

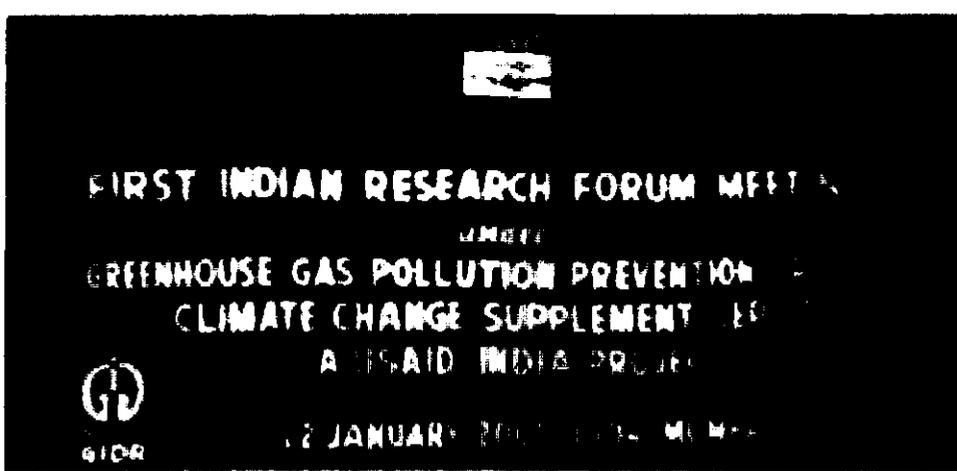


**United States Agency for International Development
Greenhouse Gas Pollution Prevention Project
Climate Change Supplement
(GEP-CCS)**

Communication and Information Outreach

Task 4.B

**Report On The First Indian Research Forum Meeting
And Proposed Research Topics**



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February 14, 2001



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Executive Summary

USAID/India's Greenhouse Gas Pollution Prevention - Climate Change Supplement (GEP-CCS) encourages collaboration between various stakeholders on various aspects of GHG emission reduction and its impact on India's economic development. The information and outreach task of GEP-CCS will facilitate joint research between Indian and U.S. researchers on various issues related on GHG mitigation project development and financing. The Louis Berger Group, Inc. (LBG) invited several renowned Indian researchers to prioritize the research topics in collaboration with industry, NGO and Government stakeholders. The American researchers would be invited to join the partnership subsequently. Indira Gandhi Institute of Development Research (IGIDR), Mumbai organized the "Indian Research Forum" meeting on January 22, 2001 in Mumbai to facilitate this multi-stakeholder research-prioritization discussion. Twenty-two participants from leading Indian research institutions conducting research on global climate change attended the Forum meeting. These researchers prioritized the following research topics and the lead author(s) for each of these topics:

1. India's Vulnerability to Climate Change and Cost of Adaptation: An Overview
2. Linkages Between Growth and GHG Emissions
3. Mitigation of GHG in Selected Sectors; and
4. Assessment of the Role of Carbon Neutral Technologies in India's Power Sector

An action plan was also finalized to disseminate the research finding and enable the beneficiaries of the research, i.e. policy makers and GHG mitigation project developers to have quick access to insights from the research community. The joint research teams will complete the first drafts of the papers by September 2001. These would be peer-reviewed and would also be available for stakeholder comments through a web dialogue hosted by FICCI. The Research Compendium will be completed by May 2002. This note discusses the identification of research topics, the formation of teams and deliberations and the details of each topic.

Background

USAID/India's Greenhouse Gas Pollution Prevention – Climate Change Supplement (GEP-CCS) project will build local institutional capacity to design and implement activities that reduce greenhouse gas emissions while supporting India's economic development. In order to support these activities a joint research between Indian and U.S. researchers will be facilitated. Outcome of the research work could assist in framing policy or developing "bankable" GHG mitigation projects. In order to achieve this objective, USAID/ LBG organized a meeting of the Indian research institutions that are known to be conducting research on climate change subjects. Representatives of industry associations, financial institutions and NGOs were also invited to participate and to provide linkages. This note discusses the research forum activities, highlights the deliberations and provides particulars of the identified research topics.

Organizational Preparations for the Forum Meeting

LBG/GEP, in consultation with USAID/India, identified reputable Indian and U.S. research institutions working on global climate change issues. These institutions were contacted, the purpose of the research activity under GEP-CCS was discussed with them and a majority of these institutions expressed their interest in joining the research process under the project. A total of nine Indian and four U.S. institutions agreed to participate. This list was expanded further as LBG/GEP continued contacting several other institutions and as a few more institutions were recommended by their peers. LBG/GEP then identified the Indira Gandhi Institute of Development Research (IGIDR), Mumbai, which is concentrating on macroeconomic policy research on climate change to host the forum. IGIDR agreed to host the first meeting of the Indian research forum on January 22, 2001. It was important to devise a structure for the deliberations at the forum meeting so as to meet the objective of identification of research topics based on the general themes of research under the project. A background paper was therefore prepared in consultation with the GEP Project Manager/USAID (a copy of the background notes is found as Appendix I). This Background Paper dwelt upon the purpose and focus of the research, the approach of selection of topics, and identified the next steps. All the Indian research institutions that had evinced interest in pursuing research were invited to attend the forum.

It was also important to note that the selection of research topics and choosing the coordinators or "lead authors" for each of the teams completing the research was done in an impartial manner. Thus, there was a need to have an independent facilitator for guiding the deliberations. LBG/GEP, in consultation with Kavita Sinha, USAID/India, identified Dr. P. H. Vaidya as the Indian Research Forum facilitator. Dr. P. H. Vaidya was formerly a senior level officer with ICICI Ltd, including heading the Human Resources Division and the Technology Division. The Resume of Dr. P. H. Vaidya is enclosed (Appendix II). Dr. Vaidya accepted the invitation to facilitate the discussions regarding the selection of research topics and lead authors.

