IRADe

Integrated Research and Action for Development

Annual Report

2005-2006

IRADe

INTEGRATED RESEARCH AND ACTION FOR DEVELOPMENT

BACKGROUND AND FOUNDING OF THE SOCIETY

A comprehensive approach to development inherently involves the participation not only of the government, but also of NGOs, industry, corporations and financial and technical 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**[1]) is set up as a fully autonomous advanced research institute, which aims to do research and policy analysis, train people and be a hub of a network among various stakeholders.

IRADe is an 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 'action tanks'

OBJECTIVES

- To develop understanding that integrates multi-stakeholder perspectives concerning issues of development.
- To promote a wider consensus through research and analysis on effective policies among stakeholders and policy makers.
- To build capacities among professionals for multi-disciplinary, multi-stakeholder policy analysis.
- To promote ideas and initiatives for inclusive development at the local and the global levels.
- To provide research support to developing countries for development and also to negotiate international agreements better.

FOCAL AREAS

- Energy systems, policy and planning
- Natural resources and environment management
- Infrastructure, industry and institutions
- Rural and urban development
- Global and local issues especially poverty alleviation programmes
- Climate change and Clean Development Mechanism

PARTNERSHIPS DEVELOPED

In a short span of time, IRADe has started working with Government, non-government and multilateral agencies such as Self Employed Women's Association (SEWA), WINROCK International-India, ENERGIA International-Netherlands, Government of India, Ministry of Environment and Forests (MOEF), South Asia Network of Economic Institutes (SANEI), Central Statistical Organization, Stanford University, USA,United Nations Environment Programme (UNEP)-Geneva, Petroleum Federation of India, etc. as well as private sector such as Pricewaterhouse Coopers (PwC)-New Delhi and Reliance Industries Ltd.

IRADe ACTIVITIES:

IRADe obtained a number of projects during the year 2005 – 06 which can be divided into four categories viz. Research, Training and Capacity Building, Action Oriented Projects and Policy Advocacy and Dissemination. The descriptions of the Research Oriented Projects and the progress follows.

[2]IRADe was registered as Society on September 5th, 2002 under the "Registration of Societies Act-Act XXI of 1860" with Registration No. S 43706.

ANNUAL REPORT

2005-2006

Integrated Research and Action for Development (IRADe)

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FOREWORD

This year our activities grow in four distinct areas, so we have structured the annual report in four parts - Research, Action oriented projects, Policy analysis, Advocacy and Dissemination and Training, Seminars and Workshops. We completed two-year project on Clean Development Mechanism, Energy efficiency in Agriculture and Health Impact of Bio fuels and Gender Empowerment. This year we began with several action projects in the area of extraction of biodiesel in Haryana, and setting up biomass based village energy systems in collaboration with Self Employed Women Association (SEWA).

We completed four policy analysis and dissemination projects viz.:

- Biodiesel system analysis from cultivation, extraction, processing and end use for Petroleum Federation of India (PetroFed).
- Biofuels analysis including biodiesel, ethanol and gasifiers for Technology Information, Forecasting & Assessment Council (TIFAC).
- “Mainstreaming gender into energy policy”: Issue Paper was prepared and presented at the "Expert Committee to formulate Energy Policy", organized by Planning Commission, Government of India.
- National paper on gender and sustainable energy prepared for Commission for Sustainable Development (CSD).

We conducted two International Training Programmes: “Use of Economic Instruments for Environmental Management in Asia”: Training-of-Trainers Workshop and 3rd International Training Programme on "Alternative Fuels: Energy Security, Techno-economic and Environment issues".

We are looking forward to organizing three day Energy Conclave titled "Implementing Integrated Energy Policy" on 26-28 July, 2006 to be inaugurated by Dr. Manmohan Singh, Prime Minister where research agenda for further analysis and implementation emerge.

Jyoti Parikh
Executive Director

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Coordinated by: Dr. K. Sangeeta

1. RESEARCH ORIENTED PROJECTS

1.1 Greenhouse Gas (GHG) Reduction Potential, Sectoral Base Lines and Opportunities for CDM Projects

It is well known that accumulated emissions of GHG cause climate change that could lead to temperature variability, sea level rise, extreme rainfall events and so on. Carbon Dioxide (CO_2) emitted by burning fossil fuels accounts for 65 per cent of the global GHG emissions. The developed countries (also referred as Annex 1 countries) account for 68 per cent of global emissions, while their share of the world population is 19 per cent. It is therefore stated in the United Nations Framework Convention on Climate Change (UNFCCC) adopted in 1992, that they will lead the effort to reduce emissions.

Subsequently, the **Kyoto Protocol (KP)** adopted in December 1997 in Kyoto, Japan sets binding emission targets for developed countries that would reduce their GHG emissions on the average 5.2 percent below 1990 levels. The Kyoto protocol came into force from 16th February 2005, legally requiring all signatories to achieve their emission reduction targets by 2012. The KP defines three innovative market-based mechanisms to enable countries to access cost-effective opportunities to reduce emissions or to remove carbon from the atmosphere in other countries. These mechanisms are Joint Implementation (JI), the Clean Development Mechanism (CDM) and Emissions Trading (ET). There is considerable interest in CDM opportunities in different sectors.

India has moved swiftly on CDMs and is positioning itself as a leading developing country in terms of the number of projects accorded to it by the CDM Executive Board.

Background and Introduction

The Ministry of Environment and Forests (MOEF), Government of India awarded a two-year project to IRADe in 2003 to reflect on various aspects of CDM.

The scope of the MOEF project was to:

- Analyze the emission profile of developed countries to study their approach to GHG reduction and their policy towards CDM. The countries selected are **Japan, Canada, Germany, Netherlands, United Kingdom and the European Union(EU)**.
- Analyze various sectors such as **power, cement, wind power, co-generation, transport sectors and hotel industries**.
- Disseminate findings through workshops and seminars.

IRADe submitted the final report to the Ministry of Environment and Forests, New Delhi in December 2005. As some country reports and sectors are reported in the earlier annual reports, only the EU and Japan are covered here and among sectors, power sector and hotel industry are covered here.

Results and Findings

1.1.1 Study of Annex-1 countries: EU and Japan

The European Union (EU)

The EU accounts for about 25% of green house gas (GHG) emissions in the group of Annex-1 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. EU 25 includes new members in addition to EU 15.

The EU 15 member states agreed to a collective target of an 8% reduction in their green house

gas (GHG) emissions of 1990 level by 2012 under the Kyoto Protocol. The GHG emissions per unit of GDP and per person have decreased in almost all the member States of EU 25 between 1990 and 2002 except Malta and Slovenia.

The three EU 15 countries reviewed in this report have chosen varied approaches to cut their emissions, with some similarities including voluntary agreements with industry and eco-taxes. Germany and the UK are the largest emitters of GHG accounting for approximately 30% of total EU emissions. The energy industries represent the largest sector accounting for 28% of the total EU emissions. The transport sector follows at 21%, close at its heels are the Household and services sector at 17%. Restructuring of industries and judicious use of nitrogenous fertilizers has led to a fall in the GHG emissions from the industry and agricultural sectors.

The EU has identified 42 reduction options after carrying out cost benefit analysis to identify the contribution that can be made by each sector to reduce emissions. Through these, it projects to reduce 664-765 Mt CO_2 equivalent. This is twice the emission reduction required by the EU in the 1st phase of Kyoto Protocol.

The type of policies and measures adopted by EU are of importance not only for emissions abatement in its member states, but also for the evolution of the international climate regime.

Japan

Japan committed itself to reduce GHG emissions by 6% level of 1990 by 2012. Eleven years later, it is finding it a tough proposition to do so. The total volume of GHG emissions has actually increased from 1103 mt CO_2 equivalents in 1990 to 1339 mt CO_2 equivalents in 2003, an unprecedented increase of 12.3%. In 1990, CO_2 comprised 94% of the total GHG emissions and this trend continues to date.

Japan also has the distinction of having an increase of 8.7 % in carbon dioxide emissions per capita, with a 12.2% over all increase of CO_2 emissions from 1990 to 2003, a very rapid rate indeed. Transport, commercial and the household sectors are the major contributors to this phenomenal increase and they need to be targeted more rigorously if Japan is to meet its commitments. Emissions in 2003 of CH_4, N_2O, HFCs, PFCs, and SF_6 (in CO_2 equivalent) have all shown a downward trend over the years.

Sector wise, the single largest source of emissions is the energy sector accounting for 89.5% of the total emissions followed by industry and agriculture. Even though economic growth has slowed markedly in the 1990s, averaging just 1.7%, emissions from the industrial sector has shown the margin, units increase by 16.0% compound to 1990, followed by increase of 13.3% compound to 1990. The agricultural sector has shown a reduction in its total emissions. A change in the land use patterns and forestry has further removed nearly 7% of total emissions from the atmosphere.

