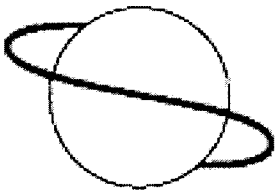

Global Environment Facility

GEF/C.15/3/Add.1
April 20, 2000

GEF Council
May 9-11, 2000
Agenda Item 7

ADDENDUM TO WORK PROGRAM SUBMITTED FOR COUNCIL APPROVAL

(Project proposal A-2a, Brazil: Promoting Biodiversity Conservation and Sustainable Use in the Frontier Forest of Northwestern Mato Grosso)

Project A-2a, Brazil: *Promoting Biodiversity Conservation and Sustainable Use in the Frontier Forest of Northwestern Mato Grosso*

The attached project proposal should be included in the work program that is presented to the Council for approval at its meeting in May 2000 (document GEF/C.15/3). With the addition of this project proposal, the total GEF allocation requested for the work program becomes $232.117 million, with Implementing Agency fees totaling $16.493 million.

This project proposal was originally submitted to the Council in the work program submitted for approval at the Council meeting in December 1999 (document GEF/C.14/6). However, as noted in the Joint Summary of the Chairs for the December 1999 meeting, UNDP withdrew the project proposal from consideration at that meeting, since the Government of Brazil had not submitted a letter of endorsement prior to the Council meeting. UNDP has now received the letter of endorsement from the Government of Brazil and has requested that the project proposal be included in the proposed work program.

Subsequent to the December 1999 Council meeting, UNDP received technical comments on this project proposal from six Council Members. UNDP will take these comments into account in the further development of the project proposal. The attached project proposal is the same as that which was submitted to the Council in December 1999.

Attached herewith is the project proposal together with a revised Annex A, the list of all project proposals included in the work program, and a revised Annex B, the list of cumulative GEF allocations to work programs and other projects.

PROJECT BRIEF

1. IDENTIFIERS

PROJECT NUMBER	**----**
PROJECT NAME	**Brazil: Promoting biodiversity conservation and sustainable use in the frontier forests of Northwestern Mato Grosso**
DURATION	7 years
IMPLEMENTING AGENCY	United Nations Development Programme
EXECUTING AGENCY	State Foundation for the Environment, Mato Grosso (FEMA)
REQUESTING COUNTRY	Brazil
ELIGIBILITY	Brazil ratified the CBD in February 1994
GEF FOCAL AREA	Biodiversity (Cross-cutting with land degradation)
GEF PROGRAMMING FRAMEWORK	Operational Program 3, Forest Ecosystems

2. SUMMARY

The long-term goal of this project is the consolidation in northwest Mato Grosso (an area comparable in size to Panama) of an integrated matrix of different land uses consisting of contiguous blocks of intact primary forest cover on private lands, corridors of secondary regeneration and more intensive agrosilvopastoral systems and permanent forest management. Accelerated development pressures currently threaten the globally significant biodiversity in over 75% of this area mainly due to the absence of a coherent land use planning framework (coordinated across municipalities) that can curtail unplanned settlement and development, and the existence of significant barriers to adoption of agroforestry and sustainable forest management systems. If current trends are allowed to continue unchecked, the default scenario is one of extreme habitat destruction, and the loss of native forests over the coming decade is expected to extend over 20,000 km^2. The project will demonstrate a widely replicable, integrated approach to the protection and sustainable use of biodiversity on private lands to mitigate this default scenario and secure global benefits through the conservation of native and endemic floral and faunal species in forested areas and soils. Project outputs will include a greater emphasis on biodiversity protection in ecological-economic zoning and the identification of high biodiversity areas for protection. There will also be strengthened municipal planning, development of supportive policies and instruments and monitoring through the incorporation of biodiversity conservation values. The project will remove barriers to the adoption of systems, practices and management techniques that integrate non-timber forest products and mitigate unsustainable pressures on biologically diverse habitats.

3. COSTS AND FINANCING (MILLION US$)

GEF:	Project:	6.704
	PDF B:	0.280
	Subtotal GEF:	6.984
Cofinancing:	Peugeot/ONF:	3.450
	Banco Axial:	2.000
	Timber industry, colonists, NGOs:	0.924
	Government (INCRA, IBAMA, CNPT, State, Municipalities):	2.676
	PDF-B Cofinancing from European Commission	0.080
	Subtotal Cofinancing (65% in cash, 35% in kind):	9.130
Total Project Costs (w/o PDF B):		**15.754**
Total Project Costs (with PDF B):		**16.114**

4. ASSOCIATED FINANCING (MILLION US$)

Project of Integrated Environmental Management (PGAI) including counterpart contributions by state and local governments and civil society	6.348
Rohden Lignea's investment in sustainable logging	2.000
Programs for monitoring forest management by IBAMA	1.500
Total	9.848

5. OPERATIONAL FOCAL POINT ENDORSEMENT

Name: Mario Vilalva
Organization: Secretariat for International Affairs (SEAIN), Ministry of Planning and Budget

Title: Secretario de Assuntos Internacionais
Date: April 13, 2000

6. IMPLEMENTING AGENCY CONTACT

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LIST OF ACRONYMS AND ABBREVIATIONS

ADERJUR	Rural Development Association of Juruena (*Associação de Desenvolvimento Rural de Juruena*)
CGAI	Council for Integrated Environmental Management (*Conselho de Gestão Ambiental Integrada*)
CNPT	National Center for Sustained Development of Traditional Peoples (*Centro Nacional de Desenvolvimento Sustentado das Populações Tradicionais*)
CONAMA	National Environmental Council (*Conselho Nacional do Meio Ambiente*)
EEZ	Ecological-Economic Zoning
EMBRAPA	Brazilian Corporation for Agricultural and Livestock Research (*Empresa Brasileira de Pesquisa Agropecuária*)
EMPAER	State Corporation for Rural Technical Assistance and Extension (*Empresa Matogrossense de Assistência Técnica e Extensão Rural*)
FEMA	State Foundation for the Environment (*Fundação Estadual do Meio Ambiente do Mato Grosso*)
FIOCRUZ	Oswaldo Cruz Foundation for Public Health (*Fundação Oswaldo Cruz*)
FSC	Forest Stewardship Council
GIS	Geographic Information System
IBAMA	Brazilian Institute for the Environment and Renewable Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*)
IMAFLORA	Instituto for Forest Management and Agricultural Certification (*Instituto de Certificação do Manejo Florestal e Agricola*)
INCRA	National Institute for Colonization and Land Reform (*Instituto Nacional de Colonização e Reforma Agrária*)
INPA	National Institute for Amazon Research (*Instituto Nacional de Pesquisa Amazônica*)
INTERMAT	State Land Institute of Mato Grosso (*Instituto de Terras do Estado de Mato Grosso*)
IPN	Instituto Pró-Natura (also referred to as Pro-Natura)
MMA	Ministry of the Environment (*Ministério do Meio Ambiente*) – formerly titled Ministry of Environment, Legal Amazonia, and Water Resources
NGO	Non-Governmental Organization
NOAA	National Oceanic and Atmospheric Administration (USA)
NTFPs	Non-Timber Forest Products
ONF	National Forest Office (*Office National des Fôrets-France*)
PGAI	Program for Integrated Environmental Management of the Northwest Area (*Programa de Gestão Ambiental Integrada da Área Noroeste do Mato Grosso*)
PNMA	National Environmental Program (*Programa Nacional do Meio Ambiente*)
PPG-7	Pilot Program for the Conservation of the Brazilian Tropical Forests
PROCERA	Program of Credit to Agrarian Reform Beneficiaries (*Programa de Crédito e Reforma Agrária*)
PRODEAGRO	Program for Agro-Environmental Development (*Programa de Desenvolvimento Agro-Ambiental do Estado de Mato Grosso*)
PRONAF	National Program for Family Farming (*Programa Nacional de Agricultura Familiar*)
SEAIN/MPO	International Affairs Secretariat of the Ministry of Planning and Budget (*Secretaria de Assuntos Internacionais do Ministério de Planejamento e Orçamento*)
UFMT	Federal University of Mato Grosso (*Universidade Federal de Mato Grosso*)

BACKGROUND AND CONTEXT

1. The Amazon basin contains the world's largest contiguous surviving tropical rainforest, with a total land area of about 8 million km2. The Amazon's unparalleled biodiversity faces constant and growing threat from shifting cultivation, large-scale ranching and agribusiness, timber extraction, infrastructure development and mining. In the wake of these anthropogenic activities lie vast expanses of barren lands and impoverished forests, vulnerable to burning whose severity is augmented as regional climate change intensifies. The Northwest frontier of Mato Grosso is the final outpost of human occupation along the advancing "Arc of Destruction". The area is experiencing accelerated development pressures threatening biodiversity in both unprotected forest habitat and protected areas. This project will demonstrate a widely replicable and integrated approach to ensure long-term adoption of practices that enhance biodiversity protection on private lands, promoting conservation of tropical forest values of global significance while also improving welfare and stability for local communities.

2. The project target area is found in the extreme northwest of Mato Grosso State, on the margin of the Juruena River, and is bounded to the north with the state of Amazonas and to the west with Rondônia. This area (see Maps 1 and 4, Annex E) encompasses the municipalities of Aripuanã, Castanheira, Cotriguaçu, Juína and Juruena. Still mostly covered by primary tropical forest, its land area totals 108,624.5 km^2, or about 2% of the Brazilian Amazon. Here, tropical forest ecosystems are interlaced with *Cerrado* (savanna) woodlands in a complex and diverse mosaic. Rainforests (*florestas ombrófilas*) prevail in the northern part of the area while, to the south, transitional forests blend rainforest and *Cerrado* biomes.

3. The forests of the Northwest area exhibit biodiversity substantially distinct from that of well-explored areas elsewhere in the Amazon. This was confirmed through botanical research during inventories conducted during the NYBG/INPA *Flora Amazônica* program (Ackerly and others, 1985), and the Humboldt Expedition in Aripuanã (see also Governo de Mato Grosso, 1992; Fernandes, 1992). Composition of the forest includes rare and useful species such as *Pterodon* spp. The local fauna is highly diversified and many of the invertebrates are considered to be endemic to this area. The number of mammals and bird species is also remarkable, with over 200 species of birds detected. Of major significance among the mammals are *Tapirus terrestris* (tapir), *Lutra* sp. (otter), *Pteronura braziliensis* (giant river otter), *Ateles* sp. (spider monkey), *Lagotrix* sp. (big bellied woolly monkey), *Ozotocerus bezoarticus* (pampas deer) and *Mazama americana, Panthera onça* (jaguar) and *Felis concolor* (suçuarana, puma).

4. Human populations have occupied the Amazon for millennia, initially through indigenous migrations and, since Conquest, by Europeans. Indigenous hunter-gatherers manipulated native species to facilitate access to prized foods and attract game, with little noticeable impact on biodiversity. In contrast, occupation of the area dramatically increased in the latter part of the current Century and has transformed nearly 15% of Brazil's original tropical rainforest for agriculture and other purposes.

5. In the more recently settled northwest area of Mato Grosso, as in neighboring Rondônia, most colonists were recruited directly from Southern Brazil, expelled from agricultural systems based on monoculture, high-input grains and mechanization. Attracted to sell their meager southern holdings by promises of cheap abundant land, they were encouraged to plant coffee by government authorities and private colonization companies who assured them markets would be

found. Most colonists soon found themselves faced with costly and seasonally precarious transport, negligible storage and nonexistent credit or technical assistance. Many colonization efforts succumbed to the infertile tropical soils, torrential rains and unfamiliar pests. A few thrived after successfully adopting agroforestry systems composed of specialized perennial fruits and spices. But most were faced with gaining a foothold on their lots using slash-and-burn practices to produce rice, beans and cassava for local consumption. Due to low productivity, they were soon forced to advance further into the forest, and to convert cropland to pastures for cattle ranching. Many soon failed as farmers and moved to local towns and cities, where they swelled urban settlements which now account for over 60% of the total Amazon regional population. In northwest Mato Grosso, 57% of the 1996 population (66,146) still lives on rural lots, where they continue slash-and-burn production activities.

6. Cattlemen typically acquire the land abandoned by colonists, rapidly converting land to pasture, burning forests from which economically valuable trees have been harvested, eliminating nearly all remaining biodiversity. Pasture productivity declines, accompanied by reduced stocking rates (from 1 head/ha at the beginning to 0.3 head/ha or less after 10 years). Within 15 years, pastures are degraded. The remaining forests are gradually encroached upon for timber extraction. This is a temporary activity, limited to fewer than 6-10 species. Timber typically is removed in several cycles, provoking successively increased damage to forest ecosystem function. Logging roads and tree felling are random, and vines are not cut, provoking severe loss in remaining vegetation and biodiversity. Extraction sites become much more vulnerable to forest fires due to logging roads, openings from treefall, and drought promoted by an overall regional warming tendency. Timber extraction becomes migratory, establishing itself briefly in boomtowns that soon lose their impetus, fading to ghost towns when timber is exhausted. Employment in wood industry for former agriculturists becomes scarce, leading to further abandonment. This cycle of boom and bust, migration, failure and repeat migration, has become commonplace throughout the Amazon region, and represents the root cause of threats to biodiversity conservation.

7. The Brazilian Constitution of 1988 defines the Amazon forest as a “national patrimony” and it is thus subject to public control to avert further loss. The Pilot Program for the Conservation of the Brazilian Tropical Forests (PPG-7) and the National Environmental Program (PNMA) are both responses to global concern over Amazonian burning. Both are coordinated by the Ministry of the Environment (MMA) to provide opportunities for state and local municipal governments and NGOs to become partners in the execution of projects aimed at environmental management, conservation and sustainable use. Through these efforts, greater attention has gone to monitoring and enforcement of cutting and burning, and the area and number of protected areas has grown. The Constitution called for municipal land use control subject to a Master Plan (*Plano Diretor*), and a 1997 ruling of the National Environmental Council (CONAMA) allows environmental review and licensing by municipal governments. The Government has also pursued Ecological-Economic Zoning (EEZ) to discipline private land use consistent with resource suitability. These instruments offer policy tools to strengthen local environmental protection and management capacity.

8. The Forest Statute (enacted in 1965) permits timber extraction on uncleared private and public lands subject to a “management plan”; once approved, property taxes are reduced, thus stimulating expanded timber enterprise on private lands. With recent uncontrolled Amazon burning, the Federal Government decreed far more rigorous criteria for forest management plans

in late September 1998.[1] The Forest Statute also stipulates in Article 44 that at least 50% of original forests be preserved on private lands in the Amazon. However, the resurgence of an agrarian reform movement brought government response, with a program to distribute public and private holdings in the area to landless families and these smallholdings are not stringently subject to the legal reserve. The National Institute for Colonization and Agrarian Reform (INCRA) is responsible for the majority of new settlement and has given growing attention to the environmental limitations associated with colonization efforts in the Amazon.[2] It has hence adopted a sustainable settlement program, which although insufficiently tested, offers an opportunity to enhance biodiversity protection and sustainable use within existing and future agrarian settlements.

9. The Brazilian Institute for Environment and Renewable Natural Resources (IBAMA), subordinated to the MMA, is broadly responsible for regulating overall forest and renewable resource utilization, in coordination with state environmental agencies (in Mato Grosso, the State Environment Foundation (FEMA) is the responsible agency). The National Center for Sustained Development of Traditional Peoples (CNPT) within IBAMA promotes the management and utilization of non-timber forest products, through projects which principally support indigenous groups and inhabitants of extractive reserves. Agricultural extension services are the responsibility of state agencies, while agricultural and forestry research is coordinated by the Brazilian Corporation for Agricultural and Livestock Research (EMBRAPA) in cooperation with allied state research institutions (EMPAER) and universities. IBAMA and state extension services are the entities with the greatest local presence in the Amazon. Municipal Environmental Councils have been established in several Amazon municipalities to review the environmental impacts of development proposals. This has not yet occurred in the target area, where environmental matters are addressed by representative Municipal Councils with the technical assistance of EMPAER extensionists and local NGOs.

10. NGOs play an increasingly important role in isolated areas as partners of government institutions. Instituto Pró-Natura (IPN), an international environmental NGO founded in Brazil in 1986, has promoted integrated protection and sustainable use of Amazon forest resources in northwest Mato Grosso since 1991, selecting the municipality of Juruena as a demonstration site for a 20-year program. With support from a range of sponsors, IPN has established an experimental agroforestry and forest management station of 100 ha in Juruena with a resident agroforestry extension officer backstopped by national and international specialists through agreements with universities, research centers, state and local government agencies and other

[1] Initially, management plans defined little more than a list of the species found on the property and the volume of each that would be removed over a given period. Government agencies made efforts to monitor and enforce these plans. However, continued deforestation, widespread damage due to burning, the recent influx of Asian timber corporations and threat of extinction of mahogany led the government in 1996 to annul previously approved plans pending review, while new management plans for mahogany extraction were suspended. On 29 Sept 1998, management provisions were amended to institute more rigorous criteria for sustained management of natural forests, promoting multiple use (including NTFPs, biodiversity and environmental protection), but exempting sites with approved management plans from environmental impact assessment.

[2] Studies by INPE and IBAMA and regional NGOs found that nearly 50% of recent Amazon burning was detected in units under 50 ha in 1995, and 41% in 1996, although these data do not reflect the size of the property but rather the area burned. These data brought Congress to question increasing colonization in the region, since 88% of new settlement areas are targeted for the Amazon. Congress then considered imposing a moratorium on new Amazon settlement, but eight such projects have already been approved for the project region.

NGOs. Through close working relationships with local government, entrepreneurs and producers, IPN has assisted in the creation and then channeled support to Juruena's Rural Development Association (ADERJUR). IPN promotes NTFPs, agrosilvopastoral systems, and has also worked with a local timber operator, Rohden Lignea S. A., on practical sustained forest management techniques, with support from the World Bank-financed PRODEAGRO programme.

RATIONALE AND OBJECTIVES

CURRENT SITUATION IN PROJECT AREA

11. Deforestation is the major proximate threat to biodiversity in Mato Grosso, reaching 23.4% (11.9 million ha) of the state's original forest area by 1996. With the highest rate of deforestation in Brazil, averaging 1.3% per year from 1989-96, Mato Grosso was responsible for 35% of all Amazon clearing as well as widespread and damaging forest fires. Nearly half of all fire points sighted with NOAA satellite imagery in the Brazilian Amazon during the 1990s were located in Mato Grosso. Northwest Mato Grosso lies along one of the three concentrated swaths of deforestation that have been distinguished across the Amazon (see Annex E, Map 2 and 3). Over 5.2% of the region's total area had been deforested by 1994 (satellite imagery analysis), at a rate of approximately 350 km^2/yr. This deforestation is largely a result of colonization and timber extraction Occupation there began in the 1970s with the construction of a main access road and consequent occupation by settlers, large and small, along the road, and the construction of feeder roads into the forest by private timber companies.

12. Population growth and the attendant competition for limited resources are recognized as root causes of biodiversity loss. While the GEF project does not address these root causes directly, it complements baseline efforts to address some of these issues. Population growth in Brazil, paralleling the demographic transition in most of the developing world, has declined considerably, from over 2.5% per year in the 1980s to less than 1.4% at the close of the 1990s, and is expected to continue declining into the next century. This reduced population growth is a function of greater efforts to educate young women, improved health services and a corresponding realisation by rural households not only that additional mouths only represent a burden, but that it is no longer necessary to bear as many children, since there is less risk of infant mortality. Furthermore, most remaining growth now gravitates toward urban areas, rather than the frontier, thus reducing some of the historical pressures on the natural resource base. Indeed, there has often been a return migration of colonists who have failed at the frontier. Changes in migratory pressures are particularly notable in Mato Grosso. The demographic transition has brought a significant reduction in population growth, with an estimated drop to around 2% annual population growth in the early 1990s, expected to continue declining throughout the remainder of the decade. Successful policies to promote industrialisation have generated considerably more new jobs in urban centers, where employment has grown by over 80% in the past eight years from a small initial base. This growth is in marked contrast to the overall job loss in the rest of the Brazilian economy, where industrial employment has dropped over 24% over the same period. These data indicate that as sustainable development pathways are adopted in Mato Grosso and other areas of the Center-West (*cerrado* region), population growth will be progressively incorporated into settled areas, reducing direct pressure on the tropical forest resource base. However, as has been clear for many years, population growth pressures alone do not account for deforestation and biodiversity loss. While highly correlated,

the causal link between population growth and deforestation is equally dependent on local land tenure structure and resource access, as well as colonists' knowledge of appropriate technologies and awareness of environmental fragility.

13. Concern for the potential environmental repercussions of expanded colonization and land redistribution has prompted a proactive response from INCRA, the federal government agency responsible for the land reform program. INCRA has adopted as its baseline policy a "sustainable settlement" strategy, which is being tested for the first time in the Amazon in its colonization projects in NW Mato Grosso. The sustainable settlement approach builds local capacity to manage and implement local land-use development plans based on carrying capacity of the environment, sustainable natural resource use potentials, and agrosilvopastoral technologies that are compatible with both soil management characteristics and water resource availability. The proposed project will enable IPN and INCRA to jointly build on this initial experience, to leverage adoption of these criteria in the remaining settlements planned for the NW region, and to disseminate this experience elsewhere in the Amazon.

14. Present land use patterns in northwest Mato Grosso are summarized in Table 1. Approximately 18,626 km^2 (17.1% of the total area) lies in indigenous or extractive reserves but only 5,520 km^2 (5.1% of the total area) is in two conservation units, one of which is superimposed on an indigenous reserve (Annex E, Map 4B).

Table 1: Characterization of land use patterns in project area

Total Land Area	108,624.5 km^2
Of which,	
State or private land with intact forest cover	80%
Unprotected forest (57.8%)	
Four indigenous and one extractive reserve (17.1%)	
Two ecological reserves (Iquê and Rio Madeirinho) (5.1%)	
Private land under exploitation	20%
Forest extraction units of 25,000ha and over (16%)	
Pasture lots of 1,000 – 20,000 ha (3.5%)	
Agricultural settlement lots between 40 and 120 ha (0.5%)	

Source: Governo do Mato Grosso (1997); Fernandes (1992); Pro-Natura/ICI-Zeneca (1991)

15. *Slash and burn agriculture in new colonization areas.* As far as land under exploitation is concerned, approximately 4% of the land area is occupied by new settlers relocated in forest margin areas, faced with making a living in an area that is ecologically very distinct from the areas they came from. The dominant model of agropastoral systems on settlers' lands typically includes cultivation of a few annual crops with little emphasis on a more diversified crop production system that includes perennials, cover crops, trees, and natural hedges. Declining productivity of lands under cultivation will continue to spur encroachment on forested segments of farmers' lands rendering it increasingly difficult to meet the legal requirement that 50% of private land holdings be under forest cover. Under prevailing circumstances, these small farmer colonists see little benefit from maintaining intact forest cover on their lands, and would have to bear entirely the costs and risks associated with testing new alternatives. Moreover, approximately 1.7% of the region's land will shortly be directed toward new settlements[3].

[3] INTERMAT has approved 8 new settlements in northwest Mato Grosso on an area totaling over 182,600 hectares.

16. *Inappropriate timber extraction.* The remaining 16% of lands under exploitation are being subjected to inappropriate timber extraction. Selective logging continues to encroach in areas of intact forest leading to increased deforestation and biodiversity loss. Subsequent conversion of logged-out forests to pasture and cropland makes this loss permanent. Those engaged in timber extraction view this as a highly temporary activity and lack the technical wherewithal and experience to promote permanent forest management systems that address the goals of maximizing long-term returns to the exploitation of timber resources and that of biodiversity conservation. In the absence of demonstrated benefits from the long-term husbandry of their forest resources, timber operators opt for forest "mining".

17. *Forest fires and land degradation.* The slashing and burning of forests for agriculture often leads to forest fires in areas adjacent to timber extraction units. They result in significant loss of remaining forest products and biodiversity. Emissions of CO_2 to the atmosphere by forest burning range from 65 to 150 mt/ha. Deforestation over large areas leads to reduced stream flows, aggravated by the area's normal 4-6-month dry season. Erosion and consequent rapid loss of soil fertility is exacerbated by slash and burn practices, which interrupt the nutrient cycle.

18. In the case of both the small farmers and timber operators, the risks associated with alternatives that could stabilize the forest frontier areas and a lack of experience, knowledge, and successful demonstrations of the same alternatives pose significant barriers to adoption. Being generally ill informed of prospects and risks associated with alternatives, they are unable to bear the risks inherent in developing new products and sustainable use systems. The distance to consuming centers increases this risk and militates against investment in any but the most rudimentary technologies. The lack of adoption in turn implies a continuation of the business-as-usual scenario with sustained deforestation and biodiversity loss at the hands of colonists.

RESULTS OF PDF B

19. With the intent of exploring alternatives to current resource destructive practices, PDF Block B funds were provided in 1995 to assess the financial and technical viability of sustained extraction of non-timber forest products (NTFPs) and small-scale enterprise as a basis for biodiversity conservation in Juruena. The PDF-B was to then lead to a full-scale intervention that would address critical barriers to adoption of NTFPs within the productive landscape including pilot sites that demonstrated the viability of the approach and associated training in technical aspects by working with small farmer colonists and timber operators on their lands, thus buying down perceived risks and encouraging spontaneous adoption. It was found that such an approach focusing on NTFPs alone would not be sufficient in and of itself for the following reasons: (See Annex G for further details on the results of the PDF B)

(i) *Market distance and value-added benefit:* With the exception of natural insecticides, essences and perfumes, NTFPs found in the area constitute industrial raw materials and inputs to production processes. These were scrutinized for market potential and found to have low value-added benefit. This makes them uncompetitive coming from an area so remote from the market, given existing substitutes, and the probability that areas closer to market would exploit these potentials were products to be developed.