Proceedings/Deliberations at the Forum

On Monday, January 22, 2001, LBG/GEP, in association with IGIDR, held the First Indian Research Forum in Mumbai, India. (Agenda is attached as Appendix III). The forum was attended by 22 prominent Indian researchers and institutions. A list of delegates and their areas of expertise is enclosed (Appendix IV).

In the opening session, Dr. Kirit Parikh, Professor Emeritus and Former Director IGIDR, welcomed the delegate to the First Research Forum. Ms. Kavita Sinha provided an overview of the USAID/India mission's environment programs, including the GEP-CCS project. Mr. Subrata Mazumder, Country Manager, LBG Global Environment Team, introduced The Louis Berger Group. Dr. P. H. Vaidya then outlined the approach for the forum. The delegates introduced themselves and their research areas including highlighting the research with respect to the themes of GEP-CCS.

In Technical Session I, Dr. Jyoti Parikh provided a brief overview of what was envisaged under each of the thematic areas. It was felt that all the research topics would essentially have four elements i) Research, ii) Policy Impacts iii) Institutional Arrangements and iv) Projects. With a view to demarcating the themes based on subjects, four broad categories were identified and a matrix was prepared for further deliberations. The delegates agreed with the categorization of the research topics under the following matrix structure.

	Research	Policy	Institutional	Projects
Vulnerability/adaptation	✓			
Mitigation	✓	✓	✓	✓
Carbon neutral power sector development	✓	✓	✓	✓
Macroeconomic aspects	✓	✓	✓	

It was decided to form small breakout sessions to discuss the four broad research categories. It was also suggested that a fifth topic could be the summary of these topics and provide the inter-linkages between them. To enable the delegates to identify better with these areas, the delegates were requested to indicate two research priorities they prefer. These were then grouped and suitable groups were formed for discussion in the Technical Session II. At this session the delegates formed four subgroups, which broke out to further deliberate on each of the research areas. The LBG/GEP and USAID/India organizers facilitated the team discussions and clarified any questions raised by the

delegates. A template indicating the main heads to be considered by the teams was circulated to facilitate the discussions.

Upon the conclusion of the break out sessions, research topics under each of the broad thematic areas were identified. Lead authors were identified to oversee and coordinate the strategic research. The list of topics and corresponding lead authors is indicated below:

List of topics identified with the Lead Authors

Broad Area	Research Topic Identified	Lead Author / Group Members
Vulnerability	India's vulnerability to climate change and cost of adaptation: an overview.	<i>Kirit Parikh, IGIDR</i> , Anand Patwardhan, IIT-B, Jayanta Bandopadhyay, IIM-Cal, K. Chatterjee, DA, Kavi Kumar, MSE,
Macro economic issues	Linkages between growth and GHG emissions	<i>Manoj Panda, IGIDR</i> , Ulka Kelkar, TERI, Sajal Ghosh, CII, Amit Kumar Garg, IIM-A
Mitigation	GHG Mitigation Options for selected sectors	Power- <i>Amit Kumar Garg, IIM-A</i> , Jyoti Parikh, IGIDR Fuel cells- <i>S. Devotta, NCL</i> Building Construction Materials - <i>A. Chatterjee, DA</i> Urban Transportation – <i>Jyoti Parikh, IGIDR</i> , S. Yedla, IGIDR Urban Waste- <i>S. Yedla, IGIDR</i> , A. Chatterjee, DA
Carbon Neutral Power Sector Growth	Assessment of the Role of Carbon Neutral Technologies in India's Power Sector	<i>Dilip Ahuja, NIAS</i> , Rangan Banerjee IIT-B, S. S. Murthy, IIT-M, Vivek Kumar, DA,

Overview of the Research Topics and Research Plan

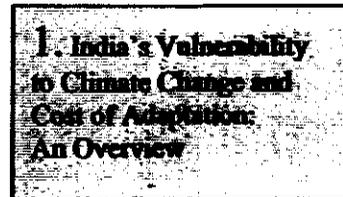
In the afternoon session, each of the Sub-Group Coordinators made presentations on the topics identified by the team. These presentations included the recommended research areas, critical issues/gaps experienced and how the research undertaken would address the gaps, expected outcomes and the relevance of the topic to India's economic development. A brief description of these topics is given below.

Vulnerability

Title: India's vulnerability to climate change and cost of adaptation: an overview

The research under this topic shall concentrate on the following:

1. Climate change trends and variability
2. Measures of vulnerability and vulnerability assessment
3. Sectoral study – water resources
4. Costs of and barriers to adaptation (extreme events, floods, cyclones, sea level rise)
5. Policy recommendations and implications



The report shall cover early warning systems, policy implications and the costs and barriers to adaptation.

Macro economic issues

Title: Linkages between growth and GHG emissions

The research under this topic shall concentrate on the following:

1. Growth and welfare implications of GHG reductions and the use of different economic instruments to forecast changes. Two different macro models developed separately by TERI and IGIDR will be compared.
2. An analysis of the relationship between GDP and CO₂ emissions using econometric co-integration analysis



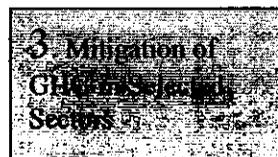
The report shall consider the major economic instruments (both command and control and market-based instruments) including but not limited to pricing, taxes, tradable

permits, quotas and reforms. This will help the policy makers to understand the relative merits and/or demerits of these instruments in the context of economic liberalization. This will result in policy inputs regarding the appropriate choice of GHG reduction instruments. The study shall cover as many sectors like agriculture, power, transport and industry for analysis as possible.