Japan lays emphasis on various Kyoto Mechanisms differently. Not in favour of dependence on international emissions trading mainly because credits are not always backed by emission reductions, Japan has initiated measures to promote forest sinks to soak up 3.9% of CO_2 emissions. It has, however been actively promoting CDM and JI projects in the last couple of years in Chile, Brazil,Thailand, Armenia, Malaysia, Vietnam, Bhutan and Kazakhstan. The two projects sanctioned in South Korea, and India have been registered as CDM projects by the CDM-Executive Board and will fetch Japan approximately 4.8 million tons of CO_2 equivalent per year.

Sectoral Reports from India

In addition to CDM in manufacturing and infrastructure, it is desirable to look at the service sector given that approximately 46% of GDP originates in the service sector.

1.1.2 CDM potential in Hotel Industry

Tourism is one of the most rapidly growing sectors. Nearly 3.21 million foreign tourists arrived in India in 2004. Tourism is expected to grow at a rate of 8.8% in the next 10 years.

Hotels form an integral part of this industry. Till 2002, there were over 1,570 hotels (1 star to 5 star categories only) comprising 82147 rooms spread across India, an abysmal figure compared to India's size and population. It is estimated that another 65,000-80,000 rooms will be added, across the country, to be able to meet this increase in demand.

Hotels consume large quantities of energy, depending on the facilities provided. According to studies conducted, it is possible to reduce energy consumption by 20-40% or say 2000 to 4000 tons of Co_2 per year in a star hotel. This implies that 0.8 to 1 million tons of emissions can be reduced per year by the star hotels in the country.

Our analysis published as a cover story in the magazine of Bureau of Energy Efficiency, (2005) is applicable to large establishments, townships and commercial complexes to which the recommendations also apply. Suggestions for energy efficiency can be used in large buildings profitably regardless of CDM benefits.

1.1.3 CDM potential in power sector in India

India is one of the world's fastest growing and large economy and the seventh largest electricity-consuming country accounting for about 3.5% of the world's total annual electricity consumption. Electricity consumption in India increased 14.5 times from 4157 GWh in 1950 to 360937 GWh during the year 2003-04.

IRADe calculated detailed baselines for all India, regional and state levels including separate baseline for only coal and all large power plants. Power sector baselines are not only relevant for power sector related CDM projects but also on-grid renewable and energy efficiency projects.

The baselines for all India, for 5 regions and states are estimated following the methodology of "Baselines for Renewable Energy Projects under Clean Development Mechanism" (MNES) with considerable modifications. In estimating the baselines, weighted average for auxiliary consumption and specific coal consumption (SCC) used are for a recent year which are determined from the operating data of individual power plants in India as available in CEA (General Review, 2005 and Performance Review of Thermal Power Stations 2003-04). Since estimation of baselines is based on weighted average (for state, region and all India basis), our study provides the most accurate estimation for CO_2 emissions per kWh in India. Baselines considering only coal based and considering all types of power generation are 0.977 Kg CO_2 per kWh and 0.74 Kg CO_2 per kWh respectively for India as a whole.

Baseline is also determined the Consumers end that takes into account the transmission and distribution (T&D) losses in the system. These are needed for measures taken at consumer's end such as energy efficiency or use of Renewable energy viz. wind or solar. The estimated national baseline at the user's end is 1.07 Kg CO_2 per kWh.

India's power sector has considerable scope for improvements in two areas namely, T&D losses (32.5%0 and Auxiliary losses 9%).

Auxiliary equipment up-gradation

Auxiliary consumption in thermal power stations in India in 2003 ranged from 6.96% to 16.36 % with an all-ends average of 9.05%.

for india as a whole during 2003-2004. Auxiliary consumption in power plants can be due to factors such as unit size, level of technology, plant load factor, coal quality, etc.

The Auxiliary reduction is estimated for these separate assumptions:

- All power plants achieve the level of the state's average,
- All plants will achieve average national auxiliary consumption, or
- They will reach the current best figure auxiliary consumption in India, which is 6.96% by 2010.

The results obtained shows reduction potential of 1009 Thousand Tons, 1315 Thousand Tons and 7753 Thousand Tons respectively per year in these three cases.

Reduction in transmission and distribution losses

Transmission and distribution (T&D) losses can be technical losses such as transformer and feeder losses. Short-term measures to reduce these include installation of appropriate conductors, installation of capacitors, reconfiguration of the network up-gradation to high voltage transmission etc. In the long term, system can be optimized through a detailed system study.

It is possible to reduce 5% of these technical losses. Estimated CO_2 emissions reduction potential is around 940 Th. tons per year for the country.

In addition to reduction in auxiliary consumption & reduction in transmission and distribution losses, other measures to reduce CO2 emissions are increased share of hydropower, nuclear, renewable energy, fuel switching, renovation and modernization of power plants and energy efficiency measures at end use. Coal gasification technologies can also increase efficiency and facilitate carbon capture.

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

Background and Introduction

Farmers in India are given highly subsidized, often free and in general un-metered power. The issue of charging a price and metering agricultural consumers is at the centre of most suggested reforms of the power sector. Power sector reforms are underway in India. What would be the impact on welfare of different groups of people of increased prices of power relative to those of agricultural outputs?

The power sector reforms in India aim to reduce Aggregate Technical and Commercial (AT&C) losses. These include apart from technical T&D losses, losses due to pilferage, uncovered subsidies, uncollected bills etc. Un-metered and often free power to farmers has provided a cover for others to steal electricity. AT&C losses now have reached a level of 40% and have led to financial sickness of most state electricity board (SEBs). A reform of the system is inescapable. This will call for metered, even if subsidized, electricity to farmers or as a number of SEBs prefer today, a separate feeder to supply agricultural pumps. The latter permits rationing power to farmers by restricting the supply to number of hours at off-peak hours, thereby also reducing the burden of subsidies.

Methodology

To address the issue of how energy price reforms will impact Indian agricultural system poses a number of challenges due to inadequate data and instruments. Therefore, innovative approaches are needed to circumvent the problem:

- Crop yield data were analyzed under various irrigation systems and estimated yield response functions to area under various irrigation systems (canals, tube wells, others). The most critical to electricity pricing, would be ground water irrigation by tube wells as well as by other sources.

- We obtain yield elasticities for irrigation. We also note that when the yields change, so do the prices of crops. As the farmers are concerned with value of output and not just the yields, we attempt to capture this by another set of data. We estimate value of output functions as affected by sources of irrigation, fertilizer, labour etc.
- We now use the outputs of the above two exercises as inputs to the CGE model and see the impact on GDP, agriculture GDP and income distribution using number of people in 5 different classes each in rural and urban areas.
- Since data on quantum of irrigation water applied are not available it was not possible to work out the marginal product of irrigation water. In the Indian irrigation data a hectare of land is considered irrigated if it gets one irrigation. It makes no difference if the land gets many more irrigations; it is still one hectare of irrigated land. Also data on actual electrical energy used for irrigation are also not reliable. Electricity consumed by farmers is not measured and a lot of pilferage is attributed to irrigation.
- Thus we had to assume that 5 and 10 percent changes in irrigation by tube wells and by other sources would take place in alternative scenarios when electricity prices are reformed. If, as many states prefer, farmers were rationed power through supply by separate feeder the impact would be reduction in irrigated areas as we have assumed. The CGE model scenarios were made using this assumption.

Key Results and Findings

We explored using a general equilibrium model the welfare impact of reduction in irrigated areas from tube wells and other sources. The impact is as follows:

- Agricultural GDP goes down as also agricultural output. Agricultural prices go up.
- Welfare impact is adverse on both urban and rural populations. Higher agricultural prices do not compensate the rural populations for loss in output. Also many rural persons are net buyers of food and their welfare can be expected to worsen when food prices go up.
- The adverse impact is less when farmers adapt their cropping pattern and input intensities than when a uniform reduction across the crops is assumed.

We should emphasize that the positive gains that one expects from electricity pricing reforms, namely larger investment in power sector leading to better electricity supply over time is not captured in the model. Given the need to improve and expand supply the imperative of reducing the technical and commercial losses of state electricity boards requires that either electricity price for farmers be increased or State Electricity Boards (SEBs) are compensated by the state governments for subsidized power to farmers, or power supply to farmers be reduced through restricted hours of supply.

The model results suggest that the adverse welfare impact in the transition period needs to be factored in the reform strategy; for example, giving direct and upfront cash subsidy to the farmers and at the same time measure and charge for electricity use. This will also provide incentives to use electricity efficiently. This way reform strategy could be given a human face.

