

PROPOSAL FOR REVIEW

Project Title:	Enabling Brazil to Fulfill Commitments to the UNFCC
GEF Focal Area:	Climate Change
Country Eligibility:	Convention Ratified 28 February, 1994
Total Project Costs:	US \$ 7.0 million
GEF Financing:	US \$ 1.5 million
Cofinancing/Parallel Financing:	5.5 million (Brazilian Government and Bilateral)
GEF Implementing Agency:	UNDP
Executing Agency:	Government of Brazil
Local Counterpart Agencies:	The Ministry of Science and Technology
Estimated Approval Date:	October 1995
Project Duration:	18 months
GEF Preparation Costs:	None
Government Endorsement:	Received 7 January, 1995

BACKGROUND AND PROJECT CONTEXT

1. Brazil is located in the central eastern part of South America between 5 degrees Latitude North and 33 degrees Latitude South and between 34 and 73 degrees Longitude West. It has an area of 8,511,996 km² being the 5th largest country in the world and occupying 47.7% of the South American continent. Geographically Brazil is divided in five main regions: the North, with equatorial climate, where the Amazon forest is located; the North-East, with a semi-arid climate; the South-East, concentrating all the main states of Brazil and industrialized cities (67% of Gross National Product); South Region with a subtropical climate; and the Central-West Region with tropical climate. Administratively Brazil consists of 26 states plus a federal district, in the middle of the country where is located Brasília, Brazil's capital. The national language is Portuguese and the national currency is Real (R\$).

2. The total population of Brazil, according to the 1991 census, was 146 million inhabitants. The growth rate of the population is 1.93%, decreasing, fast approaching the European rate of 1.2%. More than 75% of the population lives in urban areas. The main cities are São Paulo (9,6 million inhabitants) and Rio de Janeiro (5,5 million inhabitants). The economy of Brazil is the 10th largest in the world with a Gross National Product in 1992 amounting US\$ 417 billion (agriculture 11.1%, industry 35.4% and services 53.5%). Export amounts US\$ 36 billion.

Forestry

3. Approximately 40% (3.5 million km²) of the total land area of Brazil is covered by the Amazon Forest, of which two million km² is composed of dense forest and 1.1 million km² of open forest. In addition, Brazil has a large savanna area ("cerrado", more than 2.5 million km²), a semi-arid vegetation region ("Caatinga", more than 1.5 million km²), a remaining part of the Atlantic forests and also an important swamp region called "Pantanal."

4. Brazil has also 6.5 million ha of planted forests mainly composed of Eucalyptus and Pignus species. Two Brazilian States alone - Minas Gerais and Espiritu Santo in the South-East Region - comprise 43% of the total reforested area in the country. Half of this reforested area was planted before 1980 and yields low productivity. These areas are being reformed to increase their productivity (more than 21% of reforested area has already been reformed).

5. The carbon content of Brazilian forest is the highest among tropical countries (more than 100 PgC), followed by Zaire and Indonesia (more than 30 PgC, FAO 1992).

6. The biomass contents of the different kinds of forests were estimated in two main forestry inventories. The first inventory, called "Radam Brazil Project" was prepared by the Brazilian Government during the period from 1973 to 1983. The project set down different codes for each type of vegetation, drew vegetation maps in the scale 1:250,000; printed them on a scale 1:1,000,000 and presented all data and information collected in a set of more than 50 books.

7. The vegetation classification was done by IBDF (now IBAMA) and IBGE (the Brazilian Geography and Statistical Institute) later on and was presented on maps in the 1:5,000,000 scale. Classification done in this manner - not very detailed - indicates 28 types of vegetation only for the legal Amazonian region, of which 19 types refer to types of forests.

8. The second inventory was elaborated by the Food and Agriculture Organization (FAO) and was published during the 1950's under the title "Florestas Tropicais Latifoliadas Produtivas Não-Perturbadas das Americas".

Agriculture and Livestock

9. The agriculture and livestock sector is a very important one in Brazil, not only given the necessity of feeding the Brazilian population but also because its large extension allows enhancing production for exportation. As far as climate change is concerned, Brazil is one of the largest (8th) rice producers in the world, although its contribution to greenhouse gas emissions is relatively small (rice is produced mainly in dry fields), and it has one of the largest cattle population in the world (over 156 million heads or, in relative terms, more than one head per capita). Poultry is very numerous in Brazil as well (over 600 million heads).

10. Several of the permanent cultures, like coffee (production of over 2.5 million tons, representing presently only a small part, approximately 2 %, of Brazilian exports), oranges, cocoa, cashew nuts and produced over 500,000 ha each. Seasonal cultures like sugar cane (over 270 million tons), cassava and crops (like soya, corn, wheat and rice) are also very important. Brazilian total crops production amount over 75 million tons.

11. Due to raw material availability for lime and fertilizers and low land costs, the "cerrado" is the region where agriculture activities are growing and it has become the new agriculture frontier of Brazil.

Energy sector

12. The total primary energy consumption in Brazil in 1990 was 183.6 Mtoe of which petroleum accounted 30.0%, natural gas 2.0%, coal 5.0%, nuclear 0.3%, hydropower 36.9%, ethanol 9.9%, fuelwood 14.9% and others 1.0 %. The share of renewable sources of energy has traditionally been high in Brazil and thus the CO₂ emissions per energy consumed compared to many other countries are considerably lower. Main source of CO₂ emissions in the energy sector are the petroleum products used in industry and transportation. Although still a net importer, Brazil has developed rapidly its domestic oil production and reached the goal of producing more than 750,000 barrels of oil per day in 1994, a figure greater than some OPEC countries. In the transportation sector petroleum products are used together with ethanol, which was launched 20 years ago through a National Alcohol Program, PRO-ALCOHOL to reduce the dependency of Brazil on imported oil and to provide a cost-effective alternative for the, at that time expensive oil. Mainly as a consequence of the sharp decrease of oil prices in the 80's the program started to face difficulties and its continuation reassessed. Thus the future of the program is at the moment somewhat unclear.

