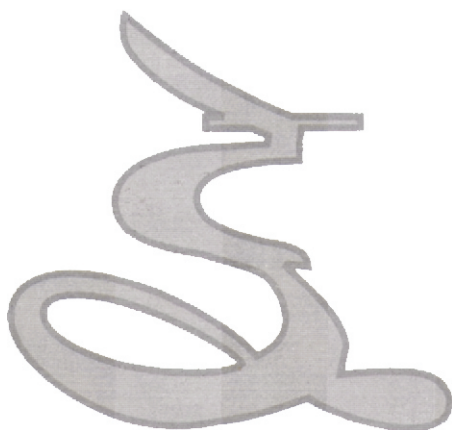




# Integrated Research and Action for Development



Annual Report  
**2007-08**

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**IRADe**

ANNUAL REPORT  
2007-2008

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2007-2008

INTEGRATED RESEARCH AND ACTION FOR  
DEVELOPEMNT (IRADe)

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## 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 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<sup>1</sup>) 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 developments at the local and global levels.

- To promote research supports to developing countries for development and also to negotiate international agreements better.

### FOCAL AREAS AND ACTIVITIES

- Environment and Climate Change
- Energy and Power System
- Impact of Policy Reforms
- Poverty alleviation and Gender
- Action Projects with communities
- Training and Capacity Building
- Policy Advocacy and Dissemination

### PARTNERSHIPS DEVELOPED

In a short span of five years, IRADe has started working with Government, Non-government and several multilateral agencies. IRADe is working with the Planning Commission, Ministry of New and Renewable Energy, Ministry of Environment and Forests, Ministry of Power, Ministry of External Affairs, Department of Science and Technology, Central Statistical Organization under Ministry of Statistics and Programme Implementation, Ministry of Chemicals and Fertilizers, etc. for many national level projects. At the international level, IRADe has worked with Stanford University, USA; Wuppertal Institute for Climate, Environment and Energy, Germany; UNDP-GEF-SGP; ENERGIA-international network for gender and sustainable energy, Netherlands; etc. IRADe has also been associating with other organizations such as Petroleum Federation of India, Pricewaterhouse Coopers, ICF International and others.

IRADe was registered as Society on 5<sup>th</sup> September 2002 under the Registration of Societies Act – Act XXI of 1860 with Registration No. S 43706.

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Coordinated by : Dr. K. Sangeeta



## Foreword

This year is special as it marks the completion of five years since *registration* of IRADe in September 2002 - but four years after the *office started in Delhi* in August 2003. In the last year Annual Report we reported our new role that begun in monitoring and evaluation of Government programmes in energy sector. This year we continued with that but also activities related to policy reforms picked-up.

Basically our work focuses on energy, environment and climate change with cross-cutting issues of policy reforms, poverty and technology. In terms of other research, climate change area dominated this year; closely linked with this was also technology assessment and analysis of biodiesel and CCS. However, gradually studies in the area of agriculture, fertilizer and food security are also picking up in the policy reforms area as you see in this report. We have also been encouraging a few internships every year, which are mutually beneficial.

To make the 5<sup>th</sup> anniversary we held an event inaugurated by Shri Montek Singh Ahluwalia, Deputy Chairman of Planning Commission, Government of India. A major international conference on Carbon Capture and Storage (CCS) Technology was organized towards the last quarter. Several new projects were awarded rather late last year, which are also briefly described, although work will be done mostly this year.

We thank our collaborators, sponsors, well-wishers and friends for their continued support for our work that helped us reach the 5-year milestone.

Jyoti Parikh  
Executive Director

## 1. Research Projects for Policy Analysis

### 1.1 ACTIVITY ANALYSIS MODEL FOR CLIMATE POLICIES IN INDIA

The Ministry of Environment and Forests, Government of India awarded climate modelling projects to IRADe along with organizations such as IIT, NCAER, TERI and others.

#### Background

A multi-sectoral, inter-temporal model in the activity analysis framework has been built. The model with specific technological alternatives, endogenous income distribution, dynamic behavior is an integrated top-down bottom-up model covering the whole economy. Indian economy is represented by 25 sectors (commodities/goods) and some of them are being produced by more than one activity. The total number of activities is now 32, 5 activities (Biofuels, Wind, Solar Photo Voltaic, Solar Thermal and Wood) have been newly added. More options will be added later.

#### Approach

The Social Accounting matrix (SAM) for 2003-04 provides the starting point for the model. The population of India has been classified in to 10 classes, 5 classes in the rural sector and 5 classes in urban sector. Income distribution is endogenous and depends on the total consumption, exogenously projected total population for rural and urban sectors and is obtained from lognormal distributions specified separately form rural and urban sectors.

LES type demand systems have been introduced into the model for the 10 consumer classes (5 in rural and 5 in urban). The Model has been updated to forecast for sector specific emission as well as household group wise emission. New constraints have been introduced to allow for impact of carbon emission quota and carbon trade. The model ensures a consistent income in a number of ways, which is important but not normally realized in other analytical approaches. Not only is there consistency among physical flows of commodities, but also consistency in the financial account for each type of economic agent is ensured:

- a) Quantities produced, demanded and traded balance at the national level.
- b) For consumers, expenditures, savings and incomes balance.
- c) Income earned is consistent with income generated by production and trade.
- d) Prices for producers, consumers and government taxes are consistent with the prices.
- e) Government expenditure balances inflows.
- f) Balance of trade accounting for capital flows is realised.

The Model, though initially only an activity analysis model, has now in the process of being extended into a general equilibrium model using Negishi formulation which involves iterating over the solutions of the activity analysis model till financial constraints are met.

## 1.2 NATURAL RESOURCE ACCOUNTING FOR GOA PHASE II

IRADe has completed the project “Natural Resource Accounting in Goa Phase II”, under SEEA, UN System of Environment and Economic Accounting Framework, awarded by Central Statistical Organization under the Ministry of Statistics and Programme Implementation, Government of India.

Under this project, the Natural Resource Accounting for three sectors, namely, solid waste generation from municipal waste and water pollution from industries and forestry sector was carried out using the SEEA framework and prepared physical and monetary accounts for the aforementioned sectors. The conceptual framework and approached to valuation of each sectors has been mentioned in the previous Annual Reports. We only report the final conclusion regarding given SGDP arrival at this year consisting all sectors.

### Green SNP (System of National Product) for Goa State

The sectoral studies have been carried out and SDP (State Domestic Product) of Goa was environmentally adjusted. The green SNP for Goa was calculated by considering the State Gross Domestic Product, depreciation value, loss of income due to environmental degradation from various sectors viz. solid waste, air pollution, water pollution and deforestation (or afforestation) activities. Avoidance cost is also taken into account for the SNP. Keeping all these difficulties into

consideration, the Net SNP for Goa was calculated which showed that for the base year 2003-04, loss of income due to environmental degradation is due to several factors but here we have accounted only for some of them:

- (a) Uncollected urban municipal solid wastes causing loss to environment and the loss is valued at Rs.1.4 Crore.
- (b) The environmental degradation due to landfill sites is Rs.11 Crore.
- (c) Avoidance cost for the solid waste management is 0.4 Crore.
- (d) Environmental degradation causing loss of income due to industrial air pollution is Rs.517 Crore.
- (e) Afforestation activities are going in Goa State and that has led to increase in environmental capital and therefore their contribution is gain of is Rs.550 Crore.

Environmentally adjusted SGDP = State Gross Domestic product – Loss of income due to environmental degradation.

Environmentally adjusted depreciation is the sum of (a) to (e), here the forest cover is increasing, so the environmentally adjusted depreciation is Rs. (530-550) = Rs.20 crores.

**The Environmentally Adjusted SNDP (6-7) comes out to be Rs.7929.2 Crore, marginally higher than the unadjusted SNDP.**

### 1.3 DEMAND, SUPPLY AND SUBSIDY ANALYSIS FOR INDIAN FERTILIZER SECTOR

The study is to analyze the demand of fertilizer nutrient (specifically primary nutrients N, P<sub>2</sub>O<sub>5</sub>, and K<sub>2</sub>O) by the agriculture sector to be made available by fertilizer sector, within current guidelines of integrated nutrient management and balanced fertilization.

