ANNUAL REPORT

2012-2013

Integrated Research and
IRADe Action for Development

CONTENTS

OVERVIEW

Background

IRADe is an autonomous advanced research institute, which aims to conduct research and policy analysis to connect disparate stakeholders such as government, non-governmental organizations, corporations, academia and financial institutions. Since sustainability, climate change, renewable energy, energy efficiency, urban development, poverty, gender equity, agriculture and food security, are considered challenges for the twenty-first century, its research covers these, as well as policies that affect them. Its focus is effective action through multi-disciplinary and multi-stakeholder research to arrive at implementable solutions for sustainable development; and policy research that accounts for the effective governance of techno-economic and socio-cultural issues.

IRADe was established under the Society's Act, in 2002 at New Delhi. It is certified as a Research and Development organization by the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology (MoST). It has also been selected as a Centre of Excellence by the Ministry of Urban Development (MoUD) for Cities and Climate Adaptation. In addition, it provides expertise to other ministries and institutions from time to time.

Thematic areas

- Energy and Power System (EPS)
- Urban Infrastructure and Services (UIS)
- Climate Change and Environment (CCE)
- Poverty Alleviation and Gender (PAG)
- Agriculture and Food Security (AFS)

Key activities

- Research and Analysis for Decision Support (RAD)
- Research in Action, Monitoring and Evaluation projects (AME)
- Training and Capacity Building (TCB)
- Policy Advocacy and Dissemination (PAD)

IRADe's objectives

- To develop understanding that integrates multi-stakeholder perspectives concerning issues of development.
- To promote 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 local and global levels.
- To promote research support to developing countries for development and also to negotiate international agreements better.

Current Governing Council

Dr. Kirit S. Parikh (Chairman)	Economist and Engineer
Prof. Jyoti K. Parikh (Member Secretary)	Specialist, Energy and Environment
Ms. Ela Bhatt	Founder, SEWA
Dr. R.A. Mashelkar	Former Director General, CSIR
Mr. Keshub Mahindra	Industrialist
Prof. Deepak Nayyar	Former Vice Chancellor, University of Delhi
Ms. Meera Shankar	Former Ambassador, Govt. Of India

+ Appointed in 2013 after the resignation of Dr. Rakesh Mohan, former Deputy Governor, Reserve Bank of India

Founding Members

Dr. Kirit S. Parikh (Chairman)	Economist and Engineer
Dr. Manmohan Singh	Member, Rajya Sabha +
Ms. Ela Bhatt	Founder, SEWA
Mr. Adi Godrej	Industrialist #
Mr. Keshub Mahindra	Industrialist
Dr. R.A. Mashelkar	Director General, CSIR +
Mr. Shirish Patel	Consulting Engineer
Prof. Jyoti K. Parikh (Member Secretary)	Specialist: Energy and Environment

Resigned after the first term
+ At the time of IRADe registration in 2002

International Advisory Board

Mr. Nitin Desai	Former Under Secretary General, United Nations
Prof. Amartya Sen	Harvard University
Prof. Gustav Speth	Yale University
Sir Nicolas Stern	UK Treasury
Prof. Joseph Stiglitz	Columbia University

PREFACE

It is my great pleasure to present the 2012-13 Annual Report of the activities of IRADe. This Annual Report provides an opportunity to reflect on the significance of research and development that makes an impact on economic growth and sustainable development.

We are proud to see many impressive milestones that have been reached this year. We completed the study titled, "Climate Resilient Urban Development: Vulnerability Profiles of 20 Indian Cities", which was supported by the Rockefeller Foundation through their Asian Cities Climate Change Resilience Network (ACCCRN) programme. The report was published and sent to the stakeholders. The USAID selected IRADe for the implementation of the South Asia Regional Initiative for Energy Integration (SARI/EI) program through a competitive process. Under this program, a substantial amount of work has been done to develop the economic rationale for a South Asian electricity market.

We also completed several influential projects such as "Study on assessment of alternative road maps on reforming diesel prices", "Perspectives of the Trucking Industry on Decontrol of Diesel Price", "MAPS India Study on Poverty and Low Carbon Development Strategies" and various other projects. Detailed overviews of projects are mentioned in this report.

The organization has taken up several new research projects such as Research study on low carbon development pathways for a sustainable India and many more during the year, which were sponsored by national and international agencies and government organizations. We also provided research support to various institutions and Government bodies. We will continue to build on this to raise the level of our achievements.

I take this opportunity to express my sincere thanks to all our sponsors, well wishers and Governing Council of IRADe for their continued support and encouragement. And Governing Council for their continued support and encouragement. I express my appreciation and thanks to the IRADe team for their cooperation and devotion to work.

Jyoti K. Parikh

Professor Jyoti Parikh
Executive Director

1 CLIMATE CHANGE AND THE ENVIRONMENT

1.1 Vulnerability of Coastal Cities on Rivers to Climate Change: Case Study of Surat to Develop Adaptation Framework

The study aimed to assess the vulnerability of the Surat city, especially most vulnerable places such as schools, hospital, slums and industries to floods and to incorporate climate change concerns in the existing decision support system.

The damage due to flood is both direct and indirect in nature. The direct damages include physical damages i.e., damage to buildings (structural elements, floorings, walls doors etc.), infrastructure, vehicles, machinery and equipment, contamination of water, loss of green spaces, etc. The indirect damages include the social and economic damage. Social damages include problems due to disruption in transportation and communication, fear and psychological effect on the people, health effects due to outbreak of diseases and economic damage include cost incurred in reconstruction and rehabilitation etc.

Surveys of Vulnerable Locations

To understand the socio-economic aspect of floods in Surat, a number of field surveys were conducted during 2012-13 in the context of the devastating flood of 2006 with a variety of questions to identify the key vulnerable locations in Surat and to understand the impacts of the flood in 2006. Four important vulnerable groups were identified and surveyed, namely; schools, slums, hospitals and industries.

Vulnerable Location Near River Tapi, Surat

The aim of the surveys was to look into the socio-economic aspect of the damage caused by the flood to these target groups and their vulnerability to the flood and to identify adaptive options to face the challenges posed by the flood. Special attention to gender specific issues was considered during surveys. The survey findings are as follows:

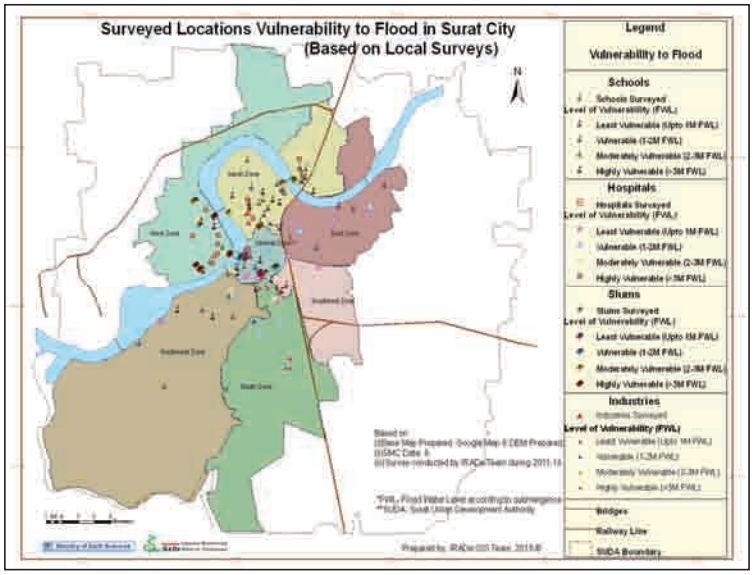
- In Surat city, there are seven zones and four most vulnerable zones were selected for school survey on the basis of the level of vulnerability. Natural disaster cannot be controlled but vulnerability of this hazard can be reduced by planned mitigation and preparedness measures.
- A few schools have introduced hazard preventive measures after the devastating flood that occurred in 2006.
- The slum residents received medical facility, livelihood support, clean drainage or sewerage, clean water supply, easy access to credit and some easy insurance options. For development of slums, Surat Municipal Corporation (SMC) adopted three strategies: slum relocation, slum redevelopment and slum upgradation.

