Peoples and Lands in the Amazon (PPTAL) was formulated in 1994 as an initiative primarily aimed at land regularization. The project’s objective was to work with the National Indian Foundation (FUNAI) to identify, delimit, demarcate, register and finalize by Presidential decree indigenous lands in the Brazilian Amazon. Specific objectives also included the promotion of indigenous participation in land regularization and protection activities, improving regularization procedures, and developing appropriate methodologies for environmental assessments of natural resources on indigenous lands.

The results of the project have been impressive, including the demarcation of 59 indigenous territories, covering a total area of 45 million hectares (equivalent to more than 10% of the Amazon forest or an area larger than that of Germany, Netherlands and Switzerland combined). A significant portion of the indigenous lands already demarcated has completed the final steps of being registered and finalized by Presidential Decree.

The project supported innovative pilot activities to increase indigenous participation in the demarcation process. Most of these activities were proposed and

developed by indigenous organizations themselves, with support from the project. In these demarcations, not only were more communities mobilized but the process also strengthened the indigenous organizations themselves. In a number of cases, indigenous participation allowed for the correction of boundary errors. Such participation has contributed to the empowerment of indigenous communities, greater dissemination of information about natural resources and the need to protect them, as well as increasing the quality of land demarcations.

PPTAL has also financed community-driven protection activities for indigenous lands, developed and implemented by indigenous organizations themselves. In this regard, the project installed 73 radio systems in 63 villages and 10 indigenous associations, in collaboration with indigenous organizations and the NGO Friends of the Earth. These radios have greatly improved communication among indigenous people and with the outside world, including FUNAI. Indigenous people have reported how the radios help in a wide variety of ways, from planning meetings to informing about illegal invaders. Other protection activities have included planning strategic locations for gardens, and the building of shelters or even new villages near boundaries in more vulnerable areas of indigenous lands. There is strong evidence that these activities have contributed to indigenous awareness about the importance of protecting their lands and natural resources.

The project has also supported a number of improvements in the technical procedures used by FUNAI for land regularization activities, including identification, demarcation and land tenure issues. For example, PPTAL developed a methodology for rapid environmental surveys to be carried out by identification teams. The project also commissioned research on alternative methods for demarcation. The new procedures and standards were then tested in PPTAL-supported pilots, codified in technical manuals and adopted by FUNAI. As a result, the project has significantly improved the technical quality of all land regularization work carried out with indigenous people throughout Brazil.

Working in close collaboration with FUNAI 's Land Department, PPTAL has financed the development of a geo-referenced database (Geographic Information System -GIS) on indigenous lands included in the project. The system is already functioning as a highly effective monitoring and mapping tool for land regularization activities, making important contributions to innovative ethno-ecological studies being financed by the project. There are plans to expand the database to all indigenous lands in Brazil, thereby mainstreaming the GIS in FUNAI overall. There are already requests from the staff of indigenous agencies in other South American countries for visits to FUNAI to learn more about how to establish similar databases.

In summation, PPTAL has been an innovative and pioneering effort not only to regularize indigenous lands in the Brazilian Amazon but also to improve technical quality and increase indigenous participation and control in the processes of regularizing, protecting and managing their lands. Satellite maps clearly show that

the area of the Amazon covered by indigenous lands represents one of the largest remaining reserves of essentially intact tropical forest. In addition to the impressive area already demarcated (45 million hectares), PPTAL 's contributions to improving the technical quality of land regularization procedures have been progressively mainstreamed by FUNAI, raising the standards for all indigenous lands in Brazil. PPTAL's participatory approaches have also strengthened the capacity of indigenous people to decide their own destinies, hence providing models for how to go beyond the traditional approach of tutelage.

In its collaboration with indigenous peoples, an increasing challenge for the Pilot Program is to support economic alternatives that are culturally appropriate, economically viable and environmentally sustainable. Such actions are particularly needed where pressures exist for unsustainable uses of natural resources. In this regard, the recently created Indigenous People's Demonstration Projects (PDPI) constitutes a challenging new initiative for the Pilot Program.

2. *Extractive Reserves: A model for community-based conservation and development*

During the late 19th century, the advent of the first Amazon "rubber boom" signaled a turning point in the region's history. Given its natural abundance of wild rubber trees (*Hevea brasiliensis*), the western part of the Amazon, including the present-day states of Acre, Rondônia and parts of Amazonas, emerged as a major producer region. At the turn of the century, thousands of migrants, mostly Northeasterners fleeing from chronic poverty and drought, were recruited to work as rubber-tappers (*seringueiros*) in an archaic system of debt peonage. The Amazon rubber boom began to collapse in 1912, as the result of competition from rubber plantations in Southeast Asia. During World War II, a brief resurgence of the "rubber economy" took place, due to the Japanese occupation of Malaysia.²

After the collapse of the second rubber boom, many of the rubber tappers remained in the forest, working either with remaining patrons (*seringalistas*) or on a more independent basis, maintaining relations to the marketplace through local intermediaries (*atravessadores* or *regatões*). In the 1960s and 1970s, forest dwellers in the states of Acre and Rondônia were faced with a new challenge: the expansion of cattle ranches, logging enterprises and rural settlement projects, with indirect or direct support from the federal government.

During this period, the *seringueiros* in the state of Acre began to organize trade unions and to define strategies for protecting the forests that constituted their main source of livelihood. Led by Chico Mendes, the rubber-tappers developed a unique form of non-violent resistance to forest clearing practiced by cattle ranchers. Demonstrations known as "*empates*", including the participation of women and children, were organized to prevent acts of extensive clear-cutting of forests.

By the mid-1980s, the movement had grown stronger and expanded to other states in the Amazon, leading to the creation of the National Council of Rubber Tappers in 1985. During this period, the rubber-tappers' movement launched the proposal for the creation of *Extractive Reserves*. With the initial objective of securing access rights to local communities, the Extractive Reserves proposal combined elements of an agrarian reform with the idea that conservation units could involve traditional communities in their protection and management. Since much of the territory occupied by rubber tappers was treated as a common property resource, the Extractive Reserves proposal envisioned the granting of access rights to local communities, without dividing the land into individual parcels.

² The two rubber booms made contact inevitable for many previously-isolated indigenous groups, often with devastating consequences. A considerable number of indigenous people eventually became rubber-tappers.

With the assassination of Chico Mendes in December 1988, problems of social conflict and environmental devastation in the Amazon became the subject of headlines in the Brazilian and international press. Under mounting pressure from public opinion at the national and international levels, the Brazilian government created the first four Extractive Reserves in the Amazon in early 1990: the Chico Mendes Extractive Reserve, with 930,230 hectares (Acre); the Alto Juruá Extractive Reserve, with 506,186 hectares (Acre), the Rio Ouro Preto Extractive Reserve, with 204,583 hectares (Rondônia) and the Rio Cajarí Extractive Reserve, with 481,650 hectares (Amapá).

Despite the creation of the National Center for the Sustainable Development of Traditional Populations (CNPT) in 1992, in response to pressures for a specific unit within IBAMA to support the Extractive Reserves, federal government actions to implement the first four Extractive Reserves were still insufficient in the early to mid-1990s. Meanwhile, opposition to the Extractive Reserves proposal was mounting among many local and regional elites, who preferred more conventional models of natural resource exploitation.