(ii) *Producer affinity:* Producers, as in many similarly occupied areas, are primarily colonists from Southern Brazil, rather than indigenous or long-term Amazonian forest dwellers. They have little tradition or experience in gathering forest products, and would thus have to be convinced of the benefits of integrating this activity into their production systems, a long-term proposition.

(iii) *Comparative evidence:* Research has indicated that even under the most privileged conditions (e.g., traditional populations on protected extractive reserves) NTFPs in and of themselves will not guarantee protection of threatened biodiversity and forest resources.[4]

(iv) *Intellectual property guarantees.* Brazil has only relatively recently begun to define rules for intellectual property rights and access to biological resources. This is essential so that biodiversity values may be captured, and thus serve as an incentive for their protection.[5]

20. NTFPs by themselves cannot be expected to serve as an immediate deterrent to biodiversity loss nor as a principal rationale for its protection in the target area. These resources may however eventually come to alleviate pressures to expand crop production, livestock ranching and timber exploitation in the long term, if coupled with other measures to alleviate threats to biodiversity. The results of the PDF B point toward an integrated strategy that would ensure the protection and management of NTFPs in natural areas for sustained yield and/or planted in exploited forests or in agrosilvopastoral systems. NTFP enterprises would thus gradually come to complement alternative farming and timber extraction practices, serving as an added incentive toward biodiversity conservation. See Annex H for more details on the pros and cons of extractivism as an incentive for biodiversity conservation.

BASELINE COURSE OF ACTION

21. Under the baseline situation deforestation and biodiversity loss is expected to continue largely unchecked in the project area. The loss of native forests over the coming decade is anticipated to extend over 20,000 km^2. Based on current land ownership patterns and proximity to roads and settlements, this will increase the area's exposure to human pressures. The baseline scenario for the project area is thus one of extreme habitat destruction brought on by:

(i) the absence of a micro-level, coherent, enforceable land use planning framework (coordinated across municipalities) that can curtail unplanned settlement and development in the project area by promoting a melded mosaic of land uses (including conservation and sustainable use) thus providing varied habitats for plants and wildlife,

(ii) lack of viable alternatives that can influence farmers' land-use decisions away from slash and burn agropastoral activities, and

(iii) forest "mining" for commercial species that may begin reflecting elements of sustainable timber yields but is unlikely to include biodiversity overlays.

22. The state and municipal governments, local producer associations, NGOs and some private timber operators will be engaging in activities that are small yet significant steps towards improving at least the sustainable development dimension of activities in the project area. These

[4] The hypothesis that Amazonian NTFPs could outperform timber extraction or ranching in net present value, which gained credence with publication of Peters et al (1989), has been widely criticized as unrealistic. Southgate (1998) asserts that NTFPs have only been successful where domesticated or managed as part of integrated agroforestry systems. Annex F provides a review of recent commentary on the hypothesis that NTFPs can be a principal means to protect tropical forests.

[5] Defining intellectual property rights over biological resources in Brazil has become a source of controversy, arising from accusations of "biopiracy" by foreign firms and independent researchers. Legislation in debate for the past several years categorizes genetic resources as "public patrimony". Rights to access of such resources would be permitted under contract by domestic research institutions and private firms or individulas interested in exploring their potential. The law in turn would define the distribution of returns from such prospecting. The government's proposed Law for Biodiversity Access is currently under discussion in the Congress, in substitute for a Bill already reported out of committee.

are explained below insofar as they provide a baseline on which to build and integrate specific measures to ensure biodiversity conservation.

Ecological-Economic Zoning, Conservation Areas and Regulatory Framework

23. As part of needed actions to revert destructive trends, the government of the state of Mato Grosso, under FEMA's supervision and with financial support from the World Bank-assisted PRODEAGRO program, is carrying out ecological-economic zoning at a macro level (1:250,000 scale) over the entire state, as a basis to direct future land uses. However, the state-level EEZ cannot serve as an effective tool to regiment municipal-level land use, due to its superficial detail and scale, and a lack of economic incentives and enforcement capacities to promote adherence to the zones established at a local level. Nevertheless, these efforts provide the basis from which to further refine zoning at a micro-scale.

24. The state government hence allocated $6.05 million in PPG-7 funds for a three-year program begun in 1998, to institute a pilot micro-level EEZ process in the project area of northwest Mato Grosso. The objective of this project is primarily to identify threatened resources (forests and watersheds) and map areas suitable for settlements, managed timber extraction and mining. It will also undertake relevant update of environmental legislation and the building of monitoring and control capacities to promote effective environmental management. The PGAI program will largely serve to mitigate adverse local environmental impacts associated with development in the project area. It will also strengthen, to some degree, partnerships with civil society organizations.

25. However, the PGAI program will not place significant emphasis on protection of biodiversity. Rather, it is intended to guide productive activity and environmental enforcement. Only two conservation units exist in the area that, together with indigenous and extractive reserves, provides some protection toward remaining biodiversity (Annex E, Map 4B). Yet, these protected areas do not lie in areas vulnerable to colonization. Additional interventions are going to be needed to ensure that the planning of land-use in the project area is not guided solely by the long-term productive potential of natural resources - an issue that is in the national sustainable development interest - but also by biodiversity conservation concerns that benefit the global community.

Agrosilvopastoral systems and NTFPs

26. Local organizations of farmers and entrepreneurs in Juruena and surrounding municipalities have requested assistance to apply environmentally appropriate alternatives. In response, through multi-year trials at its Juruena technology center, IPN is developing and testing an agrosilvopastoral model adapted to local environmental conditions, farmers' capabilities and income requirements, as well as market variables. This model primarily includes a diversified system that includes annual crops, domesticated perennial fruit trees, fast-growing timber species, and cattle, but does not as yet include native non-timber forest products (see Annex F for more details). The PGAI program will also allocate modest resources to promoting agroforestry in three of the five municipalities that compose the project area (Aripuaña, Cotriguaçu and Castanheira).

27. NTFP-based activities in the project area were until recently limited to unsustainable extraction of palmito from *Euterpe precatoria,* a species that does not regenerate naturally once harvested. A small private palmito cannery currently operates in Juruena. In 1997, the municipal

government began to distribute palm seedlings of *açaí* (*Euterpe oleracaea*) – a multi-stemmed palm species found in the Amazon estuary which has been successfully managed (Pollak and others, 1995). Farmers' knowledge of NTFP harvesting is rudimentary. For example, *copaiba* resin is only obtained during timber harvest by collection from the stump rather than from bore holes in standing trees that are later plugged to ensure survival. Systematic development of NTFPs with partial support from the PDF-B has been limited to an initial characterization of available resources, evaluation of chemical characteristics of *copaíba* and *jatobá* resins, and test of Brazil nut extraction and marketing. IBAMA's Center for Traditional Peoples collaborated with IPN in market and viability studies for management and utilization of NTFPs in the project area through PDF-B sponsored activities. A trial of collection and marketing of Brazil nuts in the shell by local producers is planned under the baseline as a direct outcome of these PDF activities, under the enterprise assistance included within the PGAI.

28. Other resources that could become available for agroforestry investments include subsidized credit formerly available to new settlements under INCRA's PROCERA program. Early in 1999, PROCERA was eliminated and merged with a federal program to strengthen small farming by rural families in general (PRONAF). Some funds in this program are now earmarked toward investment in agro-environmental management in new settlements and host communities. Family farm credit furnishes resources partially through a sinking fund, available to provide for the immediate needs of the settler and his family during the period immediately after taking over their lot, and for investments such as improved cattle, seed and equipment. Some resources are also allocated for investments at the settlement level, directed toward providing for collective needs such as schools, health posts and installations for storage and processing. However the precise volume of this support is as yet undetermined, and due to the many new settlements in progress, is in short supply. [6] INCRA and IPN have entered into an agreement to jointly assist settlers in the project area to diagnose natural resource potentials and protect biodiversity, develop management plans, train settlement leaders and implement agroforestry and forest management demonstration units. These efforts will be strengthened and broadened during the project.

Sustainable forest management

29. Under current law, timber extraction in the Amazon is subject to a rigorous management plan, whose recently amended rules incorporate sustainable harvesting criteria (see footnote 1). However, despite efforts by IBAMA to strengthen its monitoring and control functions, most exploitation areas have been degraded and subject to follow-on conversion of forest to other land uses. Under pressure from government and markets, timber producers in the target area are now anxious to adopt sustained management practices and to add value through processing technology and a diversified product mix rather than continued migration. Incipient efforts are also underway to adopt renewable energy alternatives based on wood processing residues. The largest timber industry in the area (Rohden Lignea), with 25,000 hectares of forests under recent management has initiated recovery of degraded forests and pastures through reforestation with fast-growing native species (*açaí* and *caixeta*). Rohden has expressed interest in expanding its

[6] The revamped credit program places funds for collective investment under the direct responsibility of the settlers, and will offer subsidized production credit initially, but will treat agrarian reform beneficiaries as any other farm family eligible for PRONAF support once this initial phase is terminated. Settlers are now required to undertake their own plans, and to contract technical assistance, with funds provided through the program.

sustainable forest management systems to obtain timber and NTFPs (*copaiba* resin, palm heart, etc.).

30. IPN has demonstrated experimental forest management treatments on 100 ha of the Rohden exploitation area. Rohden furnished the land, equipment, field labor and supplies; technical expertise in forest inventory and management was financed by the PRODEAGRO program. Demonstration practices included timber inventory (three size classes in 100 m^2 plots), vine-cutting, selective harvesting, low-impact access layout, directional felling, and enrichment planting. This experience has been fully documented, and is to be made available to the regional and state logging industry in a public seminar and internal document to FEMA shortly. The lessons learned from the PRODEAGRO undertakings have been at the core of the project's design and of action to remove barriers to their adoption. Under the baseline, Rohden will continue investing in the testing and application of these low-impact logging techniques[7]. While some of these practices appear technically and economically justifiable in the long-term, protection and recovery of remaining biodiversity are not in the firms' immediate financial interest unless such practices were to result in a price advantage for final products.

31. Concern over the contribution of international trade in rare tropical hardwoods to deforestation has led to preferential market treatment for sustainably managed sources certified through Forest Stewardship Council (FSC) accredited bodies. To date, Brazil has only one accredited forest management certifier (IMAFLORA) and one FSC-certified Amazon timber producer (Mil Madeireira in Itacoatiara). Interest in obtaining certification is growing among regional timber industries, but they lack knowledge of how to obtain certification, and access to alternative timber markets that would reinforce sustainable harvesting.

32. With the expressed priority in federal and state level policy to conserve forests and biodiversity, the promotion of non-destructive alternatives and of measures and mechanisms that would conserve remaining biodiversity have received increasing attention on the part of public agencies. The entities officially responsible for developing and disseminating appropriate practices and enforcing environmental codes are actively seeking partnerships with non-governmental organizations and scientific institutions to furnish technical expertise regarding agrosilvopastoral systems and sustainable forest management that addresses sustainable logging, sustainable use of NTFPs and biodiversity conservation. There is a general awareness that practical instruments exist for sustainable land use management. It is important, however, that public officials be better trained in applying and enforcing such instruments to guarantee biodiversity protection. With these measures, and with the perception that alternatives exist for use of forest resources, local residents will begin to treat the forest as the foundation for sustainable livelihoods rather than as an obstacle to be overcome.

ALTERNATIVE COURSE OF ACTION

CONCEPTUAL APPROACH

[7] Comparative cost analysis by Barreto et. al. (1998) suggests that costs involved in sustainable management practices are about 33% superior to those in conventional selective harvesting, while they result in a reduction of up to 50% in the management rotation cycle, thus reducing long-term costs as well as biodiversity loss associated with expansion in exploitation areas.

33. Based on the prevailing situation in the project area and on the analyses and results from PDF-B activities, as described above, the long-term goal of the project is to promote a matrix of land uses which, when integrated across the landscape, both conserves globally significant biodiversity through sustainable use and safeguards it through conservation units on public and private lands. This will be achieved through (i) introducing biodiversity conservation parameters into the prevalent land use planning and enforcement framework, (ii) removing critical barriers to the adoption of NTFP-enriched alternatives to current agropastoral activities, and (iii) removing barriers to adoption of alternatives to temporary forest management. The removal of barriers will allow an integrated matrix of different land uses to emerge over the long-term, consisting of contiguous blocks of intact primary forest cover on public and private lands, corridors of secondary regeneration and NTFP-enriched agrosilvopastoral systems and permanent forest management. On the one hand there is skepticism about conserving biodiversity through promoting sustainable uses, on the other a recognition that the whole landscape can seldom be converted to protected areas, implying a need for a balance between the two. To achieve this balance a system of adaptive management that enables rapid learning through field-testing is critical, and therefore underlies the conceptual approach of this project.

34. The strategy to promote a mosaic of different uses must inherently involve several stakeholders. The project aims to work at different levels to influence decision-making by the principal users of natural resources and their representative associations in the project area:

(i) *Local producer associations*, to work with settlers in colonization lots and new settlements, to address barriers to establishment of permanent agroforestry and silvopastoral systems in pastures, crop fields, and homegardens.

(ii) *Timber enterprises and their associations*, to demonstrate permanent forest management practices that include protection of remaining biodiversity, management of NTFPs, and the reforestation and enrichment of harvested stands with promising native non-timber species and assist in application and certification of these improved practices.

(iii) *Local municipal authorities*, to collaborate in introducing biodiversity conservation parameters in planning and devising appropriate instruments to regiment the use of land and natural resources of each municipality.

(iv) *State and federal institutions* (FEMA, IBAMA, INCRA, MMA), to collaborate on a set of resource management alternatives, including incentive structures for benefit-sharing and regulatory instruments to improve policy decisions and enable dissemination of alternatives to similar areas of the Amazon.

35. Given the long-term nature of these interventions, the project follows a phased-approach grounded in adaptive management that enables rapid learning through field-testing. Establishing a strong institutional foundation that engages continuous cooperation among private sector stakeholders and public institutions will be important in ensuring this phased and adaptive management approach to biodiversity conservation through bioregional management. The strengthening of the planning, management, and monitoring capacities of public and civil society organizations will enable them to fully assist private sector and community stakeholders in these activities after GEF support has terminated.

36. The alternative strategy will be implemented through three integrated outputs involving direct beneficiary participation, each insufficient alone to achieve the project purpose, but whose synergy can remove barriers to biodiversity conservation and sustainable use in the target area, serving as a model for concerted intervention in similarly threatened Amazon forest areas.

Project activities will be planned in two phases. In Phase I (three years), the project will focus efforts in the municipalities of Juruena and Cotriguaçu. In Phase II, the experience will be implemented in three adjoining municipalities (Aripuanã, Castanheira and Juína), beginning in the fourth year, after evaluation of Phase I results. During Phase I, officials and producers from the municipalities to be reached under Phase II will be invited to demonstration visits and training activities, and will take part in workshops to plan and organize activities in preparation for the second phase. Evaluation and refinement of techniques and delivery mechanisms will be accomplished not only as we move from Phase I to II, but also on an annual basis. Annex I highlights the main milestones expected over the seven years of the project through GEF and non-GEF financing. For the longer-term vision, the table also provides an indicative listing of activities to be continued after the seven-year period. Some GEF resources will be allocated to monitoring in Phase 3. Project interventions are summarized in the logframe matrix in Annex B, and elaborated below.

37. Link with UNDP-Brazil Programming Framework. The Alternative strategy falls within the second broad thematic area of the 1997-1999 **UNDP Country Cooperation Framework (CCF)** for Brazil: Modernization and Environmentally Sustainable Development. The CCF commits UNDP to continue to work closely with the Government in its efforts to promote the sustainable use of Brazil's natural resources, while at the same time protecting the environment. As part of this commitment, UNDP will concentrate its overall support on the planning, coordination and implementation of national environmental policies, improving national capacity for learning, and evaluating the country's natural resources, with particular emphasis on: (a) the management and conservation of Brazil's most threatened ecosystems; (b) the appropriate management of its water and soil resources; and (c) the conservation of biodiversity and the sustainable use of forest and mineral assets. In addition, UNDP is committed to cooperating with the Government in implementing a land reform programme that will benefit some 280,000 families over the next four years, and will continue to support the protection of indigenous and traditional populations and their lands, together with developing their capacities for generating sustainable livelihoods. Implementation of the project proposed here will produce lessons and experience for replication in this and other programmes and regions of Brazil where UNDP is involved, thus enhancing the potential for replicating and leveraging results of the project. At the same time, the lessons and experience from the programmes mentioned above will be made available to the Mato Grosso project.

PROJECT OUTPUTS, ACTIVITIES, AND EXPECTED RESULTS

Output 1: Improved land use plans with a biodiversity overlay are designed and gazetted and related incentive frameworks are developed to facilitate implementation.
[GEF: US$ 2,136,944; Cofinancing: US$ 2,149,616]

38. The baseline Program for Integrated Environmental Management (PGAI) will set the policy, incentive and regulatory framework within which the alternative course of action can become effective. The PGAI program will be building capacity of the five municipal governments within the project area in mapping, monitoring and enforcing land use patterns for sustainable natural resource management. However, a three-year period is not adequate to maintain long-term continuity and enlargement of the scope of the exercise, particularly when it comes to building local capacities. In order to improve the effectiveness of this planning

framework the project will empower municipal governments and an inter-municipal network of civil organizations in collection, interpretation and use of remote sensing data and field observations to monitor local land use change. This will involve making available GIS facilities and related technical training to the inter-municipal network of civil organizations, working together to update maps and to devise an early warning communication system that can effectively mobilize local governments and other authorities in cases of irregularities. **This capacity, developed through cofinancing from State and Municipal governments and ONF/Peugeot, with technical assistance from INPE and IBAMA**, will be critical to monitoring and evaluating project impacts over time.

39. A significant gap in the baseline ecological-economic zoning exercise (PGAI) is the inadequate emphasis being laid on biodiversity conservation parameters. Given that native forests cover a large proportion of the project area, the mapping of land uses must also account for areas that are particularly critical to maintaining ecological processes and that harbor threatened and vulnerable species. Of the total three-year PGAI budget only 1.5% will be allocated to identifying new areas as biodiversity conservation priorities, with the rest going largely towards mapping and monitoring productive natural resources for sustained use. Clearly, it is critical that conservation parameters be integrated into the PGAI simultaneously so that conservation units can be linked together with contiguous corridors of forest reserves, sustainably managed forests and agroforestry systems within occupied areas. Furthermore, it is essential that a greater proportion of the overall area be demarcated for permanent conservation, whether in public or private units.

40. The project, through **GEF support, will therefore provide technical assistance in survey, assessment, demarcation, and operationalizing of critical areas for biodiversity conservation.** Protected areas on public lands will be identified in at least 3 municipalities in the first 3 years of the project and in the remaining 2 municipalities over the next 4 years. Criteria for identifying protected areas include: (a) biodiversity uniqueness, (b) potential for maintaining contiguous blocks through corridors, (c) size, (d) likelihood of effective protection, and (e) interest of all stakeholders. Once basic capacities are established and critical areas for biodiversity conservation are identified, demarcation of these areas will commence without delay. A phased approach will be taken to gazetting these areas and making them fully operational (see project milestones in Annex I for details on this phased approach), starting with management plans, basic infrastructure and human resource capacities for those protected areas identified in the first phase. Training will also be provided to civil organizations in biodiversity inventorying, monitoring and field observations. This will be instrumental in promoting a rural monitoring network of community members to serve as an early warning system for infringements into such areas. The project will fortify the capacity and commitment of local governments and associations of civil society in the project area to monitor, regulate and contest natural resource depredation, resolving conflicts where they arise through negotiation and due process. The biodiversity overlay on land use planning will also include identification of conservation set-asides and planning of land use within groups of private properties so as to maintain contiguous blocks of intact forest cover and reduce fragmentation.

41. The project, through **GEF suppport, will integrate NTFPs into PGAI zoning** by identifying areas with greater occurrence of species that yield NTFPs, expanding on initial assessments undertaken in Juruena by the PDF-B to other municipalities in the project area. Initial assessments will consider Brazil Nuts, Copaíba, Jatobá and Unha de Gato – promising

NTFPs identified during PDF-B assessments – but could encompass others as new resources emerge with a potential to increase the economic value of standing forests. The inclusion of NTFP resources in the region-wide mapping exercise will be important in realizing the long-term vision of a mosaic of different land uses promoting conservation and sustainable use of biodiversity.

42. Gazetting these land use master plans would be the first step toward implementation. But equally important will be the **design, through GEF support, of incentive systems to encourage individuals on both large and small holdings to conform to land use plans and adopt permanent conservation easements and other tools to enable private land owners to contribute to biodiversity conservation in their own interest**. Application and adoption of this approach will depend on a combination of compatible public policy incentives (e.g., property tax deductions) and work to convince landowners that this is a desirable alternative to unsustainable land use[8]. The project will explore several options drawing from related experience in other parts of Brazil and the developing world. Under existing federal law, private nature reserves (RPPN) have become attractive to large landowners as a means to reduce property taxes, but this option is being increasingly adopted by small and medium landowners as well. Another option is the "Green Value-Added Tax" now under consideration by the Mato Grosso state legislature (already in place in several southeastern Brazilian states), that will allocate funds to local governments constituting 9% of state value-added taxes, based on the proportion of municipal area that has been set aside for permanent protection. As part of GEF-supported technical assistance, the project will undertake policy assessments, preparation of technical options and furnish legal advice to landowners and government authorities interested in setting land aside as permanent reserves, thereby playing a catalytic role in preserving at least 50% of original forests on private lands (Article 44 of the Forest Statute).

Output 2: Pilot sites demonstrating biodiversity-enhancing and NTFP-enriched agrosilvopastoral systems are established in the project area with active involvement of small farmer colonists.
[GEF: US$ 2,357,084; Cofinancing: US$ 3,128,723]

43. The project will introduce, disseminate and encourage adoption of agroforestry and silvopastoral systems that integrate sustainable use of NTFPs identified under the PDF-B. Agrosilvopastoral practices enable maintenance and recovery of biological diversity, as has been well proven and documented[9]. The adoption of these systems in the project area is expected to not only enhance biodiversity values within productive areas on farmer lots, but also reduce pressures on natural forests by making settlements more stable and productive. These measures coupled with land use planning frameworks that encourage native forests on adjoining lots to be located so as to maintain contiguous blocks of native forests can reduce habitat fragmentation and biodiversity loss.

[8] The pilot sites under outputs 2 and 3 will serve to demonstrate viable alternatives to current unsustainable land uses.

[9] For example, research conducted in other tropical habitats by the Smithsonian Institution's Migratory Bird Center found that inter-planted perennial species such as coffee and cocoa under native forests allow coexistence of up to 50% of those bird species found in the primary forest. Similar effects have been identified in shaded cocoa under native Atlantic forests in southern Bahia, but are as yet undocumented in the Brazilian Amazon.

44. Since the high risks and initial investment associated with testing new technologies or systems pose significant barriers, it is important to pilot successful demonstrations of the integrated system. Demonstrations need to be undertaken in well-distributed sites established with farmer cooperation on their lands to promote access and visibility and amplify adoption. Furthermore, farmers and extension workers will need to be trained in adapting and applying these systems. The project will establish on-farm demonstrations with associated technical training and dissemination efforts. **GEF resources will support technical assistance, assessments, training, awareness raising and dissemination, while land, labor and material inputs will be supported through cofinancing. Additional in-kind cofinancing in the form of technical expertise of other project partners has also been leveraged.**

45. Demonstration activities will be initiated during the first three years of the project in the municipalities of Juruena and Cotriguaçu. In Juruena, agrosilvopastoral demonstrations will be established in conjunction with ADERJUR's programs of crop diversification and value-added production. In Cotriguaçu, demonstrations will initially concentrate on lands surrounding a 10,000 ha property, within which a 3,000 ha "carbon sink" is being established on degraded pasture by IPN in partnership with ONF (France) with support from Peugeot. During the final four years, demonstration sites will be established in the remaining 3 municipalities. In each case, model systems developed through IPN's multi-year research and trials will be initially adapted to on-farm conditions with a selected group of up to 10 farmers whose experience will serve as nuclei for diffusion to their neighbors along corridors delineated by settlement "lines" (access roads). On-farm demonstrations will also be accomplished within new INCRA settlement areas. The results and experiences of these demonstration plots will be closely monitored and documented by the project team. For more details on the IPN model see Annex F.

46. The project will also encourage sustained utilization of native populations of NTFPs and gradual incorporation of selected native NTFP species into agrosilvopastoral systems. Based on studies conducted through the PDF B, several species have been identified whose products are of interest to the food, cosmetics and agro-chemical industries (see Annex G). The prospects for attaining this potential will depend on a combination of screening and technological assessment of applications together with local resource management to protect and find lucrative uses for *in situ* resources that will reinforce their protection. However, enough is known of their economic potential to begin their introduction as components of a diversified biodiversity-enhancing agrosilvopastoral system, and to gradually strengthen colonists' capacities to engage themselves in management and utilization of native species for small-scale enterprise such as Brazil nut oil expression, through local producer associations.

47. Demonstration activities will be complemented by the establishment of an Agrosilvopastoral Training Center in Juruena within one of the region's new INCRA settlements, which will offer regular training sessions and internships to local youth who will participate in technology demonstration and diffusion. At the training center and through a regular program of visits to demonstration plots and interchange with other communities in the region, producers will be exposed to alternatives, and learn to adapt their land use practices in accordance with locally diverse environmental conditions and management capacities. **The Training Center will be supported in part by INCRA (providing financing for technical assistance for training of colonists and the formation of dissemination agents), by the Association of Settlers of the project, and by the Municipal Government of Juruena.** The Center will be established with the intent to generate its own long-term sustainability, through continuous offering at cost of

training courses, seminars, workshops and events and through sale of products and planting materials.