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

Background and Introduction

This research project has focused on poverty, gender, energy and health issues in the state of Himachal Pradesh (HP) in India. The project is funded by DFID / KAR through Energia of ETC Foundation.

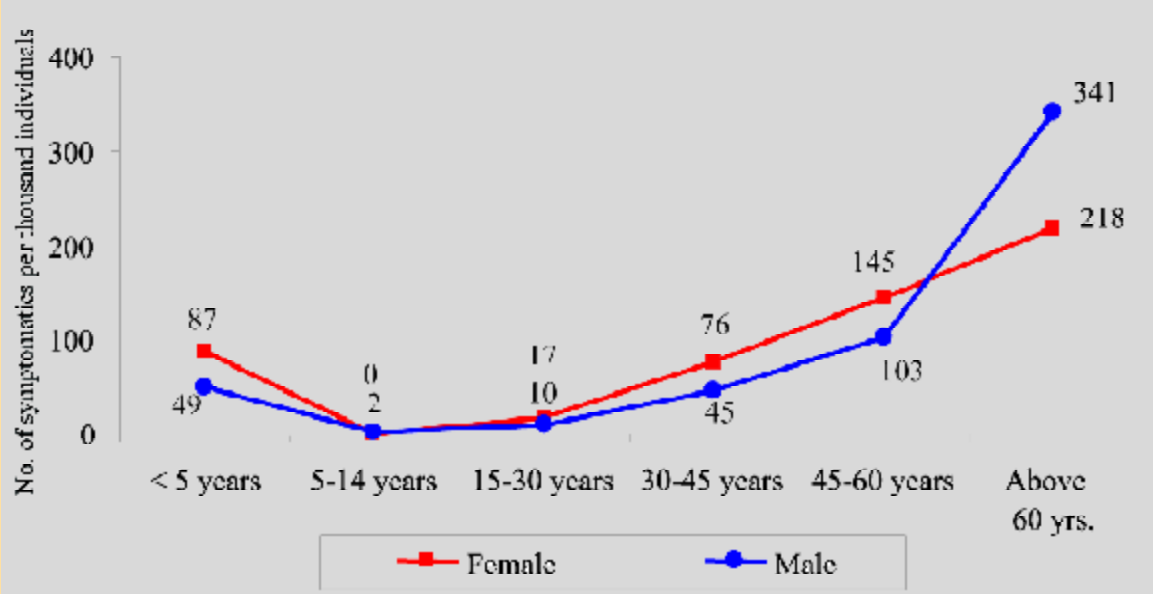

Fig. 1: Number with symptoms per thousand individuals by gender and age.

Key results and Findings

The dataset collected by J. Parikh et al in 2003 was used in this study. In addition, 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. Key components of the supplimatary field survey are as follows:

- Gender related survey taking into account the following factors
  - o Role of women in decision-making
  - o Livelihood options
  - o Benefits of Clean fuels seen in terms of productivity (and income) gains, education of children (girl child), entertainment, health, leisure, socialization, involvement in decision making and community activities
- Primary survey related 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 study together covered a sample of 9 districts, 84 villages, 792 households and 4296 individuals from HP.

Stakeholders meeting was held to arrive at final recommendations.

Energy and Gender

The results show that, in HP, biofuels still meet about 70% of fuel needs. In procuring biofuels, women walk typically 30kms each month and spend 41 hours, with each trip to collect fuelwood taking on average 2.7 hours. The state has infrastructure to provide kerosene and 31% of the population use it. Women in HP also share the agriculture and animal husbandry workload. The seasonal collection of minor forest products is the exclusive responsibility of older men. A "willingness-to-pay" survey shows that even at a price of Rs. 13 per litre – the subsidized price was Rs. 7 / litre; there could be demand for kerosene. Further, the LPG network is rapidly expanding, especially in the last 3 to 4 years, even during and after the survey.

The literacy level of women in HP is quite high at 60%, and almost 80% of the women are exposed to some form of media. A lower

incidence of domestic violence was reported compared to India as a whole.

Health and Gender

Using biofuels can have detrimental impacts on health due to the many hours of exposure in direct proximity to smoke. The project brought out, for the first time, the linkage between health impacts by gender and by age groups. Females under 5 and between 30 and 60 years of age are at greater risk than males in the same age groups. However, the situation reverses in older age, with males over 60 almost twice as likely as females to suffer from smoke-related illnesses. The data for HP shows that female smokers in HP were more likely to suffer respiratory symptoms (30%) than male smokers (17%). Overall, it seems that women, especially those in the 30-60 age group, and older men in HP are at the greatest risk of having respiratory diseases.

Womens' Voices and Preferences

Biofuel collection is primarily the responsibility of adult women and older men. This is a physically strenuous process, with almost 66% suffering from neckache at least quarterly and 50% suffering from backache almost daily. Nearly 30% of women felt the time required in collecting wood to be a problem. About 70% of adult women are household cooks and hence exposed directly to smoke and pollution. Interventions preferred to avoid smoke ventilation (36%) and improved stoves (17%).

Empowerment level and access to energy are correlated in HP. Hence, greater political attention and backing are required to give women access to modern fuels and to free them from daily drudgery.

The project is completed and a summary is published in Energia Newsletter.

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

Background and Introduction

Central Statistical Organization, under the Ministry of Statistics and Programme Implementation, Government of India awarded IRADe a research project entitled "**Natural Resource Accounting in Goa - Phase II, under SEEA Framework**".

The broad objective of the project is

- To carry out Natural Resource Accounting for three sectors, namely, the tourism sector, solid waste generation from municipal waste and water pollution from industries; using the SEEA framework.
- To prepare physical and monetary accounts for the aforementioned sectors.
- Draw lessons for the country as a whole.

Brief overviews of the work undertaken till date within the three sectors are discussed below:

Work covered in the previous year

Several (pilot phase) questionnaires were prepared for the three sectors viz. tourism sector, solid waste management sector and industrial water and air pollution sector to conduct sample surveys to undertake primary data collection. In addition to this a broad framework of the tourism satellite account for Goa along with literature survey was also done.

1.4.1. The Hotel Industries Sector

Background and Objective

'Trade, Hotels and Restaurants' is a component of service sector that contributes about 15% of value addition to the SDP in Goa and most of the hotels and restaurants mainly cater to tourists. Tourism has also activated other sectors like transport, banking, insurance, real estate etc., all of which contribute significant value addition to the SDP.

Survey Design and Survey Plan of the Tourism sector in Goa

The survey design is based on stratified

sampling procedure through a set of 3 separate surveys. The target population of the survey includes hotels (5 Star, 3 star, 4 star and budget hotels), tourists (domestic and international) and tourist places (e.g. beaches, historical monuments, churches, etc.).

1.4.2 The Solid Waste Management Sector

Background and Objectives

Municipal Councils (MC) are responsible for collection, transportation and disposal of solid wastes generated within the municipal limits. Households and establishments including hospitals, private nursing homes, restaurants, etc., deposit their wastes in communal waste storage bins, for subsequent collection (manual) and transportation to a dumping site.

Survey Design and Survey Plan

There is very limited information on the environmental and economic load of solid waste. This creates a lot of uncertainties in accounting for solid waste. Thus, dataset is being generated by means of a comprehensive survey at three levels viz., municipality, household and marketplace. The survey involves the following:

- Municipality survey
- Household survey
- Market place survey

1.4.3. Industrial Water and Air Pollution Sector

Background and Introduction

There are a total of 506 factories in Goa, which forms 0.4 % of total factories in India. A total of 20740 people are employed in industries in Goa. During the year 2003-04 up to December 2003, 101 SSI units have been registered. The State has a High Powered Co-ordination Committee to accord permission for setting up of medium and large industries in the State. There are 154 Medium and Large Industries in the State. The Committee so far has cleared 345 industrial projects in Medium & Large Industrial sector.

Survey Design and Survey Plan

An intensive survey of various large, medium and small-scale industries in North and South Goa was conducted to gain an insight on the pollution load of such industries on the environment.

The prime respondents are managers of the industries. 31 industries are being covered by the survey. 11 out of the 17 categories of polluting industries defined by Central Pollution Control Board are being covered by the survey.

2. ACTION ORIENTED PROJECTS

IRADe has been active in projects that require action for development. The details of the action oriented projects and progress in them are as follows:-

2.1 Village Energy Security Programme in Vavdi and Vaddithar hamlets in Patan District of Gujarat.

Introduction and Background

IRADe has been selected by the Ministry of Non-conventional Energy Sources (MNES), Government of India, to implement the Village Energy Security Programme under Remote Village Electrification Programme. This programme intends to install the energy systems in two villages Vavdi and Vaddithar of Santalpur Taluka of Patan district in Gujarat. IRADe in close cooperation with Self Employed Women Association (SEWA), Gujarat Energy Development Agency (GEDA) and the village panchayat will implement the programme.