#### Background

India accounts for 80% of fertilizer consumption in the South East Asian region. The consumption of total fertilizer nutrients has increased by more than 5% each year i.e., from 0.34 Mt. in 1961-62, to 6.07 Mt during 1981-82 to 23 Mt during 2007-08. Despite 8+ % growth of the economy the subsidy burden is increasing since 2003-04. The cost of fertilization accounts for approximately 16% for the operational cost of Farmers.

#### Methodology

Long-term projections of primary nutrients (N, P, and K) demand were done using Statistics and Econometric methods. The formal estimation methods were using the observations of parameters in fertilizer and related sectors. The model based projections for the next two decades were done for the time intervals of five years. The econometric projections of demand for N, P & K were made using the time series analysis with vector auto-regression procedure for estimation, based on consumption data from the year 1980-91 to 2007-08.

#### Preliminary Findings and Recommendations

- Consumption and in turn, demand for

fertilizer has been sensitive to factors like real price of urea & nutrients, level of irrigation, high yield variety seeds and rainfall index.

- It has been projected that phosphate will be the major contributor to the subsidy burden
- The focus should be on capacity utilization of domestic units & SSP by importing Rock phosphate, sulphur to supplement the domestic supply
- A nation wide technology mission can be a good initiative to study the changes in the pattern of usage of fertilizers depending upon total availability of fertilizers from domestic and international sources
- The projected subsidy scenarios are very high and will impede development in other concerned sector responsible for development in rural sector, a facilitator in boosting farmer's income and productivity.

India will have to import substantial amount of raw materials, intermediates, and potash for phosphate sector over a long term. The demand of NG will rise from 8.27 BCM in 2005 to 21 BCM in 2010 after proposed switchover of feedstock of existing units from naphtha, FO to natural gas.

### 1.4 EXTENSION OF MINIMUM SUPPORT PRICE (MSP): FISCAL AND WELFARE IMPLICATIONS

The Planning Commission, Government of India awarded IRADe Grant-in-aid for conducting a research study on "Extension of Minimum Support Price (MSP) – Fiscal and Welfare Implications".



## Background

To encourage food production the government announces a minimum support price (MSP) for a number of crops. These purchases are carried out only in few selected states and *mandis*. As a consequence, food grain prices in other regions and markets may fall below the MSP, if the production exceeds demand of MSP. Also procurement of food grains in only selected places involves additional transport to distribute the grains in the Public Distribution System (PDS). It has been suggested that procurement operations should be extended to more states. What would be the impact of such a policy? This is examined by simulating the situation in Madhya Pradesh and Uttar Pradesh for rice and wheat.

Extension of procurement system to bring more and more districts with extensive as well as intensive coverage of the procurement system has wider implications on producers and consumers' surplus. Producers of districts where market price was below MSP will get higher price and higher incomes. On the other hand consumers' will have to pay a higher price for their purchase from the market. A model was designed to simulate to answer this question and the conclusions are as follows:

## Findings and Conclusions

### Producers' gain/loss

For both the years, producers of Uttar Pradesh register a proportionate gain over their current income (from sale of rice and wheat) of 1.29% in 1999-2000 and 0.4% in 2004 for rice and 2.59% in 1999-2000 and 0.90% in 2004 for wheat. But in Madhya Pradesh rice producers post a gain of 8.73%

in 1999-2000 and a loss of .91% in 2004. However for wheat, the producers experienced gain of 0.67% in 1999-2000 and 1.22% in 2004. This increase in income of producers is the result of higher realized prices (wheat and rice) by the producers. This high realization of produce by the food growers is on account of extension of the MSP.

### Consumers' gain/loss

Consumers' of Uttar Pradesh experience an ambiguous response from the extension of MSP as their consumption expenditure for rice decreases in 1999-2000 and increases in 2004 but it shows opposite result for wheat. On balance, consumers gain or lose depending on their relative consumption of wheat and rice. In Madhya Pradesh gains are positive for consumers' for both rice and wheat in 1999-2000 but in 2004 consumption expenditure for rice is getting hit but for wheat it is a gain for consumers'.

### Fiscal implications

Analysis of extended MSP system in both the year 1999-2000 and 2004 shows similar pattern. From this analysis it is apparent that producers are gaining substantially in both the states for both rice and wheat during both the analysis period. Gains to the consumers' are however, ambiguous. Proportion of wheat and rice in the consumer food grain basket would determine the gain/loss of consumer in true sense.

Since procurement increases under EMSP it implies that there are food grains available for procurement and districts, which require MSP support through the extension of procurement. Bringing more districts under MSP by opening up

procurement centres in remote areas provide an alternate option to the farmers for selling their produce to the procurement agencies at a pre-determined price. This can ultimately reduce the vulnerability of farmers to the volatility of prices i.e. protecting them against the down side risk. This is all the more necessary with the rising input cost of cultivation. Diminished risk for food grains due to EMSP system would influence farmers cropping decision in a way. It induces farmers to plant crops having low risk factor involved in resource poor regions.

### 1.5 DEMAND FOR NATURAL GAS IN THE INDIAN FERTILIZER SECTOR

This study entails estimation of demand for Natural Gas in the Indian Fertilizer industry in the face of changing fertilizer Policy options of Central Government. The objective of Stanford study which is a part of the Program on Energy and Sustainable Development (PESD), Stanford University, USA is to understand the future demand and supply scenario of Natural Gas at the global level with particular emphasis on India and China.

#### Background

Agriculture accounts for approximately one-fourth of Indian GDP and provides employment to two-third of nation's labour force. The green revolution ensured food production at a higher growth rate and provided the nation with *food security*. The scheme of subsidy was initiated in early sixties to induce Indian farmers from all regions to use more fertilizers to increase production and also to compensate them for generally low output price they received. The fertilizer subsidy has shot up

dramatically and continues to climb rapidly. Government is watching Indian budget, while ensuring agricultural GDP growth, constraint of paying capacity of Indian farmers, considering operational viability of fertilizer industry.

#### Methodology

The IRADe model is an autoregressive time series analysis that assumes fertilizer demand is a factor of availability of irrigation facility, price of output and rainfall. The variables taken into account in the model are net sown area, gross cropped area and cropping intensity.

Water is an important component of agriculture factors of production. Water demand is affected by the area irrigated with groundwater and by surface irrigation efficiency, inclusive of rainfall. The demand of water is sustained by rainfall, groundwater balance of the area, and the irrigation facility developed in the area.

Taking into account implication of availability of gross irrigated area on fertilizer consumption, it is taken as an independent variable in the model.

Gross irrigated area is projected for the subsequent years and on this basis total demand for fertilizer is projected. The following assumption has been made: - that 10 percent increase in farm gate urea price at every five years interval. The regression equation has used Farm Gate price (Urea) as one of the explanatory variable and "N" consumption as explained variable. This was safely taken because Urea accounts for more than 81% of total "N" requirement. Rest of the 19percent requirement of "N" comes from other fertilizers like DAP, Ammonium Sulphate, ACL, CAN MOP, SOP, etc.

### Major Findings & Recommendations

- Urea demand is sensitive to real price of urea, level of irrigation, and rainfall index. For Rs4830/ton urea farm gate price the projected urea and natural gas demand are 52 MT and 30 BCM respectively in the year 2025. However, when farm gate urea price is effectively increased by 1.97% every year, urea and natural gas demand decrease to 49 MT and 28 BCM.
- NG is recognized as the most efficient fuel among the available fuel choices. It is also seen that the production cost of urea from gas-based plant is lower than all other feedstock.
- Easing of import restrictions will result in reduction in domestic urea production. Natural gas demand falls from 30 BCM to 22 BCM in year 2025, when self-sufficiency level is reduced from 95% to 70%.
- It is observed the price of NG has significant impact on estimated cost of production of urea per metric ton. Reduction in the availability of APM gas calls for a tremendous rise in subsidy for industry. It is estimated that if the entire gas requirement is met through APM gas with 95% self-sufficiency and constant farm gate price of urea, the subsidy requirement is of Rs. 179 billion. However, in the event of complete discontinuation of APM gas supply (i.e. only market priced NG) to the industry, the subsidy rises Rs.339 billion.
- The projected cost of production of urea from domestic green-field plants using market priced gas is higher than the current import parity price. The international urea market is highly sensitive to the demand and supply ratio. In view of new investment in urea

industry in gas rich countries, it is projected that there will be surplus in urea availability. The Government in association of industry should plan for long-term urea import at an affordable cost, and minimize procurement from spot market.