1. Brazil has launched also a number of other ongoing programs in the energy sector. These are, *inter alia*, PROCEL (National Programme for Conservation of Electricity), CONPET (National Programme for the Rational Use of Natural Gas and Petroleum Products), PRODEEM (National Programme for Wind and Solar Energy), and PROCONVE (National Programme for Pollution Control of Vehicles).

14. Brazil has been publishing National Energy Balances annually since 1972. After 1981, the Ministry of Mines and Energy adopted the Energy Balance Methodology developed by OLADE, the Latin-American Energy Organization. The Energy Balance presents all the information needed for the evaluation of the inventory of greenhouse gas emissions in the energy and industry sector using the "top-down" approach. Using the "bottom-up" approach of the IPCC methodology needs, however, additional data collection and analysis.

National Institutions

15. After the United Nations Conference on Environment and Development, called "Earth Summit" held in Rio de Janeiro, Brazil in 1992, the government of Brazil established an Inter Ministerial Committee for the Sustainable Development - CIDES by a President's Decree (Decree 1,160 in June 21, 1994) aiming at adopting all the necessary policies and measures to endorse Agenda XXI, considering also that the complexity of the measures for sustainable development need to bring together a great number of institutions in different areas.

16. CIDES is led by the Ministry of Planning and is constituted by all other Ministers. It consists of three Coordination bodies:

- * Coordination of Foreign Affairs, under the responsibility of Ministry of Foreign Affairs;
- * Coordination on Climate Change, under the responsibility of Ministry of Science and Technology, and
- * Coordination of Biological Diversity, under the responsibility of the Ministry of Environment, Water Resources and Legal Amazonia.

17. Regarding land-use and forestry, there are a number of institutions which have different responsibilities in this area. The Ministry of Agriculture is responsible for agricultural land use (incl. animal husbandry) and it also operates the state owned company EMBRAPA - National Company for Agricultural and Livestock Research. With respect to forestry there are several institutions in different Ministries. In the Ministry of Environment, Water Resources and Legal Amazonia, the IBAMA - Brazilian Institute for the Environment and Renewable Resources has the responsibility for forestry. In the Ministry of Science and Technology, the INPE - National Institute for Space Research and a "non-profit" institute FUNCATE have responsibilities for the development of technology and for the operational application of remote-sensing technology for forest monitoring using satellite images. The INPA - National Institute for Amazon Research conducts research in the Amazonian region, including also forestry.

18. The energy sector in Brazil is under the responsibility of Ministry of Mines and Energy - MME. MME has three National Departments, two dealing with regulatory issues related with water and electric energy (DNAEE) and fuel (DNC), and one in charge of energy planning (DNDE). The two main state-owned companies in the energy sector are Petróleo Brasileiro S.A. - PETROBRÁS which has the constitutional monopoly in the oil and natural gas sector and has a distribution company responsible for 37% of the market, and ELETROBRÁS - Centrais Elétricas Brasileiras which is a holding company responsible for the coordination and operation of the electricity sector in Brazil and owns four subsidiary companies FURNAS (Southeast region and Central-western region), CHESF region), ELETROSUL (South region) and ELETRONORTE (North and Central-western region)

19. Waste management is the responsibility of the states and counties and there are companies in almost all the main states. The two biggest are in the states of São Paulo (CETESB) and in Rio de Janeiro (FEEMA).

Project Background

20. As the host of the Earth Summit, held in Rio de Janeiro 1992, Brazil was the first country to sign the United Nations Framework Convention on Climate Change, and ratified on 28 August, 1994. As a Party to the Convention, Brazil has accepted the commitment to produce a national communication to the Conference of Parties by March of 1997. A fundamental component of this communication is a National Inventory of Greenhouse Gases following the guidelines developed by the Intergovernmental Panel on Climate Change (IPCC).

21. Due to the amount and complexity of the work to be undertaken, especially with respect to land use change but also in other areas, the Brazilian Government has requested external funding to undertake the necessary steps to finalize the inventory and the National Communication to the COP. Brazil is participating in the second round of the U.S. Country Study Initiative and under this framework an agreement providing US \$ 400,000 to prepare a "first step" inventory (or US \$ 270,000 allocated directly for the inventory) has been signed. The implementation of the project is expected to start at the end of 1995 depending on the availability of the funds from the U.S. side. Nevertheless, it is understood, and also clearly stated in the U.S. Country Study Project configuration that the funds provided will not allow the enhancement of the available data and information, and are thus not sufficient to carry out all the analysis necessary to produce high quality and credible estimates in the different areas, because of the vast area of the country and considering the importance of this area from global point of view. It is estimated that the full effort required to prepare a fully developed National Communication will require on the order of US \$ 7,000,000. This has prompted the Government of Brazil to request GEF funding to prepare the first national communication of Brazil to the COP and to complement the work undertaken under the U.S. Country Study Initiative to prepare the inventory needed for the communication. In response to this request a mission to Brazil was undertaken in August 1995 in order to clarify linkages to the Brazilian Case Study under the U.S. Initiative for Country Studies and prepare a project brief for submission to the GEF Council Meeting.

PROJECT OBJECTIVES

22. The immediate objective of the project is to prepare the first National Communication of Brazil to the Conference of the Parties in accordance with Article 12 of the UN Framework Convention on Climate Change, and to build capacity to fulfil its commitments to the Convention on a continuous basis. The communication will consist of an inventory of greenhouse gases in 1990 made in accordance with the IPCC guidelines, general description of steps taken or envisaged by the Party to implement the Convention and other relevant information on the policy measures, technologies and research related to climate change.

23. The greenhouse gases that will be addressed in the study will include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), carbon monoxide (CO), nitrogen oxides (NO_x) and in addition, assistance is requested for the development and application of inventory methodology related to fully fluorinated compounds (FFCs).