Biomass based generation coupled with wood plantation can be the most effective way to promote energy security in remote unelectrified villages. Bio-energy based power generation systems can be commissioned even in a semi arid region with mean annual rainfall of around 700 mm.

Objectives

The main objectives of this project are as given below:

- To provide access to electricity through renewable to households in remote villages which are not likely to get covered through grid extension.
- To go beyond electrification by addressing the total energy requirements such as energy required for household cooking, lighting, entertainment, primary school, commercial facilities like shops, streetlights, flour mill, and pumping water for irrigation.
- To meet village energy requirements through biomass material and biomass based conversion technology or other renewable technologies where necessary.

Project Output

Project envisages installation of various energy systems as shown in the table:

S. No.	Systems/Devices	Qty/No.	
		Vaddithar	Vavdi
1.	Biomass Gasifier with 100% producer gas engine/ genset including all accessories	2 x 10 kW	2 x 10 kW
2.	Dung based biogas plants of 6 CuM capacity each inclusive of all accessories and civil works	5	5
3.	Improved Stoves (chulhas)	82	80
4.	Service line. Minimum 2 light points and one 5 Amp. Power point per household.	82	80
5.	Plantation and fuel wood and oil-seed bearing trees	8 ha	6 ha
6.	Oil expeller	1	0
7.	Street lighting	8 lights	8 lights

Role of Communities in the project

The project incorporates active and full participation of the village community. The village committee will own the project and the overall responsibility of operation and management, i.e. they will be responsible for electricity generation and management. The committee is responsible for the allotment of land for energy plantations. 10% of the project expenses will be borne by the community for start up. User charges will be levied from which operating and maintenance costs will be met. Surplus, if any, will be credited to village energy fund.

2.2 Rural Micro enterprise Model for Bio fuel Extraction in India

Background and Introduction

IRADe was awarded a project titled "Rural Micro enterprise model for Biofuel extraction in India" by WISIONS, Wuppertal Institute for Climate, Environment and Energy, Germany.

This project aims to harness locally available Jatropha plantation to generate bio-fuel in the Bawal Tehsil of Rewari Distict in Haryana state. The project will establish micro enterprise model for locally available bio-fuel extraction. It will provide sustainable livelihood as well demonstrate the benefits of the model on socio-economic conditions of the community by using local resources. Further, it will lead to increased access to alternative fuel at local village level. Jatropha curcas (Ratanjyot), an oil-bearing seed plant has been found most suitable for the purpose. It will use lands which are currently unproductive and located in poverty stricken

areas. The extraction unit will be set up in the Khijuri Village (Bawal Tehsil, Rewari District) of Haryana state.

Objective

The specific objectives of this project are:

- To formulate micro enterprise model for bio-mass based energy system at village level
- To extract fuel from oil seeds that provide alternative fuels in rural areas
- To provide sustainable livelihood options for women at village level.
- To develop enterprise to process loccally available Jatropha and other oil-seeds.
- To identify current activities in biomass based strategies for extraction, utilization and commercialization of oil.

Activities

- Pilot implementation and dissemination of model in three villages of Haryana State
- Network of private sectors, NGO's, stakeholders engaged in bio-fuel cultivation
- Organize workshops for local stakeholders, NGO's, Private sectors and Government agencies

Project Implementation

The functioning of rural micro enterprise model for biofuel extraction would be based on its involved stakeholders:

- Implementation agency (IRADe)

Participants of the 'training of trainers' UNEP workshop

Dr. Jyoti Parikh, Executive Director, IRADe, Dr. Kirit Parikh, Member, Planning Commission, and Mr. N. Dayal, Additional Secretary, MOEF, addressing the workshop

- Village Panchayat, Khijuri along with local NGO
- Rural Biofuel Cooperative, Khijuri
- Villagers of Khijuri, Bhadoj and Majri

Stakeholders meetings are held to discuss the plan of implementation. The inputs (feedstock, seed quantity etc) would be the determinants for selecting the technology and the scale and size of the extraction plant. The framework of coordinating all the inputs, managing the outputs, prices of the byproducts needs to be worked out with the consensus of all involved stakeholders and the market conditions.

The cooperative mechanism will ensure efficient procurement/collection of oilseeds, transportation to production unit, extraction of oil and marketing to end-users. Apart from these, the project will also lead to betterment of environment. The use of bio-fuel avoids fossil fuel use and hence avoids CO2/CO in atmosphere. It will also lead to the substantial reduction of unburnt hydrocarbons, carbon monoxide and decrease the solid fraction of particular matter from the atmosphere.

3. SEMINARS / TRAININGS / WORKSHOPS

3.1 Use of Economic Instruments for Environmental Management in Asia Training-Of-Trainers Workshop, 27-29 April 2005, New Delhi, India

IRADe is a member institution for Network of Institutes for Sustainable Development (NISD) set up under UNEP.

Background

The 3-day Training-of-Trainers Workshop on the Use of Economic Instruments (EI) for Environmental Management in Asia was organized by IRADe (Integrated Research and Action for Development, India) and supported financially and technically by UNEP's Economic and Trade Branch. UNEP's Division of Environmental Policy Implementation and the Indian Ministry of Environment and Forests provided additional support.

From left to right Dr. N.P.S Varde, Director and Jt. Secretary, STE Goa, Mr. R. K Sethi, Director, MOEF Delhi, Dr. Kirit Parikh, Member Planning Commission, Dr. Jyoti Parikh and Dr. B.D Sharma at the workshop in Goa

Recommendations

In the course of the workshop, participants also worked in groups on country specific environmental problems identified prior to the workshop, first analyzing the main economic causes for the problem and then presenting a possible EI to address it. The participants stated that they greatly benefited from sharing different perceptions and experiences with EI in the workshop.

The participants conducted a workshop evaluation. The overall evaluation of the workshop was "excellent". The training of trainers programme was successfully conducted by IRADe and UNEP, with support from the Ministry of Environment and Forests, Govt. of India.

3.2 Workshop on Climate Change and Hotel Industry: CDM Opportunities, 18 June 2005, Goa, India

Background

This workshop was an activity within the Clean Development Mechanism (CDM) project awarded by Ministry of Environment and Forests (MOEF) where sectoral analysis was done.

Tourism is one of India's most important and fastest growing industries. Hotel industry is an integral part of the tourism sector and is one of the major energy intensive industries. Almost all big and small hotels are trying to pursue the best practices to enhance their energy and environment performance. Thus, there is an opportunity, as most of these efforts could become potential CDM projects. Hence a one-day workshop was organized by Integrated Research and Action for Development (IRADe) to address the issue of CDM opportunities in hotel industry.

Objectives

The overall objectives of the workshop were to understand the linkages between global climate change, hotel industry and CDM opportunities leading to sustainable development, and to provide a platform for participants to discuss and interact with policymakers' representatives of public and private sectors dealing with the hotel industry.

Outcomes of the workshop

- Participants from different ministries and hotels of Goa and Delhi attended the workshop. Participants were from Department of Science, Technology and Environment (STE) of Goa, Goa University, India Tourism Development Corporation

Mr. V Subramanian, Secretary MNES addressing the participants during the inauguration session at 3rd international Training Programme

(ITDC), various hotels of Goa (Marriot resort, Mandovi Hotel etc.), York International Corporation, Reliance Energy Limited (REL), and various hotels of Delhi (ITC hotels, Marriott Welcom Hotel).

- Participants were made aware of the recent developments in the field of CDM and also the CDM opportunities available in Hotel industry.

Recommendations

The participants made the following recommendations:

- All the participants regarded the workshop as very informative and they suggested having more such conferences in other large cities.

Prof. Jyoti Parikh, Executive Director IRADe, Dr. Kirit Parikh, Member Planning Commission and Chairman IRADe, Mr V Subramaniam, Secretary MNES with the participants of 3rd International Training Programme and IRADe Staff

- More emphasis should be given on ESCOs (Energy Service Companies), which can implement the energy efficiency projects, provide financing and avail CDM benefits.
- There is a need for an institutional arrangement for bundling of small-scale projects.
- One group of hotels or some institution should take up the first project on hotels. This could lead to several projects.
- Some of the hotel representatives were totally unaware about the CDM possibilities and they expressed their appreciation for gaining insight on CDM through the workshop.
- A good team of energy efficient experts and CDM experts should come together for CDM projects in Hotel industry.