By 1994, the Pilot Program had taken on the challenge of supporting the rubber tappers movement and IBAMA in the implementation of the first four Extractive Reserves in the Brazilian Amazon. An initial and critical step was to support IBAMA in resolving land tenure problems within the reserves, which included land expropriations and indemnifications, as a prerequisite for the granting of resource use concessions to local communities. As a basis for the implementation of the reserves, forest dwellers needed to be trained and organized in associations. Considering the low levels of formal education and technical capacity of local populations, this was no easy task. A series of training courses and other capacity-building initiatives were carried out, leading to a substantial increase in the capacity of local associations to administer the reserves.

An important activity of the project has been to support the preparation of resource utilization plans for the reserves, a legal requirement for the formal concession of use rights to local associations. Using participatory methods, local communities themselves defined the majority of regulations for the reserves, based on best traditional practices, which were then submitted to IBAMA for formal approval. Environmental monitoring and enforcement tasks were also carried out by IBAMA and local communities, that were trained to monitor reserve territories and prevent illegal encroachments associated with land speculation, poaching, commercial fishing, etc.

The Extractive Reserves Project also contributed with investments in basic infrastructure, such as schools, transport facilities, radios and health posts. These investments were carried out in close cooperation with local communities, which provided counterpart funding and labor to guarantee ownership. Increasingly, municipal and state governments are recognizing the importance of Extractive

Reserves and assuming greater responsibility for the provision of basic infrastructure and services, especially in the areas of health, education, transportation and support for sustainable economic alternatives.

The most difficult task for the project has been to improve income-generation among the inhabitants of the reserves, a critical factor in preventing out-migration to the periphery of urban areas, thus leaving the forest unprotected. In this regard, the project supported actions to create economic alternatives, with particular emphasis on non-timber forest products and agroforestry systems. Priority has been given to both improving the processing and marketing of well-known products, such as native rubber and Brazil nuts, while supporting alternative sources of income, including tropical fruits, palm oils, essences, handicrafts and honey. More recently, community projects in sustainable timber management are being tested in some Extractive Reserves as an economic alternative. In addition to forest products, the project also supported improvements in subsistence-based agriculture and small-animal husbandry, as important components of livelihood strategies.

After six years of testing and monitoring the project's activities and results, it is clear that the Extractive Reserves model is feasible and replicable in the Amazon, in other regions of Brazil and other countries where similar conditions exist. Monitoring data on the maintenance of forest cover and biodiversity indicates that the reserves are fulfilling their environmental conservation functions. The annual costs of social and economic development as well as maintenance of the reserves are less than US\$1 per hectare. This low cost could only be achieved through direct cooperation with local populations. Through still modest, average monthly incomes in the reserves have increased and are superior to those in nearby Amazon towns and peri-urban areas. Many former inhabitants of reserves that migrated to cities have recently returned to their original homes.

The positive steps taken in implementing the first four Extractive Reserves in the Brazilian Amazon, involving the management and protection of some 2.1 million hectares of rain forest and socio-economic benefits to an estimated 2,900 families, have helped mobilize support for the creation of additional reserves. Since the beginning of the project, 17 other Extractive Reserves have been created and 20 more are on the drawing board. Within two states (Acre and Amapá), the model of Extractive Reserves is being strongly supported by state governments. The model has also expanded to other regions. In the Atlantic coastal zone, 15 marine extractive reserves have been created, in cooperation with traditional fisher communities.

Some of the key lessons learned in the Extractive Reserves project of the Pilot Program include the following:

- Economic and social development of local populations and environmental protection of pristine forests do not have to be in conflict. Extractive reserves can achieve better environmental results and lower maintenance costs than

classic conservation models that operate without the participation of local residents.

- Extractive reserves are only feasible with the active participation of local communities. Stakeholder involvement with capacity building is a key to success.
- Understanding and integrating traditional best practices in a reserve's forest management plan is essential.
- Long-run sustainability is only possible when neighboring municipal governments participate by investing in and maintaining basic infrastructure and providing health-care and education services.
- Securing land tenure for the local population is essential for assuring the sustainable use of natural resources, especially where the environmental protection agency maintains leverage to intervene.
- Effective monitoring of huge forest areas is practically impossible without the involvement of the local population. The integration of forest dwellers in environmental monitoring activities has proved to be an effective tool in preventing unsustainable uses of natural resources, , especially by reducing pressures from outside areas.
- The successful establishment of Extractive Reserves depends, to a considerable extent, on their integration into an overall protection and development strategy, to avoid the creation of legally protected but vulnerable islands. In this sense, Extractive Reserves require buffer zones in order to guarantee the protection and recuperation of fauna, hydrological regimes, etc. The Ecological Corridors Project of the Pilot Program promises to make important contributions in that regard.

3. Demonstration Projects in Environmental Protection and Resource Management

One of the main challenges facing the Pilot Program has been to support resource use strategies in the Amazon and Atlantic Rain Forests that are both environmentally sustainable and capable of improving living conditions among rural communities. In most cases, such strategies need to simultaneously address needs for improved income generation and strengthening of subsistence production, within a context in which local populations seek to minimize risks that potentially threaten their economic security.

During the early stages of the Pilot Program, small-farmer associations and rural unions, the Amazon Working Group (GTA) and environmental NGOs pressured for the creation of a specific mechanism to provide financial and technical assistance to community-based projects. In response, the Demonstration Projects Subprogram (PD/A) was launched in 1995 to support the development of innovative models in environmental protection and resource management among community-based organizations and NGOs in the Amazon and Atlantic Rain Forest. Strengthening of the capacity of local organizations to plan and implement projects was also a stated goal.

A participatory approach was adopted within PD/A for carrying out the design and implementation of an entire spectrum of activities. The selection criteria for demonstration projects were extensively discussed, and then widely disseminated, in local consultations with interested parties. A technical group was set up to provide assistance to community organizations in the preparation of projects. The selection process was also designed to guarantee a maximum level of objectivity and transparency. Representatives of social movements and environmental NGOs were granted equal seating on the main decision making commission of PD/A, responsible for the formal approval of projects.

To date, 195 projects have been approved for financial and technical support from PD/A, among over 1.000 applications received. The subprogram has already invested some US\$ 17 million in the implementation of approved projects, out of an expected total of US\$ 27 million. Main activities funded by projects include agroforestry systems (52%), forest management (31%), fisheries (11%) and environmental protection (6%). Examples of specific activities include the management, processing and marketing of fruits, nuts, fibers and oils; beekeeping; and handicrafts.

Approximately three fourths of the 195 projects approved are located in the Amazon. Among these projects, the majority is concentrated in eight “sustainable production poles” in the states of Pará, Maranhão, Tocantins, Rondônia, Amazonas,

Amapá and Acre. These “poles” correspond to areas with the highest levels of social organization, where local associations mobilized to participate in the PD/A.

Beneficiaries responsible for implementing projects supported by PD/A include small-farmer associations, indigenous peoples’ organizations, rural workers unions, cooperatives, environmental NGOs and municipal governments. There is considerable variability among project activities and implementing institutions in different areas. For example, a greater focus on environmental protection can be found among projects funded by PD/A in the Atlantic Rain Forest, most of which are implemented by NGOs.

