IRADe

Integrated Research and Action for Development

Annual Report

2004-2005

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Integrated Research and Action for Development (IRADe)

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FOREWORD

After the first biennial report of Integrated Research and Action for Development (IRADe) for 2002 – 04, IRADe now proposes to bring out annual report regularly. In this year we consolidated the organization in terms of staff and activities. While we continued the earlier projects viz. Clean Development Mechanism for Ministry of Environment and Forests, Impact of electricity price reforms in agriculture for Stanford University, we also initiated new projects in various areas:

- Natural Resource Accounting for Goa (Phase II) awarded by Environment Statistics Unit of Central Statistical Organisation (CSO)
- Impact of fuel scarcity and pollution on rural poor: a case study of Himachal Pradesh supported by South Asia Network for Economic Research Institutes (SANEI)
- The energy, poverty and gender nexus in Himachal Pradesh, India: the impact of clean fuel access policy on women's empowerment supported by ENERGIA: The International Network on Gender and Sustainable Energy.

We also continued with our capacity building and training activities with the IRADe - MNES International Training Programme on "Renewable Energy: Techno-economic, Finance and Socio-environmental Issues" and "Training Sessions on Capacity Building- Environment, Trade and Sustainable Development" for United Nations Environment Programme (UNEP). In fact, IRADe entered into three-year agreement with UNEP for capacity building in environment and sustainable development. Also, IRADe hosted a policy consultation in collaboration with Invest India Economic Foundation (IIEF) for second generation of financial reforms to promote 8 per cent growth.

We made a beginning in action-oriented programmes with Self Employed Women's Association (SEWA) where we assist SEWA to install renewable energy systems in villages in Gujarat. One of the highlights of the year was the Demand Forecasting study for petroleum Products and Natural Gas done for Petrofed in collaboration with Pricewaterhouse Coopers (PwC). This report was released as a book at Petrotech Exhibition in January 2005.

We continue to work at a larger scale than before and have increased our visibility through capacity building, training programs, networking and collaborations. In the year 2005 – 06, our scale of work has tripled in terms of funds and projects received. We look forward to the support of our well wishers and those who wish to see development efforts strategically chanelled. IRADe is open to suggestions for collaboration and support for our actvities. We value your comments on this report.

Jyoti Parikh
Executive Director

FOUNDING MEMBERS

Kirit S. Parikh	(Chairman) Economist and Engineer
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Registered in September 2002 under Society Registration Act, New Delhi

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INTEGRATED RESEARCH AND ACTION FOR DEVELOPMENT

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BACKGROUND AND FOUNDING OF THE SOCIETY

Development that increases the welfare of all its citizens, especially the poor and the disadvantaged, involves innovation and change. It requires new thinking, new activities and new approaches that involve perspectives from several disciplines.

A comprehensive approach to development inherently involves the participation not only of the government, but also of NGOs, industry, corporations and financial institutions, it is essential that these stakeholders be involved as partners at all stages of the research process. An inclusive research process creates wider consensus and makes policy reforms more acceptable.

With these ideas Integrated Research and Action for Development (IRADe) is set up as a fully autonomous advanced research institute, which aims to do research and policy analysis, train people and be a hub network among various stakeholders.

IRADe is a new kind of research institute that focuses on

- **Research for effective action**
- **Multi-disciplinary, multi -stakeholder research for implementable solutions**
- **Policy research that accounts for the political economy of the society and effectiveness of governance**

It is a 'think tank' that works with 'do tanks'

OBJECTIVES OF IRADe

The objectives of IRADe are as follows:

- To redefine the problems in terms directly related to and understood by the stakeholders;
- To develop understanding that integrates multi-stakeholder perspectives concerning issues of development;
- To develop capacities among professionals for multi-disciplinary multi-stakeholder policy analysis;
- To promote a wider consensus on such policies among stakeholders and policy makers;
- To disseminate and implement ideas and insights to promote sustainable and inclusive development;
- To network with existing institutions;

1. PROJECTS

IRADe obtained a number of projects during the year. The descriptions of the projects and the progress are as follows:

1.1 GHG Reduction Potential, Sectoral Base Lines and Opportunities for CDM Projects.

Background and Objective:

In March 2003, Ministry of Environment and Forests awarded IRADe a two year research project entitled "GHG Reduction Potential, Sectoral Base Lines and Opportunities for CDM Project" to prepare a report reflecting on various aspects of Clean Development Mechanism (CDM) for Climate Change. CDM is a mechanism proposed in Kyoto Protocol by which the developed countries could invest in developing countries to reduce Greenhouse Gas (GHG) emissions. This could be done by initiatives that increase efficiency with which

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fossil fuels are used or by using renewable energy in place of fossil fuels or measures that reduce need for energy. CDM allows developed countries who are required to reduce their GHG emissions to purchase GHG credits (or permits) known as certified emission reduction (CER) from other countries.

The scope of the project is as follows:

1. Study the emissions from the developed countries to estimate their needs for buying CERs.
2. Estimate India's ability to generate CER from renewable energy, and energy efficiency in major sectors such as steel, cement and so on.
3. Disseminate findings through workshops and seminars.

1.1.1 Study of Annex-1 countries

Background and Objective

With Russia signing the Kyoto Protocol, the Kyoto agreement came to effect in February, 2005. It is therefore interesting to analyze and discuss how close Annex-1 countries are to delivering their promised reductions.

The present study reviews the progress of three European Union (EU) member states, namely, Germany, United Kingdom and the Netherlands. It also discusses emission levels and compliance of Canada and Japan. In short, the broad objective of the study is:

- Compiling the socio-economic profile of selected Annex-1countries under the United Nations Framework Convention on Climate Change (UNFCCC) and analyzing their policies w.r.t energy and environment, particularly climate change and carbon dioxide (CO_2) emissions.
- Examining their emission levels and compliance in achieving their targets under the Kyoto Protocol to see how much is their need for CDM against their commitment.

The European Union

The EU accounts for about 25% of GHG emissions in the group of Annex I countries. Hence, the type of policies and measures adopted at the EU level are of importance not only for emissions abatement in its Member States, but also for the evolution of the international climate regime.

The EU member states agreed to a collective target to reduce 8 per cent from their greenhouse gas emissions of 1990 level by 2012 under the Kyoto Protocol. They have assumed national commitments at varying levels through

Article 4 of the Protocol, which establishes that groups of countries may redistribute their emissions reductions in ways that preserve their collective goal. The three EU countries reviewed in this report have chosen varied approaches to cut their emissions, with some similarities including voluntary agreements with industry and eco-taxes.

Analysis suggests the following:

- The United Kingdom has already achieved a 14.6 per cent reduction primarily due to substantial fuel switching from coal to natural gas. To ensure continued reductions, the government is examining the possibility of a domestic emissions trading scheme (ETS). However, with differences between EU-ETS and UK-ETS, the future of emissions market in the UK will depend on the future harmonization between the two. Even though the EU has cleared the UK-ETS under EU guidelines, there is an understanding that the UK scheme will have to be changed to accommodate the entry into force of a EU-wide scheme.
- Germany, the EU's largest emitter in 1990, may fall short of its Kyoto target of 21 per cent reduction) given the high level of commitment - a reduction of 252 million metric tonnes. With regard to Emissions Trading, the Federal Environment Ministry is working on the establishment of a National Allocation Plan and developing rules and criteria for the allocation of emission certificates. However, German industry has argued that the National Allocation Plan does not adequately account for carbon dioxide reduction already made by parts of industry.
- Netherlands is often considered an environmental leader and has agreed to reduce its emissions of greenhouse gases with an average of 6 per cent per year. It wishes to meet 50 per cent of the reduction obligations through the flexible mechanisms of the Kyoto Protocol. The other 50 per cent will be realized by domestic measures. Until 2000, the Netherlands was unsuccessful with respect to realizing its goals on the reduction of CO_2 emissions. In fact in 2000, emissions of GHGs were 2 per cent higher than in 1990. There might be serious reasons for continued rise in CO_2 emissions despite the initiatives taken. Economic growth experienced during the 1990s in the Netherlands, which was higher than the European average, has surely been responsible for the rising trend in CO_2 emissions. For domestic reductions, it has made elaborate plans that addresses each sector and also addresses each GHG. For reductions abroad, it has signed Memorandum of Understanding (MoU) with many Latin American countries. However, most of these signed contracts are still awaiting international approval.