48. To identify additional incentives to motivate sustained use of biodiversity by landowners, the project, with **GEF support, will work closely with municipal governments in the region, to consider legislation and budget allocations that offer incentives toward maintaining forested areas and recuperation of degraded lands** (for example, technical assistance, access to municipal equipment, provision of tree seedlings). Official credit sources would also be approached to grant priority in access to credit by firms or producers whose projects have been prepared with an emphasis on agroecological sustainability and biodiversity protection. Such an approach would be consistent with the federal "Green Protocol", signed in 1995 by all official development banks at the instigation of the President, providing for public credit incentives to sustainable production, but which has not been applied to date as a mechanism to promote biodiversity conservation in natural forest regions.

49. The agroforestry demonstration activities will be closely monitored and will be subject to periodic economic, biodiversity and social assessments. IPN and the Federal University of Mato Grosso (UFMT) have signed an umbrella agreement, that will permit professors and graduate students of the University to conduct research associated with ongoing project activities. The university will provide research support services, facilities and equipment in exchange for access to IPN field facilities, transport and experimental areas. Monitoring components are expected to include: (i) independent evaluation and monitoring of productivity, biodiversity benefits and carbon sequestration in the agrosilvopastoral models established at IPN's Juruena research center, carbon sink properties and on farmers' fields; (ii) analysis of successional processes and diversity of flora and fauna as degraded land is recovered through trials of natural and enrichment-based regeneration on demonstration farms; (iii) assessment of technical viability of NTFP management and processing systems; (iv) development of fitomedicinal and food products. It is anticipated that these analyses will be reviewed in their design phase as well as during execution by an independent scientific panel from EMBRAPA regional centers, with advice from an international expert group at the University of Wageningen, Netherlands.[10]

Output 3: Pilot sites demonstrating a biodiversity overlay on permanent sustainable management of forest values are established in the project area with active participation of timber operators. [GEF: US$ 2,210,084; Cofinancing: US$ 3,770,780]

50. **GEF resources will support the biodiversity overlay on sustainable logging demonstrations, where the latter are to be supported through cofinancing**[11]. Logging is a significant economic activity in the region and our goal is to enable these logging operations to be more biodiversity-friendly by addressing barriers to implementation through demonstration activities. In the absence of the GEF contribution, the most we can expect is demonstrations of low-impact logging but no explicit inclusion of conservation set-asides and other biodiversity conserving actions in forest management plans. This output will therefore include a combination

[10] The monitoring and assessment components of outputs 2 and 3 will operate under similar institutional arrangements.

[11] In conformity with the "Interim Guiding Principles for Projects Associated with Logging" (Draft, August 9 1999, GEF Secretariat), non-GEF resources will finance the sustainable baseline of SFM and GEF resources will finance the biodiversity overlay. In particular, refer to sections B. v. and C. i. of the interim guidance.

of measures geared to identifying and securing as set-asides areas of conservation significance on timber operators' lands[12]. Integration of NTFPs identified during the PDF-B in the enrichment and regeneration phase will also be considered (including technical assistance with planting, protection and eventual sustainable harvesting).

51. Because these biodiversity-overlay activities have an uncertain outcome in terms of benefits to timber operators, there is little motivation to test these techniques or invest in the additional skills required to apply them and therefore the demonstration sites are critical to addressing barriers. Timber operators in the project area have little knowledge or access to differentiated markets that can provide the necessary incentive to adopt biodiversity-friendly extraction practices. The project will therefore organize seminars and courses for employees and managers on themes such as tropical timber certification and inventory and exploitation planning for minimum impact to biodiversity. Field visits to demonstration sites will also be organized. GEF resources will thus play a catalytic role by financing demonstrations on timber operators' properties, providing associated technical assistance, and increasing producers' knowledge and facilitating access to growing markets for certified tropical hardwoods and to FSC-accredited certification organizations. (Please also refer to Annex J that discusses the importance of the domestic market for Brazil's tropical timber and the potential acceptance of FSC criteria.)

52. The **sustainable logging demonstrations, supported through cofinancing**, will work with timber operators in the project area to encourage permanent forest management using sustainable logging practices to address the current migratory nature of timber activities and to restrain unsustainable expansion so as to avert the present trend of degradation and clearing for agropastoral settlement. These low-impact practices include reduced road building, pre-harvest commercial inventories and site planning, vine cutting, regeneration and enrichment with economically desirable species. Demonstration units will be on in timber companies' forest properties. In the initial three years of the project, two demonstrations will be established in Juruena and Cotriguaçu. In addition, the project will work closely with Rohden Lignea (Juruena) to plan a significant expansion in its forest management enterprise under certified management practices. For the demonstration site in Cotriguaçu, the project will result in detailed land capability assessment and resource inventories for low-impact management of timber in intact forest surrounding the ONF/Peugeot carbon sink. At least 5,000 hectares of this property will remain under permanent conservation. By the fourth year of the project, additional sustainable logging demonstration units will have been established in the three remaining municipalities of the region.

53. Given the principle of adaptive management that underlies the conceptual approach of the project, GEF support toward monitoring of impacts in demonstration sites is critical to informing the learning process. Sustainable forest management demonstrations will be closely monitored and will be subject to periodic economic, biodiversity and social assessments. To discern the effectiveness of current low-impact techniques in conserving biodiversity values, the project will monitor the impact of different extraction systems on the trial lot in Juruena, and also demarcate

[12] IPN is currently conducting a detailed comparative economic assessment of the additional costs implied in adopting progressively more rigorous forest management criteria, in collaboration with IIED with GTZ support, on the basis of information generated by the PRODEAGRO trials in Juruena, and other studies by Imazon in the eastern Amazon. This financial analysis, to be completed in early-2000, will offer parameters to assess the specific incremental costs associated with adoption of FSC and further biodiversity protective treatments. It will thus provide an immediate input into the design of interventions through the proposed project.

additional plots for long-term monitoring. These will be oriented toward assessing the successional processes underway after timber harvesting in biodiversity sensitive models, controlling on traditional and low-impact practices, and their relative effects on floral and faunal species diversity that emerges on disturbed sites. The project will also explore means for post-project monitoring of these plots by faculty at UFMT, under agreement with demonstration plot owners.

ELIGIBILITY UNDER CBD

54. The proposed project meets the objectives and principles articulated in the CBD in several ways. The project's principal activities would develop a framework for sustainable use of biodiversity components in agrosilvopastoral systems and sustainably managed forests (Article 10). By integrating conservation objectives into ecological-economic zoning and land use plans at a local and regional level, the project would fulfil Article 6 of the CBD (General Measures for Conservation and Sustainable Use). By encouraging the establishment of conservation areas on private lands, Article 8, In Situ Conservation, would be fulfilled. The status of components of biodiversity would be monitored by local civil society and municipal governments (Article 7, Identification and Monitoring); whose management capacity would be strengthened by providing training and technical assistance (Article 12); imparting conservation awareness (Article 13); and facilitating information exchange with other sustainable use experiences in the Amazon region (Article 17). The project would also advance cross-cutting objectives and synergies across the Conventions (see UNDP/Sustainable Energy and Environment Division 1997) such as recuperation of degraded lands with native species, and encourage the integration of biodiversity conservation and climate change mitigation through carbon sequestration pilot investment by Peugeot/ONF.

SUSTAINABILITY AND RISKS

55. The primary vehicle by which sustainability of alternative agroforestry and sustainable forest management approaches initiated by the project will be ensured is by involving and empowering the primary actors whose decisions have a direct bearing on biodiversity, namely, farmers, colonists, and local timber operators. The project allows for the active involvement of municipal and state government agencies responsible for sound environmental management and biodiversity conservation in the State, and will therefore greatly strengthen relevant in-country human resource and institutional capacity. The pivotal role played by the main NGO active in this area, IPN, will also contribute to long-term continuity of efforts initiated under this project.

56. The budgetary and in-kind commitments from project co-funders are impressive for the diversity of the involved agencies and their respective commitments to the project. This has been one of the key selling points of the project in the eyes of SEAIN/MOG, which insisted on the pre-endorsement commitment in writing of all involved agencies, be they governmental, private investors or local producer organizations. Their involvement in the preparation of the project has resulted in the launching of initiatives associated with the project prior to its actual approval, as is indicated by the establishment of an agreement between INCRA and Pro-Natura to implement the model sustainable settlement in Juruena, as well as other initiatives still in the project development phase (carbon sink, certified forest management fund, etc.).

57. The involvement of a diverse group of co-funders in these initial projects will provide a firm footing for a long-term endeavor that will be significantly leveraged by GEF engagement, to ensure the adoption of strong biodiversity protection objectives. The financial sustainability of these efforts in the period beyond GEF support will depend on Pro-Natura's continuing success in leveraging and mobilizing a diverse array of sources to this task. With this concern in mind during all phases of project execution, the design of each project element will be conducted so as to assure its financial sustainability in the long-term. This will require that each output be managed so as to respond in an adaptive fashion to stakeholder needs as they evolve, as well as to the evolving policy and market conjuncture.

58. Details on risks associated with achieving project outputs and activities are presented in the Logical Framework matrix (Annex B). We summarize here the principal risks:

I. Increasing skepticism regarding the realization of conservation objectives through promoting sustainable uses in the productive landscape.

In early discussions at the time of project formulation, the skepticism among some in the conservation community on achieving conservation through sustainable uses was raised as an important concern. At the same time others in the conservation community believe that unless accorded with a tangible value it will be very difficult to create appropriate incentives for biodiversity conservation and also that it is seldom possible to convert entire landscapes into protected areas, and certainly not in Mato Grosso. Therefore, it was agreed that the best approach to follow is to demarcate and gazette some areas as protected, including corridors, and promote sustainable uses in the productive landscapes. It was also recognized that to achieve this balance a system of adaptive management that enables rapid learning through field-testing is critical, and therefore the project focuses on establishing a strong institutional foundation that can implement this by engaging continuous cooperation among private sector stakeholders and key public institutions for enforcing and sustaining project activities. This institutional structure coupled with a phased approach, where evaluation of one phase determines the design and implementation of the next phase, is designed to ensure continuous adaptive management. As highlighted in the IMPLEMENTATION AND EXECUTION ARRANGEMENTS section below, the institutional framework will consist of municipal governments and civil society organizations, state agencies (FEMA, SEMA, INTERMAT, EMATER, EMPAER), and federal agencies (INCRA, IBAMA, EMBRAPA). These public sector institutions are key actors in the development of the region. This team of public and private sector representatives will work together to evaluate feedback and lessons from demonstration sites and adapt the project strategy to mitigate risks and improve chances of success. In addition, details on the monitoring and evaluation efforts and adaptive management are described under the MONITORING AND EVALUATION section of the Brief.

II. Settlement projects proceed with delimitation and occupation of lots without initial land-use planning and designation of permanent conservation blocks.

The risk of this occuring is low given the early substantive and financial collaboration established with INCRA on this project. INCRA has adopted as its baseline policy a "sustainable settlement" strategy, which is being tested for the first time in the Amazon in its colonization projects in NW Mato Grosso in collaboration with IPN. The proposed project will enable IPN and INCRA to jointly build on this initial experience, to leverage adoption of these criteria in the remaining settlements planned for the NW region, and to disseminate this experience elsewhere in the Amazon.

III. The domestic market does not adhere to international consumer trend to demand certified sustainable wood products.

As documented in a recently published analysis by Friends of the Earth, Imaflora and Imazon (*Hitting the Target: timber consumption in the Brazilian domestic market and promotion of forest certification*, June 1999), it is true that the vast majority of tropical timber produced in Brazil (86% of Amazon wood supplies) is destined for national markets. This document suggests that although there is little concern at present in domestic wood consuming enterprises for use of sustainable management technology, this trend is growing (as represented by the adoption of the FSC criteria as a basis for purchase contracts for furniture retail by the nation's leading company in this sector, Tok & Stok, in November 1998). There is a concerted effort on the part of a network of NGOs and concerned industry groups to support this trend, which has already led to adoption of FSC criteria by all 17 of the leading pulp and paper manufacturers in Brazil for their plantation practices. Based on recent legislation requiring sustainable forest management, IBAMA has restricted the traditional exploitation of timber, and has cancelled the licences of the majority (87.5%) of existing management plans in Mato Grosso alone, in 1999. For operating timber companies to comply with these new restrictions, they will be required to adopt far more rigorous management plans. These requirements, though more rigorous than current practice, still do not measure up to FSC certification criteria. It is a combination of regulatory demands, financial resources and market pressures that will eventually bring about a positive change in forest management technology. Among those economic incentives currently in process of legislative adoption in the state of Mato Grosso which will reinforce the redirection of productive activities in this direction are progressively reduced tax incidence in timber operations that adopt sustainable forest management, recycling of wood residues for energy generation, and value-added wood processing to improve economic viability. There are also important initiatives being adopted by partners in the GEF undertaking that will further reinforce these incentives, including the creation of a Forest Fund to finance certified sustainable forest management, involving private international investors linked with Banco Axial. GMO Renewable Resources of Boston is investing in this fund, having announced last week its first major investment, in a prospective collaboration with the UNDP, which is leveraging social and environmental investments in league with Pro-Natura (see Annex J).

STAKEHOLDER PARTICIPATION AND PROJECT IMPLEMENTATION

STAKEHOLDER PARTICIPATION

59. The stakeholders in the project approach are the colonist families settled in the area, timber extracting enterprises, and local municipalities. Official entities responsible for conservation and management of forest and biodiversity resources in Brazil and in Mato Grosso in particular (IBAMA and FEMA), as well as those charged with the implementation of new colonization projects (INCRA) will have access to a package of alternative strategies to improve resource management in the Amazon, proven sufficiently to guarantee their effectiveness and subsequent diffusion in other areas facing similar problems. Last but not least, the global community will also stand to benefit from measures that promote the conservation of biodiversity and associated options and intrinsic values.

60. The project will be implemented directly with stakeholders residing in the project area, through local organizations and municipal governments. When preparing the Project Document details on the specific modus operandi of each aspect of the project, and roles and responsibilities of stakeholder participants will be provided. In defining roles, particular attention will be given to ensuring adherence and participation of stakeholders to sustainable uses, as also the participation of women. All pilot demonstration activities will take place on farmers' and timber operators' lands with their participation. This strategy, by involving key private sector stakeholders directly in testing and adapting production alternatives, is central to a public-private partnership that will guarantee long-term effectiveness in achieving project objectives.

61. Thus far, participation of the local private sector and public elected officials in preparation of the project strategy has been intense and continuous. IPN, the executor of the PDF-B, has been working in the project area since 1991 and has been instrumental in the organization of Juruena's local producers' association, ADERJUR. The close working relationship that IPN has established with stakeholders through PDF-B financed activities and previous work, is a precursor to continuation of this partnership.

62. Involvement in the project of the remaining municipalities in the northwest area of Mato Grosso has been initiated through consultations with local officials and landowners. These municipalities (Aripuanã, Castanheira, Cotriguaçu and Juína) together with Juruena have agreed to participate actively in the training and demonstration activities proposed, formally committing in-kind resources to the task, and have already adhered and begun to implement the regional environmental management project, PGAI.

63. Finally, the project will be executed in coordination with state and federal authorities and agencies, particularly FEMA, IBAMA, INCRA, MMA and SEAIN that have participated in project formulation and planning missions, and will be involved in continuously adjusting targets as the project is implemented, in line with the adaptive management approach being adopted by the project.

IMPLEMENTATION AND EXECUTION ARRANGEMENTS

64. The implementation and execution arrangements of the project are critical to the long-term, phased, and adaptive management approach underlying this project. Strong institutional ownership and participation are very important. The project will have as its implementing agency the State Foundation for the Environment (FEMA is the operational branch of the State

Environmental Secretariat of Mato Grosso), whose PGAI is the centerpiece of the state's efforts to develop a decentralized environmental management structure. As part of this baseline exercise, FEMA has organized a regional Coordinating Unit and a Consultative Council (CGAI) composed of representatives of each of the five municipalities in the region, other state and federal agencies and civil society organizations. This will provide the nucleus for establishment of a permanent institutional structure to guarantee continuity, coordination and adaptive management during and beyond the immediate proposed investments.

65. FEMA would lead a Project Steering Committee (or designate a chair), with the potential for institutionalizing this Committee as a Regional Commission in the second phase of the project. To ensure continuity of the coordinating structure established under the PGAI, the Steering Committee will be modeled on the CGAI and be comprised of local representatives from municipal governments and civil society organizations, state agencies (SEMA, INTERMAT, EMATER, EMPAER), and federal agencies (INCRA, IBAMA, EMBRAPA). UNDP, as GEF Implementing Agency, will also be represented on the Steering Committee. The Steering Committee will be the primary oversight, decision-making and advisory body.

66. IPN will be the operational arm of this project implementation structure and will implement and report on project activities that have been approved by the Steering Committee (for more details on IPN's project development and implementation capacity and experience please see Annex K). As implementing agency, IPN would agree to a strict timetable, budget and oversight procedures for reporting to FEMA and UNDP/GEF. To guide its technical tasks, IPN will also name a consultative panel composed of scientific and business leaders knowledgeable of the region.

67. This structure should serve to mobilize ongoing support and buy-in from the responsible local, state and federal government agencies. Local extension and regulatory staff of these agencies will be directly engaged in project activities and training. At a local level, farmers and timber enterprises would participate in demonstrations, training sessions, etc. related both to agroforestry and forest management, as well as the carbon sink and "non-sink"/buffer zone activities. Through their representative organizations, they, other local NGOs and their elected municipal officials would also be engaged in the process. Successful coordination will depend on defining specific roles and responsibilities of each partner in the endeavor, and achieving commitments both budgetary and in-kind. However, IPN's operating philosophy has always been to leverage the maximum buy-in and adherence to a common mission. Therefore, in developing the proposed project, consultations with stakeholders at all levels indicated a substantial agreement over the means and ends to be achieved with the project. In fact, one of the aspects that has drawn praise from the GEF Focal Point at SEAIN is exactly the skill which IPN has shown in orchestrating diverse actors and inputs toward common objectives. As part of detailed operational project planning during preparation of the Project Document, it is expected that the more specific inputs of the distinct actors involved in this GEF-supported program will be better defined specifying the role of each institution, source of funds, and performance indicators.

68. Co-ordination of Activities with Baseline and other Initiatives: Extensive consultations have been undertaken with state, federal and multilateral organizations as well as private institutions and stakeholders involved in baseline activities in the project area, with a view to coordinating respective project interventions. The CGAI will provide a forum for linking the

project with associated baseline initiatives in environmental management and EEZ programmed for 1998-2000 in northwest Mato Grosso. In addition to the CGAI, an inter-institutional forum to coordinate ongoing project-related activities and coherence with overall government policy in the Northwest region has been established, including the GEF project and other multilateral initiatives (PGAI, PRODEAGRO). Tri-monthly meetings have been scheduled with the task managers of these associated projects. It is expected that joint appraisal workshops will be convened from time to time to take stock of progress and exchange information. In particular, close coordination will be maintained with the World Bank-funded PRODEAGRO team since PRODEAGRO provides the fundamental basis for further refining a micro-level zoning scheme for the project area.

INCREMENTAL COSTS AND PROJECT FINANCING

69. The agreed incremental costs of securing global environmental benefits through this project are detailed in Annex A in standard format, and summarized below. Incremental costs to be financed by the GEF amount to US$6,704,112. Total co-financing amounts to US$ 9,049,119. Therefore GEF financing is approximately 42% of the total project cost. GEF investments represent a modest increment to Brazil's own commitments to biodiversity conservation and sustainable development (the baseline has been estimated at US$9,848,333). The budget is outlined below.

OUTPUTS	COFINANCING		GEF	TOTAL
Ecological-economic Zoning		2,149,616	2,136,944	4,286,560
	Of which,			
	ONF/Peugeot:	1,184,910		
	State govt (77% in kind):	764,706		
	Municipal Govts. (in kind):	200,000		
Agrosilvopastoral demonstrations		3,128,723	2,357,084	5,485,807
	Of which,			
	ONF/Peugeot:	1,132,545		
	INCRA (52% in kind):	1,100,000		
	CNPT (in kind):	55,000		
	Municipal govts (in kind):	505,884		
	Local producers (in kind):	335,294		
Sustainable forest management demonstrations		3,770,780	2,210,084	5,980,864
	Of which,			
	ONF/Peugeot:	1,132,545		
	IBAMA (60% in kind):	50,000		
	Banco Axial (20% in kind):	2,000,000		
	Rohden Lignea (80% in kind):	588,235		
TOTAL (w/o PDF-B)		**9,049,119**	**6,704,112**	**15,753,231**

Note: GEF allocation for outputs 2 and 3 include US$150,000 as outlays for monitoring in the 3-year post-GEF phase.

70. Co-Financing: Commitments of co-financing to activities complementary with the project include, primarily, support by Peugeot/ONF toward management and rejuvenation of secondary forest and an agroforestry buffer zone in collaboration with IPN. Other significant co-financing is anticipated from Banco Axial toward an expansion in sustainable logging by Rohden Lignea

S.A.[13], and by INCRA toward its sustainable settlements program in northwest Mato Grosso. In addition, cofinancing will also be provided by the state and municipal governments and local associations, mainly in kind.

MONITORING AND EVALUATION

71. The project's Monitoring and Evaluation (M&E) arrangements encompass the collection, analysis, and dissemination of data and information on issues related to implementation progress and impact assessment (indicators along with sources of verification are outlined in the logical framework matrix in Annex B and specific milestones have been identified for each phase in Annex I). Ongoing monitoring and evaluation of field activities are critical to the adaptive management approach being adopted by the project. Therefore the project has laid particular emphasis on establishing an institutional structure that brings together private and public sector representatives with the responsibility to closely monitor progress and adapt, enforce and sustain project activities in line with this adaptive management approach (please see section on EXECUTION AND IMPLEMENTATION ARRANGEMENTS). This institutional structure (Steering Committee) will be responsible for evaluating the monitoring results of demonstration sites and adapting the project strategy in response, so as to minimize risk and enhance success. Detailed monitoring and evaluation of the demonstration sites will be conducted in collaboration with UFMT (please see paragraphs 46 and 50 above). Lessons learned will be documented and included in training courses delivered by the project. A small monitoring component will continue after the seven years of the project to review progress of the third phase.

72. In addition, an independent evaluation will be undertaken at the end of Phase I prior to implementing Phase II. The independent evaluation will carry out a critical assessment of the bioregional planning approach being promoted by the project and specifically assess the following: (1) viability and effectiveness of the institutional structure to successfully implement adaptive management, and (2) early lessons and results from the demonstrations and the potential for these to address barriers to adoption of alternatives to current practices. Based on the findings of the evaluation a decision will be made on moving from phase I to II and any needed adaptations to the project strategy. Specific milestones (listed in Annex I, page 64) must have been achieved prior to moving from one phase to the next, particularly those relating to institutional strengthening and protected areas.

73. Critical to effective monitoring and evaluation will be the participation of local stakeholders in determining, assessing, and analyzing project progress and overall impact. Therefore, training of local authorities and civil society organizations in collecting and interpreting data is an integral part of output 1.

74. Current UNDP project monitoring and reporting strategies (Tripartite Project Review, Program Performance Evaluation Reports, Mid Term- and Final independent Reviews) will be applied and complemented by GEF M&E procedures such as the annual Project Implementation Review (PIR).

[13] Banco Axial determines its participation in financing of a given enterprise based on due diligence along two parallel and mutually supportive lines: biodiversity protection and financial viability. As the basis for its consideration of financial investment in the Rohden enterprise, Axial has adopted the FSC criteria for tropical forest management, and requires that Rohden conduct pre-certification assessment and establish targets and a program of improvement in technology to attain certification of its entire management operation in the near term.

LIST OF ANNEXES

ANNEX A

INCREMENTAL COST ANALYSIS

Broad Development Goals

1. The Brazilian Constitution of 1988 defines the Amazon forest as a "national patrimony" and thus subject to public control to avert further loss. The government reaffirmed its position on biodiversity conservation by ratifying the *Convention on Biological Diversity* in February 1994. As a response to global concern over Amazonian burning, the Ministry of the Environment (MMA) is coordinating the Pilot Program for the Conservation of the Brazilian Tropical Forests, (PPG-7) and the National Environmental Program (PNMA), thus providing opportunities for state and local municipal governments and NGOs to become partners in the execution of projects aimed at environmental management, conservation and sustainable use. The Constitution also called for municipal land use control subject to a Master Plan (*Plano Diretor*), and a 1997 ruling of the National Environmental Council (CONAMA) allows environmental review and licensing by municipal governments. Government has also pursued Ecological-Economic Zoning (EEZ) to discipline private land use consistent with resource suitability. These instruments offer policy tools to strengthen local environmental protection and management capacity.

2. Although financial incentives for new pasture establishment in the Amazon were eliminated in 1988, reducing one element of deforestation pressure, the resurgence of an agrarian reform movement has forced government to distribute public and private holdings in the region to landless families. The inherent tension between these development prerogatives and biodiversity conservation suggests that establishing and maintaining protected areas must be complemented with viable alternatives to unsustainable agricultural, pastoral and timber extraction practices that enhance the potential of conserving biodiversity within productive landscapes and reduce pressures for conversion.

Global Environmental Objective

3. The global environmental objective of the proposed project is to conserve and promote sustainable use of biodiversity in the northwest region of the state of Mato Grosso, by testing a bioregional planning approach that addresses some of the important challenges to integrating conservation into the productive landscape.

