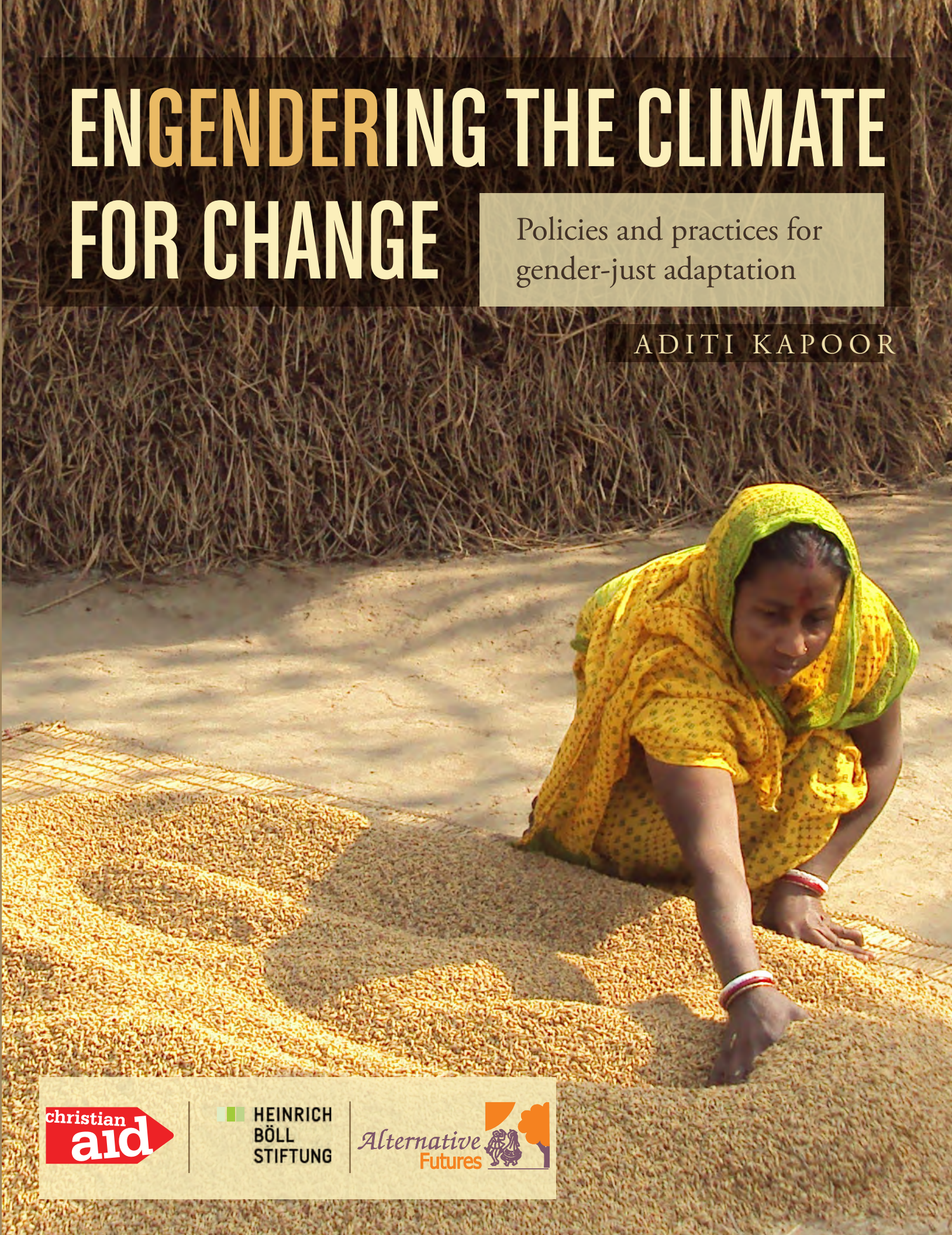
ENGENDERING THE CLIMATE FOR CHANGE

Policies and practices for gender-just adaptation

ADITI KAPOOR



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Development research and communication group

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Foreword

Climate change has emerged as one of the greatest challenges of our times. Its potential to alter the course of development and human progress poses grave concerns for the well-being of nature and even survival of human beings themselves. Differential impacts of climate change can severely affect marginalized and poor sections of the society. Women are historically, socially and economically underdeveloped and marginalized in the society. Despite the pivotal role in household management, their due participation in decision and policy making and development process is still undermined. Climate change would have serious implications for women because of greater responsibilities and less access to resources.

This research report by Aditi Kapoor explicitly highlights the causes and concerns of women due to changing climate. It rightly points out that climate change would put an extra pressure on women activities ranging from agriculture, fetching water to fodder collection; and critically analyses the implications for women livelihoods generation. Its criticism seems to be genuine that most of India's responses to climate change and its adaptation policies at best are "gender blind" or "gender neutral". Even all eight missions of National Action Plan on Climate Change (NAPCC) of India explicitly and implicitly recognize the gender concerns, but largely ignore any gender specific measures in the climate change adaptation mechanism and proactive gender agenda.

Today India, one of the most vulnerable countries to projected impacts of climate change in the world, appears to be ambivalent on policy directions to a high economic growth and environmentally compatible middle range growth. The call of the hour is to devise a strategy for an environmentally compatible inclusive growth which addresses concerns of marginalized sections including women. This research study is quite relevant and immensely useful for policy makers and researchers to highlight the gender concerns and development specific policy for coping with them.

I hope that this report would serve as a catalyst for gender specific research and generate better understanding and guide actions in future.

Jyoti Parikh
Executive Director, IRADe

Study Sites
(States and Districts)

Himachal Pradesh
- Kangra

Uttar Pradesh
- Gorakhpur
- Sant Kabir Nagar

West Bengal
- North 24 Parganas
- South 24 Parganas

Andhra Pradesh
- Anantapur
- Mahbubnagar
- Rangareddi

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Introduction

"I can help the Government by looking after the river embankment, protecting our mangrove forest and by participating in the village development plan"

Gouri Mondal, women farmer
Village Indraprastha, Block Patharpratima, District South 24 Parganas, West Bengal

What are India's climate change adaptation policies and what do they mean for its people – women and men? The public discussion on climate change in India tends to focus more on mitigation initiatives. Adaptation is far less in the public eye despite the emerging scientific research on adaptation and the imperative for all State governments to formulate adaptation-focused State Action Plan(s) on Climate Change (SAPCC). There is growing evidence that climate vagaries are affecting life and work of our people, especially the 72% of women and men living in rural India. Within the United Nations Framework Convention on Climate Change (UNFCCC) too, mitigation continues to be the primary focus.

While mitigation is important – India is the world's fifth largest emitter of greenhouse gasses (Box 1.1) – adaptation is equally central to the climate change debate. The Stern Review notes that 'adaptation policy is crucial for dealing with the unavoidable impacts of climate, but it has been under-emphasised in many countries. Adaptation is the only response available for the impacts that will occur over the next several decades before mitigation measures can have an effect.'[1] Without a considered focus on adaptation, India can neither achieve its National Development Goals and the Millennium Development Goals (Table 1.1); nor its environmental challenges (Table 1.2).

Box 1.1

India's carbon footprint

- India is the world's 5th largest GHG emitter and the 6th largest carbon emitter
- India's contribution to total global GHG emissions is, however, only 4 percent; carbon emissions are just 3% of global carbon emissions
- India's per capita emission at 1.67 tonnes/year is 23% of the total global average
- India's per capita emissions are 70% below the world average.

1 Stern Review, 2006, page 21

Table 1.1 Climate Change Barriers to Achieving Millennium Development Goals

MDGs	Climate change barriers to development	Gender dimension
Goal 1: Eradicate extreme hunger and poverty	Reduction of agricultural production for survival and commercial ends Food security at risk Less access to safe water	Loss of domestic species of plants and animals used by women to ensure food security of their families. Reduction, mobilization, or extinction of marine species used by women for household consumption or for productive activities. Increase in women's workload due to decline in availability of water and other resources.
Goal 2: Achieve universal primary education	Increases the workload needed for agricultural production and subsistence activities Environmental changes are likely to drive migration	Generally, girls and women are responsible for the collection of water and fuel wood. If the time they invest in these tasks increases, their capacity to attend school is at risk. According to UNHCR, 80% of refugees in the world are women and children. Migration of populations, given extreme changes and disasters, could interrupt and limit the opportunities for education. Men are more likely to migrate, either seasonally or for a number of years. Female-headed households left behind are often the poorest. The workloads of these women, their children and the elderly increase significantly as a result of male migration.
Goal 3: Promote gender equality	Depletion of natural resources, reduced agricultural productivity and increased climate-related disasters could: ■ Place additional burden on women's health ■ Reduce the livelihood assets of women ■ Increase women's time to access water, fuelwood, fodder and food thereby reducing time to participate in income-generating activities or in decision-making groups	*This dimension has been mainstreamed across all the other Goals.*
Goal 4: Reduce child mortality **Goal 5:** Improve maternal health **Goal 6:** Combat HIV/AIDS, malaria and other diseases	Environmental effects can aggravate the risk of contracting serious illnesses Increased prevalence of some vector-borne diseases Increase in temperatures (heat waves)	Increase in women's workload due to their role as primary care givers in the family. Loss of medicinal plants used by women. Pregnant women are particularly susceptible to water-borne diseases. Pregnant women are four times likely to contract malaria and 18 times more likely if they are carrying the HIV virus[2]. Malaria-induced maternal anaemia is responsible for a quarter of maternal mortalities. Women and children are fourteen times more likely to die than men during a disaster (Peterson 2007). The high mortality rates of mothers / women / spouses during disasters result in an increase in: the numbers of orphans and mortality rates; early marriages for young girls (new spouses) causing them to drop out of school; trafficking and prostitution which in turn increase exposure to HIV/AIDS (Oxfam International 2005). Migration enhances the risk of getting HIV/AIDS, given that families are separated and they are forced to live in overpopulated spaces. In developing countries, the poorer households affected by HIV/AIDS have less resources to adapt to the impacts of climate change. The need to adopt new strategies for crop production (such as irrigation) or mobilization of livestock is harder for female-headed households and for houses with HIV infected people.

continued...

2 http://www.eurongos.org/Files/HTML/EuroNGOs/AGM/Malaria_Climate_Change_SRH.pdf, accessed on April 20, 2010

Table 1.1 Climate Change Barriers to Achieving Millennium Development Goals (continued)

MDGs	Climate change barriers to development	Gender dimension
Goal 7: Ensure environmental sustainability	Extinction of species, changes in species composition, disruption of symbiotic relationships, changes in tropic cascades, among others. Changes in the quantity and quality of natural resources could reduce the productivity of ecosystems. Floods, droughts, rising sea levels, melting of glaciers and polar icecaps.	Without secure access to and control over natural resources (land, water, livestock, trees), women are less likely to be able to cope with climate change impacts. Less available drinking water means women have to expend more effort to collect, store, protect and distribute water. Adaptation measures, related to anti-desertification, are often labour-intensive and women often face increasing expectations to contribute unpaid household and community labour to soil and water conservation efforts. Decrease in forest resources used by women. Women often rely on a range of crop varieties (agro-biodiversity) to accommodate climatic variability, but permanent temperature change will reduce agro-biodiversity and the range of traditional medicinal plants. Lack of representatives and women's participation in the decision-making spheres related to climate change at all levels (local, national and international).

Source: UN Millennium Campaign and IUCN Report on Gender and Climate Change

India is one of the world's most disaster-prone countries (IFRC 2005; Parasuraman et al (eds) 2000) and highly vulnerable to climate change impacts (IPCC 2007). Extreme weather events that cause widespread damage and disruption include droughts, floods, cyclones/storms, coastal flooding, landslides and extreme temperatures like heat waves and cold waves which claim people's lives. Three-quarters of India's 7500-odd km long coastline is prone to cyclones, over two-thirds (68%) of India's cultivable area to drought and at least 12% to floods and river erosion (11th Plan, 2008; National Policy on Disaster Management, 2009). Over three-quarters (27) of India's 35 States and Union Territories are disaster-prone.

Climate change is expected to increase the frequency and intensity of current extreme weather events, lead to greater monsoon and temperature variability, affect agricultural production and see the emergence of a new disaster – the sea level rise (IPCC 2007) – in the Indian sub-continent. Indian climatologists have confirmed these trends, with the National Action Plan on Climate Change (NAPCC) 2008 document noting periods of more frequent droughts over the last few decades, though also less severe ones at times.

Majority of Indians – 70% of 1.2 billion people[3] – live off climate-sensitive agriculture and allied activities. Sixty per cent of India's agriculture is rain-fed and home to majority of rural poor and marginal farmers and at the same time prone to recurring disasters – floods, droughts and cyclones[4]. An increasing number of women are becoming dependent for their livelihood on this sector. The Planning Commission (11th Five Year Plan) notes the

Women farmers in Gorakhpur, Uttar Pradesh

3 61st National Sample Survey Round July 2004 -June 2005

4 Ministry of Agriculture Annual Report 2010-11

Table 1.2 Region-specific Factors Causing Low Productivity

Agro-climate Region	State/Parts of States	Region-specific constraints
Western Himalayan region-I	Jammu & Kashmir (J&K), Himachal Pradesh (HP), Uttaranchal	Severe Soil erosion, degradation due to heavy rainfall/floods and deforestation, low seed replacement rates (SRRs)[5], poor road, poor input delivery, inadequate communication infrastructure and marketing
Eastern Himalayan region-II	Assam, North eastern States, Sikkim	Aluminium toxicity and soil acidity, soil erosion and floods, shifting cultivation, low SRRs, non-availability of electricity, poor road, poor input delivery system and communication infrastructure
Lower and middle gangetic plains regions-III and IV	West Bengal, Bihar, Eastern UP	Flood/water logging, improper drainage, salinity/alkalinity, arsenic contamination, low SRRs, non-availability of electricity, high population growth, poor road and communication infrastructure
Upper and trans-gangetic plains region-V and VI	Western Uttar Pradesh (UP), Punjab, Haryana	Groundwater depletion, decreasing total factor productivity, micronutrient deficiency, non-availability of electricity, and high population density
Eastern plateau and hills region-VII	Orissa, Jharkhand, Chhattisgarh	Moisture stress, drought, and soil acidity, iron toxicity, low SRRs, non-availability of electricity, high population growth, poor road, poor input delivery and communication infrastructure

Source: Cited in Report of the Working Group of Sub-Committee of National Development Council on Agriculture and Related Issues on Region/Crop Specific Productivity Analysis and Agro-Climatic Zones, Planning Commission, Government of India (February 2007).

increasing feminization of Indian agriculture and dominance of women workers in animal husbandry and forestry. Women are typically responsible for providing their household with water, food, fodder and firewood and they are less likely to have the education, opportunities, authority and resources they need to adapt to climate impacts. Socio-cultural barriers and women's traditional role as caretakers means they have little time for taking part in community discussions, so their perspectives and needs are often not heard in processes leading up to macro policy formulation.

Catching prawns in the waters of Sunderbans on foot is difficult and time consuming

Fetching water involves time and labour. The NFHS survey for 2005-06 revealed that far less than a third (27.9%) of the households in rural areas had access to piped drinking water; in urban areas 70% of the households had this access.[6] A Water Resources Ministry document[7] states that in the year 2008, access to safe drinking water sources was 73% in rural India and 96% in urban areas. These sources include public taps, hand pumps and tube wells and protected wells. Women gather firewood, crop waste, cattle dung to power up to 92% of rural domestic energy till today. They gather 85% of their cooking fuel from forests, village commons and fields. Their time and labour is unaccounted for in the national gross income. Climate change is putting pressure on the availability of resources that women need – and as a consequence, on women's time and labour.

5 Percentage of area sown, out of total area of crop planted in the season, by using certified/quality seeds other than the farm saved seed. SRRs are very low for all crops in India.

6 Government of India, National Family Health Survey 3 (NFHS-3) on Environmental Health, 2005-06 quoted in 11th Five year Plan

7 Government of India, Ministry of Water Resources, 2010, Background Note for Consultation Meeting with Policy Makers on Review of National Water Policy

The fourth assessment report of the Inter-governmental Panel on Climate Change (IPCC) also notes that gender differences affect the vulnerability and adaptive capacity of women and men (Adger, W.N. et al 2007). There is growing literature on gender and climate change (Parikh 2007, WRI 2007, WEDO 2007, UNISDR 2008, UNDP 2009, Mcnutt 2009, Oxfam 2010, FAO 2010, UNDP 2010, HBF 2010). After decades of being gender-blind, international climate negotiations for the first time recognised in December 2010 that gender is integral to actions on both mitigation and adaptation in the UNFCCC text. The latest Conference of Parties (COP, 16) text incorporates women and gender concerns in 7 sections, including on adaptation (see Annex 1). Though women hold up half the sky[8] (Greer 1984, World Bank 1991, Kabeer 1994, Agnes 1999, Jain 2006), gender and climate change are still treated as two distinct areas of advancement. The socio-economic impacts of climate change at the local level, where gender-specific disparities are most intense, need to be better understood and addressed. This is one of the objectives of this pilot research.

A quick look at India's four adaptation-focused missions (Table 1.3) under the National Action Plan on Climate Change (NAPCC) and at the up-coming SAPCCs reveals that the adaptation plans are largely techno-managerial in their orientation and gender-blind. Of course, women are not a homogeneous category, their vulnerability usually being directly proportional to class/caste/ethnic hierarchies in the society and within their village community. This research has studied women belonging to the lower ends of these hierarchies, constituting the most vulnerable group dependent on climate-sensitive resources and to which government's adaptation plans must reach out. Without a strong gender component, the State adaptation plans will fail on the implementation front. The same holds true for the adaptation missions at the Centre. Identifying some of the gender-responsive policy gaps in the national adaptation missions and specific state-level climate change plans, and suggesting possible corrections, is the second objective of this research.