Canada

Canada ratified the Kyoto Protocol in 2002 and is committed to reduce its greenhouse gas emissions by 6 per cent from 1990 levels in 2008 to 2012 period. The Government of Canada, through its Action Plan 2000 on Climate Change, decided to invest $25.25 million over five years on the Clean Development Mechanism & Joint Implementation Office. The Department of Foreign and International Trade is investing an additional $3.2 million over five years. It is estimated that greenhouse gas emissions can be reduced by 20-40 Mt a year through the use of CDM and Joint Implementation (JI) projects, making an important contribution in meeting Canada's Kyoto target. Canada has CDM MoUs with Costa Rica, Colombia, Chile, Nicaragua, Tunisia, Bolivia and South Korea. Canada is an investor in the World Bank's Community Development Carbon Fund (CDCF), BioCarbon Fund (BCF) and Prototype Carbon

Fund (PCF). The Pembina Institute in Canada is exploring the application of the CDM in Asia with funding from the Canadian International Development Agency that involves assessment of CDM opportunities in India, Bangladesh, Indonesia and China. Further, Canadians companies are already investing in projects that are expected to qualify under the Clean Development Mechanism. For example, DuPont, Canada has achieved its ten-year goal of a 25 per cent reduction in per unit energy use six years ahead of schedule. In conclusion Canada is seriously developing CDM route to meet its Kyoto commitments and provides an excellent opportunity for CDM projects.

1.1.2 CDM Potential in Cement Sector

The cement industry sector of India is in existence for more than 90 years. Cement plants usually come up in areas with adequate limestone deposits, as production of 1 tonne of cement requires about 1.5 tons of limestone (a major raw material). The industry has been growing at a fast pace for the last 20 years- both in terms of its capacity and improved technology.

Growing at 8% during the last decade India has a production level of about 99 MT. It is the second largest cement producer in the world with (about 5% of world production ~ 2000 million tonnes, next only to China. (CMA 2002, Cement Statistics 2002). The installed capacity is about 119 MT and at an expected 10 % growth rate the production is likely to grow to about 160 MT by 2006-2007. Cement consumption is 99-kg/ person one of the lowest in the world. The world average per person is about 267 kg. It is 450 kg in China, 631 kg in Japan and 447 kg in France.

Green House Gas Emission from Cement Manufacturing

Cement industry offers major opportunities in CO_2 emissions reduction. A review of the Indian cement industry over the last two decades shows that although the new state-of-art plants are comparable to the best in the world in energy consumption and CO_2 emission, the industry average of 1.102 tonnes of CO_2 emission per tonne of cement is much higher than the world average of 0.746 tonnes (study done by National Council of Cement & Building Material (NCB) "Green House Gas Emission from Indian Cement Manufacturing- Estimates for last two decades, Future Trends"). The calculated CO_2 emission for the Indian cement industry on annual basis for the period 1980 to2000 shows that technological upgradation has curbed the annual growth rate of CO_2 emissions. Thus, although India emitted a total of about 778 MT of CO_2 from all activities in 1995 and about 1000 MT in 2000, the share of the cement industry to the total CO_2 emission increased from 4% to about 5% during these years. The present annual growth rate of the industry (8-10%) and its pattern may suggest that the trend growth of CO_2 emissions might continue.

Results and Conclusions:

The construction sector accounts for the largest CO_2 emission by final demand in Indian economy as it uses energy intensive materials such as cement, non-metallic products, Aluminum, iron and steel, glass, bricks etc. It is possible to reduce consumption of energy intensive materials to reduce the CO_2 emissions in producing these materials as well as reduce use of these. Reduction can also be achieved by substituting energy intensive materials by less energy intensive materials such as cement by lime, brickwork in foundation by stonework, and brick masonry by mud blocks. Opportunity also exists of reducing emission by appropriate design of building and structures. As discussed in this paper, following are some opportunities for reducing CO_2 emissions:

1. Improvement in energy efficiency in the manufacture of cement in Indian cement plants:
    - Technology push towards adoption of larger kiln size: Adoption of kiln size of

5000 tonnes per day for future capacity additions. This can result in about 25 per cent savings in energy demand and carbon emissions in the year 2009-10.

- Improvement in capacity utilization: This could come through careful capacity planning; export promotion and improvement in power supply situation.
- Appropriate energy pricing: This can signal investments in energy conservation.
- Use of pozzolonic additives: Fly ash and surkhi can be added to reduce energy needs.

2. Increase the efficiency of electricity supply and generation use of renewables for generation.
   - Save T & D losses: Remotely located cement plants can use captive power plants.
   - Use of biomass such as agricultural wastes, rice husks and other renewable fuels can be used to generate power in captive plants.
3. Use of cement can be reduced by use of substitutes:
   - Cement by lime in plasters and mortars
   - Cement concrete slabs by tiled roofs
   - Brickwork in foundation by stonework
   - Brick masonry by mud blocks
4. CO_2 emissions can also be reduced by alternative designs of building that give the same functional utility and durability.
5. In the manufacture of bricks, the following can help in reducing CO_2 emissions
   - Use of renewable instead of coal
   - Improve efficiency of kilns

Thus the construction industries and cement and building materials show huge potential for energy saving and thus for CO_2 emission reduction in cement, brick and other building material sectors so there are opportunities to get revenue through CDM. The following points need to be kept in mind to enable CDM progress in these sectors:

- Sensitizing various Government Organs
- Developing capacity of policy makers/ regulators
- Strengthening capabilities of sector specific industry (public and private)
- Establishing institutional network for CDM projects
- Developing capacity of Financial Institutions for appraising and financing CDM projects
- Baseline determination - general assessment
- Retrofitting of on-going Programme as CDM projects - issues and possibilities
- Assessment of Sustainable development concerns
- Preparation of Road Maps

With Business-As-Usual (BAU) growth rate in cement, around 10% emission reduction is possible by undertaking a conservative energy improvement strategy. Emission reduction of around 27.5% can be achieved at the end of 2015 through a more rigorous target for energy efficiency improvement. With a high growth rate of cement however, total emissions with BAU energy efficiency reaches 615MT of carbon. It can be brought to around 538MT with a conservative energy efficiency improvement program. A higher energy efficiency target can help to reach 423.7MT can help to reach.

1.1.3 CDM and Transport Sector

Unlike other sectors, CDM in transport is the

most complicated to design. A major obstacle is the establishment of a baseline ("that would have occurred in the absence of the project') e.g. historical and current data deficiencies, forecasting project uncertainties, small dispersed sources of emissions, linkage to other economic activities (project boundary). Strong relationship with human behavior makes it difficult to evaluate.

The transport sector is responsible for ~ 25% of CO_2 emissions worldwide and in developing counties the growth rate of transportation sector emissions is 3.2% per year (World Energy Outlook, 2001) due to increases in both vehicle ownership and vehicle kilometers traveled. As the population in developing countries is expected to double by 2030, transportation emissions are a serious issue for urban centres. Increases in emissions are accompanied by augmented risks of: local air pollution, health impacts, congestion, noise pollution, traffic accidents, etc.

Transportation sector CDM projects, especially demand-side projects, face significant methodological and financial barriers. In fact, of the 100+ projects in the CDM pipeline, only 5 are transportation and of those, all are technological projects.

Given the high percentage of emissions from the transportation sector in developing countries, if the CDM is in fact the 'entry' point for developing countries into the Kyoto Protocol, then transportation projects must fit better under the current parameters of the CDM. With the rising price of carbon credits, it could bring major funds necessary for large urban projects, mass transportation, metro and expansion of subways, corridors etc.

1.1.4 CDM Potential of Wind Power Projects in India:

Wind power may become a major source of renewable, climate-friendly energy in developing countries due to competitiveness of electricity generation. The income earned by selling GHG emission reduction can increase the total income to an investor from a project and can improve the competitiveness of wind power against conventional power generators in an increasingly competitive market.

The following features have been incorporated in this study.

- The global status of wind power projects
- Current status of renewable energy technologies for power generation in India
- Overview of India's renewable energy programme
- Wind power programme
- Wind resource assessment
- Prospects of the diffusion of wind energy for power generation in India
- CDM potential of wind power projects in India
- Current status of CDM projects in the wind sector

The CDM potential of wind power projects in India has been estimated based on the regional and national baselines. The preliminary results indicate that the annual gross and technical CO_2 emissions mitigation potential is more than 80 million tonnes and 23 million tonnes per year respectively.

1.1.5 CO_2 Emissions Mitigation Potential through Bagasse based Cogeneration in India:

Cogeneration from sugarcane waste (bagasse) provides one of the best examples of renewable based cogeneration yet it remains largely unexploited. The advantages of bagasse as a fuel for cogeneration are numerous, ranging from the environmental to the social and economic. Some advantages, such as increased energy

security and diversity of supply or the furthering of aims of sustainable development even apply across these categories.