3.3 3rd International Training Program on "Alternative Fuels: Energy Security, Techno economic and Environmental issues", 23 – 30 March 2006, New Delhi, India

Background

Every year IRADe organize a International Training Programme for Asia and Africa. The third International Training Program on "Alternate fuels: Energy Security, Techno economic and Environmental Issues" was held from 23 March- 30 March 2006 at India Habitat Center, New Delhi. The Training Programme was sponsored by Ministry of Non-Conventional Energy Source (MNES), Govt. of India. The main purpose of the training session was to create awareness about alternate fuels, renewable energy and energy security.

Participants

There were 15 participants from Nigeria, Tanzania, Nepal, Bangladesh, Indonesia, Sri Lanka, and China. They were middle and senior level rank officers (Director, Executive Director, Advisor, Assistant Lecturer, Lecturer, Engineer,

etc.) from ministry, Non Governmental Organizations and from different universities of Asia and Africa. They were from different professional backgrounds like engineering, environmental scientists, environmental economist, geologist and had work experiences in topics related to renewable energy and environmental management, natural resource management, geology, small hydropower, solar, biomass and many more.

Course Contents

The overall content of the training course covered topics such as New Context for Renewable Energy in the new millennium, Role of Renewable in future Energy Supply, Financing of renewable energy projects and sustainable development, Frontier Renewable Technologies in India, US-India Hydrogen Energy Dialogue, Transition towards a Hydrogen Economy: Technical and Policy Issues, Alternate fuels for Transportation and Power Sector, Biodiesel production, Quality and Environmental Issues, Systems approach for biodiesel programme, Jatropha: An Alternate source of Biofuel, 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 and eminent persons from Ministry of Non-Conventional Energy Source (MNES), Indian Institute of Technology (IIT), US Agency for International Development, AUSAID, Indian Renewable Energy Development Agency (IREDA), Indian Oil Corporation (IOC), Petroleum Conserve Research Association (PCRA), Haryana Agriculture University (HAU), etc.

Participants also gave presentations about their country, gave detailed feedback and suggestions for further technological collaborations.

4. POLICY ADVOCACY AND DISSEMINATION

After carrying out reserach, IRADe promotes the key messages by policy advocacy and dissemination at various levels to impact on the issues and generate awareness. Two main areas this year are gender and energy, and biofuels.

From Right to Left: Dr. P. Ghosh, Secretary MoEF, Dr. Jyoti Parikh and Dr. Kirit Parikh of IRADe, Ms. Maxine Olson, Resident Representative in India (UNDP) and Mr. Rakesh Bakshi, MD, Vestas RRB India Ltd.

4.1 National Stakeholder Consultation on Gender issues, MDG and Poverty alleviation for CSD 14, 16 March 2006, New Delhi, India.

Background

IRADe is active in the area of gender issues in terms of research, training, action and policy advocacy. Women manage one-third of the energy supply today by bringing home cooking

From Right to Left: Mr. D. Majumdar, MD, IREDA, Ms. Manjula Krishnan, Economic Advisor, DWCD, Mr. V. Subramanian, Secretary, MNES, Dr. Kinsuk Mitra, President, WII (at the podium) and Mr. Salman Zaheer of World Bank, Mrs. P. Dhamija, Director, MNES and Mrs. Lalita Balakrishnan, AIWC.

fuels. How can we help to reduce drudgery and put in organization and management to make them more efficient?

A half-day consultation was organized by IRADe in collaboration with the All India Women's Conference (AIWC) funded by ENERGIA the International Network on Gender and Sustainable Energy. The main aim of the consultation was to give inputs concerning important issues pertaining to gender, Millennium Developments Goals (MDGs) and poverty alleviation. UNDP actively participated at the highest level and offered their facilities with co-sponsorship of Integrated Research and Action for Development (IRADe) to CSD 14 to take place at UN in New York.

Objectives

Overall, the consultation was an effort to highlight:

- Key Energy, Millennium Development Goals and poverty alleviation issues.
- Official National Energy Policies and implementation.
- Suggestions for the above issues to reflect in the national statement.
- Recommendation for National level actions focused on participation of women and gender equity, in energy planning policies and decision-making process from the grassroots.
- Recommendations linked to achievement of national development and the MDGs.
- Discussion of the draft report with the stakeholders.

Outcomes of the workshop

The programme was well attended with many highly senior representatives from the Planning Commission, funding agencies like UNDP and World Bank, the ministries like MNES, MOEF, Ministry of Health, Women and Child Development, government organizations like Rashtriya Mahila Kosh and National Commission for Women. Many experts working in gender and energy from NGOs and other organizations also attended the consultation.

Recommendations

The participants supported recommenda-tions drafted by IRADe in the National paper and gave a few additional suggestions:

- Integrated Energy Policy (IEP) of Planning Commission has accepted IRADe's suggestion of bringing fuels closer to people say within 1 km of their house to reduce the burden of carrying huge loads. The participants endorsed this suggestion. What is needed is State-wise reporting and action on this issue.
- Poverty alleviation is about increasing people's productivity, for which all issues of health, education, electricity and fuel need to be addressed.
- Biomass based energy has also lot of potential for a country like India where 37% of primary energy needs are met by traditional biomass. Focus should be on local and natural resources since grid power is very erratic. In addition, if infrastructure can be provided for giving energy at the grassroots level through a conclusive programme of renewable energy like small hydropower, wind power and biomass power, some issues of MDGs would be addressed.
- More emphasis should be given to clean fuels such as LPG and Kerosene. Since 35% of subsidized energy does not reach the poor, new means should be devised such as debit cards, which could be given to poor so that they can buy kerosene from any shop at reasonable price.
- More emphasis should be given on empowering women to become energy entrepreneurs. Women can be made to be a part of supply chain of energy by creating

better understanding. For example, they can be given access to land nearby their own localities where they can grow their own fuels.

- Use of energy for income generation should be stressed. Energy is also necessary for access to water.
- Self Help Groups (SHGs) should be strengthened as transmitters of technology since not many technological ideas have been taken to women SHG.
- Role of people's participation should be increased especially in introduction of new technologies that would conserve energy and promote clean energy.
- There is need to have easy access to micro credit and a facilitator.
- Transportation solutions such as mechanized/non-mechanized equipment and wheelbarrows to transport fuelwood must be provided in order to relieve the women of daily drudgery. These should be brought to the rural people.

4.2 Mainstreaming Gender in Energy Policy

Background and Introduction

The 2001 census finds nearly 700 million people without access to modern energy. To generate greater concern for gender issues IRADe prepared a presentation for the members of the "Expert Committee to formulate Energy Policy", Planning Commission, (Power & Energy Division). Examples were cited both from India as well as other countries of the world to prove its point. The current policy of favoring electricity over fuels needs to be balanced with more impetus for better access to fuels. The various problems of unavailability of modern fuels are also highlighted and possible interventions are suggested to counter them. We collected women's opinions on a number of issues to finally prepare a comprehensive guideline. Rural communities and women, in general get very little attention in energy policies. However, men and women have different levels of access to different energy sources so gender needs to be taken into account when developing energy policy. Also, in most developing countries, the largest energy programs are aimed at rural electrification but implicit in these programs and policies is the assumption that the benefits of electricity are gender neutral.

Purpose of a gender approach in energy planning

The importance of gender involvement in development has evolved over time. The current trend is in terms of gender mainstreaming not as separate or special programmes for women. Some of the gender approaches that need to be considered in energy planning are:

The Policy Initiatives

Shift in paradigms

While formulating the policy the government should cover energy supply as well as to end use services. Also, there should be shift from only government initiatives to public – private partnership. Subsidies should be substituted with micro credits and loans or market based approaches, and low cost energy services should be provided to the rural poor.

The Process: Project Formulation, Implementation and Monitoring and Evaluation - Projects should be formulated by highlighting the gender based outcomes. Special efforts are needed to encourage women's participation, or to include women in training programmes and learning opportunities. Assessments should incorporate the views of participants and end users, both men and women.

Recommendations / List of possible interventions

1. **Project implementation -** A national mission

on "Cooking fuel availability to rural women within 1km" should be launched. Micro-enterprise development such as Self Help Groups (SHGs) should be emphasized by interlinking micro credit and energy programmes, by making access to energy as promotional incentives for running small-scale energy business units and also by enhancing the employment opportunities for women and encouraging them to use local resources.

2. Capacity building - Provide special trainings and special fellowships for women in various institutions/Universities for making a cadre of energy professionals. Capacity building and assistance to manage energy programs, policy, and projects in integrating a gender perspective is also essential.

3. Livelihood and Security - Women manage energy and hence require support which includes positive political will. Policy needs to go beyond cooking energy and emphasis should be in providing energy for meeting other energy uses especially for livelihoods and security.