Baseline

4. Deforestation and biodiversity loss in the Amazon basin has by no means been homogenous, and, over the last few years, one of the areas where the process has been most pronounced includes the northwest region of the state of Mato Grosso (Annex E, Maps 2 and 3). Mato Grosso has the dubious distinction of being the state with the highest rate of deforestation in Brazil: averaging 1.3% per year from 1989 to 1996. The primary proximate causes of this high rate of deforestation are colonization by people from outside the state, subsequent slash-and-burn agropastoral activities, forest fires, inappropriate timber extraction, and associated soil degradation.

Land use patterns

5. In the proposed project area encompassing the five municipalities of Aripuanã, Castanheira, Cotriguaçu, Juína and Juruena (see Annex E, Maps 1 and 4), approximately 80% of land is state or private land under intact forest cover and 20% is private land under exploitation for agropastoral activities and timber extraction[1]. Private land under exploitation is mainly owned by recent colonists coming from

[1] See Governo de Mato Grosso (1997) Programa de Gestão Ambiental Integrada (PGAI) da Área Noroeste do Estado de Mato Grosso. Cuiabá; F.B. Fernandes (1992) "Meio Biótico, levantamento da vegetação original e

regions that are ecologically very different from the project area. Over the years, the allocation of land to various uses has not taken place through appropriate planning that takes into account the capacity of soils in different parts to support a particular land use, thus threatening the long-term viability of settlements due to land degradation.

6. Given the importance of such land use planning to the long-term conservation and management of natural resources, the state of Mato Grosso is completing a macro zoning scheme for the state (1:250,000), with support from PRODEAGRO. While this is an important first step, the macro-level zoning scheme needs to be further refined at a micro scale in order to be useful in managing resources at a municipal level in the project area. Such an exercise is planned by the state agency FEMA as a pilot (micro-level) zoning and environmental management program under the PPG-7 initiative[2]. This project, titled PGAI, includes ecological-economic zoning, associated capacity-building, monitoring deviations from the recommendations of the EEZ, and environmental control that includes establishment of inspection routines, improvement of registry and environmental licensing processes. PPG-7 is contributing US$4.8 million to this project. The state government and municipal governments will also contribute personnel to this project (estimated at US$ 685,000) and NGOs and civil society organizations will provide in-kind support amounting to roughly US$ 30,000.

Agropastoral activities

7. The land use patterns of small holders include slash-and-burn practices to produce rice, beans, and cassava for local consumption on lots of 40 to 120 hectares, and cattle rearing on lots of 1,000 to 20,000 hectares. As productivity declines on agricultural land farmers are forced to move to other forested areas. Due to a lack of alternatives to slash-and-burn cultivation and cattle rearing, small holders in the area are likely to continue with destructive practices. Furthermore, INCRA which is responsible for the majority of new settlements in the Amazon plans to allocate approximately 1.7% of the total project area to new settlements (currently only 0.5% is occupied by colonist farmlands). Baseline trends vis-à-vis destructive agropastoral practices are likely to continue unabated, unless more emphasis is laid on alternatives such as agrosilvopastoral systems and non-timber forest products. Given that INCRA is looking to address the adverse environmental effects of its settlements program, this is an opportune moment to test and demonstrate the potential of such alternatives.

8. Demonstration of the viability of agrosilvopastoral systems has been initiated by IPN on a 100-hectare plot in Juruena through a series of multi-year trials of an agrosilvopastoral model adapted to local environmental conditions, farmers' capabilities and income requirements. The IPN model (see Annex F) requires a maximum of 20 hectares to be available for the application of a viable agrosilvopastoral system, with the rest being left as untouched forest land. The adoption of this model on an average plot size of 100 hectares will result in almost 80% being left untouched. Even at the lower end of the range (farm size of 40 hectares), the IPN model will result in 50% of the farm being left untouched[3]. The adoption of this model needs to be encouraged through additional demonstration sites, technical assistance, and awareness raising.

9. Under the State's PGAI program some resources (US$ 484,845) are earmarked for promoting agroforestry in settlements and for the recuperation of degraded lands. Along with these efforts, new settlers in the area can access credit through INCRA's tranche of the federally funded PRONAF. Some resources from the latter can be expected to go towards agro-environmental management in new

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ocupação do Município de Juruena-MT. Relatório Final da Análise Ambiental, Projeto Juruena, Vol. II; Pro-Natura/ICI-Zeneca (1991) Juruena Project.

[2] This pilot exercise will encompass the five municipalities of Aripuaná, Cotriguaçu, Castanheira, Juína and Juruena – the project area.

[3] The model will therefore more than assist in meeting the requirement by law that 50% of private land holdings be under intact forests.

settlements and host communities (US$300,000). However, there are several barriers to the adoption of the alternative agrosilvopastoral model and under the baseline these barriers will continue to impede adoption of the alternative system that can enhance biodiversity values within productive landscapes and also allow larger blocks of contiguous areas on private lands to remain under forest cover.

Timber extraction

10. Timber extraction by private operators takes place on land units of 25,000 hectares or more and is a temporary activity. Extraction is limited to 6-10 species and takes place in several cycles resulting in increased damage to the forest and biodiversity. The Forest Statute (1965) permits timber extraction on uncleared private and public lands subject to a management plan. These management plans are, however, not very rigorous with little effective monitoring and enforcement. Once the forest resource is exhausted, the industry moves to new areas or disappears, and settlers occupy the land. Timber operators are not involved in permanent sustainable forest management, with Rohden Lignea S. A. being one of the few exceptions. These practices will, however, have to change with stricter criteria for forest management plans coming in to force in September 1998. Management plans to be approved by IBAMA must include the following elements: characterization of the physical and biological environment; determination of existing stocks; intensity of exploitation compatible with the capacity of the site; promotion of natural regeneration; adoption of appropriate silviculture techniques; adoption of appropriate exploitation systems; monitoring of development of the remaining forest; guarantee of technical-economic viability and of social benefits; guarantee of mitigative environmental measures. However, there are no specific criteria for monitoring or protection of biodiversity and experience and know-how with applying these criteria is scarce in the project area.

11. The largest timber operator in the project area, Rohden Lignea will undertake limited efforts at sustainable logging. This includes an estimated expenditure of US$2,000,000 on inventory and operations, including equipment, machinery, technical personnel, and consultants. Some timber operators have expressed interest in non-timber forest products (such as copaiba resin and palm hearts). However, as yet no efforts are planned to protect non-timber or other biological resources during timber harvesting, except through demonstrations initiated with IPN.

12. The federal agency, IBAMA, will incur field expenses for IBAMA technicians in each of the five municipalities, responsible for enforcement and authorization of deforestation, burning, wood harvest, commercialization of forest products, forest management and other attributes associated with environmental monitoring, to the tune of US$1,500,000. This also includes additional field expenses for enforcement missions carried out in the region periodically with support of personnel and equipment from other jurisdictions (such as the current programs "Pró-Arco" and "Operation Macauã", in which IBAMA technicians and enforcement staff, with support from the civil and military police forces and using satellite imagery, cover the region to repress unauthorized cutting and burning activity).

Gaps in baseline

13. The factors intermediating the process from colonization to destruction are primarily (i) the absence of a detailed, micro-level land use planning framework coordinated across municipalities (current PRODEAGRO zoning is at 1:250,000 scale) that can curtail unplanned settlement and development in the project area by promoting a melded mosaic of land uses (including conservation and sustainable use); lack of sufficient local experience with and expertise in viable non-destructive, biodiversity-conserving alternatives to current agropastoral and timber extraction practices, and (iii) limited capacity to promote, enforce, and monitor the adoption of these alternatives by those residing in the project area. Under the baseline, the socio-economic development of the northwest region of Mato Grosso will proceed along conventional lines with little emphasis being laid on integrating biodiversity conservation objectives in land use planning, agropastoral activities and timber extraction.

GEF Alternative

14. In order to influence baseline trends vis-à-vis biodiversity loss in the project area there is a need for an alternative strategy that promotes an integrated package of alternatives such as agrosilvopastoral and sustainable forest management systems (with NTFPs gradually being integrated into these systems and enhancing their value[4]), along with municipal-level ecological-economic zoning that explicitly includes biodiversity conservation objectives. This includes some activities that address unsustainable trends in the current situation (move from realistic baseline to sustainable development baseline), and others that explicitly integrate biodiversity conservation measures into the sustainable development baseline.

15. While the realistic baseline includes some measures that are important in ensuring better environmental management, there is considerable scope to strengthen and therefore maximize the impact through additional actions. The private sector (ONF/Peugeot, Banco Axial), state and municipal governments, INCRA, CNPT, and local producers will finance these additional measures aimed at better environmental management. These measures must be in place for securing biodiversity conservation efforts and constitute the sustainable development baseline.

16. Activities to be implemented as part of the sustainable development baseline through cofinancing include, building capacity of local government representatives and civil organizations to enable better planning and enforcement of EEZ plans by making available essential equipment and targeted training in data collection, monitoring, and interpretation of GIS data; production inputs for promoting agrosilvopastoral systems in the project area; and trial demonstrations of low-impact logging.

17. In order to secure biodiversity conservation the project will undertake the following additional measures (detailed explanation is provided in the main brief): (i) a biodiversity overlay on micro-level EEZ; (ii) remove knowledge and incentive barriers to the adoption of agrosilvopastoral systems; and (iii) undertaking demonstrations of a biodiversity overlay on sustainable logging systems.

Scope of Analysis

18. The scope of the incremental cost analysis covers the northwest part of the state of Mato Grosso, encompassing the five municipalities of Juruena, Cotriguaçu, Aripuanã, Castanheira, and Juína. This geographical scope represents the forest frontier of the southern Amazon, an area that typifies deforestation and biodiversity loss prompted by settlers who come from ecologically very different areas. The analysis has been done for the seven-year period of the proposed project and considers all actions necessary to remove proximate threats (and underlying causes) to the forest ecosystem in the project area.

19. There are likely to be some incidental domestic benefits from the intervention, once barriers to adoption of agrosilvopastoral and sustainable forest management systems are removed. However given the uncertain nature of these benefits GEF resources are needed to demonstrate their viability and provide the catalytic financing necessary to promote wide adoption and replication. Nevertheless, significant cofinancing has been leveraged to implement the alternative strategy.

[4] PDF B activities indicated that the promise of NTFPs alone cannot act to deter current unsustainable trends for several reasons, as outlined in paragraphs 21 and 22 of the main brief and in Annex F. The PDF B identified some NTFPs that could prove successful if integrated into this broader strategy (Brazil nuts, Copaiba and Jatoba resins).

INCREMENTAL COST MATRIX

	Baseline (B)	**Alternative (A)**	**Increment (A-SDB)**
Global benefits	Deforestation and biodiversity loss continue unabated in northwest Mato Grosso (along the southern frontier of the Amazon) primarily due to uncontrolled slash-and-burn agropastoral occupation and forest mining.	Capacity of municipal organizations and local civil society organizations to incorporate biodiversity conservation parameters into land use planning and to monitor and enforce these plans. Demonstration of biodiversity-enhancing agrosilvopastoral systems and associated training improves prospects for adoption of alternatives to current slash-and-burn practices by local colonists. Demonstrations and training along with incentive frameworks on integrating biodiversity conservation parameters into forest management plans increase prospects for adoption by local timber operators.	Conservation of soil biodiversity, critical habitat and improvements in survival probabilities of vulnerable & threatened flora and fauna result from promoting a bioregional approach that addresses some of the challenges in integrating conservation in the productive landscape.
Domestic benefits	Productive potential of the natural resource base (land, timber, minerals) jeopardized by minimal control on productive activities and lack of sustainable logging practices; a micro-level EEZ plan is under design.	Improved capacity of municipal governments and civil society organizations to plan, monitor, and enforce the EEZ; and barriers to sustainable logging addressed through training and demonstration sites.	Long-term productive potential of natural resource base is enhanced.
Costs/ Activities Ecological-economic zoning	Micro-level zoning exercise primarily to identify areas suitable for production activities namely, settlements, managed timber extraction & mining; environmental legislation & the building of monitoring & control capacities to promote effective environmental management (PGAI). Sub total Baseline (USD 5,563,488)	Baseline micro-level zoning exercise will be complemented with activities to enhance capacity of local government representatives and civil organizations to plan, gazette, enforce EEZ plans by making available essential equipment and training in data collection, monitoring, and interpretation of GIS data, through cofinancing. (USD 2,149,616) Baseline activities and resources complemented with technical assistance in survey, assessment & demarcation of critical areas for biodiversity conservation; training to civil organizations in biodiversity inventorying, monitoring & field observations; planning of land use within groups of properties so as to maintain contiguous blocks of intact forest cover & reduce fragmentation; identify areas with greater occurrence of non-timber forest species; policy assessments, preparation of technical options & legal advice to landowners & municipal governments interested in setting aside land as permanent reserves and securing appropriate fiscal incentives. (USD 2,136,944) Sub total Alternative (USD 9,850,048)	Increment: (USD 4,286,560) Of which, GEF: 2,136,944 ONF/Peugeot:1,184,910 State govt.: 764,706 Municipal govts.:200,000

	Baseline (B)	**Alternative (A)**	**Increment (A-SDB)**
Agroforestry & silvopastoral systems	Modest investments for agroforestry by PGAI in Aripuaña, Cotriguaçu, Castanheira, w/o integration & sustainable use of NTFPs in this system. (USD 484,845) Limited amount of PRONAF credit is likely to be allocated toward investment in agro-environmental management in new settlements & host communities. (USD 300,000) Sub total Baseline (USD 784,845)	Baseline programs will be complemented with demonstration sites on farmers' lands, including in new INCRA settlement areas & associated technical training to remove barriers to adoption. Introduction of sustainable harvesting of NTFPs into agrosilvopastoral systems, including training in NTFP collection system planning and management, investigations on market potential, sustainable harvesting and management technology. (USD 5,485,807) Sub total Alternative (USD 6,270,652)	Increment: (USD 5,485,807) Of which, GEF: 2,357,084 ONF/Peugeot: 1,132,545 INCRA: 1,100,000 CNPT: 55,000 Municipal govts: 505,884 Local producers: 335,294
Permanent sustainable forest management	Limited efforts at sustainable logging by Rhoden Lignea on inventory & operations, including equipment, machinery, technical personnel, & consultants. (USD 2,000,000) Field expenses for IBAMA technicians in each of the five municipalities, responsible for enforcement & authorization of deforestation, burning, wood harvest, commercialization of forest products, forest management & other attributes associated with environmental monitoring. (USD 1,500,000) Sub total Baseline (USD 3,500,000)	Baseline programs will be complemented with demonstration plots in timber companies' forest properties for low-impact practices including reduced road building, pre-harvest commercial inventories & site planning, vine cutting, regeneration & enrichment with economically desirable species. (USD 3,770,780) Baseline programs will be complemented with measures targeted to identifying areas of conservation significance as set-asides in forest management plans; integration of NTFPs identified during the PDF-B (including technical assistance with planting, protection & eventual sustainable harvesting); monitoring impact of different extraction systems on the trial lot in Juruena, & also demarcate additional plots for long-term monitoring; increasing producers' knowledge & facilitating access to growing markets for certified tropical hardwoods & to FSC-accredited certification organizations; awareness raising seminars, courses & field-visits for employees & managers on themes such as tropical timber certification, sustained management principles & techniques& inventory & exploitation planning for minimum impact to biodiversity. (USD 2,210,084) Sub total Alternative (USD 9,480,864)	Increment: (USD 5,980,864) Of which, GEF: 2,210,084 ONF/Peugeot: 1,132,545 IBAMA: 50,000 Banco Axial: 2,000,000 Rohden Lignea: 588,235
Total costs	Baseline: 9,848,333	Alternative strategy: 25,601,564	Increment: 15,753,231 Of which, GEF financing: 6,704,112 Cofinancing: 9,049,119

ANNEX B

LOGICAL FRAMEWORK MATRIX

PROJECT STRATEGY	INDICATORS OF PERFORMANCE	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Development Objective: To protect and conserve the forests and biodiversity of Northwest Mato Grosso (Brazil).	By end of project, all five municipalities in the project region will have implemented zoning and environmental controls encouraging a matrix of sustainable land uses in occupied areas of 108,625 km^2 region composed of: Sustainable Use Category — Baseline % — Project% Agrosilvopastoral systems — 0 — 1.5 Biodiversity corridors — 0 — 4.0 Sustained forest management — 0 — 9.5 Carbon sinks — 0 — 0.05 Conservation units — 5.1 — 6.0 Indigenous and extractive reserves — 17.1 — 17.5 Total — 22.2% — 38.0%	Reports of executing agencies Project evaluations. Municipal legislative adoption of EEZ and environmental plans Comparison of pre- and post-project satellite imagery	No major new road-building or colonization projects are carried out in the project region without due application of the approaches promoted by the project.
Project Purpose: Community-based conservation and sustained use of natural resources, in five municipalities under deforestation threat in NW Mato Grosso, through establishment and diffusion of model agrosilvopastoral systems enriched with NTFPs, sustained forest management practices, environmental monitoring and regulatory instruments.	▪ Deforestation will be reduced, saving 7,500 km^2 from severe biodiversity loss. ▪ 60% of occupied colonist lands will be undergoing transition toward agrosilvopastoral systems. ▪ 60% of the timber companies operating in the region will have adopted sustained forest management practices on new extraction areas, reducing pressure for degradation of intact forests on 2,000 km^2 ▪ Permanent reserves and corridors will have been delineated and permanently protected through easements on contiguous private lands covering 4% of the region (4,200 km^2) ▪ New conservation units covering 1,000 km^2 will have been delineated and officially decreed on public land.	Analysis of satellite images. Periodic reports of implementing agencies. On-site verification in colonist lots and timber extraction sites. Municipal decrees and property documents. Final project evaluation.	The Mato Grosso state government receives Prodeagro financing and effectively implements the PGAI environmental management program in the NW region. Principal land users adopt resource-protective technologies and commit lands to permanent conservation.

PROJECT STRATEGY	INDICATORS OF PERFORMANCE	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
Output 1 Improved land use plans with a biodiversity overlay are designed and gazetted and related incentive frameworks are developed to facilitate implementation.	• Land uses, critical areas for conservation of biodiversity and other natural resources will have been mapped and geo-referenced with cadasters of local property by end of the second project year. • By end of second year of project, environmental monitoring mechanisms will be operational at a municipal level throughout the region. • An additional area of 870 km^2 will be identified and delineated to be set aside for conservation units in the project region, and presented to state and municipal legislatures for approval. • Municipal officials and civil organizations in all project municipalities will have received ongoing training and technical assistance in monitoring of land use change, legal rights and responsibilities for conservation and sustainable use of biodiversity and forest resources. • Master Plans for municipal land use management will have been prepared and adopted legislatively in Juruena and Cotriguaçu by the end of the second year of the project, in Castanheira by end of third year, Juína by end of fourth year, and Aripuanã by end of project. • Associations and NGOs in Juruena and Cotriguaçu will have been trained and equipped to monitor and demand execution of environmental protection plans and EEZ by end of project's second year; and in remaining municipalities by end of project.	Evaluation of thematic maps. Planning reports Monitoring reports. Training and technical assistance records. Reports of the municipal agencies responsible for environmental control. Reports of FEMA and IBAMA. Register of government decrees and legislation for protected area delineation.	EEZ has been carried out at regional level in all project municipalities by end of 2000, under Prodeagro/PGAI. Regularly updated satellite imagery covering the project region will be made available to municipal authorities and civil organizations. The national congress passes legislation adequately defining intellectual property rights and access to biodiversity. Additional lands are set aside as conservation units through official decree in the project region.
Output 2 Pilot sites demonstrating biodiversity-enhancing and NTFP-enriched agrosilvopastoral systems are established in the project area with active involvement of small farmer colonists.	• By the end of the second month of project implementation an operational plan for execution of agrosilvopastoral activities will have been prepared. • Nurseries supplying 3 million seedlings/yr of fast-growing native tree species will have been established in Cotriguaçu and Juruena by end of first year, and 5 million/yr in all project municipalities by end of project, with seedlings distributed at cost to project cooperators. • Mechanisms for delineation and permanent protection of remaining forests in colonists' lots and INCRA settlements will have been defined with Associations and responsible agencies by end of first project year. • A system for sustained collection, processing and marketing of Brazil nuts in Juruena will have been established by the end of the first year, and applied throughout the NW region by end of project. • Markets and formulations for copaíba and jatobá resins will have been developed by end of second year, and at least three other NTFP identified through PDF-B subjected to formulation and market trials by end of project. • An Agrosilvopastoral Training Center will have been established at IPN's Juruena field station by the end of the first year.	Project planning reports Project Progress reports Reports of the beneficiary Producers' Associations Reports of the State Corporation of Research and Rural Extension. Reports of training and rural diagnostic teams. Pastoral Health Commission reports. Field mission reports. Municipal cartorial records of property title and easements.	Rural producers remain highly receptive to adoption of agrosilvopastoral systems. Rural producers organized through associations receive governmental support (PRODEAGRO, PNMA II and other sources) toward investment in improved production sytems. Rural producers with legalized land titles receive PRONAF credits that can also be applied toward these activities. Rural settlers in INCRA projects receive PROCERA funds, applied toward these activities. Government agencies responsible for credit administration adopt IPN's suggestions for allowable project

PROJECT STRATEGY	INDICATORS OF PERFORMANCE	MEANS OF VERIFICATION	RISKS AND ASSUMPTIONS
	• 30 training courses, interchange trips and demonstrations of NTFP enterprises will have been accomplished during each year of the project. • By the end of the project's second year, 4 agrosilvopastoral demonstration units (DUs) in Juruena and Cotriguaçu, and, by the end of the project's fourth year, 6 agrosilvopastoral DUs in Aripuanã, Castanheira and Juína will have been established on farmers' lots. • By the end of the project 80% of the region's farmers will have been exposed to training and demonstration in application of agrosilvopastoral practices.		investments.
Output 3 Pilot sites demonstrating a biodiversity overlay on permanent sustainable management of forest values are established in the project area with active participation of timber operators.	• By end of the project's second month an operational plan for execution of this activity will have been prepared. • By the end of the first year, Rohden Lignea will have adopted sustained management practices in all new extraction units, and implemented enrichment with NTFP and post-harvest treatments on unmanaged sites. • A detailed biodiversity inventory, protected area and sustained management plan will have been prepared for non-sink segments of IPN's Cotriguaçu property • By end of first project year, mechanisms will have been defined to delineate and ensure permanent protection of biodiversity reserves in timber extraction properties. • During each project year, 5 training courses and field demonstrations will have been carried out with timber company management and field crews. • By the end of the second year, a demonstration unit will have been initiated with a timber company in each of Juruena and Cotriguaçu, and by end of the fourth year, in Aripuanã, Castanheira and Juína. • By end of project 90% of the region's timber companies will have been trained in sustained forest management and biodiversity overlay on sustainable logging. • By end of project, 30% of timber extraction operations in the region will have been certified by an FSC-accredited organization, and will have accessed eco-markets.	Project planning reports. Project Progress reports. Beneficiary companies' annual financial and technical reports. Reports of FEMA and IBAMA. Certifiers' reviews and compliance reports.	IBAMA effectively enforces its Sept. 1998 amended regulations for Sustained Forest Management in all permits for timber extraction activity. The G-7 Pilot Program finances implementation of Sustained Forest Management activities in the project region. Timber markets offer price advantages for tropical woods and wood products certified as to sustinable sources.

