UNITED NATIONS DEVELOPMENT PROGRAMME
Project of the Government of the People's Republic of China

Project Document

Project Number:	CPR/00/G33/A/1G/99
Project Title:	Targeted Research Related to Climate Change
Project Short Title:	Targeted Research
Estimated Start Date:	1 April 2002
Estimated End Date:	31 March 2004
Management Arrangement:	National Execution
Designated Institution:	State Development Planning Commission (SDPC)
Project Sites:	Beijing and case study and measurement sites
Beneficiary Countries:	China
LPAC Review Date:	August 21, 2001
HQ Review:	Oct 28, 2001

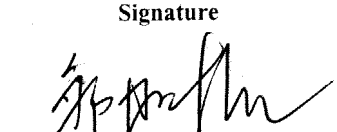
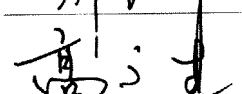
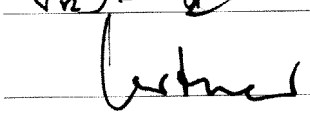
GEF / UNDP and Co-Financing Inputs

	US$
GEF:	1,500,000
Associated Govt. Financing:	120,000
Government Inputs (in kind):	1,690,000
TOTAL:	**3,310,000**

Classification Information

ACC Sector and Subsector:	Environment (20) / Environment Assessment and Monitoring (20)
DCAS Sector and Subsector:	Energy (008) / Sector Policy and Planning (046)
Primary Areas of Focus/Sub-focus:	Environmental Resources (03) / Promotion of Sustainable Atmospheric Quality (20)
Primary Type of Intervention:	Capacity Development
Primary Target Beneficiaries:	the International Community
Secondary Target Beneficiaries:	Research Institutes and Government Organizations

Brief Description: The objective of the project is to strengthen capacity in China for the preparation of national greenhouse gas (GHG) inventories. Capacity developed through targeted research will enable China to prepare high quality National Communications to the UNFCCC in the future and to have the information needed to formulate climate change related policy. The project will be focused on three areas determined to present special difficulties in GHG estimation: (1) road transport, (2) land use change and forestry, and (3) agriculture. The project objective will be pursued through activities in measurement and data collection, modeling, and estimation of activity levels and emission factors, as well as through international training and workshops.

On behalf of:	Signature	Date	Name/Title
Government		June 6, 2002	Zou Jiayi, Acting Director-General International Dept. MOF
Designated Institution		May. 15, 02	Gao Guangsheng, Director of climate change office, SDPC
UNDP		10 June 2002	RR of UNDP, China

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List of Abbreviations

ADB	Asian Development Bank
ALGAS	Asian Least-Cost GHG Abatement Strategy
APR	Annual Performance Review
CAS	Chinese Academy of Sciences
CICETE	China International Center for Economic and Technical Exchange
CH_4	Methane
CMA	China Meteorological Administration
CO_2	carbon dioxide
COP	Conference of the Parties to the UNFCCC
ENSO	El Nino Southern Oscillation
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
GOC	Government of China
Int'l	International
IPCC	Inter-Governmental Panel on Climate Change
LUC	Land Use Change
MOST	Ministry of Science and Technology
NEX	National Execution
NGV	Natural Gas Vehicle
N_2O	Nitrous Oxide

NPD	National Project Director
OECD	Organization for Economic Cooperation and Development
PDF	Project Development Fund
RMB	Renminbi
SDPC	State Development Planning Commission
SEPA	State Environmental Protection Administration
SETC	State Economic and Trade Commission
TOR	Terms of Reference
TPR	Tripartite Review
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
US DOE	US Department of Energy

A. Context

A.1 Development Problem

It is now widely accepted in the international community that global climate change resulting from anthropogenic emissions of greenhouse gases (GHG) poses a major threat to nations around the world. Human activities that are most significant in terms of their contributions to greenhouse gas emissions include those in the energy sector (which account for the largest sectoral contribution to greenhouse gas emissions), industrial processes, agriculture, land use change and forestry (which can serve as a sink for as well as a source of greenhouse gas emissions), and the municipal waste sector. Among the postulated negative impacts of climate change are a decrease in agricultural productivity, an increase in natural disasters, and a loss of low-lying coastal areas and islands to rising sea levels.

As a first step towards addressing the threat of climate change, the international community has developed the United Nations Framework Convention on Climate Change (UNFCCC). The Convention underscores the importance of carrying out work in a number of areas to address the climate change issue: current emissions must be understood; potential impacts should be evaluated; adaptation measures should be formulated; and, finally, steps must be taken to limit total global emissions of greenhouse gases. The Convention emphasizes that the responsibilities of developed countries and developing countries in these endeavors should be different. The largest share of historical and current emissions is due to the developed countries; and the developing countries' share of global emissions will need to grow to meet their development needs.

Climate change could potentially have major impacts on China; and, conversely, China's greenhouse gas emissions could have major implications for the world's climate. China's potential vulnerability to climate change and its greenhouse gas emissions are described in greater detail in Annex 5, with only a brief introduction given here. Given its many different climates and ecosystems, China could suffer a wide range of varying impacts due to climate change. The nation is already burdened with a range of climate- and natural disaster-related problems that could be exacerbated by climate change. These problems include droughts, floods, and coastal inundation from storm surges. Also of great concern are the potential negative impacts of climate change on agriculture, which are of special interest given that rural residents make up 70% of China's total population. At the same time as it faces the risk of these negative impacts from climate change, China's greenhouse gas emissions, with its large population and rapidly growing economy, are projected to continue to increase.

The UNFCCC sets out general obligations of parties to the Convention; and these obligations have been and will continue to be elaborated upon in subsequent Conferences of the Parties. The Kyoto Protocol, adopted at the Third Conference of the Parties (COP 3), for example, commits developed countries to legally binding targets to limit or reduce their greenhouse gas emissions. In light of the concept of "differentiated responsibilities", however, no emission targets have been set for developing countries, such as China.

The major concrete commitment to date for the developing countries, also an obligation for the developed countries, is submission of "National Communications." As the only major requirement to date for the developing countries, successful preparation of the National Communications by them is a crucial measure of successful implementation of the Convention.

Article 12 of the Climate Change Convention outlines the requirements for National Communications. Items that are required of all Parties to the Convention include: (1) a national inventory of anthropogenic

emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, (2) a general description of steps taken or envisaged by the Party to implement the Convention, and (3) any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication. During COP 2, guidelines for the preparation of Initial National Communications by developing countries were adopted. These are outlined in Decision 10 of COP 2, which is provided, along with the text of Article 12 of the Convention, as Annex 6 in this document. According to the guidelines, the inventory is to focus on the greenhouse gases carbon dioxide, methane, and nitrous oxide and to cover the energy sector, industrial processes, agriculture, land use change and forestry, and other relevant sources. It is likely that the inventory requirements for subsequent National Communications will be similar. According to the Convention, the Initial National Communication of a developing country is to be submitted within three years of the availability of financial resources for its preparation. The required timing of subsequent National Communications is to be determined by the Parties to Convention.

Preparation of China's National Communications to fulfill its obligations to the Convention is a challenging task that will require capacity development in many areas. The GHG inventory, in particular, will require strengthened capacity for measurement, modeling, and estimation methodology in several sectors. In addition, some sectors or sub-sectors will require special targeted research to deal with the complexities presented in obtaining accurate estimates of GHG emissions and sinks.

A.2 Previous Experience and Lessons Learned

China has already implemented or is in the process of implementing a number of foreign assistance projects related to climate change. These projects include work related to China's GHG inventory and reduction of emissions from the energy sector.

China's Greenhouse Gas Inventory

Since 1992, four internationally supported studies on climate change that have addressed China's greenhouse gas inventory have been conducted for research purposes. In each case, the projects were cooperative endeavors between the Chinese Government, relevant Chinese research institutes, and multilateral organizations or countries. The four studies, which estimated China's GHG emissions with varying degrees of effort, are listed below:

- *Response Strategy on Global Climate Change in China*, supported by ADB and completed in 1993
- *China: Issues and Options in GHG Emissions Control*, supported by the GEF and UNDP (executed by World Bank) and completed in 1994
- *China Climate Change Country Study*, supported by the U.S. Department of Energy under its Country Studies Program and completed in 1998
- *Asian Least-Cost GHG Abatement Strategy (ALGAS)*, funded by GEF/UNDP, executed by ADB, and completed in 1998

The data and methodology used for the inventory work in these studies improved over time. The first two studies used the 1991 OECD methodology, which was later adopted by the Inter-Governmental Panel on Climate Change (IPCC), for estimating emissions sources and sinks. The U.S.-supported *China Climate Change Country Study* was the first attempt to prepare a preliminary inventory using the 1995, and in

some sectors the revised 1996, IPCC methodology. The last study, *ALGAS*, made small improvements over the *China Climate Change Country Study*.

A summary of the inventory work associated with each of the four projects discussed above is given in the table on the following page. It should be noted that the results of the four inventories are very different and are not considered official.

Energy-Related Projects

There are several ongoing and recently completed GEF projects in China that relate to the energy sector, addressing the climate change issue through their aim to reduce GHG emissions. For many of these, UNDP is the implementing agency. Of particular note are the coal bed methane project and the landfill methane recovery project. In addition to their promotion of the reduction of GHG emissions, these are of added significance to climate change in that they should yield some data relevant to computing GHG emissions. Projects in renewable energy and energy efficiency are also currently under implementation. In addition to promoting reduction of GHG emissions, these projects will contribute to increased capacity for data collection and analysis that could eventually benefit GHG inventory as well as mitigation work.

PDF Work

PDF work in support of the project described in this document and associated projects were conducted during an eight-month period in 1999 and 2000. The PDF activities included substantial work related to the preparation of a greenhouse gas inventory for China. In particular, work was done in identifying the gaps in previous inventory work and in defining the steps needed to develop more accurate inventories for key greenhouse gas emitting sectors. Some of the gaps identified are to be addressed in the associated project *Enabling China to Prepare its Initial National Communication* (see below), while those that require more in-depth targeted research and capacity building will be addressed by the project described in this document.

Associated Project

Two GEF projects closely related to that described in this document were initially developed as part of the same process, using the same PDF B funds. The first of these will serve to enable China to prepare its Initial National Communication (including a national inventory and general description of steps taken or envisaged to implement the Convention) and to build public awareness of climate change. This project has already been approved and is due to be completed two years and four months after its inception. The second associated project would encompass targeted research on the impacts of GHGs on China's climate and China's vulnerability and potential adaptation to climate change. This latter project is still in the pipeline.

Table 1. Summary Information on Previous Inventory Work

	1	2	3	4
Title of the general project or the name of report or publication	Response Strategy on Global Climate Change in China	China: Issues and Options in Greenhouse Gas Control	China Climate Change Country Study	Asian Least Cost GHGs Abatement Strategy
Title of the inventory	Current Emissions of GHGs	Estimation of GHGs Emissions and Sinks in China, 1990	Preliminary Compilation of GHG Emission Inventories	GHG Inventory by Sectors
Sponsor	ADB	GEF	US DOE	ADB
Performer	Energy Research Institute	Design and Research Institute of Environmental Engineering, Tsinghua University	Energy Research Institute	Energy Research Institute
Year of inventory	1990	1985-1990	1990	1990
GHGs covered	CO_2, CH_4, N_2O	CO_2, CH_4, N_2O	CO_2, CH_4	CO_2, CH_4, N_2O
Year of completion	1993	1994	1998	1998
Emission estimates:				
All energy				
Fuel combustion	609.2 Mt-C	667.64 Mt-C, 1.8-2.6 Mt- CH_4	559.56 Mt-C, 2.97 Mt- CH_4	559.6 Mt-C, 2.97 Mt- CH_4
Fugitive fuel emission				
Oil and gas	0.4 Mt- CH_4	0.179 Mt- CH_4	0.092 Mt- CH_4	0.092 Mt- CH_4
Coal mining	5.3 Mt- CH_4	18.45 Mt- CH_4	8.689 Mt- CH_4	8.78 Mt- CH_4
Industrial processes	25.5 Mt-C	28.29 Mt-C	22 Mt-C	25.59 Mt-C
Agriculture	20.5 Mt- CH_4	20.841 Mt- CH_4	18.2 Mt- CH_4	12.59-20.09 Mt- CH_4
LUC and forestry	x	42.53 Mt-C	-86 Mt-C	-75.93 Mt-C
Waste	0.6 Mt- CH_4	0.792 Mt- CH_4	2.5 Mt- CH_4	0.899 Mt- CH_4

A.3 Development Objective

The overall development objective of the GOC with regard to the climate change issue is to avoid climate change to the extent possible and adapt if necessary while continuing to pursue sustainable development. Mitigation of climate change will require international cooperation and a greater understanding of GHG emissions and sinks. The more specific objective of this project will be to promote such cooperation and knowledge through targeted research that will strengthen China's capacity for preparing GHG inventories. Capacity developed will enable China to prepare high quality National Communications to the UNFCCC in the future and to have the information required to formulate climate change related policy.

A.4 Government Strategy

The Chinese Government views climate change as a major threat to its ability to achieve sustainable development. As such, the Government attaches great importance to climate change issues and signed the UNFCCC in 1992. In the same year, the Standing Committee of the Chinese National People's Congress ratified the Convention; and China thus became one of the first countries to ratify the UNFCCC. China is committed to developing policies to address global climate change concerns.

As one of the Non-Annex I Parties to the Convention, the Chinese government endorses the principle of "common but differentiated responsibilities" put forward by the Convention as a basic prerequisite. China takes part actively in the Conference of Parties to the Convention and takes great effort to comply with relevant obligations under the UNFCCC, including the submission of an Initial National Communication within three years after financial resources are provided. China has already been implementing work related to its first National Communication since September 1999.

Other significant actions taken by China in order to fulfill the requirements of the UNFCCC and address issues of climate change include the strengthening of research on (1) the science of the climate system and climatic change, (2) greenhouse gas emissions and the national inventory, (3) impacts on social and economic development, and (4) response strategies. China has also established a high-level cross-ministerial body, the National Coordinating Committee on Climate Change Policy, to address policy issues. Finally, China has already made contributions to alleviating the longer-term trends of climate change by such national measures and "win-win" strategies as population control, energy conservation, renewable energy development, and large-scale afforestation.

A.5 Beneficiaries

First, target beneficiaries of the project will include those organizations and individuals in government and the research arena who are able to strengthen their capacity through the various project activities. In the research arena, those research institutes involved in inventory work should benefit from increased capacity in conducting climate change related research. The National Coordination Committee on Climate Change Policy and its secretariat based in the SDPC should benefit from increased information relevant to its policy and decision-making role.

Finally, China's fulfillment of its commitments to the UNFCCC through submission of National Communications represents an important step in international efforts to abate climate change. Results of the project will also benefit the global climate change community through the availability of improved data on China's GHG gas emissions and information on methodologies used.

A.6 Institutional/ Regulatory Framework

As mentioned, China has established an inter-ministerial working group to coordinate national activities relating to climate change. This group, called the National Coordination Committee on Climate Change Policy, has 14 members and is charged with overseeing all activities related to climate change in China. Its members include a vice-ministerial official from each of the following organizations: the State Development and Planning Commission (SDPC), the State Economic and Trade Commission (SETC), the Ministry of Science and Technology (MOST), the China Meteorological Administration (CMA), the State Environment Protection Administration (SEPA), the Ministry of Foreign Affairs, the Ministry of Finance, the Ministry of Construction, the Ministry of Transportation, the Ministry of Water Resources, the Ministry of Agriculture, the State Forestry Administration, the Chinese Academy of Sciences (CAS), and the State Oceanic Administration. The Committee is chaired by the SDPC, which is responsible for coordinating the Committee's activities. In order to facilitate these activities, the SDPC has established an Office, which serves as secretariat to the Committee. The Committee is responsible for submitting China's National Communications to the State Council for approval.

A.7 National Resources

The SDPC will appoint a senior official as National Project Director, funded by the Government, and will establish a Project Management Office for this project. The SDPC will also appoint a project manager, also funded by the Government, to support the National Project Director and National Project Coordinator.