24. Beside making the inventory for the base year 1990, the project will complement the existing mechanisms by establishing permanent mechanisms for regular and periodic updating of the data required for the national inventories (as well as in the later stage in order to identify potential mitigation options) in the areas in which there are still data gaps. Especially one should mention the end use fuel consumption and technology data in the energy sector, including transport sector (needed in the bottom-up approach of the IPCC methodology) and much of the basic data needed in the agricultural and waste sector for the inventory. The project will also "test" and contribute on the further development of the IPCC guidelines, methodologies (especially in the forestry sector), and default factors for emission coefficients by evaluating and applying them in wide range of areas, different type of forests and vegetation, agricultural practices and waste management.

25. Last but not least, the project can be seen as an essential exercise to enhance general awareness and knowledge of climate change related issues in Brazil, strengthen the institutions and build capacity in order to take views and ideas related to climate change into account in the different sectors of economy. A part of this task is to develop an institutional mechanism/framework to strengthen the dialogue, information exchange and cooperation among all the relevant stakeholders. This will include governmental, non-governmental, academic, private and "grassroots" sectors.

PROJECT DESCRIPTION

26. During the project preparation, the following components and activities have been identified to respond to the objectives of the project and implement the project successfully:

- i. Identify a local Project Coordinator/Manager and establish a National Steering Committee with participants from all the project relevant sectors to prepare a detailed work plan for the project and involve the institutions that will be responsible for implementing the different subcomponents of the project (And those that will continue to do so after the project, as needed). During the project implementation the Project Steering Committee will:

- * provide guidance in the monitoring of project's implementation;
 - * work as one additional information link between the project and the "outside world";
 - * establish permanent links to coordinate climate change related issues and initiatives in the country, and
 - * ensure and support a smooth transition from this enabling activity to the potential follow-up projects.
- ii. Strengthen the links to both national and international sources of information (such as the U.S. Country Study Programme and other bilateral programmes, UNEP, IPCC, CC:TRAIN, international research institutes dealing with climate change, ongoing national projects and programmes in recipient countries etc.) in order to undertake the specific tasks of the project; learn from experiences and ideas of similar kind of projects elsewhere; and avoid duplication of effort. One goal of this activity is to find potential international partners to cooperate either on this project or on the identified follow-up projects. Specific attention will also be paid to dissemination of and public access to the available information (as well as to the results of this project) in order to enable a wide participation and involvement of all the interested individuals and organizations both during and after the project. The possibility of using electronic networks (Internet + World Wide Web, tele- and videoconferencing) is evaluated and to the extent possible encouraged to save on both domestic and international travel costs (which are considerably high in Brazil due to the geographical scattering of the different institutions), as well as to enhance internationally the geographical coverage of available information. Indeed, most of the institutions to be involved in the project are already connected to the Internet and many of them have, e.g. , own "home pages" in the World Wide Web.
- iii. Undertake the inventory in the land use and forestry sector
- Activity 3.1 Digitize the available vegetation maps of areas outside the Amazon forest, prepared in the 1970's (comprising tree volume information, which can be interpreted in terms of carbon density). In the Brazilian Amazon , retrieve such data from existing data set in the scale 1:1,000,000 or alternatively, if an independently funded FUNCATE/SAE project proceeds at a sufficiently fast rate, retrieve more accurate data on a scale of 1:250,000.
- Activity 3.2 Retrieve data on the geographical distribution of gross deforestation in the Amazon, for the period 1974-1994 - of which 9 years data sets are available from existing data sets (up to 1991) and other 2 years data sets will be produced by the on-going, independently funded, INPE/MCT project (data for 1992-1994) - and combine it with the best available information on forest classes to produce a time-evolution table of gross deforestation stratified by carbon density.

- Activity 3.3** Obtain and analyze LANDSAT satellite imagery in the scale 1:250,000 in two different years (mid 1980' and mid 1990's) for a representative random sample of the portion of Brazil covered by vegetation in the broad classes of Atlantic forest, "cerrado" and "caatinga", in order to produce maps of vegetation change. Combine such maps with the available information on vegetation classes to produce tables of changes of land-use stratified by carbon density class.
- Activity 3.4** Apply existing methodology developed in independently funded research projects to analyze existing LANDSAT satellite images in terms of forest regeneration and interpret the results for carbon uptake.
- Activity 3.5** Evaluate the available material and undertake selected field studies in order to fill major data gaps in the carbon density or regrowth rate of some specific type of the vegetation or forests or provide other information needed for the inventory.
- Activity 3.6** Aggregate the results to obtain a complete inventory (with respect to available financial resources) of CO₂ emissions from land use changes in all the geographical areas and forest types of Brazil.
- Activity 3.7** Estimate the methane emissions from the hydro reservoirs build for hydropower production.
- Activity 3.8** Publish a full detailed description of the methodology for the estimation of net emissions from land-use changes

iv. Undertake the inventory in the energy sector

- Activity 4.1** Using the "bottom-up" approach of the IPCC guidelines, evaluate the existing data gaps and establish a permanent data collection and management system to provide fuel consumption and technology data of stationary sources by different economical sectors for the inventories and undertake the inventory of GHG emissions from stationary sources.
- Activity 4.2** Evaluate the applicability of the existing emission calculation models for road transportation sector like US/MOBILE and EU/COPERT with respect to the availability of data and other specific characteristics of Brazil.
- Activity 4.3** Select an appropriate model to calculate the emissions from road transportation, establish a permanent data collection and management system to fulfil the eventually existing data gaps, and undertake the inventory of GHG emissions from transportation.
- Activity 4.4** Establish a permanent data collection and management system to gain fuel consumption and technology data from the transportation sector other than road

transportation, and undertake the inventory of GHG emissions from transportation other than road transportation.

Activity 4.5 Collect and improve the quality of data of biomass fuels, especially charcoal, bagasse and fuelwood in the energy balance, and evaluate the applicability of IPCC default emission factors in that context, in order to undertake the inventory and reduce the uncertainties of GHG emissions from this source.