ACTIVITIES	RISKS AND ASSUMPTIONS
Output 1: Improved land use plans with a biodiversity overlay are designed and gazetted and related incentive frameworks are developed to facilitate implementation. Empower municipal governments and an inter-municipal network of civil organizations in collection, interpretation and use of remote sensing data and field observations to monitor local land use change. Technical assistance in survey, assessment and demarcation of critical areas for biodiversity protection and planning of land use within groups of properties so as to maintain contiguous blocks of intact forest cover. Training to civil society organizations in biodiversity inventorying, monitoring and field observations. Mapping of land use units for agrosilvopastoral use, NTFP extraction and biodiversity corridors Prepare detailed property croquis delineating forest protection units, and define agreements for permanent conservation Mapping of areas rich in NTFP resources. Gazetting of land use master plans. Policy assessment and preparation of technical options on public investments and legislation that provide incentives for conforming to land use plans and retaining maximum area possible under forest cover. Legal advisory assistance to local organizations and governments in establishment of conservation easements and local legislation	• Civil organizations mobilize members for early warning network. • Satellite imagery and property maps are readily available and consistent. • Public policies are supportive of project objectives. • Municipalities allocate staff, resources for environmental management. • Infractions of environmental crimes are penalized judicially.
Output 2: Pilot sites demonstrating biodiversity-enhancing and NTFP-enriched agrosilvopastoral systems are established in the project area with active involvement of small farmer colonists. *Phase I: Years 1 –3* **Agrosilvopastoral systems** Preparation of technical/operational plans for implementation of demonstration units Collection and introduction of seeds and seedlings of promising native species , and planting of seedlings from local seed stocks Conduct thorough soil analyses, define and obtain production inputs, prepare land, correct soil deficiencies and planting Preparation of training materials and descriptive folders. Train beneficiaries (6 courses/talks/year/municipality in Juruena and Cotriguaçu, with participants from other municipalities) Internships for local farm youth (5 interns/two 6-month rotations/yr, based at Training Center) Conduct periodic biodiversity, social and economic assessments of pilot sites. Identify additional incentives for maintaining forested areas and recuperating degraded lands. **NTFP integration** Training in NTFP collection system planning and realization, initiating with Brazil nut in Juruena and Cotriguaçu (including harvest planning, labor organization, selection, breaking and transport) Market trial of Brazil nuts (yr 1: "in natura"; future years: shelled nuts and possibly oil, depending on trial results) Investigation of market potential, harvesting and management technology for açaí, copaíba, jatobá and "sangue do dragão" *Phase II - Years 4-7* Repeat establishment of demonstration units through all steps of Phase I, in Aripuanã, Castanheira and Juína Training of beneficiaries (3 courses / talks /year / municipality in all five municipalities x 4 yrs. Internships for local farm youth (5 interns / 6-month rotation, based at Training Center) Test and implement NTFP collection, processing and marketing based on experience in initial 3 years	• Landowners agree to commit land and resources to demonstration plots. • Seedlings are available locally. • Landowners agree to permanent protection of biodiversity corridors. • Colonists and new settlers commit resources to adopt such practices. • Government credit policies are supportive of long-term investment. • Local youth commit to participate. • Local producers are willing to engage in NTFP gathering. • Brazil nut markets are lucrative. • Markets exist for these products. ▪ Phase 1 activities are successful ▪ Receptivity in these municipalities is enhanced by Phase 1 activities. ▪ Markets remain receptive to NTFP.
Output 3: Pilot sites demonstrating a biodiversity overlay on permanent sustainable management of forest values are established in the project area with active participation of timber operators *Phase I – Years 1-3*	

ACTIVITIES	RISKS AND ASSUMPTIONS
Selection of potential areas for demonstration units (1 unit each in Jurruena and Cotriguaçú, estimated area: 100 ha each) Preparation of technical/operational plans for each demonstration unit, to maximize biodiversity protection Demarcation of demonstration units and biodiversity protection areas on each property Preparation of pre-harvest commercial and biodiversity inventories, marking of seed-bearing trees and critical habitat Realization of pre-exploitation silviculture treatments Training workshops for forest managers Training and field demonstrations for machine and chainsaw operators Production of NTFP and other native seedlings for forest enrichment Technical assistance for improving access to differentiated markets Post-exploitation silvicultural treatments, including enrichment with NTFP and establishment of regeneration monitoring plots Seminars (3) for presentation of results (Juruena, Cotriguaçu and Cuiabá) Preparation of descriptive materials for ongoing training activities and dissemination (folders , manuals, films etc) Design and implementation of biodiversity regeneration monitoring in selected plots Conduct periodic biodiversity, social and economic assessments of pilot sites.	• Timber enterprises commit resources to adopt such practices. • Landowners agree to permanent protection of biodiversity corridors.
Phase II: Yrs. 4-7 Application of above approach in Aripuanã, Castanheira and Juína (1 demonstration unit/municipality) Follow-up training activities (2 sessions/yr in each of 5 municipalities) Forest Management Certification (through subcontract with FSC-accredited certifiers)	• Research institutions assist in design and implement monitoring plan • Phase 1 activities are successful • Receptivity in these municipalities is enhanced by Phase 1 activities. • Market demand for certified timber and NTFP supports investment costs

ANNEX C

STAP ROSTER TECHNICAL REVIEW

The STAP technical review from Dr. Kenton Miller was sought early on in the formulation of this proposal. All of these comments were taken into consideration by the project, and details on how these have been addressed follow in Annex C1. The modified proposal was sent once more to the STAP reviewer to ensure that all comments had been addressed. This second response by email is also attached.

First Review by Dr. Kenton Miller, Vice President, International Development and Conservation, World Resources Institute, dated **28 February 1999**:

GLOBAL ENVIRONMENT FACILITY TECHNICAL REVIEW

Kenton R. Miller, Ph.D.

Project Name:	Brazil: Promoting biodiversity conservation and sustainable use in the frontier forests of northwest Mato Grosso.
Implementing Agency:	United Nations Development Program
Date:	28 February 1999

1. Overall Impression:

This project addresses one of the central barriers to progress in implementing the three objectives of the Convention on Biological Diversity (CBD), namely, how to conserve biodiversity while fostering uses that are sustainable and sharing the benefits equitable from those uses (especially those derived from wild genetic resources). The central issue facing governments and communities is to manage greater ecosystems or landscapes in ways that maintain diversity while enabling residents and other stakeholders to earn a good living on a long-term basis.

There is a growing consensus among scientists and community leaders that sustainable landscapes will include a network of permanently protected sites that safeguard the generation of ecosystem services, and cultural and spiritual values. Corridors that feature biodiversity-friendly land uses link these sites. In the surrounding landscapes, the majority of the land will typically be in private, communal, public and corporate farms and forest enterprises. These will feature land and resource uses that are biodiversity-friendly AND yield returns that support a dignified way of life.

While approaches for managing protected areas are relatively well known, dealing with land use in the greater ecosystem is a technical and institutional frontier. Challenges lie in developing the technological know-how to yield income while maintaining diversity. New approaches will need to establish an enabling environment of policies, incentives, and institutional mechanisms that will promote the vision and goals of overall biodiversity conservation in the context of economic development. For the results to influence neighboring regions, each program can usefully offer demonstrations of technique and practice. This project seeks to address these latter problems: technical know-how, enabling environment, institutional development, and extension through demonstration.

While GEF should be encouraged to give this proposal their serious consideration, I would suggest that the managerial and institutional aspects of the project need further development. The document fails to describe the mechanism by which this long-term enterprise will be managed. How will the stakeholders cooperate to ensure long-term buy-in? How can the federal, state and local authorities work with civil society in the area? How will the vision, strategy, and activities be established and progress monitored? Most importantly, there is little development of the institutional mechanism for adapting management quickly to lessons learned in the various components of the project.

2. Relevance and Priority

This type of work is of very high priority. Brazil has a mere 2 percent of its land area under some form of protection, and the five municipalities in the Western Mato Grosso have even less. Science has shown that protected areas are an essential ingredient of a biodiversity conservation strategy. Depending upon the biological characteristics of the region, science recommends that between 10 and 40 percent of the land area be under protection. Given the growing human occupation, established tenure rights, lack of limited entry by new colonists, and other realities, the practical approach to achieving the necessary degree of protection lies in a combination of strategies: a combination of IUCN protected area Categories ranging from strict protection to controlled multiple uses, corridors of biodiversity-friendly uses, and new use technologies in agriculture and forestry. Again, it is in this latter strategy where experience is lacking, and investment and action are of high priority.

3. Background and Justification

Considerable background has been provided, including from the PDF phase of work. The literature on valuation and markets for non-timber forest products while incipient sheds light on the objectives and mechanisms proposed in the project.

The justification for the purpose of the project is strong. The justification contained in the document itself is weak. It could be more forcefully presented by incorporating the conceptual framework noted above in items #1 and 2.

4. Scientific and Technical Soundness

Conceptually, the project is sound as noted above on #1 and 2. The discussion and annexes on the viability of NTFP as the basis for long-term livelihoods AND biodiversity conservation reveal the growing scientific and technical doubt about this approach unless accompanied with other sources of income, such as additional marketable crops or off-farm labor. The project proponents have made clear the hard facts about marketing elasticity of these commodities and other limiting factors such as scale of market, and how heterogeneity of habitats make it difficult to predict the actual volume of marketable products/hectare from site to site.

What is lacking in the proposal is an analysis of the biological, ecological and silvicultural aspects of the model. Perhaps the mentioned experimental efforts have already provided this scientific and technical information. The cited Smithsonian Institution's work on coffee and cacao illustrate these considerations. For example, what is the root competition among the plants to be added to the local ecosystems? What about light tolerance? What grows well with what? What about layering? In other words, the basic biological production function has to work first before worrying about markets, etc. Much can be learned from old indigenous plots that combined gardens, orchards, and tree crops. Has this traditional knowledge been captured; if so, why not include some examples to justify more strongly the proposed model?

5. Objectives

The objectives are appropriate. They provide a suitable framework for selecting activities and investments. At issue, however, is not what to do/what can be done, but rather the time period needed to show response and provide the basis for adaptive management. See #13 below.

6. Activities

The stated activities provide a good start. Even with the best preliminary list of activities, however, the issue is to integrate a rapid adaptive management system among participants in order to take corrective action along the implementation pathway. See #15 below.

7. Participatory Aspects

The essential stakeholders in the project region appear to have been engaged during the project PDF, as well as the design phase. The group includes the five municipalities, forest industry, and small farmer associations.

8. Global Benefits

The benefits from this work to the global community are only partially identified. As outlined in items #1 and 2, this project could well claim value in contributing to development of the emerging "ecosystem management" or "bioregional approach" being advocated by the COP/CBD, science and community practice. The project is focusing exactly upon some of the least developed components of these strategies, namely, how to achieve a biodiversity-friendly landscape that meets people's needs while saving biodiversity. For these reasons, this proposal deserves GEF consideration.

9. GEF Strategies and Plans

The project fits within the goals of the GEF, and the provisions of the CBD. At issue is that of time and management. See #13and 15 below.

10. Replicability

This project can have important impact upon biodiversity management programs elsewhere in the Amazon region. It provides a model for getting at the issues noted above – the biodiversity-friendly landscape that contains both protected areas (all IUCN Categories), and residents making a decent living. The model can be replicated, and the lessons learned can be useful elsewhere. The inclusion of demonstration experiments and a training center are vital components to not only address the capacity of local stakeholders but also to offer opportunities for neighboring regions to come and learn from this experience.

At the local scale, however, variation among habitats may make less transferable some of the details of the experience. For example, experience derived from the production of selected palm species in this area may not be of value to regions with different species. The process of collection, production, and marketing may be quite different.

This said, however, the model itself can be of great interest in building our conceptual and practical know-how for biodiversity management.

11. Capacity Building

The training center and demonstration experiments described in the document provide the context for capacity building locally. The proposal suggests that the private sector is intent on building capacity for minimum impact logging, and other silvicultural practices. As a GEF project, one could add explicit reference to opportunities for training of teams from other regions in the State and elsewhere in Brazil.

12. Project Funding

The level of funding appears to be appropriate.

13. Time Frame

Against a backdrop of project cycles that perhaps range up to 5 years, and maybe seven at the most, this project raises some challenges in funding policy. Technically, the proposal is clear that this type of work takes time. In paragraph 52, a "vision" and a 7-year goal are implied. This scenario is consistent with the rest of the proposal. It is also a laudable mid-term outcome.

Lacking is long-term vision, and a series of mileposts, say in 5-year increments. Because of the length of time required to demonstrate project outcomes, and the fact that both public and private institutions will tend to change over time, a solid adaptive management approach is fundamental. Specifically, a management team of public and private sector leaders and stakeholders could work together to negotiate and develop project vision, strategies, objectives and activities. They can gather feed back from specified activities in the field, and evaluate progress and lessons learned. Action can be initiated at any time during the project cycle to shift emphasis to reduce risk and improve chances of success in each project component. C. S. Hollings has published this type of analysis. See #15.

14. Secondary Issues

This proposal should be clearly linked to climate and land gradation. The project explicitly includes a carbon sink. However, beyond that, reference should be made to other opportunities to address the "synergy" opportunity visavis working with stakeholders in the landscape. Biodiversity friendly agriculture will need to include soil management methods that add and enhance organic matter, which in turn will increase soil biota, increase productivity

(food security), expand water-holding capacity (for the 4-6 month dry season), and reduce soil erosion. Naturally, the project also links clearly to the international forestry debate and the forest ecosystem program of the CBD, but taking steps to maintain the forest frontier through helping rural communities remain on their plots.

15. Additional Comments

On paper, the weakest component of this proposal is its reliance on a single NGO. It is also its strongest! From research on bioregional management in North America and elsewhere (University of Michigan, School of Natural Resources, Prof. Steve Yaffee; Keystone Ecosystem Management Dialogue, 1996), programs with greatest success are those led by dedicated and committed individuals and NGOs, in cooperation with local government, industry, and community organizations. Those cases where leadership depends purely upon central government agencies face problems of lack of continuity in policy and personnel, and overall antagonistic baggage of government/community relations. This project should analyze carefully the needs of the lead NGO, and ensure its viability as an institution during and beyond the GEF cycle. Can an endowment ensure the running costs?

The proposal includes reference to a council structure that provides a consultative mechanism with stakeholders and a clear line of authority and responsibility to local government.

My assessment is that the potential gains from this experimental effort overshadow the possible risks.

Moreover, I would challenge the GEF to accept the notion of long-term investment in the type of biodiversity management contained in the proposal. I would back it up with periodic evaluation and analysis of lessons learned beyond the life of the GEF project per se. We very badly need long-term experimental demonstrations of these concepts if we are to seriously address the goals of the CBD.

Second Review by Dr. Kenton Miller, dated **27 September 1999**:

Subject: Brazil: Promoting biodiversity conservation and sustainable use in NW Mato Grosso
Date: Mon, 27 Sep 1999 16:56:57 -0400
From: "Kenton Miller" <kenton@wri.org>
To: <nick.remple@undp.org>
CC: <arundhati.kunte@undp.org>

Nick and Arundhati:

My comments on the revised proposal for Mato Grosso follow, as per your request.
The response to my comments of last March are satisfactory and complete.

The introduction of "adaptive management" in para 1.2 of Annex c1 is appropriate and necessary given the nature of the project. Curiously, however,there is no mention of this component in para 58.

In para 1.3 of the same annex, the "spreading out of the risk" is well anticipated by involving public-private sector involvement, NGOs, and the Mato Grosso University.

In para 30, it would help the reader comprehend and appreciate your point if you add simple reference to the "practical instruments that exist for sustainable land use management."

In para 31, conserving biodiversity through sustainable use is a very challenging issue, about which there is growing scepticism. It is vital that experimentation takes place in agriculture, forestry, and fresh water fisheries. Here too, adaptive management is critical, to quickly gain leaning through field testing.

Para 39, good to include permanent conservation easements and other tools to enable private land owners to contribute to biodiversity conservation in their own self interest.

Para 52, the issue of "synergies" new area of concern. You might cite the work of Karen Jorgenson, Robert Prescot-Allen, etc. All investments in biodiversity, carbon storage, and halting land degradation should be mutually reinforcing. Glad you added this here.

Annex H is very helpful. It is fundamental that a critical eye pass over this topic as you have done here. Too many myths surround "sustainable development."

Good work. I endorse the revised project brief, and look forward to seeing the results of implementation.

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ANNEX C1

RESPONSE TO STAP COMMENTS

The following responses have been prepared to the comments in the STAP Roster technical review (dated 28 February 1999). Changes to the project brief are noted where relevant.

1. **Importance of institutional stability and commitment toward the long-term objectives** enunciated in the project brief:

   1.1 A more detailed presentation of the project implementation and execution arrangements at paragraphs 59-63 describes with greater detail how the project execution strategy will ensure long-term institutional commitments by government agencies.

   1.2 A table presenting anticipated project milestones during and beyond the proposed project period has been added to the brief as Annex I, indicating that although many of the expected results may only be attained in the long-term, the project will lay the strategic groundwork for these results and for institutional capacity. This strategy adopts an approach similar to that cited in the STAP review as "adaptive management" (based on Buzz Hollings' work), by involving all stakeholders in continuously adjusting targets as the project is implemented. Such a strategy has been IPN's operating philosophy through its work in this region and elsewhere in the developing world over the past 15 years.

   1.3 The project implementation strategy has a greater prospect of success in the long-term because the problems that frequently arise with discontinuity of government policies and personnel will be partially overcome through public-private partnerships (para. 55). The farmers and timber enterprises engaged in demonstration activities and IPN as the principal NGO active in the project region are representatives of the private sector, whose pursuits are not constrained to electoral mandates. Furthermore, permanent faculty of UFMT who will be partners in the monitoring and assessment of the endeavor, enjoy greater stability than do line government officials. Discontinuity in government can be partially offset through demands for complementary government action from stakeholders involved in project related activities, and informational efforts to bring new government officials and personnel into the process.

   1.4 The state government (FEMA and the SECTPLAN), multilateral agencies whose projects affect the Northwest region (World Bank/PRODEAGRO and PPG-7/PGAI) and IPN have established a steering mechanism for regular coordination of ongoing projects, and to ensure coherence with overall government policy for the northwest region. This process was instigated by the PPG-7 Natural Resources Program Secretariat (responsible for PGAI supervision) in July 1999, and is expected to continue on a trimestral basis throughout the realization of the PGAI and other externally funded programs affecting the Northwest region (including the proposed GEF project), as noted at paragraph 63. This will provide the nucleus for a permanent institutional oversight committee to guarantee continuity, coordination and adaptive management during and beyond the immediate proposed investments.

   1.5 In June 1999 the state and federal government, resource managers, forest users, and other stakeholders signed an accord ("Alternatives to Deforestation in Amazonia: Positive Agenda for Mato Grosso"), demonstrating their commitment to augmentation of protected areas, fiscal and credit incentives for sustainable forest management and agrosilvopastoral systems and biodiversity protection, and adoption of zoning plans in all forest remnants of the state. These initiatives would fortify the incentive structure crucial to the project, as yet only incipient under

baseline conditions. A government-stakeholder forum will guide this strategy. The experience obtained with the proposed project will provide important input to this statewide policy forum.

1.6 Based on a recent study (Dabbs and Bateson, 1999), IPN has found that by assuming a strategy of constructive engagement of all stakeholders in a region subject to substantial external development pressures, the risks of serious loss of biodiversity and cultural values are greatly reduced. In the Camisea project in the Peruvian Amazon, for example, IPN asked key informants to place probabilities on the consequences of development investment under distinct scenarios for stakeholder engagement. In the absence of constructive engagement, the probability that government would proceed with resource damaging road construction and settlement policies was found to be 70%. With a constructive engagement role by regional investors, informants indicated a growing probability that government will replace its traditional approach with steps to involve local stakeholders in regional planning and resource management (43%). This leads to policies that promote effective resource management as well as initiatives that address other local concerns in the long term.

1.7 The northwest Mato Grosso project is indicative of a situation in which governments at all levels have perceived the problems that resulted from prior resource damaging policies, and have begun to involve stakeholders effectively in the search for development alternatives through baseline actions. This thus constitutes an ideal setting to test and disseminate models of resource management that incorporate biodiversity conservation objectives, since the institutional commitment to long-term sustainable development and decentralized environmental management has been made.

1.8 While it is impossible to predict with certainty that an adaptive management approach at a regional scale will be successful in achieving long-term biodiversity conservation and sustainable use objectives, the institutional prerequisites to their achievement are now in place, and will be reinforced by the project execution strategy.

2. **Characterization of biodiversity conserving production models** the project will promote, including practice description, biophysical features, advantages and disadvantages has been added in Annex F.

2.1 It is important to mention in response to the STAP comments that the initial design of the IPN agrosilvopastoral system was indeed informed by a thorough review of a wide range of traditional and experimental practices utilised in the Amazon basin. This review was incorporated in the Prodoc for the PDF-B submitted to GEF/UNDP. The model responds to the particular characteristics of colonist farm households and land resources found in northwest Mato Grosso. However, it is acknowledged that a thorough independent assessment of this model is needed, detailed below and in paras. 46 and 51 of the project brief.

3. **Independent assessment of the social and environmental viability of production systems** promoted through the project will be ensured by agreements established between IPN, regional and international universities and EMBRAPA, as described in pars. 46 and 51 of the project brief and detailed further below:

3.1 IPN and the Federal University of Mato Grosso have signed an umbrella agreement, that will permit professors and graduate students of the University to conduct research associated with ongoing activities in NW Mato Grosso. Research areas proposed for immediate initiation include: (i) independent evaluation and monitoring of productivity, biodiversity benefits and carbon sequestration in the agrosilvopastoral and degraded land recuperation models established at IPN's

research center, carbon sink properties and on farmers' fields; (ii) monitoring of natural regeneration of native species in timber exploitation areas; (iii) assessment of technical viability of NTFP management and processing systems; (iv) development of fitomedicinal products; etc. The university will provide research support services, facilities and equipment in exchange for access to IPN's field facilities, transport and experimental areas.

3.2 Scientific cooperation will also involve EMBRAPA personnel, in particular those based at its Agrobiological Research Center at the Federal Rural University of Rio de Janeiro, and its Agro-Environmental Center in Jaguariuna, São Paulo, with the objective of evaluating the technical and environmental viability of degraded land recuperation in NW Mato Grosso. Further scientific assistance is anticipated from EMBRAPA's Centers for Agroforestry Research in Belém (CPATU) and Acre (CPAF-Acre), with a view toward integrating non-timber forest products in agrosilvopastoral models, based on these centers' experience with participatory research on introduction of "pimenta longa" (*Piper hisperdinervum*) a native shrub and source of the essential oil safrole (a basis for natural pesticides and perfumes), into Amazon farmers' fields as an alternative crop.

3.3 Professors Katrina Brown and Frank Ellis of the Center for Socio-Economic Research on the Global Environment – CSERGE, University of East Anglia, will be involved in the project, as advisors to doctoral research by experienced Amazonian scholar Natasha Grist, entitled "Natural Resource Management in Colonist Livelihoods in Western Amazonia, Brazil". This study will monitor factors affecting uptake of agrosilvopastoral technologies by smallholders and colonists in the Juruena area, and assess the viability of these strategies as a component of diversified rural livelihoods in the Amazon.

3.4 Researchers at the University of Wageningen, the Netherlands, involved with UFMT and INPE in the international Large-Scale Biosphere-Atmosphere (LBA) project in the Brazilian Amazon, plan to install a monitoring station in Juruena in cooperation with IPN and the ONF/Peugeot carbon sink. These researchers will be invited to take part in the independent scientific panel that will review monitoring plans and execution.

The **second review** by Dr Miller (dated 27 September 1999) raised some further minor issues which have been addressed as follows:

The reference to "adaptive management" made in para 1.2 of Annex C1 has also been included in para. 58.

In para 30 reference to the "practical instruments that exist for sustainable land use management" has been added.

In para 31 reference to the critical importance of adaptive management and learning through field-testing that underlies the project conceptual approach has been added.

In para 39 the reference to permanent conservation easements was and other tools is included.

The citation has been included in para 52.

ANNEX D

GEF OPERATIONAL FOCAL POINT LETTER OF ENDORSEMENT

(available upon request)