The total installed capacity of biomass/bagasse cogeneration projects in the country in 2004, was 613 MW, which is far below from their respective potential. One of the possible barriers to the large-scale dissemination of biomass/ bagasse cogeneration projects in India is the high upfront cost of these systems. Other barriers to cogeneration development are technical barriers, financial drawbacks, poor institutional framework, shortsighted electric utility policies, and low environmental concern, etc. The application of the Clean Development Mechanism (CDM) of the Kyoto Protocol, giving a monetary value to CO_2 emission reduction, could therefore be an important driver for bagasse cogeneration in cane producing countries.

The potential estimation of bagasse for cogeneration takes into account the state wise area under sugarcane production, states wise yield of the sugarcane, residue to crop ratio, and fraction of sugarcane and bagasse being used for alternative applications. The estimated emission savings from bagasse cogeneration has been estimated at about 68 million tonnes assuming that bagasse cogeneration project substitute grid electricity using the regional as well as national baselines. However, it is still to be seen how much of this potential can be brought under CDM umbrella since various additionality issues are yet to be resolved. Concerted efforts must be made for the large-scale dissemination of bagasse cogeneration projects in India with CDM.

The following features have been incorporated in this study:

- Overview of cogeneration and its status
- Bagasse based cogeneration - global review and potential
- Bagasse based cogeneration: current status and future potential
- Methodology for the CO_2 emissions mitigation potential of bagasse cogeneration
- Policy framework for promoting cogeneration, and
- Current status of CDM projects in the bagasse cogeneration sector

1.2 Energy Policy Reforms and Agriculture in India: A general Equilibrium Exploration

Background and Introduction:

This study is a part of the Program on Energy and Sustainable Development (PESD) at Stanford University and will focus on extension of our macroeconomic model of the Indian economy for the purpose of examining the impact of energy policy reforms on energy and agricultural products in India.

IRADe expectes to upgrade and validate a general equilibrium model of a community of rural households in order to investigate different aspects of patterns of energy consumption, utilization and demand in the farm sector.

Appropriate price for electricity will have to be charged sooner or later. Similarly price of fertilizer will also have to go up. Fertilizer subsidies are unsustainable and WTO commitments would call for removal of these subsidy. Change in cost of irrigation and price of power will change the profitability of different crops. This in turn will lead to change in cropping pattern, levels of output, consumer prices, farm income and welfare of different classes of persons, which depends on their levels of consumption in real terms. The aim of the project is to understand precisely this in a quantitative way.

- What would be the impact on welfare of different groups of people of increasing prices of power and fertilizer relative to those

of agricultural outputs?

- Even when the state decides to subsidize agricultural power, there is still a need to understand the impact of change in power tariff on agriculture to set an appropriate level of subsidy and to monitor the subsidy. What is the appropriate level of subsidy?
- What are the most relevant scenarios of price changes and other associated policy measures that we should examine?

The Research Challenge and The Approach

The existing general equilibrium model has 65 sectors, a number of these are agricultural ones. It distinguishes 10 income / consumption classes, five in rural area and five in urban areas. It can analyze a whole range of policies such as taxes, subsidies, trade, public buffer stocks, public distribution, price support, income transfer etc.

The main challenge in addressing the issues posed above is to incorporate in a persuasive ways the reaction of farmers to changes in energy prices and cost of irrigations in the face of unreliable data. Where electricity attributed to have been consumed by farmers is often been derived as a residual and contains a lot of pilferage in it.

We have district wise time series data on area, production, and prices, of different crops. We also have data on irrigation by sources, labour, capital, bullock and fertilizer use as well but only at the district level and not by crops. There is also information on the agro climatic condition of the districts such as length of growing period (LGP) and potential evapo-transpiration (PET).

Given the problems with cost of irrigation, we need to combine agronomic and technological data with general aggregate economic data. We will develop approaches to do this.

1.3 Impact of fuel Scarcity and Pollution on Rural Poor

Background and Objectives

In India, poor people, especially women and children, gather biofuels spending long hours and suffer health consequences of carrying heavy loads and pollution from biofuels. These hours which are spent in gathering biofuels could otherwise be used towards their self-development or for economically productive activities and hence poverty alleviation. The intersection of energy, poverty and gender is a key area that needs to be explored. Adding to the knowledge in this area could improve energy policies to address poverty and gender issues. Poverty, environment and health linkages in the literature are done generally with small sample and are not convincing. This is the first ever study in India that uses large sample and gives qualitative and quantitative understanding of vulnerable groups, socio economic factors and role of policies.

This project is funded by global development network (GDN) through its regional working group (SANEI), South Asian Network, New Delhi. The overall objective of the research project is to assess the impact of scarcity of clean fuels as well as of traditional fuels and assess in economic terms the impact of pollution from the use of traditional bio fuels on vulnerable groups of rural poor in Himachal Pradesh in the context of their socio-economic circumstances, access to fuel, needs and willingness to pay for cleaner fuels. This project focuses mainly on poverty, gender, and environment and health issues in the state of Himachal Pradesh in India and conduct gender specific survey to address this issue.

Himachal Pradesh (HP), which is a state with a small population, mountainous ecosystem and one of the four most progressive states of the country. It has emerged as a model hill state. It has high access to clean fuels.

The present comprehensive survey was conducted in 9 districts of rural Himachal Pradesh, India covering 712 households from 54 villages and 4100 in year 2000. Dataset in this project was supplemented by the data from a large sample survey by Parikh J. et al. (2000) carried out earlier. Doctors accompanied the survey team to check the health profile of all individuals present. The survey was conducted at three levels, viz. household level survey, village level survey and survey of near by health care facility (health centre). The methods used were following.

- Face to face interview with chief cook.
- Symptom inquiry and health assessment with measurement of weight, height and lung capacity with peak flow meter.
- Diagnostic with medical professionals.

The problem is too vast as it affects millions of people in India and needs multi-pronged solutions and for this greater political will is needed and cooperation among government ministries, development agencies, and community organizations, to ensure that rural women can choose from a range of cleaner fuels and energy technologies, in order to reduce their daily burdens and increase their social and economic opportunities. In terms of new insights this study adds further dimensions to the energy debate by adding housing improvements, education and awareness, transportation solutions, easier access to biomass or clean fuels and gender empowerment. It also gives quantitative picture by giving odds ratios for smoking, clean fuels vs. biofuels, various age groups, gender differences, literacy, and hilly areas and so on to what have been qualitative observations so far.

Key Results and Findings:

The key results of the project are:

Socio - economic status and infrastructure:

- The higher level of the achievement of the state is seen to be further strengthened by the project as the survey shows that in rural Himachal Pradesh most of the villages have some road network and mode of transportation. Almost all the villages have access to primary school and health care facilities with an average of 1/2 doctor per health centre.

Household Energy consumption pattern:

- The energy consumption pattern in HP showed that most households (hh) used multiple fuels. Around 93 percent of the households met their cooking energy requirement by using bio-fuels, mostly fuel wood. This fuel wood came from own farm as well as government and village forests.
- About 30 km distance is traveled by each household and in all, 41 hours are spent in a month to collect fuel wood.
- Kerosene was mostly used for lighting. Also the results suggested that distribution of clean fuels viz., kerosene and LPG was quite good in this area. But use of clean fuels was restricted due to non-affordability and unavailability.

Cooking behaviour:

- Most households cooked twice a day.
- It was observed, that in the study area, 88 percent households had a separate kitchen whereas in 9 percent houses the kitchen is inside the living room itself.

Health profile:

- The linkages of health with bio-fuel use were established on the basis of self-reported symptoms of respiratory diseases. And it was observed that households using biofuels were found to be at two times a high risk of being respiratory symptomatic. The risk increased with age with about 418 symptomatics per thousand individuals in

the age of 60 years and above.

- The health impact analysis at the individual as well as at the household level shows that females using biofuels were more susceptible to cough, phlegm, wheezing, chest illness and blood in sputum as compared to females using clean fuels. This was confirmed by the results, which showed 100 female symptomatic per thousand individuals (odds ratio 2.26) as compared to 92 male symptomatic per thousand individuals (odds ratio 2.01).
- Smoking too has pronounced effect on the respiratory health of individuals with age. Both the male and female smokers were at higher risk of having respiratory diseases with female smokers almost at twice high risk (306 symptomatic per 1000 individuals) than male smokers (170).
- Illiteracy had significant influence on almost all the respiratory symptoms. The number of symptomatic per thousand individuals for literates was as low as 39 (odds ratio 1.00) as compared to illiterates that were 205 (odds ratio 5.26).

Analysis of vulnerable groups:

- The vulnerable groups are children, women and old age people. It is observed that the proportions of reported symptomatics are much higher among age groups 45-60 years and 60+ years as well as below the age of 5 years.
- Chief cooks were more susceptible to respiratory diseases than assistants or non-cooks.

Toll on human resources

- About 0.7 million adults (21% of the total rural adults) might be having some respiratory symptoms.
- In addition, about 32 person days per household are lost in a year due to collection of fuel wood (29 days) and due to respiratory diseases (3 days).