Mitigation

Title: Mitigation of GHG in selected sectors

The study shall cover analysis of mitigation options in five major sectors including: power, fuel cells, building construction materials, urban transportation and urban waste. The options available in each sector shall be studied. The report shall cover barrier identification, policy analysis, institutional mechanism needed to implement the options and wherever possible, suggest possible projects. The scope of the work under various heads is described below:



Research	:	Technology, Economic Analysis, and Barriers
Policy	:	Economic, Technology Transfer, Environmental and GHG Trade Policies
Institutions	:	Global, Central, State, Private, Urban, Trade Associations, Financial Institutions, NGOs and User Groups
Projects/Activities	:	Physical Plants, Centers or Institutions, and Knowledge Databases

Carbon Neutral Power Sector Growth

Title: Assessment of the Role of Carbon Neutral Technologies in India's Power Sector

The research under this topic would look into the barriers in implementation of the Carbon Neutral Technologies (CNT) and study the ways to overcoming the barriers. The study would evaluate goal of achieving a 10% share of renewable energy in the power sector by the end of the decade as set by GOI. It will consider decentralized energy sector and the economies of scale that could make implementation attractive. The CNT to be covered under the study would be identified by the group through consultations by e-mail. The study is likely to help in the assessment of CNT, devising short/long term strategies, offer recommendations on research, policy and institutional arrangements, and possibly lead to a prioritized list of CNT based projects.



Action Plan for the Finalization of Research Papers

LBG/GEP outlined the next steps to be carried out under this activity. LBG/GEP highlighted that due to the contractual requirements of the GEP-CCS program the drafting of the framing papers would need to follow an aggressive schedule. LBG/GEP provided the action plan for implementation of the research activity, which includes the organizing of a U.S. research forum to consider the topics identified at the Indian forum and the formation of Indian and U.S. research teams to pursue the activity further. On this entire activity, Indian Research team will take the lead in view of the relevance of the research work to the economic development of India. The following activities will be undertaken:

- Preparation of a brief report of the forum meeting
- Preparation of the approach and action plan by the lead Indian authors of each the topics. The level of effort for the proposed work would be identified and submitted to LBG/GEP
- Organization of the Study Tour of the lead authors to U.S. for attending the U. S. Forum meeting to finalize the research topics identified at the Indian forum and to establish contacts with the identified U.S. researchers/institutions
- Drafting of the Research Papers on the topics, Peer Review and presentation
- Publication of the final research papers

Based on the discussions, the following schedule was agreed upon:

- 22 Dec 2001 -USAID/LBG invitation to research institutions to participate in the project
- 22 Jan 2001 – Research topics identified, deliberated and finalized.
- 15 Feb 2001 – Research forum proceedings prepared
- 15 Mar 2001 – Research topics summaries due from lead author
- 30 Mar 2001 – Feedback on summaries sent to each Research Team
- 15 May 2001 – U.S. research forum (target date) completed
- 25 May 2001 – Joint Teams established
- 01 Sep 2001 – First draft report due
- 15 Oct 2001 – Peer review of drafts due
- 22 Oct 2001 – Draft revisions incorporated
- 31 Oct 2001 – Drafts launched on FICCI web site
- 15 Nov 2001 – Draft papers presented
- 15 Dec 2001 – Comments from public due
- 15 Feb 2002 – Papers finalized
- 01 May 2002 – Papers published