Natural gas demand for fertilizer sector will increase from 8.27 BCM in 2005 to 21 BCM in 2010, due to this policy mandate. The NPS has directed easing of essential commodity act in phases, by permitting units to sell part of their produce in regions of their choice. Government has reduced freight cost equalization subsidy by Rs. 100 per metric ton for non – ECA sales. The operational units are located mainly in the northern and western states of India.

### 1.6 GENDER AUDIT OF NATIONAL ENERGY POLICIES IN INDIA

#### Background

The Gender Audit of National Energy Policy is a collaborative exercise to draw attention to the lack of gender concerns in national energy policies in India. The massive efforts by the government for energy development do not consider needs of women, gender based empowerment, and their access to and control of energy resource. The 11<sup>th</sup> Five Year Plan (2007-2012) expects to invest close to \$100 billion in the energy sector - comprising coal, oil, power, hydro-power and other renewables and nuclear - but less than 2% of this may go to alleviate drudgery of women and children. They collect close to 28% of primary energy for which no inputs of investment, management and technology (IMT) are provided - something that all other energy sectors take for granted. In this backdrop, a gender audit exercise is carried

out for defining an approach for making national energy policies that are more gender responsive in terms of its content and process. The study was done by IRADe in collaboration with ENERGIA: International network for Gender and Sustainable Energy with headquarter in the Netherlands.

### Approach and Methodology

The gender audit presents a methodology and preliminary results of a 'gender rating' exercise, which rates, on the basis of gender considerations, the budgetary outlays of MNRE, culling out the benefits percolating to women. It describes the rating process and suggests ways to improve the rating in future. The analysis is synthesized in the form of key findings and recommendations in terms of policy formulation and a suggested action plan.

### Key Findings and Recommendations

When budgetary outlay of MNRE under 10<sup>th</sup> Five Year Plan was rated from gender perspective as per a gender rating procedure devised by IRADe to substantiate the effective benefit accruing to women from different programmes of MNRE, it is found that a mere 12.67% of the total ministries outlay is contributing to address the women's specific energy needs. Part of the reasons is also intra- household inequity where various surveys have shown that women are not equal beneficiaries of even the grid electricity as as many of them do not read and have other pressing work to enjoy the benefits.

The following are the key recommendations that emerged from the gender audit exercise:

#### (i) Reorient Monitoring and Evaluation Mechanisms to Reflect Gender Concerns in Energy Programmes

- ❖ To strengthen accountability of various ministries, with regard to their performance on inclusion of gender concerns in the energy sector, the Monitoring and Evaluation (M&E) systems should clearly define gender goals, and include select gender indicators for monitoring.
- ❖ Both women's and men's priorities should be reflected in Gender budgeting within each ministry.

#### (ii) Linking women's empowerment with energy development

- ❖ At present rural women manage 28% of the energy system in India through gathering fuels (biomass), an enormous effort which is not monetised and does not have a market value. There is a need to quantify this and assign the economic value of this effort.
- ❖ Although non-commercial energy accounts for 28.5 % of total energy in India, the budgetary allocation for this activity is minimal and indirect.
- ❖ The \$100 billion planned investment in the energy sector, as envisaged in the 11<sup>th</sup> Plan, is not directed to reducing women's drudgery, even though there are indirect benefits.

**(iii) Inter-Ministerial Coordination in Addressing Energy Security**

- ❖ Improving affordable and sufficient energy is a joint responsibility of several ministries, such as Power, Petroleum and Natural Gas, Agriculture, Rural Development, Environment and Forests and Ministry of Women and Child Development. This calls for co-ordination and convergence of efforts and programmes.

**(iv) Operationalizing the Goal of “Making Cooking Fuels Available within 1 km. of Habitations.**

- ❖ Provision of affordable and cleaner energy within 1 km

distance to all rural households needs a concerted mission mode approach, as well as coordination among various ministries.

- ❖ Women could take part in the management of local generation of electricity. This would create employment and enable women to have a say in the energy resource management.
- ❖ Formation of cooperatives, run by women, for fuel-wood and oil seed plantation is an important initiative for changing traditional gender roles and relations which confine women to cooking and less skill oriented jobs.

## 2. Action Projects with Communities

### 2.1 BIOENERGY AND LIVELIHOODS

IRADe has been awarded the project titled Bio Energy to complement a development project in choosing to be consistent with the principles of ecology, equity and energy efficiency and thereby guarantee long term sustainability of programme" by Global Environment Facility in January 2007 to ensure access and assimilation of sustainable energy systems through the Village Energy Security Programme (VESP) of the Ministry of New and Renewable Energy (MNRE), in a way that could be replicated in other such communities. The project is being carried out in Vavdi (80 households) and Vaddithar (82 households) hamlets of Santalpur taluka of Patan district in Gujarat, India.



*Women preparing soap powder at Vaddithar, Gujarat.*

The project demonstrates the techno-economic parameters for village energy security, provides operational experience and mobilizes local communities to operate and maintain the project themselves through a co operative model. About 162

households of the two villages viz., Vavdi and Vaddithar with 1000 population are the direct beneficiaries.

The project was started with activities like detailed social mapping through PRA (Participatory Rural Appraisal) tools, pre-implementation survey by means of structured questionnaires and formation of women Self Help Groups (SHGs). Till date, two gasifiers in each village and 5 biogas plants in Vavdi and 15 biogas plants in Vaddithar have been commissioned. Monitoring of functioning of improved cook stoves and biogas plants have been done. Regular operations of gasifiers were started and supply of electricity to all houses has been provided. In addition to the above, a system is being developed for operation of gasifiers and collection of bills and proper accounting on sustainable basis. Availability of energy will expand livelihood options. Thus, new livelihoods activities like flourmills, sewing machines and washing powders were identified and implemented through focus group discussions held with VEC (Village Energy Committee), SHGs and women in general.

### 2.2 REDUCING DRUDGERY OF WOMEN CARRYING BIOFUELS: E-DISCUSSION AND FIELD SURVEYS

This year IRADe was chosen as the National Focal Point (NFP) of ENERGIA-International Network for Gender and Sustainable Energy.

A part of the network activities, IRADe ran

an e-debate with professionals from gender, energy and poverty on a common platform on certain identified issues to share best practices and develop ideas for gender-energy-poverty related research, activities, etc. The e-group consisted of representatives from Ministries, State level representatives, academic experts, specific ENERGIA members, Grassroots NGOs, public and private sectors, research institutions, etc. the process of sharing of ideas through e-group was the first step of the project, termed as electronic discussion.

The second level of the exercise was field survey of the suggestions received from focused group exercise, done in one village each in North India (Rajasthan) and South India (Karnataka) respectively by partners Social Policy Research Institute (SPRI), Jaipur in North India and TIDE, Bangalore in South India (Karnataka). The results of the survey brought to fore the difference in opinion and willingness to adopt new ideas in two different geographical locations of India.

### 3. Event/Seminar/Workshop

#### 3.1 INTERNATIONAL WORKSHOP ON CARBON CAPTURE AND STORAGE (CCS) IN POWER SECTOR IN INDIA, 22-23 JANUARY 2008 AT NEW DELHI

IRADe facilitated an International Workshop on Carbon Capture and Storage (CCS) in Power Sector in India on 22-23 January 2008 at New Delhi, at the behest of Department for Environment, Food and Rural Affairs (DEFRA), UK, the British High Commission of India, New Delhi, Department of Science and Technology (Ministry of Science and Technology), and Planning Commission, Government of India.

The Hon'ble Union Minister Shri Kapil Sibal, Minister of Science and Technology and Earth Sciences, Government of India, inaugurated the workshop. Valuable presentations were made by specialists from UK, European Commission, France, Australia, Canada and Japan. The experts from NTPC, CEA, Reliance Energy, Tata Power, DST, Shell India, BHEL presented

the developments made in the Indian Power sectors covering CCS.

#### Background

The coal based thermal power plants are the largest emitter of Greenhouse gases in India, accounting for more than 50 percent of total emission. However, global and domestic concern over climate change due to emissions of greenhouse gases (GHG) continues to grow. Carbon Capture and Storage (CCS) is an emerging technology, to mitigate carbon dioxide emission from large point sources such as a power plant and industry using fossil fuels. Global experts have projected that the technology will be commercially viable by year 2020. Prior to establishing commercial viability of the scheme, many technical and cross-cutting issues need to be resolved by R&D as also those of deployment regulation.