- Respondents for hospital survey were selected randomly from five out of seven different zones namely, East, West, South, North and Central. Most of the hospitals were equipped with backup power options to manage intermittent power supply during disaster. The Surat Municipal Corporation added one floor in hospital buildings as a part of preventive measure to avoid any serious damage due to flood.

- A survey of 35 industries was conducted. Most of the workers in industries are migrants and were hit by the impact of the flood. As per the survey, due to collapse of embankment the textile industry had to face losses. Due to damaged roads, industries in general were hard hit by rising waters.

Flood Inundation Mapping and its Significance to Surat city

The primary objective of this study is to assess the hydrological vulnerability of the people and the public infrastructure of Surat city. The elements of infrastructure under consideration include- buildings (schools, hospitals, slums, and industries) within and adjacent to the floodplains, roads, bridges, etc. An original systematic procedure is used in the study to gather and examine available data in order to develop an understanding of the relevant climatic effects and their interactions with infrastructure. For this, a hydrological model of the river is developed to assess the extent of inundation and water depths under various scenarios under consideration, which may arise due to climate change. An integrated hydraulic modelling system and spatial analysis software have been used in the study.



Surveyed Locations Vulnerability to Floods in Surat city

- Inundation depths that are required for an assessment of infrastructure vulnerability have been developed by using the CARTOSAT Imagery and Discharge data of UKAI Dam collected by the Surat Municipal Corporation (SMC) and Irrigation Department, Surat. Geometric data have been developed by using the GIS and Hydrological computer software for spatial analyses.

- The process of inundation mapping is based on the hydraulic calculations of water surface elevations extracted from the CARTOSAT imagery of the region of 2.5m resolutions. The main objective is to bring the process into digital format for use of software tools for spatial analyses. The methodology used in this research work consists of three steps.

  (i) Pre-processing of geometric data for HEC-RAS, using HEC-GeoRAS.

  (ii) Hydraulic analysis in HEC-RAS.

  (iii) Post-processing of HEC-RAS results and floodplain mapping, using HEC-GeoRAS and ArcGIS.

The Ministry of Earth Sciences (MoES) is supporting this study to develop an integrated analytical framework for floods and generate a disaster management strategy for coastal cities on rivers.

1.2 Research Study on Low Carbon Development Pathways for Sustainable India

The objective of the study was to use the activity analysis model of the IRADe model, developed under earlier projects, to forecast a low carbon pathway for India up to 2050 without sacrificing on the developmental priorities of India. The study required elaboration on the developmental challenges in India, the minimum level of development that must be reached despite low carbon consideration and attributes of such a minimum development threshold for India. The study was based on two carbon budgets for India- one based on 1990 as the base year and the other based on 2010 as the base year. The study provided scenarios that reach various goals of well being indicators of human development by 2030 and satisfies the two carbon budgets.

Methodology

The broad methodology consisted of adapting the model and specification of well being indicators whose targets by 2050 can be considered to constitute the development threshold. Various low carbon technologies and interventions in the sectors of power, transport, cement, Iron & Steel, forestry and buildings sector and their inclusion in the IRADe model was also explained. The team benefited from the feedback that was received from meetings with partners particularly on the aspect of human development and well being indicators.

The IRADe model was used to specify 4 scenarios for the project – 1) Dynamics as Usual scenario 2) Visionary development 3) Low carbon scenario 1, and 4) Low carbon scenario 2. In constructing the visionary development scenario, the IRADe team looked at various human development indicators that are associated with Health (life expectancy, mortality rate), Education (Mean years of schooling, Access (Acess to electricity, clean cooking fuel, clean water, sanitation and access to durable houses) and poverty. These indicators were linked to economic variables in the IRADe model through regression and normative methods. Targets were set for 2050 for each indicator based on practical consideration and comparison with highly developed countries. This enabled the IRADe model to provide the level of development associated with each scenario. The Visionary development scenario was specified with higher government expenditure on education and health. It also had higher government expenditure on building houses and transferring them to the poor to provide them access to durable houses and finally a cash transfer scheme that provides support to minimum consumption access to electricity and LPG for poor households. The low carbon scenarios had the development expenditures and interventions of the visionary development scenario, but apart from them, falling costs were assumed for renewables, higher energy efficiency, changing lifestyle (lower and efficient use of fossil fuels by household) and larger forest cover under green India mission were assumed as low carbon options. The scenario was run with carbon budgets of 156 GT and 133 GT over 2010 to 2050 as constraints. The low carbon scenarios provide GDP, consumption, sectoral and technological choices that required to be made within the carbon budgets and yet not lose out on developmental targets.

The project has been funded by a consortium of organisations working in the field of low carbon growth and climate change. The funding organizations are WWF Germany, WWF India, Centre for Environment Education, LAYA, Church's Auxiliary for Social Action, Bread for the World and German Agro Action.

1.3 Study on Economy-wide Model for Low Carbon Strategy

This study has been supported by the Planning Commission to support the work of low carbon expert group. The Expert Group on Low Carbon Strategies for Inclusive Growth (2011) appointed by Planning Commission has submitted its interim report. It provides low carbon technology alternatives for key energy intensive sectors in India. But the assessment of these technologies at macroeconomic level is not done. Study of cost considerations,

impact on growth rate, and impact on carbon emissions, energy intensity and emissions intensity are required to be done to make a careful choice among the available alternatives for India. The research study aims to answer questions like:

- What will be India's emission profiles in 2020 and 2030 given the desire for high economic growth and expected population growth?
- How will India achieve the desired reductions in carbon intensities?
- What technology changes are needed in Energy, Power, Transport, Building Construction and major energy consuming sectors such as steel, cement, fertilizers etc?
- What economic instruments- taxes, subsidies, and prices are needed in addition to technological change to reduce emission intensities?
- What would be the economic impact of carbon constraints?
- What would be the impact on rural and urban poor of such policies?
- India needs to increase energy access to 600 million people who do not have access to modern energy services. How can that be achieved and what would be CO_2 implications?

This study is supported by the Planning Commission to support the work of low carbon expert group.

1.4 Socio Economic Vulnerability of Himachal Pradesh to Climate Change

The state of Himachal Pradesh is particularly vulnerable to climate change due to its geo-ecological fragility and its potential for rapid economic development. Statistical synthesis of projected climate parameters made by international researchers establishes relevance to the region of climate change. It is therefore important to assess current vulnerability and changes by taking into account economic activities that may take place over the next 30-50 years (when climate impact will become critical).The study will develop methods to determine climate variability at the regional scale. It will assess the impact of climate change and variability on agriculture and forests. Vulnerability assessment of the two main sectors, viz., agriculture and forestry resources will be carried out on different time scales, taking into account projected economic activities in future. The study will provide insights into the socio economic vulnerability, especially on livelihood of those who derive sustenance from natural resources and depend on agriculture, water and forests. These include farmers, tribal communities and women's work on which climate change may have harder impact.

Objectives

- To develop methods that identifies and assesses scientifically the impacts and hazards of climate change and variability at the state level.
- To carry out literature survey and identify gaps in knowledge and data with relevance to the region.
- To analyse the impact of climate change and variability on agriculture and forestry of Himachal Pradesh. Statistical Synthesis of Climate parameters projections made by international researchers establishes relevance to the region to assess current vulnerability and changes by taking into account economic activities that may take place over the next 30-50 years (when climate impact will become critical).
- To carry out literature survey and identify gaps in knowledge and data with relevance to the region.
- To explore possible linkage of the project outcome to decision making and policy development.

IRADe has started the activities on literature review (survey) and secondary data collection. Following are the main activities that were initiated since the commencement of the project:

- Literature review has been completed to identify current state of knowledge, data, analysis of the issues related to climate change in the Himalayan region and to identify appropriate adaptation and mitigation technologies to address vulnerability.
- District wise data on Agriculture viz area under production, production and yield (Cropping pattern) data, sources of irrigation data, farm harvest prices, NPK (Nitrogen, Phosphorous and Potassium) Consumption has been collected from Department of Economic Statistics. Collection and analysis of climate data of the state has been accomplished and rainfall and temperature data is under process.