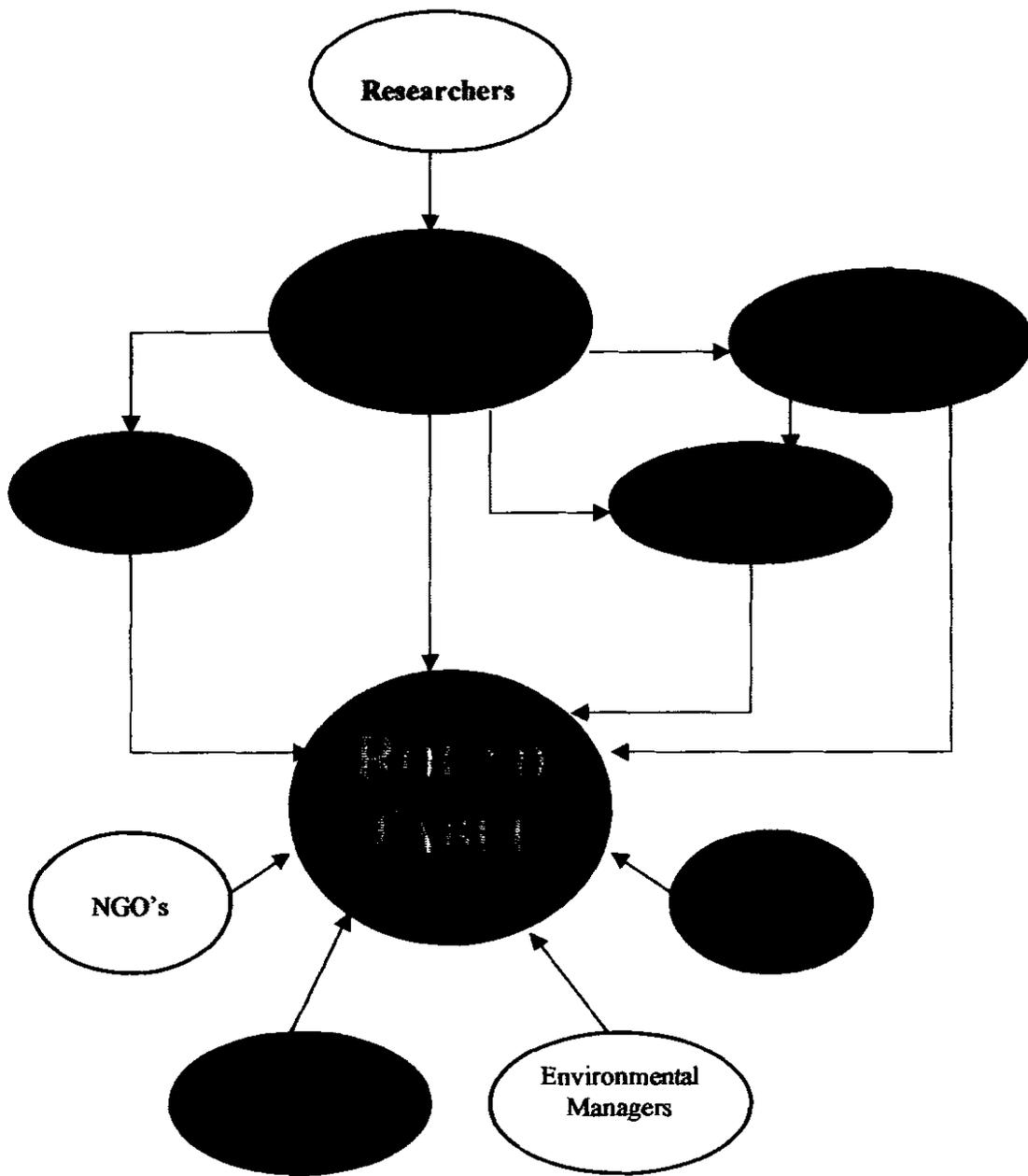
It was proposed that the groups of researchers identified at the forum would continue discussions and preparation of the approach of work. The identified lead authors of the topics will prepare a detailed action plan and will also determine the level of effort by all the authors including co-authors required to successfully conduct the research. Research team will then discuss with LBG to prepare the budget plan and other logistics required to complete the research. A separate agreement may be signed with each Lead authors and co-authors agreeing to compensate their LoE optimally required to conduct the Research with the agreed Scope of Work.

Intended use of the Research Work

The research on the identified areas would form the basis for various outreach activities under GEP-CCS. As the project developers begin developing their project concepts, the outcome of the inputs from the research work would help them in deciding the business plan and strategy. The policy framework developed by the researchers and suggestions on institutional structure will help policy makers while framing the policy which will ultimately provide support to the project developers. This will, thus, enable projects to be more bankable as the market-based mechanisms evolve.

In addition to the above, the research will guide the development of roundtables that are planned under GEP-CCS. The research would help in the capacity building of the Climate Change Centers and also the Lal Bahadur Shastri National Academy of Administration (LBSNAA) for their sustainable energy program. At a later stage the research would provide important insights for the TA and training of the Indian Financial Sectors as well to consider the GHG issues in their appraisal mechanism.

A Graphical presentation how the research activity would help various stake holders are given in next page.



INTENDED USE OF THE OUTCOME OF THE RESEARCH ACTIVITIES

APPENDIX

APPENDIX I

**Greenhouse Gas Pollution Prevention
Climate Change Supplement**

(A USAID/India project implemented by The Louis Berger Group, Inc.)

**First Indian Research Forum Meeting
Background Paper**

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January 2001

Greenhouse Gas Pollution Prevention-Climate Change Supplement

(A USAID/India project implemented by The Louis Berger Group, Inc.)

First Indian Research Forum Meeting Background Paper on Climate Change Research in India

Climate Change Efforts in India, Recent developments

India at present may not have any GHG reduction target, however, several pro-active steps have been taken in the country both at the Government and Non-Government levels. The Ministry of Environment and Forests (MoEF), Govt. of India, has set up several expert committees to prepare national GHG emissions inventory and recently constituted a Working Group on Framework on Climate Change Conference (FCCC) to deliberate on measures for reducing the impact of GHG emission from development activities in India. MoEF has also constituted a Task Group on Activities Implemented Jointly (AIJ) for approval of AIJ projects, which has approved five projects so far. Apart from this, India has entered into various bi-lateral agreements with developed countries notably the US with which Joint Statements on Energy & Environment were signed, whereby a Joint Consultative Group on Clean Energy and Environment would be created for an enhanced public and private sector co-operation between India and US.

India participated in a regional study on assessment of potential impact of climate change on India and suggestion of adaptation measures. The National Physical Laboratory has estimated the GHG emissions from India. Under a jointly co-ordinated project by USAID and World Bank, assessment of the power sector was carried out. In another Jointly co-ordinated project by UNDP and World Bank an evaluation of renewable energy sector was conducted. IGIDR has made assessment of sectoral GHG emissions and their distribution by income groups in India. IGIDR has also brought out a paper on policies and measures carried out by India. Indian Institute of Science (IISc) has analyzed the impact of alternative land-use practices on GHG emissions and also the assessed carbon sequestration potential in India and its costs. Development Alternatives (DA)¹ had assessed the emissions from the building sector in India. Climate change researches or facilitation are conducted by various institutions in India (a brief account of work of major institutions is enclosed later in the note). While an attempt has been made to include as many organizations as possible, it may be mentioned that the list is not exhaustive and any omissions are unintentional.