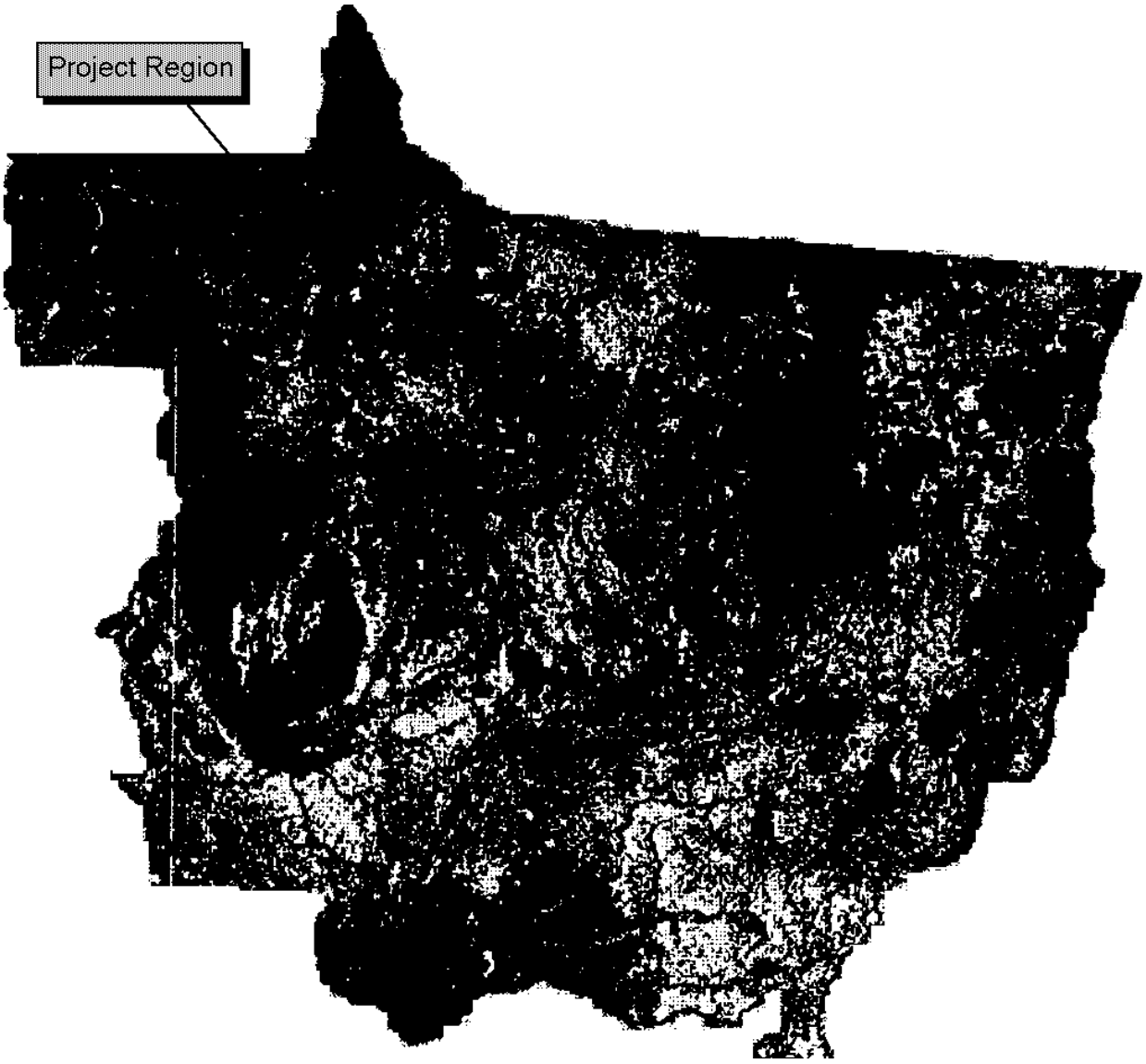
ANNEX E

MAP 1: LOCATION OF PROJECT SITE IN BRAZIL AND MATO GROSSO

MAP 2: THE "ARC OF DESTRUCTION" ON THE AMAZON RIM

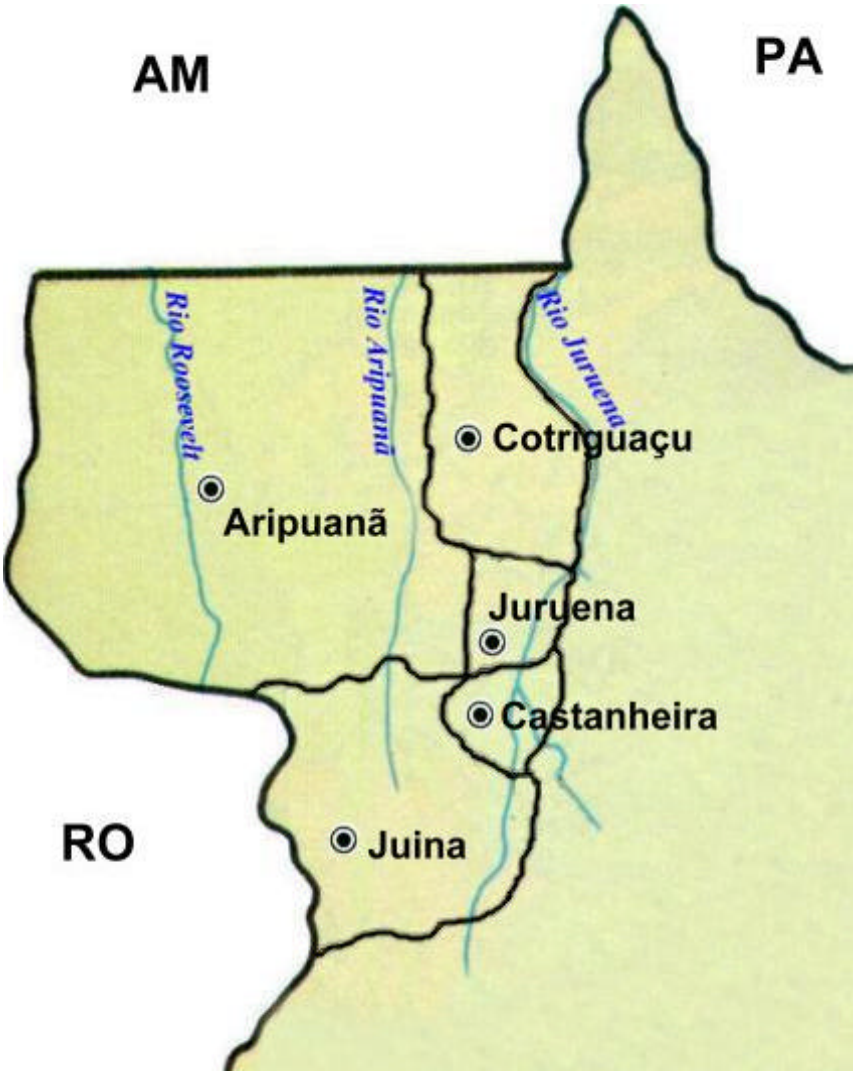
Source: Jornal do Brasil, 1996

MAP 3: DEFORESTATION IN MATO GROSSO AS OF 1994

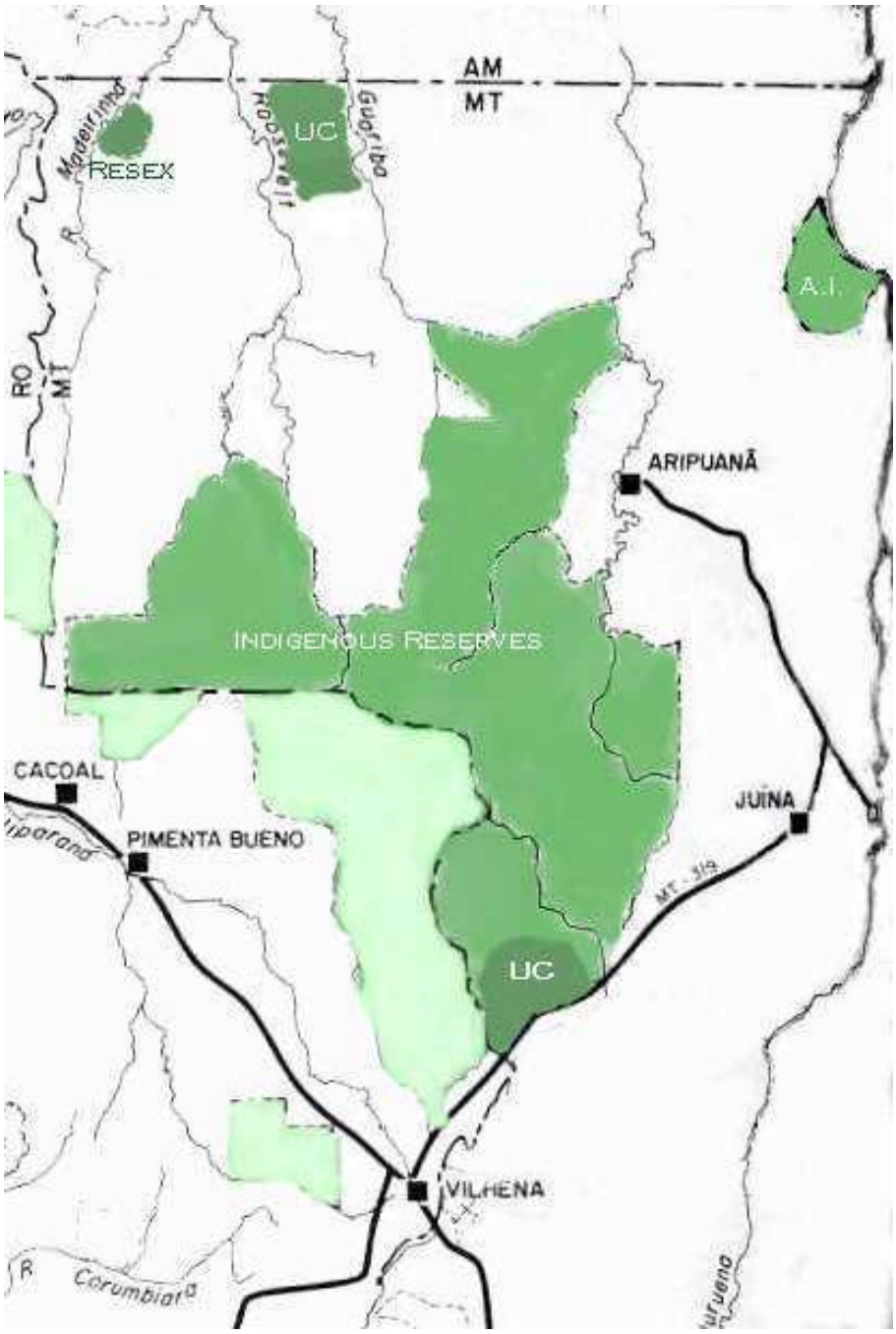


SOURCE: FEMA-MT

MAP 4A: MUNICIPALITIES AND PRINCIPAL RIVERS IN THE PROJECT REGION



MAP 4B: INDIGENOUS AND EXTRACTIVE RESERVES AND CONSERVATION UNITS IN THE PROJECT REGION



Obs.: Indigenous reserves in the project region are distinguished from contiguous reserves in the neighboring state of Rondônia by darker shade of green.

A.I. – INDIGENOUS AREA. RESEX – EXTRACTIVE RESERVE. UC – CONSERVATION UNIT

ANNEX F

AGROSILVOPASTORAL AND FOREST MANAGEMENT MODELS

Agrosilvopastoral System

For the average smallholder of 50-100 hectares, a system was needed that would provide for a family of around five people from 25 farmed hectares.

The IPN team calculated that by dividing the available area into units of 5 ha, a rotation system could provide for annual crop production on 5 ha each year, with a similar area available for a handful of cattle. The remaining 15 ha would be in various stages of recuperation after carrying out the intensive production phase. A program of reforestation would follow the clearing necessary to offer space for the annual crops, with an average of 1.25 ha available for the harvesting of commercially valuable timber each year.

Over time, each 5 ha unit would be cleared and planted with tree seedlings. For the first four years, these seedlings would be interplanted with annual crops. In the fifth year after clearing, pasture would be introduced to allow cattle to graze beneath the saplings. By the ninth year, as the tree canopy begins to close, the unit would be left fallow and the forest left to re-grow beneath the trees. By the thirteenth year, fast growing tree species would be ready for harvest, with other species taking up to 20 years to reach a commercially acceptable size. Thus the rotation would be completed and return to the first 5 ha unit every 20 years.

The IPN "model" (in reality a 25-year experiment initiated in 1992) included only timber species and some domesticated fruit trees as the perennial component. The NTFP element will have to be added. In principle, this system will incorporate the following NTFP species identified through the PDF-B: açaí (*Euterpe oleracea)*, Brazil nut (*Bertholletia excelsa)*, copaíba (*Copaifera multijuga*), jatobá (*Hymenaea courbaril*), and sangue de dragão (*Croton lechleri*).

Because this model has not been in place for a full cycle of 25 years, it is only conjectural that it will have a higher economic return in overall present value terms than that feasible with the traditional shifting cultivation system. However, the following potential advantages to its broad utilisation may be noted:

- Increase in household income over the long-term
- Improvement and continuous supply of food to the household
- Maintenance of the productive capacity of soils
- Permanence of the farmer on the same land for a longer period of time
- Diversification, allowing reduced production risk
- Lesser dependency on use of commercial inputs
- Recuperation of degraded areas
- Environmental conservation

Such benefits could not be without their commensurate costs. Key disadvantages include:

- More complex management of the agroecosystem
- Higher initial investment cost
- Forest component reduces agricultural and livestock income

- Restricted opportunities for mechanization

These restrictions emphasize the requirement for technical assistance to promote a better knowledge of interactions between components (better management); credit, tax, service and in-kind (e.g., seedling donations) incentives (investment cost); marketing opportunities for wood and minor forest products (income) and technical assistance on use of no-till systems for soil management (restricted mechanisation).

The tenure situation is favorable to this long-term land use model. The majority of landholders in the Juruena and Cotriguaçu have their property rights well-defined: IPN's recent title search on the property purchased for the Peugeot/ONF carbon sink project shows that the origin of the property (the two municipalities were all under the ownership of the same colonisation company belonging to entrepreneur João Miereles, current State Secretary of Agriculture of São Paulo) is based on a legally recognized "chain of dominion". Most are titled, although some smallholders have not had the funds or access to legal services to formally register their titles. The situation in the remaining three municipalities will have to be assessed in this respect

The IPN model, due to discontinuities in funding and staff changes, has not yet been well documented or evaluated by external independent audit. The project will launch a program of steady performance assessment at demonstration plots implemented through the proposed project, including socio-economic aspects. Independent assessment of the social and environmental viability of production systems promoted through the project will be ensured by agreements established by IPN, regional and international universities and EMBRAPA, described below:

- IPN and the Federal University of Mato Grosso have signed an umbrella agreement, that will permit professors and graduate students of the University to conduct research associated with ongoing activities in NW Mato Grosso. Research areas proposed for immediate initiation include: (i) independent evaluation and monitoring of productivity, biodiversity benefits and carbon sequestration in the agrosilvopastoral and degraded land recuperation models established at IPN's research center, carbon sink properties and on farmers' fields; (ii) monitoring of natural regeneration of native species in timber exploitation areas; (iii) assessment of technical viability of NTFP management and processing systems; (iv) development of fitomedicinal products; etc. The university will provide research support services, facilities and equipment in exchange for access to IPN's field facilities, transport and experimental areas.

- Scientific cooperation will also involve EMBRAPA personnel, in particular those based at its Agrobiological Research Center at the Federal Rural University of Rio de Janeiro, and its Agro-Environmental Center in Jaguariuna, São Paulo, with the objective of evaluating the technical and environmental viability of degraded land recuperation in NW Mato Grosso. Further scientific assistance is anticipated from EMBRAPA's Centers for Agroforestry Research in Belém (CPATU) and Acre (CPAF-Acre), with a view toward integrating non-timber forest products in agrosilvopastoral models, based on experience with participatory research on introduction of "pimenta longa" (*Piper hisperdinervum*) a native shrub and source of the essential oil safrole (a basis for natural pesticides and perfumes), into Amazon farmers' fields as an alternative crop.

- University of East Anglia Professors Katrina Brown and Frank Ellis of the Center for Socio-Economic Research on the Global Environment – CSERGE, will be involved in the project, as advisors to doctoral research by accomplished Amazonian scholar Natasha Grist, entitled "Natural Resource Management in Colonist Livelihoods in Western Amazonia, Brazil". This study will monitor factors affecting uptake of agrosilvopastoral technologies by smallholders and colonists in

the Juruena area, and assess the viability of these strategies as a component of diversified rural livelihoods in the Amazon.

Forest Management Model

The forest sector of the State of Mato Grosso is characterized by its substantial economic importance. Approximately 3000 wood products companies operate there, generating about 30% of overall state tax revenues and employing 15% of the economically active population. The current situation of forest exploitation and timber production is characterized by low technical level of activities, substantial wastage of raw materials, poor training of the technical and operational labor force, besides problems due to inadequate equipment maintenance and technology. The contrast between the economic importance of the sector, on one hand, and the low technological level, on the other, suggests an immediate need for testing of practices for sustainable management of the forest for multiple use, serving as an analytical base and reference for the diffusion of technology.

Instituto Pró-Natura, working with an innovative wood processing firm, Rohden Lignea, in the Municipality of Juruena, with the support of PRODEAGRO, devised and tested a model of low-impact forest exploitation, that has validated practices of forest management for the Northwest region of Mato Grosso. This model offers the following benefits:

- *Conservation of Biodiversity:* Compared to unmanaged exploitation, management maintains forest cover, retaining most of the original floral diversity and minimizing impacts on local fauna.

- *Environmental services:* Managed forests renders services favoring regional and global climate equilibria, particularly through maintenance of the hydrologic cycle and of carbon storage.

- *Continuity of Production:* The adoption of management practices guarantees regional wood production indefinitely, and requires half the time necessary to regenerate as compared with conventional practices.

- *Profitability:* The economic benefits of management overshadow the costs. These benefits arise from increased labor productivity and from reduction in wood wastage.

- *Work safety:* The management techniques decrease the risks of work accidents drastically.

- *Respect for Applicable Legislation:* Forest management is an obligatory practice by law. The companies that don't execute such practices are subject to severe penalties.

- *Market Opportunities:* Importers of tropical timbers are more and more demanding with regard to the origin of the wood, and consequently to the type of practices used for its exploitation. The companies that adopt management practices will become candidates for labeling that distinguishes them from other companies. Through this, they could secure improved marketing opportunities, as well as differentiated prices.

The low-impact model of forest exploitation requires a series of procedures in succession. With the objective of stimulating adoption of this model, Demonstration Units will be established as the basis for diffusion of these techniques.

Pre-Harvest Silvicultural Practices

These practices involve the following activities, undertaken over a period of six months, in the period prior to selection of exploitation areas, with the objective of selecting and marking marketable trees:

- Demarcation of the Demonstration Unit
- Pre-Harvest Inventories (wide-scale)
- Full Pre-Harvest Inventory
- Floristic and Fitosociological Inventories
- Cutting of Vines

Cutting of vines has the purpose of liberating trees that they will be harvested from their influence.This operation should be accomplished at least 6 months before the beginning of harvesting, and is accomplished by the same team that carries out the pre-harvest inventories.

Planning of Forest Exploitation

The location and the size of the holding patios, analysis of trees that will be cut, the protection of trees that are seed donors, the positioning of draglines and the directional felling layout of the trees, are defined in this phase. These data, together with the inventory (location of the secondary roadways and of the trees), are used to elaborate the harvest map, that will serve as the basic guide for the operation itself.

Training of Technicians, Chainsaw and Machine Operators

This phase is considered key for the success of the low impact exploitation. This training is addressed toward managers and group supervisors, and for the personnel responsible for accomplishing the tasks of opening paths, roads, holding patios, etc., the directional felling of trees, sectioning trees, embarkation and transport to the plant. In this training, the subject of safety has also been closely integrated into the overall content.

Timber Harvesting

The following procedures are adopted during the actual harvesting of wood from the inventoried stock, incorporating a range of techniques to avert damage to other vegetation, to the market timber itself, so as to reduce wastage and improve marketable raw materials:

- Directional felling of the trees
- Cutting operations with trees to protect surrounding vegetation and ease skidding
- Dragging the roundwood to the patio (using lightweight skidders and tractors)

Post-Harvest Silvicultural Activities:

Besides the reduction of the environmental impacts, one of the objectives of the forest management is to guarantee the continuity of wood production by facilitating natural regeneration in openings, and protection of the stock of remaining trees. Seed-donor trees are left in the forest, and other techniques are employed to reduce the ecological damage from harvesting.

However, it is possible that, in some openings, natural regeneration is insufficient to ensure adequate regeneration. In this case, it is necessary to conduct enrichment planting and post-harvest reforestation activities, including, inter alia:

- Plantation of timber and non-timber species in cleared forest gaps
- Enrichment plantings in the areas of juvenile forest
- Treatments to increase growth of trees of commercial value

Protection Against Forest Fires

The Amazon Forest has suffered major alterations in its landscape due to anthropic processes in different pressure areas. Its current landscape consists of a complex mosaic composed of extensive virgin areas, forests harvested for wood, secondary forest, small farms and pastures. This is true of the Northwest region of Mato Grosso. Although its occupation is more recent, with more significant remnants of unexploited forests, there is increasing occurrence of areas under timber exploitation and other activities.

Unexploited forest have nearly closed canopies that protect medium-sized trees and forest floor vegetation against solar penetration, helping to maintain it always green and humid, and usually impeding the spread of fires. With areas of exploited forest, *capoeira*s, shifting cultivation and pastures, this protection is no longer present. In such areas, fire can appear in several forms, including lightning bolts, burning for pasture establishment or management, or shifting cultivation, but often it occurs accidentally or due to criminal malfeasance.

To avoid these problems, some practical expedients should be adopted, primarily to protect exploitation forests:

- Forest management itself, reducing canopy openings and damaged wood
- Systems of natural firebreaks and protective boundaries (*aceiros*)
- Exploitation of alternating, non-adjacent sites

These practices were refined and adapted by faculty of the Institute of Forestry of the Federal Rural University of Rio de Janeiro, led by Professor Hugo Amorim. Dr. Amorim will be retained as principal forestry advisor to the proposed project.

ANNEX G

PDF-B RESULTS

I. BACKGROUND

In 1995, IPN submitted a project proposal for PDF B support to the GEF as part of its tropical forest biodiversity program. Proposed activities were confined to an assessment of the viability to develop small-scale community enterprises in Juruena based on non-timber forest products (NTFPs).

The project had the following specific objectives, as expressed in the UNDP-approved Prodoc:

(1) To develop a series of feasibility studies in order to implement industrial processing of the following products in Juruena: Brazil Nut oil, other vegetable oils, natural soap, animal feed, perfumes and aromas, chewing gum, insecticides and natural fertilizers, in order to aggregate as much value as possible and obtain products that remain lucrative even after their transport to distant markets; and

(2) To prepare a longer-term project aimed toward establishment of pilot industrial facilities, a training school and quality control laboratory to facilitate development of the aforementioned industries.

By assessing the production and market potential of NTFPs, and later investing in their local processing and commercialization, it was hoped that local incomes would improve, producers would concentrate attention on these options and would reduce pressures on neighboring forests. The Prodoc affirmed that these products were known on the market, and could be rapidly developed as bootstrap enterprises in Juruena with the involvement of the Association of Rural Development (ADERJUR) and local entrepreneurs, through IPN's technical assistance.

These feasibility studies were proposed to the GEF in 1995, but execution only began in March 1997 due to institutional obstacles. Complementary funding of ECU$100,000 was obtained for work with the local cooperative toward these objectives from the European Community, with a focus on small farmers' agrosilvipastoral systems and NTFPs industries to be developed in a complementary fashion with such systems.

II. METHODOLOGY

After the initial review, consequently, IPN began a broad-scope market assessment of essential oils and turpenes derived from locally prevalent species, and their cosmetic/pharmaceutical properties, potential formulations and consumer applications. These studies and a companion review of resources on the internet to access firms on a global level interested in such products, suggested a growing domestic and international market for products that could be developed along these lines (Reydon, 1997; Bransky, 1997). In many cases, these products already find markets in small volume from dispersed sources as natural products on the Brazilian market, but their value and the breadth of this market were perceived as limited. To meet broader industrial market opportunities, it would be necessary to guarantee a steady supply with consistent quality in fairly large volumes, currently unavailable in Brazil.

To develop industrial-scale and quality output of new products derived from NTFPs in the Juruena area, it was deemed necessary to make strides toward the chemical characterization of such products according to international standards, and to proceed with distribution of samples of materials obtained from the wild, to ascertain potential interest in these products. Due to the limited resources remaining in the PDF B, chemical characterizations were limited to two tree resins (Copaíba and Jatobá) with broader commercial potential. These were undertaken simultaneously by natural products chemists under Gilbert and Barata's

direction at FioCruz and UNICAMP, after thorough literature reviews (Barata, December 1997; March 1998). Samples were distributed to pharmaceuticals enterprises in Europe and the United States.

Whilst this effort was being launched, efforts were made to devise a full feasibility assessment for an initial venture directed toward trial exploitation of Brazil Nut at a community level. This initiative was undertaken for two reasons: (1) Despite the previously mentioned assessment that Juruena could not expect to compete with alternative sources of industrial raw materials such as vegetable oils, there is sufficient demand for Brazil nut as a snack nut to justify efforts to utilize the nearly completely unexploited and fairly abundant resources of this species in the Juruena area, possibly offering better margins at a lower level of investment than could be obtained from more advanced processing, as an immediate complementary income source, (2) such an effort could serve to test the vocation of local colonists to participate in gathering of other forest products on a sustainable footing, as a basis for investment in enterprises that might be pursued at a later stage in project implementation.

Staff of the National Center for Traditional Peoples (CNPT) at IBAMA in Brasília undertook a detailed feasibility assessment of Brazil Nut collection, hulling, packaging and oil pressing enterprises adapted to the Juruena context (Kornexl, 1998). However, it became apparent that the lack of a gathering tradition would be the principal bottleneck toward development of an enterprise of this nature as a bootstrap operation in Juruena. ADERJUR members – who had received approval from the state government to install a small plant based on Brazil nut in Juruena as part of the PGAI – hence agreed to carry out a pilot collection program during the harvest season beginning in December 1998, with the objective of marketing nuts in the shell, as a preliminary approach. Should this experience prove successful, consideration would be given toward further processing and eventually oil extraction for industrial use in cosmetics.

The following summary reports on results to date from the PDF B, emphasizing solely the analysis of NTFPs viability as a means to promote sustained use of biodiversity in Northwest Mato Grosso.

III. SUMMARY OF NTFPS VIABILITY AND MARKET ANALYSES

Many natural products useful for medicinal and cosmetic purposes as well as for artifact manufacture have been identified during the PDF B, on the basis of forest inventories carried out by IPN, and by *in situ* verification and interviews with local inhabitants (see the preliminary listing in Section IV).

However, the remote geographical location of Juruena makes it difficult for many bulk products to achieve competitiveness on the international market due to the high cost of commercial transport to sales and export locations. This implies that any product to be marketed must exhibit high value-added, uniqueness to the regional biome and a special appeal of being linked with a sustainable development strategy for the area. To be competitive, furthermore, lots of several tons of each product will have to be available on a steady basis, with adequate quality control and homogeneous chemical specifications.

In order to guarantee an adequate flow of products in volume and quality to meet the above-mentioned output requirements for industrial viability, it is necessary to consider a two-pronged strategy. First, because local producers are primarily agriculturalists and loggers, the NTFPs production has to be complementary with their agrosilvipastoral and forest management systems. NTFPs should therefore be considered whose characteristics render them of interest for agroforestry treatment on degraded lands and/or exploitation forest enrichment. However, the slow development of woody species will imply a period to maturity of from five-ten years from planting to achieve a desired production level of many NTFPs. Some products may be derived from vines, bushes and herbaceous species, that come into production sooner.

Thus, in the interval, carefully managed exploitation of wild populations would ensure an initial supply, later complemented and eventually substituted by planted species, thus averting over-harvesting and unsustainable use. This in turn implies the need, in an implementation phase, to devise and enforce strict criteria for sustainable extraction to ensure species survival and reproduction, as well as to avoid over-homogenization of agroforestry systems. Such criteria would be developed in strict conformance with FSC certification standards for non-timber forest products, so as to ensure that products from the area could obtain eco-labels.

The Brazilian branch of the FSC produced draft criteria for Amazon forest management and forest plantation certification, in July 1998. An FSC committee has been established at the global level to develop broad criteria for NTFPs. No such criteria have yet been drawn-up, except recommendations for Brazil nut and rubber, prepared by IMAFLORA – a Brazilian Smartwood certifier working closely with IPN. In the draft natural forest management certification criteria for the Brazilian Amazon, an enterprise seeking such certification is urged to use a diverse range of wood and non-timber products. The only reference to protection and sustainable use of NTFPs is the following criterion:

No caso de manejo de produtos florestais não-madeireiros, existem inventários desses produtos, com estimativa de estoque, valor, forma de colheita, mercado e impactos ambientais, considerando a caracterização da ecologia das espécies com potencial de colheita.

These criteria are vague at best, requiring further detail to be applied in forest management certification. Furthermore, enterprises based solely or principally on NTFPs are not specifically treated by these criteria.