The Government of China will provide co-financing of US$ 1.69 million to the project. In addition, associated financing for the project is provided from the Ministry of Science and Technology, which provides US$ 12,000; the National Nature Foundation (US$ 96,600); and the Chinese Academy of Science (US$ 12,000).

B. Strategy for Use of UNDP/GEF Resources

B.1 Relevance of Project to UNDP Mandate and the Climate Change Convention

The project is closely related to the UNFCCC. National GHG inventories are an important component of the National Communications required of all Parties to the Convention. Targeted research will enable China to prepare higher quality GHG inventories in the future, thus contributing to the Climate Convention goals.

As a neutral, intergovernmental organization with a strong interest in the environment, UNDP is appropriate for its role of GEF implementing agency for this project. UNDP's overarching mandate is to help developing countries eradicate poverty. Fundamental to this task is promoting sustainable livelihoods --- ways of life that can sustain communities into the foreseeable future. Thus, addressing climate change is an important issue for UNDP, as it is the developing world that will likely be hardest hit by the expected altered weather patterns, changes in food production, rising sea levels, and impacts on public health associated with climate change. UNDP is committed to support the government in the implementation of the UNFCCC as one of the key means of addressing climate change.

B.2 Problems to Be Addressed by the Project

In order to comply with the UNFCCC, China must prepare national GHG inventories to be submitted as a part of its National Communications. Up to the present, however, only limited progress has been made in China in building a body of relevant research results to facilitate preparation of an accurate inventory. While the achievements of previous projects in inventory development are acknowledged, it is clear that

there are still many areas where past inventory work is deficient, with results of previous studies varying by as much as 100% in some sectors. Many of the gaps, identified during PDF B work, will be addressed in the parallel project CPR/00/G31, which aims to enable China to prepare its Initial National Communication to the UNFCCC. In order that future National Communications will continue to make progress in terms of quality of the national inventory, however, it is extremely important that additional, longer-term improvements in research capacity as proposed in this project be pursued. Areas of deficiency that were identified during the PDF B as requiring targeted research for such longer-term improvements include inventory development for the road transport, land use and forestry, and agricultural sectors. The problems that need to be addressed in each of these areas are discussed below:

Road Transport: Classified as one of the important end use sectors in energy demand and hence a significant source of GHG emission, the anticipated strong growth of road transport suggests the pursuit of improved methodology in estimating activity levels and emissions factors by type of vehicle. As part of the transport sector, the rail transport can be adequately handled through the Initial National Communication Project. In the case of road transport, however, the structure, activity levels, and emission factors of China's vehicle fleet are not accurately known and are expected to change rapidly.

Forestry: Past estimates of CO_2 emissions from the forestry sector are based on forestry resource survey data that does not contain the parameters and variables required for the estimation of CO_2 removal by land use change and forestry. Rather, the intake of CO_2 by the forestry sector is indirectly calculated in past studies from data on deforestation and afforestation areas; and this may have consequentially produced a great uncertainty in estimates. Soil is the largest carbon sink in the terrestrial ecosystem, playing a vital role for carbon absorption and prompting carbon transfer from the atmosphere to soils. Preliminary results show that the potential role of soils as a sink in China is possibly even larger than that of its forest sector, but previous inventory work in this area is lacking.

Agriculture: In the agricultural sector, additional work is needed in the sub-sectors of rice paddies, animal husbandry, and fertilized fields. For rice paddies, previous estimates of methane emissions have relied on measurements of emissions factors made at only a few sites in China. Methane emissions, however, are sensitive to several factors, including the watering regime, organic and chemical fertilizer types and the manner of their application, and the type of rice cultivated. These key factors influencing the methane emissions factors of wetland rice fields must be considered in the estimation of total emissions from the sub-sector. The relevant data, however, is not available in agricultural yearbooks or related documents. In previous studies, the variations of these factors were not considered, with estimation of methane emissions made by setting these parameters as constants, under some unrealistic assumptions, in the modeling programs used. As a result, if the uncertainty of these regulating factors is considered, the estimate of methane emissions from wetland rice fields of China in 1990 may be as high as 13 Tg or as low as 5 Tg.

Previous estimates of methane emissions from enteric fermentation and livestock wastes also have high uncertainties. One reason for the uncertainty in methane emissions from enteric fermentation is that the uncertainty in the number of animals of various types is larger than is usually recognized. Another reason is that some important parameters associated with feeding characteristics (e.g. amount of feed consumed per animal) and the rates of conversion of feed to methane by these animals have high uncertainties. Besides uncertainties in animal population and feed intake, those in data on the use of livestock waste management systems and in methane conversion coefficients related to such systems usually lead to large uncertainties in estimation of methane emissions from livestock wastes. Considering these uncertainties, the estimate of methane emissions from enteric fermentation and livestock wastes in 1990 could be as low as 2.9 and 0.66 Tg or as high as 8.7 and 1.98 Tg, respectively. To improve the reliability of future inventory estimates, data on the age structure of the livestock population, data on feed intake, important

parameters of livestock waste management systems; activity levels of livestock sub-categories and waste management systems, and emission factors have to be obtained via direct investigation.

Finally, previous inventory work has not covered the estimation of nitrous oxide emissions from agriculture. Although a few relevant field observations have been carried out in China, the existing data on emissions factors from croplands with fertilizer amendments is quite inadequate in representing the complexity of China's agricultural systems. At the same time, data on activity levels in crop fertilization is still unavailable. Hence, data on emissions factors and activity levels in this sub-sector will have to be obtained through investigation or field measurements in order to develop a more reliable inventory.

B.3. Project Strategy

The overall strategy of the project will include adherence to the following guiding principles:

- Build on existing knowledge and expertise in China and avoid duplication
- Use internationally established methodologies where appropriate and make use of international experience to date
- Design methodologies so that these may, in addition to facilitating the preparation of future national communications, provide the basis for formulation of relevant policy and identification of economically viable solutions

Project work will be divided into three parts corresponding to the three sectors identified during the PDF work as requiring targeted research to improve the quality of inventories in the longer-term (road transport, land use change and forestry, and agriculture). For each sector, the focus will be on strengthening capacity of the participating national agencies in the collection or measurement of data, modeling and/or estimating activity levels, and estimating emission factors. Outputs, then, will include methodologies, inventories and databases that can be worked with in the future. Overseas training and workshops held in China will be key capacity development tools. Workshops will include regional workshops with other developing countries in attendance so that results of the project may be disseminated to other countries at the same time as those Chinese in attendance learn from their counterparts in other countries.

A domestic subcontractor will be selected to handle the bulk of the tasks, other than training, for each sector. In addition, an international expert will be recruited for each sector to provide technical guidance to the relevant subcontractor in the use of internationally established methodologies. For agricultural sector work, several other international experts will be recruited to attend workshops, so that they can provide advice on methodologies in their various areas of expertise.

In terms of international training, project strategy will emphasize the spreading of knowledge gained to the broad base of local institutions that are to be involved in project implementation and future inventory work. Each individual completing a training fellowship and one representative of the study tour (see Section C for details of these activities) will be responsible for submitting a return to post report within two weeks of commencement of work duties following the training. It will be required that these reports clearly specify how the trainee/study tour group intends to use the training received for improved implementation of the project and for improved GHG inventory work in China.

C. Immediate Objectives, Outputs, and Activities

There are three immediate objectives in this project; and these have the common goal of strengthening capacity to estimate GHG emissions and removals. Each of the three objectives addresses a distinct sector presenting special challenges in the estimation of GHG emissions and removals. The sectors included are:

- Transport (Immediate Objective One)
- Land Use Change and Forestry (Immediate Objective Two)
- Agriculture (Immediate Objective Three)

Immediate Objective 1: Strengthened Capacity for Estimating GHG Emissions of China's Road Transport Sector

Success Criteria:	China develops methodology for and expertise in calculating GHG emissions from the road transport sector and exchanges related information with other developing countries
Target Beneficiaries:	National institutions, international society, particularly parties to the UNFCCC and the climate change community
Time Frame:	April 2002 – March 2004
Responsibility:	For all activities, Subcontractor 1 will take the lead, with support from the International Transport Sector Expert

Output 1.1: Information analyzed on road vehicle fleets in China and other developing countries.

Indicators (Output 1.1):

- Report on characteristics of road vehicle fleets in China and other developing countries such as Brazil, Egypt and India by the end of the 6th month.
- Two case studies on the road transport fleet of two major Chinese cities completed by end of the 10th month.
- Report and presentation on the estimated size and composition of China's current and future vehicle fleet by the end of Year 1.

Activity 1.1.1: Gather information on characteristics of main modes of road transport, vehicles used, and corresponding technological levels in China and other major developing countries through Internet search and conduct of study tours. (Months 1 - 6)

Activity 1.1.2: Prepare case studies on the road transport fleets in two Chinese cities, including analysis of vehicle growth trends and emission standards. The case studies will also include comparative analyses of vehicle growth trends and emission standards with those in other developing countries based on data gathered in Activity 1.1.1. (Months 7 - 10)

Activity 1.1.3: Based on information gathered in Activity 1.1.1 and on case studies performed in Activity 1.1.2, provide analysis of size and structure of the current and estimated future vehicle fleet in China. (Months 11 - 12)

Output 1.2: Improved methodology for estimating emissions factors of road vehicles

Indicators (Output 1.2):

- Report and presentation on preferred methods for estimating activity levels for the road transport

sector by end of the 6th month.
- Report on preferred methods for calculating vehicle emissions factors and preferred methods for conducting in-situ measurements of vehicle emissions presented in a briefing by the end of Year 1.
- Case studies on emission factors of main road transport technologies for each type of road vehicle completed by the end of the 18th month.

Activity 1.2.1: Conduct survey in order to identify possible methods for estimating activity levels for the transportation sector in developing countries (Months 1 - 6)

Activity 1.2.2: Carry out investigation and analysis in order to determine formulae for calculating emission factors and methods for in-situ measurements in developing countries (Months 7 - 12)

Activity 1.2.3: Conduct case studies on emission factors of main technologies used for key types of road vehicles found in China (Months 13 - 18)

Output 1.3: Trained staff with international experience on estimating activity levels and emissions factors for road transport sector

Indicators (Output 1.3):
- Proceedings of two workshops, including comprehensive information on road transportation sector in other developing countries prepared by the end of the 5th month and the 15th month, respectively.
- Six Chinese technical people trained, with a good understanding of the methodology used in developed countries for preparing transportation sector inventories by the end of the 3rd month.

Activity 1.3.1: Hold two international workshops to collect information on characteristics of road transportation in other major developing countries, such as India, Brazil, and Egypt. Through these workshops, exchange of experiences on methodology for estimating activity levels and measuring emissions factors. Workshops should cover the experience of other countries regarding Natural Gas Vehicles (NGVs) and the potential role of this energy source in China's future energy mix. (Month 5 for first workshop, month 15 for second workshop)

Activity 1.3.2: Train six persons abroad in developed countries on the methodology for developing transportation sector inventories. (Month 3)

Immediate Objective 2: Strengthened Capacity for Estimating GHG Emissions and Sinks from Land Use Change and the Forestry Sector

Success Criteria:	China develops a methodology for and expertise in calculating GHG emissions and removals from land use change and forestry sector and exchanges related information with other countries in the region.
Target Beneficiaries:	National institutions, international society, particularly parties to the UNFCCC and the climate change community
Time Frame:	April 2002 – March 2004
Responsibility:	For all activities, Subcontractor 2 will take the lead, with support from the International Land Use Change and Forestry Expert

Output 2.1: Expertise developed in on-site measurement; estimation, modeling, and remote sensing for land use change and forestry sector GHG inventories

Indicators (Output 2.1):

- Database for compiling information on soil carbon content and GHG fluxes for land use change, by forest and agricultural type and by species at an appropriate geographic level completed by the 21st month.
- Carbon dynamics model and scenarios of carbon stock changes for alternative soil carbon and GHG flux values completed by the end of the 24th month.
- A Geographic Information System (GIS) system displaying the distribution of main forest types in Eastern China and estimation of living stocks by region and forest type completed by the end of the 15th month.

Activity 2.1.1: Collect and measure soil carbon content for various land use types and estimate GHG fluxes associated with land-use change, forest harvesting, and detritus. These measured and estimated data are to be coded and inputted into the database. (Months 1 - 9 and months 16 - 21)

Activity 2.1.2: Develop a stand-level model of carbon dynamics in soils, including roots and detritus. With data gathered in Activity 2.1.1, use the model to project changes in carbon stocks for land converted from forest to other uses and for afforested lands. (Months 10 - 15 and months 22 - 24)

Activity 2.1.3: Collect and decode remote sensing maps of Eastern China, focusing on distributions of forest and agriculture. Use a geographic information system (GIS) to map the distribution of forests by type and estimate living stocks by region and forest type. (Months 4 - 15)

Output 2.2: Trained staff with international experience related to improving estimates of GHG emissions and sinks from land use change and the forestry sector

Indicators (Output 2.2):
- Proceedings of two workshops on land use classification and imaging completed by the end of the 6th month.
- Proceedings of two workshops on remote sensing techniques completed by the end of the 18th month
- Chinese technical personnel trained in the field of soil carbon research by the end of the 3rd month.

Activity 2.2.1: Organize two regional workshops early in project implementation to coordinate methods and criteria for land-use classification and to discuss image quality and details. (Months 4 and 6)

Activity 2.2.2: Organize two regional workshops to discuss remote sensing techniques. (Months 16 and 18 for second workshop)

Activity 2.2.3: Organize international study tour to give Chinese participants exposure to international experience and training on techniques used in preparing land use change and forestry sector GHG inventories. Targeted institutions will be in the U.S. and Brazil. (Month 3)

Immediate Objective 3: Strengthened Capacity to Estimate GHG Emissions from the Agricultural Sector

Success Criteria: China develops a methodology for and expertise in calculating GHG emissions from the agricultural sector

Target Beneficiaries: National institutions, international society, particularly parties to the UNFCCC and the climate change community

Time Frame: April 2002 - March 2004

Responsibility: For all activities, Subcontractor 3 will take the lead with support from the International Agricultural Expert.

Output 3.1: Methodology for and expertise in estimating nitrous oxide (N_2O) flux from croplands

Indicators (Output 3.1):
- Database for compiling information gathered on N_2O flux from croplands completed by the end of the 21st month.
- Dynamic model of N_2O flux from croplands, validated with scenarios completed by the end of the project.
- Two technical personnel trained in measurement and modeling of N_2O emissions from croplands by the end of the 3rd month.

Activity 3.1.1: Collect and measure N_2O flux from croplands using automatic and manual methods. Prepare database of information gathered, by region and/or crop type and at the appropriate geographic level (Months 1 - 21)

Activity 3.1.2: Develop and validate a process-based model for simulating and predicting N_2O emissions from croplands with fertilizer amendment. Validate model with scenarios of N_2O fluxes for alternative parameter values from Activity 3.1.1. (Months 1 - 24)

Activity 3.1.3: Conduct international training for two persons on measurement and modeling of N_2O emissions from croplands, with follow-up technical assistance. (Months 1-3)

Activity 3.1.4: Linked with Activity 3.2.4; see below

Output 3.2: Methodology for and expertise in estimating methane (CH_4) emissions from rice paddies

Indicators (Output 3.2):
- Database for compiling measurements of methane emissions from rice paddies, by region and/or crop type completed by the end of the 21st month.
- Validated model simulating methane emissions from rice paddies completed by the end of the project.
- Two technical personnel trained in measurement and modeling of methane emissions from rice paddies by the end of the 3rd month.
- Proceedings of workshop on N_2O and CH_4 emissions from croplands prepared by the end of the 15th month.