Role of GEP-CCS Project

The U.S. Agency for International Development (USAID) launched the Greenhouse Gas Pollution Prevention (GEP) project in 1995 to help India to increase the efficiency of its coal-fired power plants and promote year-round cogeneration of

¹ *Confronting Climate Change: Economic Priorities and Climate Protection in Developing Nations.* Kalipada Chatterjee, B. Biagini (ed), National Environmental Trust, 2000

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power in the sugar industry. The Climate Change Supplement (CCS) expands on this effort by focusing on the linkage between climate change and urban infrastructure for sustainable development. ICICI Limited, a premier Indian financial institution, and the Indian implementing partner for GEP-CCS, will steer the activities jointly with USAID. The Louis Berger Group, Inc. (LBG) was awarded the contact to implementing the project activities on behalf of USAID.

GHG emissions reduction project development

The major thrust under the GEP-CCS project is on development of bankable GHG emission reduction projects. The most visible outcome of any activity is demonstrated through industrial projects. If these project activities get initiated on commercial terms, they become self-sustainable. As the global mechanisms for development of market based instruments for funding the GHG mitigation projects get defined, the research on various aspects of Climate Change impacts becomes crucial. The developments on areas such as methodologies for fixing the baselines for particular industrial sectors, arrangements for technology transfer, monitoring & verification mechanisms will greatly help industrial project developers, domestic and international lenders and investors in development and financing GHG mitigation projects. Thus, it is desired that the research work under GEP-CCS should be project development oriented.

As per the current understanding from the international dialogue on climate change, the GHG mitigation projects would have to be different from the "any way" projects which would have taken place even in absence of the market based mechanisms. These projects essentially have to exhibit a robust IRR that would enable a financial institution to consider it on its own merit. The proposed GHG reduction activity would be additional to the business as usual project. As it would be a tough task to envisage many such projects, the research work should provide guideline to decide which project is really GHG mitigative. This is especially true of projects involving renewable energy, which may not necessarily have adequate IRRs. In such situation, the proposed research papers could provide new indicators to show the desirability of such GHG mitigation projects.

GEP-CCS Approach, Focus of research under GEP-CCS

From the above it is clear that the research proposed to be undertaken under GEP-CCS would mainly be applied research. The outcome of the research papers would be put into practice by the Climate Change Centers, Project Developers, Banks and FIs. The research work would enhance the skills of staff at these institutions and help them in making informed decisions about environmentally benign technologies, which could avail Carbon Offset finance from international sources. This suggests a wide area, which could lead to loosing the above focus. We have, therefore, identified later in this note major categories, which seems to be important and could be taken as a basis for discussion and identification of specific research topics.

The basic theme of the research work envisaged under GEP-CCS is as follows:

Theme of preferred topics for research under GEP-CCS

1. Analysis of vulnerability of India to global climate change and its impacts on the planned economic development. (Adaptation strategies for adverse impact on specific areas like forests, coastal zones, fragile ecosystems)
2. Development of a strategy and implementation framework for directing potential foreign investments for GHG emissions reduction activities into areas of critical importance for economic and social development. (Methodology for structuring GHG mitigation projects, implementing arrangements/contracts development)
3. Development of methodologies to evaluate trade-offs between mitigation and adaptation strategies and establishing needed infrastructure changes to limit or adapt to climate change. (Appropriate sector specific baseline methodologies, additionality assessment for GHG mitigation projects)
4. Assessment of potential carbon neutral power sector growth for India through a combined strategy including development of carbon sinks, renewable energy and highly efficient fossil fuel conversion technologies. (Additionality establishment for renewable energy, energy efficiency projects)
5. Review and assess the development and deployment of various policy instruments and impact on carbon emissions growth rate. (Such policy instruments could include public information, building standards, taxes and incentives, tradable permits, and environmental impact assessment)

We propose to adopt a 'participatory approach' for research work, which would include teams of researcher under a lead author. The areas being debated at this forum would be categorized and five of these would be short listed for further research. The group that identify the topics would select a lead author for the research work, who would co-ordinate the joint research activity in the next year and a half with the US institution to be identified later by LBG at the US research forum, which is expected to be held before May, 2001.

While the lead author would be the main focal point for that particular topic, he/she may co-opt suitable experts as Co-authors from other Indian institutions depending on the strength of their research and areas of expertise.

Although the role of the institutions is appreciated, as the research work of the lead author would be the starting point for further development and refinement and to ensure quick response during further development, involvement at the individual level rather than of the institutions themselves is desirable. The modalities would be further evolved once the lead authors have been identified. FICCI has agreed to help in these efforts by putting up the draft research papers on the web for a wider dialogue and refinement.

Suggested Methodology in identification/short listing of research topics worth pursuing

In order to guide the discussions on key areas so as to short list at least 5 research topics for further research by the end of the day the following methodology is suggested:

- LBG in co-ordination with USAID have identified five important areas for Indo-US joint Climate Change research under GEP-CCS. Subject to the acceptance of these or any addition/deletion at the general session, five sub-groups would be formed from among the delegates. These five sub-groups shall debate on that specific area during the technical session II.

- During the discussions, it is suggested that the Sub-Group may adopt the following methodology:
 - Decide the crucial issues affecting the particular subject, e.g. in the Project development related issues: Baselines- what are the ways in which they could be fixed, how sectoral baselines affect the project level baselines, what type of baselines are important for project development etc.
 - Debate on the gaps that exist that hinder the speedy project development and how research could address these gaps
 - Debate on the outcome of research that would be helpful for all the stakeholders
 - In view of the above arrive at key research areas and prioritize these. In case more than one area is needed to be pursued, the order of undertaking research may also be identified.
 - Based on the perception of the Group, suggest the lead author for that particular topic
 - Depending upon the areas of expertise and institutional strength, select the co-author where necessary.
 - Summarize the findings of the Group in the form of a brief presentation covering, the short listed topic, recommendations of the research topic, desired outcome and its relevance to the industrial project development and suggestion on the lead author

- Each group will then make a presentation for further discussion, deliberations and final recommendations

The above methodology is subject to any change if felt necessary by the delegates at the opening sessions.