Products must be marketed in their final retail form if they are to bring sufficient benefit to the producer or collector. Extraction and sale *in natura* can be immediately initiated for those products having well-known characteristics. Extraction and processing of products as yet unknown to the market constitutes a longer-term objective. Processing to a higher added value of existing and potential products, and their packaging on site for the retail market are technically feasible, but will require further investment in medical/toxicological assessment, product development and pilot facilities.

Section V describes the criteria for technical and financial viability applied during the PDF B as a basis for decisions toward further product development, in the cases of Brazil nut, copaíba, unha de gato and sangue de dragão. These include (1) sustainable use potential; (2) availability and markets; (3) potential products and (4) financial viability and (5) licencing and registration issues. Such assessments indicate potential, but only in the case of Brazil nut has a full financial feasibility analysis been prepared at this stage, for immediate implementation, with resources provided by the PPG-7/PGAI.

IV. NON-TIMBER FOREST PRODUCTS OF NORTHWEST MATO GROSSO

Common name	Scientific name	Natural form	Indications
1. Vegetable Oils			
COPAIBA	*Copaibafera affin multijuga*	balsam	wounds, herpes
JUTAÍ, JATOBÁ	*Hymenaea courbaril*	balsam	urinary/pulmonary
CASTANHA	*Bertholletia excelsa*	fruit / oil	cosmetics, snacks
TUCUMÃ	*Astrocaryum tucuma*	fruit	cosmetics/soaps
TUCUM	*Bactris setosa*	fruit	hemorrhage
2. "Over-the-counter" medications sold as-is or in hydro-alcoholic tinctures			
All of the above			
CAROBA	*Jacarandá copaia*	leaves	skin disorders
UNHA DE GATO	*Uncaria guianensis*	vine	immune stimulation
SANGUE DE DRAGÃO	*Croton salutaris*	exudant	intestinal disorders
3. Natural insecticides			
SUCUPIRA BRANCA	*Pterodon pubescens*	oil from seed	insect repellent
ERVA DE BUGRE	*Lithraea brasiliensis*	bark	insect repellent
QUINA	*Quassia amara*	stem	insect repellent
4. Essential oils			
BÁLSAMO	*Myroxylon balsamum*	bark	aromatherapy
CANELA, CANELINHA	*Ocotea spp*	bark	aromatherapy
CEDRO ROSA	*Cedrella oderata*	bark	aromatherapy
CHAMPAGNE, CUMBARÙ	*Dipteryx odorata*	bark	aromatherapy
CEREJEIRA	*Torresia acreana*	bark	aromatherapy
AMESCLA, BREU	*Protium heptaphyllum*	bark	aromatherapy
AMORCEGUEIRA	*Protium sp*	bark	aromatherapy
LOURO ARITU	*Licaria aff. Aurea*	bark	aromatherapy
SACACA	*Croton cajucara*	leaf/stem	linalool
ALFAVACÃO	*Hyptis mutabilis*	leaves	hepatic disorders
PATAQUEIRA	*Conobea scoparioides*	leaves	timol
5. Other natural products			
BREU DE VICK		balsam	aroma
IPÊ AMARELO		sawdust	sunblock

V. DETAILS ON NTFPS' VIABILITY ASSESSED DURING THE PDF B

Brazil nuts and oil

Sustainable Use Potential: Harvest of Brazil nuts (*Bertholletia excelsa*) does not harm the tree, as only fallen fruit are gathered from the ground. However, it has been hypothesized (but not proven) that constant removal of all fallen nuts could lead to ecosystem impoverishment if this practice were to occur over decades, a hypothesis bolstered by the fact that juvenile Brazil nut trees are rare in traditional harvest areas. Furthermore, pasture and colonist expansion in the 1970s-80s severely deforested the area around Marabá in Pará, known as the "*Castanha* Polygon", leading to a serious decline in supply. Brazil nut trees are also often cut for timber as a mahogany substitute (although clandestinely, as such harvesting is illegal). Loss in this resource is also associated with deforestation and timber operations in Mato Grosso. Repeated burning of pastures and cropland where Brazil nut trees remain also leads to their death. Fruit set in trees isolated in open areas is seriously impeded by absence of associated pollinators (small bees) that cannot survive in open conditions. To offset these sources of long-term genetic erosion and species predation, planting of juvenile *Bertholletia* trees within exploitation timber and agrosilvipastoral systems is increasingly practiced. Plantation of precocious dwarf varieties has been accomplished in the Manaus area, with production initiating after 10-15 years.

Availability and Markets: The raw material is readily available in the Northwest area of Mato Grosso, at a density of 1-2 trees/ha and more densely in groves where indigenous groups probably planted them long ago. In 1975, 51,000 tons of Brazil nuts (in the shell) were produced in Brazil, while this volume dropped to half that in the early 1990s. In 1995, Brazil exported 9,000 tons of shelled nuts, while Bolivia may now have assumed an equal or greater market share of this more lucrative segment. Export of dehydrated Brazil nuts in the shell has been around 17-20,000 t/yr. Demand for Brazil nuts on the international market has remained high, with prices on the rise, while the domestic market is almost unexploited – nearly all nuts are exported. Traditional nut gatherers earn between $1,000 and 2,000 during a harvest season that can range over as much as 6 months, harvesting about 2 tons marketed at net of about $15 per 60 kg sack. (This rate of harvest is not practiced in Northwest Mato Grosso, where traditional Brazil nut production is restricted to indigenous areas.) The unshelled market in Brazil is dominated by the Mutrán family in Belém, which is monopsonist. Unshelled nut prices at the producer level are on average about $0.25/kg, while shelled nuts, depending on their grade and quality, can fetch $3.00/kg. Other product options (eg., oil) and marketing pathways (eg., domestic retail) have been proposed to avoid dependence and improve profitability. Competitiveness of Brazil nut oil in the food industry is marginal, due to the extremely low price of soybean oil, despite the superior nutritional characteristics of Brazil nut. As yet, this oil is only produced in very limited quantities, for specialized markets in cosmetics and aromatherapy. The Body Shop has supported investment in Brazil nut oil expression in indigenous areas, and the CNPT has developed viability studies for nut extraction and oil production for rubber tappers in Amapá. Other efforts have been made along this line in Boca do Acre, but transport costs for oil were deemed prohibitive.

Potential Products: Brazil nut both unshelled and mechanically shelled are commonly marketed in Brazil and internationally. Production in the shell requires only breaking fallen fruit and the drying and cleaning of nuts, which are sold in bulk. Shelling is done mechanically, after drying in an oven or in open air, using a simple nut breaking apparatus. A decentralized approach for nut breaking and initial packaging under vacuum has been successfully implemented in Xapurí, Acre with urban women as well as rural families. Vacuum packing or use of anti-oxidants is necessary to avoid moisture-related spoilage and aflatoxin, which must be absent to enter quality overseas markets. Production of oil requires scalding, shelling, pressing, filtering and packaging. This technology is readily available and adaptable to 50 litre/hour for small communities using an electrically driven screw press or to a larger scale for private

companies. The oil is very readily oxidized, and thus must be enclosed in airtight containers or an anti-oxidant added.[1] It is deemed most desirable to consider formulation of cosmetics or over-the-counter medicinals containing Brazil nut oil as a base, as part of a marketing strategy (see copaíba products, below).

Financial Viability: studies by Kornexl (1998) indicate that a range of product lines and final markets should be considered, from unshelled nuts to industrial oil. An investment in a small oil press processing of 50,000 t/yr of unshelled nuts can yield a financial IRR of 23% over 20 years, generating considerable revenue and employment, at an initial investment of slightly under $135,000. However, for such an enterprise to succeed in Juruena, a number of obstacles must be surmounted, beginning with the organization and testing of a gathering system including access to forest properties, shelling (decentralized or centralized), and the testing at a laboratory and pilot industrial level of potential oil-based cosmetic applications, followed by pilot oil facility installation.

Licencing or Registration: No special export licencing is required for Brazil nut products, as a standard product of commerce. However, aflatoxin testing is required for shelled nuts, which must also have low moisture content. Eco-labelling may represent a desirable strategy for market segmentation.

Copaíba oil

Copaiba oil, derived from the trunk of several *Copaifera* species by tapping, has been recognized the world over for some centuries as an anti-infective agent, mainly for topical use but also, in some medicines, for internal use.

Sustainable Use Potential: Raw material is manually extracted by boring the trunk of the tree. No damage is caused to the tree if the bore holes are stopped-up after running off most *but not all* of the oil. Oil is best collected in the wet season. Copaíba trees are prized by the timber industry; therefore availability in Northwest Mato Grosso could decline rapidly if the lumber companies cut remaining large trees, which yield oil. Thus, although copaíba may be considered sustainable on the basis of natural occurrence (on average, one tree/ha in areas inventoried), enrichment by planting would be highly recommended to offset the inevitable losses incurred due to the timber industry. However, owing to the probably lengthy period to a stage suitable for tapping (> 40 yrs.), such enrichment would not yield products in the near term, but would rather compensate for prior logging. Such enrichment would be undertaken chiefly to enhance and restore biodiversity rather than secure monetary benefit.

Availability and Markets: Copaíba oil is produced in several Amazon states, primarily Amazonas but more recently, Mato Grosso and Rondônia. Total volume commercialized has oscillated around 100 tons/yr. Domestic prices of unprocessed oil at wholesale are fairly low, averaging $2.50/kg, while exports have attained up to $8.00/kg, most of which go to the U.S. (50%), France (25%) and Germany (<20%). Exports averaged 76 tons/yr from 1986-95. Several tons each year could be tapped in Juruena; greater quantities would be obtainable from surrounding municipalities. Copaíba oil is known and used by colonists, but not regularly harvested (it is usually obtained from tree trunks after felling). Wood industry entrepreneurs in Juruena have expressed interest in protecting remaining individuals of copaíba if a steady market can be obtained.

Potential Products: Copaíba oil *in natura* could be immediately marketed with a range of domestic natural medicine dealers, as an additive in shampoos and other cosmetics, and to overseas buyers. However, to

[1] This anti-oxidant will be, at the present moment, a synthetic commercially available compound such as BHA or BHT, but could in the future be replaced by a combination of natural anti-oxidants which could be obtained from, for example, *Virola* species.

add value at local level, products under consideration include: (1) a formula of Brazil nut oil base containing copaiba oil (ca. 10% concentration, depending on biological evaluation), for skin treatment and healing of wounds and skin rash including *Herpes simplex* and probably *Papilloma* virus infections, and (2) a cream or lotion containing 10-15% copaiba oil based on synthetic or semi-synthetic bases which are cheap and available (containing emulsifying agents, humectants and conservation agents); and (3) a medicinal soap that could also be produced in the area using locally available palm and Brazil nut oils. These products can conveniently also contain natural pigments and perfumes as enhancements.

Financial Viability: Facilities for oil filtration and bottling for final sale as an over-the-counter retail product would be very inexpensive, but would not add much value to the product. More complex formulations would require a greater investment, whose financial viability has not yet been assessed, pending laboratory trials and studies of toxicological problems and medicinal efficacy.

Licencing or Registration: Barriers to sale of copaíba oil are not expected, given its common use in natural medicine. However, product development must cope with the problem of variable chemical composition of copaíba oil between trees found in different areas. The toxicity of one oil does not necessarily therefore correspond to that of another oil of different geographical origin. Secondly, the Ministry of Health, Secretaria de Vigilância Sanitária, the licencing body, normally requires toxicity measurement to be made on the formula which will become available to the public. The formula (Products 1 or 2) must therefore be decided and then the dermal toxicity measured anew.

Other products with immediate potential

Two fast-growing species prevalent in Northern Mato Grosso, "unha de gato" and "sangue de dragão", were identified during initial inventory and fieldwork (and Antonio Brack's mission), as having potential for immediate development, although a more significant investment would be necessary to identify product and marketing options.

Uncaria guianensis, ("unha de gato"), is an abundant vine found in the undergrowth of Juruena forest, that quickly propagates on clearing and is thus prevalent in degraded fields and secondary forest stands. This climbing plant has been shown to contain the same pentacyclic oxindole alkaloids that confer the powerful immune stimulation shown by the Peruvian plant of the same common name, *U. tomentosa* D.C. This latter plant, as well as alkaloid concentrates derived from it, are widely commercialised, principally for treatment of AIDS patients but also for a number of other disease treatments. It is anticipated that Brazilian "unha-de-gato" preparations could reach not only the Brazilian AIDS market (already in the multi-million dollar bracket) but also the world market. However, a series of applied research steps are necessary to bring this product to market, as well as to determine appropriate steps for local extraction and formulation.

Croton salutaris, or "sangue de dragão", is similar in its traditional medicinal use to *C. lechleri* (known in Peru and Ecuador as "sangre-de-drago" or "sangre-de-grado" . and described as the most important phytopharmaceutical export of Ecuador). The former species has been located along the banks of watercourses where it is abundant in Mato Grosso and should be easily propagated in humid habitats. A drug in process of licencing in the USA, "Provir" based on the gum extracted from the Peruvian and Ecuadorian species, is used for the treatment of diarrhoea associated with AIDS. It is hence believed that the Mato Grosso drug may reach the international market not only for its traditional use as a topical "healing agent" but may also find application in this type of dysentery.

However, consultation with the San Francisco company Shaman Pharmaceuticals, developer of "Provir" has indicated that this firm will not in the near future purchase raw material from species other than that which has been registered with the US-FDA. Shaman expressed aversion to introducing *C. lechleri* into

northern Mato Grosso, as an exotic variety, unless it can be shown that voucher specimens have been located in the Brazilian Amazon. Shaman may also promote development of *C. ucurana*, a related species. The CNPT has been investigating use of "sangue de dragão" found near the Bolivian border of Acre in the Chico Mendes extractive reserve, to verify whether this species exhibits the same characteristics registered by Shaman.

VII. PDF B PROJECT REPORTS REFERRED TO IN THE TEXT

Barata, Lauro. (December, 1997)"Copaíba: propriedades farmacológicas, etno-farmocologia e usos".

Barata, Lauro. (March 1998) "Seiva de Jatobá: etnofarmocologia e outros usos".

Bransky, Regina Meyer. (December 1997) "Utilização da Internet como veículo de vendas e marketing para produtos extrativos não madeireros de Juruena" (and companion "Pro-Natura Bookmarks" for WWW searches in natural products markets and consumer groups.

Kornexl, Werner. (March 1998) "Estudo de viabilidade para beneficiamento de óleo de castanha; Juruena/MT".

Gilbert, Benjamin. (April 1997) "Produtos naturais Industrializáveis em Juruena".

Gilbert, Benjamin. (December 1997) " Non-wood forest products from Juruena-Mato Grosso".

Reydon, Bastiaan. (December 1997) "Estudo de mercados para produtos oriundos de Juruena".

ANNEX H

EXTRACTIVISM AS AN INCENTIVE FOR BIODIVERSITY CONSERVATION: PROS AND CONS

The following represents a by no means exhaustive review of recent literature on the potential that non-timber forest product (NTFPs) extractivism from wild trees and plants may hold promise as a contributor to biodiversity conservation.

One of the most influential papers in tropical forestry, "Valuation of an Amazon rainforest" (Peters, Gentry and Mendelsohn, in *Nature*, 1989, 339:665-6), quantified promising returns from NTFPs on forestlands in the Peruvian Amazon. The results demonstrated that, if managed on a sustained-yield basis, NTFPs and low-impact selective timber extraction in combination can provide higher financial returns than alternative and more destructive forms of land-use such as ranching or fast-growing timber plantations. This is so because even a modest annual value derived from the wide range of NTFPs found at the site, when accumulated over time, generated a net present value superior to the opportunity costs embodied in alternative land uses, estimated as nearly triple that obtained from cattle ranching and double that of a *Gmelina arborea* plantation in the Brazilian Amazon.

This article and numerous repetitions of the valuation approach created optimistic expectations of the ubiquitous role of NTFPs management in deterring tropical deforestation, to the point that this approach became almost a panacea for NGOs and development agencies. The argument became axiomatic with the social and environmental objectives of Brazil's rubber tappers' movement, and lent material justification to demands for creation of extractive reserves, widely emulated as a model of sustainable development and wildlands protection.

There are two fronts on which the Peters et al. study has been contested and their results revised: the methodology used and the representativeness of the chosen site (Sven Wunder, pers. comm., 9/98). The first part refers to issues such as stock vs. flow valuation, elasticity of demand in local markets, etc.; the second to the choice of an oligarchic forest patch (*aguaje* - *Mauritia flexuosa* and *aguajillo*), an Amazonian palm whose fruit is used locally as a flavoring for ice cream, was particularly abundant, as was *Jessenia bataua* and rubber), closeness to a large urban market, etc. (considerable volumes of a*guaje* and other NTFPs found at the study site are readily consumed in the voracious Iquitos market of 250,000 inhabitants.) In fact, even in roughly the same area of the Amazon, these results were found to be overly generous when sustainable flows of the same NTFPs species on an alternative site at San Rafael in the same area, where economic fruit species were half as abundant. When these are compared with the land use opportunity costs faced by local producers for merchantable timber extraction followed by swidden cultivation, the authors were not surprised at the behavior they observed among local farmers, who were much more apt to clear the forest than manage it for sustainable NTFPs yields (Pinedo-Vasquez et al., 1992).

Southgate (1997; 1998) argues that besides these concerns for replicability, it is improbable that NTFPs extractivism on its own can generate livelihoods that may compete with alternative sources of rural income. On the rare occasions when market conditions for extractive forest products are particularly propitious, if property rights for the resource are ill-defined and harvesting practices are damaging, the result may be destruction and even extinction rather than sustainable harvesting. These conditions have been observed in the case of palmito harvest in the Atlantic Forest with *Euterpe edulis* and *açaí* (*Euterpe oleracaea*) in the Amazon floodplain, and with historical extraction of quinine (*Cinchona* spp.) in the Andes (according to references cited by Southgate).

The response to such conditions, under this scenario, lies in agricultural domestication or development of synthetic substitutes, either of which will undercut extractive incomes, supplanting them with alternative sources of the compounds consumers crave. The most notorious example is that of the domestication of rubber and its plantation in Malaysia, and the attendant collapse of the Amazon rubber boom. The resulting lower cost supply takes pressure off the natural resource base, but also may remove the immediate incentive to protect it, except perhaps as a gene pool for domesticated species improvement (Homma, 1992; May, 1992).

The pessimistic view that emerged as a result of debate in the early 1990s crystallized in a seminar organized in Bangkok in 1992, which distinguished a number of central hypotheses based on case studies and literature reviews on the relationship between extractivism, livelihood and biodiversity conservation:

- *Specialization and transition* – as households' incomes improve, they tend to gravitate toward non-forest related occupations and consume fewer products from wild species, but that under some conditions, the share of household derived from sources was highest among middle-income than among richer or poorer households;
- *Forest opportunity cost* – the opportunity cost of NTFPs is similar in tropical forests worldwide, and lies in the neighborhood of \$50 $ha^{-1}yr^{-1}$;
- *Sustainability* – the sustainability of extraction depends on access to technology, availability of substitutes and the end use of the particular product in question (goods exported tend to be depleted more rapidly);
- *Extraction costs and species richness* – costs of extraction increase with species richness (ie., oligarchic forests more readily serve as a basis for sustainable extractivism);
- *Commercialization, depletion, domestication and deforestation* – market expansion can lead to either domestication or deforestation (or both), depending on tenure security, among other variables.

In some cases, it has been found, the promise of NTFPs as a basis for both livelihood and conservation incentive is greater. The resilience of locally important species and ecosystems is one factor that can contribute in this direction. For example, products such as *babaçu* (*Orbignya phalerata*) and Brazil nut (*Bertholletia excelsa*), whose fruit are gathered from the forest floor where they drop, are fairly resistent to increased harvest pressure (Anderson, et al., 1991; May, 1991; Clay, 1997).

Furthermore, a wide range of common property resource management regimes permit exclusive use rights to be controlled by specific social groups. Their knowledge and respect for natural limits have ensured the establishment of rules to limit extraction at levels below what would do damage to the resource. According to a recent review of global experience with Integrated Conservation-Development Projects, "predictability of markets, level of consumption (local markets versus international ones), and the type and locus of management power are likely to be among the key predictors of success" for sustainable use (Brandon, 1997:99).

Even where property rights are well delimited, management is local and resources are resilient, however, difficulties in marketing have led to the demise of an "extractivism-only" approach. This has been the unhappy discovery by the very rubber tappers who had championed the extractive reserve experience in Acre. There, after several years of testing improved systems of Brazil nut and rubber processing, competing with, respectively, cut-rate Bolivian producers and Malaysian (and São Paulo) plantation sources of the same goods, extractivists concluded that they would have to focus attention on a "multiple-use strategy" involving the intensification of perennial crop production in agroforestry systems, and initiation of low-impact managed timber extraction to bolster flagging incomes (May et al., 1996).

As Charles Peters recognizes today (pers. comm., 9/98), “the problem (with reliance on NTFPs as a basis for biodiversity conservation and enhanced livelihoods) is the ‘if managed on a sustained-yield basis’ part. For this to happen, you clearly need to bring other things into the farmer’s portfolio like agroforestry and perhaps small-scale timber harvesting. All of this, of course, is habitat sensitive.”

As a strategy for incorporation of NTFPs into an integrated approach to conservation and sustainable use, various authors (e.g., Anderson, 1992; Pollak et al., 1995; Southgate, 1997;) recommend low-intensity management of dense native, oligarchic stands whose products are in high demand and which grow on lands uncompetitive for other uses, such as *açaí* and *aguaje* (in Brazil – *buritî*). The most lucrative approach to management of fast-growing palm species such as *açaí* would involve gradual native stand improvement through seed dispersal and thinning of undergrowth and canopy species to permit light to penetrate and hasten fruiting. Coupled with this approach, NTFPs could be gradually integrated within agroforestry systems and through enrichment of secondary forests that now constitute as much as 40% of all occupied Amazon lands (Browder, 1992) by domestication of diverse species whose occurence in nature is sparse and whose resilience to harvesting is low, once their products had been screened for market potential.

Finally, it is worthwhile citing the conclusions of recent work reviewing the values of domestic benefits derived from tropical forests as an argument for their conservation. Consonant with the results cited above, Chomitz and Kumari (1998) found that the consumptive benefits from NTFPs extraction and of watershed protection for such purposes as hydroelectric energy generation are in general lower than is commonly believed. This is true because benefits (1) must be compared to those derived from alternative land-uses; and (2) are highly site-specific and scale-dependent: “diversity results in a continuous variation over the landscape in both the physical processes underlying forest benefits and in their economic value”. Thus it is tropical biodiversity itself which undermines the potential that domestic benefits may justify its protection. These factors serve as further justification for global sharing in the investments necessary to conserve tropical forests and ensure their sustainable use on a broad scale.

Peter H. May, Technical Coordinator
GEF/PDF B - Juruena: Non-timber forest products

ANNEX I

PROJECT MILESTONES OVER A 10-YEAR PERIOD

Component/ Output	PHASE WITH GEF FINANCING AND CO-FINANCING Milestones: End of Year 3	PHASE WITH GEF FINANCING AND CO-FINANCING Milestones: End of Year 7	PHASE WITH ONLY NON-GEF FINANCING Milestones: End of Year 10
COMPONENT 1: ECOLOGICAL-ECONOMIC ZONING AND ESTABLISHMENT AND MANAGEMENT OF PROTECTED AREAS	<u>Zoning milestones</u> • Land use plans are developed in at least 2 municipalities (Juruena and Cotriguaçu) at a 1:100,000 scale that include zoning for biodiversity conservation and sustainable natural resource management. • Protected Areas on public lands identified in at least 3 municipalities, as part of land use plans. • Conservation set-asides on private lands identified in at least 3 municipalities. • Current barriers and existing or proposed incentive systems (examples: property tax deductions, green VAT) to encourage large and small landholders to maintain conservation set-asides are evaluated for effectiveness. • Buffer zones, transition zones and corridors identified (can include private and public lands) in at least 3 municipalities. <u>NTFP milestones</u> • Areas where promising NTFPs (identified by PDF B) occur in relatively higher densities are identified within land use plans and zoning	<u>Zoning and Protected Areas milestones</u> • Land use plans are developed in the remaining 3 municipalities (Aripuanã, Castanheira and Juina). • All plans are approved by the Municipal Council (*Vereadores*) of each municipality. • Protected Areas on public lands are identified in remaining 2 municipalities. • New protected areas are legally established in initial 3 municipalities, management plans developed and basic PA infrastructure and human resource capacities provided, agreement on financing of recurrent costs from here on obtained. • Conservation set-asides on private lands identified in remaining 2 municipalities. • New incentive systems to encourage large and small landholders to maintain conservation set-asides are designed and effective existing mechanisms applied to create conservation easements on private properties in the region. • Agreements are negotiated with private landholders on type of land use allowed in buffer zones, transition zones and corridors based on initial results of agrosilvopastoral and SFM demonstrations in 3 municipalities. • Buffer zones, transition zones and corridors identified in remaining 2 municipalities, and initial agreements negotiated. <u>NTFP milestones</u> • Areas where promising NTFP's occur are identified within land use plans and zoning maps in remaining municipalities in NW region.	<u>Zoning and Protected Areas milestones</u> • Land use plans are in effective use by municipal governments as a basis for location of new settlements, agricultural and forest utilization projects. • New protected areas are legally established in remaining municipalities in the NW region, management plans developed and basic PA infrastructure and human resource capacities provided, agreement on financing of recurrent costs from here on obtained. • New or adapted incentive systems are created through state and/or municipal law, and their effectiveness and that of existing incentive structures in protecting remaining biodiversity has been evaluated. • Agreements are negotiated with private landholders on type of land use allowed in buffer zones, transition zones and corridors based on initial results of agrosilvopastoral and SFM demonstrations in all municipalities in the NW region.