#### Objectives

The objectives of the workshop was to examine the opportunities for CCS and R&D priorities in Indian context by



*Shri Kapil Sibal, Hon'ble Union Minister, Science & Technology inaugurating the International Workshop on CCS in Power Sector in India.*



*Dr. Jyoti Parikh and other expert in the International Workshop on CCS in Power Sector in India.*



interaction between international experts and Indian experts, working in the areas such as power plant efficiency, carbon capture technologies, transport of GHG, storage and monitoring of carbon dioxide, and regulation, law, economics, safety, environment and finance.

### Major Outcomes of the workshop and Recommendations;

The workshop presentation included technical schemes, management of cost of electricity, safety, characteristics of storage sites, cross-cutting and regulatory issues, and development of infrastructure.

The participants agreed for further work on CCS in the following areas of:

- CO<sub>2</sub> emissions inventory - The Central Electricity Authority is working on Carbon dioxide emission to atmosphere by Power Plants.
- Indigenous R&D efforts by NGRI, ONGC, NEERI, BHEL, NCL for example, on bio-mimetics, oxy-fuel and accelerated mineralization needs to be promoted.
- Opportunities in Enhanced Oil Recovery (EOR) should be identified and exploited.
- Assessment of storage capacity of saline aquifers and sedimentary basins should be a R&D priority.
- Assessment of the work being done in developing regulatory frameworks in the EU and how transferable these regulations might be to the Indian regulatory system
- Assessment of the cost estimate of the full CCS Chain on a Indian power plant needs to be made.

- Assessment of the existing capabilities in Indian industry on CCS chain to identify gaps.

### 3.2 ENERGY TECHNOLOGY CONCLAVE, 13-14 MARCH 2008

Integrated Research and action for Development (IRADe), India Energy Forum, and World Energy Council (WEC-IMC) together organized the "Energy Technology Conclave" (ETC) on 13-14 March 2008 at New Delhi. Dr. Kirit Parikh, Member Planning Commission inaugurated the Conclave and Shri B.K. Chaturvedi, Member (Power), Planning Commission was the Chief Guest at the valedictory session.

The highlight of the event was the **dinner talk delivered by Hon'ble Dr. A. P. J. Abdul Kalam, former President of India.** Dr. Kalam encouraged the delegates to think in the direction of energy independence by explaining multiple options available to India.



*Hon'ble Dr. APJ Abdul Kalam, Former President of India at the Energy Technology Conclave.*

Eminent energy experts including Shri Anil Razdan, Secretary (Power), Government of India, Dr. T. Ramasami, Secretary, Ministry of Science & Technology, Shri T. Sankaralingam, CMD, NTPC Ltd., Shri P.S. Bami, Ex-CMD, NTPC/Chairman, IEF and

Dr. Jyoti Parikh, ED, IRADe participated and shared their views. The Conclave also witnessed a rich mix of experts from public and private sector and academic organizations sharing the stage on this vital issue of energy technology for growth. To realize the goal of sustainable energy system, the ETC deliberated on the issues stated above with particular focus on:

- ❑ Bringing emerging technologies closer to commercial deployment.
- ❑ Identifying the challenges in bringing viable medium-term technologies forward e.g. hydrogen and fuel cells, solar energy, etc;
- ❑ Discussion on scope, and cost-sharing structure for expensive exploratory research.
- ❑ Actualizing the vision of the Integrated Energy policy on Research and development
- ❑ Investment in fundamental R&D. Possible technological options that we need to pursue in short, medium and long term.



*Dr. APJ Abdul Kalam, Dr. Jyoti Parikh and Mr. P.S. Bami at the Energy Technology Conclave.*

- ❑ Policy intervention and Institutional framework to facilitate the process of R&D and technology development for sustainable development.

- ❑ Issues linked with technology transfer, especially in the context of climate change concerns.
- ❑ Synergy through concentrated and combined R&D being pursued by various institutions.

### Key recommendations

The key recommendations emerged from the Conclave are as follows:

- Establish, by Act of Parliament, National Energy Fund (NEF) to plan and manage energy technology financing
- Promote private and public sector companies to create their own facilities by enhancing their expenditure on R&D through tax incentives. Accelerate Public-Private Partnership in mitigating Greenhouse gas emission and generate awareness on climate change related recommendation.
- Prepare a National Plan for Energy R&D and launch collaborative research and development in all stages of the innovation chains to reach a targeted goal of expanding the present day technological efforts to a final stage
- Identify where NEF could provide R&D funding in support of application, innovative new ideas, fundamental research etc to researchers in different institutions, universities, organizations and even individuals working independently
- Develop 'Centres of Excellence' in energy research in academic institutions, at all levels
- Identify, promote and develop new financing mechanisms like carbon

finance, venture capital funds, and other commercial resources aimed at promoting joint R&D Projects

- Promote human resource development for energy technology activities.

### **3.3 DEDICATION (LOKARPAN) CEREMONY OF THE GASIFIER BASED POWER GENERATION, VESP, GUJARAT**

The Dedication (Lokarpan) Ceremony of the project (Gasifier based power generation) was held on 13 February 2008 at Vadithar village. The project (Gasifier based power generation) was dedicated to



*Dr. Kirit Parikh, Mr. V. Subramaniam and Dr. B.D. Sharma interacting with the local people in Vaddithar, Gujarat.*



*Dr. Kirit Parikh, Dr. Jyoti Parikh and Mr. V. Subramaniam at the Dedication Ceremony in Vaddithar, Gujarat.*

the villagers by Dr. Kirit Parikh, Member Planning Commission. Shri V Subramaniam, Secretary (MNRE) was the

Chief Guest at the event. Different types of livelihood possibilities provided by the IRADe like flour mill, sewing machine and detergent powder manufacturing unit for income generation at village level were explained. The importance of establishing the institutional mechanism through VEC for operation and maintenance of the plant, collection of electricity charge and securing the project on a self-sustainable basis was emphasized.

### **3.4 DEDICATION CEREMONY OF OIL EXTRACTION UNIT, BAWAL, HARYANA, 18 AUGUST 2007**

The dedication of oil extraction unit at Bawal was held on 19 August 2007 at Bawal



*Dr. A.R. Kidwai, Governor of Haryana at the Dedication Ceremony of Bio-diesel Extraction Unit at Bawal*

in the presence of the Honourable Governor of Haryana, Dr A. R. Kidwai. Dr. Kirit Parikh, Member Planning Commission, Government of India was the Chief Guest of the event.

The specific objectives of the ceremony were to:

- Dedicate the biodiesel extraction unit to the Bawal Biodiesel Co-operative (BBC)
- Explain to officials and experts the technology adopted and activities

- undertaken to establish the enterprise.
- Demonstrate and explain the technology and its benefits to villagers of surrounding villages who attended the dedication ceremony.

Dr. Kidwai appreciated the efforts put in by three villages and the IRADe team for setting-up the biodiesel extraction unit. He said that a large quantity of wasteland is available in the area of Bawal, and can be used for plantation of *Jatropha* to produce biodiesel at village level. He specifically congratulated to Dr. Jyoti Parikh, IRADe Executive Director for her initiative to set up this biofuel based village enterprise in the remote village of Bhadoj. He indicated that in today's scenario *Jatropha* oil could act as a sustained mechanism for human well being with their relevance in today's life. He expressed his desire to replicate this concept in different parts of Haryana, and support villagers to generate additional income by devoting their time in such a set up.

### 3.5 EVENTS RELATED TO GENDER AUDIT OF NATIONAL ENERGY POLICY IN INDIA

Various events were held at different stages of the study to share the information and receive feed back from the Ministry of New and Renewable Energy, Planning Commission, gender experts, energy experts, policy makers, rural development professionals, academicians, researchers and other stakeholders. Brief notes on the events held follows.

- 3.5.1 Awareness Creation workshop held, 10 October 2007, IHC, New Delhi –** This event was attended by government officials, gender experts,

policy makers, corporate representatives, NGOs, etc. The objective of the workshop was to bring together key stakeholders/ decision makers in the energy and related fields at the national level to make them aware of the tasks that need to be undertaken in the gender audit exercise. It was well attended by people who are involved in energy and gender related sectors both from the government departments and civil societies. The workshop was successful in meeting its objectives with the kind of quality discussion and suggestions model by the participants, which will help in successful implementation of the gender audit study.