This project is supported by the Ministry of Science and Technology, Government of India, New Delhi.

1.5 Measuring Ecosystem Services for Green India Mission: A Case Study of Paderu Project in Andhra Pradesh

Green India Mission (GIM) is one of the eight missions for climate action plan. It aims to improve the distribution and quality of forest resources and the associated livelihoods of the people. Climate change influences the functioning of forest ecosystems. Ecosystem valuation, green accounting, etc. motivates efforts for preservation of the natural resources, especially the forest cover of the country.

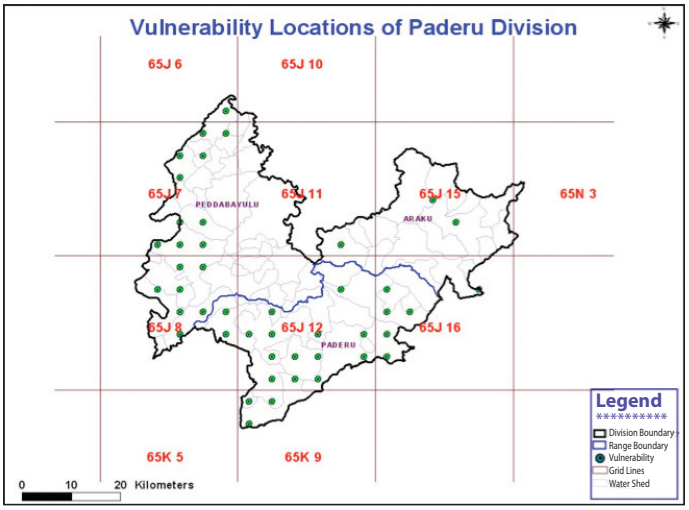
The Ministry of Environment and Forests (MoEF), Government of India has initiated the pilot phase of Green India Mission, which is being implemented in the state of Andhra Pradesh. During the current year, it is being implemented in Paderu Forest Division of the Visakhapatnam District. The landscape selected in Paderu Division has 23 habitations spread over 4985 ha, out of which forests constitute 3200 ha (64.19%) and outside Forest area 1785 ha (35.81%). Each Grama Sabha (GS) has a Vana Samrakshana Samithi (VSS), which functions as the forestry committee of the GS with the total number of 23 GIM Gram Sabha/VSS village.

Objectives

- To measure the increase in forest and tree cover area in Paderu division.
- Measurement and valuation of goods and services.
- Value NTFP (Non Timber Forest Products) and increased forest based livelihood income for forest dependent households.

The study was based on the primary field survey. Three separate questionnaires were prepared for the field survey of the research study as follows:

- Household Survey
- Gram Sabha/VSS Survey
- Forest Department Survey



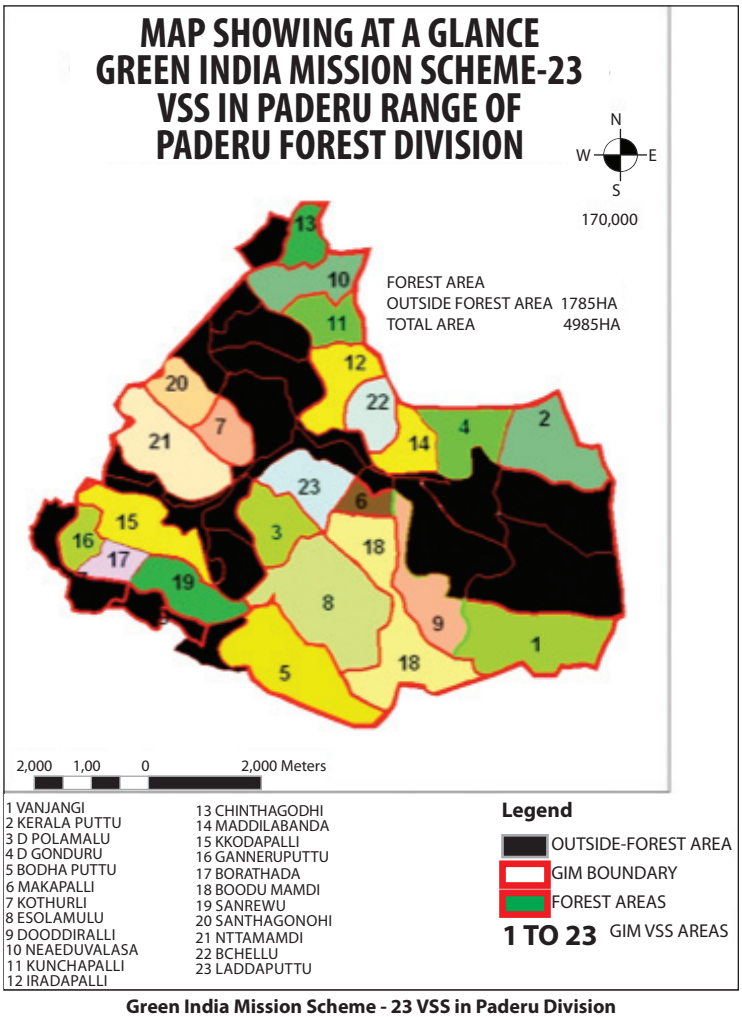
Vulnerability Locations of Paderu Division

The IRADe team conducted the primary field survey with the help of Forest Department of Paderu Division in Visakhapatnam Distinct of Andhra Pradesh. The IRADe team obtained information from a sample of seven Gram Sabha/VSS villages out of 23 Gram Sabha/VSS villages in Paderu Division of Andhra Pradesh. Thus, the field survey is based on the random selection of seven Gram Sabha/VSS villages from Paderu Division, chosen to represent each one of these regions. For the pilot household survey, 3 to 5 households were randomly selected for interview from each of the seven Gram Sabha/VSS. The total possible number of observations was 20 households.

Gram Sabha Meeting at Paderu

Key Findings

- Forests in Paderu are easily accessible and most of the population is dependent on them. They mainly derive non-timber goods from forest like honey, adda leaves, fodder, etc. for subsistence and commercial purposes. Development of non-timber goods as well as forest based products like medicinal plants helps in protecting the forest cover.
- Among the selected areas studied, seven Gram Sabha/ VSS villages of Paderu Division were able to generate good employment and income due to commercially important species such as Tamarind, Adda Leaf, Turmeric, Honey, Pippallu and Broom Stick are grown. Most of the families depend on the NTFP collection from the forest.
- Development of non-timber forest products benefits Paderu Division by protecting the forest area. The fruits and nuts extracted from trees are adequate and, therefore, pose no threat to the forest so far.
- During the survey, it was found that female participation was much higher than male participation. However, the females were more concerned about water uses, NTFP collection and fuel.



Green India Mission Scheme - 23 VSS in Paderu Division

- During the study, it was also found that all the households in the village are dependent on fuel wood collected from the forest due to easy accessibility and mobility within the forest. People in Karakaputtu also mentioned that they want to grow Pippallu and Turmeric medicinal plants to generate additional income rather than other NTFP products.
- Majority of the villages are part of tribal community. Under the tribal belt, it is understood and observed that the relationship between the people and natural resources in particular with forests and trees are perfectly tuned and they are an integrated part of the ecosystem.

This project was supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

1.6 Identifying Specific Policy Options with the Aim of Reducing Carbon Intensity in India

As India's economy expands, CO_2 emissions will continue to rise. In the business, as usual scenario, India's CO_2 emissions will increase five-fold by 2050, and remain heavily dependent on scarce fossil fuels. Rising global emissions, high dependence on fossil fuels and consequent changes in India's climate will have major impacts on many spheres of the Indian economy including livelihoods, water supplies, agriculture, food production and infrastructure. Therefore, the Government of India has announced the National Action Plan on Climate Change (NAPCC) and its constituent eight missions, prepared under the aegis of the Prime Minister's Council on Climate Change, provide a range of key policy and regulatory drivers and incentives for low carbon growth and is now taking a leading role in driving low carbon development globally. Furthermore, an 'Expert Group on Low Carbon Strategies for Inclusive Growth', chaired by Dr. Kirit Parikh, has been set up to provide technical and policy options to reduce 20-25% emission intensity by 2020 compound to 2005.