One of the important innovations of PD/A was the development of a differentiated system for transferring funds to local associations, using the *Banco do Brasil*. This system succeeded in substantially reducing the amount of paperwork normally associated with this type of project. This administrative model of PD/A is now being replicated among other recent projects in the Pilot Program, such as PROVÁRZEA, PROMANEJO, and the second phase of RESEX.

Although it is still early to arrive at definitive conclusions about the impacts of PD/A, several important results have already become visible, including:

- Improvements in managerial capacity and increased “social capital” among participating grassroots organizations and NGOs;
- Diversification of production systems, associated with improved resource management, income generation and better subsistence production;
- On agricultural plots, the expanded use of agroforestry systems and other management practices, such as recovery of degraded lands, fire prevention and protection of gallery forests,
- Improved use of forest management techniques, including diversification of non-timber species and adoption of strategies in processing and marketing.
- Greater awareness among rural communities of the importance of forests, in terms of income generation, subsistence production and provision of vital environmental services.

This combination of factors has contributed to a substantial reduction in pressures on remaining forests within project areas of the Amazon and Atlantic Rain Forests.

On the other hand, the economic results of PD/A appear to be less effective. In this regard, many projects gave insufficient attention to issues related to financial sustainability and the insertion of productive activities into the local economy and marketplace. A partial explanation is that pressures to fund a very large number of projects in the initial stages of the subprogram tended to divert attention from the objective of developing solid, well-tried models of sustainable production that could be disseminated to other producers.

Lessons learned and challenges for the future

- The most successful projects in PD/A have frequently been those that anticipated difficulties in transportation, processing and marketing, and implemented appropriate measures.
- Marketing difficulties experienced by community organizations and small businesses are usually less a reflection of limited demand than of issues related to quality control, guaranteed delivery and marketing strategies.
- Initiatives such as PD/A need to be more realistic in their timetables, given the extended cycles and maturation periods of many production systems (e.g. agroforestry and forest management) in comparison to more conventional economic activities;
- There is an urgent need to develop alternative models of capacity-building and technical assistance in support of new approaches to resource management and sustainable local development. Such initiatives require strengthening the organizational and managerial capabilities of local associations.
- Demonstration and experimentation projects such as PD/A need to become better integrated with related projects and other local initiatives aimed at sustainable local development (e.g. Agenda 21);
- The PD/A, like the Pilot Program in general, needs to more clearly define a strategy for working with the private sector, especially in terms of helping to develop linkages between local communities and sustainable business opportunities;³
- During an initial phase of preparation, a solid monitoring system needs to be established among demonstration projects, to ensure a proper analysis of results and lessons learned, with an eye towards the replication of successful innovations.
- A major challenge for the next phase of PD/A is to consolidate sustainable production models, especially in terms of economic viability, and to guarantee their “scaling up” in public policies, especially programs of rural credit and technical assistance.

³ The experience acquired within the PROMANEJO project demonstrates the importance of building partnerships with private enterprise to support environmental protection and sustainable use of natural resources. For a positive case study of private sector involvement in the Pilot Program, see also “Fostering Sustainable Cosmetics from the Amazon: A Private Sector Partnership to Conserve the Rain Forest” (World Bank, Brazil Rain Forest Pilot Program Success Story #3), available at: www.worldbank.org/rfpp

4. *Community Mobilization for Fire Prevention and Control*

For centuries, fire has been used as a part of agricultural practices in the Amazon. When properly controlled, burning has several positive effects. The ash deposited by burnt vegetation increases levels of soil nutrients essential for plant growth, such as phosphorus, potassium and magnesium. Decreased soil acidity and aluminum toxicity, associated with improved cation exchange capacity, help make soil nutrients available for plants. Burning also kills potentially harmful parasites, insects, fungi, nematodes, and pathogenic bacteria. Weed competition is decreased and anaerobic nitrogen-fixing bacteria increase their activity. Some of the best examples of how fire can be beneficial, when properly managed, are to be found among the agroecosystems of indigenous peoples.

In recent decades, the rapid expansion of extensive cattle ranching, small-farmer settlements and the logging industry have transformed the use of fire in rural Amazonia into a major threat. During the dry season, runaway fires often invade neighboring agricultural plots, causing catastrophic economic losses for local farmers. Moreover, uncontrolled fires have increasingly entered into adjacent forests, a phenomenon stimulated by high impact logging that drastically increases the level of dry biomass on the forest floor that is susceptible to combustion. Among both rural and urban populations, smoke from burning often constitutes a major public health problem, particularly with regard to respiratory illness. During periods of intensive burning, airports have often been forced to close, leading to further negative impacts for the local economy.

The year of 1998 was particularly dry in the Amazon basin due largely to the effects of El Niño (the cyclical climatic phenomenon caused by the warming of the Pacific Ocean off the western coast of South America). In response to concerns among rural worker unions and NGOs linked to the Amazon Working Group (GTA) regarding the adverse consequences of uncontrolled burning, a new initiative was created in the Pilot Program: the *Project for Mobilization and Training for the Prevention of Forest Fires in the Amazon* (PROTEGER).

An salient characteristic of PROTEGER is it was the first project in the Pilot Program to be implemented directly by civil society organizations: the Amazon Working Group, together with grassroots organizations representing family farmers, agricultural workers, extractivists and indigenous communities.

Given this emergency situation, the main challenge during the first phase of the project was to implement a large-scale educational campaign among local communities concerning the dangers of wildfires during the dry season, together

with complementary activities for mobilization and training in fire prevention techniques.

In the first phase of the project, particular emphasis was placed on training farmers responsible for disseminating information among their respective communities. During this phase, the project promoted the training of some 12,000 community leaders in techniques for controlled burning and forest fire prevention, through partnerships with local associations and other civil society organizations. Since each of the trainees was expected to share knowledge with at least another ten people in his or her community, it is estimated that the first phase of PROTEGER benefited a minimum of 120,000 people throughout the Amazon.

After the initial emergency phase of the project, a second phase of PROTEGER was designed to meet the broader challenge of developing viable alternatives for rural populations to minimize the use of fire in their productive activities. Based on a decentralized methodology that stimulates the active involvement of local communities and partnerships with state and municipal governments, project activities have been focused in three main areas – environmental education; social mobilization; and sustainable production techniques for minimizing and/or eliminating the use of fire. The second phase of PROTEGER aims to benefit at least 39,000 people within 134 municipalities in the Brazilian Amazon.

As a result of the project's innovative strategy, measures to prevent and control the use of fire have been increasingly assimilated into resource management strategies at both the household and community levels. In Brazil, the project is widely considered a successful example of cooperation between government agencies, NGOs and local communities in environmental management. Currently, the methodology developed by PROTEGER is being up-scaled into public policies elsewhere in the Amazon region.

In summation, the PROTEGER project has demonstrated that grassroots initiatives based on creative methodologies for raising environmental awareness have key roles to play in the prevention and control of forest fires and deforestation. At the same time, it is clear that the implementation of innovative projects such as PROTEGER requires substantial changes within the institutional culture of environmental agencies, in terms of their ability to work constructively with local communities in the search for practical solutions to environmental problems.