Activity 4.6 Estimate the fugitive emissions from coal mining and handling as well as from oil and natural gas activities.

v. Estimate the GHG emissions from industrial processes (including CO₂ from cement production, CF₄ and C₂F₆ from aluminium production, SF₆ from electronic industry and electric sector, and N₂O from adipic acid and nitric acid production).

vi.. Estimate the emissions from solvents and other product use.

vii. Undertake the inventory in the agricultural sector.

Activity 7.1 Evaluate the existing information and applicability of the IPCC default factors related to domestic livestock, and undertake studies to fill the major data or information gaps. Undertake the inventory of GHG emissions from the domestic livestock.

Activity 7.2 Estimate the CH₄ emissions from rice cultivation.

Activity 7.3 Evaluate the applicability of IPCC methodology and the default emission factors with respect to savanna burning, collect data using satellite images and other available information, undertake studies to fill the existing data or information gaps, and undertake the inventory of the emissions from savanna burning.

Activity 7.4 Evaluate the applicability of IPCC methodology and the default emission factors with respect to burning of agricultural residues, collect data and other available information, undertake studies to fill the existing data or information gaps, and undertake the inventory of the GHG emissions of burning agricultural residues.

viii. Undertake the inventory in the waste sector

Activity 8.1 Collect data on the amount and type of waste as well as disposal methods in the 11 main States covering 80 % of the population of Brazil.

Activity 8.2 Evaluate the applicability of the IPCC default emissions factors with respect to the specific characteristics of Brazil and undertake studies to fill the existing data or information gaps.

Activity 8.3 Undertake the inventory of GHG emissions from waste disposal.

- ix. Using the results of this project as well as other ongoing projects prepare the first National Communication of Brazil to the COP.
- x. Prepare the final report of the project presenting in detail the different methodologies and practices used to prepare the inventory, emissions factors used in the different areas and discussion about the applicability of the IPCC methodologies and default emission factors in the Brazilian context.
- xi. Organize a workshop (with wide local participation and relevant international partners) to present the results of the project, together with the results or status of other ongoing projects relevant to the issue and to discuss about the results considering the potential follow-up measures.

RATIONALE FOR GEF SUPPORT

27. The project is consistent with the enabling activity and capacity building objectives listed in INC Document (A/AC.237/90/Add.3), prepared jointly by the interim secretariat of the UNFCCC and the GEF Secretariat in order to facilitate coordinated and timely assistance to countries for the implementation of the Convention. This project responds to such objectives by implementing an activity needed to enable Brazil to fulfil its commitments to implement the Convention. This activity is unlikely to be carried out without GEF funding.

28. Due to the size of the country and insufficient or inaccurate data and information in many areas, the costs to produce even a comparatively reliable inventory in Brazil are relatively high.

29. With respect to the inventory under the U.S. Country Study Initiative, it will clearly be a very initial one using easily accessible data from the various sources and using mainly the IPCC default factors to calculate the emissions. The GEF funds requested will complement the funds provided under the U.S. Country Study Initiative by involving a wider range of relevant institutions to start the work with climate change related issues and undertake more "in-depth" studies in each sector in order to fill the existing data and information gaps, evaluate the reliability of the data and the IPCC default emission factors and thus produce a fully credible and consistent inventory following the IPCC guidelines. By involving a larger number of institutions the project will also enhance the general knowledge and awareness in Brazil, of the information mechanisms, specific technologies and practices related to the sources and sinks of greenhouse gases as well as their relative importance from the global point of view, and thus establish a basis for future work with the potential measures to mitigate these gases. The approach of combining these two sources of

funding (or three with the Government contribution) has been used also in order to prepare the project budget. At first the total amount of funds needed to complement each task to produce a "full-scale" inventory has been estimated, and of this amount the expected U.S. Country Study Contribution for each task has been subtracted, the remaining part being the requested GEF funding.

30. Making a thorough inventory in a country like Brazil will contribute directly to the development and evaluation of the IPCC methodology and default factors, which in many areas are still fairly inaccurate, especially with respect to land use change and emissions of other GHGs than CO₂. As a developing country covering a very variable geographical area, a broad field of economic activities as well as possessing remarkable technical capacity and a number of institutions to undertake, if needed, very demanding research, Brazil is in an excellent position to contribute through this project to the overall effort of the IPCC to produce more reliable estimates of the sources and sinks of greenhouse gases, and the climate change phenomena itself. For instance, considering that Brazil has about one-third of the world's tropical forests and that the net emissions from tropical deforestation are one major source of uncertainty of the global carbon cycle (of the order of plus or minus 1 billion tons of carbon a year) the development of the IPCC methodology in this area will have a remarkable effect on the credibility of the estimates of greenhouse gas emissions on a global scale.

31. Considering the regional cooperation one should mention especially the collaboration with the MERCOSUR countries (incl. Argentina, Brazil, Paraguay and Uruguay) by establishing consultations to exchange information and evaluate technical data that will be contained in the draft national communications. Thus, the results of this projects will be directly distributed and utilized also in other MERCOSUR countries with ongoing enabling activities or others about to commence.

32. Finally, the Government of Brazil has endorsed that GEF funds, under the framework of enabling activities, will only be requested for the preparation of the national inventory and its communication to the COP. Other elements normally included as a part of enabling activities, such as vulnerability assessment and mitigation analysis, will be paid out of Brazil's own resources.

SUSTAINABILITY AND PARTICIPATION

33. The Government of Brazil fully supports the objectives of this project and gives a very high priority to it due to the reasons already mentioned in the chapters "Background and Project Context" and "Rationale for GEF Support". The Government has also stated that the project outputs will be used for the National Communication in compliance with the UN Framework Convention on Climate Change. In financial terms, the Government is contributing "in kind" covering the office costs and project support staff. Government is also contributing to the most expensive part of the inventory in the land use sector by providing the LANDSAT satellite images for the inventory (annual costs US \$ 1 million) as well as launching a project to estimate the geographical distribution of gross deforestation rate on the basis of the LANDSAT images

(estimated cost US \$ 1 - 1.5 million). In the waste sector Government is covering the major part of the cost (including personnel) of the data collection of amount and type of wastes (total estimated costs close to US \$ 900,000). The combined GEF and U.S. Country Study Contribution will be mainly used to cover some workshops, domestic travel as well as some specific material and equipment in order to estimate the emissions.