Activity 3.2.1: Conduct continuous measurement of methane emissions from winter-flooded rice paddy fields and prepare database of methane emissions by region and/or crop types and at the appropriate geographic level. (Months 1 - 21)

Activity 3.2.2: Develop a process-based model for simulating and predicting methane emissions from rice paddy fields. Validate model with scenarios of methane fluxes for alternative parameter values based on Activity 3.2.1. (Months 1 - 24)

Activity 3.2.3: Conduct international training for two persons on automatic measurement and modeling of methane emissions from rice paddy fields, with follow-up technical assistance. (Months 1-3)

Activity 3.2.4: Organize and conduct an international workshop on emissions of N_2O and CH_4 from croplands. (Month 15)

Output 3.3: Methodology for, and expertise, in estimating GHG emissions from the livestock sector

Indicators (for Output 3.3):

- Database for compiling information on methane emissions from enteric fermentation completed by the end of the 21st month.
- Two Chinese technical staff trained in measurement and modeling of methane emissions from enteric fermentation by the end of the 3rd month.
- Database for compiling information on methane and nitrous oxide emissions from animal wastes and animal grazing completed by the end of the 21st month.
- Model projecting methane and nitrous oxide emissions from livestock sector completed by the end of the project.
- Two Chinese technical staff trained in measurement and modeling of methane and nitrous oxide emissions from animals wastes and animal grazing by the end of the 3rd month
- Proceedings of workshop on methane and nitrous oxide emissions from livestock sector prepared by the end of Year 1.

Activity 3.3.1: Collect and measure methane emissions from enteric fermentation and related parameters in the field and in the laboratory. Prepare database for compiling information collected, by region and animal type at the appropriate geographic level. (Months 1 - 21)

Activity 3.3.2: Conduct international training for two persons on measurement and modeling of methane emission from enteric fermentation, with follow-up technical assistance. (Months 1-3)

Activity 3.3.3: Collect and measure methane emissions, nitrous oxide emissions, and related parameters from animal grazing and animal wastes in the field and in the lab. Prepare database for compiling information collected, by region and animal type at the appropriate geographic level. (Months 1 - 21)

Activity 3.3.4: Conduct studies on how to model methane and nitrous oxide emissions from livestock-related activities. Based on studies, prepare model. (Months 1 - 24)

Activity 3.3.5: Conduct international training for two persons on measurement and modeling of methane and nitrous oxide emissions from livestock waste management systems and grazing, with follow-up technical assistance. (Months 1-3)

Activity 3.3.6: Organize an international workshop on methane and nitrous oxide emission from livestock-related activities. (Month 12)

D. Inputs

UNDP/GEF contributions and Government co-financing for the project, broken down by components, overall technical support, and management costs, are summarized in the tables below. Detailed terms of reference for each of the three subcontracts can be found in Annex 1. The terms of reference for all experts and a list of all equipment needed can be found in Annex 2 and Annex 4, respectively.

Inputs for Objective 1 (Estimating GHG Emissions from Road Transport Sector)

Item	Amount (in USD)		
	GEF/UNDP	**GOC**	**Total**
Subcontract	114,000	140,000	**254,000**
Office and Lab Facilities		70,000	**70,000**
International Expert (0.6 month of 2 missions)	18,000	---	**18,000**
Int'l Training (6 persons x 1 month x $7,000 per month)	42,000	---	**42,000**
Total	**174,000**	**210,000**	**384,000**

Inputs for Objective 2 (Estimating GHG Emissions/Sinks from Land Use Change and Forestry)

Item	Amount (in USD)		
	UNDP/GEF	**GOC**	**Total**
Subcontract	409,000	700,000	**1,109,000**
Equipment	44,000	20,000	**64,000**
Office/ Lab Facilities	---	50,000	**50,000**
International Expert (1 month of 2 missions)	27,000	---	**27,000**
Int'l Training (5 persons x 1 month x $7,000 per month)	35,000	---	**35,000**
Total	**515,000**	**770,000**	**1,285,000**

Inputs for Objective 3 (Estimating GHG Emissions from Agricultural Sector)

Item	Amount (in USD)		
	UNDP/GEF	**GOC**	**Total**
Subcontract	357,000	262,000	**619,000**
Equipment	143,000	448,000	**591,000**
International Training (8 persons x 1 months x $7,000 per month)	56,000	---	**56,000**
International Expert (0.4 month of 2 missions)	12,000	---	**12,000**
International Experts (10 experts for 4-day workshop, with travel)	36,000	---	**36,000**
Total	**604,000**	**710,000**	**1,314,000**

Overall Technical Support

Item	Amount (in USD) Provided by UNDP/GEF
Overall Project Training Workshop	10,000
Total	**10,000**

Project Coordination Costs

Item	Amount (in USD) Provided by UNDP/GEF
CICETE – Operations Costs	45,000
Duty Travel	12,000

Audit	8,000
Monitoring and Evaluation	16,000
Reports	30,000
National Project Coordinator (24 months x $2,500 per month)	60,000
Inception Workshop	10,000
Miscellaneous: stationery, telecom, bank charges, etc.	16,000
Total	**197,000**

A table summarizing the totals of the inputs for each component, for overall technical support, and for coordination costs (i.e. a table summarizing the totals given in the five tables above) is given below:

Summary of Total Inputs for Each Component and for Overall Technical Support and Management Costs

Item	Amount (in USD)		
	UNDP/GEF	**GOC**	**Total**
Inputs for Objective 1 (Road Transport Sector)	174,000	210,000	**384,000**
Inputs for Objective 2 (Land Use Change and Forestry Sector)	515,000	770,000	**1,285,000**
Inputs for Objective 3 (Agricultural Sector)	604,000	710,000	**1,314,000**
Overall Technical Support	10,000	---	**10,000**
Coordination Costs	197,000	---	**197,000**
Total	**1,500,000**	**1,690,000**	**3,190,000**

E. Risks and Prior Obligations

E.1 Risks

The project faces certain risks, as delineated below. In each case, an explanation is given of why risk is considered manageable and of how project activities or strategies address the risk.

1. **Local institutions lack the baseline capacity required in measurement, modeling, and estimation to develop improved methodologies and capacities for preparing GHG inventories**. The risk of this is very low. First, China has high-caliber and reputable research institutions available in each of the sectors to be addressed. The most capable of these will be identified through competitive bidding to carry out project sub-contracts. In addition, project design includes substantial training elements early in the work plan, so that trained individuals can make strong contributions to subsequent project outputs. Finally, activities associated with the project *Enabling China to Prepare Its Initial National Communication* should build up baseline capacity in measurement, modeling and estimation.

2. **Information and data required for project activities is inaccessible**. The risk of this is low. Given the strong government support for this project through its links with the inter-ministerial National Coordinating Committee on Climate Change Policy, a high level of local and institutional cooperation in providing existing data and remote sensing maps and in facilitating field measurements is expected. In addition, face-to-face meetings at international workshops should facilitate access to required information from other countries.

3. **Training abroad is inappropriate to goals of project**. The risk of this is low. Project design calls for the expertise of both the sub-contractors and the international experts to be harnessed in identifying training institutions.

4. **Capacity developed will not be sustained or disseminated outside of subcontracting institutions**: The risk of this is low. The project's many workshops will disseminate learning through involving a cross-section of institutions. China's commitment to the UNFCCC to provide National Communications will ensure the priority and sustenance of capacity developed in preparing GHG inventories.

E.2 Prior Obligations

There will be a few prerequisites to UNDP/GEF support to this project. First, the relevant government agencies must contribute or commit to contributing the necessary resources. These resources include commitment of the necessary staff to provide guidance and administrative management to the project. Second, a project office will need to be established as described below in Section F-1.

The project document will be signed by UNDP; and UNDP/GEF assistance to the project will be provided, subject to UNDP receiving satisfaction that the prerequisites listed above have been fulfilled or are likely to be fulfilled. When anticipated fulfillment of one or more prerequisites fails to materialize, UNDP may, at its discretion, either suspend or terminate its assistance.

F. Management

F.1 Implementation Arrangements

During the project development phase of this project and the parallel project for preparing China's Initial National Communications, a Steering Committee was established. This committee will continue to work as the Steering Committee both for preparing China's Initial National Communication and for implementing the targeted research described in this project document. The committee, chaired by SDPC, will have six other members, which will include the Ministry of Foreign Affairs, CMA, MOF, SEPA, MOST, and SETC. This committee will be strengthened to include technical and policy experts from the relevant agencies.

The State Development and Planning Commission (SDPC) will nationally execute the project. SDPC has the mandate, among Chinese Government agencies, for coordinating and leading national activities related to climate change. The Commission heads China's National Coordinating Committee on Climate Change Policy. Throughout the project, SDPC will ensure frequent consultation and close collaboration with relevant national and provincial agencies and with appropriate regional and international organizations and institutions. Given its experience in managing UNDP projects and as requested by the National Executing Agency, CICETE will be providing services to SDPC for financial management, mobilizing project inputs, and procurement in accordance with GEF and UNDP rules and procedures, as well as technical and financial reporting. (Details of procurement and financial procedures to be determined and agreed upon by SDPC and CICETE.)

A project management office responsible for administration of the project will be established by the SDPC. Physically, this project office will be one and the same with the project office already established for implementation of the Initial National Communication Project, with facilities and some support staff being shared by the two projects. A National Project Director (NPD), as a part of government in-kind input, will be designated to lead this office. He/she will be responsible for effective management of the project and will oversee the functions of staffing, planning, and implementation of project activities. The NPD will also oversee official reporting to relevant agencies on project status. The SDPC will recruit a project manager to serve under the NPD. The manager, also a part of government in-kind input, will be responsible for the day-to-day management of the project, planning and managing project activities. The manager will obtain guidance from and report to the NPD. Full-time staff, including a full-time National

Project Coordinator (NPC), will be recruited by the project for the office. This NPC post (to be distinguished from the NPC post for the Initial National Communication Project) was inadvertently not identified during the project design (i.e., development of the project brief). However, during the development and preparation of the project document, it became apparent that, such post is essential for effective project management and implementation. The post requires technical and managerial capability to support the national execution. Since there is no resident CTA and full time national experts for the project, the NPC can take up the management and coordination functions to support both the government management for the project and the experts and subcontractors to ensure effective project implementation. The SDPC and other government agencies will make available, on a part-time basis and as a part of government in-kind input, various staff with expertise in areas related to climate change to assist with project activities.

To facilitate project management, all major areas of the project will be implemented largely by domestic sub-contract. International experts will be recruited to help ensure the effective transfer of international guidelines, methodologies and approaches, and to help ensure that the capacity development activities are implemented to international standards.

F.2 Coordination Mechanisms

Through the National Coordinating Committee on Climate Change Policy and the SDPC, the project will be closely coordinated with all other relevant climate change activities in China. In particular, the project will be coordinated with the in-progress GEF project prepared using the same GEF PDF funds as the project described in this document. The in-progress project is aimed at enabling China to prepare its Initial National Communication to the UNFCCC and has preparation of China's first official GHG inventory as a key part of its work plan. All relevant lessons learned from the Initial National Communication project will be made available in a timely fashion to this targeted research project. In addition, those results of the targeted research project that are available in time will be fully utilized as relevant in inventory work for the Initial National Communication Project.

UNDP is currently implementing a large portfolio of projects related to climate change and energy management in China. In addition, UNDP is also working on sustainable agriculture and forestry management in China. In order to maximize the impact of international support and develop possible synergies between these projects and the proposed project, major findings and technical outputs generated by the former could be shared with experts and management staff working on the latter. For example, experts working on the proposed project could be invited to join the workshops organized by other UNDP projects and vice versa.

G. Monitoring and Evaluation

G.1 Monitoring and Evaluation Mechanisms

The project will be subject to tripartite review (TPR) by representatives of the Government, UNDP, and SDPC at least once every twelve months. The first such meeting will be held within 12 months of the start of implementation. The National Project Director (NPD) shall prepare and submit to each tripartite review meeting an Annual Project Report (APR). Additional performance reviews may be requested, if necessary, during the project implementation.

The project shall be subject to a final evaluation by independent evaluators. A final evaluation report (to be prepared by the evaluation mission) and a project terminal report (to be prepared by the NPD and the

project management office) will be prepared and submitted to the final TPR. These shall be made available in draft form sufficiently far in advance so as to allow review and technical clearance by SDPC.

The project shall be submitted to an annual auditing.

G.2 Monitoring and Evaluation Schedule

Monitoring and Evaluation Activities

Monitoring Activity	Timing	Responsibility
1. Hold Tripartite Review (TPR) Meeting	Annually (at least twice during project implementation)	NPD and Project Management Office (PMO)
2. Prepare Annual Project Report/PIR	Annually, prior to TPR	NPD and the PMO
3. Prepare Project Terminal Report	Prior to final TPR	NPD and the PMO
4. Conduct evaluation and prepare Evaluation Report	Upon completion of project	External Evaluator
5. Conduct Audit	Annually	National Auditors

G.3 Resources Allocated for Monitoring and Evaluation

The total project budget for monitoring and evaluation is 16,000 USD.

G.4 Updating of Work Plan and Budget

The updating of budgets and work plans will be carried out in line with the China NEX manual.

H. Legal Context

This Project Document shall be the instrument referred to as such in Article I of the Standard Basic Assistance Agreement between the Government of the People's Republic of China and the United Nations Development Programme, signed by the parties on 29 June 1979. The host country's implementing agency shall, for the purpose of the Standard Basic Assistance Agreement, refer to the government cooperating agency described in that Agreement.

The following types of revisions may be made to this Project Document with the signature of the UNDP resident representative only, provided he or she is assured that the other signatories of the Project Document have no objections to the proposed changes:

1. Revision in, or addition of, any of the annexes of the Project Document;
2. Revisions which do not involve significant changes in the immediate objectives, outputs or activities of the project, but are caused by the rearrangement of the inputs already agreed to or by cost increases due to inflation; and,
3. Mandatory annual revisions that rephrase the delivery of agreed project inputs, or reflect increased expert or other costs due to inflation, or take into account agency expenditure flexibility.

I. Work Plan

Objective & Output	Activity No.	Description	1Q			2Q			3Q			4Q			5Q			6Q			7Q			8Q		
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Output 1.1	Activity 1.1.1	Gather information on main modes of road transport	■	■	■	■	■	■																		
	Activity 1.1.2	Prepare case studies on vehicle fleets in two Chinese cities							■	■	■	■														
	Activity 1.1.3	Analyze size and structure of current and future vehicle fleet											■	■												
Output 1.2	Activity 1.2.1	Survey methods for estimating transport sector activity levels	■	■	■	■	■	■																		
	Activity 1.2.2	Determine emission measurement and factor methods for vehicles							■	■	■	■	■	■												
	Activity 1.2.3	Conduct case studies on vehicle emission factors													■	■	■	■	■	■						
Output 1.3	Activity 1.3.1	Hold two international workshops on road transport					■										■									
	Activity 1.3.2	Train six persons abroad on methods for transport inventory			■																					
Objective 2																										
Output 2.1	Activity 2.1.1	Measure soil carbon content and estimate GHG fluxes	■	■	■	■	■	■	■	■	■							■	■	■	■	■	■			
	Activity 2.1.2	Develop a stand-level model of carbon dynamics in soils									■	■	■	■	■	■	■							■	■	■
	Activity 2.1.3	Collect and decode remote sensing maps of Eastern China				■	■	■	■	■	■	■	■	■	■	■	■									
Output 2.2	Activity 2.2.1	Organize two regional workshops on land-use classification				■		■																		
	Activity 2.2.2	Organize two regional workshops on remote sensing techniques																■		■						
	Activity 2.2.3	Organize study tour on land use change and forestry inventories			■																					
Objective 3																										
Output 3.1	Activity 3.1.1	Measure N2O flux from croplands; prepare database	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
	Activity 3.1.2	Develop and validate model of N2O emissions from croplands	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Activity 3.1.3	Conduct int'l training on N2O emissions from croplands	■	■	■																					
	Activity 3.1.4	Same as Activity 3.2.4; see below															■									
Output 3.2	Activity 3.2.1	Measure methane emissions from rice paddies; prepare database	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
	Activity 3.2.2	Develop and validate model of CH4 emissions from rice paddies	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Activity 3.2.3	Conduct int'l training on CH4 emissions from croplands	■	■	■																					
	Activity 3.2.4	Organize workshop on N2O and CH4 emissions from croplands															■									
Output 3.3	Activity 3.3.1	Measure methane emissions from enteric fermentation	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
	Activity 3.3.2	Conduct int'l training on emissions from enteric fermentation	■	■	■																					
	Activity 3.3.3	Measure CH4 and N2O emissions from livestock activities	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
	Activity 3.3.4	Prepare model for emissions from livestock activities	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	Activity 3.3.5	Conduct int'l training on emissions from livestock activities	■	■	■																					
	Activity 3.3.6	Organize int'l workshop on emissions from livestock activities												■												