Climate science researchers working on adaptation and practitioners engaging local communities on adaptation interventions are also gender-neutral in their approach. Unlike mitigation, adaptation requires local action and local actors (WRI 2007, IUCN [undated], HBF 2010, Oxfam 2010). The success and failure of adaptation is determined by the profile of the actors – the socio-economic stratifications along the lines of gender, caste, class and ethnic background. Levels of development and the interplay of information/knowledge, resources and capacities are other determinants. Scientific climate research and applications more often than not end up targeting men and not both women and men.

The socio-economic impacts of climate change at the local level, where gender-specific disparities are most intense, need to be better understood and addressed.

Table 1.3 Climate Change Missions and the Nodal Ministries

Focus	Mission	Ministry
Mitigation	National Solar Mission	Ministry of New and Renewable Energy
	National Mission on Enhanced Energy Efficiency	Bureau of Energy Efficiency, Ministry of Power
	National Mission on Sustainable Habitat	Ministry of Urban Development
Research & Development	National Mission on Strategic Knowledge for Climate Change	Ministry of Science and Technology
Adaptation	National Water Mission	Ministry of Water Resources
	National Mission for a Green India	Ministry of Environment and Forests
	National Mission for Sustainable Agriculture	Ministry of Agriculture
	National Mission for Sustaining the Himalayan Eco-system	Ministry of Science and Technology

8 A Chinese proverb based on Mao Tse-Tung's statement envisioning gender equality.

Box 1.2

Research Objectives

- Understanding some of the socio-economic impacts of climate change at the local level where gender-specific disparities are most intense.
- Identifying some of the gender-responsive policy gaps in the national adaptation missions and specific state-level climate change plans, and suggesting possible corrections.
- Identifying some areas where women and men can both participate in, influence and benefit from scientific work on adaptation
- Assessing how gender-responsive the work of grassroots NGOs working on adaptation is and how this can be up-scaled in a gender-responsive manner by government's climate-related policies and plans.

Identifying some areas where women and men can both participate in, influence and benefit from scientific work on adaptation is a third objective of this report.

India has several oases of excellent development/adaptation interventions initiated by non-government organizations. While the debate on what constitutes 'development' and what constitutes 'adaptation' will continue, some very useful literature on the relationship between development and adaptation (WRI 2007, HBF 2009, Oxfam 2007, UNDP 2010) reveals that adaptation will add value to egalitarian development, or gender-just development in this case, by factoring in climate vagaries. Grassroots NGOs engaged in development initiatives in the climate-sensitive area of agriculture-related activities are implementing some excellent models of adaptation. A fourth objective of this research is to assess how gender-responsive the work of grassroots NGOs working on adaptation is and how this can be up-scaled in a gender-responsive manner by government's climate-related policies and plans.

Using the gender lens, this research has studied climate change impacts and adaptation strategies across policy, practice and scientific research in four agro-climatic zones in different States:

- The Himalayan eco-system in Himachal Pradesh
- The flood plains of Eastern Uttar Pradesh
- The Sunderbans coastal area in West Bengal and
- The drought region of Andhra Pradesh.

Joint meeting of women and men farmers to decide what measures the village will take to adapt to climate vagaries, Gorakhpur, Uttar Pradesh.

This research sets out to demonstrate that successful adaptation to climate change will require recognition of women as critical partners in both driving and delivering solutions needed to increase the resilience of communities, especially those living in disaster-prone areas across India. This will also require a close collaboration between adaptation research, agriculture-related government services and women farmers. Poor and marginalised rural women are the worst sufferers of climate change impacts but they are also critical change agents in implementing climate solutions. Their traditional knowledge and skills are often a resource to adapt to climate vagaries and they have a valuable influence over their households' consumption patterns and lifestyle choices, both critical in the wake of climate change. Women suffer climate impacts more than men -- they are also integral to solutions.

The Gender Analysis Framework

According to the UN Inter-agency Secretariat for Disaster Reduction (UNISDR), 'Both women and men are part of the same society, which, as we know, does not mean we have the same rights, education and options to manage, neither in 'normal' times, nor when a disaster strikes.' Chapter 17 of the IPCC Report takes gender equity as one of the socio-economic factors, in addition to literacy and the ratio of farmers and wage farm workers, to assess the capacity of a community to adapt to changing climatic parameters and the consequent economic conditions. Other assessment parameters include the biophysical – including soil quality and groundwater availability – and technological conditions comprising irrigation and availability of further agricultural infrastructure facilities.

Though 'gender' is not a synonym for 'women,' gender studies often focus on women. This is because 'gender' is a social construct and the position of women in society is unfavourable to that of men from every aspect – politically, economically and culturally. So promotion of gender equality often implies a focus on

correcting women's disadvantages vis-a-vis men so that both women and men can enjoy the same rights, freedoms and opportunities. In the wake of climate change, this becomes even more critical because climate change adds another layer of inequality between women and men, often the difference being between life and death. This approach also calls for men to change their mindset and power play vis-a-vis women. Transforming gender relations is not about 'adding' women to existing power structures and institutions but is about doing things differently to address women's and men's needs and concerns (Box 1.3).

In feminist literature (Porter 1999, Krishna 2008), the above difference is often referred to as the 'Women and Development' approach which questions and attempts to transform the structural roots of the imbalance in power between women and men; moving beyond the earlier 'Women in Development' approach which limited itself to addressing women's economic needs, believing that this would empower them, and as passive beneficiaries of programmes. The Gender and Development (GAD) approach deepens the study of inequalities to include the different layers of inequalities – like poverty, class and caste – that women may face.

A useful framework for addressing gender concerns in the context of livelihoods, and valuable in the context of climate change adaptation, is to do a gender needs assessment. The needs of women and men are related both to the roles they perform in society; and to the unequal power relationships which requires transformation. Thus there are the 'practical' needs of women and men which respond to the immediate need to make the two ends meet, to eat, live and survive and are linked to the socially accepted labour division within the society. 'Strategic' needs of women and men seek to bridge the gender gap by bridging the political, economic and socio-cultural divides and help women become more self-confident, skilled, knowledgeable and capable of making choices, influencing and satisfying her practical needs.

Livelihood options are gender-just when they address not only the 'practical' needs of women (and men) but also their 'strategic' needs. Practical needs of women include food and fodder, water for home and animals, fuelwood, cooking spices/herbs and herbal medicines. They also include flowers and herbs for religious and cultural purposes. Men's practical needs include securing food and finances for the house. Practical needs of both women and men include housing, health and education.

Strategic needs for women, just like for men, include land rights, ownership & control over productive resources including own income, financial viability, credit as well as relevant knowledge and skills and gender-friendly technology; reduction of drudgery and access to labour saving measures; mobility; freedom

Box 1.3

Doing Things Differently

"Extension workers should come either before 7 a.m. or after 10 p.m. to our houses if they want to speak with us," says Urmila Katoch, a farmer and Sarpanch of Lanjhni Panchayat, Dharamsala tehsil, Kangra district, Himachal Pradesh. "Or, they should come to our fields during their office timing to talk to us. Else how would we know what schemes the government has for us? I have heard the government is promoting organic farming because it is good for the soil. We know that but what help can we get from the government?"

Mother and daughter harvest groundnut in village Malkaipait Tanda Ibrahimpur, Rangareddi district, AP

to make choices; freedom from partner violence; decision-making power at home, within the community and on larger public platforms/institutions and leisure time.

Policies, programmes, schemes and practices are best analysed using the gender empowerment tool (Table 1.4) that uses the gender lens to judge the result of these interventions on gender equity. This project uses the above gender analysis framework and the gender empowerment tool to recommend policy, practice and adaptation research changes.

Table 1.4 Gender Empowerment Tool to Analyse Interventions

Classification	Type of Intervention	Examples from Indian Policies
Gender-Blind	Interventions literally 'blind' to gender differences; they appear neutral but are implicitly male biased	Urmila Katoch's response to the timing of the agriculture extension workers in the quote above is a good example of a gender blind service
Gender-Neutral	Interventions reinforce existing gender inequalities	Water users societies giving membership only to land owners given that very few women own land.
Gender-Sensitive	Interventions recognise existing gender inequalities	'Gender budgeting,' or forming women's self-help groups
Gender-Transformative	Interventions that transform gender relations to promote gender equity..... but need to work at different levels simultaneously to achieve results	50% reservation in the Panchayat Raj Institutions
Gender-Just	Interventions that promote sustainable, structural changes in gender power relations, redressing the discrimination and violence committed as a result of gender inequality.....but need to work at different levels simultaneously to achieve results	No such example is available!

Key Resource: Kabeer, 1994

2

Mirroring Reality: Climate Impacts through the Gender Lens

"We used to enjoy good cool weather for at least six months earlier. Now we have to work more in hotter weather. Earlier when we had to harvest, tend to our vegetables and fetch water, fodder and firewood in April, it was never so bad. Now it is very tiring."

Shreshta, Village Dhima
Block Rait, District Kangra, Himachal Pradesh

The impacts of higher temperatures, more variable precipitation, more extreme weather events, and sea level rise are already being felt in India and will continue to intensify. The NAPCC gives in brief some of the observed climatic changes and changes in extreme weather events in India as well as projected impacts on agriculture, water, forests, and sea-level rise. At the national level, the NAPCC reports an increase of 0.4 degree Celsius in surface air temperature over the past century, regional monsoon variation and a rising trend in the frequency of heavy rain events, some changes in the frequency of droughts, an increasing trend in severe storm incidence along the coast and sea-level rise consistent with the estimates of the IPCC. On the Himalayan glaciers, the NAPCC says recession of some glaciers has occurred in some Himalayan regions in recent years but the trend is not consistent across the entire mountain chain.

India reports these climatic changes to the UNFCCC through the National Communications on Climate Change (NATCOM) set up by the Ministry of Environment and Forests. Climate research institutions, ranging from those engaged in estimating greenhouse gas emissions and their mitigation potential to others assessing vulnerabilities and measures for adaptation,

contribute to the periodic NATCOM reports. The ministry has also set up the Indian Network for Climate Change Assessment (INCCA), a national network of more than 120 climate science research institutions and over 250 scientists who together produce periodic assessments of observed and projected climatic changes for India. These INCCA reports form part of India's national communication through the NATCOM to the UNFCCC.

The latest INCCA Report 2, released in November 2010 by the Environment Ministry, projects climatic trends for 2030s and covers physical changes as well as impacts of these changes on India's agriculture, forests, water and human health. It notes that 'climate change has enormous implications for natural resources and livelihoods of the people. The available knowledge suggests adverse implications for key sectors of the economy.' Nowhere does the INCCA report highlight any gender-differentiated data that would show who among the 'people' would suffer the worst economic and livelihoods impacts of climate change – so that this vulnerable group can be central to the government's adaptation policies and programmes.

According to the report, for India as a whole, frequency of hot days shows a gradual increasing trend and frequency of cold days shows a significant decreasing trend during the pre-monsoon season over the period 1970–2005. Further, the spring snow cover of Western Himalaya has been declining and the snow has been melting faster from winter to spring after 1993.

On impacts of climate change, the NAPCC notes that since India's agriculture is sensitive to rainfall and variability and temperature changes, studies by the Indian Agricultural Research Institute (IARI) and others indicate reduced Rabi (winter wheat) crop and changes in the quality of fruits, vegetables, tea, coffee, aromatic medicinal plants and basmati rice. Changes in temperature and humidity will also impact pathogens and insect populations. Other impacts include lower yields from dairy cattle and decline in fish breeding, migration and harvests. India loses 1.8 million tonnes of milk production at present due to climatic stresses in different parts of the country. Further, up to 77% of the forest areas are expected to shift affecting both the associated biodiversity and livelihoods based on these forests. Vulnerability to extreme climate events is also expected to increase with heavy populations living in coastal, flood and drought-prone areas (Box 2.1).

"There is far less water in our 'kul' (water channels carrying water from the glaciers to the villages below) now than earlier," says Shreshta, village Bhima, district Kangra. "Less snow if falling now, and much later than before. We used to see snow on the mountain tops in October and my mother would say its time to harvest paddy because it will not rain now. Harvested paddy can take 1-2 rains but gets spoilt if it rains continuously for 3-5 days. For the last 4-5 years it has been raining in October. Earlier, hailstorms used to visit only the upper villages. For the last 15-20 years, hailstorms are damaging our harvested paddy."

All of the above will especially impact women because more women than men are engaged in growing vegetables, tea, coffee, paddy, in livestock rearing and in fish processing and gathering medicinal herbs, fodder and fuelwood. Tribal women in India, for example, use almost 300 forest species for medicinal purposes. (FAO 2003) and shifts in forest vegetation are going to affect their livelihoods and their health. It is also now accepted that women are affected more than men in any natural calamity (Oxfam 2005, IUCN (undated), UNDP 2010).

Adaptation research done to mitigate these impacts will need to mainstream gender issues into the research agenda and within adaptive interventions, looking at vulnerability (Table 2.1) not only from the eco-system lens but also through the lens of women's vulnerable livelihoods and more vulnerable groups of women within women; the poorest and the most marginalised women bear a triple burden – of poverty, gender and caste/ethnic background – and find it that much more difficult to have the wherewithal for adaptation.

Box 2.1

Gender Facts on Disasters

- Disasters lower women's life expectancy more than men's, according to data from 141 countries affected by disasters between 1981 and 2002
- Women, boys and girls are 14 times more likely than men to die during a disaster
- Following a disaster, it is more likely that women will be victims of domestic and sexual violence; many even avoid using shelters for fear of being sexually assaulted

Source: UNDP, Gender and Disasters, http://www.undp.org/cpr/documents/disaster/7Disaster%20Risk%20Reduction%20-%20Gender.pdf

Table 2.1 Vulnerability Analysis Using a Gender Lens

Eco-system Changes	Livelihoods Changes	Vulnerable Groups
■ Soil moisture on farm land and vegetable gardens ■ Water availability for agriculture, kitchen garden, livestock, domestic use ■ Availability of firewood/other fuel ■ Availability of grazing patches and fodder ■ Availability of edible weeds, seeds, fruits and herbs from the forests and the fields, as also wild fishes, mussels, small crabs etc during lean periods of food production and during disaster time.	■ Grain production – types of grains ■ Livestock – small & large ■ Forest products - range ■ Vegetable & fruit production ■ Fish production ■ Market access ■ Farm labour ■ Non-farm labour ■ Women's and men's crafts	■ Small holder women and men farmers ■ Women and men pastoralists ■ Livestock rearing and diary farming women and men ■ Women and men forest product gatherers ■ Women and men fisherfolk – including those engaged in inland fishing ■ Petty women and men traders selling agriculture and allied products

Adapted from Stockholm Environment Institute's analysis of vulnerability

The importance of local climate data and farmers' observations

Increased climate variability places greater dependence on locally available data. The Indian Council of Agricultural Research (ICAR), the world's largest national agriculture research and education system, has been studying locally specific climate change phenomena and its impacts on local eco-systems and local climate-sensitive livelihoods through its network of 97 research institutes and 47 agriculture universities, including the apex Indian Agriculture Research Institute (IARI). Research findings of the first phase (2004-07) of ICAR's National Network Project on "Impacts, Adaptation and Vulnerability of Indian Agriculture to Climate Change" have provided information to NATCOM.

For instance, the ICAR collaborates with the National Centre for Medium Range Weather Forecasting Agro-meteorological Field Units – 130 such units in 83 agro-climatic zones – to give 'Agromet Advisory' to farmers across India. This information is given to Doordarshan, the national television network, and to All India Radio for dissemination with the onus being on the channels to use it. This information is also put up on the web. Meant to be universally accessible, agromet advisory service becomes gender-blind because poor women farmers seldom have the time to listen to radio or watch television and are also not part of the cyber world.

To deal with climate variability, the ICAR-accredited Center for Geo-informatics Research and Training (CGRT) at the CSK Agriculture University at Palampur, Himachal Pradesh, has collaborated with the Indian Meteorological Department (IMD) on Project Agro Advisory. Using a super-computer, CGRT is able to give a 5 day weather forecast at the district level. So, for instance, during the wheat crowning[9] stage, if no rainfall is predicted, farmers can arrange for irrigation to save their crop. Information from this super-computer is sent to All India Radio which airs this irregularly. In another initiative, with the Centre for Atmospheric Studies and the Indian Institute of Technology, New Delhi, the CGRT is engaged in a model that can give long-term weather information for three months in advance which can help farmers plan agriculture cycles in times of climate variability and save their crops during the critical stages.

At another level, a single hailstorm can destroy the year's harvest, the only available food grain in the house. Poor farmers can prevent this by using a solar-powered hail control gun[10] like the fruit-growing farmers of France, Spain, Belgium and Austria. Considering 70% of the agricultural work in Himachal is done by women, this gun can save their lives! However, there are no institutional mechanisms whereby the excellent research being done at the CGRT can benefit the state's women's farmers directly and wherein these women can add value to this research – something that the CGRT itself is

Adaptation research needs to mainstream gender issues into the research agenda and within adaptive interventions, looking at vulnerability not only from the eco-system lens but also through the lens of women's vulnerable livelihoods and more vulnerable groups of women within women...