34. After the project has ended and the first communication for the Conference of the Parties has been finalized, the Government will take responsibility of regularly updating the inventory and preparing further communications to the COP, in accordance with the agreements reached by CC-FORUM, the COP and the Inter-Agency Task Force on Climate Change.

LESSONS LEARNED AND RESPONSE TO THE TECHNICAL REVIEW.

35. In the course of technical reviews of enabling projects, the importance of cooperation and networking of a broad range of experts has been noted and duly reflected in the present proposal. The project recognizes the importance of exchange of information and experience at the national level, as well as regionally and internationally.

36. In the technical review a number of issues are raised which have been taken into account in the revised project brief.

37. As the Reviewer rightly notes, the proposal is unusual in many respects from most proposals for enabling activities related to global warming. This leads to the basic question: If GEF will provide funding only for a very basic inventory for countries like Brazil using already existing data, IPCC default factors and "top-down" methodologies, the funds provided under the U.S. Country Study Program are clearly enough and additional GEF funding is not needed. However if it is seen as important that GEF should provide funding for more comprehensive inventories for the countries which are large contributors of GHG emissions, willing to undertake a more thorough inventory comparable to most developed countries, and which have also the technical capacity to undertake the tasks needed, clearly additional funding is needed to the funds provided under the U.S. Country Study Program. Beside reducing directly the uncertainties of the global estimates of sources and sinks of the greenhouse gases as a result of the inventory itself, more comprehensive projects in some selected countries like Brazil with very diverse geographical and economical coverage will contribute also to the overall development of the IPCC methodology and emissions factors and their applicability in developing countries, and thus in the long term enhance the credibility of the inventories also in other developing countries. In that context specific attention will be paid to the publication and distribution of the results of the project regionally as well as internationally. Therefore the timing of the project is equal important since most of the developing countries are either in the process of preparing their national inventory or just going to start it.

38. Regarding the Reviewer's comments on possible weaknesses of project coordination, the costs of the Project Manager will be paid by the Brazilian Government as in-kind contribution to the

project. This will be the case also considering the costs of convening the Steering committee, including travel expenses where appropriate.

39. The time scale of the project is largely determined by the preparation of the National Communication of Brazil which is due in May, 1997. Thus the time scale of the project was maintained at 18 months. It is expected that the tasks to be undertaken will be finalized within this timeframe, since a lot of preparatory work has already been done in Brazil to start the effective implementation of the project as soon as possible.

40. Considering the institutionalization of the activities covered during the proposed project, one of the main objectives and outputs of the activities is to establish permanent mechanisms to manage the data and update it on a regular basis as needed for the inventories. Through the Project Steering Committee, as well as bringing all the stakeholders together which are relevant from the climate change point of view, the project will help to establish permanent links to continue the work with the climate change related issues including the identification and implementation of measures to mitigate greenhouse gases.

41. Finally, considering the comments of not including vulnerability assessments or mitigation analysis in the project, the Government of Brazil prefers at this stage to request funds only for the preparation of the National Communication in accordance with the Article 12.1 of the UNFCCC, without these additional elements. If the final decisions on the content of the Communication of the non-annex 1 countries will include these additional elements, the Government of Brazil has endorsed that they will be paid out of Brazil's own resources.

PROJECT FINANCING, BUDGET AND INCREMENTAL COSTS

42. As an enabling activity, this project would not take place outside of the context of Art. 12 of the UNFCCC. Therefore, the full costs of the project equal the incremental costs of the project. With the exception of the "in-kind" contribution of the Government of Brazil, GEF is being requested to fund the full amount of the project. The detailed project budget reflecting the different sub-tasks is presented below:

Component 1 (Project Coordination Unit):

Personnel (Project Assistant + Secretary)	US \$ 70,000
Operational Costs (incl. publishing of the reports)	US \$ 20,000
GEF Total	US \$ 90,000

Component 2 (Strengthen the Information Links)

- costs for this activity will be covered in the sub-budgets of the component 1 and components 3-11

Component 3 (Inventory in Land Use and Forestry sector)

FUNCATE (Digitization and superimposition of the vegetation maps + inventory)

Amazonas	US \$ 200,000
Atlantic Forests	US \$ 115,000
Savannah	US \$ 180,000
North East Forests	US \$ 150,000
FBDS (managed forests)	US \$ 40,000
INPE (regrowth rate of the forests)	US \$ 50,000
INPA, Universities (selected field studies)	US \$ 100,000
ELECTROBRAS (methane from hydroreservoirs)	US \$ 50,000
Expected US Country Study (USCS) "contribution"	- US \$ 100,000
GEF Total	US \$ 785,000

Component 4 (Inventory in Energy Sector)

COPPE ("bottom-up" analysis of the energy end use + technical expertise considering the other activities)	US \$ 100,000
ELECTROBRAS (thermal power plants)	US \$ 20,000
PETROBRAS (oil refining, oil and natural gas production, transportation and distribution)	US \$ 40,000
COMGAS, CEG (methane emissions from natural gas distr.)	US \$ 20,000
SNIEC (methane emissions from coal mining)	US \$ 10,000
COPERSUCAR, ABRACAVE, IBAMA (biomass burning)	US \$ 50,000
PETROBRAS, CETESB (transport sector)	US \$ 50,000
Expected USCS "contribution"	-US \$ 100,000

GEF Total**US \$ 190,000****Component 5 (Emissions from Industrial Processes) +****Component 6 (Emissions from solvents and other product use)**

SNIC, ABAL, ELECTROBRAS, ABIQUIM, RHODIA, US \$ 50,000

PETROBRAS

GEF Total**US \$ 50,000****Component 7 (Inventory on Agricultural Sector)**

EMBRAPA, COPERUCAR

US \$ 220,000

Expected USCS "contribution"