Various other countries have aggressively been pursuing low carbon growth plans, by rapidly disseminating the lessons learned globally in implementing low carbon growth plans and particularly from UK/EU experience, and then applying them to the challenges faced in India, India may be able to leapfrog based on these experiences and accelerate the implementation of policies that deviate from the business as a usual scenario. Under this context, the aim of this study project was to provide practical recommendations on low carbon policy options to support the 'Expert Group on Low Carbon Strategies for Inclusive Growth' appointed by the Planning Commission to reduce Indian's emission intensity. The study aims to provide practical recommendations for the policy landscape in India, specifically in three key domains identified by stakeholders: Renewable Energy Certificates (RECs), Green/Energy Efficient Buildings and Low Carbon Institutional Framework.

Key Findings

Renewable Energy Certificates (RECs)

- Ensuring policy certainty and regulatory compliance by demonstrating a national policy commitment for RECs by setting appropriate targets that aligns with national level targets of renewable energy generation.
- Setting uniform RPO targets across states in India
- Minimum Price guarantee for RECs
- Strengthening the penalty mechanism

Green and energy efficient building standards

- Promote the uptake of green and energy efficient building standards by incentivising owners and developers to overcome barriers related to capital intensity, high cost and general reluctance to move from existing practice.
- Reduce the knowledge gaps and promote greater sharing of information amongst technical experts and developers to incorporate Green building/ energy efficiency techniques in building design and construction.
- Strengthen the supply chain of green building materials, which will ensure that the green building market can operate at scale.
- Stringent regulatory provisions and mandating standards for making designers and contractors for rapid adoption of techniques and technologies for green and energy efficient buildings.

Low carbon governance and institutional framework

- A special unit such as the Low Carbon Growth Unit (LCGU) could be established in planning a commission to focus expressly on delivery of those aspects of the 5-Year Plan with climate elements linked to the NAPCC.
- A new dedicated committee established by the Prime Minister under the PM Council to track the progress of the NAPCC Missions with clear recommendations of what improvements can be made.

The study, Identifying specific policy options with the aim of reducing carbon intensity in India was undertaken jointly by AEA, Emergent Ventures India and IRADe, and was supported by the British High Commission.

2 URBAN INFRASTRUCTURE AND SERVICES

2.1 Centre of Excellence for Urban Development and Climate Change

IRADe has been recognized as a **Centre of Excellence** (COE) on Urban Development and Climate Change by the **Ministry of Urban Development (MoUD)** since 2008. The COE has evolved with the dynamics of urban development and climate change, and in its efforts to initiate transformations towards a sustainable future; it works with various stakeholders - the central, state, and city governments, corporate houses and NGOs. IRADe-COE focuses on issues related to mitigation and adaptation of climate change impacts on urban areas. It also examines urban policies and regulations in the context of climate change impacts.

Under the capacity building momentum, IRADe delivers lectures on urban development and climate change in renowned institutions. This helps in filling the knowledge gap that currently exists among various professionals and also helps in creating awareness. It has also started developing the capacity of various other organizations and institutes by working on Urban Climate Resilience.

2.2 Climate Resilient Urban Development: Vulnerability Profiles of 20 Indian Cities

The COE-IRADe executed the project, "Climate Resilient Urban Development: Vulnerability Profiles of 20 Indian Cities".

This study evolved from a question "How many cities in India are vulnerable to climate change and in what ways?" Twenty representative Indian cities from fourteen states were selected for this study on the basis of their location and other characteristics that included population density and the urbanization trend. The cities have been categorized on the basis of their location: cities along the sea coast; cities located along a river or its delta; and mountainous cities.

The main objective of the study is to develop vulnerability profiles of Indian cities for climate resilient urban development that highlight exposure and vulnerability factors. Thus, a coherent set of urban resilience measures has been assessed, which can be merged with the ongoing natural hazard risk reduction and urban renewal interventions, minimizing the impacts of climate change on the cities and their inhabitants. This climate induced risk profile at city level may further orient Urban Local Bodies (ULB's) to make concerted efforts to protect natural systems, the built environment, and population at large. The study covered vulnerability profiles of 20 cities.

Table 1: Vulnerability Matrix of 20 Cities

Vulnerability Matrix													
S.No.	Classification	City Name	Hazards					Infrastructure				Population base in 2011 (million)	Categorization of cities on basis of population
			Drought	Flooding	Landslides	Cyclones	Heat/cold waves	Water supply	Sewerage	Drainage	MSW		
1	Coastal	Kolkata	Y	Y		Y	Y	Y		Y	Y	14.1	A
2		Mumbai		Y	Y	Y				Y		18.4	A
3		Chennai	Y	Y		Y	Y					8.6	A
4		Surat	Y	Y		Y				Y		4.5	A
5		Visakhapatnam	Y	Y		Y	Y		Y	Y		1.7	B
6	Hill	Thiruvananthpuram		Y		Y				Y	Y	1.6	B
7		Kochi	Y	Y		Y	Y		Y	Y	Y	2.1	B
8		Puri	Y	Y		Y		Y	Y	Y	Y	0.2	C
9		Srinagar		Y	Y		Y		Y	Y	Y	1.2	B
10		Shilong		Y	Y		Y		Y	Y	Y	0.3	C
11		Dehradun		Y	Y		Y		Y	Y		0.7	C
12	Riverine	Hyderabad	Y	Y			Y	Y	Y	Y		7.7	A
13		Delhi	Y	Y			Y			Y	Y	16.3	A
14		Ahmedabad	Y	Y		Y	Y			Y		6.3	A
15		Allahabad	Y	Y			Y		Y	Y	Y	1.2	B
16		Haridwar	Y	Y	Y		Y				Y	0.3	C
17	Mixed	Bengaluru	Y	Y			Y	Y		Y		8.5	A
18		Jodhpur	Y				Y			Y	Y	1.1	B
19		Indore	Y	Y			Y			Y		2.1	B
20		Bhubaneswar	Y	Y	Y	Y	Y	Y	Y	Y	Y	0.8	C
	Total Vulnerable cities	Cities	15	19	6	10	16	5	9	18	11	97.7	

Categorization of Cities on the basis of Population

- >4 million = A
- 1 to 4 million = B
- <1 million = C
- Y indicates vulnerable

Key Findings

- The study furnished evidences related to cities that can use knowledge of various key institutions such as universities, research organizations, etc, which helps in formulation of policies and finance options for sustainable and climate resilient urbanization of India's growing urban centres.
- There is a requirement of advanced understanding, motivation and empowerment of actions that addresses climate change issues and facilitates adequate investments with appropriate institutional mechanisms within an enabling policy framework in order to improve resilience of India's urban areas.

The study was supported by Rockefeller Foundation through their Asian Cities Climate Change Resilience Network (ACCCRN).

2.3 Working Paper on HIGS Framework for Climate Resilient Urban Development

Considering growing vulnerable population and lag in infrastructure and services, as well as formal protective mechanisms, the cities need to develop resilience at a much faster pace as huge economic losses occur even if cities do not function for a week. Moreover, a methodology for rapid assessment is needed urgently, as there is not much time to deal with nearly four thousand cities and towns, inhabited by 377 million people, where considerable economic assets are located.

The aim of this study is to present HIGS framework as a customized and holistic approach that can be used for rapid assessment of climate vulnerability and sustainability of cities.

Objectives

- To highlight the links between climate change and cities.
- To discuss concerns focusing on issues pertaining to cities and their approaches to climate resilience.
- To develop climate informed urban development interventions while understanding the urban systems at risk.
- To scale-up climate informed development interventions for customized and coherent framework, which is needed for climate resilient urbanization.
- To provide planners, decision makers and other relevant stakeholders with a theoretically as well as methodologically well- grounded framework to use for other cities.

Outcomes of the Study

- The framework prepared will facilitate an understanding of likely future climate impacts while assessing the resilience of the current socio-economical system in the face of numerous stresses that are partly related to climate impacts and partly due to fragilities in the system itself.
- Currently, there are numerous gaps in public knowledge regarding the risks associated with climate change.