5. *Promoting Integrated Environmental Management in the Amazon*

Since the mid-1990s, the Natural Resources Policy Project (NRPP) has supported the decentralization of environmental management strategies in the Brazilian Amazon, with a particular emphasis on institutional strengthening among state environmental agencies and municipal governments. In a first phase, project activities focused mainly on infrastructure improvements, personnel training, establishment of environmental legislation and creation of councils to address environmental issues at the state and municipal levels. In a second phase of the project (since 1997), a more integrated approach to environmental management was adopted, combining various policy instruments (environmental monitoring, licensing and enforcement, ecological-economic zoning, educational activities, etc.) within priority geographic areas, with increased participation of various government agencies, civil society organizations and the private sector.

Some of the key lessons learned with regard to decentralization and integrated environmental management include the following:

- The decentralization of environmental management should not be conceived as a mere transfer of responsibilities from the federal to state governments, and from states to municipalities. In contrast, what are needed are partnerships that involve a sharing of responsibilities among federal, state and municipal agencies. A series of actions need to be gradually decentralized to state and local governments, to the extent they are prepared to assume such responsibilities, but federal agencies such as IBAMA must remain present, even in a supervisory role.
- It is essential to develop a clear set of criteria for defining the conditions under which decentralization of responsibilities for environmental management will occur, including needs for trained personnel, a consistent legal framework and strategies for integration between the actions of different government agencies. Moreover, partnerships need to be based on common objectives that take precedence over the specific interests of individual institutions.
- Strategies aimed at the decentralization of environmental management need to be articulated, whenever possible, with participatory initiatives in sustainable development at the local level. For example, cooperation with municipal councils responsible for sustainable rural development planning has been mutually beneficial.⁴

⁴ The success of municipal councils responsible for sustainable development planning, created through programs such as PRONAF (National Program to Support Family Farming) has depended, to a large extent, on the willingness of local governments to share decision-making power, as well as the capacity of civil society organizations to effectively participate in such initiatives.

- The experience of the Pilot Program has shown that initiatives in “ecological-economic zoning”, that typically involve diagnostic studies and prescriptive maps for environmental protection and land use, need to be firmly rooted within participatory exercises in planning for sustainable local and regional development. Prior to the initiation of technical studies, demands for information should be clearly defined, both in terms of clients and practical applications to local and regional planning (e.g. support for creation and management of protected areas, definition of potential and limits for specific economic activities on a sustainable basis).
- There is a need to avoid certain assumptions about the potential for technical studies to magically identify the optimal use or “vocation” of landscapes, in the absence of transparent and participatory negotiations among stakeholders about land use options, with due respect for existing environmental and human rights legislation. Rather, zoning studies are most useful when they contribute to participatory processes of local and regional planning, in a manner that enhances possibilities for public policies to be adapted to the heterogeneous physical and cultural landscapes of the Amazon.
- Strategies to promote integrated environmental management require establishing a balance between effective “command and control” instruments and economic incentives for sustainable resource use. As described below, negotiations with local stakeholders regarding agendas for sustainable development are an important part of finding this balance.
- The environmental training program supported by the UK’s Department for International Development (DfiD) as part of the Natural Resources Policy Project has highlighted the importance of capacity-building among the personnel of government agencies, civil society organizations and the private sector, based on a clear definition of priority demands, as a key element for the implementation of integrated environmental management strategies.

Negotiating Agendas for Sustainable Development

In recent decades, processes of frontier expansion in the Brazilian Amazon have often involved social conflicts over access rights and the use of natural resources. In several instances, such conflicts have resulted in acts of violence, such as the assassination of rubber-tapper and union leader Chico Mendes in December 1988.

The experience of the Pilot Program has demonstrated the important role of the public sector in fostering dialogue and negotiations between different groups involved in environmental problems and social conflicts over natural resources. Although issues are often complex and difficult to resolve, the establishment of open dialogue and negotiations, encouraging mutual respect between different stakeholders, is often a first step towards the practical implementation of sustainable development.

A groundbreaking initiative supported by the Natural Resources Policy Project has been the elaboration of “Agendas Positivas” (Positive Agendas) in the Amazonian states of Brazil. In early 1999, in response to the release of satellite data indicating a rise in deforestation rates in the Amazon, the Ministry of the Environment issued a decree temporarily prohibiting new forest clearings in the Amazon region. This act immediately stirred opposition from social movements, local politicians and private sector groups alike, who viewed the ban on deforestation as an attempt to undermine economic development in the region.

Faced with a politically tense situation, the Ministry of the Environment’s Secretary for Coordination of the Amazon, Mary Allegretti, led an unprecedented effort to stimulate dialogue and negotiations between government agencies, civil society organizations and private sector groups in the region. A starting point for the initiative was the notion that actions to reduce deforestation in the Amazon needed to be negotiated with local stakeholders as a part of a “positive agenda” for sustainable development. In this regard, a priority would be to encourage more efficient use of previously cleared areas for agricultural and livestock production (including recovery of degraded lands) and the maintenance of standing forests, through sustainable management and valuing of their environmental services.

With support from the Natural Resource Policy Project, state-level agendas were negotiated in each of the nine Amazonian states in seminars with wide participation among government agencies, civil society organizations and the private sector. In many cases, the process opened an unprecedented dialogue between stakeholders involved in conflicts over access rights and the use of land and other natural resources.

Subsequently, an “Agenda Positiva” for the Amazon region was elaborated in a seminar promoted in conjunction with the Brazilian Congress, drawing upon key points from each of the state agendas. The Ministry of the Environment has since used the *Agenda Positiva* as an important reference in planning its actions in the Amazon, especially in partnerships with state governments. It has also become increasingly clear that initiatives such as the “Agenda Positiva” and Agenda 21 need to include a clear definition of priority actions, institutional responsibilities, timetables for implementation and strategies for their monitoring and evaluation.

The Pilot Program has supported similar actions aimed at the resolution of social conflicts over natural resources at the local level. For example, initiatives supported by the Natural Resources Policy Project in Laranjal do Jari (Amapá state) and Lago de Tucuruí (Pará state) have made significant contributions to the resolution of resource use conflicts, as part of plans for sustainable local development. The PROMANEJO project has facilitated the resolution of local disputes over access rights and the use of natural resources, in conjunction with preparation of a management plan for the Tapajós National Forest, in the state of Pará. The PROVARZEA project has played an important role in the resolution of

conflicts on the *varzea* floodplains, especially those involving riverine communities and commercial fishermen.

An important lesson learned in the Pilot Program is that initiatives such as the creation of protected areas and enforcement of environmental legislation need to involve prior consultations and negotiations with local stakeholders, in conjunction with actions to promote economically-viable alternatives for sustainable resource use. The experience of the *Agenda Positiva* has demonstrated that when environmental actions are negotiated as part of plans for sustainable local development, their implementation is far less likely to suffer opposition from influential political and economic groups.

6. *A Model for Controlling Deforestation in Rural Properties*

One of the most successful initiatives supported by the Pilot Program has been an integrated system for monitoring, licensing and control of deforestation on private properties, developed by the State Environment Foundation (FEMA) of Mato Grosso. Combining remote sensing and GIS technology with a series of other practical measures, the system represents a major improvement to conventional approaches to environmental surveillance, licensing and monitoring, both in terms of accuracy and effectiveness.