9 Part of the root from which the stem emerges

10 Shoots at the hail clouds to convert hailstones into rain. Costs about Rs 30 lakh each.

very keen on. The CGRT, for instance, is keen to give rain gauges to women farmers so that they can measure rainfall and further fine tune the CGRT weather data to more precise local forecasting but viable farmers' institutions that cater equally to women and men members are missing.

Equipping local institutions and women farmers with some simple instruments to measure some of these variables at the local level can feed into these more sophisticated, complex climate data to give locally relevant climate data and help adaptation strategies.

While large climate research institutions have the sophisticated GIS system and mapping expertise to collect and analyse different parameters of climate variability, local data requires collaboration with local institutions and local communities for the data to be useful to the end-user and for adaptation measures to be successful. Equipping local institutions and women farmers with some simple instruments to measure some of these variables at the local level can feed into these more sophisticated, complex climate data to give locally relevant climate data and help adaptation strategies. This also gives the advantage of learning from local and traditional knowledge that exists, especially with women, and giving them the status of being practitioner experts.

One of the cues that women in Himachal follow, for instance, is to sow seeds during full moon because with the pull that the moon exerts on gravity, it also pulls up soil moisture and soil nutrients, increasing the chances of good germination. So women always say sow during a waxing moon, not during a waning moon. It would be useful to validate this with scientific know-how and if it holds true then this simple practice will be easy to message and understood by women farmers across India. Science can help women farmers by giving this information – maybe through SMS – during cloudy days for instance, when no moon can be seen in the cloudy skies.

Subsistence farming is work – a lot of hard work, Sunderbans

Increasingly, climate-related local information is being gathered through village, block or district level scientific instruments. With regard to the four States studied here, the Uttar Pradesh government has mandated putting up an automatic meteorological observatory in every district[11] and rain gauges are installed at the tehsil-level.[12] The Himachal Pradesh government has given rain gauges to the patwaris, the lowest land revenue department official who also has an official computer to digitize all land records in every village. In Andhra Pradesh, mandal-level rainfall data is available while in West Bengal district-level rainfall data is available.

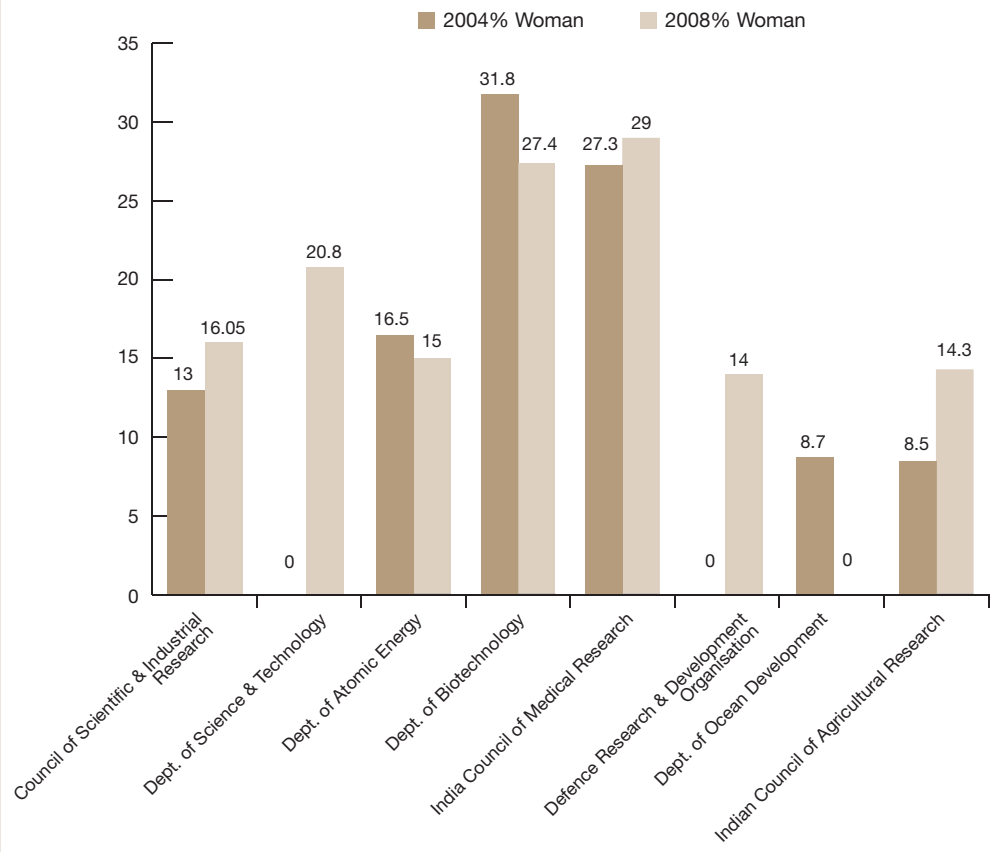
Field application of agro-climatic research with the most vulnerable people and through institutionalized mechanisms is as critical as the research itself. Capacity building and empowering women and men at the level of local Panchayats, line agencies, NGOs and community-based organizations is necessary to build institutions that will be adaptation-responsive. It is possible to measure long-term changes in key climate variables, namely temperature, precipitation and humidity, locally at every panchayat level, process it through larger dynamic climate data systems and use this data for planning and implementing village development plans.

For gender-just development and adaptation, it is critical to involve women and women scientists. The three things to keep in mind are – recognising women's climate-related observed data; involving them in collecting and analyzing scientific data at every level – vertically from the grassroots upwards; and validating their traditional knowledge. There are hardly any women climate scientists who can give a more gendered view of scientific data – what data needs to be collected and how it can be interpreted. India's Report of National Task Force for Women in Science (DST, GOI undated but released in January

11 Personal conversation at N D University, Kumarganj, Uttar Pradesh

12 Personal conversation with staff from Regional Meteorological Centre, Lucknow, UP

Figure 2.1 Women Scientists in Various Organisations (Percentage)



2010) acknowledges availability of limited data on women scientists. Based on available data, the Report reveals that women scientists occupying faculty positions in research institutions and prestigious universities are less than 15% though India has the world's third largest scientific manpower after USA and USSR. Women scientists in prestigious government research institutions constitute less than 21% of the total number (Figure 2.1).

At ICAR, only 14.3% of the scientists were women in 2008, a very gradual rise from 8.5% in 2004. While data is not available on the proportion of women scientists in senior ranks at the ICAR, data from some of the other prestigious research institutions shows that far more women scientists occupy lower ranks than higher ranks (Women in Science Report, 2010). The proportion of women scientists is also very small in State agriculture universities-based extension wings, Directorates of Extension, Krishi Vigyan Kendras (KVKs) and Krishi Gyan Kendras (KGKs); and in the ICAR extension wings – Zonal Research Stations/ Krishi Vigyan Kendras, Agriculture Technology Information Centres (ATICs), Institute Village Linkage Programme (IVLP) etc.

No wonder then that climate research agenda and interventions are implicitly male-biased. For instance, the high yielding saline-resistant paddy varieties promoted by the government, based on its agricultural scientific research, does not meet women's practical needs that some of the traditional saline-resistant varieties do. "We need to collect crop waste as our fuel from our fields because there is restriction in entering the Sunderbans forest," says Rita from village Chak-Pitambarpur, block Basanti, 24 South Parganas, West Bengal. "These high-yielding varieties are small in height. So after we harvest the paddy, the rest of the part is also very small and it takes more time to collect these parts as fuel compared to the longer residue of some of the traditional paddy varieties that are not being given by the government."

...climate research agenda and interventions are implicitly male-biased. ..."These high-yielding varieties are small in height. So after we (women) harvest the paddy, the rest of the part is also very small and it takes more time to collect these parts as fuel..."

"All the three seasons are changing now – summer, winter, monsoon. Rains are delayed now and when it rains, they come down so strong that I cannot stand in my field and all our standing crop is washed away.

"There is not a single 'arhar' (a lentil) plant left in the village because water-logging damages it completely," says Kamlavati, of village Janakpur, Campierganj block, district Gorakhpur, Uttar Pradesh. "The 'arhar' plant is especially useful for me because it gives me my cooking fuel and fodder. I can make brooms and sell them. I can also use it to weave baskets and cover the roof of my house."

In another instance in Andhra Pradesh, a scientific research institute teamed up with a technical NGO to train young men in feed nutrition supplement for livestock. All the trained boys subsequently joined NGOs and other institutions outside the village! The programme later learnt, following the inputs from a gender expert, that it should have worked with middle-aged women – women who were actually responsible for caring for the livestock. Up-grading their skill meant the results were seen quickly and were sustainable.

One of the better known studies conducted during the first phase (2004-07) of the ICAR's National Network Project on "Impacts, Adaptation and Vulnerability of Indian Agriculture to Climate Change" is about the upward shift of the apple growing belt in Himachal Pradesh. The study (Rana et al 2009) says the apple belt has shifted to higher villages because of warmer temperatures and decreasing chilling periods during November and March. Farmers were already talking about this shift and indeed experiencing it through loss of livelihoods in the lower regions and new avenues in the upper reaches. In 2008, the IARI conducted a socio-economic study by distributing questionnaires among farmers to understand their perceptions on the changing climate[13]. The ICAR study underpinned villagers' observations with scientific parameters. The ICAR has also undertaken a National Initiative on Climate Resilient Agriculture (NICRA) which includes village level studies on 'coping mechanisms.'

Training on adaptive livelihood options in semi-arid Rangareddi district, AP

Women's intimate knowledge on sowing seasons, multi-cropping, local crop, trees, herb varieties that can withstand local climate, wild edible varieties, crops suitable to climatic conditions,, seed selection, seed storage, preparation of bio-fertilisers and bio-pesticides, manure application, pest management, post-harvest processing and value addition is all part of the oral tradition that needs to be factored into climate data to reach a more precise understanding of adaptation measures. In village Madirapalli, Andhra Pradesh, for instance, women note that the calendar month for groundnut sowing has advanced by 15 days due to early onset of summers. In village Chellapur, Andhra Pradesh, women know the preferred crops for low rainfall as well as for high rainfall. "We don't know how much it will rain at the beginning of the season," said a woman farmer. "So we sow a mix of crops because that still give us something to eat at the end of the season."

"We are moving towards a new research paradigm in the field of development and climate change," said a senior scientist from ICAR's Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad. "We can call it 'development research' or 'action research.'" Similarly, CRIDA said it is moving from 'increasing land productivity' to increasing productivity of the 'farming systems.'

Development professionals and practitioners have built their work on the basis of 'action research' based on participatory methods. ICAR institutes have also been engaged in action research with more emphasis on the 'lab-to-field' approach of taking their learnings to the farmers than the more participative 'field-to-lab' approach wherein researchers can learn from the farmers and then add value to that. Or even an enabling 'farmer-to-farmer' approach whereby famers with similar challenges can learn from each other and emulate best practices.

However, there are examples in some of the work that CRIDA is now doing on adaptation where a more participatory approach is

13 Personal conversation at N D University, Kumarganj, Uttar Pradesh

followed and the work is done in collaboration with NGOs and community-based groups (CBOs). Some of their work is focused on women farmers (Table 2.2) – to tackle their drudgery, reduce time spent in some tasks and add value to their knowledge and skills. For instance, the much lauded adaptive measure of using vermicompost[14], instead of chemical fertilizers, to raise soil nutrients and soil moisture has tremendously increased women's workload though it boosts productivity of the 'farming system' giving good mixed crop yields as also fodder and crop waste for fuel.

CRIDA is piloting preparation of vermicompost at the community level so that women farmers can share the work burden. A step further would be to promote commercial preparation so that women farmers have a choice on whether they want to buy the preparation or spend hours preparing it. The same goes for organic manure which is again the preferred choice of small farmers to reclaim degraded lands in water-logged and arid zones. "Why can't the government give us organic manure?"asks Ponnam Padma of village Enabavi, Lingala Ghanapur Mandal, Warangal District, Andhra Pradesh. Padma stopped using chemical inputs on her small farm 16 years ago. "It is a lot more hard work to prepare vermicompost and organic manure but at least I'm assured that my crop will not fail because the soil is good. Chemicals leach soil nutrients and then my paddy used to fail. So did my vegetables, if I planted them at all!"

What do women know about climate change? Village women's observations and perceptions are often consistent with scientific climate data collected using sophisticated instruments and model simulations. Their observations can influence adaptation interventions. The following tables (Tables 2.3 – 2.6) reveal the amazing similarity between observations of village women and scientific climate change data reported by climate scientists.

Table 2.2 Some women-focused interventions by CRIDA

On-Farm Interventions	Off-Farm Interventions
■ Drudgery reduction (including replacing manual labour with simple machine work) ■ Value addition (gradening fruits; packaging milk) ■ Raising nurseries to become suppliers ■ Crop diversification to include vegetables for domestic use and to earn an income ■ Green fodder cultivation on leased lands ■ Alternate fodder resources like preparing Azolla at the homestead ■ Raising poultry ■ Small ruminant[15] animal rearing ■ Seed procurement and seed self-suffciency	■ Training needs ■ Value addition to minor forest products ■ Computer literacy

Source: Central Research Institute for Dryland Agriculture (CRIDA)

Table 2.3 Women's Anecdotal and Scientific Climate Evidence in West Bengal

Women's Anecdotal Evidence	Scientific Evidence
■ Storms are increasing in frequency and intensity ■ Earlier women could collect wild fish species, small crabs, mussels etc from the sea to tide them over the crisis period. After AILA these are hardly available. Herbs and leafy vegetables can no longer grow in saline fields & pond sides ■ "After giving time and hard labour, the yield of paddy is very low due to erratic rainfall," Ajina Bibi, village Chakpitambur, district South 24 Parganas (Women put in upto 10 hours & hard labour into paddy fields – doing 70-80% of the work)	■ Rising frequency of Severe Cyclonic Storms Over Bay of Bengal ■ Retreat of shoreline, beach erosion and consequent siltation in the estuarine channels cause threat to the human habitat, tourism, agriculture and fishing ■ Decline of Aman Paddy yield with increasing post monsoon rainfall in Coastal W. Bengal (S. 24 Paraganas) *Source: Sugata Hazra, Jadavpur Univ, Kolkata*

14 A natural fertilizer using red worms, usually earthworms in India, to decompose crop waste and other organic matter.

15 Ruminant animals, such as cattle, sheep, buffalo, and goats have special digestive systems which can convert otherwise unusable plant materials into useful food and fibre products. This digestive system, however, also produces methane which contributes to climate change.

Table 2.4 Women's Anecdotal and Scientific Climate Evidence in Eastern Uttar Pradesh

Women's Anecdotal Evidence	Scientific Evidence
■ Untimely rainfall: more rainfall in shorter time period ■ Waterlogging ■ Variation in temperature; end-February hot eastern winds come early and the growing wheat grain, needing cooler temperatures, becomes smaller; yield also decreases ■ More and diverse pests ■ Impact on livestock reproduction. Cow or buffalo earlier reproduced within 2 years, now within 3-4 years	■ Erratic weather patterns ■ Due to heavy rainfall in this low-lying area waterlogging has become a perpetual problem in last 10-15 years ■ In February – March 2007-08, then in 2010, the temperature shot up suddenly resulting in shrinking of wheat grains ■ Increase in all sorts of crop diseases (air-borne, seed-borne and soil-borne) *Source: N.D. University; UP Council of Agricultural Research (UPCAR)*

Table 2.5 Women's Anecdotal and Scientific Climate Evidence in Andhra Pradesh

Women's Anecdotal Evidence	Scientific Evidence
■ Disturbed distribution and frequency of rainfall; more early withdrawal of monsoon ■ Hotter summers; warmer or very cold winters: *"Summers are scorching. Working with soil has become very difficult. Our hands get burnt & we can't roll our ragi-rice morsels at home!"* ■ More drought years: earlier once every five years, now thrice every five years ■ Pest infestations	■ Rainfall variability; changes in rainfall patterns; untimely rainfall ■ Changes in temperature, increase in frequency of extreme events like cold wave, heat waves, floods, droughts, cyclones ■ 4 droughts in the last decade out of which two were severe; 4-5 droughts in last 10 years ■ More sucking pests & growing minor pests *Source: Central Research Institute for Dryland Agriculture (CRIDA) Acharya N G Ranga University (ANGRAU)*

Table 2.6 Women's Anecdotal and Scientific Climate Evidence in Himachal Pradesh

Women's Anecdotal Evidence	Scientific Evidence
■ Less winter rains affecting wheat production ■ Less water in *kul* reducing water availability ■ Untimely rains and hail storms in new areas ■ Delayed snowfall so snowfall for less period & gets less cooler temperatures so melts faster and does not fill the *kul* through the year like it used to ■ Multiplication of invasive weed species Lantana due to higher temperatures ■ New, undiagnosed crop pests	■ Poor precipitation in winters ■ Rapid retreating of glaciers reducing water availability ■ Erratic rainfall and delay in monsoon ■ Declining volume of snowfall over last 10-15 years, now limited to high altitudes ■ Invasive species Lantana (Lantana camara) due to higher temperatures ■ Changed pest spectrum of crops *Source: National Bureau of Plant Genetic Resources, Regional Station (NBPGR, RS), Shimla G.B. Pant Institute of Himalayan Environment and Development (GBPIHED)*

3

Gender-Responsive Adaptive Interventions

"The whole village now shares water from the few private borewells we had. We talked amongst ourselves in our SHG meetings on the importance of water sharing in our arid village. Digging more borewells would mean losing the lowered groundwater table. It took some time to convince our menfolk but now we have signed an agreement amongst ourselves and with the Mandal officer to stop digging new borewells and to share the water from existing ones. I have enough water now and even grow vegetables."