The study is supported by the International Institute for Environment and Development (IIED).

3 ENERGY AND POWER SYSTEM

3.1 South Asian Regional Initiative for Energy Integration (SARI/ EI)

The South Asia Regional Initiative for Energy Initiative (SARI/EI) program is the regional energy program of USAID covering eight countries of the region: Afghanistan, Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka. Started in the year 2000, the program has consistently strived for promotion of energy security in the South Asian nations by working in three focus areas: 1) cross border energy trade, 2) energy market formation, and 3) regional clean energy development.

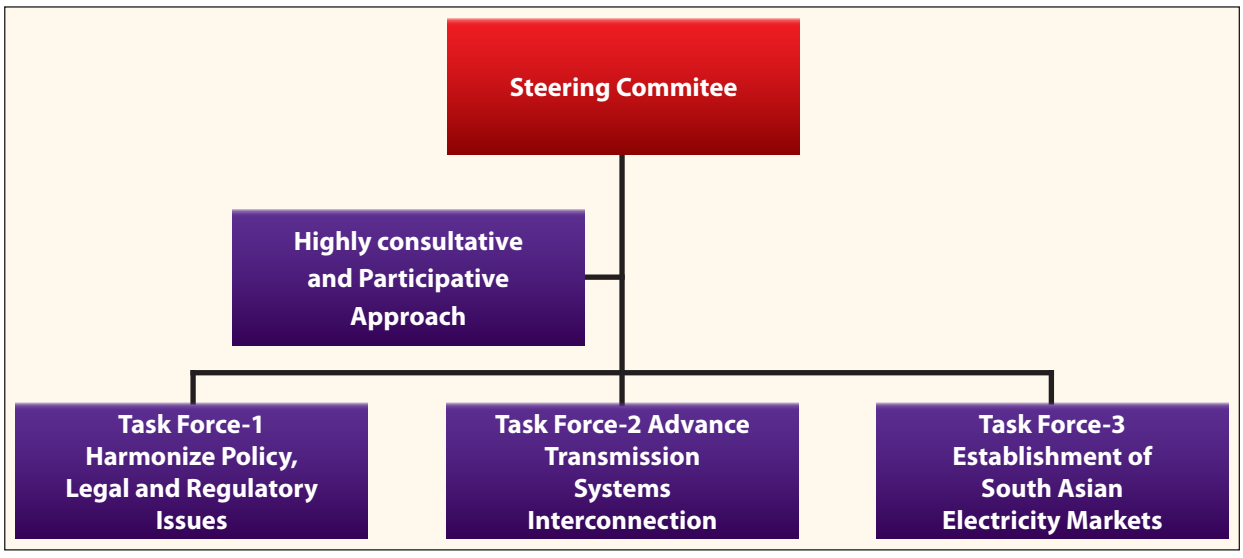
The SARI/E Energy program in year 2012 entered into its fourth and final phase, SARI/Energy Integration (SARI/EI). In this phase (2012-2017), the project goal is to advance regional energy integration and project purpose is to increase cross-border energy trade through focus on the following three components:

1. Harmonization of Policy, Legal, and Regulatory mechanisms
2. Advancement of Transmission Systems Interconnections
3. Establishment of South Asia Regional Electricity Markets

The program would catalyze enabling systemic conditions for regional energy integration through formation and support to three Task Forces (TFs) focusing on three components mentioned above.

The representatives of regional stakeholders like national governments, national power transmission utilities, national electricity regulatory commissions, power market institutions, and other in-country organizations will be the members of the Task Forces. TFs will showcase examples of the benefits of regional cooperation, leverage counterpart funding and resources, provide unbiased support for regional initiatives, present a platform to discuss cross-border trade, and promote infrastructure interconnections. TFs will also help create markets and mechanisms for transparent trade practices, clean energy access, efficiency, conservation and renewable sources.

The Project Steering Committee (PSC) is program's apex body and provides overall strategic direction. The PSC comprises senior representation from the country governments of individual SARI/EI countries, independent energy experts/diplomats, representatives from the regional institutions like SAARC Energy Center and multilateral donors like the Asian Development Bank.



Steering Committee Setup

IRADe's approach would be to actively act both as the secretariat and technical input provider, and work towards consensus building amongst member countries for the program objectives in a constructive manner. The key enablers would be co-ordinating policies, regulations and interconnections. The activities of the Task Forces form the heart of the program. Task Force meetings will be focused, structured, demand-driven and resulting into tangible outcomes. The process of guiding the TFs through their work will be supported by demand driven research and analysis. The requirements for technical analysis, study, and research evolved during the discussion in the TF meetings will be promptly responded to. Thus, the members will be assisted in their decision-making process so that they can make informed recommendations on the issues of cross-border energy trade.

The U.S. Agency for International Development (USAID) selected the Integrated Research and Action for Development (IRADe), through a competitive process, for the implementation of the South Asia Regional Initiative for Energy Integration (SARI/EI) program.

3.2 Study on Assessment of Alternative Road Maps on Reforming Diesel Prices

Government is reluctant to raise diesel price fully due to fear that it might lead to inflation, even though administered price of petroleum products leads to large under-recoveries. Partial financing of under-recoveries by the government is done by direct budgetary support and indirectly by the Public sector oil marketing companies (OMCs) and upstream oil companies (ONGC and OIL).The high level of under-recoveries raises the fiscal deficit, which in turn leads to higher money supply resulting in higher inflation, prompting Reserve Bank to raise interest rate that lowers investment and economic growth rate over time. While steps have been taken by the government to decontrol prices of petrol, diesel continues to be heavily subsidized as a change in status quo may lead to short term inflation. To explore this trade-off between short term impact and medium term outcomes, IRADe has conducted a study titled Taming Diesel Subsidy to Curtail Inflation and Foster Economic Growth. The aim of the study was to assess the alternative roadmaps to reform diesel prices in India.

Key Findings

- Continuing with the present policy of subsidizing diesel price is not viable. This could lead to large economic costs in the long term.
- Full increase, which is a one shot increase of 30% in the diesel price leads to some immediate increase in inflation. However, continuing with present subsidy involves a much higher rate of inflation later and which persists over a longer time. The average inflation rate over 3 years will be 6.6 percent, if diesel price is decontrolled but would be 9%, if diesel subsidy continues. Such high overall inflation hurts the poor even more than the increase in diesel price.
- The trade-off between short term negative impacts and long term benefits is not just with inflation, but also for GDP. The growth rate would be 8% with price decontrol and only 6.5%, if continued with the present policy. The loss in GDP will have vicious impact on underprivileged whether they use diesel or not.

The study has also considered the impact of increase in diesel prices on various other prices and expenditure pattern of consumers in rural and urban areas to assess the burden on different consumers, where diesel price is raised by INR 4.5/litre, i.e. 10% increase from the prevailing price.

- In absolute terms, the increase in average expenditure of the rural consumers from poorest decile is less than INR 2 per person per month and for the urban consumers coming under the poorest segment, the additional expenditure would be less than INR 2.5 per person per month. This is due to the fact that large number of underprivileged do not consume diesel, neither directly nor indirectly.

- The impact on the urban consumer belonging to the richest segment on an average would be less than INR 15 per month per person. Of course, consumers driving diesel vehicles would have a larger expenditure, but they can bear it.
- At present, the owners of diesel driven passenger cars get an implicit subsidy compared with the petrol driven passenger car owners, due to the difference in the price of petrol and diesel arising from differential excise between petrol and diesel and the subsidy on diesel. The subsidy to a diesel car owner, after the price and tax revisions of September 2012, ranges over INR 12,500 to INR 31,000 per year depending on the size of the car .

The study carried out by IRADe was supported by Shakti Sustainable Energy Foundation and the Ministry of Finance.

3.3 The Impact of India's Diesel Price Reforms on the Trucking Industry

Recently, the Government of India decided to allow oil marketing companies to increase diesel price by INR 0.45 per month till it is equal to market rate. It already gave directives to sell diesel at market prices to bulk consumers of diesel like the Indian Railways and State Transport Corporations. In the retail sector, farmers and truckers may be most vulnerable to increase in diesel prices.