Located in the Legal Amazon and Center-west region, Mato Grosso is the third largest state in Brazil, covering 90.6 million hectares and possessing a population of some 2.5 million inhabitants. Mato Grosso of the fastest growing states in Brazil: the state's GDP increased 8.7% during the years 1998- 1999 and by nearly 10% annually during 2000-2001, while national GDP grew by 0.8% and 1.5%, respectively, during these periods.

In recent years, Mato Grosso acquired notoriety as the largest contributor to deforestation in Brazil, accounting for 40% of forest clearing in the Legal Amazon during 1999. In December 1999, Governor Dante de Oliveira signed an agreement with the Federal Government to assume responsibility for environmental control in order to conserve and protect the state's forests. The state environmental agency (FEMA) was given the task of developing an approach to deal with the illegal deforestation, forest fires and improper land use that threaten Mato Grosso's forests.

With support from the Natural Resources Policy Project (NRPP), FEMA has developed an innovative system for controlling deforestation, based on the concept of environmental licensing of rural properties. Within this system, emphasis has been given to the maintenance (and recovery) of forest reserves and areas of permanent preservation (along waterways and steep slopes) that are required by the Brazilian Forestry Code. The concept of environmental licensing contrasts sharply with conventional procedures limited to the issuance of authorization permits for specific activities (forest clearing and timber extraction) in a manner that has been largely ineffective in controlling indiscriminate deforestation.

The system is based on the following strategic principles:

- **Concentration on large holdings in critical areas** – In Mato Grosso, properties over 500 hectares in size account for 88% of all privately-held land. FEMA's system concentrates on rural holdings above 1,000 hectares. Located in areas that are most susceptible to deforestation and fires; a strategic focus on large properties located in areas where deforestation rates are critically high,

accounting for approximately 70% of forest clearing in the state, thus optimizing the use of scarce human and financial resources;

- **Emphasis on managing environmental assets** – Instead of seeking to fine those who degrade or fail to comply with the law, the emphasis is on having landowners maintain environmental assets and mitigate environmental degradation. As an alternative to fines for illegal forest clearing, landowners have the option of signing an agreement with the public prosecutor's office (*Ministério Público*) to implement a mitigation plan, recovering the degraded area over a fixed period of time, thus regularizing the environmental situation on rural properties. The situation is monitored annually for changes in land use and compliance with plans.
- **Use of information technologies** – LANDSAT-TM remote sensing imagery is first combined with baseline maps in a geographic information system that allows for a preliminary analysis of forest clearing. Data on burning is collected from NOAA satellite imagery and analyzed by IBAMA's remote sensing center. Remotely sensed data and digitized plans used in the licensing system are maintained in a database of the GIS. Ground positioning systems (GPS) are used by inspectors to go directly to problem areas identified on imagery-based maps and by over flights carried out during
- **Simplified licensing** – The licensing process is de-bureaucratized by substituting a unified environmental license for the previous preliminary license, installation license and operational license required by the traditional approach for rural enterprises
- **Educating the client** – Enforcement operations are supported by a team of experts in environmental education to provide information to landowners. FEMA agents use imagery-based maps and GPS to inform landowners about irregularities and provide guidance on how to comply with the law. These agents receive training on awareness-raising and conflict avoidance in interactions with rural proprietors.
- **Using partnerships** – The system relies on partnerships between FEMA, the Mobile Environmental Court, civil society organizations, and the private sector. Landowners use the services of a professional registered with FEMA to prepare projects for remedying environmental damage on their property (registration and training have been provided at no charge to local professionals by FEMA). This system is put into action through three surveillance campaigns each year.⁵

⁵ For further details on the calendar of activities and other aspects of this pioneer initiative in Mato Grosso, see the World Bank's publication on this topic in its series of Pilot Program "success stories", available at www.worldbank.org/rfpp. To learn more about the work of FEMA in Mato Grosso, see also the publication entitled "Environmental Control System on Rural Properties" available at www.fema.mt.gov.br.

The implementation of the system of environmental licensing and control on rural properties has contributed significantly to a recent decline in the deforestation rate in Mato Grosso, from 1.8 million ha in the two-year period 1998-1999 to 1.2 million ha in the two years from 2000-2001, or nearly 33%. Heat sources (fires) were reduced 38% during the first year of implementation (2000).

The implementation of this system in Mato Grosso has improved perspectives for the financial sustainability of the state environmental agency. Instead of a small number of large fines for environmental damage, which normally are not paid, FEMA now has a steady and rising influx of revenue from the licensing of a growing number of rural properties, each of which corresponds to a relatively small fee but which in total result in the collection of substantial funds.

One of the lessons learned from this experience in Mato Grosso is the importance of political commitment to environmental policy on the part of the state governor and his direct subordinates. In this case, the governor personally supported this initiative that mainly affected large landowners. This high-level commitment was essential to successful implementation. The adoption of an innovative approach control that avoided the repressive actions that often characterize environmental agencies was also important in ensuring political support.

An important challenge for the Pilot Program is to consolidate the system developed in Mato Grosso and to promote its replication in other states of the Amazon and Atlantic rain forest regions, with appropriate adaptations to different environmental and social contexts, as well as varying land-tenure situations. Currently, the system is being scaled up to include other priority areas in Mato Grosso and other Amazon states with high levels of deforestation, particularly Pará and Rondônia.

7. Revitalizing Research in Science and Technology

Although tropical rain forests contain most of the earth's biodiversity, and perform a range of important environmental services, such as carbon sequestration to offset the effects of global climate change, they remain one of the least understood ecosystems on earth. This is especially relevant in the case of the Brazilian Amazon, the largest expanse of tropical rain forest left in the world.

Brazil has a long tradition of supporting research in science and technology. Until recently, however, its investments for environmental research in the Amazon were only a small fraction of total national science and technology funding. Cutbacks in overall national funding for science and technology during the 1980s and early 1990s further limited resources for Amazon research institutions and environmental research.

The Pilot Program aimed to address this situation with the Science and Technology Subprogram, which was designed to increase scientific knowledge about tropical forests and their sustainable management and use by focusing research support and helping to improve research centers in the region.

Starting in 1995, the Science and Technology Subprogram focused its actions on: 1) improvements in the scientific research and dissemination capacity of the region's two premier science centers - the National Institute for Amazonian Research (INPA) in Manaus, and the Emílio Goeldi Museum of Pará (MPEG) in Belém, and 2) creation of a grants program aimed at supporting applied research on a transparent, competitive basis according to set priorities.

Institutional strengthening of the two research centers financed the construction and renovation of buildings; improvement of electrical, telecommunications, computer, water, and sanitation systems; upgrading of scientific equipment; strengthening of institutional management and administration; institutional strategic planning; scientific exchange and specialized training; and improved dissemination of research results.

The grants program under Phase I directed US\$5.6 million to three thematic areas: ecosystem studies, sustainable management and technology development, and socioeconomic and cultural studies. Some examples of the projects funded include research on the dynamics of forest fragments in the state of Amazonas (carried out by INPA); agroforestry systems in the state of Roraima (carried out by the Brazilian Enterprise for Agricultural Research, EMBRAPA); and sustainable forest resource use in the state of Pará (carried out by the Institute for Man and Environment in the Amazon, AMAZON).