Gomlibai

Village Malkaipait Tanda, Mandal Parigi, District Ranga Reddy, Andhra Pradesh

Livelihoods interventions of grassroots development NGOs in the four agro-climatic zones studied here gave clear empirical evidence that in the wake of climate change, women's vulnerabilities deepen while men mostly take the route of distress migration. In fact, two of the biggest climate change impacts on women have been work overload, including increased investment of time, and double burden due to distress migration. The third impact, usually unaddressed, is the social impact like increase in domestic violence due to deepening poverty and male frustration, as well as the introduction of/increase in HIV/AIDs and human trafficking.

Examples of work overload includes longer working hours on the farm, repeated sowing, harder labour to do earthworks and shouldering additional work opportunities to

"There are times when I am very tired. But whether I am able to work or not work does not matter because I have to work – there is no one else to whom I can give my work. Even if sometimes I do request someone to do my work, no one really does it because this work is seen as my lot – we get this work the moment we are born." Roshni, Village Ghrthed, block Rait, district Kangra, Himachal Pradesh

make the two ends meet. Distress migration results again in work overload for women who are left behind, unless the climate vagaries are so intense that the whole family has to migrate. The status of climate refugees is a different story altogether where women refugees again are at a severe disadvantage (Women's Environmental Network 2010).

In village Madirepalli, block Singanamala, district Anantapur, Andhra Pradesh, women said last year summer was so hot that the first time they did sowing, the seeds could not germinate. So 10 days later they had to do the sowing again and only one-third of the seeds germinated. "The soil becomes so hot in summer that it does not allow us to do the earth work needed nor supports germination. While sowing particularly, our fingers get boils and re-sowing adds to our misery," said one woman farmer. Women also said that since last two years, summer has started coming early and is hotter. So they have had to change their farm work timings by leaving for work earlier at 7 am and returning by 1 pm because it is not possible to work during the hot afternoons. Their days have become longer now. The hardship of longer days because of heat stress was echoed in Uttar Pradesh and even in Himachal Pradesh.

"Scarcity of rainfall is leading to decreasing soil moisture and an increase in insects and weeds. Now I have to be ready all the time with my 'khurpi' (traditional weeding instrument) to weed them out," said Manju of village Sadheykhurd, Mehdawal, Sant Kabir Nagar, Eastern Uttar Pradesh.

Unpredictable and untimely rains mean that women cannot plan their work, have to work longer hours and more intensely. "Earlier our work was more regulated and spread over the different seasons. Now we don't know when it may suddenly rain. We have to take advantage of it for our rainfed agriculture," said Tripta of village Ghrthed, HP. Vimla (village Ladli, block Rait, district Kangra) said in 2009, rains stopped before paddy could ripen. "So we could not keep seeds and had to spend money to buy them from the block office." "Late rains means work that would usually take a month to do has to be squeezed in a week," Kanta added. "Untimely rains now damage our standing crops. Our menfolk will go off to work and the children will go off to school. That leaves us to spend days just sifting our damaged crop to save whatever we can," she said. In some villages of Sunderbans, women farmers have started seed banks to adapt to crop failure due to climate vagaries.

In village Sagarmadhabpur, West Bengal, women said due to increased salinity from cyclone AILA, they are struggling and walking longer distances to collect water and firewood. AILA-hit tribal women of the last tola (hamlet) at the mouth of the sea in village Dokhin

Box 3.1

Women's Daily Work burden

Women farmers said they felt they worked more than men, whether in the house or outside. Women get up early morning at 5 am. They clean up their house and premises and at 7 am they start cooking. By 8 am they pack breakfast for their children, make their children take bath and, get them ready for school. From 8-11 am, they wash clothes, bring water, do other household works and then take a bath. At 11 am they go to field to work and return home at 6 pm and sometimes even later at 7 or 8 pm when there is more work to do on the farm. After coming home, they again clean their house and premises, clean the utensils and then make the beds. Then they take dinner and go to bed. If there is any self-help group or community meeting, women attend it after dinner. Women said their menfolk are not involved in the housework at all.

This daily routine was narrated by a woman in arid Anantapur. But it could be the story of any poor woman farmer. Daily time charts collected from a sample of women in the four agro-climatic studies revealed that women worked for 16-18 hours every day. Where women keep livestock, farm work would include that or, where fodder/fuelwood had to be collected as in Himachal Pradesh, it would be included in this time. "Every 2nd day I have to spend an entire day collecting fodder and fuelwood from the forest," says Nokhru Devi from village Ladli, HP. "I go in the morning after finishing my housework and return in the evening to feed the animals and to do my housework. The rest of the days I have to look after my livestock and the farm."

Govindpur Abad, district 24 South Paraganas, said there is no work left to do on the saline lands. While men are employed seasonally to collect honey from the tiger-infested forest by the forest department, women stand in the alligator- infested waters for hours to try and catch prawns and crabs to eat at home and to sell these to middlemen. It can take anything between 3-7 days to collect 1000 prawn seeds or eggs and these fetch a paltry sum of Rs 300 from the middlemen. In rainy season, its half the price.

On distress migration, women in village Chellapur (block Bomraspet, district Mahbubnagar), said rainfall had become so erratic over the last couple of years that it was affecting agriculture productivity and reducing wage labour opportunities for farm work. "Earlier, very few families, maybe just about two, would migrate to Mumbai," said one woman farmer. "Now, after we harvest red gram (masoor dal – a popular pulse), many families migrate for the four summer months to Mumbai and then return to cultivate the winter crop." In arid Anantpur district, women from village Chaandrayunipalli (mandal Bukkapatnam) said half of the families seasonally migrate from the village. The government's Mahatma Gandhi National Rural Employment Guarantee Act (NREGA), that provides 100 days of work to one person per household during the agricultural lean season, has stemmed distress migration in Andhra Pradesh.

"After AILA, almost all the young boys from this village too migrated. No moneylender is willing to lend us anything because there's no collateral that we can offer," said Nonasha Bhokla of village Dokhin Govindpur Abad, West Bengal. "Fifteen years ago we had some traditional saline-resistant paddy varieties. Now there's hardly any wage labour too because nothing grows in this saline soil." In village Sagarmadhabpur, West Bengal, women said men migrate for work for 8-9 months in a year to work in rice mills, as masons or as rickshaw-pullers. "At this time there is a huge pressure on us," said a woman farmer. "We have to look after our children, earn, fetch water, fodder and fuelwood, work on our vegetable gardens and available farm work, care for our livestock, etc."

Greenery due to sharing water from a government borewell in village Gundlapalli in semi-arid Mahbubnagar, AP

In village Bankra in West Bengal, women said that earlier only men used to go in the deep forest to collect honey and other non-timber forest products while women tended to the farms and livestock. But following more frequent sea storms and AILA, men just migrate, leaving women to go to the forest to collect honey and to collect shrimps. Women said with dwindling habitats, tiger attacks in the forest and crocodile attacks in the river are increasing by the day. One woman farmer said, "There is so much work burden on us that we find little time to tend to our vegetable gardens which are so important for our food security. What to do and what to leave out. That is always the question."

Heavy male migration in the hill economy of Himachal Pradesh is a well established fact. Small and marginal women farmers, who form the bulk of the farming community and survive on subsistence farming despite the government's promotion of commercial horticulture, do not want men to do farming but to continue in non-farm jobs. "Agriculture just about gives us enough food for the house. All our other needs are fulfilled with the income that comes from our menfolk," they say in village Ghrthed.[16]

Gendered Impact of Climate Change

Much of the above discussion has shown how women and men experience changes in

16 In the discussions with the women staff of Jagori. Most of the staff are farmers in their own right and work with women farmers.

Table 3.1 Gendered Impacts of Climate Change

Climate Change	Impacts on Women	Impacts on Men
Lower food production	Least to eat; sleep on an empty stomach Need to take on additional work as wage labour – feminisation of agriculture labour (WB, UP, AP)	1st priority to available food
Cyclone Aila, floods, water-logging, droughts, delayed snowfall – drying waterways	Longer walks to get water and fuelwood Loss of fodder and livestock – primarily women's livelihood Drought/infrequent spells of rains – harder ground to do work on	Distress migration
Higher summer temperatures	Lower milk production among animals More tiring work in fields even in April (HP) Longer hours – *"I wake up 2 hours earlier to go to the field in summers now" Lakshmi Devi* (AP). Same in HP, Eastern UP	Lesser tasks in the field Distress migration
Effect on regeneration of species	Medicinal herbs and fodder unavailable in forests now (HP)	
Heavy rainfall	More weeding jobs Water, fodder, fuelwood difficult Excess rains/low rainfall, women's opportunity for wage employment declines	
Untimely rainfall Rain in villages where it used to snow	Lower farm production & consequences of male distress migration – work overload on own farm and as wage labour + care giver	Distress migration
Social impact – higher indebtedness	Women go to take loans and have the responsibility to pay off loans!	Distress migration
Social impact – male migration	Women and child trafficking/HIV AIDS	
Social impact – domestic violence	Increase in domestic violence	

This research revealed that across the four agro-climatic zones, adaptive livelihoods strategies are very similar.

climate variability differently. The table (Table 3.1) attempts to differentiate these experiences from a gender lens in each of the four agro-climatic zones where this research was carried out. As a woman from village Badshahpur in Eastern Uttar Pradesh said, "Workload has doubled, even tripled. And, with more and more food problem, we have to bear our men's abuses and live with an empty stomach."

Adaptation

Most grassroots development organizations working on issues of livelihoods development in rural India have willy-nilly promoted adaptation measures in the wake of climate change primarily because they have no option. Since adaptation is really 'development-plus' or developmental measures that are also climate-proof, sustainable natural resources-dependent livelihood interventions have to take climate vagaries into account. Recent analysis of adaptation terms this as 'serendipitous adaptation,' or activities undertaken to achieve development objectives incidentally and only later recognised as adaptation interventions (WRI 2007). While some organizations have started labeling their interventions as also adaptation, most livelihoods-focused organizations are yet to recognize this aspect due to inadequate understanding and awareness about climate change adaptation. Adaptation uses the same 'toolbox' as development measures, is more integrated than development interventions (WRI 2007) and factors in the dimension of 'additionality' on account of climate variability. The relationship between development and adaptation is complementary and this is brought out by the recent analysis on adaptation (WRI 2007).

Some of the adaptation-oriented livelihoods interventions of NGOs, whose work this research project examined, are very robust. They build on traditional knowledge, adopt the diversified livelihoods basket approach and add value through applied science and technological interventions. This research revealed that across the four agro-climatic

zones, adaptive livelihoods strategies are very similar. Some of the common strategies include:

- **Innovative and adaptive integrated farming through land shaping and creating different levels for different products.** Farmers grow diverse crops ranging from grains to vegetables and herbs, rear poultry, other livestock and even fish, using waste from one product as input for another product. This helps poor and small farmers optimize their resources and also spread their risks. So if erratic rainfall or variable temperature damages one type of crop, other crops survive. If all the crops are damaged, they still have fish to eat or eggs and milk. Or even the poultry animals themselves. This farming system gives farmers a diversified, more nutritious, food basket and multiple means of livelihoods so it reduces the risks.

  This technique has been used very successfully in water-logged and flood-prone villages in Eastern Uttar Pradesh as also in the saline soils of coastal Sunderbans in West Bengal. In water-logged areas, fish are reared in ponds and an enclosed wooden platform is made on part of the pond for poultry rearing. Fruit trees are grown around the pond and grain, pulses, vegetables and herbs on the land.

  In Sunderban islands, the challenge is soil salinity. So part of the land is excavated and the dug out soil is used to elevate part of the land holding. The fish pond is linked to trenches or channels made in part of the excavated area to give more space to saline water fish and augment fish production. Paddy is grown on the raised part of the land holding so that when the rains come, they wash the salinity from soil below into the water channels and the lower part of the land. Different vegetables, fruit and fuel trees, medicinal plants, etc are grown on the lower part of the land – not on the flat land but on raised soil furrows, so that when the rains come, soil salinity from these furrows is also washed into the narrow channel spaces between them and into the larger fish channels. This simple innovative adaptive technique has helped stem distress migration and increased production of diverse crops. Poultry sheds are also kept in one portion of the land. Asked how they managed to survive after cyclone AILA made their soil saline where nothing could grow, women from village Bankra (block Himgalganj, North 24 Paraganas), after a moment's silence, said: "We have a backup system of (vegetable) garden, cows and hens."

- **Mixed farming using innovative and adaptive techniques.** This is part of the integrating farming system wherein different kinds of grains, vegetables and pulses are grown both through inter-cropping and crop rotation. DRCSC, the NGO promoting this in Sunderbans, appropriately called this 'nutrition gardens.' Apart from spreading risks, this also helps retain soil fertility because different crops draw on different soil nutrients and contribute different nutrients to the soil. Growing of legumes, for instance, helps fix nitrogen in the soil. In village Bankra, West Bengal, women say,"We survived Aila on our nutrition gardens." Different vegetables are also grown around circular compost pits and even in gunny bags when the soils are too saline.

  Innovative farm technology and traditional knowledge increases productivity from mixed farming. For example, in the Sunderbans, seeds of legumes or pulses or even oilseads like mustard are broadcasted

Asked how they managed to survive after cyclone AILA made their soil saline where nothing could grow, women from village Bankra (block Himgalganj, North 24 Paraganas), after a moment's silence, said: "We have a backup system of (vegetable) garden, cows and hens."

Shantamma tends to her biomass pit which gives her farm inputs, fodder and helps retain soil mositure in Mahbubnagar district, AP

For women farmers, use of organic manure and bio-pesticides gives better quality grains and vegetables which are also more nutritious (not having any chemical residue in them) and tasty. "This is very important to us because if the food is not tasty, we women are blamed for it!"

in the paddy field a week or two before the paddy is to be harvested. DRCSC calls it 'relay cropping.' The residual moisture in the soil is enough for these seeds to germinate. In the flood plains, fruit trees and crops of different height are grown together on one patch of land. GEAG, the NGO promoting this in flood-prone villages calls this multi-layered cropping 'machan' (scaffold) farming, or space management for small and marginal farmers it works with. The highest crop grown is at 5-6 feet (Table 3.2) and depending on the level of floods, some crops are saved. This also spreads the risk for farmers in this disaster-prone area. Climate variability, however, destroyed machans this year because the floods were much higher than expected. There is a need for climate scientists to team up with GEAG and women and men farmer groups so that farmers can benefit from robust and detailed early warning systems.

- **Organic/bio-inputs farming.** Bio-fertilisers and bio-pesticides have proved to be a boon for degraded soils across the agro-climatic regions under study. In the hills in Himachal Pradesh, in the flood plains and water-logged fields, in the saline soils of Sunderbans and in the arid zone in Andhra Pradesh, organic manure is seen as an adaptive measure leading to retention of soil moisture, increase in soil nutrients and fertility and reduction in crop loss even in the wake of saline ingress, drought or after water-logging or flooding. In the Sundarbans, mulch lined on vegetable furrows decomposes to form organic manure which reduces salinity and prevents destruction of soil nutrients in the strong sunlight. Women farmers in village Chakpitambarpur, block Basanti, district 24 South Paraganas, say farms where organic inputs are used recover soil fertility much faster than farms where chemical inputs are used.

Organic matter also helps to improve the water holding capacity of the soil and retains soil moisture. So women farmers in the drought-prone village Chellapur (block Bomraspet, district Mahbubnagar), Andhra Pradesh, say organic inputs are the 'best way' to revive hard and unproductive arid soils. The Andhra Pradesh government has a unique 'non-pesticide management' (NPM) policy to reduce use of chemical pesticides which have decreased soil fertility and to reduce cost of cultivation. In the water-logged areas, mixed cropping with organic inputs also revives the fertility of the soil. In Himachal Pradesh, the state is actively promoting organic farming to combat overuse of chemical inputs in the past. The State government is encouraging every farming family to have a vermicompost unit on its farm by the end of the current 11th Five Year Plan.

For women farmers, use of organic manure and bio-pesticides gives better quality grains and vegetables which are also more nutritious (not having any chemical residue in them) and tasty. "This is very important to us because if the food is not tasty, we women are blamed for it!" say the women. Venkatamma from village Chellapuram, Mandal Daulatabad, district Mahbubnagar, says, "Using organic inputs gives a good vegetable crop. We labourers can take vegetables in

Table 3.2 Seasonal and Spatial Combinations of Crops Under Multi-Layered System

Agriculture Seasons	Kharif (Jun-Sep)	Rabi (Oct-Mar)	Jayed (Mar-May)
Levels of Cropping			
Upper Layer (On 'machan') Standing crops (on the bunds)	Nenua, Bitter gourd, Satputia, Bottle gourd, Pumpkin, Cucumber, Kunduru, Arhar, Brinjal, Chilli, Spinach	Bottle gourd, Bitter gourd, Sem, Nenua Soya, Brinjal, Chilli	Cucumber, Bitter gourd, Kundru Ocra, (Lady finger), Maize, Brinjal
Ground Layer	Groundnut, Elephant leg, Spinach, Kulthi, Urad, Turmeric	Garlic, Onion, Raddish, Carrot, methi, Spinach, Tomato, Coriander	Onion, Spinach, Tomato, Coriander

Source: http://www.geagindia.org/space_management.html

lieu of part of our wages and that is very useful."