4. Research and Capacity building - Information and knowledge and activities of national as well as international experiences should be disseminated to women. Development of various biofuel species and cultivation practices and appliances (stoves) for women by women should be encouraged. A body of evidence and experience (conceptual, methodological, and case studies) linking attention to gender in energy policy and projects to equitable, efficient, and sustainable outcomes in energy and development, should be built up.

5. Health issues - In order to combat health issues arising from the use of biofuels, health centers should be sensitized with these issues. It is important to spot and correct respiratory diseases from indoor air pollution, to reduce the daily drudgery of women so that they can spend time on generating income. The impact of aggravating conditions of agricultural production on well being of men and women and their access to work must also be taken into account.

6. Participatory approach - Energy interventions can become more effective when they are responsive to the needs of different users in differing conditions. Reaching this goal will require changes in how energy programmes are formulated and implemented, in how energy decisions are made, and in who is involved in making those decisions. A more participatory approach to energy policy decisions will allow both men and women to be engaged in defining energy problems and in implementing appropriate solutions.

4.3 Integrated Analysis of Diesel Substitutes from Oil Seeds for India

Background and Introduction

India consumes about 9 mmt of petrol and 47 mmt of diesel requiring enormous amount of foreign exchange on the import of crude oil. High Speed Diesel (HSD) has the largest share (35%) of the total petroleum product consumption in India and mainly used in rail and road transport, agriculture and power generation. The increase in global oil prices, depleting sources of fossil fuels, environmental concern and increasing need of energy security have lead to the search for alternate sources of energy. Biodiesel has emerged as an alternative to HSD world wide in the last decade owing to its multiple benefits viz. energy security, employment generation, reduced burden of oil import and less emission.

The Government of India, institutions, oil companies, academic institutions, automobile companies and prominent agencies in government and private sectors are actively promoting several programmes for development of biodiesel. The Petroleum Federation of India (PetroFed) awarded IRADe a project entitled "**Integrated Analysis of Diesel Substitutes from**

oil seeds for India". This study reviews the entire mechanism, beginning from an overview of the best biodiesel tree plantation practices, extraction and processing of oil and finally the end uses of the product and the by products.

Important Findings and Results

- Biodiesel is mainly produced from edible vegetable oils in the USA and European countries but Asian countries are dependent on non-edible oil seeds, some are Tree Born Oil Seeds.
- It can be seen that the developed countries have significant tax incentives whereas the developing countries provide financial incentives upfront.
- The Ministry of Rural Development, GOI has initiated the National Mission on Biodiesel for the feasibility of biodiesel in India targeting 400,000 hectares spread over nine states.
- Many states have constituted special authorities for biodiesel by supporting the cultivation of biodiesel plants, biodiesel production and policy statements.
- Several institutes and public and private sector companies are also putting their endeavors in R&D, promotion and policy advocacy for the feasibility of biodiesel in India.
- Jatropha (Jatropha curcas) appears to be most suitable species for biodiesel production in India due to its adaptation to wide climatic and edaphic variations and multiple benefits. Some have preference for Pongamia. Out of 70 million hectare of wasteland, 13 million ha. may be suitable.
- Out of the total cost (Rs.30, 000/ha) of establishment of Jatropha for the first two years, nursery cost (44% of total) is maximum followed by labour cost (35.2% of total).
- The total expenditure for 6 years has also been calculated at three different (3,4, 5 tons/ha) yield levels. Sensitivity analysis showed that to get 15% return on investment, biodiesel can be produced at Rs.18.1, 20.7, 23.3 per litre at the seed price 4, 5, and 6 Rs/kg respectively accounting for value of byproducts.
- Three possible GHG reduction opportunities available for biodiesel project are discussed and suggested to bundle several smaller projects on a group chain basis or location basis for earning carbon credits. It could give benefits of US $15/ ton of biodiesel, taking current CER price for emissions reduction to US $ 5 to 10 per CER.
- A policy framework for land availability for oil seeds plantation, minimum support price for seeds, subsidies to farmers for raising plantations, tax exemption for entrepreneurs and sale of biodiesel is suggested.
- Institutional mechanism for raising nursery and plantation and for carrying R&D is also suggested.
- Financial incentives could be provided to oil companies as they will ensure oil quality and take various types of risks. Initially, biodiesel could be exempted from excise duty in order to reduce financial costs of producers and retailers.
- An action plan to reduce cost of production, increase financial viability and market linkages has also been discussed for biodiesel programme.

4.4 Background Paper on Bio-energy

Background and Introduction

Technology Information Forecasting and Assessment Council (TIFAC) under Department of Science and Technology (DST) awarded IRADe a project **"Background Paper on Bio-energy"** to prepare a report reflecting on various issue of bio-energy in India.

The papers's objective is to prioritize investment opportunities for technology development and its market adaptation under appropriate policy.

Important Findings of the Study:

- Among various bioenergy options in India, biodiesel, bioethanol and biomass gasification are found to be the most relevant areas where investments for technology and marketing development could be made.
- Wastelands can be used for growing oil seed plants for producing biodiesel, irrigated land for sugarcane based ethanol production and small plots in villages could be used for producing fuelwood for gasification. Thus their land requirement are complementary.
- Technology is available but could be improved through research and development to reduce cost of production by deriving more value from products. Sustainable supply of feedstock for biodiesel and biomass gasification is major constraint. Several market and policy barriers for the promotion of bioenergy were highlighted.
- Interventions needed for land availability for feedstock production, institutional support, clear tax policy and long-term vision were discussed as major policy issues.
- The concept of bio-refinery for biodiesel and bioetahnol are recommended where value addition and commercial utilisation of each byproduct can be done which results in reducing cost of production of bioenergy. Successful use of biotechnology for improving genetic materials for high yield and stability under various conditions can accelerate the adoptation.

IRADe Publications

Books, Monographs, Journal Articles and Reports

- Parikh J. and Sharma S. (2005), "The Energy, Poverty, Health and Gender Nexus–A Case Study from India", Newsletter of the Network for Gender and Sustainable Energy, Vol.8 (2).
- Sharma B.D and Parikh J. (2005), "Energy Efficiency and CDM Opportunities in Hotel Industry", Bulletin of Energy Efficiency, p. 20–25.
- PETROFED (2005), "Fuelling India's Growth Vision 2030", Petroleum Federation of India, New Delhi, India.
- Purohit P. and Parikh J. (2005), "CO_2 Emissions Mitigation Potential of Bagasse Based Cogeneration in India", ISES Solar World Congress 2005, August 8-12, 2005 Orlando, Florida USA.
- Parikh J. and Walia A. (2006), "Integrated Analysis of Diesel Substitutes from oil seeds for India", Petroleum Federation of India, New Delhi and IRADe, New Delhi.
- Parikh J. and Walia A. (2006), "Background Paper on Bioenergy", TIFAC, Ministry of Science and Technology, Govt. of India and IRADe, New Delhi.

News Paper Articles by J. Parikh

- Asia-Pacific Partnership, Business Standard, 13 Mar. 2006
- Green Budget to support Biofuels, Business Standard, 27 Feb. 2006
- Adapting to Climate Change, The Economics Times, 27 Jan. 2006
- Resolving the impasse at Montreal, Business Standard, Oct. 2005
- Home and Hearth, Business Standard, 13 Oct. 2005
- "Growing our own oil", Business Standard, 31 Aug. 2005

PROFESSIONAL ACTIVITIES OF MEMBERS IN 2005-06

Dr. Kirit Parikh, Chairman

Membership of Committees

Policy

- Member, Planning Commission, Govt. of India, New Delhi
- Member, Committee on Infrastructure under the Chairmanship of the Prime Minister
- Member, Energy Coordination Committee under the Chairmanship of the Prime Minister
- Member, Committee on Rural Infrastructure, Govt. of India
- Chairman, Expert Committee on Integrated Energy Policy

Academic

- Member, Board of Director, Institute of Global Environmental Studies, Japan
- Chairman, Governing Council, Centre for Environment Education, Ahmedabad
- President, Governing Board, Gujarat Institute of Development Research, Ahmedabad
- Member, Governing Council, Indian Council for Research on International Economic Relations, New Delhi
- Member, Advisory Council of IIT, Delhi