The main results of the Science and Technology Subprogram are summarized below:

- ***Directed research.*** A total of 23 directed research projects were funded throughout the Amazon under the Phase I project.⁶ Twenty-six regional institutions, 17 national agencies based in other regions, and nine international institutions participated in the inter-institutional and interdisciplinary research teams. They collaborated with an additional 51 national and 26 international institutions. A second phase Directed Research Project is currently being prepared to continue funding innovative, interdisciplinary applied research in the Amazon.
- ***Infrastructure and equipment.*** The subprogram also provided support for improving hydraulic, electric, sanitary and fire-control systems; upgrading library facilities; establishing modern computer networks; and expanding and renovating laboratories and offices. Overall, the infrastructure improvements financed by the subprogram provided adequate working conditions for the scientists, and helped energize the staff at both institutions.
- ***Scientific collections.*** The improvements made during the projects were essential to preserving the globally significant scientific and specimen collections at INPA and MPEG. Both centers used available funding to expand their existing collections, improve storage facilities, enhance museum exhibits, and modernize and computerize the overall cataloguing and management of their collections.
- ***Dissemination of research results.*** Dissemination activities at both institutions also improved. In addition to publishing back issues of scientific bulletins, which were years behind due to funding shortfalls, both centers developed a variety of targeted dissemination activities, such as publishing books and pamphlets, producing videos and other media material, and organizing a number of events aimed at the general public as well as scientists, students and children.
- ***Improved management of Science Centers.*** The subprogram contributed to defining the centers' strategic objectives, restructuring and prioritizing their research programs, and introducing competitive fund allocation systems to support research projects within each institution. These improvements have resulted in more rational management and increased efficiency in the execution of research projects.
- ***Human resources.*** Staff training was revitalized at both institutions during project implementation. The number of PhDs increased by 34% at INPA and

⁶ Another 30 directed research subprojects were funded separately by the European Commission under a second call for proposals in 1998.

by 54% at MPEG, while most of the remaining research staff was registered in graduate courses by project completion. The participation of researchers from both institutions in national and international scientific congresses increased significantly, and the post-graduate programs for non-staff researchers at both Centers were also considerably expanded.

- ***Inter-institutional cooperation.*** Both INPA and MPEG increased their cooperation with national and international institutions. As a result, a number of important research, training and dissemination activities were carried out with technical and financial support from national and international research institutions, universities, government entities, private companies and NGOs, such as the Smithsonian Institution, the Wood's Hole Oceanographic Institution and Brazil's National Institute for Space Research (INPE).

The main impacts of the Subprogram may be summarized as follows:

- Scientific research in the region was revitalized through critical infrastructure improvements, technical capacity building and strategic planning at the two most important science centers in the Amazon, the National Institute for Amazonian Research (INPA) and the Emílio Goeldi Museum of Pará (MPEG), where working conditions had badly deteriorated in previous decades.
- Through its support for directed research, the Pilot Program's Science and Technology Subprogram has also helped expand scientific knowledge of the region's natural resources, assess the impact of human interventions, and open new opportunities for the sustainable management of Amazonian plants and animals. It is expected that these results will contribute to improved development and preservation strategies for the Amazon.

Lessons Learned

- Overall, the experience with strategic planning at the two regional science centers shows that it is necessary to carry out participatory analyses of specific institutional roles, research priorities, timing/costs, potential benefits and potential clients in order to more rationally allocate resources.
- The long-term sustainability of research operations in Brazil depends on a combination of adequate public funding and fund-raising/development planning which in turn requires a certain degree of institutional autonomy and administrative flexibility to be successful.
- The impact of directed research on regional conservation and development issues will likely depend on more precise targeting of research problems within a general framework of research priorities for the region as a whole, the identification of beneficiaries and end users of the research results, the

definition of the appropriate scope of research, and improved identification of local and regional research needs.

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- The establishment of a permanent dialogue between the subprogram and other projects in the Pilot Program should be an integral part of defining priorities for applied research. The participatory process recently initiated in preparations for the second phase of the Pilot Program has been a positive step in that direction (see section 9). It is foreseeable that a more demand-driven approach to the subprogram will result in increased interdisciplinary research on resource management problems, requiring greater collaboration between natural and social scientists.
- The experience of the Science and Technology Subprogram has highlighted the need for well-planned dissemination strategies, geared towards presenting research results in an understandable fashion to interested parties, ranging from local producer groups and community organizations to policymakers within government agencies.

8. *Lessons in the Participation of Civil Society*⁷

The Pilot Program has long been noted for its explicit commitment to broad civil society participation at various levels. In particular, such characteristics reflect the mobilizing efforts of civil society organizations (CSOs) to participate in the program, and a growing recognition among authorities and project managers (within government agencies, donor agencies and the World Bank) that earlier investments in the Amazon and Atlantic Forest regions had failed to reach their objectives largely because of lack of political and social support.

From its inception in 1991, the Pilot Program has encouraged participation of a wide variety of stakeholders, while giving particular emphasis to community organizations that represent beneficiary populations (e.g. rubber tappers and other extractivist populations, indigenous peoples, family-based agricultural producers, river dwellers, etc.) and intermediary social and environmental organizations that work with these social groups.

The participation of civil society in the Pilot Program has taken various forms at different levels of the program. At the broadest level, support has been provided to assist in building the institutional capacity of two major civil society organization (CSO) networks that are closely involved in the Pilot Program -- the Amazon Working Group (GTA) and the Atlantic Forest Network (RMA). Civil society representatives from both GTA and RMA have long played a role in program oversight, through direct participation in the Brazilian Coordinating Commission for the Pilot Program. Since 1999, CSO network representatives have also served as members of the Pilot Program's Steering Committee, joining forces with the Brazilian government, donor representatives and the World Bank at the highest level of decision-making for the program.

At the project level, the nature and extent of civil society participation has varied from case to case. During the design phase of some projects, for example, CSO and beneficiary involvement was limited to consultation, while in other projects, they participated more actively in project preparation. During project implementation, civil society involvement has ranged from participation in formal project advisory commissions to direct responsibility for implementing projects. Some illustrative examples of differences in CSO participation in the design and implementation of projects are the following:

⁷ This section is based on research commissioned by the World Bank and carried out in 2000 to assess the nature, impact and lessons learned from a decade of civil society participation in the Pilot Program. A summary of the study can be found on the World Bank's Pilot Program website (www.worldbank.org/rfpp) and a copy of the full report can be requested from the Bank's office in Brasilia (see address page).