- **Discovering and building on traditional knowledge.** There are tens of saline resistant paddy varieties[17] 're-discovered' in the Sunderbans by DRCSC and enabling very poor small and marginal farmers to harvest crops from these varieties while the 'high yielding' varieties given by the government are failing them year after year, especially after cyclone Aila (May 2009). The government agriculture department, part of the States's decision-making body on the State-level Climate Change Action Plan, has not incorporated this field-based knowledge into its plans and shows little inclination of doing so after initial discussions[18]. In the floodplains of Uttar Pradesh, local farmers and a government agriculture university teamed up to help farmers sow some early maturing varieties of paddy because of delayed floods which have started coming during harvest time. Farmers who adapted to the changed frequency of floods by sowing these varieties have reported very small losses during the subsequent floods. Andhra's NPM policy is based on women's traditional knowledge of bio-inputs. In Himachal, the CGRT department at Palampur Agriculture University is attempting to collect and scientifically validate traditional knowledge and then use this in the field as part of the applied research strategy.
- **Simple and useful technological measures**. Technological interventions are few and far between and seldom target women. What is noteworthy is GEAG's initiative of giving basic agriculture equipment like irrigation pipe, winnowing fan and spray machine to a few women's self-help groups for common use. "Now we are not dependent on the market or our husbands," says Kamlavati, of village Janakpur, Campierganj block, district Gorakhpur, Uttar Pradesh. "Our (self-help) group has the machines we need for our farm work. We borrow when we need them during our agriculture cycle. With erratic rains and strange seasons, we need to be able to access this equipment quickly at times. Also, our work does not get delayed and we can be in control of our schedules. We also loan it at a higher rate to members of other self-help groups." In district Anantapur, Andhra Pradesh, farmers had used solar power for sprinklers on their arid land given to them under the State's policy of giving agriculture land to the lowest caste. Of course, land was not in joint names of the spouses, or even in the woman's name. In Sunderbans, a local invention has fitted solar lanterns with mobile charge sockets so SMSs can be a medium for women to link up with larger climate adaptation research institutions and access timely weather bulletins.
- **Mitigating measures as part of disaster preparedness.** Seed banks and grain banks, to promote self-sufficiency in seeds and to tide over lean periods when no harvested crops are available, are very popular with women farmers. Other interventions include leasing panchayat land, forest land or other government-owned land to grow useful trees, including mangrove plantations, on river bunds (raised mud banks) in Sunderbans and on forest land in Himachal Pradesh as also SMS-based early warning system.

Demonstrating 'mulching' to retain soil moisture in summer, Sunderbans

17 These include (local names) Talmugur, MarichSal, Kumro Gor, Kamini Bhogh, Ghunsi, Nonasri, Soler Pona, Geush, Hogla, Nicco, Kanak Shail

18 Personal discussions by the lead researcher.

Adaptation interventions from a gender lens

Women farmers are very often key players in these interventions because grassroots NGOs acknowledge that women farmers are more responsive than men farmers and achieve greater success. So women farmers are not only recipients of knowledge, skills and technologies but are also mobilisers, decision-makers and risk-takers. The latter strategic roles are, however, less recognised or acknowledged in documents, meetings and advocacy initiatives.

Women farmers are very often key players in these interventions because grassroots NGOs acknowledge that women farmers are more responsive than men farmers and achieve greater success.

A visit to the path-breaking borewell sharing villages in Andhra Pradesh brought to the fore all the technical benefits from the adaptive interventions but no one spoke what Gomlibai of village Malkaipait Tanda articulated on women's role in actually creating the enabling environment for the intervention to be implemented. Gomlibai's words in the quote at the start of this section came after persistent persuasion because women themselves have learnt not to acknowledge their critical contributions or to take credit for these. It required building the capacities of NGO workers in seeking gendered responses before her words could be reported back.

Again, in village Chakpitambarpur, block Bansanti, district 24 South Paraganas, for instance, of the number of women interviewed, as many as 85% said they were 'housewives' doing vegetable gardening, poultry and livestock rearing. The women do not define these activities as 'productive work' because the work only satisfies their domestic needs and is not commercially viable. The fact that climate change is putting an additional stress on these tasks is therefore still considered a 'private' problem rather than a 'public' problem where the women have a right to ask the government agencies to satisfy their practical needs.

Where women themselves have been socialized into writing off their knowledge, skills, labour, time and social entrepreneurship, intervening NGOs fall prey to the same paradigm. Even where there are women staff members in these NGOs, the dominant male biases prevail. Only a handful of women staff members who had been through some gender sensitization training earlier could gather somewhat gendered responses for this research project. There were one or two male staff members who were able to empathise and get somewhat gendered responses.

Women involved in adaptation interventions also have more workloads than their menfolk. This is true for both adaptation interventions 'targetting' women and the more technical ones that do not specifically target women. Take the example of promotion of organic agriculture. Azolla, a small, fast growing fern floating on water fixes nitrogen from the air and is an excellent biofertiliser for rice with over 50% increase in yields and is used widely in South-east Asia. This 'green manure' is manufactured with manure, crop waste, ash, etc by women in their homes in Andhra Pradesh. Azolla is very susceptible to fungus growth so the water has to be changed very frequently – which adds to the labourious task. Making NPM inputs, including collecting and preparing crop extracts, processing, grinding and fetching water for these are all women's responsibilities.

In mixed farming and vegetable farming, women's work also increases as all the time something needs to be sowed or weeded or watered or pruned or harvested or processed or sorted or stored. Men's work is easier with growing just one or two main crops – in between sowing and harvesting they can rest! Himachal Pradesh, which is promoting horticulture, has put a greater burden on its women farmers. So do adaptation interventions. In West Bengal, women have to work the year around on their farms and in the vegetable patches. Of course, women do it because the results ensure more and better food in their homes. Yet, from a gender lens, the dice is loaded against them. In village after village in Sunderbans, women said they wished their menfolk would help them with preparation of beds for vegetable farming because it was very labourious and time consuming work.

This research reveals that most of the NGOs in the focused agro-climatic zones do not have a well-articulated gender policy that addresses both the practical and strategic needs of women and men. While the adaptation measures involve women and there is a participative consultative process that guides

Box 3.2

Who owns the farm land?

Climate variability is leading to work overload for women farmers but farm decisions are still taken by men – they exercise remote control! "We work like servants on what is really our own land but we don't really own it," said Shankutla from village Ghrthed (block Rait, district Kangra). Several case studies of women-headed farming households in Kangra district, HP, revealed that where women continued to own land either as a widow or had delegated power from her husband, even grown-up sons would let their mothers take or influence farming decisions. But where the land was in the name of the adult son, the single mother would have no say in the decisions though she bore the responsibility of doing her share of the farm work.

the interventions, the focus is more on getting the technical mix right, not on transforming gender relations. Or, as in the case of most NGOs in Himachal Pradesh, in implementing government's policies and programmes with women too, without questioning how empowering these policies and programmes are for women. The technical-focused NGOs are often gender-sensitive but NGOs implementing policies and programmes are usually gender-neutral. This prevents these NGOs from taking a lead to advocate gender-transformative or gender-just adaptation policies and programmes at the State level or the national level.

Keeping women in mind helps NGOs and women farmers do things differently and satisfy at least some of women's strategic needs. For example, women farmers undertaking adaptive interventions in the Sunderbans plant marigold flower on the fringes of their mixed cropping field and around circular pits for composting to ward off pests. The plant is also used for puja (prayer offering), decoration and in the preparation of home remedies (medicines). In village Indraprastha (block Patharpratim, district 24 South Paraganas), women running a grain bank said their men saw them in a new light now. "Men now give us more respect, consult us, listen to us and appreciate our help in times of emergency when there is no harvest and nothing to eat. Earlier, we never knew what decision they would take!" said Gauri.

In the flood plains of Uttar Pradesh, some women SHGs own and run Village Resource Centres, each of which houses a threshing machine, an irrigation pipe, a sprinkler, etc. These simple machines are rented by SHG members when needed and also rented out to non-SHG members on a slightly higher charge. This helps women do the needful when the truant weather allows them to undertake the required farm activities.

How much do these adaptation interventions help women? What is the benefit that men enjoy? Is there a way to reduce women's work burden and time investment in these adaptive interventions through government programmes and application of climate research? The table (Table 3.3) below gives answers to some of these questions. It analyses

Grain Bank in flood-prone UP

Box 3.3

Puspanjali Ghosh teaches adaptation to other women farmers

Puspanjali, from village Sagarmadhavpur, block Patharpratima, district 24 South Paraganas, Sunderbans, West Bengal, was earlier growing paddy during the monsoons in the low-lying Sunderbans delta but could not grow any crops during summer or winter. She had to buy vegetables from the market whenever it was possible.

Once she started doing sustainable agriculture through a study circle initiated by a local NGO, DRCSC, she shaped her 0.6 acre of land to get a fishing pond and a homestead garden. She excavated soil from part of the land to make the pond and raised another part of her land with this soil to grow multiple types of vegetable throughout the year. She started using vermicompost, liquid manure and organic materials to reduce the infertile and saline soil. This was her way to adapt to increasing salinity due to cyclones in the regions.

From 2009 she started using biogas daily for 4 hours for cooking. Slurry of biogas was used in the vermicompost pit and as fish feed. Pushpanjali began saving Rs 600/- of fuel cost per month by using biogas. DRCSC contributed Rs 5000 towards the capital cost of the biogas and Puspanjali's family contributed the entire labour cost.

Puspanjali is a famous gardener in her village today.

Other group members of her self-help group have also started doing mixed cropping after getting trained by her. Pushpanjali teaches techniques like composting and mulching. Today, her entire family is working on the farm and living a better life. Pushpanjali's children are taking higher education.

the different adaptation interventions from a gender lens and then suggests how women's workload/time can be reduced, especially in the wake of climate change.

Table 3.3 Gender Analysis of Adaptation Interventions

Adaptive Interventions	Gender Analysis	What government/applied climate research can do
Organic/NPM agriculture to restore soil fertility and retain soil moisture	More food security for both women and men More labour and time invested by women Less information/knowledge/ inputs accessed by women Less participation in decision-making bodies	Community vermicomposting (CRIDA) Organic manure/tank silt from Panchayat to women's groups/women farmers Weather-related information (over mobile phones) to women farmers Rain gauges with women farmers
Traditional saline/drought/ flood resistant seeds and animal species	More food security for both women and men Gives women fodder/ fuelwood (not available from high yielding varieties given by the government) Seed exchange Opportunity for women to reclaim traditional knowledge	Farm-to-lab transfer of adaptive knowledge and technology Women and men farmer trainers Appropriate seeds/animal species from PRIs/block
Rain-water harvesting	Benefits women more Women often mobilized for community sharing of water (AP)	Water for farm and kitchen gardens + animals and household consumption, not just for irrigation
Mixed cropping/relay cropping/intensive farming/ agro-forestry/ 'nutrition' garden (DRCSC)	Food security for both women and men Women gain by food variety/nutrition Women invest more labour, time	Joint pattas Seeds/manure for 'nutrition' gardens Rain water-harvesting Simple technological help
Land shaping of low-lying lands/integrated farming – Diversification of agriculture to ensure soil fertility, & soil moisture use of all land/ water and optimum use of water	Women benefit – many vegetables, fish, eggs, milk, own income, stops migration Women invest more labour, time; do not own/ control productive resources; cannot take credit for the change!	Joint pattas Provision of livestock & fodder by PRIs/blocks Women farmer trainers (GEAG) Women-friendly technology to reduce drudgery Bio-gas and bio-electricity
Innovative agriculture techniques (eg machan/ circular pits)	Food security for both women and men Women invest more labour, time	Joint pattas
Shelter trees on ridges/banks/ common land/fallow land/ forest land	Protection from erosion, availability of fibre & wood for agricultural tools/housing & water conservation Women will benefit from fodder, fuelwood, herbs	Lease panchayat/forest land to women's groups Women decide what to plant and how to share produce More women on forest committees for afforestation through Green India Mission
Agriculture tools – SHG runs a village resource centre	Benefits both in food production Empowers women	Panchayat to give tools to women's groups
Promoting millets	Benefits food security for both women and men Women's traditional knowledge	Panchayat to give seeds/inputs/training Women as trainers
Seed banks/grain banks	Resilience for both women and men Empowers women	Mandatory in every panchayat through women's groups

4

The Adaptation Policy Framework

"Would you believe it? The Sarpanch himself came to my home to borrow the irrigation pipe that my self-help group owns. Earlier, I was invisible for him."

Rajmati

Village Sadhey Khurd, Block Mehdawal, District Sant Kabir Nagar, Uttar Pradesh

Several of India's plans, policies, programmes that have a bearing on agriculture-related livelihoods and adaptation aim to be gender-sensitive, envisioning gender parity. In practice, however, India's policies are either gender blind or gender neutral – far from being gender transformative or gender just. In terms of livelihoods, they focus more on meeting women's practical needs and not on meeting their strategic needs. This is one of the reasons that gender disparity persists (Box 4.1) on many fronts in India.

Take, for instance, India's flagship National Rural Employment Guarantee Act (NREGA) with its immense potential for being used for adaptation interventions. The Act provides for 33% reservation for women who are to be given 100 days work by the government during the agricultural lean season. In practice, a study (WNTA 2007) reveals that this percentage is almost never reached, women are paid less than men for the same amount of work, women have no role in planning what works are to be done under the NREGA, women have scant awareness about NREGA provisions and no work site facilities like the mandated crèche, shade to rest, drinking water and toilets. There is no gender-disaggregated work allocation. In fact, in certain places women are asked to come with menfolk thereby preventing single women, widows, deserted women and

Box 4.1

Gender Disparity in India

Sex ratio

Despite several policy initiatives to stem female foeticide, encourage nurturing of girls and protect young girls' life and health, India's child sex ratio has dropped to its lowest at 914 girls to 1000 boys according to the provisional figures of the Census of India 2011. This is the bleakest figure since India's Independence in 1947. The child sex ratio has declined from 927 in Census 2001. The overall sex ratio has, however shown an increasing trend, rising from 933 women per 1000 men in Census 2001 to 940 women to 1000 men in the 2011 Census. This is the highest sex ratio recorded since 1971 and one point lower than 941 women to 1000 men recorded in Census 1961. Except Indonesia and Japan, India follows the Asian trend of adverse sex ratios.

Literacy

The provisional 2011 Census figures show that female literacy has increased to 65.46% in 2011 from 53.67% in 2001. The male literacy, in comparison, rose less sharply, from 75.26 to 82.14 per cent. Yet, the gender gap of 16.68% remains. The 11th Five Year Plan envisages an ambitious reduction of this gap to just 10% by 2011–2012. The figure also hides the disparity of female literacy within different ethnic groups. According to the 11th Five Year Plan, 73% of scheduled (lowest in the hierarchy) caste women, 79% of the scheduled tribe women and 61% each of the 'other backward castes' and Muslim women in the age group of 15–49 years are illiterate. This is the most productive age group with women working with natural resources. This magnitude of illiteracy means women from these groups face the double barriers of lack of development and lack of representation in the vertical ladder of decision-making.

Workers

While the results on working women from Census 2011 are still awaited, the Census of India 2001 lists 65% of all females as non-workers; and 74.3% of all non-workers as female. Fetching water and collecting firewood are not recognized as 'work' by the Census though studies show that the mean time spent in collecting water is nearly 2 hours (109 minutes) a day in rural areas and over an hour-and-a-half (103 minutes) in urban India. Households spend an average of over 6 hours (369 minutes) a week on collecting firewood. Women spend nearly twice as much time gathering firewood and fetching water as men. A similar ratio exists between girls and boys with regard to these activities (Desai et al 2010).

Land ownership

There are no official records of women owning productive assets, especially agricultural land. A recent Action Aid press release (October 2008) says that in India, some 70% of the female workforce is engaged in agriculture yet only 10% of women farmers own land[19]. An online database by FAO[20] corroborates this figure (as 9.5%) based on India's 1995–96 Agricultural Census. Gender-disaggregated data collected by the Agriculture Census records holdings operated and managed by women, not owned by women. The latest Ministry of Agriculture Annual Report 2010–2011 has a table devoted to 'Women in Agriculture at a Glance' with no information on ownership of land.

Political power

Through India's 14 general elections, representation of women in Parliament, State legislatures, political parties and other decision-making bodies has been abysmally low. Less than 8% of Parliamentary seats, less than 6% Cabinet positions, less than 4% of seats in High Courts and the Supreme Court have been occupied by women. Only less than 3% of the administrators and managers are women. The average percentage of women's representation in the Parliament, Assemblies and Council of Ministers taken together has been around 10 percent[21].

Women and environment is not a key focus in India's 11th Five Year Plan which is the platform through which the NAPCC Missions will be implemented.

those women whose husbands have migrated from taking up work that can help them do afforestation or build small watersheds.

Women and environment is not a key focus in India's 11th Five Year Plan, which is the platform through which the NAPCC Missions will be implemented. India's adaptation-focussed Missions, to be implemented through their nodal Ministries under the overall five-year Plan documents, are expected to run for the remaining part of the ongoing 11th Five Year Plan (2007-2012) and the 12th Plan (2012-2017). The same holds true for all State-level climate change plans. The approach paper to the 11th Five Year Plan, however, clearly states that the Plan will focus on violence against women (VAW), women's economic empowerment and women's health. Women's economic empowerment is focused on unorganized and home-based labour, not on women's work with natural resources – land, water and forests. A reading of the Plan's chapter on 'Environment and Climate Change' reveals how women are completely missing in the whole discussion.