Suggested important areas for Indo-US joint Climate Change research under GEP-CCS

Based on the broad theme of research under GEP-CCS mentioned earlier the following areas are suggested for further research work.

A. Project Development related aspects

These would include all the major aspects relating to facilitation of GHG emission reduction projects. The topics under this category would be based on the development of international dialogue on climate change. The research would lead to improvement in understanding of the key stakeholders to facilitate foreign investments through various funding instruments. These could include baseline development methodology, additionality considerations, sustainable development aspects and the like.

B. Vulnerability/Adaptation vs. Mitigation

A major input from research work would enable assessing the cost benefits of various strategies to allow a comparison of these. Under this category aspects of mitigation strategy as compared with adaptation could be covered. This is crucial to the areas susceptible to impacts of climate change. The work could cover uncertainty/risks assessment of vulnerable regions, bring out mitigation strategies and the relative cost benefit analysis of mitigation vs adaptation.

C. Institutional issues in climate change project activities

This category would cover aspects, which are important for establishing the institutional framework including financing, legal, liability and risk management etc. The suggestions or directions emanating from research would enable the government to plan creation and structuring of appropriate institutions that would facilitate easier flow of investments in India. The area of development of operational mechanisms for developing clean energy projects with reference to the reforming of electric power sector.

D. Strategies for development of a carbon neutral power sector

This category would include areas covering climate change impacts of power sector development strategies including a faster renewable energy sector growth, energy efficiency improvement projects, impacts of renovation and modernization of power plants, incremental cost analysis of energy policy options etc.

E. Macroeconomic policy analysis

This category would mainly address the climate change policy framework related topics. These would include areas like assessment of various policy instruments, market based instruments etc., climate change impact on economic development, assessing impacts of government policies on climate change, preparation of basis for macroeconomic models for GHG reduction strategies

Climate Change Research in India, Institutions, and areas covered

There are a whole host of institutions, which are engaged in research on Climate Change Impacts in India. These institutions cover various aspects of GHG mitigation ranging from technical, macro-economic, ecological, managerial activities. GEP-CCS, proposes to establish a platform for these institutions to create a dialogue and debate on various Climate Change topics to analyze impact of Climate Change on India's Economic development.

I Research Institutions

Indian Institute of Management, Ahmedabad (IIM – A)

Indian Institute of Management Ahmedabad (IIM-A) was established in 1961 as an autonomous Institution by the Government of India in collaboration with the Government of Gujarat and the Indian Industry.

Prof. P. R. Shukla, of the Public Systems Group is the focal point of the research work on Climate Change activities at IIM-A. He specializes in energy, energy efficiency and environment modeling, renewable technologies, decentralized planning, integrated assessment modeling and climate change policy analysis. He has worked extensively with government organizations, international agencies, NGOs and private organizations. He has been a Lead Author of IPCC Second Assessment Report and Technical Papers 1 and 4, Co-author of six books on energy and environment policies and has published extensively in reputed journals. IIM-A has tie up with renowned US institutions including Harvard Business School, Pacific Northwest National Laboratory, Batelle Memorial, University of Virginia etc.

Indian Institute of Technology, Mumbai (IIT- M)

IIT M, is one of the six Indian Institutes of Technology and has placed considerable emphasis on Research and Developmental work as key component of its activities in pursuit of excellence. The institute plays a very significant role in diverse facets of R&D - in keeping with the rapidly expanding frontiers of knowledge, national needs & global developments. Research activities at IIT-M range from sponsored research, to consultancy, technology development and technology transfer.

A number of faculty members are working on research in the area of climate change, greenhouse gases and energy systems. IIT-M has a range of facilities useful for research in the climate change area. These include laboratories as well as computing infrastructure. IIT-M has been working with the Carnegie Mellon University on climate change research.

Indira Gandhi Institute of Development Research (IGIDR), Mumbai

IGIDR is an advanced research institute in Mumbai promoted by the Reserve bank of India. The institute is engaged in the study of national and global issues relating to

economic development to promote and conduct research, to teach and train and to promote national and international collaboration.

Professor Jyoti Parikh, who is the leader of this group has served as a member of Scientific and Technical Advisory Panel (STAP) for the Global Environment Facility (GEF) as well as a convening lead author for the IPCC-SAR and the reviewing author for TAR. The Climate Change research at IGIDR is focused on three major areas: (i) Analysis of North-South issues: IPCC response strategies, GEF-incremental costs, Joint implementation, Analysis of economic instruments to reduce GHG emissions. (ii) Top down modeling or national issues for India: climate change and India's energy policy options: carbon flows in the Indian economy, carbon emissions associated with consumption patterns in India by rural/urban income groups and, trade and environment and (iii) Bottom up modeling or sectoral issues for India: CO₂ emissions by power systems, DSM, T&D losses, transport sector, solid waste management. IGIDR has worked on several international assignments for multilateral organizations like UNDP, UNCED, UNEP.

National Chemical Laboratory (NCL), Pune

NCL was established in January 1950 under the Council of Scientific & Industrial Research (CSIR). NCL is a science and knowledge based research, development and consulting organization. NCL is internationally known for its excellence in scientific research in chemistry and chemical engineering, and for its outstanding track record of industrial research.

Considerable research work has been carried out at NCL on Climate Change issues. The focus is mainly on the technology transfer under international protocols viz. Montreal protocol and now Kyoto Protocol. NCL has provided consultancy to several Indian and US multinational companies and UNEP.