Component/ Output	PHASE WITH GEF FINANCING AND CO-FINANCING Milestones: End of Year 3	 Milestones: End of Year 7	PHASE WITH ONLY NON-GEF FINANCING Milestones: End of Year 10
	maps in at least 3 municipalities.		
	Capacity-building milestones	Capacity-building milestones	Capacity-building milestones
	• Training of municipal governments and an inter-municipal network of civil organizations in collection, interpretation and use of remote sensing data (all municipalities).	• Legal advice provided to large and small landholders and municipal governments on setting land aside as permanent reserves.	
	• Training of municipal governments and an inter-municipal network of civil organizations in biodiversity inventorying, monitoring, field observations and conflict resolution (all municipalities).	• Municipal governments and civil organizations establish action priorities, work program, and funding requirements for long-term monitoring and protection of threats to biodiversity conservation.	• Municipal governments and civil organizations have secured long-term financing for long-term monitoring of threats to regional biodiversity conservation and sustainable use.
COMPONENT 2: AGROSILVOPASTORAL DEMONSTRATION SITES AND RELATED CAPACITY BUILDING	Demonstration site milestones	Demonstration site milestones	Technology adoption milestones
	• 10 demo sites on farmers' lands (each of 25 hectares) in Juruena and another 10 in Cotriguacu are established and operational.	• Agrosilvopastoral model is adapted based on initial results and evaluations of demo sites. • Agrosilvopastoral models are adopted by farmers outside of initial demonstration areas in Juruena and Cotriguaçu.	• Adapt agrosilvopastoral models based on initial results from demo sites, and results extended to other adopting farmers.
	• Natural regeneration and forest corridor plots are established in farming areas and monitored regularly to assess recovery of flora and faunal diversity.	• 10 demo sites on farmers' lands (each of 25 hectares) in Aripuana, another 10 in Castanheira, and another 10 in Juina are established and operational.	• Agrosilvopastoral models are adopted by farmers outside of initial demonstration areas in Aripuanã, Castanheira and Juína.
	• Ecological sustainability, social acceptability and economic attractiveness of models are independently evaluated.	• Ecological sustainability, social acceptability and economic attractiveness of models are independently evaluated. • Financing to support continuation of demonstration sites and independent evaluation is identified and secured.	• Ecological sustainability, social acceptability and economic attractiveness of models are independently evaluated
	NTFP milestones	NTFP milestones	NTFP milestones
	• NTFPs that can be used to enrich the agrosilvopastoral demos are introduced in Juruena and Cotriguacu.	• NTFPs that can be used to enrich the agrosilvopastoral demos are introduced in Aripuana, Castanhiera and Juina.	
	• Market trial of Brazil Nut (in shell) completed.	• Pilot Brazil Nut shelling and oil extraction facilities established**.	
	• Feasibility study for Brazil Nut shelling and oil facility completed.	• Market trial of shelled Brazil Nuts and Brazil Nut oil completed.	
	• Investigation of (a) market potential, and (b) harvest and management technology for acai and copaiba completed.	• Investigation of (a) market potential, and (b) harvest and management technology for jatobá and sangue de dragão completed.	• Pilot facilities for processing & marketing jatoba, sangue de dragao established, based on investigations completed previously.

Component/ Output	PHASE WITH GEF FINANCING AND CO-FINANCING Milestones: End of Year 3	Milestones: End of Year 7	PHASE WITH ONLY NON-GEF FINANCING Milestones: End of Year 10
	• Financing for implementation of Brazil Nut, açaí and copaíba pilot processing facilities investigated with co-funders and development agencies.	• Pilot facilities for processing and marketing açaí and copaíba are established, based on investigations completed during 1st 3 years **	• Investigation of (a) market potential, and (b) harvest and management technology for additional NTFPs (identified during first 7-year period) completed.
	<u>Capacity-building milestones</u>	<u>Capacity-building milestones</u>	<u>Capacity-building milestones</u>
	• Training center established in Juruena.	• Satellite training centers established in new settlement areas.	• Further training centers established and staffed with financing identified in previous period.
	• Internships for local youth from Juruena and Cotriguacu at Training Center.	• Internships for local youth from Aripuana, Castanheira, and Juina at Training Center.	• Continued training for local youth through training centers established after project completion.
	• Compile training material and undertake training courses in Juruena and Cotriguacu. Training targeted to local farmers and government agricultural extension workers.	• Revise training material based on experience in 1st 3 years and undertake training courses in Aripuana, Castanheira, and Juina. Training targeted to local farmers and government agricultural extension workers.	
	• Training in sustainable harvest planning, labor organization, selection, breaking and transport of Brazil Nuts (Juruena and Cotriguacu)	• Training in sustainable harvest planning, labor organization, selection, breaking and transport of jatobá and sangue de dragão	• Training in sustainable harvest planning, labor organization, selection, breaking and transport of other NTFPs identified during first 7-year period.
COMPONENT 3: SUSTAINABLE FOREST MANAGEMENT AND RELATED CAPACITY BUILDING	<u>Demonstration site milestones</u>	<u>Demonstration site milestones</u>	<u>Technology adoption milestones</u>
	• Two sustainable forest management demonstrations (averaging 100 hectares each) established in two municipalities of the NW region (Juruena and Cotriguaçu), including 100% inventories, biodiversity protective felling plans, and conservation set-asides.	• Three sustainable forest management demonstrations (averaging 100 hectares each) established in remaining three municipalities of the NW region (Aripuanã, Castanheira and Juina)	• Timber enterprises involved in final 4 years of project through demonstration trials have successfully obtained provisional FSC certification for sustainable forest management, have begun to access environmentally friendly market options, and observe set-asides.
	• Forest management system established following FSC certification criteria and biodiversity overlay on areas under control of Rohden Lignea.	• Timber enterprises involved in first 3 years of demonstration trials have successfully obtained provisional FSC certification for sustainable forest management, have begun to access environmentally friendly markets, and observe set-asides.	• Timber enterprises that have not participated in the initial demonstrations have begun to adopt sustainable management practices, and actively seek information on certification and market options.
	• Natural regeneration monitoring plots are established in demonstration units.	• Ecological sustainability, social acceptability and economic attractiveness of models are independently evaluated.	
	• Ecological sustainability, social acceptability and economic attractiveness of models are independently evaluated.		• Ecological sustainability, social acceptability and economic attractiveness of models are independently evaluated.
	• <u>Capacity-building milestones</u>	• <u>Capacity-building milestones</u>	• <u>Capacity-building milestones</u>

Component/ Output	PHASE WITH GEF FINANCING AND CO-FINANCING		PHASE WITH ONLY NON-GEF FINANCING
	Milestones: End of Year 3	**Milestones: End of Year 7**	**Milestones: End of Year 10**
	• Training materials developed based on Prodeagro demonstration experience. • Training provided in two municipalities to timber enterprise executives, field managers and chainsaw operators regarding sustainable logging practices. • Results of demonstration activities presented in regional seminars and to sectoral representatives and government authorities in the state capital. • Timber enterprises informed of FSC certification procedures and criteria.	• Training materials revised in light of experience during first 3 years of project. • Training provided in remaining three municipalities to timber enterprise executives, field managers and chainsaw operators regarding sustainable logging practices. • Results of demonstration activities presented in regional seminars and to sectoral representatives and government authorities in the state capital. • Timber enterprises informed of FSC certification procedures and criteria.	• Continued training of timber enterprise personnel is assumed under the auspices of state and federal forest management and extension agencies.

** Concessional financing arrangements with private sector partners in these activities will be explored.

ANNEX J

DOMESTIC MARKET FOR TROPICAL TIMBER

The vast majority of tropical timber produced in Brazil (86% of Amazon wood supplies) is destined for national markets, as was documented in a recently published analysis by Friends of the Earth, Imaflora and Imazon (*Hitting the Target: timber consumption in the Brazilian domestic market and promotion of forest certification*, June 1999). This document suggests that although there is little concern at present in domestic wood consuming enterprises for use of sustainable management technology, this trend is growing (as represented by the adoption of the FSC criteria as a basis for purchase contracts for furniture retail by the nation's leading company in this sector, Tok & Stok, in November 1998). There is a concerted effort on the part of a network of NGOs and concerned industry groups to support this trend, which has already led to adoption of FSC criteria by all 17 of the leading pulp and paper manufacturers in Brazil for their plantation practices.

Based on recent legislation requiring sustainable forest management, IBAMA has restricted the traditional exploitation of timber, and has cancelled the licences of the majority (87.5%) of existing management plans in Mato Grosso alone, in 1999. For operating timber companies to comply with these new restrictions, they will be required to adopt far more rigorous management plans. These requirements, though more rigorous than current practice, still do not measure up to FSC certification criteria.

As we have stressed at various points in the Project Brief, it is a combination of regulatory demands, financial resources and market pressures that will eventually bring about a positive change in forest management technology. This project will play a catalytic role in bringing about this enabling environment. Among those economic incentives currently in process of legislative adoption in the state of Mato Grosso which will reinforce the redirection of productive activities in this direction are progressively reduced tax incidence in timber operations that adopt sustainable forest management, recycling of wood residues for energy generation, and value-added wood processing to improve economic viability.

There are also important initiatives being adopted by partners in the GEF undertaking that will further reinforce these incentives, including the creation of a Forest Fund to finance certified sustainable forest management, involving private international investors linked with Banco Axial. GMO Renewable Resources of Boston is investing in this fund, having announced last week its first major investment, in a prospective collaboration with the UNDP, which is leveraging social and environmental investments in league with Pro-Natura (see below).

Gethal Amazonas e GMO Renewable Resources anunciam aliança para a exploração florestal certificada sustentável

A empresa Gethal Amazonas S/A (Gethal) e a GMO Renewable Resources (GMO RR) anunciaram ontem que estão mantendo negociações avançadas para estabelecer uma parceria dedicada ao desenvolvimento de atividades florestais certificadas no Estado do Amazonas. As empresas já completaram as principais etapas das negociações e discutem os últimos pontos de uma parceria que inclui investidores brasileiros, americanos e a participação ativa de ONGs sem fins lucrativos. Esta parceria poderá servir como um modelo para os novos paradigmas do

desenvolvimento sustentável dentro do principio da conservação das florestas tropicais. A operação, lançada pelo grupo ambiental do Banco Axial SA sob mandato da Gethal Amazonas SA., continua sujeita a uma completa e satisfatória due diligence e finalização dos contratos, o que é esperado antes do final do ano. O projeto incluirá a adoção das práticas internacionais certificadas sustentáveis de colheita de madeira com baixo impacto ambiental, expansão da fábrica em Itacoatiara; estudos silviculturais de longo prazo para determinar os melhores métodos e ciclos de corte; estudos científicos de longo prazo da fauna e flora da floresta no intuito de preservá-las e o trabalho com comunidades locais, visando amenizar ao máximo o impacto da extração de madeira e criar novas oportunidades econômicas e sociais.

Em um desenvolvimento paralelo, o Departamento Ambiental do Axial e a GMO RR estudam uma parceria para investir em projetos florestais sustentáveis no Brasil e em outras partes da América Latina. O objetivo é associar empresas privadas com agências públicas e ONGs a fim de proteger grandes partes da Amazônia contra devastação, preservar a diversidade biológica e promover os interesses econômicos de investidores e de residentes locais na região. O esforço responde à nova política ambiental de desenvolvimento sustentável que coloca o homem no centro da equação de conservação do meio ambiente. Essa parceria está sujeita a uma due diligence e a preparação de acordos e contratos finais.

A Gethal Amazonas SA, localizada em Itacoatiara (AM), opera uma planta de laminados e compensados de madeira de alta qualidade, que é abastecida com o manejo de 170.000 hectares de floresta amazônica. Ela já obteve em 1999 o Certificado "verde" do FSC (Forest Stewardship Council) pela cadeia de produção baseada em produtos laminados oriundos de madeira certificada da sua vizinha, a Mil Madereira. Desta forma a Gethal Amazonas SA se tornou a primeira fábrica de compensados de origem tropical com certificação FSC. Atualmente a Gethal está se preparando para obter a Certificação completa da FSC, incluindo suas atividades florestais.

O Grupo Gethal - Fundado e operando no Brasil há mais de meio século, o Grupo da Gethal iniciou suas operações na Amazônia no final da década de 70. Produz laminados e compensados de alta qualidade em Itacoatiara, sendo uma das maiores empregadoras do setor privado no município com relevante impacto econômico na região. A empresa vende atualmente mais de 30.000 metros cúbicos de laminados e compensados por ano, sendo que 75% de sua produção é exportada para a Europa e Estados Unidos, atendendo à demanda especializada da construção e engenharia. O grupo planeja investir em melhores eficiências de produção, aumentando o aproveitamento das toras para chegar a duplicar a produção dentro de três anos. Investimentos florestais reduzirão ao mesmo tempo o impacto da extração da matéria prima, contribuindo para a preservação da biodiversidade de suas reservas florestais. Um trabalho de desenvolvimento agro-florestal coordenado com ONGs brasileiras permitirá o desenvolvimento de inúmeras atividades colaterais incluindo a bio-prospeção, o ecoturismo e outras atividades florestais não madereiras com impacto social e econômico direto para as populações da região.

Por outra parte, o projeto da nova parceria com a Gethal inclui a implantação de estruturas par a execução de estudos de longo prazo e monitoramento das práticas de extração madereira na floresta. Este projeto irá testar várias técnicas de extração de baixo impacto e práticas de silvicultura para avaliar e aperfeiçoar a prática atual de extrair de 10 a 15% do volume da madeira (de 2 a 4% das árvores a cada 25-30 anos. A meta é monitorar e corrigir o nível de impacto da extração para preservar a capacidade de regeneração natural da floresta.

Um segundo estudo de longo prazo avaliará a diversidade biológica atual da floresta, o efeito da atividade extrativa e o índice de recuperação da diversidade extraída. O objetivo é reduzir o impacto da extração no restante do ecossistema e definir as práticas, incluindo áreas de preservação, que melhor protegem a flora e a fauna.

Um outro aspecto chave do projeto enfatiza o apoio ao desenvolvimento das comunidades locais através de um acompanhamento minucioso do impacto das atividades florestais e um plano contínuo de desenvolvimento destas comunidades baseado em suas características e costumes tradicionais. Este programa será desenvolvido em colaboração direta com a ONG Pró-Natura, que já desenvolveu projetos similares em outras localidades do Brasil e da America Latina. O trabalho será integrado com os grupos residentes locais, cooperativas, instituições sociais locais, ambientalistas e representantes dos órgãos oficiais dos governos estadual e federal. O objetivo é ouvir o homem da Amazônia para administrar com ele, usando recursos e talentos próprios para fortalecer as instituições sociais, culturais e econômicas da região.

Axial - Com sua sede em São Paulo, o Banco Axial SA é um Banco de Investimento Brasileiro especializado na estruturação financeira de "Projetos Ambientalmente Corretos". É considerado pelo setor como o primeiro Banco "verde" no Brasil. O Departamento Ambiental do Banco, que iniciou o processo de investimento na Gethal, administra o Terra Capital Investors Ltd., o primeiro Fundo de Capital de Risco para investir em projetos que incrementam ou conservam a biodiversidade através de toda a América Latina. O Fundo é administrado em parceria com o SDI (Sustainable Development Inc), o EEAF (Environmental Enterprise Assistance Fund) e o International Finance Corporation (Grupo Banco Mundial) em Washington. O Fundo participará das atividades da parceria Gethal/GMO-RR buscando investir em projetos regionais gerados pela atividade florestal.

A GMO Renewable Resources (RR) é uma subsidiária da Grantham, Mayo, van Otterloo & Co. LLC (GMO), uma administradora de recursos financeiros estabelecida em Boston, Massachusetts. A GMO administra US$ 25 bilhões de ativos para clientes institucionais e pessoas físicas, os quais incluem várias instituições universitárias com renome internacional, fundações e famílias americanas. A GMO RR organiza parcerias a fim de investir em florestas e projetos florestais. A empresa já captou mais de US$ 1 bilhão de dólares para investimentos em projetos florestais sustentáveis através do mundo. Este projeto com a Gethal é o primeiro investimento do grupo em florestas Amazônicas. A equipe executiva da GMO RR totaliza coletivamente mais de setenta e cinco anos de experiência em silvicultura sustentável e em investimentos em projetos florestais.

A Pró-Natura é uma ONG especializada em projetos de desenvolvimento sustentável que reduzem o impacto sócio-ambiental de emprendimentos localizados em regiões pouco desenvolvidas no mundo. A Pró-Natura foi fundada há 20 anos no Brasil e atualmente possui escritórios no Rio de Janeiro, Paris e New York. Desenvolveu extensa experiência em projetos que limitam o impacto de investimento de infrastrutura nos ecossistemas e grupos sociais indígenas. Atualmente administra 52 projetos em 25 países tropicais e sempre mantém como objetivo principal a preservação dos interesses do homem e de seu meio ambiente no processo de desenvolvimento nacional.

ANNEX K

IPN'S PROJECT DEVELOPMENT AND IMPLEMENTATION CAPACITY AND EXPERIENCE

IPN, a non-governmental organization, in its 15 years of existence, has been responsible for administering successful projects in sustainable development, natural resource management, park and nature reserve management planning, health and environmental education throughout Brazil. These projects are often managed through partnerships with state, municipal and federal agencies, in which IPN acts as the executor of government policies at the local level. IPN thus has considerable experience in administering complex projects involving a large number of stakeholders and beneficiaries.

At the international level, the Pro-Natura family is responsible for a growing portfolio of projects in tropical areas worldwide, and now commands an annual budget exceeding $3 million. This does not include projects undertaken in conjunction with other agencies, such as the Peugeot/ONF carbon sink in NW Mato Grosso, which is alone investing over $14 million over a 3 year period, or the Shell/Camisea project, which involved investment in indigenous consultations, enviromental safeguards and biodiversity monitoring of over $10 million in 2 years.

Pro-Natura projects have been conducted with financial support from a wide range of organizations, including private corporations, foundations, multilateral agencies and banks. These initiatives in many cases have served as the basis to induce investments at a greater scale, such as those adopted by the World Bank in Mato Grosso through its Prodeagro program.

Although IPN staff have had broad theoretical training and practical experience in development fields, project monitoring and evaluation, as in many NGOs, has not been as systematic as could be. In this regard, IPN will benefit from participation in ongoing efforts by UNDP and GEF to systematize M&E processes.

ANNEX L

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ANNEX A (revised [d])

PROJECT PROPOSALS SUBMITTED FOR COUNCIL APPROVAL
Work Program - May 2000 (January 1, 2000 - March 31, 2000)

Country	IA	Project Title	PDF A	PDF B	PDF C	IA Fee	GEF Allocation ($ million)[a]	Total Cost ($ million)[b]
A. BIODIVERSITY								
1 Global	UNEP	Millennium Ecosystem Assessment		0.350		0.437	7.310	24.920
2 Brazil [c]	WB	Amazon Region Protected Areas Program (ARPA)		0.350		1.550	30.350	89.000
2a Brazil	UNDP	Promoting Biodiversity Conservation and Sustainable Use in the Frontier Forest of Northwestern Mato Grosso		0.280		0.559	6.984	16.114
3 Cameroon	UNDP	Community-Based Conservation in the Bamenda Highlands (MSP L)				0.146	1.000	3.091
4 Colombia	WB	Caribbean Archipelago Biosphere Reserve: Regional Marine Protected Area System (MSP L)	0.025			0.146	1.000	4.180
5 Colombia	WB	Conservation and Sustainable Use of Biodiversity in the Andes Region		0.350		1.095	15.350	30.350
6 Ecuador	WB	Choco-Andean Corridor (MSP L)	0.025			0.146	1.000	3.353
7 Egypt	UNDP	Conservation and Sustainable Use of Medicinal Plants in Arid and Semi-arid Ecosystems		0.170		0.365	4.287	9.053
8 Ghana	WB	Northern Savanna Biodiversity Conservation (NSBC) Project		0.300		0.788	7.900	47.800
9 Mexico	WB	Indigenous and Community Biodiversity Conservation (COINBIO)		0.300		0.942	7.500	18.700
10 Mexico	WB	Mesoamerican Biological Corridor	0.025	0.340		1.261	15.200	93.310
11 Tanzania	UNDP	Development of Mnazi Bay Marine Park		0.120		0.268	1.615	2.329
		Sub-Total	**0.075**	**2.560**		**7.703**	**99.496**	**342.200**
B. CLIMATE CHANGE								
12 China	UNDP	Enabling: China to Prepare Initial National Communication to the UNFCCC		0.100		0.382	3.600	3.840
13 Cuba	UNDP	Co-generation of Electricity and Steam Using Sugarcane Bagasse and Trash		0.350	0.680	0.861	12.515	85.746
14 Kazakhstan	UNDP	Wind Power Market Development Initiative		0.350		0.382	2.900	7.740
15 Mexico	WB	Methane Capture and Use (Landfill Demonstration) Project		0.300		0.624	6.530	23.150
16 Philippines	WB	Metro Manila Urban Transport Integration Project-Marikina Bikeways Project Component	0.025	0.150		0.467	1.875	2.061
17 Poland	WB	Krakow Energy Efficiency Project				0.867	11.000	99.000
18 Uganda	WB	Rural Energy for Development		0.350		1.520	30.350	375.000
19 Uruguay	UNDP	Enabling Activity: Uruguay's Second National Communication to the UNFCCC: Programs of General Measures and Voluntary Greenhouse Gas Emissions Reduction				0.099	0.596	0.885
		Sub-Total	**0.025**	**1.600**	**0.680**	**5.202**	**69.366**	**597.422**
C. INTERNATIONAL WATERS								
20 Regional (Angola, Namibia, South Africa)	UNDP	Implementation of SAP Toward Achievement of Integrated Management of the Benguela Current Large Marine Ecosystem		0.344		0.724	15.458	38.908
21 Regional (China, Rep. Korea)	UNDP	Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem		0.350		0.695	14.744	25.046
22 Regional (Costa Rica, Nicaragua)	UNEP	Formulation of SAP for the Integrated Management of Water Resources and the Sustainable Development of the San Juan River and its Coastal Zone		0.283		0.412	3.930	5.365
		Sub-Total		**0.977**		**1.831**	**34.132**	**69.319**
D. MULTIPLE FOCAL AREAS								
23 Global	UNDP	Small Grants Program (Second Operational Phase)				0.932	22.823	46.823
24 Benin	WB	Program for the Management of Forests and Adjacent Lands		0.300		0.825	6.300	28.300
		Sub-Total		**0.300**		**1.757**	**29.123**	**75.123**
		Total	**0.100**	**5.437**	**0.680**	**16.493**	**232.117**	**1,084.064**

[a] "GEF Allocation" includes previous grants for project preparation (PDF A, B & Cs) but not the IA Fee.

[b] "Total Cost" includes GEF Allocation and all project cofinancing

[c] "Subject to endorsement, which is expected by April 10, 2000

[d] with the inclusion of Brazil:Promoting Biodiversity Conservation and Sustainable Use in the Frontier Forest of Northwestern Mato Grosso

ANNEX B (revised [f])

CUMULATIVE GEF ALLOCATIONS TO WORK PROGRAMS AND OTHER PROJECTS
Work Program - May 2000 (January 1, 2000 - March 31, 2000)

A: WORK PROGRAMS

Focal Area	FY 95 - FY 98										
	Pilot Phase	Approved 1995/1998[a]	Approved Jul 1998	Approved Oct 1998	Approved Dec 1998	Approved May 1999	Approved Dec 1999	Approved Feb 2000	Proposed May 2000	Subtotal excluding pilot phase	Total (Pilot Phase, GEF Feb 95-Mar 00)
Biodiversity	331.810	390.17	4.730	70.610 [b]	23.930 [b]	82.090 [b]	45.143	39.980	99.496	756.149	1,087.959
Climate Change	258.820	470.64	19.590	17.960	1.500	75.220	105.483	11.000	69.366	770.759	1,029.579
International Waters	117.960	115.93	35.090	24.570	6.010	49.210	3.000	9.947	34.132	277.889	395.849
Ozone Depletion	4.200	121.8		3.320		31.300	0.989	6.519		163.928	168.128
Multi-Focal	19.900	93.27		35.130					29.123	157.523	177.423
Sub-Total	**732.690**	**1,191.810**	**59.410**	**151.590**	**31.440**	**237.820**	**154.615**	**67.446**	**232.117**	**2,126.248**	**2,858.938**

B. OTHER PROJECTS

Enabling Activities - Expedited		33.09	4.570	1.740	2.910	0.972	2.123	1.100	1.026	47.531	47.531
Medium-Sized Projects - Expedited			6.040	4.120 [c]	4.960	2.958	18.080	5.626	10.472	52.256	52.256
PDF A				2.500 [d]	0.390	0.372	0.681	0.382	0.250	4.575	4.575
PDF B, C				22.280 [e]	3.140	4.180	8.556	5.073	5.578	48.807	48.807
Sub-Total	**0.000**	**33.090**	**10.610**	**30.640**	**11.400**	**8.482**	**29.440**	**12.181**	**17.325**	**153.168**	**153.168**

Total	**732.690**	**1,224.900**	**70.020**	**182.230**	**42.840**	**246.302**	**184.055**	**79.627**	**249.442**	**2,279.416**	**3,012.106**

[a] Exluding PDFs; starting March 1997, PDFs included in GEF allocation

[b] Includes one medium-sized project exceeding $750,000 ceiling for which Council approval is needed

[c] Cumulative allocation to medium-sized projects from August 1997 to June 1998

[d] Cumulative PDF A allocation from 1995 to August 1998

[e] Cumulative PDF B and C allocations from 1995 to June 1998

[f] with inclusion of Brazil: Promoting Biodiversity Conservation and Sustainable Use in the Frontier Forest of Northwestern Mato Grosso