J. Budget

Development Programme

CPR/00/G33 - Targeted Research Related to Climate Change
Budget " A"

Main Source of Funds: 1G - Global Environment Trust Fund
Executing Agency: SDPC - State Development and Planning Commission

Sbln	Description	Implementing	Funding		Total	2002	2003	2004
010	PERSONNEL							
011	International Consultants							
011.51	Expert Road Transport	SDPC		Net Amount	18,000	6,750	9,000	2,250
				W/M	0.6	.225	0.3	0.075
				Total	18,000	6,750	9,000	2,250
011.52	Expert Land Use/Forestry	SDPC		Net Amount	27,000	10,125	13,500	3,375
				W/M	1	0.375	0.5	0.125
				Total	27,000	10,125	13,500	3,375
011.53	Expert Agriculture	SDPC		Net Amount	12,000	4,500	6,000	1,500
				W/M	0.4	0.15	0.2	0.05
				Total	12,000	4,500	6,000	1,500
011.54	Int'l Evaluation Expert	SDPC		Net Amount	12,000	0	12,000	0
				W/M	0.5	0	0.5	0
				Total	12,000		12,000	
011.55	Experts Agriculture Seminar	SDPC		Net Amount	36,000	13,500	18,000	4,500
				W/M	2	0.75	1	0.25
				Total	36,000	13,500	18,000	4,500
011.99	Line Total	----------		Net Amount	105,000	34,875	58,500	11,625
				W/M	4.5	1.5	2.5	0.5
				Total	105,000	34,875	58,500	11,625
015	Monitoring and Evaluation							
015.01	Duty Travel	SDPC		Net Amount	12,000	6,750	4,000	1,250
				Total	12,000	6,750	4,000	1,250

015.99	Line Total	----------	Net Amount	12,000	6,750	4,000	1,250
			Total	12,000	6,750	4,000	1,250
017	National Consultants						
017.01	National Project Coordinator	SDPC	Net Amount	60,000	32,500	20,000	7,500
			W/M	24	13	8	3
			Total	60,000	32,500	20,000	7,500
017.02	National Evaluation Expert	SDPC	Net Amount	4,000	0	4,000	0
			Total	4,000	0	4,000	0
017.99	Line Total	----------	Net Amount	64,000	32,500	24,000	7,500
			W/M	24	13	8	3
			Total	64,000	32,500	24,000	7,500
019	Component Total	----------	Net Amount	181,000	74,125	86,500	20,375
			W/M	28.5	14.5	10.5	3.5
			Total	**181,000**	**74,125**	**86,500**	**20,375**
020	CONTRACTS						
021	Contract A						
021.01	Subcontract Road Transport	SDPC	Net Amount	114,000	42,750	57,000	14,250
			Total	114,000	42,750	57,000	14,250
021.99	Line Total	----------	Net Amount	114,000	42,750	57,000	57,000
			Total	114,000	42,750	57,000	57,000
022	Contract B						
022.01	Subcontract Land Use/Forestry	SDPC	Net Amount	409,000	153,375	204,500	51,125
			Total	409,000	153,375	204,500	51,125
022.99	Line Total	----------	Net Amount	409,000	153,375	204,500	51,125
			Total	409,000	153,375	204,500	51,125
023	Contract C						
023.01	Subcontract Agriculture	SDPC	Net Amount	357,000	133,875	178,500	44,625
			Total	357,000	133,875	178,500	44,625
023.99	Line Total	----------	Net Amount	357,000	133,875	178,500	44,625
			Total	357,000	133,875	178,500	44,625
029	Component Total	----------	Net Amount	880,000	330,000	440,000	110,000
			Total	**880,000**	**330,000**	**440,000**	**110,000**
030	TRAINING						
031	Fellowships						
031.01	Int'l Training Road Transport	SDPC	Net Amount	42,000	15,750	21,000	5,250
			Total	42,000	15,750	21,000	5,250
031.02	Int'l Training Land Use/Forestry	SDPC	Net Amount	35,000	13,125	17,500	4,375
			Total	35,000	13,125	17,500	4,375
031.03	Int'l Training riculture	SDPC	Net Amount	56,000	21,000	28,000	7,000

			Total	56,000	21,000	28,000	7,000
031.99	Line Total	----------	Net Amount	133,000	49,875	66,500	16,652
			Total	133,000	49,875	66,500	16,652
032	Other Training						
032.01	Inception Workshop	SDPC	Net Amount	10,000	10,000	0	0
			Total	10,000	10,000	0	0
032.02	Overall Project Training Workshop	SDPC	Net Amount	10,000	7,500	0	2,500
			Total	10,000	7,500	0	2,500
032.99	Line Total	----------	Net Amount	20,000	17,500	0	2,500
			Total	20,000	17,500	0	2,500
039	Component Total	----------	Net Amount	153,000	67,375	66,500	19,125
			Total	153,000	67,375	66,500	19,125
040	EQUIPMENT						
045	Equipment						
045.01	Equipment Land Use/Forestry	SDPC	Net Amount	44,000	16,500	22,000	5,500
			Total	44,000	16,500	22,000	5,500
045.02	Equipment Agriculture	SDPC	Net Amount	143,000	53,625	71,500	17,875
			Total	143,000	53,625	71,500	17,875
045.03	Operations and Maintenance	SDPC	Net Amount	45,000	23,000	17,000	5,000
			Total	45,000	23,000	17,000	5,000
045.99	Line Total	----------	Net Amount	232,000	93,125	110,500	28,375
			Total	232,000	93,125	110,500	28,375
049	Component Total	----------	Net Amount	232,000	93,125	110,500	28,375
			Total	232,000	93,125	110,500	28,375
050	MISCELLANEOUS						
052	Reporting Costs						
052.01	Reporting Costs	SDPC	Net Amount	30,000	11,250	15,000	3,750
			Total	30,000	11,250	15,000	3,750
052.02	Audit	SDPC	Net Amount	8,000	4,250	3,000	750
			Total	8,000	4,250	3,000	750
052.99	Line Total	----------	Net Amount	38,000	15,500	18,000	4,500
			Total	38,000	15,500	18,000	4,500
053	Sundries						
053.01	Miscellaneous	SDPC	Net Amount	16,000	8,500	6,000	1,500
			Total	16,000	8,500	6,000	1,500
053.99	Line Total	----------	Net Amount	16,000	8,500	6,000	1,500
			Total	16,000	8,500	6,000	1,500
059	Component Total	----------	Net Amount	54,000	24,000	24,000	6,000
			Total	54,000	24,000	24,000	6,000

099	BUDGET TOTAL	---	Net Amount	1,500,000	588,625	727,500	183,875
			W/M	28.5	14.5	10.5	3.5
			Total	1,500,000	588,625	727,500	183,875

Annex 1: Outline Terms of Reference for Subcontracts

The Terms of Reference for subcontracts will be detailed and updated by the National Project Director with the assistance of the Project Manager and the National Project Coordinator, during the initial phase of project implementation. Subcontracts will be awarded to qualified and competent institutions on the basis of domestic competitive bidding.

Outline TOR for Subcontract 1: Estimating GHG Emissions from Road Transport Sector

The key purpose of this subcontract is engage expert(s) who will provide the relevant services to develop strengthened capacity for estimating GHG emissions from China's road transport sector. The subcontractor will be responsible for the performance of all activities and delivery of the required outputs for this assignment, except for international training, stated under Immediate Objective 1 in the project document. The tasks associated with this work are given below, followed by an estimated budget breakdown and listing of required qualifications:

Tasks:

1. Compile and analyze information on the fleets of road vehicles in China and other selected developing countries. Specific sub-tasks are listed below:

- Gather information on characteristics of main modes of road transport, vehicles used, and corresponding technological levels in China and other major developing countries. Prepare a written report based on information collected.
- Prepare two case studies, each on the road transport vehicle fleets in a major Chinese city. Include analyses of vehicle fleet growth trends in the case studies.
- Based on general information gathered and the results of the two case studies, provide analysis of the size and structure of the current and projected future vehicle fleet in China. Prepare and make a presentation outlining methodology used and results.

2. Develop improved methodology for estimating emissions factors of road vehicles in China. Specific sub-tasks are listed below:

- Conduct a survey in order to identify possible methods for estimating activity levels for the transportation sector in developing countries. Based on results, prepare a presentation on preferred methods for estimating activity levels.
- Carry out investigation and analysis in order to determine formulae for calculating vehicle emission factors and methods for in-situ measurements in developing countries. Prepare a presentation on preferred methods of estimating vehicle emission factors and preferred methods for conducting in-situ measurements of vehicle emissions.
- Conduct case studies on emission factors of main technologies used for key types of road vehicles found in China. Prepare written report on findings.

3. Develop ways of facilitating and enhancing information exchange among developing countries on the topic of greenhouse gas emissions from the road transport sector by organizing and holding two international workshops. Prepare the proceedings of each workshop. The workshops should cover the following:

- Characteristics of the road transport sector in other major developing countries, such as India, Brazil, and

Egypt.

- Experience on methodology for estimating activity levels and measuring emissions factors.
- Experience of other countries with Natural Gas Vehicles (NGVs) and the potential of natural gas and this technology to play a role in China's future transport energy mix.

4. Provide the Project Management Office with recommendations of target institutions for international training with regard to estimating GHG emissions from the road transport sector.

Level of Effort:

Preliminary Budget for Subcontract 1 (Estimating Road Transport Sector GHG Emissions)

Item	Amount (in USD)		
	UNDP/GEF	**GOC**	**Total**
Personnel	59,000	70,000	**129,000**
Data Purchase	28,000	70,000	**98,000**
Workshop	10,000	---	**10,000**
Travel	17,000	---	**17,000**
Total Subcontract	**114,000**	**140,000**	**254,000**

Required Qualifications:

1. Extensive experience in the analysis of the transport and/or energy sectors in China
2. Research background in the area of road transport and/or vehicle emissions
3. Proven track record of projects implemented involving surveying, data collection, and preparation of case studies
4. Knowledge of the use of methodologies for calculating greenhouse gas emissions
5. Experience in organizing international workshops preferred, but not required
6. Professional staff fluent in the English language

Outline TOR for Subcontract 2:
Estimating GHG Emissions and Sinks from Land Use Change and Forestry Sector

The key purpose of this subcontract is to engage expert(s) who will provide the relevant services to develop strengthened capacity for estimating GHG emissions and removals in China from land use change and the forestry sector. The subcontractor will be responsible for the performance of all activities and outputs for assignment, except for the international training, stated under Immediate Objective 2 in the project document. The tasks associated with this work are given below, followed by an estimated budget breakdown and listing of required qualifications:

Tasks:

1. Develop a methodology for, and expertise in, on-site measurement, estimation, modeling, and remote sensing for land use change and forestry sector GHG inventories. Specific sub-tasks are listed below:

- Measure soil carbon content for various land use types and estimate GHG fluxes associated with land-use change, forest harvesting, and detritus. Prepare a database for compiling information on soil carbon content and GHG fluxes for land-use change, by forest and agricultural type and by species, at an appropriate geographic level.
- Develop a stand-level model of carbon dynamics in soils, including roots and detritus. With data gathered on soil carbon content, use the model to project changes in carbon stocks under various scenarios for land converted from forest to other uses and for afforested lands.
- Collect and decode remote sensing maps of Eastern China, focusing on distributions of forest and agriculture. Use a geographic information system (GIS) to map the distribution of forests by types and estimate living stocks by region and forest type.

2. Develop ways of facilitating and enhancing regional exchange of information related to improving estimates of GHG emissions and removals from land use change and the forestry sector by organizing and holding four workshops as described below. For each workshop, prepare the workshop proceedings.

- Two regional workshops held early in project implementation to coordinate methods and criteria for land-use classification and to discuss image quality and details
- Two regional workshops on remote sensing techniques

3. Provide the Project Management Office with recommendations of target institutions in U.S. and Brazil for international study tour related to estimating GHG emissions/sinks from land use change and the forestry sector.

Level of Effort:

Preliminary Budget for Subcontract 2
(Estimating Land Use Change and Forestry Sector GHG Emissions and Sinks)

Item	Amount (in USD)		
	UNDP/GEF	**GOC**	**Total**
Personnel	93,000	20,000	**113,000**
Data Purchase	120,000	680,000	**800,000**
Workshops	128,000	---	**128,000**
Travel	68,000	---	**68,000**
Total Subcontract	**409,000**	**700,000**	**1,109,000**

Required Qualifications:

1. Extensive experience in the analysis of land use change and forestry sector in China
2. Proven track record of research work on the analysis of soil carbon content and fluxes and in estimates of living stocks by forest type
3. Proven track record of work experience with remote sensing data and Geographic Information Systems (GIS)
4. Credible skills in field measurements, data collection, and modeling
5. Knowledge of the use of methodologies for calculating relevant greenhouse gas emissions and sinks
6. Professional staff fluent in the English language

Outline TOR for Subcontract 3: Estimating GHG Emissions from Agricultural Sector

The key purpose of this subcontract is to engage expert(s) who will provide the relevant services to develop strengthened capacity for estimating GHG emissions from the agricultural sector in China. The subcontractor will be responsible for the performance of all activities and the required outputs for this assignment, except for international training, stated under Immediate Objective 3 in the project document. The tasks associated with this work are given below, followed by an estimated budget breakdown and listing of required qualifications:

Tasks:

1. Develop a methodology for, and expertise in, estimating nitrous oxide (N_2O) flux from croplands. Specific sub-tasks are listed below:

- Measure N_2O flux from croplands using automatic and manual methods. Prepare database of information gathered, by region and/or crop type and at the appropriate geographic level.
- Develop a dynamic, process-based model for simulating and predicting N_2O emissions from croplands with fertilizer amendment. Validate the model with scenarios of N_2O fluxes for alternative parameter values from the database described above.
- Organize and conduct an international workshop on N_2O (and CH_4) emissions from croplands (note: same workshop as listed under the following task). Prepare workshop proceedings.

2. Develop a methodology for, and expertise in, estimating methane (CH_4) emissions from rice paddies. Specific sub-tasks are listed below:

- Conduct continuous measurement of methane emissions from winter-flooded rice paddy fields. Prepare database of methane emissions by region and/or crop type and at the appropriate geographic level.
- Developed a process-based model for simulating and predicting methane emissions from rice paddies. Validate the model with scenarios of methane fluxes for alternative parameter values from the database described above.
- Organize and conduct an international workshop on CH_4 (and N_2O) emissions from croplands (note: same workshop as listed under the previous task). Prepare workshop proceedings.

3. Develop methodologies for, and expertise, in estimating GHG emissions from the livestock sector. Specific sub-tasks are listed below:

- Measure methane emissions from enteric fermentation and related parameters in the field and laboratory. Prepare database for compiling information collected, by region and animal type at the appropriate geographic level.
- Measure methane emissions, nitrous oxide emissions, and related parameters from animal grazing and animal wastes in the field and the lab. Prepare database for compiling the measured data.
- Conduct studies on how to model methane and nitrous oxide emissions from livestock related activities. Based on the results of the studies, prepare model.
- Organize and conduct an international workshop on methane and nitrous oxide emissions from livestock - related activities.

4. Provide the Project Management Office with recommendations of target institutions for international training activities related to estimating GHG emissions from the agricultural sector.