To understand the vulnerability of trucking industry to increase in diesel price and explore various possible coping mechanisms, a study was undertaken under the support of Global Subsidies Initiative (GSI).

The study considered existing literature available on the trucking industry and various reports of the government. The secondary data was verified through a sample survey of large, medium and small truck operators in the Indian states of Delhi, and Assam and city of Jodhpur. Consultations were undertaken directly with truck operators to seek answers to their specific issues related to increase in diesel price, and thereby, fuel costs. Views of truck operators were verified by consultations with the Central Institute of Road Transport and the Asian Institute of Transport Development who are engaged in research on road transport.

The study concluded that the vulnerability of the trucking industry to diesel price arise due to the inherent structural and regulatory issues of the industry, which urgently need to be rectified.

Key Findings

Due to the lack of training stipulations, easy registration and easy financing, there are virtually no entry and exit barriers in the trucking industry. Hence, most of the truck operators enter the business with no prior knowledge of trucking and have a very small asset base. 80 per cent of truck operators are small truckers who own less than five trucks. Such small operators cannot reap the benefits of economies of scale and cannot afford to obtain the necessary business information, thereby being dependent on brokers. There is a need

Survey of Small Truck Operators at Okhla Industrial Area, New Delhi

to set up modern computerized exchange networks to provide business information to truckers and reduce their dependency on brokers. Government interventions are necessary in this direction.

Due to oversupply of trucks and fierce competition, freight rates are mostly determined by demand for trucking, and thus, increased fuel costs have little influence on freight rates. But fuel costs being around 56 per cent of the total operating costs, increase in fuel costs increases the overall operating costs, which was found to be difficult to pass on. There is an urgent need to find a solution to unviable freight rates.

Tolls should be collected once, toll plazas need to be modernised and easy movement of freight across states should be made possible to reduce fuel wastage and low mileage arising from toll stoppages. If the toll stoppages are minimized, more trips are possible in a month and this can significantly alter the business. There is a need for one single regulator for trucking industry, who will look at both regulatory issues as well as training requirements of both truck operators and truck drivers.

Key Recommendations

Some recommendations can be implemented in short term and will give immediate relief to the truck operators against rising diesel price, whereas some recommendations are long term and are directed towards structural changes required in trucking industry.

- Reduce waiting time at toll gates.
- Improve mileage of the trucks.
- Incorporate flexibility in long term contracts to adjust to changes in fuel costs.
- Introduce training for truck operators and examine truck finance.
- Set up computerized exchange networks for matching loads to trucks.

The work related to phasing out of fossil fuel subsidies world over was supported by International Institute for Sustainable Development (IISD) and Global Subsidies Initiative, Geneva.

3.4 Monitoring and Evaluation of Off Grid Solar Photovoltaic Systems Installed in Punjab and Himachal Pradesh in Years 2008, 2009 and 2010

The **Ministry of New and Renewable Energy (MNRE)** is implementing a country wide Solar Photovoltaic program (SPV) on demonstration and promoting utilization of solar photovoltaic lighting systems, stand alone power plants and other new and specialized systems in the country.

The evaluation was conducted through discussions with the officials of the Ministry of New and Renewable Energy (MNRE), state nodal agencies (PEDA of Punjab state and Himurja of Himachal Pradesh state) and the beneficiaries.

Solar photovoltaic systems have enhanced and reformed the livelihood and standard of living of the people, especially in the rural areas. The utility of solar system installations are mainly beneficial in highland rural areas of Himachal Pradesh and Punjab in the form of Solar Home Light system (SHLs), Solar Lantern system (SLs), Solar Street Light system (SLLs), and Solar Power Plant system (SPPs).

Objectives

- To physically verify and evaluate the technical performance and social impact of the solar photovoltaic system such as a solar home lighting system , solar lantern , solar street light and solar power plant installed during

the year 2007-08 , 2008-09, 2009-10 in the state of Himachal Pradesh and Punjab State.

- To monitor off-grid solar Photovoltaic systems established in the various districts of Himachal Pradesh and Punjab that had maximum installation of SPV system during the years 2007-08, 2008-09 and 2009-10.
- The districts selected for the study were Amritsar, Jalandhar, Kapurthala, Hoshiarpur, Ferozpur, Fazilka, Ludhiana, Nawansahr and Chandigarh district from Punjab state; and Shimla, Solan , Kinnaur , Lahul and Spiti and Sirmour district from Himachal Pradesh.

Solar Photovoltaic System in Himachal Pradesh

Results from Monitoring and Evaluation

Monitoring and evaluation was done as per the methodology adopted by taking the input from the State nodal agencies and other stakeholders.

Himachal Pradesh

It was observed that 82 % of solar home light systems, 47 % of solar street light systems, and 100% of solar power plant system were functioning effectively in 43 villages in 5 districts out of 12 districts of Himachal Pradesh.

Punjab

It was observed that 86 % of solar home light system, 46 % of solar street light system, and 100% of solar power plant system were functioning in 55 villages in 9 districts out of 22 districts of Punjab.

Key Findings

- The study revealed that with the functioning of solar system electrification there was a direct impact on the livelihood and standard of living of the people.
- It enhanced the social and economic status of people, e.g. increase in the usage of mobile phones, availability of electrical lights during evenings, etc.
- The solar photovoltaic systems system has helped in improvement of the education sector, security of public property, and health of women who are affected by harmful gases produced by the use of kerosene lamps.
- The installation of solar photovoltaic systems provides clean and reliable power source for local communities, which mitigates pressure on non-renewable and limited energy resources, such as coal, and fossil fuel.

Key Recommendations

- Solar home lighting system has proved to be beneficial and hence, should be continued and upgraded from 74 watt to 80-100W capacity system in the future.
- Maintenance has been a major concern in solar photovoltaic systems, hence, local entrepreneurs should be approached and a third party monitoring and inspections can speed up the process.

Solar Photovoltaic System in Punjab

- The State nodal agencies (SNAs) must be strengthened by MNRE wherever required.
- Training support for the SNAs, beneficiaries and maintenance personnel should be supported by the Ministry and subsidy should be rationalized, as for community solar light additional subsidy is required.

The project on monitoring and evaluation of SPV program for the state of Himachal Pradesh and Punjab was supported by the Ministry of Non Renewable Energy.

4 POVERTY ALLEVIATION & GENDER

4.1 MAPS India Study on Poverty and Low Carbon Development Strategies

MAPS (Mitigation Action Plans and Scenarios) is a collaborative venture amongst developing countries (South Africa, Brazil, Chile, Columbia and Peru) under the flagship of South South North Trust, Cape town, South Africa. MAPS contributes to climate change mitigation actions that align with economic development and poverty alleviation goals. A specific term, "Poverty Alleviating Mitigation Action" or PAMA has been coined and a research is ongoing on its viability in developing countries.

In its first engagement in India, MAPS commissioned IRADe to work on a complementary research paper on the broad topic of poverty and low-carbon development strategies from the perspective of Indian researchers.

Significance of the study

There is a need to establish the impact of development initiatives in general and poverty alleviation measures in particular on the CO2 emissions of the country and the extent to which they affect CO2 emissions compared to a business-as-usual situation. Furthermore, mitigation actions should also be assessed from the point of view of their impact on poverty. Mitigation actions in India require increased investments in the energy sector, as renewable sources of energy are expensive compared to fossil fuels and tend to reduce non-energy sector investments unless these are then funded by foreign capital. Non-energy sector investments include development initiatives like poverty alleviation, food security, investments in health and education etc., which directly affect the well being of everyone, especially the poor. Hence, it is important to study the impact of poverty alleviation on mitigation and vice versa, before formulating any low-carbon development strategies and poverty-alleviating mitigation actions (PAMAs) at the country level. Furthermore, PAMAs might work at specific action level but might yield smaller results at macro level.

Methodology

Using IRADe's Macroeconomic model, four scenarios were created taking into account current Indian situation and policies:

- Partial cash transfer to the poor households till they come out of poverty – PT (partial transfer).
- Lowered urban to rural consumption expenditure parity ratio – LPR (low parity ratio).
- Providing subsidized electricity to poor households – ET (electricity transfer).
- National energy mission which provides targets for solar and wind based power generation in India – NEM (national energy mission).