-US \$ 50,000

GEF Total**US \$ 170,000****Component 8 (Inventory on Waste Sector)**

CETESB

US \$ 130,000

Expected USCS "contribution"

-US \$ 20,000

GEF Total**US \$ 110,000****Component 9 + 10 (National Communication + Other Reports)**

- costs for these activities will be covered in the sub-budjects of the component 1 and components 3 - 11

Component 11 (Workshop)**GEF Total****US \$ 60,000****GEF Subtotal****US \$ 1,455,000****Project Support Services (3%)****US \$ 45,000**

(including Executing Agency Support Costs)

GEF TOTAL**US \$ 1,500,000**

ISSUES, ACTIONS AND RISKS

43. The ultimate criteria of success will be how the project will contribute over the long term to capacity building related to environmental and climate change related issues in Brazil, contribute to the global effort to produce more reliable estimates of sources and sinks of greenhouse gases, and finally how the project will contribute to address mitigating greenhouse gases. The project addresses this by involving a number of institutions to produce reliable data for the inventories, "testing" and evaluating of the IPCC methodology and default factors in a developing country like Brazil; as well as establishing a basis for future work by establishing an institutional framework for cooperation and involvement of all the relevant partners in order to identify and raise awareness of the sources and sinks of greenhouse gases, their relative importance from the global point of view, and to identify potential mitigation measures in a "win-win" or "no-regret" basis.

44. Considering the immediate results of the project, the crucial element determining its success will be, as well, close collaboration between the different "implementing" institutions as well as international collaboration when preparing a work plan for and implementing the research oriented activities. During this process, common methodologies which respond to the specific characteristics of Brazil will be used. Among others, IPCC and UNEP will be consulted to ensure that the methods and details of the subjects are appropriate also from the global point of view. The project will also use the results of ongoing or finalized projects to avoid duplication of effort and ensure an effective implementation of the project.

INSTITUTIONAL FRAMEWORK AND PROJECT IMPLEMENTATION

45. The project will be executed by the Government of Brazil. The Project Steering Committee will be charged with overseeing, coordinating and advising project execution and will have decision making power over all aspects of the project and consist of, in addition to the national coordinator, the individuals and organizations taking lead responsibility for key areas of work. The project will also collaborate closely with all the other relevant ongoing projects in Brazil, both through the Project Steering Committee and between the research teams in order to enable an effective information change between the projects and full utilization of their results.

46. The project will be managed by a national coordinator, representing the Ministry of Science and Technology (MCT). As mentioned already before, MCT has responsibility for coordinating the issues related to the Climate Change Convention under the Inter Ministerial Committee for the Sustainable Development - CIDES. This committee will provide a mechanism for coordination with other work on Climate Change in Brazil and will formulate strategies and national policies, taking into account sustainable development in accordance with "Agenda 21".

47. Under the different sub-tasks, working links with international partners will be established in order to ensure effective exchange of information and appropriate implementation of the project.

48. With these arrangements the project seeks to establish close links with other climate change related activities being carried out by other GEF implementing agencies or by other multilateral and bilateral organizations. It will do so practically as figured above and also by participating in the informal consultative mechanism, CC:FORUM, being set up by the UNFCCC secretariat, to ensure that results and outputs of this project will be shared among all actors involved in climate change activities in order to enable such actors to mutually benefit from one another's activities for the present and for the future.

49. A number of institutions will participate in technical aspects of the study, under the guidance of the coordinating committee. These will include:

I. Energy Sector and Industry

- **National Department of Fuels - DNC/Ministry of Mines and Energy National Fuel Regulatory Entity**
 - responsible for the regulations and price control of some fuels, like oil products, natural gas and alcohol as fuel for vehicles.
- **PETROBRAS - Oil State Company.**
 - responsible for generation of information in the oil and natural gas sector.
- **National Department of Water and Electric Energy - DNAEE/Ministry of Mines and Energy**
 - National Electric Sector Regulatory Entity responsible for the regulations and price in the electric sector.
- **ELETROBRAS**
 - main source of information in the electric sector.
- **CEMIG - Energy Company Minas Gerais**
 - Minas Gerais State Energy Company has a large experience in energy planning in Brazil.
- **COPPE/UFRJ - Energy Department/Federal University of Rio de Janeiro**
 - COPPE has several studies done in the area of greenhouse gas emissions in Brazil, in collaboration with foreign institutions like LBL - Lawrence Berkeley Laboratories (Berkeley, U.S.), CIRED (France) and RISO (Denmark).
- **USP - Energy Institute/University of São Paulo**
 - University of São Paulo has several studies done in this area.
- **SNIEC - Coal Producers Association**
 - the association is responsible for the generation of data in the coal sector.
- **ABRACAVE - Charcoal Producers National Association**
 - association of charcoal producers is responsible for the generation of information for this industry branch.
- **SNIC - Cement Producers National Association**

- association of cement producers is responsible for the generation of information for this industry branch.
- **ABAL - Aluminum Producers National Association**
 - association of aluminum producers is responsible for the generation of data of aluminum production. It will be important in the discussion of fully fluorinated compounds gas emissions.