Highlights of Seminars, Conferences, Meetings attended

- Delivered the Valedictory Address at the **26th Annual Conference of the Bengal Economic Association** held in the Department of Economics & Politics, Visva Bharati University, Shantiniketan; 12th February, 2006.
- Chaired the first plenary Session on "**Transition to Renewable Energy – Is it feasible?**" At the International Congress on Renewable Energy at Hyderabad; 9th February, 2006.
- Inaugurated the **4th Petro India 2006 Conference**, New Delhi; 21st January, 2006.
- Chaired the Session on "**Energy, Infrastructure and Regulation**" at the Seventh Annual NBER-NCAER Neemrana Conference at Neemrana Fort Palace, Rajasthan; 17th January, 2006
- Delivered the Inaugural Speech at the **International Seminar on Advances in Energy Systems and Technologies** organized by Malaviya National Institute of Technology; New Delhi; 16th January, 2006
- Delivered a address on "**Rural Energy Security – Not by intentions alone**" at the 93rd Indian Science Congress, Hyderabad; 6th January, 2006
- Plenary Speaker at **ICORD-V Conference** organized by the Indian Institute of Management, Ahmedabad at Jamshedpur; 19 December, 2005.
- Delivered the 12th V.T. Krishnamachari Memorial Lecture on "**India's Energy Future**" at Institute of Economic Growth, Delhi on 7th December, 2005
- Participated in the **13th National Conference of Water Resources and Irrigation Ministers of State Government & Union Territories**, New Delhi; 30th November, 2005
- Delivered the Presidential Address on "**Water Resources Development in India-Challenges and Road Map for the Future**" at the XIIth World Water Congress, New Delhi; 22nd November, 2005.
- Chaired the Lecture by Prof. Kemal Dervis, UNDP Administrator and UN Under

Secretary General on "**High Debt Emerging Market Macroeconomics**" organized by Indian Council for Research on International Economic Relations (ICRIER), New Delhi, 11th November, 2005

- Chaired the **Power India 2005** and delivered the theme address, Mumbai 9-11 November, 2005
- Delivered the Theme Address on "**India and The Asian Century**" at the India-Tech Foundation Power India 2005, Mumbai 8th November, 2005
- Delivered a Talk on "**Governance and Growth**" at the Workshop on Economic Growth organized by International Institute for Applied Systems Analysis (IIASA), Laxenburg, Austria; 24-26 October, 2005
- Delivered the Inaugural Address at the 7th **Annual Conference of the North East India Economic Association** at Rajiv Gandhi University, Itanagar, 20-22 October, 2005
- Chaired the Session on **Policy Framework – Demand and Supply at the Coal Summit 2005** organized by the India Energy Forum, New Delhi; 19th October, 2005
- Delivered the Key note address at the **National Conference on Corporate Governance & Compliance**; Mumbai; 15th October, 2005
- Delivered a Special Address on "**Role of Captive Power": A National Perspective at the 5th National Conference on Captive Power Plants** organized by Confederation of Indian Industry, Mumbai; 7th October, 2005.
- Participated in The Science Council of Japan Conference on Sustainability 2005 "**Dynamism and Uncertainty in Asia**" and delivered the Dinner Speech on "**Human Development for Economic and Social Development**", Kyoto, Japan 9th and 10th September, 2005.
- Delivered the Plenary Talk at the International Conference on "**Human Centred Sustainable Development Paradigm**" at Dr. Swaminathan Research Foundation, Chennai 8-9, August, 2005.
- Member of the **Delegation Headed by the Prime Minister of India to the G8 Summit at London**; 6-9, July, 2005.
- Participated in the **Indian Parliamentarians' Round Table Seminar** at New Delhi; 27th April, 2005
- Chief Guest at the Discussion Session on "**Environmental Governance: A Tool for Fulfilling Corporate Social Responsibility**"; New Delhi 26th May 2005
- Delivered the Inaugural Address at the **International Conference on Power Market Development in India** organized by IIT, Kanpur; 19th April, 2005
- Participated in a Workshop to examine three studies on "**Indian Agricultural Markets and Policy**" at IGIDR, Mumbai; 16th April, 2005
- Inaugurated the Workshop on '**Adoption of Alternative Fuels**' by Administrative Staff College of India, Hyderabad held at New Delhi; 13th April, 2005
- Chaired the **Session on Water Conservation at Agriculture Summit 2005** – New Delhi – 10th April 2005

Dr. Jyoti Parikh, Executive Director

Current Appointments and Membership of Committees, etc.

- Advisory Board Tyndall Centre for Climate Change.
- Appointed honorary life member of India Energy Forum.
- Associate Editor of Energy – the international journal.
- Think-tank for gender issues.

Chief Guest at the Sixth Convocation of Institute of Technology and Management, Gurgaon Haryana, 24 February, 2006.

Seminars, Conferences, Meetings participated

- **3rd International Training Programme on "Alternative Fuels: Energy Security, Techno-economic and Environmental issues"**, New Delhi, 23-30 March 2006.
- **National Stakeholder Consultation: Gender issues, MDG and Poverty alleviation for Commission on Sustainable Development** organized by ENERGIA International and IRADe at New Delhi, 16 March 2006.
- ISES, Solar Energy Society, Hyderabad.
- **Regional Implementation meeting for Asia and the Pacific for the fourteenth session of the Commission on Sustainable Development by UNESCAP** at **Bangkok, Thailand**, 19-20 January, 2006.
- Thematic address on **"Petroleum and gas demand scenarios up to 2030"** at International seminar on Advances in Energy Systems and technologies, ASSOCHAM House, 16th January, 2006.
- Member of **Indian Delegation at Asia Pacific Partnership meeting of six nations**, Sydney, Australia, 11-14 January, 2006.
- Keynote address at inaugural session of **"Seminar on Beyond Petroleum"** by Petrotech Society, New Delhi, 9th January 2006.
- Attended the **think tank meeting on engendering the eleventh Development Plan in India** held at UNDP Conference hall, New Delhi, 13 December 2005.
- Panelist at **the IGES sessions on options for facilitating adaptation to climate change at 11th Conference of Parties (COP11) to UNFCCC, Montreal, Canada**, 5th December 2005.
- Speaker on **Emerging Scenarios for oil and gas at conference on Exploring advancements in Risk and Innovations for oil and gas,** New Delhi, 24-25 November, 2005.
- Panelist at the **POWER India International Exhibition and Conference** held at Mumbai, 9-11 November 2005.
- Panelist for **Climate change from India's perspective at Center for Globalization** Studies, Yale University, New Haven, Connecticut, USA, 20-22 October,2005
- Lecture on **"Demand and supply scenarios for Oil and Gas of the New Energy Security in India"** by Aspen Institute, Aspen, Colorado, USA, 14-17 October, 2005
- Second meeting of the **Network of Institutions for Sustainable Development** by UNEP, Geneva, Switzerland, 19th September, 2005.
- **Biomass based Energy Sources** held at International Environment House, Geneva, Switzerland, 19 September, 2005.
- Meeting for providing inputs to the **Expert Committee on Energy Policy- Energy Efficiency, R&D, Technology Development**, Planning Commission, New Delhi, 7th September 2005.
- Chaired at Technical Workshop of the Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF) on "**Liquid Biofuels**" in New Delhi, 29 August-1 September, 2005

- **Petroleum and Gas scenarios 2030** held at PHD House, New Delhi, 26 August, 2005.
- Training programme on **Natural Resource Accounting System for Financial Controllers of the Ministry of Home Affairs by IFS**, New Delhi, 7-9 July, 2005.
- **Meeting of Expert Committee to Formulate Energy Policy, presentation on Gender Sensitive Energy Policy**, Planning Commission, New Delhi, 13th June, 2005.
- Fourth biennial **Conference of the Indian Society for Ecological Economics (INSEE)**, Mumbai, 3-4 June, 2005.
- Presentation of **Final Review meeting on DIFID/KAR Energia** at **Nairobi, Kenya**, 16-20 May, 2005.
- **Discussion about the possible climate change strategies that make sense to large developing countries**, organized by Hewlett Foundation at **Sao Paulo, Brazil**, 12-13th May, 2005.
- **Fuelling India's Growth: Vision 2030** at Planning Commission chaired by Dr Montek Singh Ahluwalia, New Delhi, 9 May 2005.
- **National Circumstances for Climate Change, NATCOM**, New Delhi, 3 May, 2005
- **Convener and Trainer at Climate Change and Flexible Mechanisms**, International Training Programme organized by UNEP, IRADe at New Delhi, 29 April, 2005

Workshop and Conferences Attended by Staff

Dr. B.D Sharma

- "**National Workshop on Coalbed Methane**" Organized by DGH and Total CBM Solutions, PhD Chamber of Commerce, 24-26 November, New Delhi
- "**Bio Diesel Conclave**" Organized by Ministry of Petroleum & Natural Gas jointly with Ministry of Panchayat Raj, 5 Nov, 2005 at India Habitat Center, New Delhi.
- "**Towards a Strategic Approach to Climate Change : Indo-Italian Business Seminar on Renewable Energy and Energy Conservation**" FICCI, 19-20 October, 2005, New Delhi
- International Conference & Expo "**Bio fuels 2012–Vision & Reality**", 17-18 October, 2005, TERI.
- **Workshop on Alternative Fuels in India–Focus on Coal bed methane, Global Opp. Fund**, British High Commission, 7th October, 2005, Ashok hotel, New Delhi.