- Within the Extractive Reserves, PD/A, PROTEGER projects, civil society organizations (including local associations, environmental and support groups and umbrella organizations, such as the National Council of Rubber Tappers and the Amazon Working Group) have played key roles in the design and implementation of activities (see sections 2, 3 and 4).
- The preparation of PROMANEJO (sustainable forest management project) was highly participatory, involving a series of workshops and meetings that brought together a carefully selected balance of environmental CSOs, local populations, the logging industry and government representatives to agree on project design. Similar to PROMANEJO, the floodplains management project, PROVARZEA, has adopted a systematic approach to civil society participation from the preparatory phase onwards.
- In the Natural Resources Policy Project (NRPP), CSO involvement was initially limited to formal participation on a commission responsible for approving funds for subprojects prepared by state governments. Subsequently, civil society participation has gradually expanded at the state and municipal levels, in terms of overall planning and implementation of specific activities.
- In the Science and Technology Subprogram, the first phase science centers and directed research projects were designed with a minimum of CSO participation, especially in the definition of thematic priorities for directed research. Greater participation has since occurred in the ongoing design of the second phase of the subprogram.

Within a wide spectrum of projects and activities, the nature and extent of civil society participation in the Pilot Program has ranged from simple information-sharing and consultations to integral involvement and control of project activities. Some of the key factors related to such differences include:

- i. the extent to which civil society organizations were actively involved in the initial stages of project preparation, in order to influence overall strategy and to maximize their role in project implementation.
- ii. the degree to which government agencies are politically willing to share decision-making power with CSOs;
- iii. the level of technical capacity among government agencies to promote participatory methods in project management;
- iv. the organizational and technical capacity of CSOs to participate effectively in projects, and
- v. the perceptions of CSOs with regard to the relevance of projects to their particular interests.

As the Pilot Program has progressed, the idea that participatory processes are important for broader policy, scientific or institution-building projects gained greater

acceptance. This can be seen most clearly in the Natural Resources Policy Project that initially focused almost exclusively on institutional strengthening of state governments, using a command and control approach to improve environmental enforcement. The project's approach has since slowly changed to recognize the importance of building local constituencies for improving environmental management, as well as the need for local involvement in fire prevention and other environmental activities, and the important role of municipalities and other local groups.

During the first phase of the Natural Resources Policy Project, project managers often viewed civil society participation as largely irrelevant. Meanwhile, given its narrow focus on institutional strengthening among state environmental agencies, CSOs generally viewed the project with little interest, in contrast to other initiatives in the Pilot Program that responded to their immediate demands, most notably PD/A, RESEX and PPTAL.

Recent advances in the extent and impacts of civil society participation within NRPP reflect the gradual adoption of more innovative approaches to integrated environmental management, associated with increased awareness among project managers of the relevance of CSO participation and a growing interest among CSOs themselves in policies related to environmental issues of concern to the general public (see section 5).

The increased mainstreaming of participatory processes into the Pilot Program over the past decade also reflects the positive results of community-driven projects such as PD/A and RESEX. Initiated during the early years of the program, these projects clearly demonstrated the importance of stakeholder involvement for successful project implementation. As a result, they contributed over time to a growing receptivity on the part of government agencies to greater CSO co-management of projects.

The ability of Pilot Program activities to reach beneficiary populations has increased over time, as has the breadth of their portfolio. From its inception, the program included projects that clearly targeted traditionally excluded populations in the tropical forests. Over the past decade, the program has rapidly expanded its portfolio to reach a broad range of local beneficiary populations. To cite just a few examples, the forest management (PROMANEJO) and the floodplains (PROVARZEA) projects both include components to support community management subprojects; fire prevention activities were implemented by the GTA in cooperation with local organizations; and community development projects for indigenous groups are being funded through the Pilot Program.

This increased outreach to local beneficiary populations has occurred in part because of growing awareness of the relevance of CSO participation, among both government institutions and international partners in the Pilot Program. As in the experience of the negotiations of the *Agenda Positiva* (see section 5), there has also

been a growing recognition in Brazil of the importance of building local political constituencies for sustainable development in Brazil, with active participation of civil society organizations and the private sector. In this regard, the Brazilian government's growing experience of working effectively with civil society and CSOs' increasing effectiveness in program and project management have been positive factors. Finally, the increased outreach of the Pilot Program reflects a greater overall understanding of the linkages between reducing poverty and improving natural resources management and respect for knowledge systems in resource management among local populations.

While civil society organizations have gained decision making power in the Pilot Program, the degree of such influence is not always well correlated with formal mechanisms of participation, such as project committee membership. Indeed, despite the existence of such mechanisms, important decisions at the project and program level have often taken place through informal interactions and access of CSOs to government authorities and other decision-makers. Although such practices facilitate rapid decision-making, they tend to favor the participation of better-articulated groups, often at the expense of other CSOs. Moreover, such informal mechanisms of participation do not substitute the dialogue and negotiations between various stakeholders that are often necessary to adequately address strategic issues in the Pilot Program.

Despite the growing extent of participation of CSOs and beneficiary populations at various levels within the Pilot Program, much still remains to be done to overcome certain bureaucratized management approaches that are often ingrained into institutional cultures. In some cases, such tendencies have negatively affected the functioning of coordinating committees, both at the project and program levels, in terms of their ability to promote adequate dialogue and negotiations between key participants on issues of strategic importance.

While the Pilot Program has moved over time to provide CSOs greater control over financial resources for implementation of specific projects and activities, the simple transfer of money has not always been an optimal strategy, especially where there is need for capacity building and institutional strengthening to enhance project management performance. Moreover, there is a danger that CSOs may become excessively reliant on program funding, in a manner that negatively-affects their long-term sustainability.

One of the principal conclusions of the World Bank-sponsored study on participation in the Pilot Program is that participatory processes contribute to improved project results. In numerous projects participation of CSOs and other local groups has been a critical means to the end of achieving key project objectives. This is true in the case of the indigenous lands project, where highly participatory demarcations of indigenous lands improved project outcomes, in terms of accuracy of information, local ownership, and long-term sustainability. The positive results of the first phase Extractive Reserves Project are also due largely to the strengthening

local organizations – local reserve associations and neighborhood organizations– in terms of their ability to sustainably manage natural resources, while helping to improve the well-being of the local population.

Lessons Learned

- At a preliminary stage of project design, specific actions are needed for capacity-building and institutional strengthening among CSOs and other beneficiary groups, in order to prepare them for implementation responsibilities.
- The experience and capacity of government agencies to promote effective participation must also be evaluated, and strengthened if required. For example, training of project management personnel in participatory methodologies is often an urgent necessity.
- From an early stage of project design, specific efforts may be needed to foster awareness among government decision makers about the relevance of civil society participation. On the other hand, specific measures are often required to identify relevant CSOs and to encourage their participation in project design and implementation.
- Processes of project design are increasingly dependent upon the ability to foster dialogue and negotiations between relevant government agencies, civil society organizations and private sector groups. Such participatory processes tend to be beneficial in terms of the technical quality of projects and for the critical issue of governance.
- Clearly, there is no “one size fits all” recipe for participation of CSOs in projects such as those supported by the Pilot Program. Rather, participatory strategies should be tailored to the specific characteristics of individual projects, in terms of their objectives, beneficiaries, political context, etc. The adoption of participatory methods at an early stage of project design is an important means to maximize the capacity to “learn by doing”.
- While enhanced participation in project and program activities may in some cases raise financial costs, these modest increases are clearly outweighed by the gains to civil society and beneficiary groups in terms of improved capacity and institutional strengthening, and to achieving overall project objectives.