*Gender Audit Team at the Workshop in Delhi.*

- 3.5.2 Stakeholders Consultation and Dissemination workshop, 17 January 2008, IIC, New Delhi -** The objective of the workshop was to share and discuss the process and findings of the gender audit and deliberate on the recommendations with various stakeholders ranging from Planning Commission to Ministry of New and Renewable Energy to ENERGIA International Secretariat to other civil society

groups. Shri V. Subramaniam, Secretary, Ministry of New and Renewable Energy, Government of India inaugurated the workshop. Dr. Kirit Parikh, Member, Planning Commission chaired the session on Recommendations and Future Action Plan. The welcome address and introduction was made by Dr. Jyoti Parikh, Executive Director, IRADe. Ms. Sheila Oparaocha and Ms. Ana Rojas from ENERGIA International Secretariat, Netherlands also attended the workshop and made valuable inputs to the discussion. The idea was to consolidate the various findings to be able to come up with workable plans. It was well attended by people who are involved in and have stake in energy and gender related sectors both from government departments and civil societies. The objective of the workshop was fulfilled by the rich discussion and deliberation that took place between stakeholders and result in recommendations that can strengthen the role of government in providing access to energy sources to rural poor women in India.

**3.5.3 Meeting on “Gender Responsive Energy Policy” 7 April 2008 at Yojana Bhawan, New Delhi** – The Planning Commission convened this meeting where the findings of the gender audit of national energy policy in India was shared with the government. Dr. Kirit Parikh, Member, Planning Commission, chaired the meeting and Shri V. Subramaniam, Secretary, Ministry of

New and Renewable Energy also attended the meeting and officials from nine other ministries were also present.

Dr. Jyoti Parikh, Executive Director, IRADe made a brief presentation describing the issues, emerging from IRADe-ENERGIA study on gender audit of the Ministry of New and Renewable Energy (MNRE). She said very little investment, management and technology go into non-commercial energy which provided 28% of energy gathered by women. This was followed by the discussion on the findings and recommendations of the study. It was successful in the sense that the underlying problem of energy issues from the women’s point of view was able to make impact.

### **3.6 FIVE YEARS OF IRADe, 4 October 2007**

IRADe completed 5 years in September 2007. In a period of five years, IRADe has gained considerable strength and carried out a wide-ranging activities including research in the field of environment and climate change, energy and power systems, policy reforms with cross cutting themes as poverty alleviation and gender, technology and so on. In addition to research, policy advocacy and dissemination, training and capacity building and most importantly action projects with the deprived and marginalized sections of the society also continued. During this period, one area that stood out among the above is climate change sector, where IRADe has done diverse activities ranging from policy level to field level.

On the occasion of the completion of the first 5 years, IRADe held a dinner-event on 4 October 2007 at New Delhi as a mark of gratitude to all its well-wishers,. The occasion had the presence of Shri Montek Singh Ahluwalia, Deputy Chairman, Planning Commission, Government of India and Shri V. Subramaniam, former Secretary, Ministry of New and Renewable Energy, Government of India as the chief guest. The event was attended by representatives from various ministries, public and private sectors, experts, academics, NGOs and others.

Shri Montek Singh Ahluwalia noted that

IRADe strives to work on diverse issues in the context of research, analysis, project activities, etc. to improve understanding of the complex issues. He also appreciated IRADe’s role as an independent evaluator to assess the effectiveness of different programmes and policies sponsored by government and quasi-government organizations.

The occasion gave an opportunity to thank our council members, our donors and well-wishers and to congratulate all the IRADe staff for their dedicated work with commitment.



*Mr. V. Subramaniam, Dr. Kirit Parikh, Dr. Montek Singh Ahluwalia and Dr. Jyoti Parikh at IRADe’s 5-year event.*



*Dr. Montek Singh Ahluwalia giving speech at IRADe’s 5-year event.*

## 4. New Projects

### 4.1 TECHNO-ECONOMIC AND SOCIO-AGRONOMIC ANALYSIS OF BIODIESEL SYSTEM

The Ministry of New and Renewable Energy (MNRE) awarded IRADe this project with the objective of analyzing the feasibility and success of Jatropha based biodiesel production and consumption in the state of Orissa and Rajasthan. The study will generate the information needed to set the future agenda to address key demands from the community for targeted information on Jatropha cultivation in Orissa and Rajasthan and to fill critical knowledge gaps, which currently inhibit effective policy on bio diesel in India. It is also to delineate the key challenges in the Jatropha cultivation in consonance with the need to scale up the outreach of services to the poor and vulnerable.

The study analyse various socio economic parameters from the perspectives of various stakeholders consisting of oilseeds cultivators, processing (extraction and trans-esterification) industries, biodiesel marketing companies and end-users with regard to Jatropha based biodiesel cultivation and production. Thus stakeholder profile, dynamics and interdependence and role of government are analyzed in the study. In doing so, the project identifies the primary barriers of Jatropha plantation, bio-diesel production in India and addresses demand and supply gaps and analyse socio-economic feasibility of a multi-stakeholder system with focus on rural population. It also finds out gaps in each subsequent step from land use, seed

availability, Jatropha plantations to the finished product, marketing and supply of bio-diesel to the end consumer.

For collection of data, survey, empirical observations, and expert judgment methods are used to study the social structure of rural India, wasteland profile, effectiveness of Jatropha Plantation on wasteland, profile of farmers and marketing of seeds in respective states. Both quantitative and qualitative surveys are used among the beneficiary population of the selected villages in Rajasthan and Orissa. The obtained data would be analyzed to detail the above process to draw inference for policy framework for Jatropha plantation and bio-diesel production.

### 4.2 ECOSYSTEM MANAGEMENT OF MARINE NATIONAL PARK, GUJARAT

#### Background

Gujarat has the distinction of creating the country's first Marine National Park (MNP) spread over an area of nearly 458 sq. km in the Gulf of Kachh. The Marine National Park is a vast reserve of marine life as well as home to some of the finest coral reef formations on India's west coast, some fringed by mangrove forests. The International Union for Conservation of Nature and Natural Resources (IUCN) has declared the Marine National Park as category-II area in the list of important National Parks of the world. A complex coral reef ecosystem, coupled with

extensive mangroves, dominates the landscape of the shallow water of the MNP. There are about 30 to 40 islands on the Jamnagar coast in the MNP, all surrounded by reefs. Today, the entire coastline is threatened by a combination of mangrove destruction, oil spills, toxic waste and reclamation. Industrial and other developments along the Gulf have accelerated in recent years with the establishment of oil refineries.

This region is going through unprecedented industrialization. With market potential and easy availability of finance many industries are coming up along the coast with obvious potential threat to the ecosystem. It is clear that multidisciplinary, multi-stakeholder approach is needed and considerable dialogue would be necessary with the new and existing entrepreneurs to show them that they have a stake in the ecosystem. Thus, it becomes essential to study the overall potential threats and formulate a proper action plan to protect these valuable resources. This case study of Marine National Park will strive to do the same and also provide guidance for the management of other sensitive coastal areas in the country.

### **Objectives**

The objective is to identify management, conservation and rehabilitation options to terrestrial and marine ecosystems that are consistent with stakeholders' plans concerns and to suggest on implementation plan through a blend of economic instruments and command and control measures. The study will focus mainly on the assessment of the overall potential impact of industries on coastal marine ecosystem and Marine National Park and creation of an Ecozone consisting of MNP

and Khidijia Bird Sanctuary through dialogue among stakeholders.

### **4.3 CLIMATE CHANGE AND MOUNTAIN ECOSYSTEM**

Developing countries such as India are subject to adverse effects of climate change, mainly due to the high dependency of the majority of its population on its natural-base resource. Climate change is projected to give rise to a multitude of alterations in temperature and weather patterns, which is likely to threaten food production, increase water stress and decrease its availability. Specifically in the Uttarakhand Himalayas, the most obvious sign of climate change is taking place, which is the recession of the Himalayan glaciers. This project aims to analyze the vulnerability assessments and various adaptation strategy particularly in four sectors viz, livelihoods, agriculture, water and forestry in Uttarakhand and in particular Almora district.

### **Objectives**

Major objectives in this study:

- To identify implications of climate change on mountain ecosystems, specifically in the three vulnerable sectors (agriculture, water and forestry).
- To conduct vulnerability assessments and further identify impacts on livelihood.
- To map vulnerabilities and corresponding adaptation options.
- To improve understanding of barriers to adaptation options and



- To suggest how to adapt climate change at policy and community level for the different sectors.