The project was concluded with a consultation workshop organized on 11th March to discuss and disseminate results with policy makers and NGOs. The final report of the project has been submitted.

1.4 The Energy Poverty and Gender Nexus in Himachal Pradesh, India: The Impact of Clean Fuel Access Policy on Women's Empowerment

Background and Objectives:

The SANEI project described above was followed up by another project titled "The Energy Poverty and Gender Nexus in Himachal Pradesh, India: The Impact of Clean Fuel Access Policy on Women's Empowerment". This study focuses on poverty, gender, and environment and health issues in the state of Himachal Pradesh in India and involves a gender specific survey to address this issue.

The project is funded by DFID / KAR. The main objective of the project is to examine the hypothesis that when women are given energy on a sustainable basis they feel empowered and freed from daily drudgery. They move ahead in human development indicators and find new ways to enrich life. This study, undertakes a comparative analysis between those groups in H.P having access to clean fuels and those who do not have access in terms of the level of prosperity and impact on socioeconomic development indicators. The State Government has a policy to allocate additional quota of clean fuels (LPG, kerosene) in hilly areas to prevent deforestation i.e. 20 litres per household as against 5 litres elsewhere in India. Has this policy made an impact on gender indicators ranging from literacy, health, income and so on?

Key results and Findings:

The dataset collected from an integrated survey

in SANEI project was carried forward in this study, termed as Database A that was analyzed from an altogether different perspective. In addition to database A, supplementary information to bridge the data gap with coverage of village level information was collected from 2 districts, 30 villages, 80 households and 196 individuals and termed as Database B. The key components of Database B (field survey data) are as follows:

- Gender related survey taking into account the following factors
  - Role of women in decision-making
  - Livelihood options
  - Benefits of Clean fuels seen in terms of
    - Productivity (and income) gains
    - Education of children (girl child)
    - Entertainment
    - Health
    - Leisure
    - Socialization
    - Involvement and decision making in community activities
- Primary survey aimed to estimate accessibility and use of clean fuel by households for 30 villages in two districts. A survey on the kerosene depots was also undertaken to get the seller's perspective of supply situation under the Public Distribution System (PDS).

The results reveal that women are more empowered in Himachal Pradesh as compared to other states. However in the state bio-fuels still provide about 70% of fuel needs. To procure bio-fuels women walk approximately 30kms in a month to collect fuel-wood. About 2.7 hours per person per trip are expended in fuel-wood collection and transportation. The state has infrastructure for kerosene but only 31% are using it because they perceive it to be expensive and also not always available. The people in the Himachal Pradesh are willing to pay for kerosene, the next fuel on the energy ladder above bio-fuels. It is estimated that even at a price of Rs. 13 per litre, which is higher than the market price, there is a demand for kerosene. Therefore there is a need to meet this unmet demand. However, LPG network is expanding and about 54% households use LPG in rural areas.

Literacy level of women in Himachal is as high as 60% and almost 80% of the women are exposed to at least one form of media. Low incidence of domestic violence was reported from Himachal Pradesh. Bio-fuel is the chief source of energy and their collection is primarily the responsibility of adult women and older men. The main difficulty faced by them is the physical strenuous process with almost 67% suffering from neck - ache atleast quarterly and 50% suffering from backache almost daily. One of the prime concerns for about 30% women was the time taken in collection of wood. Also about 70% of adult women are chief cooks and hence exposed to smoke and pollution. They are willing to have interventions to avoid smoke with about 73% of them preferring ventilation over improved stoves.

In addition to the above information a prelimainary kerosene oil survey was conducted. The key observations from the kerosene oil survey are as follows:

- Due to increased availability of LPG, the demand for kerosene has been on the decline. In both the survey district, the demand level in summer was less than 40% of the available quota. In winter and rainy season, when the demand for energy increases (and fuelwood availability is restricted), the demand is correspondingly higher. Primary reasons, as indicated by kerosene sellers are availability of (and preference for) LPG, distance from the shops, and use of firewood.
- The profit margins in selling kerosene under

PDS are fairly low, at 25 paise per litre for rural areas and paise 15 per litre for urban areas. As a result, most sellers have other businesses, commonly ration shops. In fact, most said that the income from kerosene sales constitutes only 2% of the total incomes, and most view this only as a supplementary business.

- Dissemination workshop was organised to dicuss the results.

1.5 Natural Resource Accounting in Goa Phase II, under SEEA Framework

In September 2004, Central Statistical Organization, under the Ministry of Statistics and Programme Implementation, Government of India; awarded IRADe an 18 month research project entitled 'Natural Resource Accounting in Goa Phase II, under SEEA Framework'.

With high literacy, well-educated manpower, peaceful environment, good transport and power facilities, Goa is fast emerging as one of the best tourism and industrial locales in the country. Goa has already set up a number of industrial estates. These activities generate value added by creating employment and providing profits to the entrepreneurs in Goa. However, they also produce environmental consequences some of which have negative impacts on the well being of the society, which include pollution of the land, the water as well as the air.

The broad objective of the project is

- To carry out Natural Resource Accounting using the SEEA framework for three sectors, namely:
  - The tourism sector
  - Municipal waste management
  - Water pollution from industries
- To prepare physical and monetary accounts for the aforementioned sectors.
- Draw lessons for the country as a whole.

The above objectives would be achieved by extending the conventional UN system of national accounts (SNA) to reflect the waste accounts.

A brief overview of the work undertaken till date within the three sectors viz., tourism sector, solid waste management sector and water pollution from industries sector are discussed below:

1.5.1 The tourism sector

Background and Objective

In the global tourism market, Goa enjoys certain comparative advantages, due to its unique natural and cultural assets. Goa had an inflow of around 2.5 million tourists in the year 2004. This represents an increase of around 20 per cent over the previous year. It is a major source of income and employment for Goa state, and is seen as having significant potential to contribute to economic growth in the region. However, it is inevitable that tourism has important environmental impacts. These impacts range from resource consumption, to pollution and waste generated by tourism activities, including impacts from transport and pressure on historical monuments.

The management of natural resources to reverse this trend is thus one of the most difficult challenges for governments at different levels. The current study would therefore involve an in-depth assessment of the environmental impacts in order to fully evaluate the performance of the tourism sector in Goa.

A tourism satellite account integrates in a single format data about the supply and use of tourism related goods and services. In our study, these economic satellite accounts will be extended to cover the use of natural resources (land, energy, water) and the production of pollutants (water,

discharges, BOD, PH, CO_2 etc.). Economic-environmental accounts give better understanding of the economy - environment links of the tourism sector. In a nutshell, the fundamental research question that needs to be addressed is: How sustainable is the tourism sector of Goa?

Progress and Achievements

A broad framework of the tourism satellite account for Goa along with literature survey is completed. A (pilot phase) questionnaire has been prepared to conduct sample surveys to undertake primary data collection. Various individuals, government and non-government organizations from Goa are contacted to assist in the field survey and successful completion of the project.

1.5.2. Solid waste management sector

Background and objective

The environmental impacts of solid waste generation municipal waste and households. Solid waste has harmful effects on air, water as well as land.

The reason for constructing these integrated economic-environmental accounts is to take a balanced view of economic and environmental objectives. This will help assess the contribution of different economic activities to human well-being as well as provide inputs for the calculation of green GDP.

1.5.3. Water pollution from industries

Background and objectives

Water pollution has many sources. The most polluting of them are the city sewage and industrial waste discharged into the rivers. The facilities to treat waste water are not adequate in any city in India. Presently, only about 10% of the waste water generated is treated; the rest is discharged as it is into our water bodies. Due to this, pollutants enter groundwater, rivers, and other water bodies. Such water, which ultimately ends up in households, is often highly contaminated and carries disease-causing microbes.

The Central Pollution Control Board (CPCB) has identified 1551 major polluting large and medium industries for All India. The 17 polluting industries identified by CPCB are categorized as aluminum, caustic soda, cement, copper, distillery, dyes & dyestuff, fertilizer, iron & steel, leather, pesticide, petrochemicals, pharmaceuticals, pulp & paper, refinery, sugar, thermal power plants, and zinc. Goa has138 large and medium industrial units as on 31/03/2001, of these 6 are in the polluting industries category. One of the important objectives of this project is to assess the economic costs of water pollution from industries.

In order to achieve this goal, a detailed questionnaire is constructed and a survey would be conducted to estimate, total effluents from industry with treatment & without treatment. Physical co-efficients and monetary accounts based estimated/available abatement cost data or avoidance technique will be obtained. Valuation needed for monitory accounts will be done using the avoidance cost approach.