II. Forestry Sector

- **FUNCATE, the Foundation for Space Science, Applications and Technology (a non profit organization)**
 - FUNCATE is specialized in satellite imagery of the Amazonian forest, which is complementing the satellite surveys to produce a fully geo-referenced database (under the contract with the Ministry of Science and Technology/National Institute for Space Research - INPE/MCT). FUNCATE has been working with INPE in the development of a digital database on the scale 1:250,000, with an effective resolution of 100 meter, for the evolution of forest cover of Legal Amazonia (400,000,000 out of 500,000,000 ha) with highest vegetation density, for the period 1974/94, based on the interpretation of LANDSAT satellite imagery. The theme mapped from LANDSAT images is the gross deforestation, i.e., the conversion from forest to other low-density vegetation cover. This effort will produce estimates of the evolution of the extent and rate of gross deforestation stratified by vegetation classes for the 20 year period. FUNCATE has also developed a joint project together with the Secretariat for Strategic Affairs - SAE and the FBDS - Brazilian Foundation for Sustainable Development, which is responsible for the ecological and economic zoning of the Brazilian territory and Amazonia in particular, which will result in the superposition upon the satellite land-use change database, of the available vegetation maps of the region which contain information that can be interpreted in terms of carbon density. This effort involves the use of the RADAM database and other regional studies.
- **INPE - National Institute for Space Research, Ministry of Science and Technology**
 - INPE has been developing technology for the survey of the gross deforestation in Legal Amazonia with the use of satellite images which is applied for comprehensive surveys by FUNCATE, as well as conducting field surveys of the carbon density in the forest in cooperation with INPA. This work is at present being conducted by the FUNCATE, which has been involved in all of the previous INPE surveys. INPE is also developing methodology based on automatic digital classification of satellite data with the aim of developing techniques to map forest re-growth thus allowing for the estimation of net deforestation.
- **IBAMA - Brazilian Institute for the Environment and Renewable Resources, Ministry of Environment**
 - IBAMA is working on the identification of vegetation classes of the Amazonian forest to be incorporated into the RADAM classification. The relationships between forest

classes and carbon density will be established by the use of statistical relationships between tree volume and carbon content obtained in field experiments. IBAMA intends to organize new field campaigns for this purpose, with a view to producing better samples with emphasis on the areas where the deforestation rate is higher, as opposed to the presently available samples which tend to concentrate in forest areas where there is an interest for other reason, and which do not coincide with the areas where deforestation actually occurs. Similar work will be conducted to estimate the carbon density of the re-growth vegetation, including the tree -ring works of IBAMA.

- INPA - National Institute for Amazon Research, Ministry of Science and Technology
- FBDS - Brazilian Foundation for Sustainable Development
- EMBRAPA - Brazilian Agricultural Research Corporation (a state company responsible for agricultural and livestock research in Brazil);
- USP - University of São Paulo is studying methane emissions from the hydroelectric power plants reservoirs

III. Agricultural and Livestock Sector

- EMBRAPA - Brazilian Agricultural Research Corporation
- Ministry of Agriculture
 - The evaluation of emissions from the agricultural and livestock sector will be conducted by EMBRAPA, the Stated-owned Brazilian Corporation for Agricultural and Livestock Research, of the Ministry of Agriculture, with the use of statistical data collected by IBGE, the Brazilian Institute of Geography and Statistics. Together, these two institutions will have the necessary knowledge of the processes and of the intensity of agricultural activities in the country, which are needed for the inventory. The structure of EMBRAPA, with almost 40 country-wide specialized centers, devoted to specific products, is such that a series of visits and workshops will be necessary to ensure the engagement of appropriate technical staff. EMBRAPA will also maintain all the technical data related with methane emissions from livestock, flooded rice paddies, nitrous oxide emissions from fertilizers use and also emissions from burning of agricultural crops residues.

IV. Waste Management

- São Paulo State Secretary of Environment
- CETESB
 - the São Paulo State Company responsible for waste management in the most important State of Brazil

Monitoring and Evaluation

50. After the detailed work plan has been prepared, an external review of it will be undertaken. The purpose of the review is to identify in the very early stage of the project the eventual gaps, overlaps and other risks of successful implementation as well as to identify potential partners and sources of information which could benefit the project.

51. The Project Steering Committee will be responsible for monitoring the project on a continuous basis. In order to do this, the Project Manager with the help of the leaders of the research teams will prepare regular reports on the progress of the project as whole and the different sub-tasks under it. In addition to this, an external midterm evaluation will be conducted about 12 months after the start of the project. The purpose of the evaluation is to review the overall success of the project and suggest modifications to the implementation of the project for the remaining part. It is vital that the recommendations from the evaluation are disseminated immediately, so that appropriate action can be undertaken without delay. A joint meeting of the evaluators together with the Project Steering Committee has been designed for this purpose.

52. For the remaining part the project will rely on the common UNDP monitoring and evaluation practices.

CAPACITY TABLE FOR CLIMATE CHANGE ENABLING ACTIVITIES IN BRAZIL

Enabling Activity	Planning	Instit Strength	Training	Research	Education
Background Information for National Communication					
Emission inventory					
- CO2 from energy sources	X(US)	X(US)	X(US)	X(US)	X(US)
- CO2 from land use changes	X(US)	X(US)	X(US)	X(US)	X(US)
- CH4	X(US)	X(US)	X(US)	X(US)	X(US)
- N2O	X(US)	X(US)	X(US)	X(US)	X(US)
- other sources and gases	X(US)	X(US)	X(US)	X(US)	X(US)
Mitigation Options					
Energy related					
- industry	0(UNR)	0(UNR)	0(UNR)	0(UNR)	0(UNR)
- transport	0(UNR)	0(UNR)	0(UNR)	0(UNR)	0(UNR)
- residential	0(UNR)	0(UNR)	0(UNR)	0(UNR)	0(UNR)
- energy supply	0(UNR)	0(UNR)	0(UNR)	0(UNR)	0(UNR)
- other	0(UNR)	0(UNR)	0(UNR)	0(UNR)	0(UNR)
Non-Energy Sources					
- agriculture	0	0	0	0	0
- forestry	0	0	0	0	0
- waste management	0	0	0	0	0
- other	0	0	0	0	0
- sink enhancement	0	0	0	0	0
Vulnerability Assessment					
- agricultural sector	0	0	0	0	0
- forestry	0	0	0	0	0
- coastal zone	0	0	0	0	0
- water resources	0	0	0	0	0
- health impacts	0	0	0	0	0
- natural ecosystems	0	0	0	0	0
- other impacts	0	0	0	0	0
adaptation options (stage 1)	0	0	0	0	0
National Plans					
- national plan (mitigation)	0	0	0	0	0
- national plan (adaptation)	0	0	0	0	0
- other elements?	0	0	0	0	0