Various methods and approaches adopted in this study are: vulnerability indicators; sustainable livelihoods approaches, PRA approach; public consultation with multi-stakeholders, and integrated assessment. For vulnerability assessment methods such as climate vulnerability index, district-wise vulnerability index and various climate scenarios etc. will be used.

#### 4.4 THREE-TIER SYSTEMS FOR CLIMATE NEGOTIATIONS

##### Background

New ideas are desperately needed for going beyond the commitment period ending in 2012. Assuming that in the very near future, the developed countries will get their act together and undertake drastic reductions, what is the strategy to get the developing countries on board? It appears that strong message must go through that more than 550 ppm can be quite risky for the world but especially for developing countries.

##### Approach

There would have to be several simultaneous approaches for engaging developing countries, as no single criteria works for all. The major ones are: Three tier system based on the per capita emissions, CO<sub>2</sub> intensity approach, total emission approach and sectoral approach. We observe that Co<sub>2</sub> emissions of non-Annex 1 have gone up substantially, for example, South Korea, South Africa, Saudi Arabia, Iran, UAE, Malaysia and so on and of late China. In fact, they exceed even the Annex 1 countries in terms of total emissions as well per capita emissions.

##### Methodology

Therefore, we suggest that non-Annex I countries (NAC) be divided in two groups: those with emissions Above Global Average (AGA) in per capita terms, that is 4.2 t/cap, and those non-Annex I countries with below per capita Global Average (BGA). Thus, we have a three tier system: Annex1, AGA and BGA. Each one can take on responsibilities to contain or reduce emissions. This Three-Tier System:

- Provides a smooth transition into the next tier
- And is consistent with UNFCCC fairness principle, equity among equal emitters in a rule based manner, common but differentiated responsibility and a rule based system that prepares countries for transition well in time.

The AGA countries do not have to “join Annex 1” but could be in a second tier with a *separate programme* for commitment in terms of deliverables and time period. Instead of having a fixed number of countries, we can have a flexible system where countries can move to the next group according to their position with global average per capita emissions in a structured system that does not have to be negotiated each time.

Sectoral approach with financial and technology inputs is one of the proposals that is favored by many industrialized including International Energy Agency (IEA). This is especially suited for large countries and India may be pressurized to join this group. What are the implications for India? We can classify sectors into three categories: production, energy and

consumption. Production sectors are those with large energy consumption; such as steel, aluminum, fertilizer, and cement, concentrated *in a few economies in the world*. Energy sectors include coal, power, renewable and nuclear. Consumption sectors are: transport, building –including households-, which is present in all countries, big and small. Energy efficiency means, manufacturing and standards, labels, and building codes can address this category. All signatories to UNFCCC could be involved in this. However, the first two sectors are specific to large countries viz. manufacturing and energy.

#### **Progress**

Groupings have been done into Annex1, AGA and BGA on the basis of per capita emissions and the position of India and China relative to developed countries is seen on the basis of per capita emissions. Some of the sectors like coal, cement, aluminum, steel and energy have been analyzed on the basis of some indicators like world top ten ranking, time trend, share of the world total and per capita consumption/production.

#### **4.5 ANALYSIS OF CARBON CAPTURE AND STORAGE (CCS) TECHNOLOGY IN THE CONTEXT OF INDIA POWER SECTOR**

The Carbon Capture and Storage (CCS) technology has been recognized as a potential scientific & technological method to address climate change mitigation. The scope of CCS is, to capture CO<sub>2</sub> emission from stationary industrial source (primarily power station), and transport to a geological site, where it (captured CO<sub>2</sub>) can be safely stored, under the earth surface without being released to atmosphere. The study

will cover projection of emission of CO<sub>2</sub> from power plants in future, literature survey to identify development in carbon capture technology, evaluation of each technology for its economical and technical viability requirement of sequestration sites, learning from demonstration project, mechanisms monitoring CCS options, conduct work-shops and public awareness program, and carry out technology assessment including economic analysis and regulatory issues to encourage debate with policy makers. What should be the response of India and level of participation in global development of this technology?

According to the Government Policy, India would like to watch the progress by the developed countries who have to take a lead because of their differentiated responsibilities. However, India is always open to participate in Research and Development (R&D).

The major apprehension to CCS technology is additional cost being added to electricity tariff due to additional use of coal (30%). The impact of CCS on the cost of power generation should be assessed with various options to define appropriate technology and costs under Indian conditions.

#### **4.6 EVALUATION SURVEY OF THE REMOTE VILLAGE ELECTRIFICATION (RVE) PROGRAMME IN RAJASTHAN AND HARYANA STATE**

##### **Background and Introduction**

The Ministry of New and Renewable Energy (MNRE), Government of India awarded this project to IRADe in 2008 to evaluate Remote Village Electrification Programme (RVE) through solar home systems in Rajasthan and Haryana State

and to prepare a report reflecting on the success rate of this programme.

### **Scope of the project**

IRADe is carrying out evaluation in Rajasthan and in Haryana. It is still in progress. The evaluation covers 15 percent of sanctioned villages or 10 sanctioned villages whichever is higher, from each selected state. On this basis there are 30 sample villages for Haryana and 45 for Rajasthan.

### **Objectives**

The main objectives of the survey are -

- To assess the performance of the systems installed under the scheme at the beneficiary level
- To assess impact and programme implementation feed back

- To assess effectiveness of service and maintenance infrastructure
- To assess the level of community participation.

### **Approach**

The evaluations of RVE programme are conducted through the combined approach of field verification and surveys of beneficiaries, village panchayat and officials of the state nodal agency. The evaluation process was initiated with a briefing from the ministry regarding the objective, implementation process and expected outcomes of RVE programme. IRADe aims to evaluate the programme based on Performance Measurement Indicators, which will finalized based on briefing consultations with the concerned officials of MNRE.

## 5. Training

### 5.1 INTERNSHIPS AT IRADe

For the last few years, IRADe has been giving learning opportunity to young students coming from diverse backgrounds by providing internship facilities to students from India as well as abroad. IRADe believes that internships help students gain professional experience in their chosen areas and equip them with knowledge and skills, thereby enhancing leadership skills. IRADe involves the interns in many areas of research, and action projects in its focal areas, particularly climate change, gender, clean development mechanism, biodiesel development, etc. The knowledge gained has helped them towards their degrees or future careers.

Sr. No.	Name	Year	Came from	Area of work
<b>INDIAN STUDENTS</b>				
1.	Mr. Indu Kalpa Saikia	2005-06	UPES, New Delhi	E, CC & CDM
2.	Mr. Rueben Syiem	2005-06	UPES, New Delhi	E, CC & CDM
3.	Mr. Nandraj Kumar	2006-07	B R Ambedkar Univ.	CC & Agriculture
4.	Mr. Raj Thakur	2006-07	UPES, New Delhi	E, CC & CDM
5.	Ms. Deepti	2006-07	UPES, New Delhi	CDM & EU
6.	Mr. S N Mishra	2007-08	IIFM, Bhopal	Bio-fuels & CC
7.	Mr. Dibakar Chakroborty	2007-08	FRI, Dehradun	Mountain Ecosystem
<b>International Students</b>				
1.	Ms. Aleksandra Guayacan	2007-08	University of Colombia	CC & gender
2.	Ms. Aysecan Oztop	2007-08	Bogazici University, Istanbul	Gender & energy
3.	Mr. Jarich Spliethoff	2008-09	Twente University, Netherlands	CC & health
4.	Ms. Sumaiya Kabir	2008-09	North South University, Dhaka	CC & forests

#### Abbreviations:

UPES – University of Petroleum and Energy Studies  
IIFM – Indian Institute of Forest Management  
FRI – Forest Research Institute

E – Energy  
CC – Climate Change  
CDM – Clean Development Mechanism  
EU – European Union

#### TESTIMONALS:



**Indu Kalpa Saikia** - The work experience at IRADe provided excellent exposure to working in different areas of energy, Climate Change and Clean Development Mechanism (CDM) which gave a platform to start my career as professional. *Senior Carbon Trading Specialist, GTZ.*



**S N Mishra** - I would like to thank IRADe for giving me a platform and guidance to envision and articulate my doctoral research in the domain of economic and policy aspect of biodiesel use in India, with resource use perspective. *Doctoral Fellow, IRMA, Anand.*