19 http://www.actionaid.org/drc/index.aspx?PageID=%203787 accessed on February 1, 2011

20 http://www.fao.org/gender/landrights/report/#bib_country_id=56 accessed on April 15, 2011

21 UNIFEM, 2000, as quoted in the paper by Malathi Subramaniam "Human Rights, Gender & Environment"

This is despite the fact that women's work with natural resources is well documented in the January 2007 Report of the Sub-group on Gender and Agriculture (Box 4.2), submitted to the Planning Commission Working Group on Gender Issues, Panchayat Raj Institutions, Public Private Partnership, Innovative Finance and Micro Finance in Agriculture for the 11th Five Year Plan. It is clear that women do more work than men to grow our food, manage livestock and fisheries and collect water, fodder, fuel and forest produce. This official recognition is very welcome, being the first step towards involving women in owning, accessing, managing and utilising natural resources for their livelihoods and in helping them drive adaptation interventions. The challenge here is to translate this official recognition into gender-just policies and gender-just budgeting as a cross-cutting theme in the Adaptation Mission documents.

Thus, at one level, the 11th Five Year Plan (GOI 2008) does recognise that women are the principal stakeholders in natural resource use and management. The section on agriculture observes that there are an increasing number of women farmers among the 85% of India's farmers who are small and marginal. Also, more women constitute agricultural casual labour while more men take up wage labour in the non-farm sector. Further, women doing casual labour are poorer than men doing wage labour. There is a 'feminization of the workforce in agriculture' and an increasing incidence of female-headed households. Women are also the main workers in horticulture, livestock and fisheries. About 90% of those involved in marine products are women.

At another level, time spent on the above activities is not counted because these activities are part of the informal economy and not the market economy. The 1933 guidelines for the System of National Accounts (SNA) used in India mandates that production of all goods, for sale in the market or for own consumption, can be included as part of the national income. India has also piloted collection of time-use data through expenditure that includes consumption of firewood, fruits, vegetables etc. through own resources, In practice, however, India's GDP does not reflect women's gruelling hours spent in subsistence farming.

Box 4.2

Report of the Sub-group on Gender and Agriculture, Planning Commission 2007

Women work extensively in production of major grains and millets, in land preparation, seed selection and seedling production, sowing, applying manure, fertilizer and pesticide, weeding, transplanting, threshing, winnowing and harvesting; in livestock production, fish processing, collection of non-timber forest produce (NTFP) etc. In animal husbandry, women have multiple roles ranging from animal care, grazing, fodder collection and cleaning of animal sheds to processing of milk and livestock products. Keeping milch animals, small ruminants and backyard poultry is an important source of income for poor farm families and agricultural labourers. Landless women agricultural labourers play a pivotal role as they are involved in most of the agricultural operations. Landless women also lease in land for cultivation. The majority of workers involved in collection of non-timber forest produce (NTFP) are women, particularly tribal women. Women also augment family resources through tasks such as collection of fuel, fodder, drinking water and water for family members and domestic animals.[22]

In the wake of climate change impacts and more work hours added, it becomes critical to adopt statistical methodologies to value and include time-use statistics for this work into the country's gross national income.

This is also mandated by the Platform for Action (PFA) adopted by UN member countries including India at the Fourth World Conference on Women in Beijing in 1995. The PFA called for developing 'suitable statistical means to recognise and make visible the full extent of the work of women and all their contribution to the national economy including their contribution in the unremunerated and domestic sectors, and to examine the relationship of women's unremunerated work to the incidence of their vulnerability to poverty.'

Integration of time-use statistics will mean the Census of India will record women's productive work correctly. This will influence India's development policies and programmes to be more gender-sensitive and gender-transformative. The same continuum holds true for climate change adaptation or climate proofing policies and programmes.

India's GDP does not reflect women's gruelling hours spent in subsistence farming. In the wake of climate change impacts and more work hours added, it becomes critical to adopt statistical methodologies to value and include time-use statistics for this work into the country's gross national income.

22 Maithreyi Krishnaraj and Amita Shah, Women in Agriculture, Academic Foundation, 2004; Notes sent by E. Revathi, CESS, Hyderabad; V. Prameela and Nina Bijoor 2002. Improving the Lot of Women in Agriculture, Sampark, Bangalore, through Solution Exchange; note from Geetha Kutty subgroup member; Aasha Kapur Mehta et al., The Budget: A Gender and Poverty Sensitive Perspective, National Commission for Women, 2004; CP Sujaya (2006), Climbing a Long Road, MSSRF, Chennai.

"Climate change needs quick decisions...we can't be dependent on our men to take these decisions when they are not even here to do all the work!"

Gender 'equity' in 11th Plan unequal

A short section on 'gender equity' in the 11th Five Year Plan seeks to 'ensure women's rights to land and infrastructure support.' This section proposes:

- Women's names should be recorded as cultivators in revenue records on family farms where women operate the land having ownership in the name of male members.
- The gender bias in functioning of institutions for information, extension, credit, inputs, and marketing should be corrected by gender-sensitizing the existing infrastructure providers.
- Women's co-operatives and other forms of group effort should be promoted for the dissemination of agricultural technology and other inputs, as well as for marketing of produce.
- Wherever possible a group approach for investment and production among small scale women farmers, be it on purchased or leased land, should be promoted. Women farmers are typically unable to access inputs, information, and market produce on an individual basis. A group approach would empower them.

The gender equity section begins with a gender-neutral provision – that of giving women the right to be a cultivator but not an owner. Even after recognizing women's larger role in managing natural resources, the 11th Plan persists with a strong gender bias. In fact in the section on agriculture, the language of the 11th Plan is almost dismissive of land rights for women where it states: '…credit has grown at unprecedented rates (30% per annum) to other sectors but not to small and marginal land holders and (to) women who lack collateral security. *Besides issues such as rights to land* (emphasis added) it is now well recognized that the poor are best empowered if they function as a group rather than as individuals.'

Every provision in the 'gender equity' section ranges from being gender-blind to gender-neutral. A gender-transformative policy would make cultivators who operate land owners of that land. This would provide collateral to women farmers who will then be able to access credit. It would also necessarily make them key audiences for extension workers. Most significantly, owning land would empower women economically as well as socially and politically – as individuals in their own right and not as part of a successful group.

Land is not only a sensitive issue in any agriculture-dominant country like ours but it is also integral to the owner's economic well-being and, more importantly, to the owner's social status and political power within and outside the household (Agarwal 1994). "Climate change needs quick decisions… we can't be dependent on our men to take these decisions when they are not even here to do all the work!" said the women in village Janakpur, Uttar Pradesh. So should land be in their name? "We have to demand our right to land," said Putla. "When land is in my name, no one can ask us to leave when my husband is not here (meaning, has migrated for seasonal work)." Should land be jointly owned or separately owned? Women had different opinions. Some said joint, some said individually. Dhoopa, having sat quiet through the discussion, finally said, "We should own land individually. One bigha[23] in my name, one bigha in my husband's name." Other women all nodded in agreement.

Some states have embarked on issuing joint pattas (land title deed) in the name of spouses when land is distributed to landless and

Adaptation interventions re-green semi-arid fields in Mahbubnagar, AP

23 1 bigha equals about 1 acre; approximately 2.5 acre equals 1 hectare.

marginalized people (read that as 'men') or even when houses are re-built after a disaster, as in Kerala after the Tsunami. While joint pattas are gender sensitive, individually owned pattas will be truly gender-transformative. Just inheritance laws are not enough. This needs to be strengthened with distribution of land to both women and men, laws that ensure land to the tiller and give long-term leases for common land or government land to women farmers.

That gender 'equity' will be possible by just sensitizing extension workers is also skirting real issues. There are limitations at several levels. For one, the 11th Plan itself acknowledges that India's agriculture extension services, the largest in the world, anyway focuses more on the progressive and bigger farmers than on the small and marginal ones; small women farmers are obviously completely at the margins of this machinery, even among the small and marginal farmers who may gain some benefit from extension services. The Plan also notes that the government's 'minimum support price' for farm produce also benefits the bigger farmers because small and marginal farmers have low surpluses which are 'at times' pledged to moneylenders for a loan. The reform of the agriculture extension work does envisage 'mainstreaming of women' but this has not meant gender equity in extension staff.

Culturally, women are not only denied ownership rights to productive assets like agricultural land and property including homesteads, but also to financial capital and even equipment and technology. The provision under gender equity above deepens this divide by only envisaging access to technology and marketing through groups rather than as empowered individuals. This is again a gender-neutral provision. Of course, because women's time and labour is not recognized, leave alone valued, their need for labour saving technology is also not catered to. In the wake of climate change, as discussed in the earlier chapter on adaptation interventions, the role of appropriate technology will be critical for climate change adaptation and climate change proofing. The need for re-discovering women's traditional knowledge and technologies must also be a driving force for climate change adaptation. This includes going beyond viewing marketing as just an income generating enterprise but to see it also as a non-farm enterprise, an adaptive mechanism. Here again women's traditional knowledge about food processing needs to be tapped. The 11th Plan does not factor these imperatives that can help women adapt to climate change.

While working through women's groups has proved beneficial and has its share of merits, it cannot be the 'best' empowering avenue for women farmers' livelihoods security. Women's groups are good as an entry point but the aim has to be empowerment of every women member, irrespective of whether she belongs to a group or not. As women from village South Gayadham, West Bengal, for instance, pointed out: "We are getting better respect now as we got involved in SHGs and are saving money, growing vegetables in our kitchen gardens, raising hens etc. We provide loans to our husbands too from our savings. But for rice cultivation, men think they are to take all the decisions."

The Ministry of Rural Development's main strategy to organize rural women has been the formation of self-help groups (SHGs). These groups are expected to achieve a variety of objectives – basic health and hygiene awareness, literacy, social advocacy (e.g. for prohibition) besides economic independence of the women through savings and micro credit and income generating activities. SHGs have improved access to credit for poor women who are now perceived even by the mainstream financial sector as credit

"We are getting better respect now as we got involved in SHGs and are saving money, growing vegetables in our kitchen gardens, raising hens etc. We provide loans to our husbands too from our savings. But for rice cultivation, men think they are to take all the decisions."

Rajmati brings out an irrigation pipe from the Agro Service Centre the village women run. Even the Sarpanch takes equipment on loan from women here in village Sadhey Khurd, district Sant Kabir Nagar, UP

worthy. Women have used savings and credit to overcome climate-related risks such as crop failures, loss of livestock, droughts, floods and cyclones though often this has benefited both men and women. Women have also used their SHG funds to pay off debts incurred solely by their menfolk. NGOs working on adaptation interventions have successfully used these SHGs as their entry points for mobilizing women and adoption of specific adaptive mechanisms like grain banks and resource centres for agricultural equipment.

Yet, because SHGs are women-focused, this strategy of forming SHGs is gender-sensitive and not gender-transformative. Intervening through SHGs also means leaving the men with lesser responsibility to adapt.

The 11th Plan notes that 'the number of SHGs formed under the Swarnajayanti Gram Swarozgar Yojna (SGSY) is very large, but there is a feeling about whether such large numbers mean anything from the point of view of poverty alleviation.' If SHGs have not helped overcome the gender bias in development, then this is an insufficient route to adaptation and 'group empowerment.' Low levels of skills within SHGs has been identified by the 11th Plan as one major area of concern. For climate proofing, this gap would have to be necessarily filled. Even where SHGs have done better, like in the state of Andhra Pradesh, it has required a very strong hand-holding by the government as well as several NGOs. Institutionally, women's SHGs have proved to be a strong community institution for adaptation interventions where these have been well supported by NGOs and/or government institutions. Yet, because SHGs are women-focused, this strategy of forming SHGs is gender-sensitive and not gender-transformative. Intervening through SHGs also means leaving the men with lesser responsibility to adapt.

'Rights' language missing, especially for women

It is easy to understand why the gender equity section above does not talk about land rights even though the government must have a land rights policy that guarantees land rights to both genders. There is no mention of 'rights' over water resources or even forests in the 11th Five Year Plan documents. Local men and women have usufruct rights over local forests but are not in practice the real managers, despite the government's Joint Forest Management programme. This perhaps also explains why the National Adaptation Missions also steer clear of the 'rights' language. The Water Mission mentions rights but does not elaborate on them, nor recognizes the need for women to enjoy these rights.

In the section on forests, the 11th Plan gives due recognition to gender roles, stating that it is crucial to ensure equal representation of women in the decision making and implementation processes in participatory planning and development programmes. This gender-responsive approach applies to the government's Joint Forest Management (JFM) programme which stipulates 50% participation of women in JFM institutions and at least 33 percent of the membership in the JFM Executive Committee/ Management Committee. Decisions are to be 'based on their (women's) considered opinions.' In fact, Joint Forest Management is the only government-supported institutional approach where women are explicitly involved to manage a natural resource and they have usufruct rights over the forests. A national-level evaluation[24] of about 500 Joint Forest Management Committees in 2004-05 across 13 States revealed that the effectiveness of the institutions was 50% with a strong correlation to resource management. Criteria included clarity and purpose of roles, institutional mechanisms, capacity of JFM Committees, resource management, impact on forest profile as well as socioeconomic aspects such as household income, village development level, women's empowerment and social unity.

The Forest Rights Act[25] recognizes community rights over forest resources for traditional forest dwellers or tribal people, ensuring ownership rights over forests as common property resources for the first time at the national level. The Act empowers the Gram Sabha, comprising all village women and men in the given village panchayat, the right to take decisions over 'their' resource. This 'bottoms-up' decision making empowers Gram Sabhas to:

- Identify the local community forest

24 The study was conducted by the Indian Institute of Bio-Social Research and Development and is mentioned in the 11th Five Year Plan

25 The Scheduled Tribes and other traditional forest dwellers (Recognition of Forest Rights) Act, 2006 (hereafter, Forest Rights Act)

resources to be managed under the Act's provisions.

- Receive, consolidate and verify claims on individual and community rights, and pass appropriate resolutions on the claims.
- Ensure protection and conservation of forest and biodiversity resources, and
- Check any activity which could affect the natural and cultural heritage of the forest-dwelling community.

While the Act is applicable to all forest communities, state governments are implementing it in tribal areas only. In Himachal Pradesh, for instance, where 67% of the area is deemed to be under forests, almost all villages should implement this Act. Even before this Act was passed, the state provides for gram sabhas to pro-actively participate in deciding which trees are to be afforested and to manage afforestation with the support of the forest department. "At least 50% of the plantation has to be done through the Joint Forest Management Committee," said a very senior forest official in Shimla, State headquarters of Himachal Pradesh. "We have also said we prioritise timber trees (40%), wild fruit bearing trees like Amla, Mahua, (40%) and medicinal plants (20%)." The Participatory Forestry Rules 2001, in fact, are very progressive, providing for village development societies to make micro plans for forest management. Yet, Shreshta from village Dhiman, block Rait, district Kangra said this seldom happens in practice: "No one really asks us villagers," she said. "The forest department people plant whatever they want to. So villagers are often angry and they don't nurture the trees." Urmila Katoch, Sarpanch from village Lanjhni, Rait Block, Kangra district, said she had helped plant a lot of medicinal plants but with the help of the local NGO. "No one from the government came to do this here," she said.

Medicinal plants are indeed popular with women in Himachal because they can be used domestically and have a good market in a State that promotes the pharmaceutical industry. Yet, the State policy does not prioritise fodder or fuelwood trees. Women said the large-scale plantation of chir (pine) trees by the forest department for its timber has led to loosening of the soil and lowering of the water table so it is difficult for broad-based leafy trees that provide them with fodder and fuelwood to grow. Obviously, despite JFMs and women's mandated participation by the guidelines, forest cover has decreased and the firewood crisis has grown (Agarwal, 2010) in India.

In another policy development, rural women living below the poverty line are provided with financial assistance to raise nurseries in forest lands. This will help rejuvenate the forests and provide income to women but the policy remains in the 'welfare' framework rather than the 'rights' framework. This policy does not meet women's strategic need of empowerment because they do not have a say in the governance of forests on which they are dependent for their livelihood and food security. Gender issues are also part of the training curriculum of the Indian Forest Service (IFS) officers. Women's practical needs are also addressed through programmes focused on providing non-wood energy sources to rural women, including sources such as biogas and solar power.

Government policies 'encourage women's "participation" in community resource management and watershed programmes,' not ownership of water resources. India's National Water Policy 2002 provides for formation of 'Water Users' Associations' involving direct consumers and local governance institutions – municipalities and gram panchayats – to operate, maintain and manage water

Urmila Katoch, Sarpanch from village Lanjhni, Rait Block, Kangra district, said she had helped plant a lot of medicinal plants but with the help of the local NGO. "No one from the government came to do this here," she said.

Basket of livelihoods on a small patch of land to adapt and get fish, poultry, vegetables, fruits and grains in flood-prone UP

Ramrati, women farmer teaches adaptation techniques in flood-prone UP

infrastructure/facilities. In practice, several studies have shown that membership rules allow only those who own land to be members of the Associations so that leaves women out. Women are also not present because meeting times don't suit their schedules and they hardly take part in decision-making (Phadnis et al, 2010). In the context of climate change, this governance space given to local stakeholders is positive for climate change adaptation but this provision is again gender-neutral.

The National Policy for Farmers 2007 also calls for women's 'enhanced role in accessing and managing water resources,' not having ownership rights over water bodies. Wells on private fields also belong to men who own those farms. Thus, for instance, women in village Madirepalli in drought-prone Anantpur, may be responsible for 60-70% of the farm work and may have catalysed their menfolk to share water from the tubewells on their farms with all farmers in their village, but the ownership of the water sprinkler unit given by the government to the donor farmer remained with men who owned the farm in their name.