National Institute of Advanced Studies (NIAS), Bangalore

NIAS was established with the aim to conduct advanced research in multidisciplinary areas, and also serve as a forum that would bring together administrators and managers from the industry and government, leaders in public affairs, eminent individuals in different walks of life, and the academic community in the natural and social sciences.

NIAS has conducted Research Work in areas pertinent to climate change, greenhouse gases, global warming and energy efficiency, research is being carried out in three different units of the Institute: Environmental Studies, International and Strategic studies and the Science and Technology Policy Studies Units. NIAS has performed work for institutions like GEF, UNDP etc.

Tata Energy Research Institute (TERI), New Delhi

TERI is an autonomous, non-profit research institute established in 1974. It is committed to every aspect of sustainable development, and conducts scientific and policy research in diverse fields such as energy, environment, biotechnology, and

forestry. Project activities in TERI focus on formulating local- and national-level strategies to suggest global solutions for critical energy and environment related issues.

TERI has a dedicated center for research on climate change issues, called Centre for Global Environment Research (CGER). Its mission is to undertake research and outline effective policy initiatives that integrate developing country concerns in the search for effective and equitable solutions to global environmental challenges. CGER participates actively in various debates and discussion forums around the world. It plays a proactive role by raising key concerns and providing balanced, meaningful solutions.

II Industry Associations

Apart from the above mentioned institutions, the two industry associations CII and FICCI have also played important role especially in GHG mitigation project development. The work of these mainly relates to the propagation of the knowledge about Climate Change mitigation among their industrial constituents. CII has created center of excellence in its energy group at New Delhi, Chennai and Hyderabad. FICCI's role has been mainly that of information disseminator through its website. A brief description of their work is mentioned below.

Confederation of Indian Industries (CII)

CII is the association of Indian industries with the largest representation. CII's goal is also to develop Indian industry and to ensure that government and society as a whole, understand both the needs of industry and its contribution to the nation's well being. Climate Change Project Information Bank (CCIB) has been created by CII with the objective of collecting information on climate change project concepts from companies who are interested in exploring funding options for assessing the feasibility or implementation of the project mentioned herein. CII assists in shaping climate change project ideas into a potential climate change project. CII also helps industries to discuss the project with possible funding agencies/consultants/partners. It provides feedback to the concerned industry for further action on their part. CII's Climate Change Center (4C) was established under a USAID supported initiative. The Climate Change Center at CII would engage in research mainly dealing with industrial policy on climate change issues. CII has recently established tie-up with the US Energy Association and the Green Institute USA for cooperation between Indian and the US utility and industrial sector on clean energy projects.

Federation of Indian Chamber of Commerce & Industry (FICCI)

Federation of Indian Chambers of Commerce and Industry (FICCI), the leading apex chamber in India, has been playing a catalytic role in the economic development of the country since 1927. FICCI represents over 100,000 small, medium and large business units, employing over 10 million people.

FICCI has established the Environmental Information Center (EIC) with a view to promoting and facilitating industry actions for environmental improvement, compiling and disseminating business relevant information on climate Change, energy efficiency, clean technologies and for providing technology intermediation services to the Indian industry. The Climate Change India website has been developed under USAID/India GEP project's Climate Change Outreach and Awareness Activity (CCOA) component by FICCI. The website provides crucial and up to date information on Global Climate Change subject. FICCI's role in this activity is mainly to offer a platform on their website for discussion and debate on the research papers at the draft stage and ultimately for wider dissemination of the research work.

III Non Governmental Organizations

Development Alternatives (DA)

The Development Alternatives Group (or the "DA Group") comprises Development Alternatives and its associate organizations in India: namely, TARA (Technology and Action for Rural Advancement) DESI Power and People First. The activities of the DA Group broadly cover the three primary areas that underlie any form of sustainable development process: the design and large-scale dissemination of appropriate technologies, environmental management systems and effective people-oriented institutions and policies.

Climate Change Program is a part of Global Environment Systems Group. This Program addresses various facets of climate change including problem identification, impact assessment and formulation of response strategies. The Group is actively engaged in assessing the impact of climate change on agriculture, health and hydrology. Research also focuses on sequestration of carbon dioxide by forests and other vegetation. The group also includes the industrial systems division for development of industrial project. DA has initiated research on the Baselines in various industries.

Appendix II

CURRICULUM VITAE

Name : Dr. P.H. Vaidya
Designation : Director, Human Capital Academy
Address :

[Redacted Address]

Telephone :

[Redacted Telephone]

e-mail :

[Redacted e-mail]

Age :

[Redacted Age]

Education : M.Com. Ph.D. (Finance) - University of Bombay

Experience : Retired in Dec. 1998 from ICICI Limited, a well known Development Finance Company in India, as General Manager, Human Resource Development. I made a substantial contribution in designing and implementing performance appraisal system for the Corporation and the performance reward system for employees. Further, during my tenure a Voluntary Retirement Scheme was introduced and implemented successfully. I was also responsible for overseeing all training and development activities of the Corporation and its training institute located at Pune.

Worked in ICICI since 1976 and handled various activities as follows :

Since May 1994 - Chief of HRD,

1979-94 - Worked in various departments such as Follow-up, Development, Accounts - Computerization, etc.

As part of development activities of ICICI Ltd, I worked on two Innovative projects of USAID ,namely, Program for Acceleration Commercial Technology (PACT) for promotion of Indo-US joint technology development and Program for Acceleration of

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Commercial Energy Research (PACER).

I was deputed by ICICI as Advisor to development banks in Nepal and Ghana for a period of 4 months and 6 months each during 1984 and 1989 respectively. Both these assignments included identification of training needs, designing training courses and imparting training to professional staff of the concerned institutions.