Level of Effort:

Preliminary Budget for Subcontract 3 (Estimating Agricultural Sector GHG Emissions)

Item	Amount (in USD)		
	UNDP/GEF	**GOC**	**Total**
Personnel	156,000	262,000	**418,000**
Data Purchase	56,000	---	**56,000**
Workshops	84,000	---	**84,000**
Travel	61,000	---	**61,000**
Total Subcontract	**357,000**	**262,000**	**619,000**

Required Qualifications:

1. Extensive experience in the analysis of the agricultural sector in China, with proven track record of projects implemented involving quantification of data from as many as possible of the following areas: rice fields, fertilized croplands, animal husbandry, and animal waste management
2. Proven track record of research work involving measurement and modeling of emissions for the agricultural sector, in as many as possible of the following areas: rice fields, fertilized croplands, enteric fermentation, animal grazing, and animal waste management
3. Credible skills in field measurements, data collection, database development, and modeling
4. Knowledge of the use of methodologies for calculating greenhouse gas emissions
5. Professional staff fluent in the English language

Annex 2: Terms of Reference for National Professionals and International Consultants

Terms of Reference for National Project Director

The Government shall appoint a National Project Director (NPD) to be responsible, on behalf of the government, for the project. It is likely that the NPD will be a senior official from the executing agency. The NPD will be supported by the Project Manager and will work closely with the Project Management Office, National Project Coordinator, and international experts. The NPD will be responsible for:

- Assuring the Government inputs to the project are forthcoming in a timely and effective manner
- Assuring the project stays in line with national programs, strategies, and objectives and full achievements of the immediate objectives and outputs
- Overseeing project implementation and the timely undertaking of all activities

With the support of the Project Manager and National Project Coordinator, the NPD shall:

1. Oversee establishment of the Project Management Office with systems put in place for sound management of all project subcontracts and financial disbursements.

2. Prepare detailed draft work plan and inception report for all three project objectives and identify resource requirements, responsibilities, task outlines, performance evaluation criteria and work plans/schedules.

3. Develop detailed and measurable quarterly performance indicators for each project output at the outset of the project.

4. Prepare quarterly work plans, which are to include indication of extent to which previous quarter's activities have contributed to project's overall objectives.

5. Create detailed TOR and qualifications for each subcontract and international expert.

6. Coordinate international experts and advise on international training and workshops.

7. Submit, as required, Annual Performance Review (APR) to tripartite (TPR) review meetings.

8. Approve detailed terms of reference and qualifications for each subcontract.

9. Direct and supervise the establishment of project administration procedures for all staff, subcontractors, and participating agencies.

10. Approve quarterly status and financial reports for comment and approval of the Project Steering Committee.

11. Approve six-month budget forecast requests for approval of the Project Steering Committee.

12. Oversee implementation of Project Steering Committee directives.

Terms of Reference for National Project Coordinator

Duration: 24 months

Introduction:

To implement the UNDP-GEF funded project, three subcontracts will be selected to achieve three immediate objectives related to strengthening capacity for estimating GHG emissions in the three sectors of road transport, land use/forestry, and agriculture. The National Project Coordinator (NPC) will be responsible for coordinating the participating national agencies that are implementing the subcontracts and the national and international experts, as well as for facilitating coordination and cooperation among all components of the project.

Qualifications:

- Postgraduate degree in energy, engineering or environmental science
- Broad experience in the estimation of greenhouse gas emissions, calculation, methodologies, modeling, etc. in China and the world
- Sound policy understanding of the global concerns and discussion on climate change
- Extensive business and information exchange contacts with national and international agencies involved in the study of climate change worldwide
- Proven track record of project management
- Project team experience

Language: English

Duties: Reporting to the NPD, the national project coordinator will perform the following duties:

1. Work closely with the National Project Director in coordinating and facilitating inputs of government agencies and research institutions, subcontractors, and experts in a timely and effective manner

2. Report to the steering committee on main policy issues and progress in project results and achievements. Report back to participating agencies and individuals on the committee's comments, recommendations and concerns.

3. Take the lead in preparation of project reports and information releases to be produced by the project management office, while keeping an updated record of information on the project and in maintaining close contacts with the media.

4. Maintain clear and timely communication with the National Communication Project.

5. Prepare an annual Project Implementation Report and the Project Terminal Report.

Terms of Reference for International Expert on Road Transport Sector GHG Emissions

Duration: 0.6 month (2 missions)

Qualifications:

- Postgraduate degree in transport engineering or energy
- Extensive experience in the estimation of greenhouse gas emissions from the road transport sector, including experience in estimating national vehicle activity levels, calculating emissions factors, and making in-situ measurements of vehicle emissions
- Project team experience
- Familiarity with, and updated on, various international efforts in estimating road transport sector GHG emissions

Language: English

Duties: Reporting to the NPD, the expert will perform the following duties:

1. Assist National Project Director in preparing the portions of the work plan and inception report dealing with the road transport sector.

2. Provide suggestions and feedback to Subcontractor 1 on methodology to be used in analyzing road transport sector activity levels. In particular:

   - Provide guidance on preparation of case studies of road transport fleets in two major Chinese cities.
   - Provide assistance in preparation of analysis of size and structure of China's current and projected future vehicle fleet.

3. Provide assistance to Subcontractor 1 in the development of methodology for estimating emissions factors for main types of road vehicles in China. In particular:

   - Provide suggestions on available and preferred methods for calculating road transport emissions factors.
   - Make expert recommendations regarding in-situ methods of measuring vehicle emissions.
   - Provide technical feedback on case studies on emission factors of main technologies used for key types of road vehicles found in China.

4. Provide suggestions to the National Project Director and Project Manager on locales and curriculum for international training of six Chinese technical personnel on developing road transport sector GHG inventories.

5. Provide suggestions to Subcontractor 1 on agenda and invitees for two international workshops on the characteristics of road transportation in other major developing countries, such as India, Brazil, and Egypt. Agenda would include exchange of experiences on methodologies for estimating activity levels and measuring emissions factors. Experience in other countries with Natural Gas Vehicles (NGVs) would also be covered.

6. Monitor results of activities for Objective 1, providing technical feedback. Review drafts of all written outputs for the objective and provide feedback.

7. Prepare mission report at the end of each mission.

Terms of Reference for International Expert on GHG Emissions/Sinks from Land Use Change and Forestry

Duration: 1 month (2 missions)

Qualifications:

- Postgraduate degree in relevant science or engineering field, such as forestry or soil science
- Extensive experience in the estimation of GHG emissions and sinks from land use change and the forestry sector, including experience in the use of on-site measurement, modeling, and remote sensing data to estimate emissions and sinks
- Project team experience
- Familiarity with, and updated on, various international efforts in estimating GHG emissions and sinks from land use change and the forestry sector

Language: English

Duties: Reporting to the NPD, the expert will perform the following duties:

1. Assist National Project Director in preparing the portions of the work plan and inception report dealing with the GHG emissions and sinks from land use change and the forestry sector.

2. Provide suggestions and feedback to Subcontractor 2 on methodology to be used in measuring soil carbon content for various land types and estimating GHG fluxes from land use change. Provide assistance in design of the database structure for information gathered.

3. Assist Subcontractor 2 in the development of stand-level model of soil carbon dynamics.

4. Provide guidance to Subcontractor 2 in the decoding and use of remote sensing maps of Eastern China to estimate living stocks by region and forest type.

5. Provide suggestions on targeted institutions in the U.S. and Brazil and curriculum for international study tour.

6. Provide suggestions on agenda and invitees for two regional workshops held early in project implementation to coordinate methods and criteria for land-use classification and to discuss image quality details.

7. Provide guidance in the design of two regional workshops on remote sensing techniques. Provide suggestions on the profiles of participants for these workshops.

8. Monitor results of activities for Objective 2, providing technical feedback. Review drafts of all written outputs for the objective and provide feedback.

9. Prepare mission report at the end of each mission.

Terms of Reference for International Expert (I) on Estimating Agricultural Sector GHG Emissions (Enteric Fermentation and Animal Science)

Duration: 0.4 month (2 missions)

Qualifications:

- Ph.D. degree in relevant science or engineering field, such as animal sciences and agro-waste management
- Extensive experience in the estimation of greenhouse gas (GHG) emissions from the agricultural sector, including experience in measuring and estimating GHG emissions from fertilized croplands, rice paddies, and livestock (e.g. enteric fermentation, grazing, and livestock wastes)
- Skills in conducting field measurements, developing databases, and designing emissions models
- Project team experience
- Familiarity with, and updated on, various international efforts in estimating GHG emissions and sinks from the agricultural sector

Language: English

Duties:

1. Assist National Project Director in preparing the portions of the work plan and inception report dealing with GHG emissions from the agricultural sector.

2. Provide suggestions and feedback to Subcontractor 3 on methodology to be used in estimating nitrous oxide (N_2O) flux from croplands. In particular:

   - Provide suggestions on methods for measuring N_2O flux from fertilized croplands and for design of database to include information gathered by region and/or crop type and at the appropriate geographic level.
   - Provide assistance in the development of a process-based model for simulating and predicting N_2O emissions from croplands with fertilizer amendment.

3. Provide assistance to Subcontractor 3 in development of methodology for estimating emissions of methane (CH_4) from rice paddies in China. In particular:

   - Provide suggestions on methods for measuring CH_4 emissions from winter-flooded rice paddies and for design of database compiling measurements by region and/or crop type.
   - Assist in the development of process-based model for simulating and predicting methane emissions from rice paddy fields.

4. Provide guidance to Subcontractor 3 in the development of methodology for estimating GHG emissions from the livestock sector. In particular:

   - Provide suggestions on methods for measuring methane emissions from enteric fermentation and related parameters in the field and laboratory. Provide suggestions for design of database to compile information collected, by region and animal type, at the appropriate geographic level.
   - Provide suggestions on methods for measuring methane and nitrous oxide emissions from animal grazing and animal wastes, in the field and the lab. Provide suggestions for design of database to compile information collected.

- Assist in the preparation of a model to simulate methane and nitrous oxide emissions from livestock-related activities.

5. Provide suggestions to the National Project Director and Project Manager on locales and curriculum for international training of eight Chinese technical personnel on the following topics:

   - Measurement and modeling of N_2O emissions from croplands (2 persons)
   - Automatic measurement and modeling of methane emissions from rice paddy fields (2 persons)
   - Measurement and modeling of methane emissions from enteric fermentation (2 persons)
   - Measurement and modeling of methane and nitrous oxide from livestock grazing and animal waste management systems (2 persons)

6. Provide suggestions to Subcontractor 3 on agenda and invitees for two international workshops as follows:

   - International workshop on emissions of N_2O and CH_4 from croplands
   - International workshop on emissions of N_2O and CH_4 from livestock-related activities

7. Monitor results of activities for Objective 3, providing technical feedback. Review drafts of all written outputs for the objective and provide feedback.

Terms of Reference for International Experts (II) on Estimating Agricultural Sector GHG Emissions (for Four-Day Conference)

Duration: 4 days (10 experts to be recruited for four-day conference)

Qualifications:

- Postgraduate degree in relevant science or engineering field, such as biology or plant science
- Extensive experience in the estimation of greenhouse gas (GHG) emissions from the agricultural sector, including experience in measuring and estimating GHG emissions from fertilized croplands *or* rice paddies *or* livestock (e.g. enteric fermentation, grazing, and livestock wastes)
- Skills in conducting field measurements, developing databases, and designing emissions models
- Familiarity with, and updated on, various international efforts in estimating GHG emissions and sinks from the agricultural sector

Language: English

Duties:

1. (All experts) Provide advice on the portions of the work plan and inception report that deal with GHG emissions from the agricultural sector in area of expertise.

2. Three experts) Provide suggestions on methodology to be used in estimating nitrous oxide (N_2O) flux from croplands. In particular:

    - Provide suggestions on methods for measuring N_2O flux from fertilized croplands and for design of database to include information gathered by region and/or crop type and at the appropriate geographic level.
    - Provide advice on the development of a process-based model for simulating and predicting N_2O emissions from croplands with fertilizer amendment.

3. (Three experts) Provide suggestions on methodology to be used for estimating emissions of methane (CH_4) from rice paddies in China. In particular:

    - Provide suggestions on methods for measuring CH_4 emissions from winter-flooded rice paddies and for design of database compiling measurements by region and/or crop type.
    - Provide advice on development of process-based model for simulating and predicting methane emissions from rice paddy fields.

4. (Four experts) Provide suggestions on methodology to be used for estimating GHG emissions from the livestock sector. In particular:

    - Provide suggestions on methods for measuring methane emissions from enteric fermentation and related parameters in the field and laboratory. Provide suggestions for design of database to compile information collected, by region and animal type, at the appropriate geographic level.
    - Provide suggestions on methods for measuring methane and nitrous oxide emissions from animal grazing and animal wastes, in the field and the lab. Provide suggestions for design of database to compile information collected.
    - Provide suggestions on preparation of a model to simulate methane and nitrous oxide emissions from livestock-related activities.

5. (All experts) Provide suggestions to the National Project Director and Project Manager on locales and curriculum for international training of Chinese technical personnel on the following topics, as relevant to area of expertise:

   - Measurement and modeling of N_2O emissions from croplands (2 persons)
   - Automatic measurement and modeling of methane emissions from rice paddy fields (2 persons)
   - Measurement and modeling of methane emissions from enteric fermentation (2 persons)
   - Measurement and modeling of methane and nitrous oxide from livestock grazing and animal waste management systems (2 persons)

6. (All experts) Provide suggestions to Subcontractor 3 on agenda and participant profiles for two international workshops as follows and as relevant to area of expertise:

   - International workshop on emissions of N_2O and CH_4 from croplands
   - International workshop on emissions of N_2O and CH_4 from livestock-related activities

Terms of Reference for a Terminal Evaluation

(Subject to revision during the planning of the evaluation)

Objectives of the Evaluation:

According to the project document, the project shall be subject to an evaluation during the last year of implementation. The evaluation, organized by UNDP, will look into the effectiveness of implementation and results of capacity building and inventory preparation.

Specific Tasks for the Evaluation

a) Confirm the supportiveness of the project to address global concern of the climate change and the national priorities, and the immediate objectives were properly defined and the strategies were properly designed to achieve the objectives.

b) Review whether the project has achieved the expected results, particularly whether the immediate objectives and outputs have been fully achieved with the input from the government and GEF within the timeframe.

c) Review whether the national capability of the project staff has been improved to carry out tasks related to the commitment of UNFCCC.

d) Examine quality of the inventories of the subject areas for the project.

e) Determine and assess any major obstacles during the full achievements of the project results and what actions were taken to remove the obstacles.

Findings of the review and follow-up actions recommended by the evaluation mission will be communicated to the government, project authorities, and UNDP.

Expected Deliverables of the Evaluation

The evaluation mission should complete and submit a Project Evaluation Report.

Composition of the Evaluation Team

The mission will consist of two staff: one international expert who will act as the team leader and one national expert.

Schedule of the Mission

The evaluation mission is scheduled at the end of the project in early 2004, lasting for two weeks.

Annex 3: Terms of Reference for Overseas Training

Background

The project will support some overseas training for each of the three main project components. Training will be specifically tailored to the needs of the project and to increasing capacity in China for developing GHG inventories in sectors of interest.

There will be two types of training for this project:

1. *An overseas study tour* will be designed to benefit a group of technical personnel through exposure to international experience and training. The tour will include visits to relevant institutions and meetings with experienced personnel abroad.

2. *International training fellowships* will include short-term placements in relevant agencies and short certified courses at universities or other institutions of higher learning. International training fellowships will be targeted at mid-level technical staff specifically involved in relevant greenhouse gas emissions inventory work. Training fellowships will be of two to three months in duration; and most will take place near the start of the project to ensure that capacity built can be utilized and disseminated in subsequent project activities.

Procedure

For each overseas training program called for in the project activities, the National Project Director (NPD) will be responsible for making final decisions on which individuals will participate and which foreign institutions will be involved. The relevant subcontractor and relevant international expert will provide recommendations with justifications in written form for each training activity. After the NPD has made the final decision, staff of the project management office will be responsible for assisting with liaison work to ensure that the overseas training is smoothly implemented.

Trainees' chosen must meet the qualifications stipulated by the overseas host training institute or agency. These may include certain standards of English language proficiency, educational qualifications, and work experience. An effort will be made to ensure that no less that 30% of the trainees are women and that equal opportunities are give to suitable men and women candidates.