Ms. Pallavi Maitra

- Seminar on "**Impact of rising oil prices and possible solutions**", organized by Petrofed, at the Gulmohar Hall, India Habitat Centre, 10 May, 2005, New Delhi.
- Meeting on "**Fuelling India's Growth: Vision 2030**", organized by Planning Commission, at Yojana Bhawan, 9 May, 2005, New Delhi.
- Book Release Function: "**Fuelling India's Growth: Vision 2030**", organized by Petroleum Federation of India 28 April, 2005, New Delhi.

Ms. Saudamini Sharma

- Presented a paper on 'Gender budgeting for Energy' in the workshop on "**Gender Budgeting**", organized jointly by UNDP and DWCD, 15 May, 2005, Yashada, Pune.

Mr. Jignesh Jadav

- "**Bio Diesel Conclave**": Organized by Ministry of Petroleum and Natural Gas and Ministry of Panchayati Raj, GoI, 5 Nov, 2005, New Delhi.
- International Conference on "**Biofuels 2012-Vision to Reality**", organized by TERI, 17-18 October, 2005, New Delhi

Mr. Ayan Pujari

- Seminar on "**Macro Economic Projections**

for the Eleventh Five Year Plan", 5-6 December, Planning Commission, New Delhi.

STAFF JOINED DURING 2005-2006

Mr. Ayan Pujari

Educational Qualification

MA Eco., Ph.D (Cont.), IGIDR, Mumbai.

Research Interests

Agrl. Eco., Macro Eco. & Development Studies

Current job responsibilities

- Modeling climate change.

Dr. Amit Walia

Educational Qualification

Ph.D (Forestry), CCS HAU, Hissar.

Research Interests

Biofuels, Natural Resource Management and Livelihoods enhancement through agro forestry.

Current job responsibilities

- "Integrated Analysisof Diesel substitutes from oilseeds for India".
- "Background Paper on Bioenergy",.
- Rural Micro enterprise Model for Bio-fuel Extraction in India.

Ms. K. Swarna

Educational Qualification

- M.Sc. in Env. Management, Guru Gobind Singh Indraprastha University, Delhi
- B.Sc. Life Sciences, Delhi University

Research Interests

Climate change and CDM, Environmental Microbiology, Energy Management and Planning.

Current job responsibilities

- Energy Conclave 2006.
- 3rd International Training Programme on "Alternative Fuels: Energy Security, techno-economic and Environmental issues", New Delhi, 2006.
- Making proposals on Climate Change and Mitigation and Adaptation.

Dr. Konsam Sangeeta

Educational Qualification

Ph.D (Environmental Science), University of Pune, Pune

Research Interests

Community based Natural Resource Management, Gender issue in water and energy, Participatory local governance.

Current job responsibilities

- "Integrated Analysis of Diesel substitutes from oilseeds for India".
- Rural Micro enterprise Model for Bio-fuel Extraction in India.
- Energy Conclave, 2006.

Ms. Vidya Damera

Educational Qualification

M.Sc. (Environmental Economics), University of York, UK.

M.A.(Economics), Hyderabad University, Hyderabad.

Research Interests

Economics of biodiversity; specifically agro-biodiversity, the non market economic valuations of the environment, Climate change mitigation and energy policy issues.

Mr. Shalender Kumar

Educational Qualification

B.E (Environmental Engineering), Delhi School of Engineering, Delhi.

Research Interests

Low cost technology-taking technology to the common people, Clean Development Mechanism, Biofuels.

Current job responsibilities

- Energy Conclave 2006
- "Background Paper on Bioenergy".

CONSOLIDATED LIST OF IRADe PROJECTS

Project awarded to IRADe up to 31 March, 2006

Projects undertaken			
Title of Project	**Status**	**Type**	**Funding Agency**
2005-06			
International Training Programme on "Alternative Fuels: Potential, Economic Feasibility and Emerging Issues" in March 2006 at New Delhi.	C	T	Ministry of Non-conventional Energy Sources, Govt. of India
Village Energy Security Project with SEWA at Vavdi & Vaddithar hamlets, Taluka Santalpur, District Patan of Gujarat	O	A	Ministry of Non-conventional Energy Sources, Govt. of India
Rural Micro-enterprise Model for Bio-fuel Extraction in India	O	A	WISIONS, Wuppertal Institute, Germany
Review paper on Bio-energy for Energy Assessment.	O	P	Technology Information, Forecasting and Assessment Council (TIFAC)
Integrated Analysis of Diesel substitutes for Oil Seeds in India.	O	R	Petroleum Federation of India (PETROFED)
Regional Training Workshop on the use of Economic Instruments for Environment and Natural Resource Management in Asia (Training-of Trainers).	C	T	United Nations Environmental Programme, Geneva and Nairobi / Ministry of Environment and Forests, Govt. of India
Gender Oriented Energy Policy	C	P	Energia International Netherlands
Demonstration of Biomass Energy in Jeevika Village, Gujarat.	C	A	Self Employed Women Association, Gujarat
Coal bed Methane form Sohagpur fields: CDM opportunities	O	R/A	Reliance Industries Limited
2004-05			
IRADe - IIEF State of Market Conclave 2005: Second Generation Financial Sector Reforms for India.	C	P	World Bank, State Bank of India, SDC and others
Training Session on capacity Building- Environment, Trade and Sustainable Development	C	T	United Nations Environmental Programme
Natural Resource Accounting (NRA) Goa Phase-II under SEEA Frame Work	O	R	Central Statistical Organization, New Delhi
International Training Program on Renewable Energy: Techno-economic, Financial and Socio-environmental Issues	C	T	Ministry of Non-conventional Energy Sources, Govt. of India
Projections for Petroleum Products, Natural gas and substitutes upto 2030.	C	R	PriceWaterHouseCoopers, New Delhi Petroleum Federation of India
Opportunities for Energy Efficiency and Clean development Mechanism (CDM) in Cement and Building Materials.	C	P	Institute of Global Environmental Strategies, Japan/ MoEF, Govt. of India
Gender as a Key Variable in Energy Interventions in Developing Countries: Are We Asking the Right Questions?	C	R	DFID (UK), Engineering Knowledge and Research Programme

Projects undertaken			
Title of Project	**Status**	**Type**	**Funding Agency**
2003-04			
GHG Reduction Potential, Sectoral Baselines and opportunities for CDM Projects.	C	R	Ministry of Environment and Forests, Govt. of India
Consequences of Electricity pricing reforms on agriculture	C	R	Stanford University, California, USA
International Training Programme on "Renewable Energy in Local National and Global Context with Socioeconomic Perspectives	C	T	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	R	South Asia Network of Economic research Institutes (SANEI)/ Global Development Network
India's National circumstances for addressing Climate Change (NATCOM).	C	P	Ministry of Environment and Forests, Govt. of India through Winrock International
2002-03			
International workshop: Gender & Climate Change (COP8)	C	P	UNDP, New York

C = Completed O = Ongoing
A = Action Oriented T = Training P = Policy R = Research

FOUNDING MEMBERS

Name	Profession/Designation+
Kirit S. Parikh (Chairman)	Economist and Engineer
Jyoti K. Parikh (Executive Director)	Scientist: Energy & Environment
Ela Bhatt	Founder, SEWA
Adi Godrej	Industrialist
Keshub Mahindra	Industrialist
R.A. Mashelkar	Direct General, CSIR
Shirish Patel	Consulting Engineer
Manmohan Singh	Member, Rajya Sabha

* Mr. Hemant Sahai, Sahai Law Consultants, was appointed in 2005 as Honorary Treasurer.
+ At the time of IRADe registration in 2002.

IRADE TEAM

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Dr. Kirit Parikh

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Dr. Jyoti Parikh

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Dr. B.D Sharma
Dr. K.K. Govil

Advisor
Mr. K.C. Mahajan

Consultants
Mr. Jignesh Jadav
Dr. Amit Walia
Dr. K. Sangeeta
Mrs. Meenu Mishra
Mr. J.M Singh
Mr. Krishan Kapil

Research Associates
Ms. Pallavi Maitra
Ms. Saudamini Sharma
Mr. Ayan Pujari

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Ms. K. Swarna
Ms. Vidya Damera
Mr. Shalender Kumar
Ms. Kavita Singh

Administration and Accounts
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Mr. B.K.Sarkar

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