1963-76 - Vice-Principal and Professor of Commerce and Banking at M.L. Dahanukar College of Commerce, University of Bombay. Also taught at the management institutes in India viz. Bajaj Institute of Management, Narsee Monjee Institute of Management Studies and Dahanukar Institute of Management.

Author of a book on 'Law and Practice of Banking' and a few research articles

Participated in a number of seminars, workshops including HRD programmes at Michigan Business School, University of Michigan, USA.

On retirement from ICICI I have established an organization called Human Capital Academy to conduct training programmes for senior executives of financial institutions, banks and industries. In collaboration with Leadership Management International(LMI), Texas, USA, Human Capital Academy offers various training programmes including Effective Personal Productivity Programme which are very well received. During the last 2 years, over 300 participants from industry have benefited from these programmes. A list of companies who have nominated participants for the programmes is enclosed.

I have been recognized as an outstanding facilitator of the LMI programmes amongst the world-wide professionals and have received several international awards for my excellent work.

During the last 2 years I have provided consultancy / advisory services in HRD to ICICI Infotech Services Ltd, Unit Trust of India. and its two subsidiaries ,IDBI and its two subsidiaries and IFCI Ltd.

I am a Director on four companies .

Appendix III

Greenhouse Gas Pollution Prevention-Climate Change Supplement (A USAID/India project implemented by The Louis Berger Group, Inc.)

First Indian Research Forum Meeting
Monday 22 January 2001
Venue: Indira Gandhi Institute of Development Research
Goregaon, Mumbai

AGENDA

- | | |
|-------------------|---|
| 09.00 – 09.15 hrs | Registration |
| 09.15 – 09.45 hrs | <p>Welcome <i>Dr. Kirit Parikh, IGIDR</i></p> <p>Introduction of the GEP-CCS Project and Research Forum
 <i>Ms. Kavita Sinha, GEP Project Manager, E³, USAID/ India</i></p> <p>Introduction of The Louis Berger Group, Inc.
 <i>Mr. Subrata Mazumder</i></p> <p>Objective of the Research Forum
 <i>Dr. P. H. Vaidya</i></p> |
| 09.45 – 10.45 hrs | Brief introduction by the Delegates |
| 10.45 – 11.00 hrs | Tea Break |
| 11.00 – 13.00 hrs | <p>Technical Session I</p> <p>- Overview by <i>Dr. Jyoti Parikh</i></p> <p>- Discussion on proposed areas of research</p> <p>- Formation of Sub-Groups</p> |
| 13.00 – 14.00 hrs | Lunch Break |
| 14.00 – 15.00 hrs | <p>Technical Session II</p> <p>- Discussion on identified topics in separate groups</p> <p>- Finalization of topics by each group</p> |
| 15.00 – 15.15 hrs | Coffee Break |
| 15.15 – 16.30 hrs | Presentation on identified Research Topics by each Sub-Group |
| 16.30 – 17.00 hrs | <p>Prioritization of Research Topics</p> <p>Discussion Facilitator: <i>Dr. P. H. Vaidya</i> (Inputs from USAID and LBG)</p> |
| 17.00 – 17.15 hrs | Next Steps – USAID, LBG |
| 17.15 – 17.30 hrs | <p>Concluding Remarks and vote of thanks</p> <p><i>Dr. Jyoti K. Parikh, IGIDR, Mr. S. Mazumder, LBG</i></p> |

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Appendix IV

List of Institutions that took part in the Indian Research Forum Meeting

Name of Institution	Participant(s)	Areas of Research
IGDR	Kirit Parikh, Jyoti Parikh, Manoj Panda, Sudhakar Yedla, Sudhakar Reddy, Sanjay Singh	Analysis of North South Issues (IPCC/ GEF response strategies) Macromodelling of national issues (Climate change and India's energy options, carbon flows, energy forecasting etc.) Micromodelling of sectoral issues
NIAS	Dilip Ahuja	Science and policy research
TERI	Ulka Kelkar	Policy analysis and outreach, vulnerability, ALGAS study, Adaptation, capacity building
IIM-A	Amit Kumar Garg	Top down modeling of power sector, GIS, Impact assessment on industry
IIM-C	Jayanta Bandopadhyay	Climate change impacts on Fragile ecosystems, Mountains, Hydrological changes, CO2 free energy policy, energy management/economics
MSE	Kavi Kumar	Vulnerability, sea level rise, International mechanisms
IIT-M	S. Srinivasa Murthy	Energy efficiency technology mission, industry/institution linkages, GWP of various gases,
IIT-B	Anand Patwardhan, Rangan Banerjee	Biomass, energy efficiency and renewables, impact on oceans and urban air quality, modeling, IPCC third study, tropical cyclones, hydrological balance, extreme climate conditions
NCL	Sukumar Devotta	Energy efficiency aspects, fuel cells, simulation studies for CFC replacement technologies, Montreal Protocol support
DA	Kalipada Chatterjee, Vivek Kumar, Abhijeet Chatterjee	AJ pilot projects, sustainable development with climate change, GHG impacts on building materials, country study, sustainable livelihood practices, effects of droughts, CC mitigation project development
CII	Sajal Ghosh	Industry response to climate change project development and policy
FICCI	M. A. Jeyaseelan	Information management on climate change issues
ICICI	Anil Malhotra, Jaisingh Dhumal	Financing of energy efficiency and GHG mitigation Projects
HCA	P. H. Vaidya, Facilitator	
USAID, LBG	Kavita Sinha Subrata Mazumder, Vinay Deodhar, Nicholas Shufro	} Organizers

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