Progress and Achievements

The project commenced in November 2004 and So far a detailed literature survey and construction of a broad framework of the solid waste satellite account for Goa have been completed

- Questionnaires have been prepared to conduct sample surveys to undertake primary data collection.
- Various individuals, government and non-government organizations from Goa are contacted to assist in the field survey.

1.6 Fuel Forecasting Study - a joint collaborative venture between IRADe and Pricewaterhouse Coopers Ltd.

IRADe was associated with Pricewaterhouse Coopers Ltd. (PwC) in a project awarded by Petroleum Federation of India (PetroFed) to study the current petroleum mix scenario in India. This included understanding the changes in trends of production, consumption, imports and exports of petroleum fuels and their contribution to the overall energy mix in India.

IRADe agreed to undertake the demand projections for India by building scenarios using econometric models based on time series data for each of the various petroleum products, namely, Aviation Turbine Fuel (ATF), Light Diesel Oil (LDO), Low Sulphur Heavy Stock (LSHS), Heavy Fuel Oil (HFO), Bitumen, Liquefied Petroleum Gas (LPG), Superior Kerosene Oil (SKO), Petrol, Naphtha and Natural Gas. This exercise focused on several key milestone years that coincide with the Indian planning calendar viz.2011-12 and 2016-17 are the terminal years of the XIth and XIIth five year plans of Government of India (GoI), while 2020 coincides with GoI Vision 2020 document. 2030 looks at five years beyond the period considered by Hydrocarbon Vision 2025 brought out in the year 2000.

Background and Objective

Growth in energy consumption is intrinsically linked to growth in the economy. Population and the resultant changes in the rural-urban demographic profile and other structural changes get mirrored in the economic growth. Moreover, this high rate of economic growth is likely to be accompanied by decreasing energy intensity of the economy on account of progressive substitution of primary non-commercial energy sources by more efficient commercial energy sources and adoption of more efficient technologies.

The joint IRADE-PwC report gives an overview of the broad trends in the fuel demand and specific sectors that have impacted the trends in energy consumption.

The key objectives that the study entailed were:

- To understand the broad contours of energy demand scenarios in India in coming decades.
- Developing econometric models based on time series data for each of the various petroleum products mentioned above.
- To use the results of this study with an endeavor to provide information as a basic input for strategic planning, policy making and reviewing the future course of action to ensure that the energy needs of India are met.

Table: Scenarios for Projections in India for Selected Petroleum Products and Natural Gas

Primary Fuel	Units	Econ. Growth Scenarios	2011-12	2016-17	2020	2030
Selected Petroleum Products (excluding Naphtha)	MMT	6%	122.9	151.7	170.8	258.1
		8%	133.8	177.0	208.5	374.6
NG and NG equivalent of Naphtha	BCM	6%	68.4	107.5	129.9	243.0
		8%	75.8	141.0	180.5	405.7

Source: IRADe-PwC Analysis MMT = Million Matric Tons BCM=Billion Cubic MeterNote: The totals for Selected petroleum products include LPG equivalent of SKO

Methodology

- In-depth review of past trends over the period 1998-99 to 2003-04 was undertaken.
- The projections were developed for 6 % and 8% economic growth.
- Projections took account of fuel substitution and/or reduction of use through energy efficiency of some of the fuels. Supply based projections for ethanol, biodiesel, CNG and LPG were made separately.

Key results and Findings

- Past Trends: India is highly dependent on fossil fuels viz. coal, lignite and oil and gas, which account for 95 per cent of its commercial energy mix. Coal and lignite form 48% whereas oil and gas account for 47% of total commercial energy mix. Past trends indicate that the gap between domestic supply and demand of crude oil has been increasing. The refining capacity of India stood at 126 MMT in April, 2004. India's refinery though put in the year 2003-04 was 113 MMT and consumption was 106.5 MMT, an increase of 2.3 per cent over 104.1 MMT registered in 2002-03.
- Demand Projections till 2011-12: Show that the total demand for the selected petroleum products would range from 23 MMT to 133.8 MMT for 6% and 8% economic growth respectively. This represents a CAGR of 5.5 per cent to 6.8 per cent over the consumption levels in 2003-04.
- Demand Projections from 2016-17 to 2030: Under the Business-As-Usual (BAU) scenario, the projected demand of refined products is 151.7 MMT, 170.8 MMT and 25.1 MMT in 2016-17, 2020 & 2030 respectively. Similarly demand for Natural Gas and NG equivalent of Naphtha is projected to be 107.5 BCM, 130 BCM and 243 BCM in 2016-17, 2020 & 2030 respectively (for 6% growth).

The study concludes with a summary of projections made by other various agencies on the energy mix for India in the key milestone years which use different economic growth rates, methodology, assumptions and pertain to different petroleum products.

Publication

A book titled "Fuelling India's Growth - Past trends and Scenarios 2011-12", emerged from this project, which broadly discusses the current energy scenario in India and the approach and methodology used for projections in 2011-12. Earlier, the executive summary of the publication was released by Shri. Subir Raha, CMD, ONGC and Chairman, Petrotech Society. The release coincided with Petrotech 2005 exhibition, New Delhi.

1.7 Action plan for Pilot Demonstration projects by IRADe in Jeevika villages of SEWA:

Background

Self Employed Women's Association (SEWA), Gujarat has been implementing a large programme for improving the living conditions and livelihoods of earthquake affected people in three districts of Gujarat - Surendranagar, Patan and Kutch. A total of 400 villages in these three districts are to be covered under various activities with a view to not only increase livelihood and income generation but also to improve living conditions under this programme called Jeevika.

Objectives

The overall objective of SEWA- IRADe collaboration is to incorporate energy technology systems in the Jeevika programme with a view

to not only increase livelihood opportunities and enhance income generation but also improve living conditions.

Action plan

The current suggested action plan is a short term pilot plan as there are no prior innitiatives regarding alternate energy sources in the area and these initiatives need to be evaluated in terms of their suitability to local conditions and acceptance among the people, especially women - SEWA members. This pilot action plan and would be developed into a full scale action programme once the feedback from these initiatives is available.

In the subsections below, the village wise technology initiatives planned and their associated costs have been given in brief. The detailed activity planned under each of the technology, the area selected and the operational details have been given in the annexures.

a. Cooking energy requirement for households Dehgam village in Surendranagar district

Requirement: Most of the people in this village use firewood for cooking. In inefficient chulhas (traditional mud stoves). Several households also use LPG in the village and spend about Rs 350 every two months for one LPG cylinder.

Technology planned: Community biogas plants and improved smokeless cookstoves have been planned for this village. Water from Narmada canal is now available in the village (they have a tank which is linked to the canal). Since the houses in the village are closely located and cattle dung is adequate, a community biogas plant is planned for the village for the pilot phase to be operated in an Energy Service Commissary ESCO mode by the villagers where dung would be purchased and gas and manure would be sold. In some of the poorer households who may not have the capacity to pay for the gas, improved smokeless cookstoves will also be installed. About 50 improved cookstoves would be constructed in the first phase of this project. For this masonry training will be provided to one or two of the poor women, which would help in increasing their incomes. We will also experiment with community Kitchen where the poor can come and cook a meal for a small payment.

b. Solar assembly Centre(For Solar lanterns and Home Lighting systems).

In almost all the villages (even if they are electrified), there is a demand for better lighting services. The current supply of power in these villages is poor with unscheduled power cuts and low voltages. Solar lanterns would provide these villagers with better lights in the evening which can be linked to the Jeevika programme of handicrafts and other livelihood options like petty shops. These entrepreneurs can increase their working hours resulting in increase in their incomes.

To meet the demand on such a large scale it would be prudent that a solar assembly centre be established at one of the SEWA centres to start with. There are examples in the country where local villagers have been trained to assemble and carry out complex repairs of solar technology systems. This would be more cost effective than sourcing lanterns from other manufacturers and also would provide employment opportunities to several women. The other benefits of such an initiative would be reduced procurement time, better quality, better maintenance and most of all, developing systems which suit the people's requirements. The trained personnel will also provide repair and maintenance service in the area.

2. SEMINARS/WORKSHOPS

2.1 Workshop on Energy Policy Reforms and Agriculture in India: A general Equilibrium Exploration, 20April 2004.

Participants of workshop on Energy Policy Reforms and Agriculture in India: A general Equilibrium Exploration.

Dr. Jyoti Parikh, Dr. Kirit Parikh, Member Planning Commission, Sh. Arvind Jadav, Ministry of Power and Dr. David Victor, Stanford University, California, USA

IRADe organized a workshop April 20,2004 at India International Center, New Delhi for launching the Stanford - IRADe project to receive suggestions at the inception stage.

Objectives:

The overall objective of the workshop was to discuss the various features in order to upgrade the general equilibrium model.