## 6. List of New Staff at IRADe

- **Ms. Aparajita Kumari**, *Research Assistant*  
M. Sc. (Oil Trading), University of Petroleum and Energy Studies, Gurgaon  
B.Com (Hons.), Ranchi University
- **Mr. Vinay Srivastava**, *Project Associate*  
MBA in HR and Marketing,  
P.G Diploma in Renewable Source of Energy.  
Diploma in Electrical Engineering
- **Mr. Nirbhay Srivastava**, *Research Analyst*  
MBA (Power Management) Univ. of Petroleum and Energy Studies, Dehradun  
BE (Mechanical Engineering) Institute of Engineering and Technology, Agra
- **Prof. S. K. Gupta**, *Senior Advisor*  
B.Sc., B.E., M. Phil (Reading), M. I .Mech E, C Eng., F.I.E.(I), M.I.E.C.(U.K)
- **Ms. Arshi Vimal**, *Research Associate*  
M. Sc. (Energy Systems), University of Petroleum & Energy Studies, Gurgaon,  
B.Sc. M.J.P. Rohailkhand University
- **Mr. Anand Patel**, *Research Analyst*  
M. Sc., Environmental Science, Barkatullah University, Bhopal, Madhya Pradesh  
Bachelor in Bioscience from Barkatullah University Bhopal, Madhya Pradesh
- **Mr. Priya Ranjan Pradhan**, *Accountant*  
B.Com (Hons.), MCA, IGNOU
- **Dr. Nilamani Sahoo**, *Research Fellow*  
Ph. D in International Relation of Environment and Development from  
Keele University, UK

## 7. Seminars/Workshops/Conferences Attended by Dr. Kirit Parikh and Dr. Jyoti Parikh

### Professional activities of Dr. Kirit Parikh, Chairman, IRADe

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

Member, High Level Committee on Estimation of Savings and Investments

#### Academic

Chairman, Governing Council, Centre for Environment Education (CEE), Ahmedabad

Chairman, Indian National Committee (Indian NMO Committee) for the India-IIASA (International Institute for Applied Systems Analysis) Programme

President, Governing Board, Gujarat Institute of Development Research (GIDR), Ahmedabad

Member, Governing Council, Indian Council for Research on International Economic Relations (ICRIER), New Delhi

Member, Governing Council, CUTS

Institute for Regulation & Competition (CIRC)

Member, Advisory Council of IIT Delhi

Member, International Advisory Group of the William and Flora Hewlett Foundation and the International Development Research Centre (IDRC)

#### Awards/Honours

Received Distinguished Alumnus Award at the 53<sup>rd</sup> Annual Convocation of Indian Institute of Technology (IIT), Kharagpur.

Received Distinguished MIT alumni of the decade in India by the Massachusetts Instt. of Technology, Boston.

#### Selected List of seminars/conferences excluding IRADe events that are already discribed.

- Attended the high-level panel discussion on *“Accelerating Africa’s Growth and Development to Meet the Millennium Development Goals – Emerging Challenges and the Way Forward”* at the Conference of African Ministers of Finance, Planning and Economic Development at the 40<sup>th</sup> session of the UNECA in Addis Ababa, Ethiopia; 2-3 April, 2007.
- Addressed the inaugural and plenary session at the India-IIASA Joint Workshop on *“Economic, Societal and Environmental Benefits Provided by the Indian Forests”*, New Delhi; 25<sup>th</sup> April and 27<sup>th</sup> April, 2007.

- Address at the roundtable discussion *“The Practice and Politics of Indian Electricity Regulation”* organized by NIPFP and IIM, Bangalore, New Delhi; 28<sup>th</sup> April, 2007.
- Addressed the luncheon session on *“Demand Side Management”* at 10<sup>th</sup> India Power Forum & Non-Fossil Energy Summit, organized by India Energy Forum, New Delhi; 11<sup>th</sup> September, 2007.
- Addressed the valedictory session on *“Energy Biosciences Strategy for India”* by Department of Bio-technology, New Delhi; 11<sup>th</sup> September, 2007.
- Addressed the session on *“Energy and India: Looking into the Future”* at the Emergent India 2007 – An Engagement with MIT Conference, Massachusetts, USA; 19<sup>th</sup> September, 2007.
- Address at the roundtable discussion on *“The Challenges of Developing Fuel Economy Regulations in India”*, organized by CSE, New Delhi; 4<sup>th</sup> October, 2007.
- Attended the 1<sup>st</sup> interdisciplinary symposium on *“Global Sustainability – A Nobel Cause”* organized by Potsdam Institute for Climate Impact Research, Potsdam, Germany; 9<sup>th</sup>-10<sup>th</sup> October, 2007.
- Addressed on *“Infrastructure and the poorest”* at the global conference on Taking Action for the World’s Poor and Hungry organized by IFPRI, LGOPAD and CAAS; Beijing, China; 17<sup>th</sup> October, 2007.
- Addressed the session on *“Energy Security & Climate Change in the Context of Sustainable Development”* at the 16<sup>th</sup> meeting of Indo German Consultative Group (IGCG), Hyderabad; 3<sup>rd</sup> November, 2007.
- Address at the Symposium on Energy from Moving Water on *“Hydro Energy in South Asia”*, Stockholm, Sweden, 12<sup>th</sup> November, 2007.
- Address at the 35<sup>th</sup> Anniversary Conference of IIASA (Global Development: Science and Policies for the Future) on *“Beyond a Hunger Free World”*, Vienna; 15<sup>th</sup> November, 2007.
- Member of the Official Indian delegation to Thirteenth Conference of Parties (COP-13), 3<sup>rd</sup> Meeting of Parties (MOP-3), 27<sup>th</sup> Session of the Subsidiary Body for Scientific and Technological Advice (SBSTA) and Subsidiary Body for Implementation (SBI) to the UNFCCC, Nusa Dua, Bali, Indonesia; 11<sup>th</sup> to 14<sup>th</sup> December, 2007.