Key Findings

All the scenarios are compared with the business-as-usual (BAU) scenario in the model, and results were reported for the period of 2010 to 2030. The results discussed the impact of various scenarios on a whole range of macro-level parameters like GDP, per capita consumption, poverty levels, poverty head count ratio, urban rural disparity, electricity consumption by poor, as well as carbon emissions, CO2 intensity of GDP, energy intensity of GDP, etc.

Poverty alleviation could be achieved through both the partial cash transfer (PT) and lowering urban rural disparity (LPR) scenarios. Also, moderate climate mitigation action (enhancing energy efficiency) in the NEM scenario did not increase poverty.

CO^2 emissions could be reduced by reaching targets for solar and wind power generation set by the Ministry of New and Renewable Energy. Also, poverty alleviating measures increased CO^2 emissions in short term, but tended to come back to BAU levels in the longer term.

The results indicated that development goals like poverty alleviation, providing energy access to poor, and reducing urban-rural disparities can be achieved without increasing carbon emissions compared to BAU. Also, certain mitigation actions can be taken without increasing poverty.

The study was supported by South South North Trust, South Africa.

4.2 Assessing Socio Economic Vulnerability to Climate Change: A Case Study of Assam

This study aims to assess vulnerability to climate change for the state of Assam and its socio-economic implications on the sectors such as agriculture, water and forestry in the state. The implications of climate change are complex and multi-dimensional, thus, vulnerable groups such as farmers, forest dwellers, women and other multiple stakeholders need to be given special attention in reforming the livelihood of vulnerable sections of the society. Cities—especially in developing countries including India--are vulnerable to the adverse impacts of climate change due to excessive dependence of population on climate-sensitive sectors, such as agriculture, water, forestry and fisheries, coupled with poor infrastructure facilities, weak institutional mechanisms, lack of access to credit, etc.

Objectives

- To assess the extent of impacts of climate change on different ecosystems, regions and sectors of the economy.
- To focus on the gender dimension and cover different stakeholders including farmers, tribal community, fishermen, etc. The impact of climate change depends not only on the sensitivity of those systems to climate change, but also on the systems' ability to adapt to climate change.
- To compare the costs of damages and losses with the cost of adaptive measures in some cases.

Kachha Toilet in Assam

IRADe initiated research activities by collecting primary and secondary data. A questionnaire was designed by IRADe to conduct primary survey at the household level and village level on the dimensions of natural and economic resources and occupation of people. On the basis of secondary data and review of literature, IRADe selected vulnerable areas under the agriculture and forestry sector, which were affected by flood. Regional census

reveals that some of the districts affected by floods in Assam were Nagaon and Sonitpur distinct. IRADe team conducted a primary survey with the help of their association with the local NGO that covered total 100 households in 3 villages of Nagaon and 3 villages of Sonitpur district. Focus group discussions were also conducted with the villagers.

In India, women are more sensitive to the impacts of climate change, as on one hand they have confined participation in governance with a limited access to healthcare, employment, economic opportunities and decision-making, and on the other side they have major share in managing the household responsibilities. Vulnerabilities among women are due to their restrictive adaptive capacity that emerged due to illiteracy, inequality, inadequate access to resources and limited healthcare facilities. Most of the policies for climate change adaptation and mitigation do not concentrate on the issues related to vulnerability of women. Although the National Action Plan for Climate Change (NAPCC) was formulated to build future discourse of climate change adaptation and development, it incorporated very few gender specific measures.

The study is supported by the Indian Council of Social Science Research, (Ministry of Human Resource Development), New Delhi.

5 EVENTS – WORKSHOPS, MEETINGS AND LECTURES

5.1 Regional Workshop on Cross Border Energy Trade: "Issues before Regulators in the South Asia Region"

A South Asia Regional Workshop on Cross Border Energy Trade (CBET) - Issues before Regulators in the South Asia Region was organized on 19th and 20th February, 2013 at Kathmandu, Nepal.

The objective of the workshop was to gather country wise status, discuss the minimum policy, regulatory and code harmonization, required to facilitate energy exchange and thus, trade in energy. The Hon'ble US Ambassador to Nepal, Mr. Peter W. Bodde inaugurated the workshop. The event received participation from all the South Asia countries except Maldives i.e., Afghanistan (DABS), Bangladesh (BERC), Bhutan (BEA), India (CERC, PTC), Nepal (DoED, NEA, Electricity Tariff Fixation Commission, Ministry of Energy), Pakistan (NEPRA) and Sri Lanka (PUCSL). The event also received the participation of Mr. Hari Ram Koirala, Secretary, Ministry of Energy, Govt. of Nepal.

Key findings of the workshop

- India, Nepal, Bhutan and Bangladesh are keen for deeper engagement in the South Asia Region for Cross Border Electricity Trade (CBET)
- South Asian countries are at various levels of electricity regulation, institutional and power sector reforms, therefore, laws, acts and correct policies are crucial for the success of CBET
- CBET ensures transparency, accountability, formation of confidence for private sector participation and enhancement of energy exchange in the region
- Private sector participation is the key to long term success of CBET in the South Asia region. Currently private sector participation is limited due to lack of clarity in policy and poor investment in most of the South Asian countries.
- The various issues like technical complexities, risk of National Grid interconnection, potential economic and financial benefits from interconnections, the existence of independent regulators, unbundling for accountability, open access in transmission, transmission pricing, independent system operator, payment security, etc. are the concerns that need to be addressed prior to energy exchange and trade.

5.2 First Meeting of the Project Steering Committee of SARI/Energy Integration

The first meeting of the Project Steering Committee (PSC) of SARI/EI program was held on 12th March, 2013 in New Delhi. The PSC meeting was chaired by Dr. Kirit Parikh, Chairman IRADe. Dr. Parikh shared his vision to address energy security concern in the region.

Objective

- To update members regarding the role of Steering Committee as a guiding force for the program implementation.
- To gather suggestions and consensus in formulating a strategy for rolling out Task Forces, issues to be taken by each Task Force and ensuring the buy-in of the policy makers on issues pertaining to promoting CBET.
- To discuss about the role of PSC in:
    - Consensus building amongst stake holders

- Feedback from regulators workshop
- Establishment of Task forces and their Terms of reference
- Regional Inaugural conference and deliberated on the strategies to be adopted for meeting the program objectives.

First Project Steering Committee Meeting (SARI/EI)

5.3 Stakeholder Workshop on Alternative roadmaps on Reforming Diesel Prices in India: Discussion with Policy makers and Key stakeholders

Diesel price reforms have implications on various stakeholders such as consumers, automobile industry, oil marketing companies, telecom companies, agricultural sectors, transport sectors, and equipment manufacturers such as diesel generators, pumps etc. and most importantly on the consumers in terms of increase in overall inflation.

The workshop brought out the impacts on different stakeholders and their perspectives. Many of them felt that either diesel price rise is good for them or that they can handle the impact, except trucking association, which felt that if they have fuel efficient trucks they can handle the price rise.

Objectives of the Workshop

- To share analytical results from IRADe's study on road maps for reforming diesel price (section 3.2)
- To understand and discuss the various stakeholder perspectives in terms of reforming diesel prices.
- To provide protection to vulnerable section of the society who gets affected by the rise in diesel prices.

The workshop was organised by IRADe on 22nd August, 2012, at Claridges, New Delhi. Dr. Kirit Parikh, Chairman IRADe, highlighted the background of study, stressed on the immediate need to reform diesel price in India and its benefits to the economy in the long run. IRADe made a detailed presentation on the findings of the report.