Each individual completing a training fellowship and one representative of the study tour will be responsible for submitting a return to post report within two weeks of commencement of work duties following the training. These reports should clearly specify how the trainee/study tour group intends to use the training received for improved implementation of the project and for improved GHG inventory work in China.

Specific Overseas Training Activities

The table below lists the training activities called for in each project component. The host institutions and countries will be identified during the project implementation.

Overseas Training Activities

Training Activity	Project Component	Duration	Suggested Host Institutions/ Countries
1. Training of six technical staff in developed countries on methodology for developing road transportation sector GHG emissions inventories	Estimating Emissions from Road Transport Sector	1 month	TBD
2. Study tour abroad providing exposure to international experience and training on techniques used in preparing land use change and forestry sector GHG inventories	Estimating land use change and forestry sector GHG emissions/ sinks	1 month	TBD
3. Training of two technical staff abroad, with continued follow-up technical assistance, on measurement and modeling of N_2O emissions from croplands	Estimating agricultural sector GHG emissions	1 month	TBD
4. Training of two technical staff abroad, with continued technical assistance, on automatic measurement and modeling of methane emissions from rice paddies	Estimating agricultural sector GHG emissions	1 month	TBD
5. Training of two technical staff abroad on measurement and modeling of methane emission from enteric fermentation, with follow-up technical assistance	Estimating agricultural sector GHG emissions	1 month	TBD
6. Training of two technical staff abroad, with continuing follow-up technical assistance, on measurement and modeling of methane and nitrous oxide emissions from livestock-related activities (i.e. waste management systems and grazing)	Estimating agricultural sector GHG emissions	1 month	TBD

Annex 4: Equipment List

GEF funds to be used for purchase of equipment are listed below, grouped according to project objective:

Objective 2: Estimating GHG Emissions/ Sinks from Land Use Change and the Forestry Sector

1. Li-Cor 6400	US$32,000
2. GPS receivers (2 x US$3,500 per receiver)	US$ 7,000
3. GIS platform	US$ 5,000
*4. Root Core (3 x US$300)	
*5. Lysimeter (10 x US$500)	
*6. Rhizo-Win software for root analysis	
*7. Plant and soil analysis equipment	

* can be purchased if there is saving after Items 1-3 have been procured.

Equipment Subtotal 1	*US$44,000*

Objective 3: Estimating Agricultural Sector GHG Emissions

1. HP6890 gas chromatography (4 x US$30,000) each GC for rice, cropland, enteric fermentation and animal waste activities	US$120,000
2. BaPS system designed by Fraunhofer Institute of Atmospheric Environmental Research, Germany	US$ 13,000
3. Nox Analyzer produced by Thermal Physical Corporation, USA	US$ 10,000
Equipment Subtotal 2	*US$143,000*

EQUIPMENT TOTAL	**US$187,000**

Annex 5: Overview of China's GHG Emissions and Vulnerability to Climate Change

China's Vulnerability to Climate Change

China is already burdened with a range of problems related to climate and natural disaster. Within its large arid and semiarid areas, for example, desertification and recurring drought are serious issues. Global climate change could serve to exacerbate those problems that already exist and may present new ones as well.

Throughout history, China has experienced many droughts and floods, the frequency of which might increase with climate change. According to historical records, more than 1,000 severe droughts occurred between 206 BC and 1949. Since 1949, severe droughts occurred in 1959, 1960, 1961, 1972, 1978, and 1997. The last three of these were extremely serious and extensive. The historical records also show that, throughout history, there have been a similar number of major floods, occurring predominantly over the middle and lower reaches of the Yangtze River, Yellow River, Huaihe River, and Haihe River, which together cover the major agricultural zones of China. Since 1949, most major rivers have been partially controlled and many water conservation projects have been undertaken, helping to reduce flood damage. Despite this work, floods still result in serious damage. Based on statistics, up to 7.34 million hectares of farmland were inundated by floods between the 1950s and 1970s. Of this land, over 4 million hectares was seriously damaged. Despite all the stepped-up control efforts made in recent years, extremely severe floods occurred along the Yangtze River or in South China in 1991, 1996, 1997, and 1998. These recent experiences point to the potential difficulty that China would have in adapting to an increase in the frequency of major floods and droughts, as might occur with global warming.

Coastal inundation and an increase in natural disasters in coastal areas potentially brought about by climate change are also serious considerations for China. The Chinese mainland coastline is about 18,000 km long, with the coastal zone accounting for 13% of the nation's total land area, 42% of its population, and 60% of GDP. Consequently, the eight littoral plains and many estuarine deltas that make up the Chinese coastal zone would be very vulnerable to impacts from climate change. Around 11% of the area of China's coastal zone lies below 5 meters elevation and is thus particularly prone to the influence of sea level rise and storm surges, while saline intrusion into estuarine waters and groundwater threatens coastal ecosystems and freshwater supplies. Currently, tropical cyclones, or typhoons, may reach as far as 40°N in China, although most make landfall along the coastline south of Zhejiang Province. On annual average, about 28 typhoons affect the offshore areas of China and about eight affect inland areas, with the number varying greatly from year to year. Storm surges over one meter high occur, on average, six times annually at various locations on the Chinese coast, with those over two meters high occurring at least once annually. Rising sea level and an increase of typhoon frequency or intensity, both potential consequences of climate change, would increase the frequency of such storm surges.

The potential impact of climate change on the behavior of the El Nino-Southern Oscillation (ENSO) is also of vital importance to China. The frequency of occurrence of droughts, floods, and typhoons in some regions of China has been found to correlate with the occurrence of ENSO. While the relationship is complex, it suggests that there would be further links, in addition to those mentioned above, between climate change and natural disasters.

Another area of special concern to China is that of the impacts of climate change on agriculture, forestry, and natural ecosystems. Preliminary studies have shown that natural ecosystems in China could face significant impacts from climate change, including changes in the composition, structure, and carbon storage potential of vegetation. Agriculture is of vital importance to China, as rural residents make up 70% of the total population. A substantial decrease in precipitation has already occurred over eastern China's farming regions. Some research on Northeast China, one of the major industrial and agricultural regions of Asia, has indicated that annual precipitation in that area has been decreasing in the region since 1965, while average temperatures have risen by up to 1°C over the last 100 years. (It has also been found, however, that temperatures have actually dropped slightly in parts of Southern China.) Any potential future water shortage due to climate change would threaten the sustainability of North China's agricultural development and enhance the difficulties of increasing irrigated land area. Forestry is also a key

land use sector in China, not only supplying wood and other forest products, but also playing a key role in environmental protection. Major afforestation projects are underway to help control erosion and provide shelter. The options for extending forested land, however, are limited, principally due to inadequate rainfall in large parts of the nation. With temperature rise and other climatic changes, this situation could worsen; and consequent changes in forest fire frequency and intensity would also be of great concern. In sum, it has already become increasingly clear that Chinese agriculture, forestry, and natural ecosystems are sensitive to local climatic changes, with the implication that the consequences of global change could be extensive in these sectors.

China's Greenhouse Gas Emissions

Given the current scale of the Chinese economy and its potential for growth, the situation of China in terms of greenhouse gas emissions is of vital interest to the international community. China is currently the world's second largest emitter of carbon dioxide (the most significant of all greenhouse gases). It has been projected that by 2025 China will not only be the top emitter of carbon dioxide (CO_2), but also will also have total CO_2 emissions greater than those of the U.S., Canada, and Japan combined.[1] The key sectors for greenhouse gas emissions and sinks in China are energy, industry (industrial processes), agriculture, forestry, and municipal solid waste. Despite the global significance of China's greenhouse gas emissions, the current status of its emissions is not well understood, indicating a need for further work on a sector-by-sector basis.

China's potential for economic growth, and thus for the growth in greenhouse gas emissions that generally accompanies economic growth, can be seen by reviewing some recent statistics on the Chinese economy. In 1998, China's GDP was 7.955 trillion Renminbi (RMB), with an annual growth rate over the previous year's GDP of 7.8% and a per capita GDP of US $770 (based on calculations using the end-of-year foreign exchange rate). From 1993 to 1997, the annual economic growth rate in China averaged 11%, surpassing the world average and the average of developed countries by 7.3 and 8.8 percentage points, respectively, for the same period.

Of the key sectors for greenhouse gas emissions in China, the energy sector is the most significant in terms of total emissions. China currently ranks second, worldwide in energy consumption. Coal is the major source of fuel in China and thus plays an extremely important role in the nation's social and economic development. This is particularly significant in terms of greenhouse gas emissions, because combustion of coal produces more CO_2 per unit energy than do other fossil fuels. Coal accounts for 75% of total primary energy consumption in China; and China's coal consumption accounts for about 30% of coal consumed worldwide. China has adopted extensive programs to slow growth in energy consumption and has made substantial progress over the last twenty years in controlling that growth, which has consequentially risen at only about half the rate of economic growth. Due to the continued use of out-dated technologies, however, utilization efficiency remains lower than that in the developed countries. Also, because China stands on the threshold of an era of continued economic growth, increases in energy consumption are inevitable, with coal, given the endowment of natural resources in China, being the cheapest and most available source of energy to fuel that growth. Thus, China's coal-dominated energy structure is not likely to change in the short term; and greenhouse gas emissions resulting from energy consumption will continue to increase.

Oil and gas make up the second most important segment of China's energy sector. Together they account for about 20% of China's energy consumption. In 1997, oil and natural gas production reached 160.76 million tons and 160 billions cubic meters, respectively, with imports also playing an increasingly important role. Within two to three decades, the production and consumption of oil and gas is expected to increase significantly, in large part as a result of the rapid growth of the transportation sector. Thus, greenhouse gas emissions from this subsector may also become more important in the future.

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[1] "Strategic Options for Reducing CO_2 in China," Fang Dong et al in *Energizing China*, Michael McElroy, et al, ed., Harvard University Press, 1998.

Industrial processes are important in terms of greenhouse gas emissions, but further and in-depth research on emissions from such processes is required in China as well as around the world. China is a large producer of cement, lime, iron and steel, calcium carbide, and adipic acid, all of which have production processes that are undoubtedly important sources of greenhouse gas emissions. Given the large number of such manufacturing enterprises in China and the great disparity in technologies and processes, huge uncertainty exists in both the data on production levels and the emissions factors.

The agricultural sector is also a significant source of greenhouse gas emissions in China, with the most significant emissions from the sector being methane released during rice cultivation, methane and nitrous oxide released from the animal husbandry subsector, and nitrous oxide released from fertilized cropland. Rice production in China accounts for about 39% of world rice output. The contribution of rice paddy fields in China to global methane emissions has been a great concern to the international community. It is thus important to accurately quantify emissions factors and harvest areas for each category of rice field. The regional heterogeneity in geographic and climatic conditions of wetland rice fields and the large complexity in watering regime, fertilizer application, and other farm operations in rice cultivation, however, make it difficult to accurately quantify emissions factors and activity levels and thus present a challenge in developing a sufficiently accurate methane emissions inventory for the subsector.

China has the largest domestic livestock population in the world, with cattle and swine accounting for about 8% and 40% of the global population, respectively. Enteric fermentation and livestock waste together make up the second largest source for agricultural methane emissions in China. In the past decade, the nation's populations of cattle and swine have been increasing at rates of 0.4 and 15 million heads per year, respectively. China's livestock is widely distributed over several climatic zones, with large variability in feed characteristics, feed intake, and waste management. These parameters are important to methane emissions inventory development, but their values still remain greatly uncertain, so that strong efforts will be needed before a sufficiently accurate inventory of methane emissions from enteric fermentation and of methane and nitrous oxide emissions from livestock wastes can be made.

Cropland that is subject to amendment with nitrogen-based chemical fertilizers is one of the major sources of nitrous oxide emissions in China. During 1980-1995, the annual amount of nitrogen-based fertilizer consumption in China increased from 9.7 million tons to 25.2 million tons. With great complexity in terms of crop cultivation, management systems, and agricultural conditions and with a lack of experimental data, the study of nitrous oxide emissions from fertilized land in China is in its infancy; and much work remains to be done in order to reduce the hundred-fold uncertainty in current estimates.

Forests are important sinks for greenhouse gas emissions, as trees and other green plants take up carbon dioxide from the atmosphere for growth. China has undertaken extensive afforestation activities for the past several decades, with almost 30 million hectares of land having been afforested. Currently, China's forests are estimated to be net sinks of the order of 50-90 million tons of carbon annually.

Methane emissions from municipal solid wastes are thought to be an important contributor to greenhouse gas emissions in China. Over the past 20 years, the living standard in China has been rising and unprecedented developments in urbanization and growth of the urban population have been occurring. As a result, solid wastes are produced daily in large amounts, but waste management and treatment systems are still very poor. Such a situation usually leads to serious impacts on urban environmental sanitation and the health of city dwellers, as well as intensive emissions of methane via fermentation of organic wastes. Because of the poor level of management of urban wastes, little data relevant to estimating an urban wastes methane emissions inventory is yet available, thus making the development of an inventory for past years a difficult task.

Annex 6: Article 12 of the UNFCCC: Communication of Information Related to Implementation

1. In accordance with Article 4, paragraph 1, each Party shall communicate to the Conference of the Parties, through the secretariat, the following elements of information:

(a) A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties;

(b) A general description of steps taken or envisaged by the Party to implement the Convention; and

(c) Any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends.

2. Each developed country Party and each other Party included in Annex I shall incorporate in its communication the following elements of information:

(a) A detailed description of the policies and measures that it has adopted to implement its commitment under Article 4, paragraphs 2(a) and 2(b); and

(b) A specific estimate of the effects that the policies and measures referred to in subparagraph (a) immediately above will have on anthropogenic emissions by its sources and removals by its sinks of greenhouse gases during the period referred to in Article 4, paragraph 2(a).

3. In addition, each developed country Party and each other developed Party included in Annex II shall incorporate details of measures taken in accordance with Article 4, paragraphs 3, 4 and 5.

4. Developing country Parties may, on a voluntary basis, propose projects for financing, including specific technologies, materials, equipment, techniques or practices that would be needed to implement such projects, along with, if possible, an estimate of all incremental costs, of the reductions of emissions and increments of removals of greenhouse gases, as well as an estimate of the consequent benefits.

5. Each developed country Party and each other Party included in Annex I shall make its initial communication within six months of the entry into force of the Convention for that Party. Each Party not so listed shall make its initial communication within three years of the entry into force of the Convention for that Party, or of the availability of financial resources in accordance with Article 4, paragraph 3. Parties that are least developed countries may make their initial communication at their discretion. The frequency of subsequent communications by all Parties shall be determined by the Conference of the Parties, taking into account the differentiated timetable set by this paragraph.

6. Information communicated by Parties under this Article shall be transmitted by the secretariat as soon as possible to the Conference of the Parties and to any subsidiary bodies concerned. If necessary, the procedures for the communication of information may be further considered by the Conference of the Parties.

7. From its first session, the Conference of the Parties shall arrange for the provision to developing country Parties of technical and financial support, on request, in compiling and communicating information under this Article, as well as in identifying the technical and financial needs associated with proposed projects and response measures

under Article 4. Such support may be provided by other Parties, by competent international organizations and by the secretariat, as appropriate.

8. Any group of Parties may, subject to guidelines adopted by the Conference of the Parties, and to prior notification to the Conference of the Parties, make a joint communication in fulfillment of their obligations under this Article, provided that such a communication includes information on the fulfillment by each of these Parties of its individual obligations under the Convention.

9. Information received by the secretariat that is designated by a Party as confidential, in accordance with criteria to be established by the Conference of the Parties, shall be aggregated by the secretariat to protect its confidentiality before being made available to any of the bodies involved in the communication and review of information.

10. Subject to paragraph 9 above, and without prejudice to the ability of any Party to make public its communication at any time, the secretariat shall make communications by Parties under this Article publicly available at the time they are submitted to the Conference of the Parties.