**Dr. Jyoti Parikh**

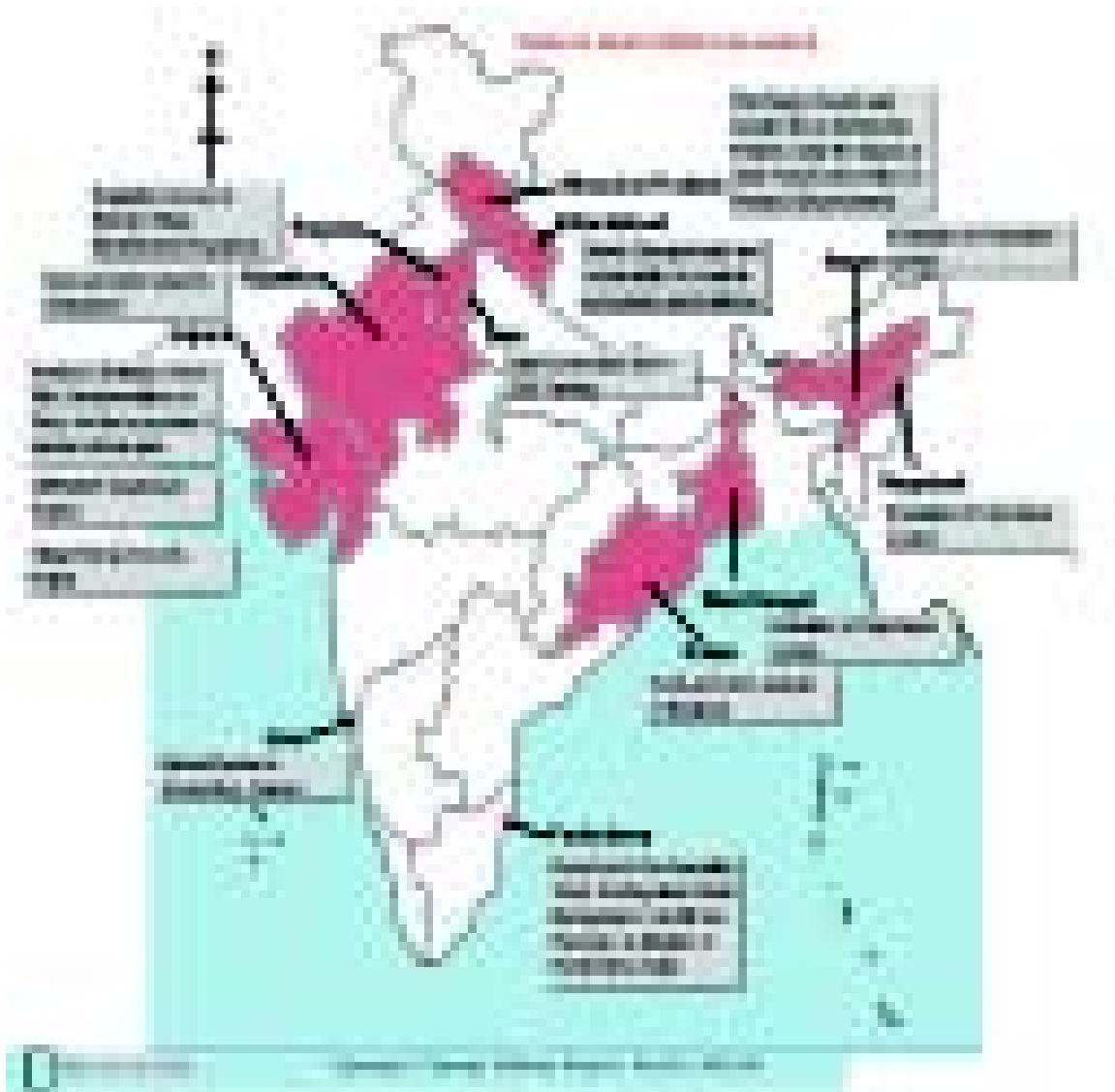
**Selected List**

- Chaired *“Forest Trade & National Accounts Session”* at India – IIASA Joint Workshop on Economic, Societal and Environmental Benefits provided by the Indian Forests at IIC, New Delhi, 27 April, 2007
- Participated as Panel Discussant in the CSD 15<sup>th</sup> Session in New York, USA 6 May 2007
- Speaker in CSD-15 Side Event Indoor Air Pollution (A TV Style Debate) at United Nation, New York – 7-5-07
- Jury member in the event *“Innovation Day”* India Development Market Place 07 at World Bank Premises. – 28.05.07

- Presentation on “*An Estimation of Demand for Natural Gas in the Indian Fertilizer Sector*” in Stanford University, California, USA, 1-6 June 2007
- Panelist at Delphique-07, MDI, Gurgaon – 25-26/08/07
- Panel Speaker at 7<sup>th</sup> Non-Fossil Energy Summit Session “*Plenary on Renewable Energy- Solar Biomass- Biofuels*” at Le-Meridien Hotel, New Delhi, 12 September 2007
- Chaired the session “*Economics, Pricing and Incentives*” at International Symposium on Biofuels organized by PetroFed at Imperial Hotel, New Delhi, 25 September 2007
- Chaired in IPCC Outreach Event on AR4 Working Group III Session “*Opportunities in the Agriculture/ Forestry Sector*” at Hotel Grand Hyatt, Santacruz, Mumbai. Organised by Reliance Industries Ltd, 9 October 2007
- Keynote address at Industry and Ecology Perspectives on Development in Northeast India at IIT, Guwahati, 26 October 2007
- Inaugural address at Workshop on Issues in vulnerability Assessment & Adaptation in India at Conference Hall-III, IIC Annexe. Invitation from NATCOM – 1-2/11/07
- Keynote speaker at the International conference on Climate Change in Sydney, Australia on “*India-Balancing Energy and Climate Policies for sustainable growth and development*” in Sydney, Australia, 14-16 November 2007
- Panel Speaker on Session: Mechanisms Opportunities to Strengthen Stakeholders Participation” at Workshop on “*Efficient use of Energy & Alternative Systems*” CEE, Ahmedabad, 21 November 2007
- Speaker at the Training Course on Climate Change Impacts on Agriculture and Other Crops organized by National Institute of Disaster Management (NIDM) at IIPA Campus, 27 November 2007
- Participated at Conference of Parties 13 for Climate Change at Bali Dec.8-13. 07.
- Speaker at the seminar “*Sustainable Development Post Bali*” at Gulmohar Hall, IHC, New Delhi – 18/12/2007
- Chief Guest and inaugurated the convention at 23<sup>rd</sup> National Convention of Environmental Engineers and National Seminar on Environmental Economics and Clean Technologies at Ranchi, 11 January 2008
- Expert on Conference “*Global Perspectives on Fuel & Food Security*” in FAO, Rome – 18-20/02/2008
- Keynote Address on Renewable Energy in India at Imperial Hotel, New Delhi organized by Powerline, 27 February 2008
- **Key note Lecture** on “*Economics & Science of Development*” at INSA Meet in New Delhi, 14 March 2008



## 8. Map of India with Sites of Trade Projects



IRADe has extended its scope of work and work in various states as outlined above including the activities of the recent years.

## Consolidated List of IRADe Projects

Projects Undertaken -2007-2008				
S.No.	Title of the Project	Funding Agency	Type	Status
1	Climate Change and Mountain Ecosystem	Ministry of Environment and Forests	R	O
2	Ecosystem Management of Marine National Park, Gujarat	Ministry of Environment and Forests	A	O
3	Evaluation Surveys of RVE Programme in the state of Haryana & Rajasthan	Ministry of New and Renewable Energy	R	O
4	Techno-economic and Socio-agronomic Analysis of Biodiesel System	Ministry of New and Renewable Energy	R	O
5	Analysis for Carbon Capture and Storage (CCS) Technology in Indian Power Sector	Department of Science and Technology	R	O
6	Three-tier Systems for Climate Negotiations	Ministry of External Affairs	R	O
7	Demand, Supply and Subsidy analysis for Indian Fertilizer Sector	Ministry of Chemicals and Fertilisers	R	O
8	Activity Analysis Model for Climate Policies for India	Ministry of Environment and Forests	R	O
9	Demand for natural gas in the Indian fertilizer sector	Stanford University, USA	R	C
10	Gender Audit of National Energy Policy in India	ENERGIA International, Netherlands	P	C
11	Extension of Minimum Support Price (MSP): Fiscal and Welfare Implications	Planning Commission, GOI	R	C
12	Natural Resource Accounting (NRA) Goa Phase-II	The Central Statistical Organizations, New Delhi	R	O
13	Bioenergy and Livelihoods	CEE Delhi/UNDP GEF SGPs	A	O
14	VESP Program in Vavdi and Vaddithar, Gujarat	Ministry of New and Renewable Energy	A	C
15	Rural micro enterprise model for bio-fuel extraction in India	Wuppertal Institute for Climate, Environment and Energy	A	C
16	Reducing drudgery of women carrying biofuels: e-discussion and field surveys	ENERGIA International, Netherlands	P	C
17	International Workshop on Carbon Capture and Storage (CCS) in Power Sector in India 22-23 January 2008, New Delhi	British High Commission DESRA, UK, DST NEW DELHI	D	C
18	Energy Technology Conclave, 13-14 March 2008, New Delhi	The International Environment Forum (IEF) & World Energy Council (WEC)	D	C

R-Research Project  
D-Dissemination

A-Action Project  
P-Policy Analysis

O-Ongoing  
C-Completed

## Founding Members

Name	Professional / Designations +
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	Ex-Director 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

## International Advisory Board

Name	Position
Mr. Nitin Desai	Currently at ICRIER*
Prof. Amartya Sen	Harvard University
Prof. Gustav Speth	Yale University
Sir Nicolas Stern	UK Treasury
Prof. Joseph Stiglitz	Columbia University

## IRADe Team

<b>Chairman</b>	Reneema Hazarika
Dr. Kirit Parikh	Mr. Probol Ghosh
<b>Executive Director</b>	Mr. Vivek Singh
Dr. Jyoti Parikh	Mr. Vinay Singh
<b>Senior Advisors</b>	Mr. Pankaj Karn
Dr. B D Sharma	Mr. Onkar Nath
Dr. K K Govil	Mr. Rajesh Bajpai
Mr. C R D Biswas	<b>Research Assistants</b>
Mr. S K Gupta	Ms. Aparajita Kumari
<b>Research Fellows</b>	Mr. Nirbhay Srivastava
Dr. K. Sangeeta	Mr. Aditya Chopra
Dr. Nilamani Sahoo	Ms. Arshi Vimal
<b>Research Analysts</b>	Ms. Gurina Bajaj
Mr. Vinay Srivastav	Ms. Vinika Koul
Mr. Anand Patel	<b>Administration and Accounts</b>
Mr. Chandrashekhar	Mr. B K Sarkar
Mr. Santosh Kumar	Mr. Priya Ranjan Pradhan
	Mr. Sharad Garg

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