6 PROFESSIONAL ACTIVITIES

6.1 Dr. Jyoti K Parikh, Executive Director, IRADe

Selected Events

Engineers' Day, Qatar Chapter, Doha

- Delivered keynote address at "*Sustainable Developments National & Global Priorities for RIO+20*" on 28th April, 2012, New Delhi.
- Keynote speaker at workshop on "*Managing the Risks of Climate Extremes and Disasters in Asia-What can we learn from the IPCC Special Report*", organised by Climate & Development Knowledge Network (CDKN) on 3rd May, 2012, New Delhi.
- Visited *EU for discussions on cities and climate change* from 26th June 2012 to 5th July 2012, Brussels, Belgium.
- Review panel meeting as a representative from India for multi country project on *coastal vulnerability* arranged by MoES from 12th to 14th September 2012, London, UK.
- Delivered keynote address at *Engineers Day* from 15th to 16th September 2012, Doha, Qatar.
- Chaired Panel discussion on "*Energy Access: The Challenge of Energy for all*" on invitation from ORF on 11th October, 2012, New Delhi.
- Speaker at international conference on *Gender and Sustainable Mountain Development in a Changing World* from 14th to 20th October 2012, Thimphu, Bhutan.
- Participated in the 3rd *Leader Author Meeting* of IPCC from 4th to 9th November 2012, Vigo, Spain.
- Attended *Board Meeting of NSI* from 20th to 27th November 2012, Ottawa, Canada.
- Delivered address on "*Climate Vulnerability Assessment of Indian Cities*" on the occasion of Silver Jubilee celebration of Indira Gandhi Institute of Development Research (IGIDR) on 1st December, 2012, Mumbai.
- Delivered keynote address at Doha 2012, UN Climate Change Conference COP 18 and CMP 8 from 3rd to 4th December, 2012, Doha, Qatar.
- Participated in the "*National Conference on Ushering 2nd Green Revolution in India Agriculture through Public Private Partnership*" on invitation from CII on 11th December, 2012, New Delhi.
- Participated in the workshop on "*Capacity Development for Environment Fiscal Reforms*" on invitation from NIPFP on 27th December, 2012, New Delhi.

- Invited for the *Special Climate Visitor Program*, administered by Australian Government from 18th to 27th January 2013, Australia.
- Panelist at Valedictory Session at *Green Energy Summit*, 2013, organised by Indian Chamber of Commerce (ICC), Kolkata on 14th February, 2013, New Delhi.
- Inaugural speaker at the Workshop on South Asia Regional Workshop on Cross Border Energy Trade (CBET)- "*Issues before Regulators in the South Asia Region*"19th -20th February 2013 in Kathmandu, Nepal.

SARI/EI Project Team's Visits to Bangladesh, Nepal and Sri Lanka

The visits were targeted to meet the relevant stakeholders. Mr.S Padmanabhan and Mr. Amol Bhutad from USAID and Mr. L.V.Rao, Mr. R.C.Dhup, Mr.Rajiv Panda from IRADe visited Dhaka, Bangladesh from 3rd December to 5th December, 2012 followed by Kathmandu, Nepal from 5th to 8th December, 2012 .

- The same team visited Colombo (Sri Lanka) from 18th to 21st December, 2012 to meet senior officials from USAID, US Embassy, Energy Ministries and its departments, Regulatory Commission, Power Utilities, Transmission companies and eminent personalities to appraise them about the road map of the SARI/EI program and seek their views.
- Organized and participated in the Workshop on South Asia Regional Workshop on Cross Border Energy Trade (CBET) -"*Issues before Regulators in the South Asia Region*"19th-20th February 2013 in Kathmandu, Nepal.
- Organized and Participated in the 1st Steering Committee meeting of South Asia Regional Initiative for Energy Integration (SARI/EI) held in New Delhi, 12th March, 2013.

Mr. Mohit Gupta

- Participated in the National Solar City Meet organized by Ministry of New and Renewable Energy on 22nd November 2012 at India Habitat Centre, New Delhi.
- Participated in the consultation meeting on *Integrated Development of Indian Himalayan Region: Role of Mountain Division of Ministry of Environment and Forests* organized by MoEF, 11th December 2012, Paryaravan Bhawan, New Delhi.

Dr. Probal Ghosh

- Participated in the stakeholder meetings organised by CASA at Mumbai, Bangalore, Kolkata and New Delhi. The purpose of the meetings was to present the methodology and approach of the study to a wider audience and take their inputs for enriching the study.

Mr. Priyank Jindal

- Participated in the National Workshop on Post 2015 Framework for Disaster Risk Reduction on 27th April 2013 at the India International Centre, New Delhi.

7 LIST OF PROJECTS (2012-13)

S.No.	Title	Funding Agency	Status
1	Measuring Ecosystem Services for Green India Mission: A Case Study of Paderu Project I Andhra Pradesh	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)	Completed
2	Climate Resilient Urban Development: Vulnerability Profiles of Indian Cities	Rockefeller Foundation	Completed
3	The Impact of India's Diesel Price Reforms on the Trucking Industry	International Institute for Sustainable Development (IISD)	Completed
4	Study on Assessment of Alternative Road Maps on Reforming Diesel Prices	Shakti Sustainable Energy Foundation, Ministry of Finance	Completed
5	Identifying Specific Policy Options with the Aim of Reducing Carbon Intensity in India	Department for International Development (DFID) and AEA	Completed
6	Monitoring & Evaluation of Off Grid Solar Photovoltaic Systems Installed in Punjab and Himachal Pradesh in 07-08, 08-09 and 09-10	Ministry of New and Renewable Energy (MNRE)	Completed
7	MAPS India Study on Poverty and Low Carbon Development Strategies	South South North Trust (SSN)	Completed
8	Vulnerability of Coastal Cities on Rivers to Climate Change: Case Study of Surat to Develop Adaptation Framework	Ministry of Earth Sciences (MoES)	Ongoing
9	Research Study on Low Carbon Development Pathways for an Inclusive India	World Wildlife Fund, Germany and World Wildlife Fund, India	Ongoing
10	South Asian Regional Initiative for Energy Integration (SARI/EI)	U.S. Agency for International Development (USAID)	Ongoing
11	Assessing Socio-Economic Vulnerability to Climate Change: A Case Study of Assam	Indian Council of Social Science Research (ICSSR)	Ongoing
12	Socio Economic Vulnerability of Himachal Pradesh to Climate Change	Department of Science and Technology	Ongoing
13	Study on Economy-Wide Model for Low Carbon Strategy	Planning Commission	Ongoing
14	Working Paper HIGS Framework for Climate Resilient Urban Development	International Institute for Environment and Development (IIED)	Ongoing

IRADe networks with the government, ministries/ departments, international organizations, public and private sectors, academic experts, NGOs, and consultants to work on projects awarded by them. The ministries include Ministry of Environment and Forests, Ministry of New and Renewable Energy, the Planning Commission, Ministry of Power, Ministry of External Affairs, Ministry of Earth Sciences, Department of Science and Technology, Central Statistical Organization under Ministry of Statistics and Programme Implementation, Technology Information, Forecasting and Assessment Council (TIFAC), etc. for many national level projects.

At the international level, IRADe has worked with Stanford university, California and United States Environmental Protection Agency (USEPA), Wuppertal Institute for Climate, Environment and Energy, WISION-Germany, Deutsche Gesellschaft fuer Internationale Zusammenarbeit (GIZ), Germany; ENERGIA-International Network for Gender and Sustainable Energy, Netherlands; British High Commission; International Institute for Applied Systems Analysis (IIASA), Austria, etc. IRADe has collaborated with private sector and multinational organizations and NGOs such as SEWA, Petroleum Federation of India, Pricewater House Coopers, ICF International, Rockefeller Foundation, Institute for Social and Environmental Transition (ISET), Center for Clean Air Policy (CCAP) and Shakti Foundation, among others.

IRADe carried out monitoring and evaluation work for Rajiv Gandhi Grameen Vidyut Yojana (RGGVY) for rural electrification. It has done pioneering work in the area of Natural Resource Accounting (NRA) in general, and for Goa and Andhra Pradesh specifically; climate adaptation for Ministry of Earth Sciences; and low carbon strategy for inclusive growth for the British High Commission.

Our Partners in Development

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IRADe Integrated Research and Action for Development
C-80, Shivalik, Malviya Nagar
New Delhi 110017, INDIA
Tel: 91 (11) 2667 6180, 2667 6181, 2668 2226
Email: info@irade.org Web: www.irade.org