The National Policy for Farmers 2007 also calls for women's 'enhanced role in accessing and managing water resources,'

The Water Policy Review provides for training women in repairing and maintaining water sources – focusing only on drinking water, not water for livelihoods. The United Progressive Alliance (UPA), the current coalition government at the Centre, in its manifesto, the 'Common Minimum Programme (CMP) 2004' promises involvement of rural women and their associations in 'managing' water-related development schemes, not having water rights. The CMP also focuses on drinking water, sanitation, primary education, health and nutrition, not on water for livelihoods, including for agro-processing and the livestock, as well as for domestic chores such as cooking, cleaning and washing. The CMP is gender-blind to this extent.

In a recent development, the Coastal Regulation Zone (CRZ) notification 2011 has, for the first time ever, provided for communities living along India's 7,500 km coastline to shape the development plans in their own region but is silent on the need for women to participate in this forum. In the fisheries sector, where women are involved heavily in net making/mending as well as processing and markeing of fish and other marine products, women fish workers are offered financial and technological help from the National Bank for Agriculture and Rural Development (NABARD), India's apex financial institution for agriculture and rural development, though few women are able to avail of it. NABARD also takes the route of SHGs with women achieving some of their practical needs.

Women's work in climate-sensitive fishing households is often informal and rarely remunerated.[26] Women's testimonies[27] at a 2009 public hearing revealed that due to sea level rise and sea ingress, women had less space on the beach for post-harvest activities including fish processing. The fall in fish production was also forcing them to take up other livelihood options including wage labour in agricultural fields and domestic work. Ground water aquifers were also getting depleted and becoming saline so getting water had become a problem.

In village Sagarmadhabpur, Sunderbans, West Bengal, for instance, women have broadened their livelihoods basket to include domestic work, bidi (local cigarette) binding, making bamboo containers and doing other thread work. In some other villages women also take up work in brick manufacturing units. India

26 http://www.fao.org/gender/gender-home/gender-programme/gender-fisheries/en/

27 At a public hearing on 'coastal communities and climate change' organized by Oxfam India, Centre for Education and Communication (CEC), et al in Pondicherry in October 2009 as a run-up to the UNFCCC conference in Copenhagen.

is planning to come up with a fisherfolks' rights act to ensure that communities living by the coast and using sea resources for their livelihoods will have the right to possess land and build habitations near the coast, have rights over fish and other products of water bodies, and the rights to protect, conserve or manage resources in coastal areas or in sea. The draft legislation is tentatively called the 'Traditional Coastal and Marine Fisherfolk (Protection of Rights) Act, or just Fishermen Rights Act and is out for public discussion. Rights of fisher women are currently unrecognized in government policies and so far there is no hope that the draft legislation will be gender-sensitive, leave alone gender-transformative.

Gender in the Adaptation Missions and State Climate Plans

The first among the seven principles that guide the NAPCC, is 'protecting the poor and vulnerable sections of society through an inclusive and sustainable development strategy, sensitive to climate change.' India's nodal climate change plan, notes that the impact of climate change would prove 'particularly severe for women' for it would lead to possible decline in availability of food grains, scarcity of water, reduction in yields of forest biomass and increased risks to human health with children, women and the elderly being the most vulnerable within a household. The threat of malnutrition may also rise. The Plan observes that 'special attention should be paid to the aspect of gender….in each of the (climate) adaptation programmes.'

A gender analysis of the four adaptation-focused Missions, however, reveals that there is no additional focus on gender issues, especially strategic needs of both genders, in the national Missions. Of course, the fact that the Missions are simply going to be implemented through ongoing programmes and schemes is one reason. The adaptation Missions ignore the central role that women need to play in being part of the solution – by being part of the vertical decision-making apparatus, having ownership and control over productive resources and being the knowledge managers in climate proofing.

It may be pointed out here that the NAPCC has been put together by a high-powered, male-dominated (just 2 of the 26 members were women) Council headed by the Prime Minister with no involvement of practitioners on the ground or even a representative from the Ministry of Women and Child Development. NGOs on the Council were engaged in climate technology, research and advocacy, not direct interventions with women most vulnerable to climate change and critical to the success of adaptation. Thus, the missions are more techno-managerial in their approach with no space for 'bottoms-up' learning from successful adaptation experiments on the ground and from agents of change. Vulnerability studies focus on physical changes, not on the social dimensions of these changes.

National Mission on Sustainable Agriculture

The Mission envisages 'development' that is 'ecologically sustainable, creates a prosperous but not a wasteful society and is self-sustaining.' Development also needs to be socially just. This social dimension of development, equally important for building successful adaptation components, needs to be part of the Mission's guiding Overview section. The missing social dimension reflects in the Mission's Risk Analysis Framework which is purely technical in nature without social risks analysis being part of the Framework. The Mission is focusing on 100 most vulnerable districts to implement adaptation measures through the ICAR with the Central Research Institute for Dryland Agriculture (CRIDA) as the nodal institute for this.

Climate change and sea-level rise threatens the Sunderbans

The Mission, that affects the everyday lives of so many women, has been developed by technical research organizations and government functionaries, without any consultations or inputs from gender experts. The Mission document is still not complete and only an outline has been put up on the internet for public discussion. An earlier draft that was circulated among some members of civil society reportedly stands rejected. Considering that the Mission will take forward the government's main agricultural policies, a quick analysis (Table 4.1) shows that these policies are primarily gender-sensitive and only partly meet women's strategic needs.

There exists a 'gender task force' in the Ministry of Agriculture. The National Gender Resource Centre in Agriculture (NGRCA) aims to mainstream gender into all agriculture policies and programmes. It also functions as an advisory body for agriculture-related areas for other ministries. Besides undertaking or commissioning studies on how to mainstream

Table 4.1 Women in Agriculture at a Glance

Sl. No.	Division/ Subject Matter Area	Scheme/Component	Flow of benefit to women in schemes/programmes	Gender Analysis
1	Horticulture	National Horticulture Mission	The State Horticulture Missions have been directed to earmark at least 30% of the budget allocation for women beneficiaries in all ongoing programmes	Gender sensitive/Essentially meets women's practical needs
		Technology Mission for Integrated Development of Horticulture in North Eastern States, Sikkim, Jammu & Kashmir, Himachal Pradesh and Uttaranchal (TMNE)	During 2010-11 (upto Jan 2011) 81946 women entrepreneurs have been trained on different aspects of horticulture and 9087 Women SHGs have been established.	Gender sensitive/ Also satisfies women's strategic needs
2	Macro Management		The States have been instructed to allocate funds for SC/ST women farmers proportionate to their population and utilize the 10%-20% provided under "New Initiatives" for implementing activities for gender empowerment, development and to include Schemes which encourage group formation among Women/ SC/ST farmers in the Work Plan. During the financial year 2010-11, over 20 lakh women farmers have benefited under the scheme.	Gender sensitive/ Partly meets women's strategic needs
3	Agricultural Extension	Support to States for Extension Reforms	Minimum 30% resources meant for programmes and activities are allocated for women farmers and extension functionaries. Since inception of the scheme in 2005-06, total 26.74 lakh farm women have participated in farmer oriented activities like exposure visit, training, demonstrations, trainings & kisan melas (farmers' fairs) including 3,89,503 women farmers benefited during 2010-11 (up to January, 2011) i.e. 55,602 through exposure Visits, 96,268 through trainings, 24,855 through demonstrations and 2,12,778 through kisan melas.	Gender sensitive/ Essentially meets women's practical needs
		National Gender Resource Centre in Agriculture (NGRCA)	Focal point for convergence, coordination and mainstreaming gender concerns in agriculture. During 2010-11, 127 extension functionaries have been sensitized through 9 training programmes.	Gender sensitive/ Contributes to both practical and strategic needs
		Mass Media Support to Agriculture Extension	Special programmes are being produced and telecast by Doordarshan & AIR in areas of predominant involvement of women such as vermincompost, nursery-raising, seed treatment, floriculture, kitchen garden, animal husbandry, dairy, poultry, drudgery reducing/gender friendly tools etc.	Gender sensitive/ Essentially catering to practical needs
		Establishment of Agri-Clinics and Agri-Business Centres (ACABC)	During 2010-11 (up to December 2010), 121 women agriculture graduates have been trained, of whom 45 trained graduates have set up their ventures. The credit-linked back-ended subsidy @ of 33% of the capital cost of the project funded through back loan is eligible under the scheme. The subsidy is 44% in respect of candidates belonging to SC/ST, Women and other disadvantaged sections and those from North-Eastern and Hill areas.	Gender transformative since it explores 'male' spaces for women/ Addresses both practical and strategic needs

continued...

Table 4.1 Women in Agriculture at a Glance (continued)

Sl. No.	Division/ Subject Matter Area	Scheme/Component	Flow of benefit to women in schemes/programmes	Gender Analysis
4	Cooperation	Intensification of Cooperative Education in the co-operatively underdeveloped states	National Cooperative Union of India (NCUI) is running four exclusive development projects for women viz., Shimoga (Karnataka); Berhampur (Orissa), Bhopal (MP) & Imphal (Manipur). 'Special Women Development component' – a part of each Field Project caters to the training and extension and marketing needs of women. One women educational and development project is running in North Eastern Region at East Imphal, Manipur. About 71 women members are reported to be on the Board of Directors of some of these Cooperatives and about 1354 members are expected to get employment through activities of the cooperatives. The cumulative outlay during the financial year 2010-11 for the women development of cooperative societies exclusively organized by women including Food Grain Processing, Plantation Crops, Oilseed Processing, Fisheries, Integrated Cooperative Development Projects (ICDPs), Spinning Mills, Handloom and Power loom Weaving and Super Mills etc. is Rs 6.40 crores out of which Rs 1.72 crores has been released upto December 2010.	Gender sensitive/ Essentially addresses women's practical needs
5	Rainfed Farming System	National Watershed Development Project for Rainfed Areas	Since 2007-08, 24,438 Women Self Help Groups and 18,075 User Groups of Women have been formed in the project areas covered under the programme.	Gender sensitive/ Limited contribution to women's strategic needs
6	Crops	National Food Security Mission (NFSM)	States have been advised to set aside at least 33% of the total allocation for small and marginal farmers, including women farmers.	Gender sensitive/ Addresses women's practical needs
7	TMOP	Integrated Scheme of Oilseeds, Pulses, Oil palm and Maize (ISOPOM)'	Directions have been issued to the State government to ensure 30% of the allocation should flow to women farmers. Therefore, in components like distribution of agricultural inputs, training and demonstration, etc preference may be given to women headed house-holds. Under the scheme, assistance of Rs 15,000 is also provided for 210 meters of pipe for carrying water from the source to the field. Small/marginal, SC/ST and women farmers are also provided to a maximum of 4 ha per beneficiary for the development of Oil Palm. Further, the assistance provided to women farmers for drip irrigation component is 50% of the cost (with ceiling ranging from Rs. 7,400 to Rs. 9,300), whereas, for other categories it is 35% (with a ceiling of Rs. 5,200 to Rs. 6,500).	Gender sensitive/ Addresses women's practical needs
8	Mechanization & Technology	Promotion and Strengthening of Agricultural Mechanization through Training, Testing and Demonstration	During 2010-11 (upto December 2010), around 2,925 gender friendly tools / equipments have been distributed among farm women and 499 women have been imparted training at Farm Machinery Training and Testing Institutes.	Gender sensitive/ Does address women's strategic need of reducing drudgery
		Outsourcing of training & Demonstration of Newly Developed Agricultural Equipment including Horticultural Equipment at Farmers' Fields	Separate physical targets have been fixed for women farmers and 30% of the funds have also been allocated for them. List of about 30 identified gender friendly tools/equipments developed by Research & Development Organization for its use in different farm operations has been sent to all States/UTs for popularizing them.	Gender sensitive/ Does address women's strategic need of reducing drudgery
		Post Harvest Technology & Management through Demonstration, Distribution and Outsourcing of Training	732 demonstrations have been conducted out of which 512 were exclusively for women farmers. The flow of funds to women farmers during 2010-11 (upto November 2010) has been to the tune of Rs. 80.36 lakhs.	Gender sensitive/ Does address women's strategic need of reducing drudgery

continued...

Table 4.1 Women in Agriculture at a Glance (Contd...)

Sl. No.	Division/ Subject Matter Area	Scheme/Component	Flow of benefit to women in schemes/programmes	Gender Analysis
9	Integrated Nutrient Manage-ment (INM)	National Programme for Organic Farming (NPOF)	25% seats have been reserved for training of women in organic farming.	Gender sensitive/ Addresses women's practical needs
10	Agricultural Marketing	Rural Godown Scheme	Under institutional lending a back-ended subsidy as term loan is provided by the banks up to a minimum of 50% of the project cost. The projects belonging to women farmers, SC/ST entrepreneurs and self help groups, cooperatives located in the NE states/ hilly areas (i) the owner's minimum contribution is 20%, whereas, for others categories it is 25%, (ii) Subsidy from Government is 33.33% compared to 15% for other categories and (iii) the minimum term loans from eligible financing institutions is 46.67% for women farmers, SC/ST entrepreneurs and self help groups, cooperatives located in the NE states/hilly areas and 50% for all other categories.	Gender sensitive/ Addresses women's practical needs

Source: Annual Report 2010-2011 of Department of Agriculture and Cooperation, Ministry of Agriculture; Gender Analysis column added by author.

There is space for farmers' groups to sit on decision-making platforms of some these schemes though women's representation is enabled through self-help groups, seldom in their individual capacity as a farmer/ cultivator.

gender within the department, the main tool used by the NGRCA for gender mainstreaming is gender sensitization and capacity building of extension workers – though not much work seems to have been done on swelling the number of women extension workers to at least half of the total force.

Though agriculture falls under the purview of State governments, being in the State List of Legislative Powers under Part XI of the Indian Constitution,[28] the Centre has the power to make national-level guidelines and support the States where needed. The reform of the agriculture extension programme by the Centre's support is done through specific schemes, some of which have earmarked certain budget proportions, capacity building components, financial aid and technological assistance for women farmers. There is space for farmers' groups to sit on decision-making platforms of some of these schemes though women's representation is enabled through self-help groups, seldom in their individual capacity as a farmer/cultivator. Thus, the policy framework does include structured institutions to accommodate a bottoms-up demand driven governance structure.

Mention must be made of the district-level Agriculture Technology Management Agency (ATMA) programme under The National Agriculture Technology Project (NATP) wherein 30% of the reservation in the ATMA General Body is for women farmers and 30% of the funds are to be utilized for women farmers. Unfortunately, in practice, male members and government functionaries, including elected Panchayat leaders simply nominate women and go to their homes to get their thumb impressions/signatures. The overall bias against women farmers participating in agriculture-related decision making bodies needs to be first overcome. This can be done through capacity building of men and women stakeholders and in collaboration with NGOs and other civil society groups including gender experts. If climate change adaptation is development-plus, the gender gap needs to be first bridged before women can pro-actively become change agents in climate proofing. The help of external agencies like NGOs and gender groups is necessary here.

Unfortunately, as the earlier chapter reveals, several NGOs too have yet to cross gender barriers and so hardly any NGO promotes women farmers to become trainers and be invited as resource people at extension workers' training programmes. But there are exceptions of individual excellence. "I run a Kisan Vidyalaya (farmers' school) and am the Master Trainer," said Meera Ghowdhuri from

28 Under the Indian Constitution, legislative powers are divided between the federal government at the Centre and the State governments through three lists – the Union List, the State List and the Concurrent List, with the last List being under the jurisdiction of both the Centre and the States. Agriculture is within the purview of the State List.

village Janakpur, block Campierganj, district Gorakhpur, Uttar Pradesh. "Women farmers discuss agricultural problems with me, we get the soil tested for different nutrients and even call in the government veterinarian when needed." Isravati laughed and said, "I am a Super Master Trainer! I go as a trainer to the ATMA farmer field school. I teach women farmers and also galvanise them to collectively put their problems on paper, with their thumb-impressions so that we can give it to the relevant government officers. I go to the block-level government officer with our problems, call in the various government officials we need and even call people from the Krishi Vigyan Kendra to come and help us." Meera and Isravati are both successful farmers and are learning how to adapt to climate changes in their village which becomes water logged during the flooding season. They attribute their success to the local NGO which has a mission to empower women farmers (Box 4.3)

Box 4.3

"Woman exemplar award" for better farm management, 8th April 2011

Ramrati, a poor woman farmer from village Sarpataha, block Campierganj, district Gorakhpur, was honored for her excellent 'farm management' by Confederation of Indian Industry (CII) which awarded her with the Woman Exemplar Award in April 2011. She received Rs 1 lakh for her contribution to the field of micro-enterprise on Sustainable Agriculture.

Fifteen years ago, Ramrati was a poor agricultural labourer. With the assistance of Gorakhpur Environmental Action Group (GEAG), a local NGO, Ramrati soon excelled in several farming techniques in her flood prone village. Member of a Self Help Group, Ramrati began using organic compost to regain the fertility of her land and started growing vegetables along with oilseeds, wheat and rice on her one acre of land. She also planted fruit trees like banana and guava. She has established herself as a very successful farmer, able to adapt to climate vagaries like hotter summers, erratic rainfall and floods in her village.

Though illiterate, Ramrati utilizes every inch of her land, doing intensive and integrated farming. She produces 30-35 crops from her one acre land in a year. Skillful management of her small land has made her a resource person at the government's Farmer Field School. Trainees from all over the district regard her land as a model farm and learn from it. Today, she is counted among one of the most progressive farmers. In addition to farming, she also makes candles and is a Master Trainer for seed production. She teaches her trainees how to gain from farming using minimum capital and resources and how to climate proof their farm by spreading risks across several crops through inter-cropping and mixed farming. The crops mature at different times. The paddy varieties used mature early and are harvested before the floods reach the village .