Dr. P. Ghosh, Secretary, Ministry of Environment and Forests, who earlier did computed general equilibrium models inaugurated the workshop. Professor David Victor of Stanford University gave a keynote address after which Professor Kirit Parikh gave a substantive presentation concerning the objectives, methodology, possible outputs and policy implications. The experts and representatives of World Bank, Stanford University, ICAR, NIPFP, NCAER, IGIDR, Planning Commission, Ministry of Power, IARI, DFID India, USAID, Ministry Of Environment and Forests, Reliance Industries Limited, Indian Statistical Institute (ISI) and University of Delhi attended the workshop.

The workshop recommended to land tillers and land owners and poor and small farms address questions directly related to decision making such as disaggregation of farmers and some scenario related to WTO.

2.2 IRADe-UNEP Workshop on "Training Sessions on Capacity Building- Environment, Trade and Sustainable Development"

IRADe organized a Training Sessions on Capacity Building- Environment, Trade and Sustainable Development" on November 24, 2004 at India Habitat Center, New Delhi. The United Nation Environment Program (UNEP) financed the workshop.

Background:

In view of the need to build the capacity of planners, industrial organizations, environmentalists, business community, trade associations and decision makers, Integrated Research and Action for Development (IRADe) organized a training session on "Capacity Building for Environment, Trade and Sustainable Development" on 24 November, 2004 at India Habitat center, New Delhi, India. It was based on the Training Module: Introduction into Capacity Building for Environment, Trade and Sustainable Development, developed by the UNEP-UNCTAD Capacity Building Task Force (CBTF). This training session also provided an opportunity to present UNEP-ETB's recent publications on environmental assessment, economic instruments and subsidies which were

distributed to the participants for further reading and use. The training targeted a broad group of relevant stakeholders in government and aimed to increase their understanding of trade-environment-development inter-linkages as well as help them identify and prioritize their capacity building needs related to the topic.

Inaugural Session: Dr. Kirit Parikh, Member Planning Commission, Dr. Jyoti Parikh, Executive Director, IRADe, Mr. Peter Repinski, United Nations Environment Programme (UNEP), Sh. Anwarul Hoda, Member Planning Commission, Dr. B.D Sharma, IRADe

Objectives of the Session:

Overall purpose of the training session was to support capacity building for environment, trade and sustainable development with the following specific objectives:

- To enhance the understanding of the participants regarding the linkages between environment, trade and sustainable development and to capture environment-related development opportunities offered by trade and globalisation.
- To improve participant's capacity to engage effectively in trade and environment negotiations and implementing multilateral trade and environment agreements.
- To inform participants about the recent publications released by UNEP-ETB in the field of trade, economics and environment.

It emphasized the role of trade in sustainable development, environmental opportunities and challenges, as well as effective approaches to capacity building.

Presentations were made on Environment, Trade and Sustainable Development, Trade and Environment issues at the WTO, Standards and Market Access: A Case Study of Select Processed Food Products and Environmental effects of exports and utility of ecolabels for increasing exports: Leather Industry Case Study were presented with detailed discussion.

The session broadly covered following issues:

- Does WTO provide a level playing field for

Participants of second International Training Course on Renewable Energy from Asia and Africa and IRADe Staff

Professor J. Parikh, Executive Director, IRADe addressing the participants during the inauguration session. Seated next are: Mr Rakesh Bakshi,CMD VESTAS, Kirit Parikh, Member Planning Commission,Dr B.D. Sharma,Senior Adviser (IRADe)

both developed and developing countries?

- Sustainable Development & Environment
- MBIs for Environment Protection

Participants from Delhi based organizations and from Northern states of the country attended the training session. Participants came from Research and Information System for Non-Aligned and Other Developing Countries (RIS), United Nations Conference on Trade and Development (UNCTAD), different ministries, the Planning Commission, several universities (Jawaharlal Nehru University, Delhi School of Economics, University of Delhi) many research institutions (Indian Institute of Management (IIM) Calcutta, Indian Institute of Forest Management, The Energy Research institute (TERI), Winrock International India (WII), Indian Renewable Energy Development Agency Ltd. (IREDA), World Wide Fund for Nature - India (WWF), and industry (Reliance Industries Ltd.).

2.3 IRADe_MNES International Training Programme on "Renewable Energy: Techno-economic, Finance and Socio-environmental Issues, 7-17 December 2004, New Delhi

Background and Objectives:

This International Training Programme in December 2004 on "Renewable Energy: Techno-economic, Finance and Socio-environmental Issues" The training course was sponsored by Ministry of Non-conventional Energy Source, Govt. of India. The specific objectives of the training course were:

- To give a broad based understanding of the renewable energy in the overall context of energy sector planning and global energy and environmental issues.
- To explain why renewable energy is needed for energy security and environmental considerations. Give national and global energy perspectives and discuss new paradigms to reduce fossil fuel dependence.

Shri. P. Chidambaram, Minister for finance inaugurating the conclave. Seated Bhardwaj, Dir. IIFF, Dr. Kirit Parikh, Member Planning Commission, Michal Carter, Resident Representative World Bank, Dr Jyoti Parikh, Executive Director IRADe.

- To impart techno-economic understanding of major renewable technologies. Discuss cost-benefit framework as well as relative comparisons with fossil fuels and pricing issues.
- To stress the need for innovative finance approaches and micro credit so that the people take responsibilities of financing at local level.
- To give hands-on experience about understanding of their own country's energy balances. This is necessary for reducing dependence on subsidies.
- Visit Renewable Energy project sites

The Participants:

In all, twelve participants attended the 2nd International Training Course, representing 10 organizations. The participants from Africa were from South Africa, and Tanzania. The Asian participants were from Nepal, Bangladesh, Pakistan, Iran and Sri Lanka. The participants were from middle or senior level ranks officers (Director, Executive Director, Advisor, Assistant Professor, Assistant lecturer) from ministry, Non-governmental organizations and from different universities Asia and Africa.

Course Contents:

The overall content of the training course covered topics such as Understanding about energy sources, National energy planning, Choosing renewable energy portfolio, Techno-economic analysis, Financing renewable energy, Externalities of fossil fuels, International energy issues, Environmental aspects, Global climate change and Clean Development Mechanism (CDM), Need for participative approaches and Developing entrepreneurship and community based initiatives.

The lectures were given by highly reputed experts from Vestas, India Renewable Energy Development Agency (IREDA) etc. The participants were from different background and work experiences such as renewable energy and environmental management, natural resource management, environmental geography, energy (oil sector), statistics and environmental health, small hydropower, solar, biomass, energy economics and communication and information.

2.4 IRADe-IIEF (Invest India Economic Foundation) State of Market Conclave 2005-Second Generation Financial Sector Reforms Conclave, 06 - 08 January 2005, New Delhi, India

IIEF and IRADe hosted a policy consultation from 06 - 08 January 2005 at New Delhi. The conclave examined financial policy reforms needed for facilitating a financial sector which would support and foster 8% growth. The conclave was inaugurated by Shri P. Chidambaram, Union Finance Minister of India, Professor Kirit Parikh, Member, Planning Commission and Michael Carter, Resident Representative of the World Bank gave keynote addresses. Mr. Gautam Bhardwaj, Director, IIEF, welcomed the participants and Prof. Jyoti Parikh, Executive Director, IRADe gave vote of thanks.

India seeks to get the trend growth rate up from 6% to 8%. Existing demographic trends, and the increase in income, will fuel the growth of the savings rate in the years to come.

This will throw up new challenges for the financial sector to effectively intermediate an enormous flow of savings. In addition, obtaining higher growth will require enhancements in the efficiency with which savings are utilized. That is, a financial sector that supports and fosters 8% growth will need to do better, as compared with the present situation, in terms of information processing and wise resource allocation.

In this context, the first IRADe-IIEF Conclave

brought policymakers, regulators, finance practitioners and leading economists from India and abroad under one roof to examine second generation financial sector reforms for India and the relevant policy imperatives for the Government. It provided a consultative forum to the domestic and international policy and financial community to exchange views, information and ideas in these areas. A demonstration of new trading platforms for commodities as well as cutting edge IT solutions for financial markets was arranged at the venue.

The Conclave was a step towards a consultative process for effective design and efficient implementation of economic and financial policies, which will benefit India's citizens in the years to come.

2.5 IRADe-SANEI Dissemination Workshop on "Impact of fuel Scaracity and Pollution on Rural poor:

A Comparative analysis of vulnerable groups in Himachal Pradesh" India International Center, New Delhi, March 11, 2005.

The purpose of this dessimination workshop was to disseminate findings of the SANEI project and discuss final of the Energia project to get feedback from reputed experts and representatives of stakeholders. The workshop focused on poverty, gender, and environment and health issues in the state of Himachal Pradesh in India and give policy conclusions.