9. *Towards a Second Phase of the Pilot Program*

A second phase of the Pilot Program, scheduled to begin in 2003, is currently under preparation. Based on discussions that have evolved since 1999, there is broad consensus among participants that the next phase of the program will focus on consolidation of innovative strategies and “mainstreaming” lessons learned to influence public policies for the sustainable development of the Amazon and Atlantic rain forests. At a Participants’ Meeting in June 2001, the following mission was defined for the second phase of the Pilot Program:

To contribute to policies that promote conservation and sustainable development of Brazil’s Amazon and Atlantic rain forests, including due attention to the livelihoods of local populations, by pursuing the following objectives:

- *Generating, validating and disseminating knowledge within Brazil and the Amazon and Atlantic Forest regions*
- *Catalyzing the adjustment of policies and mobilizing political support for their adoption and their effective implementation*
- *Promoting and selectively supporting the mainstreaming and scaling-up of successful experiences and models*
- *Strengthening capacity in public, private and civil society institutions to implement such policies and apply new knowledge*

The resolution of the Participants’ Meeting defines the contributions of the Pilot Program to “mainstreaming” as: a) providing inputs to for better policies; b) using the program’s catalytic, convening and mobilizing abilities; and c) being a force towards mainstreaming and learning lessons. While the document acknowledges that the Pilot Program itself implements mainstreaming only selectively (as in the case of the indigenous lands project), it affirms that its contributions should be measured by its impacts on a wide array of environmental and development policies that affect rain forests across all sectors.

Since December 2001, a series of seminars and workshops has been organized to take additional steps in planning the second phase of the Pilot Program. One of the innovations of this process has been the creation of working groups around strategic lines of action (conservation units and indigenous lands; sustainable production and business; environmental monitoring and control; local and regional development; science and technology). With broad participation of stakeholders from government agencies, civil society organizations and the private sector, the working groups are responsible for identifying priority actions for the second phase of the Pilot Program, while incorporating lessons learned from the first phase. This

includes an analysis of actions that may be implemented by existing projects in the Pilot Program's portfolio, as well as needs for the creation of new projects.⁸

Another important aspect of planning for the second phase of the Pilot Program, directly related to the issue of mainstreaming, is the building of partnerships with other relevant government institutions and programs, while at the same time strengthening existing collaborative efforts. Significant progress has already been made in this regard. For example, the Ministry of the Environment (MMA) and the Ministry for Agrarian Development (MDA) are increasingly cooperating on issues related to land tenure, environmental and rural development policies.⁹

A major challenge for the second phase of the Pilot Program regards the need for vigorous efforts to streamline cumbersome bureaucratic procedures that often affect the quality of project implementation. In this regard, further steps are needed to enable more flexible approaches to the preparation and implementation of projects, suited to the 'pilot' nature of the Program. Such initiatives can build upon positive examples of decentralized and simplified management strategies, such as the differentiated approach adopted by PD/A for transferring funds to local associations (see section 3) and the streamlined nature of the *environmental training program* supported by the UK's Department of International Development (DfID) within the Natural Resources Policy Project.

Another challenge for the second phase of the Pilot Program is to strengthen the monitoring and evaluation systems of projects, especially in terms of their ability to analyze impacts and to identify strategic lessons. Such a qualitative approach to monitoring and evaluation contrasts with a tendency to view these instruments of project management as mere bureaucratic exercises undertaken in response to external demands for administrative and financial control. Clearly, such measures are best initiated early in the process of project design, in order address questions such as the allocation of financial and human resources to monitoring systems, and the organization of baseline data.

A further challenge for the second phase of the program will be to promote greater exchange of experiences and lessons learned with other countries in the Amazon basin, as well as other regions of the world where the protection and sustainable use of tropical forests is an urgent necessity.

⁸ The proposals of the thematic working groups are subsequently consolidated and submitted to the Brazilian Coordinating Committee (BCC) and the Joint Steering Committee (JSC) for analysis and deliberations.

⁹ This cooperation between the two ministries resulted in the creation, in August 2002, of a specific line of rural credit for forest-based activities among family farmers (PRONAF Florestal) that will initially prioritize the rehabilitation of degraded lands in the Atlantic Rain Forest.

Finally, a key issue for the second phase of the Pilot Program is to strengthen partnerships with existing donor countries, while exploring additional possibilities for financial and technical cooperation.

List of Acronyms

AMA	Monitoring and Analysis Project
CSO	Civil Society Organization
DfID	Department for International Development (United Kingdom)
FEMA	State Environment Foundation (Mato Grosso)
FLONA	National Forest
FUNAI	National Indian Foundation
GIS	Geographic Information System
GTA	Amazon Working Group
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (Germany)
IAG	International Advisory Group
IBAMA	Brazilian Institute for the Environment and Renewable Natural Resources
INPA	National Institute for Amazonian Research
MDA	Ministry of Agrarian Development
MMA	Ministry of the Environment (Brazil)
NGO	Non-Governmental Organization
NRPP	Natural Resources Policy Project
PD/A	Demonstration Projects - Type A
PPTAL	Integrated Project for the Protection of Indigenous Peoples & Land in the Amazon
PRONAF	National Program to Strengthen Family Farming
PROMANEJO	Amazon Sustainable Forest Management Program
PROTEGER	Project for Mobilization and Training in the Prevention of Forest Fires in the Amazon
PROVARZEA	Floodplain Management Project
RESEX	Extractive Reserves Project
RMA	Atlantic Rain Forest Network
SCA	Secretariat for Coordination of the Amazon
SPC&T	Science & Technology Sub-Program
ZEE	Ecological-Economic Zoning

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About the AMA project

The **Monitoring and Analysis Project (AMA)** has the role of contributing to the identification, analysis and dissemination of lessons learned and other strategic knowledge related to the Pilot Program. The project is linked to the Ministry of the Environment's executive coordination unit for the Pilot Program. Its principal activities include:

- Training and technical assistance in innovative methods of monitoring and evaluation among project personnel in the Pilot Program;
- Implementation of studies, with a focus on lessons learned and public policies that the Pilot Program seeks to influence;
- Organization of seminars on themes of strategic interest to the Pilot Program, providing forums for exchange and debate among program participants and other stakeholders; and
- Dissemination of the results of project activities through a series of publications adapted to the information needs of participants in the Pilot Program and the general public.

The AMA project is implemented in cooperation with the United Nations Development Program (UNDP). The project also benefits from the technical cooperation of GTZ - *Deutsche Gesellschaft für Technische Zusammenarbeit* (Germany).

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About the World Bank's Brazil Rainforest Unit

The Rainforest Unit is a team of World Bank professionals based in Brazil that contributes to the management of the Pilot Program. The team has fiduciary responsibility for the Rain Forest Trust Fund, a central funding instrument that finances 15-20% of most projects. Apart from being a trustee, the Unit has also:

- contributed towards Program strategy;
- helped develop and supervise most of the projects in the Program;
- coordinated donor involvement in the Program;
- used its convening power to seek environmentally friendly options for Amazon development;
- been instrumental in promotion of mainstreaming of environmental management at state level;
- carried out analytical work on the forest sector, land use change and poverty environment trade-offs, and mechanisms for compensation for global benefits; and
- incorporated lessons it learned from the Program into the World Bank's own strategy and operations for rain forests in Brazil.

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