Decision 10 of the Second Conference of the Parties (COP 2) to the UNFCCC

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Decision 10/COP 2
Communications from Parties not included in Annex I to the Convention: Guidelines, facilitation and process for consideration

The Conference of the Parties,

Recalling Article 12.1, 12.5 and 12.7 of the United Nations Framework Convention on Climate Change,

Recalling also its Decision 8/COP 1 on first communications from Parties not included in Annex I to the Convention and Decision 4/COP 1 on methodological issues,

Noting that, in accordance with Article 12.5 of the Convention, each Party not included in Annex I to the Convention shall make its initial communication within three years of the entry into force of the Convention for that Party, or of the availability of financial resources in accordance with Article 4.3, and that Parties that are least developed may make their initial communication at their discretion,

Recognizing that, in accordance with Article 4.7, the extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology, and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties,

Having considered that from its first session, in accordance with Article 12.7, the Conference of the Parties shall arrange for the provision to developing country Parties of technical and financial support, on request, in compiling and communicating information under this Article, as well as in identifying the technical and financial needs associated with proposed projects and response measures under Article 4. Such support may be provided by other Parties, by competent international organizations and by the secretariat, as appropriate,

1. *Requests* the Convention secretariat:

(a) In accordance with Article 8.2 (c), to facilitate assistance to Parties, particularly developing country Parties, in the preparation of their initial communications, through the organization of workshops at the regional level; to provide a forum for the exchange of experiences in the development of emission factors and activity data for the estimation of the inventory, as well as, on request, for other elements of information in the initial communication; and to provide a report to the Subsidiary Body for Implementation and the Subsidiary Body for Scientific and Technological Advice at each of their sessions; and

(b) To make available to the Subsidiary Body for Implementation, at each of its sessions, details of the financial support made available to Parties not included in Annex I to the Convention (non-Annex I Parties) from the interim operating entity of the financial mechanism for the preparation of their initial communications, including projects in this regard proposed by each Party, the funding decision and the date and amount of funds made available to the Party;

2. *Decides*:

(a) That non-Annex I Parties should use the guidelines contained in the annex to the present decision when preparing their initial communications under the Convention;

(b) That the national and regional development priorities, objectives and circumstances of non-Annex I Parties should, in accordance with Article 4.1, and the provisions of Article 3 and Article 4.3, 4.4, 4.5, 4.7, 4.8, 4.9 and 4.10, be taken into account by the Conference of the Parties in considering matters related to their initial communications; and

(c) That non-Annex I Parties that wish to submit voluntarily additional information may use elements from the guidelines approved for Parties included in Annex I to the Convention when preparing their initial communications.

8th plenary meeting
19 July 1996

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Annex to Decision 10, COP 2: Guidelines for the Preparation of Initial Communications by Parties Not Included in Annex I to the Convention

1. The guidelines for the preparation of initial communications by Parties not included in Annex I to the Convention (non-Annex I Parties) have five principal objectives, taking into account Article 4.7:

(a) To assist non-Annex I Parties in meeting their commitments under Article 12.1;

(b) To encourage the presentation of information in ways that are, to the extent possible, consistent, transparent and comparable as well as flexible, and to take into account specific national situations and requirements for support to improve the completeness and reliability of activity data, emission factors and estimations;

(c) To serve as policy guidance to the interim operating entity of the financial mechanism for the timely provision of financial support needed by the developing country Parties to meet the agreed full costs in complying with their obligations under Article 12.1, as referred to in decision 11/CP.2;

(d) To facilitate the process of preparation, compilation and consideration of the communications, including the preparation of compilation and synthesis documentation; and

(e) To ensure that the Conference of the Parties has sufficient information to carry out its responsibilities to assess the overall aggregated effects of the steps taken by the Parties in the light of the latest scientific assessments concerning climate change, and to assess the implementation of the Convention.

Scope

2. In accordance with Article 12.1, the communication should include:

(a) A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties;

(b) A general description of steps taken or envisaged by the Party to implement the Convention; and

(c) Any other information that the Party considers relevant to the achievement of the objective of the Convention and suitable for inclusion in its communication, including, if feasible, material relevant for calculations of global emission trends.

National circumstances

3. In presenting the information, non-Annex I Parties should specify their national and regional development priorities, objectives and circumstances on the basis of which they will address climate change and its adverse impacts. The description of these circumstances can cover a wide range of information. In addition to information, which can be conveniently presented in a table (see table I below), Parties may present basic economic, geographic and climatic information, as well as other factors relevant to climate change of any nature, such as, for example, features of their economy, which may affect their ability to deal with climate change.

4. Parties may provide a brief description of existing institutional arrangements, which are relevant to the preparation of the inventory on a continuing basis, or a list of perceived deficiencies in this area.

5. Parties may also present information on their specific needs and concerns arising from the adverse effects of climate change and/or the impact of the implementation of response measures, especially on:

(a) Small island countries;

(b) Countries with low-lying coastal areas;

(c) Countries with arid and semi-arid areas, forested areas and areas liable to forest decay;

(d) Countries with areas prone to natural disasters;

(e) Countries with areas liable to drought and desertification;

(f) Countries with areas of high urban atmospheric pollution;

(g) Countries with areas with fragile ecosystems, including mountainous ecosystems;

(h) Countries whose economies are highly dependent on income generated from the production, processing and export, and/or on consumption of fossil fuels and associated energy-intensive products;

(i) Landlocked and transit countries; and

(j) Other special considerations foreseen in Article 4.9 (least developed countries) and Article 4.10 (fossil-fuel dependency), as appropriate.

6. In presenting the information, wherever applicable, Parties should present numerical indicators. For example, they might present data expressed in terms of affected percentage of land area, population, gross domestic product (GDP), etc.

Inventory

7. There is a clear need for adequate and additional financial resources, technical support and technology transfer to supplement the efforts towards capacity building for preparation of the national inventories.

8. The Guidelines for the National Greenhouse Gas Inventories and Technical Guidelines for Assessing Climate Change Impacts and Adaptation or the simplified default methodologies adopted by the Intergovernmental Panel on Climate Change (IPCC) should be used by non-Annex I Parties, as appropriate and to the extent possible, in the fulfillment of their commitments under the Convention.

9. Information should be provided on the following greenhouse gases: carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O), to the extent the Party's capacities permit. In addition, Parties are encouraged to include in their national inventories the fully-fluorinated compounds, as appropriate. Other greenhouse gases included in the IPCC methodology may be included at the discretion of the Parties. Emissions from bunker fuels should be reported separately from national emissions.

10. Parties should strive to present the best available data in a table (see table II below), to the extent their capacities permit, and try to identify the areas where the data may be further improved in future communications through national capacity building. Additional information, such as, for example, expression of the results in terms of socio-economic, geographical indicators deemed relevant by each country, may also be provided.

11. As recognized by the IPCC in its Second Assessment Report, there is still great uncertainty associated with net anthropogenic emissions resulting from activities other than combustion of fossil fuels. Such activities include, *inter alia*, methane emissions from agriculture and waste sectors, coal mining, biomass burning; carbon dioxide emissions from land use change and forestry; and nitrous oxide emissions from all sectors. Since the emissions resulting from these activities depend on local circumstances, and make up a large proportion of the national emissions of non-Annex I Parties, such Parties should make efforts to obtain field observation data to decrease the uncertainties associated with the inventory of these emissions, taking into account the further development of the IPCC methodology.

12. It is further recognized that such improvement of the quality of emission data, in addition to improving the transparency and comparability of national emissions inventories, also improves knowledge of the relationship between global emissions and resulting atmospheric concentration of greenhouse gases, and therefore aids

significantly the task of estimating the emission limitations or reductions required to achieve a given concentration level of greenhouse gases, the ultimate objective of the Convention.

13. Non-Annex I Parties are thus encouraged to formulate cost-effective national, and where appropriate regional, programmes aiming at the improvement of the quality of local emission factors and appropriate data gathering, and to submit requests for financial and technical assistance to the interim operating entity of the financial mechanism of the Convention in addition to their request for support for the preparation of their initial communications.

14. Non-Annex I Parties should provide the best available data in their inventory. To this end such data should be provided for the year 1994. Alternatively, non-Annex I Parties may provide such data for the year 1990.

General description of steps

15. In accordance with Article 12.1, each non-Annex I Party should communicate a general description of steps taken or envisaged by the Party to implement the Convention. Taking into account the chapeau of Article 4.1, the initial communication should seek to include, as appropriate:

(a) Programmes related to sustainable development, research and systematic observation, education and public awareness, training, etc;

(b) Policy options for adequate monitoring systems and response strategies for climate change impacts on terrestrial and marine ecosystems;

(c) Policy frameworks for implementing adaptation measures and response strategies in the context of coastal zone management, disaster preparedness, agriculture, fisheries, and forestry, with a view to integrating climate change impact information, as appropriate, into national planning processes;

(d) In the context of undertaking national communications, building of national, regional and/or sub-regional capacity, as appropriate, to integrate climate change concerns in medium and long-term planning;

(e) Programmes containing measures the Party believes contribute to addressing climate change and its adverse impacts, including the abatement of increase in greenhouse gas emissions and enhancement of removals by sinks.

Other information

16. In accordance with Article 12.7 the Conference of the Parties should use the information in initial communications in arranging for the provision to developing country Parties of technical and financial support, on request, in compiling and communicating information under Article 12, as well as in identifying the technical and financial needs associated with proposed projects and response measures under Article 4.

17. Developing country Parties may, in accordance with Article 12.4, on a voluntary basis, propose projects for financing, including specific technologies, materials, equipment, techniques or practices that would be needed to implement such projects, along with, if possible, an estimate of all incremental costs, of the reductions of emissions and increments of removals of greenhouse gases, as well as an estimate of the consequent benefits.

18. Non-Annex I Parties may provide any other information relevant to the achievement of the objective of the Convention, including, if feasible, material relevant for calculation of global emission trends, constraints and obstacles, etc.

Financial and technological needs and constraints

19. Non-Annex I Parties may describe the financial and technological needs and constraints associated with the communication of information. In particular, and following the recommendations of the Conference of the Parties that have evolved through its subsidiary bodies, the description may cover needs and constraints associated with the further improvement of national communications, including reduction of the margin of uncertainty in emission and removal variables through appropriate institutional and capacity-building.

20. According to national priorities, non-Annex I Parties may include a description of financial and technological needs associated with activities and measures envisaged under the Convention.

21. Information on national technological needs related to measures to facilitate adequate adaptation to climate change may be included in the communication.

22. Information on relevant financial and technological needs relating to the assessment of national, regional and/or sub-regional vulnerability to climate change may be added in the communication. This may include, where appropriate, information related to data-gathering systems to measure climate change effects in particularly vulnerable countries or regions or to strengthen such systems; and identification of a near-term research and development agenda to understand sensitivity to climate change.

23. There is a need to take into full consideration the circumstances and vulnerabilities of developing country Parties, keeping in mind that the extent to which developing countries will effectively implement their commitments under Convention will depend on the effective implementation by developed countries of their commitments under the Convention related to financial resources and transfer of technology.

Timing of submission of the initial communication

24. In accordance with Article 12.5, the timing of submission of the initial communication is within three years of entry into force of the Convention for that Party or of the availability of financial resources in accordance with Article 4.3.

Structure and executive summary

25. The information provided in accordance with these guidelines should be communicated by a Party to the Conference of the Parties in a single document. Any additional or supporting information may be supplied through other documents such as a technical annex.

26. The initial communication should include an executive summary that would present the key information and data from the full document. The executive summary will be translated and distributed widely. It would be useful to envisage an executive summary of no more than 10 pages.

Language

27. The communications may be submitted in one of the official languages of the United Nations. Non-Annex I Parties are also encouraged to submit, to the extent possible and where relevant, a translation of their communications into English.

Table I. National circumstances

Criteria	1994
Population	
Relevant areas (square kilometres)	
GDP (1994 US$)	
GDP per capita (1994 US$)	
Estimated share of the informal sector in the economy in GDP (percentage)	
Share of industry in GDP (percentage)	
Share of services in GDP (percentage)	
Share of agriculture in GDP (percentage)	
Land area used for agricultural purposes (square kilometres)	
Urban population as percentage of total population	
Livestock population (disaggregate as appropriate)	
Forest area (square kilometres, define as appropriate)	
Population in absolute poverty	
Life expectancy at birth (years)	
Literacy rate	

Note: Parties may also report on the rate of change of the above indicators to the extent possible; data in this table should be as disaggregated as possible and include information on individual sectors.

Table II. Initial national greenhouse gas inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol

Greenhouse Gas Source and Sink Categories	CO_2	CH_4	N_2O
Total (Net) National Emission (Gigagram per year)	X	X	X
1. All Energy	X	X	X
Fuel combustion			
Energy and transformation industries	X		X
Industry	X		
Transport	X		
Commercial-Institutional	X		
Residential	X		
Other (please specify)	X	X	
Biomass burned for energy		X	
Fugitive Fuel Emission			
Oil and natural gas systems		X	
Coal Mining		X	
2. Industrial Processes	X		X
3. Agriculture		X	X
Enteric Fermentation		X	
Rice Cultivation		X	
Savanna Burning		X	
Others (please specify)		X	X
4. Land Use Change and Forestry	X		
Changes in Forest and other woody biomass stock	X		
Forest and Grassland Conservation	X		
Abandonment of Managed Lands	X		
5. Other Sources as appropriate and to the extent possible (please specify)	X	X	X

Note 1: X - Data to be presented to the extent the Party's capacities permit (Article 12.1(a)).

Note 2: Non-Annex I national communications will include the information in this table, and a description of assumptions and methods used, and the values of emission coefficients, where these differ from IPCC assumptions, methods and values.

Note 3: Efforts should be made to report the estimated range of uncertainty, where appropriate.

Annex 7: Revised Project Planning Matrix

Project Planning Matrix

Summary	Objectively Verifiable Indicators	Means/Source of Verification	Critical Assumptions and Risks
Development Objective			
China develops stronger capacity in estimating emissions for GHG inventories	By the end of the project, China has capacity to produce GHG inventory with fuller sectoral coverage and greater accuracy	Journal articles by Chinese experts on improved methods for estimating GHG emissions	Local institutions have technical capacity to improve methodology
Immediate Objectives			
Immediate Objective 1: Strengthened capacity in estimating GHG emissions from road transport sector	By project end, China possesses a better methodology for estimating transport sector GHG emissions than that initially used in the project "Enabling China to Prepare its Initial National Communications"	Climate change experts or transport sector experts recognize improvement in China's methodology for estimating transport sector emissions in journal articles or at international meetings	Local institutions have technical capacity to improve methodology
Immediate Objective 2: Strengthened capacity in estimating GHG emissions and removals due to land use change and the forestry sector	By project end, China possesses a better methodology for estimating GHG emissions and removals due to land use change and the forestry sector than that initially used in the project "Enabling China to Prepare its Initial National Communications"	Climate change experts or land use/forestry experts recognize improvement in China's methodology for estimating emissions due to land use change and the forestry sector. Said recognition expressed in journal articles or at international meetings.	Local institutions have technical capacity to improve methodology
Immediate Objective 3: Strengthened capacity in estimating agricultural sector GHG emissions	By project end, China possesses a better methodology for estimating agricultural GHG emissions than that initially used in the project "Enabling China to Prepare its Initial National Communications"	Climate change experts or transport sector experts recognize improvement in China's methodology for estimating agricultural sector emissions in journal articles or at international meetings	Local institutions have capacity to improve methodology

Project Planning Matrix (continued)