The workshop provided a platform for drawing policy conclusions and reiterate new insights. As the problem is too vast as it affects millions of people in India and needs multi-pronged solutions that cover a whole range of issues, such as, energy supply, health, gender empowerment transportation and housing.

Participants were from Forest Survey of India, Himachal Pradesh Government, different universities like JawaharLal Nehru University, University of Petroleum and Energy Studies (UPES), Different NGOs like Jagrati from HP and TERI, ENERGIA/ETC foundation, Planning Commission, IGIDR Mumbai, IGMC Shimla, Swiss agency for development and cooperation and Petroleum Federation of India.

Standing (LtoR): Ms. Rubeena (SEWA), Jignesh Jadav and Dr. B.D.Sharma (IRADe) during Solar Energy Awareness Session at Degam village community

PROFESSIONAL ACTIVITIES OF THE MEMBERS IN 2004-2005:

Dr. Kirit S Parikh

Membership of Committees

Policy

1. Member, Planning Commission, Govt. of India, New Delhi
2. Chairman, Integrated Energy Policy Committee, Planning Commission
3. Member, Committee on Infrastructure, Govt. of India
4. Member, Committee on Rural Infrastructure, Govt. of India

Academic

1. Member, Board of Director, Institute of Global Environmental Studies, Japan
2. Chairman, Governing Council, Centre for Environment Education, Ahmedabad
3. President, Governing Board, Gujarat Institute of Development Research, Ahmedabad
4. Member, Governing Council, Indian Council for Research on International Economic Relations, New Delhi

Finance

1. Member, Board of Director, State Bank of India (Till July 2004)
2. Member, Board of Director, Industrial Development Bank of India (Till July 2004)

Honours

1. Elected as life member of International Association for Agricultural Economics (IAAE)
2. Awarded the Nayudamma Award for contribution to the welfare of mankind through developments in the fields of Economics & Energy.

Media

1. Member, Board of Directors, Business Standard (Till July 2004)
2. Member, Board of Economists, India Today (Till July 2004)

Seminars, Conferences, Meetings attended

1. Chaired a Session on Findings of the Scenarios Working Group of the MA Launch Event in India, 31 March, 2005, New Delhi
2. Chief Guest at the Valedictory Session of the Seminar on Energy Value Chain: Moving Towards Cohesion and Regulation, 29 March, 2005, New Delhi
3. Led the Indian delegation to the Energy and Environment Ministerial Roundtable in London - 14-17 March, 2005
4. Delivered the keynote address at the Inauguration of the International Conference on Hydrological Perspectives for Sustainable Development at IIT Roorkee, 23 February, 2005
5. Made a presentation on "Sustainable Development a Developing Country Perspective" at the Expert Meeting of the Inter-governmental Panel on Climate Change - 14-18 February, 2005; St. Denis, Reunion Islands, France
6. Delivered the Presidential Address at the Safety Conference organized by Safety and Quality Forum, 14 February, 2005 - New Delhi
7. Chaired the Workshop to discuss French Experience pertaining to the Regulation of the Water supply and Electricity from an Indian perspective organized by NCAER and CERNA, 9th February, 2005 - New Delhi
8. Delivered a brief talk/presentation to the full Canadian Environmental business Development Mission - February 8, 2005, New Delhi
9. Delivered the Prof. Y. Nayudamma Memorial Lecture "Research for Development" - 4 February 2005, Chennai
10. Keynote Address at the Inaugural Session in the International Conference on "Moving the Competition Policy Agenda in India" - 31 January, 2005 New Delhi

11. Chief Guest at the valedictory session of the International Congress on Renewable Energy, Pune - 22 January 2005
12. Inaugurated the 41st Annual Conference of the Indian Econometric Society at Jadavpur University, Kolkata and delivered the inaugural address on "Explaining Growth of South Asian Countries" - 20 January, 2005
13. Chair a Session on "Poverty and Rural Development" in the Sixth Annual NBER-NCAER Neemrana Conference - January 17, 2005, Neemrana Fort, Rajasthan
14. Guest of Honour at the Valedictory Session of the National Workshop on challenges for Water Development and Management in India and Future Strategies - 14th January 2005, New Delhi
15. Participated in the IRADe-IIEF State of Market Conclave 2005-A financial sector that support and fosters 8% growth - 6-8 January, 2005 New Delhi
16. Delivered the 4th Dr. C. Chandrasekaran Memorial Lecture on "Food Security, Poverty and Employment Guarantee" at International Institute for Population Sciences, Mumbai - 27 December, 2004
17. Inagurated the Winter School 2004 in Economic Theory and Public Policy at the Delhi School of Economics - 27 December, 2004; Delhi
18. Participated in a dialogue on sustainable rural development Organised by Centre for Environment Education, Ahmedabad 15-16 December, 2004
19. Participated in a Roundtable on the Implementation of the objectives of the Employment Guarantee Programme organized by India Development Fund and CII - December 11, 2004; New Delhi
20. Special Address on 'Rationalising Fertiliser Policy' at the Fertiliser Association of India - December 9, 2004; New Delhi
21. Inaugurated the Regional Conference on Universality of Infrastructure Services: Financing, Delivery, Legal & Regulatory Issues organized by TERI - 6 December, 2004; New Delhi
22. Inaugural Address at the Global Conference on Higher Education organized by FICCI & UGC - December 1, 2004; New Delhi
23. Chief Guest in the Twenty Third Convocation at the Dayalbagh Educational Institute, 20 November, 2004; Agra and delivered the Convocation Address.
24. Keynote address at Water Summit 2004-Public-Private Partnership for Water Conservation & Management and Chaired the Plenary Session - November 18, 2004, New Delhi
25. Participated in a Roundtable on Employment Guarantee Act organized by IGIDR, 6 November, 2004; Mumbai
26. Made a presentation on "Strengthening Educational Institutions to Analyse Energy Issues Integrating Social, Economic & Technical Impacts" in a Seminar organized by CII on Clean Air for Asia: China-India-Japan-United States Cooperation to Reduce Air Pollution in China & India on 2 November, 2004, New Delhi
27. Participated at the National Conference on Water Quality Issues organized by MOWR and PHED, Govt. of West Bengal, 15 October, 2004 Kolkata
28. Delivered Shri R.S. Bhatt Memorial Lecture on "Accelerating Development: With a Human Face, a Compassionate Heart and a Clear Head" at Bhavnagar University, Bhavnagar 4-5 October, 2004
29. Delivered Lecture on "Emerging Development Needs" at the National Seminar on Alternative Strategies for Development organized by RCVP Noronha Academy of Administration and Management, Bhopal 10 August, 2004
30. Gave a talk on 'Subsidies: Good, Bad & Ugly' at Policy Breakfast for MPs organized by Centre for Civil Society, 13 July, 2004-New Delhi

Prof. Jyoti K. Parikh, Executive Director

Current Appointments and Memberships of Committees, etc.

International Appointments:

1. Member of the Research Advisory Committee of the Institute for Global Environmental Strategies (IGES) Japan, April 1, 2002 till March 31, 2005.
2. Convening Lead Author for the chapter on "Carbon Regulation for Millennium Ecosystem Assessment"-2002 till 2005
3. Technical Advisory Committee (TAG) for Energy Trust Funds Programmes of the World Bank (2003) that include Energy Sector Management Programme (ESMAP), Asia Technical Assistance in Energy (ASTAE), Africa Renewable Energy Initiative (AFREN), Africa, 2002-2006.
4. Advisory Board of Tyndall Center for Climate Change, University of East Angela, Norwich, UK, 2001-2004.
5. International Steering Committee of ENERGIA, Network on Gender and Environment, Nederland, 2004-2004.
6. Steering Committee: Global Village Energy Partnership (GVEP) initiated of ESMAP/ World Bank, August 2002-2003.

National Appointments:

1. Member, Committee on Distribution Reforms (DRUM), Ministry of Power, New Delhi.
2. Member, Climate Change and Insurance Task Force, Ministry of Environment and Forests, New Delhi.
3. Executive Committee, Petroleum Conservation Research Association, New Delhi.
4. Member, Board of Directors, Indian Renewable Energy Development Agency Ltd. (IREDA), Government of India, Ministry of Non-Conventional Energy Sources (MNES), 2001-2004.