Formulation of National Communication					
- inventory	X	X	X	X	X
- mitigation options	X	X	X	X	X
- vulnerability and adapt.	X	X	X	X	X
- information on research and observation	X	X	X	X	X
- information on education	X	X	X	X	X
- other relevant information	X	X	X	X	X

Key to Table

- X** = Areas to be covered by the proposed project
'\$\$\$' = Areas already covered by other projects or programs; Following acronyms are used:
 ADB = Asian Development Bank
 ALG = ALGAS Project
 CCT = CC-TRAIN
 GEF = Other Regional or Country Specific GEF "Enabling" Project
 GTZ = German Agency for Technical Cooperation
 OEC = OECD/IPCC Programme
 UNE = UNEP-GEF Country Case Studies
 UNR = UNEP-RISO Greenhouse Gas Abatement Costing Studies
 US = U.S. Country Studies Program
'X(\$\$\$)' = Some preliminary activities have already been undertaken, but completing activities presented in the proposed project are needed to finalize the task
0 = Remaining ability gaps for which additional funding from GEF or other sources might still be requested
'0(\$\$\$)' = Some preliminary activities have already been undertaken, but completing activities not undertaken by the proposed project might be needed to finalize the task
NA = Non-applicable or nonsensical entry (e.g. coastal vulnerability assessment for land-locked country)

TELEPHONE UNIT 1A WILSON

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Aug. 31 1945 07:25

To Mr. Vesc or Richard Hubler

p3/2

that the budget has not been padded.

An important part of the project brief is the list of institutions who would be involved in conducting specific portions of the overall tasks. Many of the institutions named are known to me, and have an excellent track record. Others are industry associations, whose involvement is important not only during the time frame of the project but also later.

Given the scale of the project, and the number of institutions involved, one possible weakness could be in project coordination. The first component includes the designation of a Project Manager and the setting up of a National Steering Committee. The budget item corresponding to this shows (as personnel) one project assistant + secretary. The Project Manager is not mentioned. P. 15 states "the project will be managed by a national coordinator, representing the Ministry of Sc. and Tech. (MCT)". I feel that the process should be clarified, e.g.:

- (1) A Project Manager to be designated by MCT;
- (2) The Steering Committee to be made up of representatives of ... ministries, trade organizations, ... universities, etc.
- (3) Several meetings of the Steering Committee during the course of the project;
- (4) A budget for convening the Steering Committee, including travel expenses where appropriate.

The scale of the project coordination unit and the operational costs are too low, given the project scale. Also (p. 14bottom) there is mention of setting up "an institutional framework for cooperation..." . These are additional, and essential, activities that will take up time. Besides the Proj. Manager, there will need to be one or more technical staff, and two or more secretarial and support staff. This should be recognized, even if the Brazilian government intends to pay for it.

The time scale of the project (18 months) is too short for the activities. I believe a two-year time frame would be more suitable, without increasing the budget proportionally.

The only significant weakness, in my opinion, is "an adequate description on how the activities covered during the proposed project will become institutionalized and permanent. This is all the more important since the project scale is large and involves so many institutions. I believe this should go beyond what is specified under item 11 (p. 10) "Organize a workshop" - which institutions shall be responsible for project sustainability? Besides modifying item 11, a paragraph should be added at the end of the Institutional Framework section explaining this aspect.

Summarizing, I find the project brief to be excellent, and suggest a few modifications based on observations noted above. The budget, though large compared to those of other countries, is adequate (or a little short) considering the size of the country, and the importance and difficulty of the tasks proposed.

To: Mr. Vesa /or/ Richard Hoesier

p1/2

Brazil Climate Change Enabling Activity

OVERALL. This project brief is unusual in many respects from most proposals for enabling activities related to global warming. It demonstrates a strong awareness of issues involved in climate change analysis. There is a great deal of detail both on the background as well as the steps to be taken, and by which specific institution. The project is limited to preparing the inventory of GHG sources and sinks. There are no activities on vulnerability or impact assessment, nor on the development of mitigation and adaptation strategies. The project brief recognizes (and rightly) that available data are inadequate to preparing an accurate inventory, and includes studies to be undertaken in order to fill data gaps. Some of the areas of data collection and analysis are relatively unusual in an enabling activity. Among these are the measurement/estimation of the balance of many non-carbon dioxide GHGs, e.g. methane emissions from land flooded by hydroelectric projects. The project brief shows awareness that these aspects are likely to be pioneering. The project therefore includes not only input from the experience from other countries, but also output that would permit the Brazilian experience to be accessible to other countries with similar data shortcomings. The project deserves support. The only possible doubts relate to project coordination and the assurance of sustainability. A more detailed review follows.

Brazil is the fifth largest country in surface area and also fifth in population. Its territory includes the Amazon rainforest, by far the largest tropical rainforest in the world. The future evolution of this and other ecosystems is crucial not only for its impact on global-warming but also on biodiversity.

While in most countries, fossil fuel combustion is responsible for most emissions, Brazil's case is quite different, since renewable sources make up for a large share of energy supply, producing little or no net CO2 emissions. On the other hand, land use changes potentially account for a large share of emissions and/or reduction in sinks. Land use changes and their impact on emissions/sinks are much more difficult to quantify than the almost trivial calculations of CO2 emissions from fossil fuel combustion.

The importance and difficulty of this task is recognized by the Brazilian government in the project brief, reflected both in the procedure described for undertaking the corresponding tasks, and the relative budget requests. The analysis starts from satellite data collected for a different purpose. The digitization and superimposition of vegetation maps in order to develop inventories makes up for \$645,000 of the project budget. While this seems high, one must keep in mind that the areas involved are immense, and the survey work at the scale resolution to be accurate, is arduous.

Elsewhere, where the emissions are less important, the budget request for quantification is also much smaller, e.g. \$10,000 and \$20,000 for methane emissions from coal mining and natural gas movement, respectively. Indeed, the budget request for "bottom-up" analysis of energy end-use (\$100,000) is slim, and is only feasible because Brazil has strong technical manpower.

Unlike some project briefs for enabling activities that I have reviewed, there is no specific budget request for components 9 and 10. This shows