Summary	Objectively Verifiable Indicators	Means/Source of Verification	Critical Assumptions and Risks
Outputs and Activities			
Output 1.1 Information on road vehicle fleets in China and other developing countries			
Activities:			
1.1.1 Gather information on characteristics of main modes of road transport, vehicles used and corresponding technological levels in China and other major developing countries through visiting the Internet and study tours	Report on characteristics of road vehicle fleets in China and other developing countries such as Brazil, Egypt and India by the end of the 6th month.	-Quality report on the characteristics of road vehicle fleets in China and other developing countries provided	-Information needed on road transport in various developing countries, including China, is accessible
1.1.2 Prepare case studies on road transport fleets in two Chinese cities, including analysis of growth trends	Two case studies, each on the road transport vehicle fleet of two a major Chinese cities y completed by end of the 10th month.	-Two quality case studies, each on the vehicle fleet of a major Chinese city	-Institute carrying out case studies possesses requisite skills in surveying; local municipal organizations cooperative
1.1.3 Provide analysis of size and structure of current and projected vehicle fleet in China	Report and presentation on the estimated size and composition of China's current and future vehicle fleet by end of Year 1.	-Briefing estimating size and composition of China's fleet and delineating improved methodology	-Local institutions have technical capacity to prepare improved estimates
Output 1.2 Improved methodology for estimating emission factors of road vehicles			
Activities:			
1.2.1 Conduct survey to identify methods for estimating road transport activity levels. These measured and estimated data are to be coded and inputted into the database.	Report and presentation on preferred methods for estimating activity levels for the road transport sector by end of the 6th month.	-Briefing on preferred methods for estimating activity levels with justification	-Current methods for estimating activity levels are sub-optimal
1.2.2 Carry out investigation and analysis in order to determine formulae for calculating emission factors and methods for in-situ measurements in developing countries	Report on preferred methods for calculating vehicle emissions factors and preferred methods for conducting in-situ measurements of vehicle emissions presented in a briefing by the end of Year 1.	-Briefing on preferred methods for calculating emission factors and in-situ measurements, with justification	-Current methods sub-optimal; local institutes possess capacity to identify optimal methods
1.2.3 Conduct case studies on emission factors of main technologies used for key types of road vehicles found in China	Case studies on emission factors of main road transport technologies for each type of road vehicle completed by the end of the 18th month.	-Quality case studies on emission factors of main technologies of interest	-Local institutes possess necessary technical capacity

Output 1.3 International exchange and training on estimating activity levels and emission factors for road transport sector *Activities:* 1.3.1 Hold two international workshops to collect information on road transport in major developing countries and share experiences on estimating activity levels and measuring emissions factors	Proceedings of two workshops, including comprehensive information on road transportation sector in other developing countries prepared by the end of the 5th month and 15th month, respectively.	-Workshop proceedings	-Relevant individuals/institutions in other developing countries possess interest and relevant knowledge to share
1.3.2 Train six persons abroad in developed countries on methodology for developing transportation sector inventories	Six Chinese technical people trained, with a good understanding of the methodology used in developed countries for preparing transportation sector inventories by end of the 3rd month.	-Satisfactory reports on training; positive contribution by trainees to subsequent project activities	-Appropriate institutions exist abroad that will meet training requirements

Project Planning Matrix (continued)

Summary	Objectively Verifiable Indicators	Means/Source of Verification	Critical Assumptions and Risks
Output 2.1 Expertise developed in on-site measurement, estimation, modeling, and remote sensing for land use change and forestry sector GHG inventories *Activities:* 2.1.1 Collect/measure soil carbon content for various land use types and estimate GHG fluxes associated with land-use change, forest harvesting, and detritus •	Database for compiling information on soil carbon content and GHG fluxes for land use change, by forest and agricultural type and by species at an appropriate geographic level completed by 21st month.	-Database compiling information on soil carbon content and GHG fluxes for land us change. Data in format convenient for use in model.	-Instrument for soil carbon content measurements available; local institutes possess technical capacity to make measurements and estimate fluxes
2.1.2 Develop a stand-level model of carbon dynamics in soils and use to project changes in carbon stocks for land converted from forest to other uses and for afforested lands	Carbon dynamics model and scenarios of carbon stock changes for alternative soil carbon and GHG flux values completed by the end of the 15th month.	-Carbon dynamics model verified with scenarios of carbon stock changes for alternative soil carbon and GHG flux values	-Effective measurements of soil carbon (If measurements are not made properly, the model will not have parameters and data needed for development.)
2.1.3 Collect and decode remote sensing maps of Eastern China and use GIS to map distribution of forests by types and estimate living stocks by region and forest type	A Geographic Information System (GIS) system displaying the distribution of main forest types in Eastern China and estimation of living stocks by region and forest type completed by the end of the 15th month.	-A Geographic Information System (GIS) displaying the distribution of main forest types in Eastern China	-Remote sensing maps available; GIS display enables more accurate estimate of forest living stocks than is currently available

Output 2.2 International exchange and training related to improving estimates of GHG emissions/ sinks from land use change and the forestry sector *Activities:* 2.2.1 Organize two regional workshops to coordinate methods and criteria for land-use classification and to discuss image quality and details 2.2.2 Organize two regional workshops to discuss remote sensing techniques 2.2.3 Organize international study tour to give Chinese participants exposure to international experience and training on techniques used in preparing land use change and forestry sector GHG inventories	Proceedings of two workshops on land use classification and imaging completed by the end of 5th month. Proceedings of two workshops on remote sensing techniques completed by the end of the 17th month Chinese technical personnel trained in the field of soil carbon research by the end of the 2nd month.	-Proceedings from two workshops reflecting coordination on methods and criteria for land-use classification and exchange on image quality and details -Proceedings from two workshops reflecting fruitful exchange on remote sensing techniques -Satisfactory report on study tour; positive contribution by participants to subsequent project activities	-Relevant individuals/institutions in other countries in the region possess interest and relevant knowledge to share -Relevant individuals/institutions in other countries in the region possess interest and relevant knowledge to share -Appropriate institutions exist abroad that meet study tour requirements
Output 3.1 Methodology for and expertise in estimating N_2O flux from croplands *Activities:* 3.1.1 Collect and measure N_2O flux from croplands using automatic and manual methods 3.1.2 Develop process based model for simulating and predicting N_2O emissions from croplands 3.1.3 Conduct international training for two persons on measurement and modeling of N_2O emissions from croplands	Database for compiling information gathered on N2O flux from croplands completed by the end of the 21st month. Dynamic model of N2O flux from croplands, validated with scenarios completed by end of project. Two technical personnel trained in measurement and modeling of N2O emissions from croplands by end of the 3rd month and 15th month respectively.	-Database compiling information gathered on N_2O flux from croplands; format convenient for use in model -Dynamic model of N_2O flux from croplands validated with scenarios -Satisfactory reports on training; positive contribution by trainees to subsequent project activities	-Instruments for measuring N_2O flux available and accurate; local institutes possess technical capacity to make measurements -Accurate measurements of N_2O available for model development -Appropriate institutions exist abroad that meet training requirements

Project Planning Matrix (continued)

Summary	Objectively Verifiable Indicators	Means/Source of Verification	Critical Assumptions and Risks
Output 3.2 Methodology for and expertise in estimating methane emissions from rice paddies			
Activities:			
3.2.1 Conduct continuous measurement of methane emissions from winter-flooded rice paddy fields	Database for compiling measurements of methane emissions from rice paddies, by region and/or crop type completed by the end of the 21st month.	-Database compiling measurements of methane emissions from rice paddies, by region and/or crop type	-Instruments for measuring methane from rice paddies available and accurate; local institutes possess technical capacity to make measurements
3.2.2 Develop process-based model for simulating and predicting methane emissions from rice paddies	Validated model simulating methane emissions from rice paddies completed by end of project.	-Validated process-based model for simulating methane emissions from rice paddies	-Accurate measurements of methane emissions from rice paddies available for model development; local institutions possess required modeling capabilities
3.2.3 Conduct international training of two persons on automatic measurement and modeling of methane emissions from rice paddy fields	Two technical personnel trained in measurement and modeling of methane emissions from rice paddies by end of the 2nd month.	-Satisfactory reports on training; positive contribution by trainees to subsequent project activities	-Appropriate institutions exist abroad that meeting training requirements
3.2.4 Organize an international workshop on emissions of N_2O and CH_4 from croplands	Proceedings of workshop on N2O and CH4 emissions from croplands prepared by the end of the 13th month.	-Workshop proceedings reflecting good exchange on cropland emissions	-Relevant individual interested in attending; have capacity to understand presentations

Output 3.3 Methodology for and expertise in estimating GHG emissions from the livestock sector			
Activities:			
3.3.1 Collect and measure methane emissions from enteric fermentation and related parameters in the field and laboratory	Database for compiling information on methane emissions from enteric fermentation completed by the end of the 19th month.	-Database compiling information on methane emissions from enteric fermentation	-Instruments for measuring methane emissions from enteric fermentation are available and accurate
3.3.2 Conduct international training for two persons on measurement and modeling of methane emissions from enteric fermentation	Two Chinese technical staff trained in measurement and modeling of methane emissions from enteric fermentation by end of the 3rd month.	-Satisfactory reports on training; positive contribution by trainees to subsequent project activities	-Appropriate institutions exist abroad that meet training requirements
3.3.3 Collect and measure methane emissions, nitrous oxide emissions, and related parameters from animal grazing and animal wastes in the field and lab	Database for compiling information on methane and nitrous oxide emissions from animal wastes and animal grazing completed by end of the 19th month.	-Database compiling information on methane and nitrous oxide emissions from animal wastes and animal grazing	-Instruments for measuring emissions from animal wastes and animal grazing available and accurate
3.3.4 Conduct studies of how to model methane and nitrous oxide emissions from livestock-related activities (i.e. waste management systems and grazing)	Model projecting methane and nitrous oxide emissions from livestock sector completed by end of project	-Validated model projecting methane and nitrous oxide emissions from livestock sector	-Accurate measurements of methane and nitrous oxide emissions from the livestock sector exist for use in model development
3.3.5 Conduct international training for two persons on measurement and modeling of methane and nitrous oxide emissions from livestock-related activities (i.e. waste management systems and grazing)	Two Chinese technical staff trained in measurement and modeling of methane and nitrous oxide emissions from animals wastes and animal grazing by end of the 3rd month	-Satisfactory reports on training; positive contribution by trainees to subsequent project activities	-Appropriate institutions exist abroad that meet training requirements
3.3.6 Organize an international workshop on methane and nitrous oxide emissions from livestock related activities	Proceedings of workshop on methane and nitrous oxide emissions from livestock sector prepared by end of Year 1.	-Workshop proceedings reflecting fruitful exchange on emissions from livestock related activities	-Relevant individuals interested in attending and have capacity to understand presentations

Annex 8: Incremental Cost Analysis and Matrix

Baseline
There is a series of activities that China is undertaking/planning to undertake with regards to inventories of emissions. These activities are described in the IC matrix (below) and the total cost of these activities, funded by the Government of China, is US$ 100,000.

Alternative
For each component of the targeted research, the Alternative project to be implemented with GEF support consists of much more detailed databases, more databases, more analysis of recent and historical records, new and improved models for predicting emissions and impacts, more research into determining emission factors, international support to preparing models and databases, international training to ensure sustainable capacity is built. In each case the findings will be shared with the global community through papers, regional seminars, international seminars. Total cost of this alternative project is $3,190,000.

The overall incremental cost is therefore: $3,090,000. Of this, GEF is requested to finance $1,500,000, and the GOC will finance $1,590,000.

Domestic Benefits (of the Alternative, of the Baseline)
For the targeted research, (a) support the preparation of subsequent National Communications for China and improve their quality; (b) the research will primarily benefit China since it will provide China with better data and information in order to develop policy measures to overcome any climate-related impacts.

Global Benefits (of the Alternative, of the Baseline)
Benefits of the targeted research include the following: (a) significant data will be generated. This data related to climate change will be of use to the convention and be of use to researchers/policy makers in all countries; and (b) improved methodology. Existing CC methodologies apply principally to temperate countries in Europe and N. America and are of questionable application to other zones. The methodologies developed under this project will therefore be of use to all other countries, particularly developing countries, in their efforts to manage climate change and undertake obligations to the UNFCCC. (c) Global impact: Given China size (e.g., in terms of coastline, food production, population, emissions, etc.) helping China to manage CC has a sizeable impact on helping the world to manage CC. For example, ensuring the maintenance of China's food supply through climate change is of key importance to maintaining world food supplies and therefore to peace and development.

Overall Funding
Government of China is to finance the baseline ($100,000) and 51 % of the increment ($1,590,000). Total GOC funding is therefore: $1,690,000.

GEF is requested to contribute 49 % of the increment ($1,500,000).

Total project cost is therefore: $3,190,000 (with PDF, $3,414,000).

TARGETED RESEARCH: INCREMENTAL COST ANALYSIS

BENEFITS/ COSTS	BASELINE	ALTERNATIVE	INCREMENT (ALTERNATIVE-BASELINE)
Global Environmental Benefits	Land-use change and forestry (LUCF), agriculture and transportation sector research is focused on improving the future inventory of China's GHG emissions. Its benefits are largely global. Land-use images are available but remain unutilized, equipment to measure methane and N2O is available but remains or will remain under-utilized, and little or no detailed survey and measurement work is planned in the transportation sector.	Global benefits fall in 3 areas: (i) Significant data will be generated. This data related to climate change will be of use to the convention and be of use to researchers/policy makers in all countries. (ii) Improved methodology. Existing CC methodologies apply principally to temperate countries in Europe and N. America and are of questionable application to other zones. The methodologies developed under this project will therefore be of use to all other countries, particularly developing countries, in their efforts to manage climate change and undertake obligations to the UNFCCC (iii) Global impact: Given China size (e.g. in terms of coastline, food production, population, emissions, etc.) helping China to manage CC has a sizeable impact on helping the world to manage CC. For example, ensuring the maintenance of China's food supply through climate change is of key importance to maintaining world food supplies and therefore to peace and development.	The additional and data and analysis will significantly help China improve its national GHG emissions inventory in the LUCF, agriculture and transportation sectors. Emissions from agriculture are poorly understood and the uncertainty on N2O emissions is very large. Transportation sector emissions are growing faster than coal-related ones, and understanding this sector better will be crucial to future GHG inventories.
Domestic Benefits	See paragraph above for a description of the domestic benefits, which would be negligible for the LUCF, agriculture, and transportation sectors. The research will benefit China since it will provide China with better data, and information, in order to subsequently develop related policy measures.		

BENEFITS/ COSTS	BASELINE	ALTERNATIVE	INCREMENT (ALTERNATIVE-BASELINE)
Activity 1: **Transportation Sector Inventory**	- Help China have a better understanding on its specific features of transportation modes and its energy consumption and environment emission from this sector, support planning making, energy conservation and environment policies making in the sector. US$ 30,000	This research is focused on improving the future inventory of China's GHG emission. Its benefits are largely global. This study will conduct investigation on transportation sector with collaboration local researchers and do research on methodology suitable to developing countries regarding to activity level and emission factor in this sector and case studies and on-situ measurement would be undertaken on four types vehicle – coach, truck, motorcycle and agricultural vehicle. International training will also be provided. US$ 410,000	GEF funding will support investigation, questionnaire and international training regarding to transportation sector, and will share the funding of equipment, consultation, information data process and international workshop. Total increment is $380,000, of which: $200,000 from GEF; $180,000 GOC co-funding.
Activity 2 **Land use change and Forestry Inventory**	China will improve its understanding on soil carbon content. US$ 70,000	1. Measure soil carbon content, and estimate GHG fluxes associated with forest harvesting and detritus. 2. Develop a stand-level model of carbon dynamics and use the model to project changes in carbon stocks of various forests. 3. Collate and analyze remote sensed maps of Eastern Chinese land use, and develop a geographic information system (GIS). 4. Organize two regional workshops. 5. Review and revise existing policies and programmes $1,370,000	GEF will cover the cost of study tours, equipment, travel and loading, international advisory and data processing for soil carbon measurement Total increment is $1.3 million, of which: $600,000 from GEF; $700,000 from GOC co-funding.
Activity 3 **Agriculture Sector Inventory**	None	1. Field and laboratory measurement of N_2O and CH_4 emissions from croplands and animal-related agriculture. 2. Developing tool models for simulating and projecting N_2O and CH_4 emissions from croplands and animal-related agriculture. 3. Training (national and international) and academic workshops The total cost of these activities will be US$ 1,410,000.	GEF will cover costs of utilizing the basic facilities, analysis equipment, laboratory and international inputs and training. Total increment is $1.41 million, of which: GEF $700,000 GOC $710,000.
TOTAL	**$100,000**	**$3,190,000**	**$3,090,000, of which:** **GEF: $1,500,000** **GOC: $1,590,000**

Note: Numbers may not add due to rounding.

Annex 9: Project Implementation Chart