Books, Monographs, Journal Articles and Reports

1. Purohit P. and J. Parikh (2005), "CO2 Emissions Mitigation Potential of Bagasse Based Cogeneration in India", ISES Solar World Congress 2005, August 6-12, 2005 Orlando, Florida USA.
2. PETROFED (2005), "Fuel Forecasting Study: Past Trends and Scenarios 2011 - 2012 ", Petroleum Federation of India, New Delhi, India.
3. PETROFED (2005), "Fuelling India's Growth Vision 2030", Petroleum Federation of India, New Delhi, India.
4. Parikh J. (2004), "Trade, Environment and Sustainable Development", Training Session on Capacity Building: Environment, Trade and Sustainable Development, November 24, 2004, New Delhi, India.
5. Parikh J. and K. Parikh (2004), "Kyoto Protocol: The Indian Perspective", International Review of Environmental Strategies, Vol. 5(1).
6. Jyoti Parikh (2004), "Gender and Environment: Missing Link in The Rural Development of India", National Council of Applied Economic Research, New Delhi, India.
7. Noble I., J. Parikh and R. Watson (2004), "Responses to Climate Change", Chapter in MA Responses Assessment, Working Group Report on Responses.
8. MOEF (2004), "India's Initial National Communication to the United Nations Framework Convention on Climate Change", Ministry of Environment and Forests, Government of India, New Delhi, India.
9. 2004 Top News on the Environment in Asia

Workshop and Conferences attended by staff:

Prof. Jyoti K. Parikh

1. Release of the Millennium Ecosystem Assessment Report, followed by a Workshop, 31st March 2005, New Delhi
2. Discussion Meeting on Agenda for G-8 organized by RIS March 31st 2005, New Delhi
3. Meeting on Climate Change Modelling, Ministry of Environmrent & Forests, 4th March 2005, New Delhi
4. Attended One Day Dissemination workshop on Bundling of Small-Scale CDM projects, 7th Feb.2005, New Delhi
5. Attended South Asia Regional Initiative for Energy Cooperation and Development (SARI/Energy)
6. Delivered a talk on "Environmentally Compatible Energy Strategies" at TIFAC-IIASA Meet, 25-26th October, 2004, New Delhi
7. Attended Seminar on accelerating the growth of Energy Efficiency and Renewable Energy "Prospects for India-UK Partnership" October 5th 2004, New Delhi
8. Attended a Discussion Meeting on Agenda for G-8, 23rd September 2004, New Delhi
9. Quarterly meeting of Technical Advisory Group (TAG), World Bank, September, 17-18th September, 2004 Denmark
10. Panelist at the session on Energy Cooperation in South Asia at RIS-SACEPS Regional conference on SAARC-Post Islamabad Challenges, 31st August 2004, New Delhi
11. Attended Sixth Annual SANEI Conference, August 26-27,2004 New Delhi
12. Chaired Session at The Coal Summit 2005-Energy Security Option for India, 1-2nd July, 2005
13. Seminar on Nuclear Techniques for air pollution, International Atomic Energy Agency (IAEA), June 7-10 2004, Vienna, Austria
14. India Development seminar, Stanford University, June 3-5 2004, California USA
15. Millennium Assessment Working group meeting at Montreal, April 26-30 2004, Canada
16. Review meeting for Tyndall Center on climate change at University of East Anglia, April 20-23 2004, Norwich UK

Dr. B.D Sharma

1. Workshop on" The Developing World and Electricity Challenge" 17-18 Jan 2005, Paris, France organized by International Energy Agency.
2. "Second Generation Financial Sector Reforms for India "Jointly Organized by IRADe and Invest India Foundation Pvt. Ltd., from January 6-8,2005 held at Taj Palace, New Delhi
3. International Training Programme on "Renewable Energy Techno-economic, Financial and Socio-environmental issues "organized by IRADe and MNES at New Delhi from 6th -17 December, 2004.
4. Training Session on "Capacity Building for Environment, Trade and Sustainable Development" organized by IRADe on November 23, 2004 at New Delhi sponsored by UNEP -ETB Geneva.
5. UK-INDIA Climate Change Business Seminar on "Technology and Finance for CDM Projects" held at Federation House New Delhi on October 6-7, 2004 organized by FICCI and UK Government.
6. Workshop on "Awareness on CDM Opportunities for Power Sector" held at Power Management Institute, Faridabad on October 5-6, 2004 organized by CDM-India, NTPC and GTZ.
7. Workshop on "Capacity Building on CDM Opportunity for Cement Sector" held at

CMA Tower, Noida on October 1, 2004 organized by CDM-India and GTZ

8. Workshop on "Capacity Building on CDM Opportunity in Biodiesel Sector" held at IOC Faridabad on September 30, 2004 organized by CDM-India, IOC and GTZ

Mrs. Meenu Mishra

1. Workshop on " GHG Forum on the Clean Development Mechanism on February 1-2, 2005 organized by a partnership of the International Emissions Trading Association (IETA), the Word Bank's Carbon Finance Unit, World Business Council for Sustainable Development (WBCSD) and The Energy and Resources Institute (TERI), Delhi.
2. Sixth SANEI Annual Conference, organized by ICRIER, in New Delhi during August 26-27, 2004.
3. Workshop on "Development of Clean Development Projects in India and an announcement of a new Indian Facility to support the development of Project Design Documents" April 30 organized by Government of Canada, The Energy Resources Institute (TERI) and GCSI-Natsource Delhi

Mr. J. M. Singh

1. Attended workshop on "Macro-economic Priorities and Peoples Perspectives: Union Budget 2005-06" organized by National Centre for Advocacy Studies, New Delhi, Feb.2-3, 2005.
2. Participated in the "Delhi Greenhouse Gas" Forum Organised by TERI, International Emissions Trading Association, World Bank, and World Business Council for Sustainable Development, New Delhi, February 1-2, 2005.
3. Participated in the "Second Generation Financial sector Reforms Conclave 2005" Organised by Integrated Research and Action for Development and Invest India Economic Foundation, New Delhi from January 6-8, 2005.
4. Attended International Training Course on "RETScreen software" Organized by Natural Resources Canada and IIT, Delhi, May18, 2004.

Ms. Kavita Singh

1. Attended Terracotta Summit-Beyond National Environment Policy 2004: Institutions, Incentives and Communities March 7, 2005, Casuarina Hall, India Habitat Centre, New Delhi
2. Attended Inception workshop on "National Capacity Needs Self assessment (NCSA) for Global Environmental Management in India" on 10-11 February 2005 at New Delhi.

CONSOLIDATED LIST OF IRADe PROJECTS

In a short span of time, IRADe has either executed or linked up projects in a number of areas and with national and international organizations.

Projects undertaken		
Title of Project	**Started in**	**Funding Agency**
	2005-06	
Regional Training Workshop on the use of Economic Instruments for Environment and Natural Resource Management in Asia (Training-of Trainers).	C	United Nations Environmental Programme, Geneva and Nairobi / Ministry of Environment and Forests, Govt. of India
Integrated Study of Diesel Substitutes from Oil Seeds in India	O	Petroleum Federation of India
Gender Oriented Energy Policy	O	Energia International Netherlands
Pilot Demonstration Project on Renewable Energy in Jeevika Village of SEWA.	O	Self Employed Women Association, Gujarat
Coal bed Methane form Sohagpur fields: CDM opportunities	O	Reliance Industries Limited
	2004-05	
IRADe - IIEF State of Market Conclave 2005: Second Generation Financial Sector Reforms for India.	C	World Bank, State Bank of India, SDC and others
Training Session on capacity Building- Environment, Trade and Sustainable Development	C	United Nations Environmental Programme
Natural Resource Accounting (NRA) Goa Phase-II under SEEA Frame Work	C	Central Statistical Organization, New Delhi
International Training Program on Renewable Energy: Techno-economic, Financial and Socio-environmental Issues	C	Ministry of Non-conventional Energy Sources, Govt. of India
Projections for Petroleum Products, Natural gas and substitutes upto 2030.	C	PriceWaterHouseCoopers, New Delhi Petroleum Federation of India
Opportunities for Energy Efficiency and Clean development Mechanism (CDM) in Cement and Building Materials	C	Institute of Global Environmental Strategies, Japan/ Ministry of Environment and Forests, Govt. of India
Gender as a Key Variable in Energy Interventions in Developing Countries: Are We Asking the Right Questions?	C	DFID (UK), Engineering Knowledge and Research Programme
	2003-04	
GHG Reduction Potential, Sectoral Baselines and opportunities for CDM Projects.	O	Ministry of Environment and Forests, Govt. of India
Consequences of Electricity pricing reforms on agriculture	O	Stanford University, California, USA
International Training Programme on "Renewable Energy in Local National and Global Context with Socioeconomic Perspectives	C	Ministry of Non-conventional Energy Sources, Govt. of India & Energia International
Impact of fuel Scarcity and Pollution on Rural Poor, a comparative analysis of vulnerable groups in Himachal Pradesh	C	South Asia Network of Economic research Institutes (SANEI)/ Global Development Network
India's National circumstances for addressing Climate Change (NATCOM).	C	Ministry of Environment and Forests, Govt. of India through Winrock International
	2002-03	
International workshop: Gender & Climate Change (COP8)		UNDP, New York

C = Completed
O = Ongoing