Source: http://www.geagindia.org/ramrati.html

Rural Development Ministry and Climate Proofing

The Rural Development Ministry is not a nodal ministry for any of India's adaptation-focused national Missions but its mandate of on-farm and off-farm rural livelihoods as well as safety nets for poor women and men makes it critical for climate proofing. Two of the key programmes worth mentioning are:

- The path-breaking Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA). A 2009 (Tiwari et al, 2011) study using rapid scientific assessment methods in 20 villages in district Chaitradurga, Karnataka, assessed the environmental benefit of MNREGA activities such as water conservation and harvesting, irrigation provisioning and improvement, renovation of traditional water bodies and land development to find that agriculture production and water availability increased despite uncertain rainfall, water stress and declining soil fertility.
- Mahila Kisan Sashaktikaran Pariyojana (MKSP) or 'Women Farmers' Empowerment Programme' under the National Rural Livelihoods Mission (NRLM) which gives an unprecedented recognition to women farmers at the national level. The programme seeks to empower small and marginal women farmers economically and technically, help them secure inputs like water, seed subsidy and credit and manage their productive resources (Table 4.2).

The MKSP notes that 'almost all women in rural India can be considered as "farmers" in some sense, working as agricultural labourers, unpaid workers in the family farm enterprises or a combination of the two.' That the agriculture sector employs 80% of all economically active women. Further, that women comprise a third of the agriculture labour force and 48% of self-employed farmers. Quoting from the 57th household survey by the NSSO[29], the MKSP states that 18% of farm families in India are headed by women. The NSSO survey reveals that the number of women-headed households

29 Household Survey data of NSSO 55th Round, July 1999-June 2000

Table 4.2 Women Farmers' Empowerment Programme

Specific objectives	Expected Outcomes
■ To enhance the productive participation of women in agriculture; ■ To create sustainable agricultural livelihood opportunities for women in agriculture; ■ To improve the skills and capabilities of women in agriculture to support farm and non-farm-based activities; ■ To ensure food and nutrition security at the household and the community level; ■ To enable women to have better access to inputs and services of the government and other agencies; ■ To enhance the managerial capacities of women in agriculture for better management of bio-diversity; ■ To improve the capacities of women in agriculture to access the resources of other institutions and schemes within a convergence framework.	■ Net increase in the incomes of women in agriculture on a sustainable basis; ■ Improvement in food and nutritional security of women in agriculture and their families; ■ Increase in area under cultivation, cropping intensity and food production by women; ■ Increased levels of skills and performance by women in agriculture; ■ Increased access of women in agriculture to productive land, inputs, credit, technology and information; ■ Drudgery reduction for women in agriculture through use of gender friendly tools / technologies; ■ Increased access to market and market information for better marketing of their products; ■ Increased soil health and fertility to sustain agriculture based livelihoods; ■ Increased visibility of women in agriculture as an interest group – in terms of increased number of women institutions and increase in their entrepreneurship.

in rural India is increasing. A budget of Rs 100 crore for 2010-11 has been earmarked for this programme.

While the spirit behind this programme is praise-worthy, from a gender lens, the risk that needs to be managed is ghettoization of women farmers as opposed to being mainstreamed into the existing farming system. The MKSP is built on the learnings from the Andhra Pradesh experience where the Andhra Pradesh Rural Development Department has been implementing several of its schemes, including watershed development etc, through SHGs which have federated at the sub-district and district level. Most of the village women are now members of some SHG or the other and decide what programme can be implemented where with varying degree of self-reliance and confidence. Where these SHGs and SHG federations are supported by NGOs, these women's institutions achieve more – essentially satisfaction of their practical needs more than their strategic needs.

The same holds true for MKSP. The objectives of the MKSP target practical needs of women and not their strategic needs, including working with them outside the mainstream farming systems with a separate budget. In Andhra Pradesh too, the SHGs and their federations function as parallel governance systems with the PRIs. The Panchayats are busy with revenue generating schemes and building roads and leave developmental works to SHGs. Instead, the PRIs should be mainstreaming gender and rolling out programmes that cater to both women and men farmers equally, with enhanced initial focus on women farmers to bridge the gender gap.

With a focus only on women's institutions and not on gender mainstreaming, the MKSP is a gender-sensitive approach but will not lead to empowerment of women in the real world. For instance, ownership of productive resources is not addressed by the MKSP. Again, both in Andhra Pradesh and within the MKSP, while women constitute the horizontal decision-making bodies (essentially the SHGs), women are not mandated to be present in the higher decision-making bodies. Thus, even in the MKSP, the higher decision-making bodies PAC, PSC, the Technical Support Group, the Central Advisory Body and the Programme Implimentation Agency (the implementing NGO) do not have gender-balanced membership. There are also no gender experts mandated in any of the decision-making bodies.

Climate adaptation is not built in as an integral part of the MKSP. In fact, the three year duration of MKSP projects may just be too short to prove success or failure of adaptation interventions. The MKSP should integrate

with the PRI system and be mainstreamed with the primary governance system; the MKSP must also ensure gender-balance in all decision-making fora for the Programme to become gender-transformative and satisfy women's strategic needs as well.

National Water Mission

The Water Mission is a 500-plus page document in two volumes and there is no mention of the word 'gender' or even 'women'! The gender gap in India's water policy and implementation is expected to continue, even though accessing adequate water for a variety of livelihoods-related and domestic uses is primarily a woman's job.

The Mission aim is 'conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within states through integrated water resources development and management'. On the ground, women are key players in each of these areas. The Mission provisions are gender-blind. The Mission's five goals do not use gender-responsive language:

- Comprehensive water database in public domain and assessment of impact of climate change on water resource. *A gender disaggregated water database and gender differential impact of climate change is required here.*
- Promotion of citizen and state action for water conservation, augmentation and preservation. *Recognition and promotion of women as agents of change for the above activities is required here.*
- Focused attention to over-exploited areas. *In particular, attention should be paid to water stress areas where women are walking longer distances or climate-induced water pollution like salinity has increased.*
- Increasing water use efficiency by 20 per cent. *In the household sector, women will be the main stakeholders to achieve this aim.*
- Promotion of basin level integrated water resources management. *Water rights of women and men in the basins shoud be recognized.*

National Mission for Sustaining the Himalayan Eco-system

The Mission is gender-blind with regard to the five key issues it seeks to address:

- Himalayan Glaciers and the associated hydrological consequences
- Biodiversity conservation and protection
- Wild life conservation and protection
- Traditional knowledge societies and their livelihood
- Planning for sustaining of the Himalayan Ecosystem

The lack of attention paid to gender is surprising because in its opening para, the Himalayan Mission lists areas like agriculture, forests and water where gender issues are centre-stage. The Mission states: 'The Himalayan ecosystem… includes 51 million people who practice hill agriculture and remain vulnerable. The Himalayan ecosystem is vital to the ecological security of the Indian landmass through providing forest cover, feeding perennial rivers that are the source of drinking water, irrigation and hydropower, conserving biodiversity, providing a rich base for high value agriculture and spectacular landscapes for sustainable tourism.' The section on Vulnerability Assessment does mention social impacts of climate change and identification of vulnerabilities of 'regional minority communities' but does not elaborate this, nor includes gender divides as one of the issues here.

Mixed vegetable patches ensure food security for families, AP

Himalayan Mission is technical to the core, stating that it would require joint effort of 'climatologists, glaciologists and other experts' and would need to build capacities in these areas. Even where the Mission mentions building knowledge of community-based organizations and studying traditional knowledge systems 'for community participation' in adaptation in the farming and health sectors, the Mission does not articulate the gender differentials and the need to address these differently.

Green India Mission

The draft Green India Mission document was opened for discussion at several consultations across the country but a close reading of the participants at these consultations revealed that a majority of them were forest officers. Hardly any civil society groups attended the consultations and gender balance at these consultations was heavily skewed in favour of men. The Mission proposes to continue with the existing Joint Forest Management committees with nothing mentioned about augmenting the capacities of these committees to deal with shifting vegetation and impacts on the agriculture and water table.

The dominant aim of the Mission is carbon sequestration through afforestation (to earn carbon credits in the global carbon trade later) rather than the central focus being securing women living off forests have the right to the non-timber products like wild herbs/fruits/food, fodder and firewood where no other fuel is available. The Mission document itself does not highlight the role of women in forest management and accords only a limited recognition to them as one of the stakeholders. The Mission is a continuation of India's forest policies – 'old wine in a new bottle' – with afforestation envisaged at a faster pace.

National Mission on Strategic Knowledge for Climate Change

This Mission envisages a new area of knowledge generation and knowledge-management on climate change. The Mission has fleetingly referred to the need to consolidate activities under gender budgeting and to empower women by helping them access science and technology applications. The rest of the Mission is gender-blind, including where it notes the need to 'assimilate traditional knowledge systems' without addressing the gender differentiated knowledge which has been well acknowledged (ADB 2004, CBD 2005, FAO 2003). This Strategic Knowledge Mission could have been used for:

- Recognition of women's knowledge
- Using the knowledge to influence land/water/forest-related adaptation policies
- Developing new gender-just indicators for climate proofing

Finance for Climate Proofing

Financial resources for the National Adaptation Missions and the State climate plans are also being allocated within the relevant ministries and the Plan document (GOI 2008). Several of the climate-responsive ministries and the nodal ministries/departments for the adaptation Missions have gender budget cells that earmark at least 30% of the funds for women. These include the Ministry of Environment and Forest, Department of Agriculture and Cooperation, Ministry of Water Resources and the Ministry of Rural Development to name a few.

The NAPCC states that India's expenditure on adaptation to climate variability already exceeds 2.6% of the GDP. This investment is in the sectors of agriculture, water resources, health and sanitation, forests, coastal zone infrastructure and extreme weather events. The list of adaptation-related 'areas of concern' include crop improvement, drought-proofing, forestry, water re-charge and harvesting, coastal protection, surveillance and control of vector-borne diseases, risk financing covering climate risk-linked crop insurance and credit support and the last area being disaster management. There is no list of adaptation-focused programmes provided within these areas. The challenge here is threefold: one, the heavy techno-managerial approach within these programmes; two, the lack of a focus on the most vulnerable – poor and maginalized women often being the most vulnerable; and three, the absence of the 'additional' resources to cope with the impacts of climate vagaries and invest in adaptation. In other words, climate change or no climate change, given India's

geo-climatic position, the country would anyway have to invest in these programmes.

This is proved by a rare number-crunching study (CBGA 2009) on India's announced adaptation budget, covering 146 government schemes from 22 ministries. These schemes have the potential for being used for adaptation but may not necessarily be used for that end. For instance, a large proportion of the 'adaptation' budget comprises programmes such as the National Rural Employment Guarantee Act (NREGA) which is a general poverty alleviation programme and can also be used for environmental regeneration programmes. There is no mention in any of the government documents of any additional resources being provided within any of the schemes that comprise the government's adaptation budget. Further, the study concluded that the government's expenditure on the identified 'areas of concern' was a mere 1.7% of GDP for 2006-07, in wide variance with the government's announced figure of 'exceeding' 2.6% of its GDP for 2006-07. For the four financial years (2006-07 to 2009-10) reviewed, expenditure on adaptation increased from 1.7 per cent of GDP in 2006-07 to 2.68 per cent of GDP as per 2009-10 budget estimates.

Gender Budgeting

India's Gender Budget Statement, introduced in the year 2005-06 as part of the Union Budget, lists government schemes that have 100% budget provisions for women and those where at least 30% of the budget provisions are earmarked for women. Together, this amounts to about 5-6% of the budget being allocated for women, a far cry from a more equitable 50% allocation that would be gender-just. When seen as per capita allocation, this amounts to less than Rs 1200 per year per women. Worse, several of the schemes included in the 100% allocation are not women specific (Mishra and Das, 2006). For instance, the 100% allocation includes schemes like free distribution of contraceptives and social marketing of contraceptives! It includes the Integrated Child Development Scheme (ICDS) and other child welfare schemes which cater to young children of both sexes.

Kitchen garden around the house means food security

In the budget estimate of 2006-07, the Department of Agriculture and Cooperation, under the Ministry of Agriculture, allocated just 0.03% of its resources to gender budgeting (Mishra and Das, 2006). The Department of Rural Development allocated 17.88% of its budget estimates to gender budgeting but the bulk includes schemes like the Indira Avaas Yojana, which gives subsidized houses to poor women, and not natural resources-based livelihood programmes. An analysis of gender budgeting in the context of the Millennium Development Goals (CLRA et al, 2011) for three financial years[30], 2008-09, 2009-2010 and 2010-11, reveals that none of the government schemes specifically address MDG Goal 7 – ensuring environmental sustainability. Climate change adaptation is the next step to this and has so far not been addressed in gender budgeting. Gender budgeting schemes that can be used for adaptation, like the NREGA and the Village Grain Bank Scheme, address MDG Goal 1 of eradicating extreme poverty and hunger rather than adaptation per se.

State level climate change plans

All the State governments, including the four States that are part of this study, have been mandated by the Central government to come up with State-level Climate Change Action Plans focusing on adaptation. Mitigation will be addressed nationally by the Central government. The deadline, for all States in India, for coming up with Action Plans was

30 Revised estimates for 2008-09 and 2009-2010 and budget estimates for 2010-11

short – about seven months. It was then extended by a few months. Except for Andhra Pradesh, the other three states, Uttar Pradesh, Himachal Pradesh and West Bengal, took technical help from bilateral and multilateral agencies including the UNDP, World Bank and the German GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) for making their Action Plan. This was decided at the Centre's planning meeting in August where States were asked to take outside assistance to formulate the Action Plan. In Andhra Pradesh, Environment Protection Training and Research Institute (EPTRI), a government institute, is putting together the Action Plan.

The Centre's guidelines to State governments for making their State-level Action Plans on Climate Change (SAPCC) reiterate that the 'poorest of the poor, especially the marginalised groups including women and children, will be the most affected by these changes' though this is the only articulation of gender concerns in the 12-page document. Yet, none of the State-level Climate Change Action Plans have a gender perspective built into it. To be rolled out largely through existing development programmes and schemes, planners are grappling with what needs to be done to reduce the physical vulnerability of the eco-system, not what also needs to be done first – closing the development gap and closing the gender gap. They are also grappling with the factor of 'additionality,' where development becomes 'development-plus.'

Table 4.3 Focus Areas in State-level Climate Change Action Plans

Andhra Pradesh	West Bengal	Uttar Pradesh	Himachal Pradesh
■ Coastal Vulnerability ■ Agriculture ■ Forestry ■ Transportation, energy and power	**Two geographical areas:** ● Sunderbans ● Darjeeling Himalayan **Sectors** ■ Water ■ Health ■ Forestry ■ Agriculture & Horticulture ■ Energy Efficiency ■ Non-conventional Energy Sources ■ Habitat ■ Knowledge Management	■ Agriculture ■ Irrigation ■ Environment ■ Forest ■ Energy ■ Housing	■ Agriculture ■ Water ■ Glaciers ■ Himalayan ecosystem ■ Biodiversity

"We have been already spending a lot of money on drought prevention and working on it for decades," said a senior Andhra Pradesh officer involved in the making of the AP Climate Change Action Plan. "We need to do more of the same work but at the same time need to think of what needs to be done more so that it stops being just development and becomes adaptation. For instance, we need different types of paddy varieties. Droughts are increasing and this year we got some unseasonal rains. Andhra Pradesh was under floods! So we need some drought-proof and inundation-proof varieties of paddy."

Prior public consultation is part of the Centre's guidelines but States have centralized the making of the plan and may open the plan for public discussion or consultation after the draft is approved by the Centre. Obviously, that is too late a stage for real public consultation. The apex committees in the States are headed by the Chief Secretaries, the highest bureaucrat in each States. So state governments have full commitment to formulate the plan, especially because these are to be presented to the Centre – the Union Ministry of Environment and Forests. The state environment departments are the nodal departments for the formulation of the Action Plans.

Government officials are taking the help of geologists and other physical climate researchers to formulate the State climate action plans but, following on the footsteps of the National Missions, there is almost negligible focus on additional social vulnerability due to climate change or inputs from social scientists, gender experts and practitioners on additional social interventions that would be needed for climate proofing to be a success. There is no involvement of civil society organizations or any public debate – or even any public announcement or awareness that state governments are coming up with climate proofing plans that will help ordinary people adapt to climate vagaries.

Among the four case study States, Himachal Pradesh had embarked on preparing a State-level Master Environment Plan (EMP) based on which it is preparing its Climate Change Action Plan as per the Centre's guidelines. The EMP aims to translate 'sustainable development' into a set of guidelines as a ready

reckoner across sectors. It includes guidelines for bottoms-up decision-making and capacity building at all levels to achieve sustainable development. The hill State government understands the imperatives of safeguarding their eco-system even as it encourages development for its people. The EMP tries to integrate climate change impacts and climate proofing into the guidelines but Himachal Pradesh is also coming up with a stand-alone State-level Climate Change Action Plan.

States, of course, have some of their own women-focused programmes. The Panchayat system itself gives women space for equal participation at the village level after three of the case study States – Andhra Pradesh, Himachal Pradesh and West Bengal hiked reservation for women in PRIs to 50 per cent. While Panchayat elections in Andhra Pradesh and West Bengal with the new quota are still due, in the 2010 Panchayat election of Himachal Pradesh, 57% of the elected Panchayat members were women. Beyond PRIs, however, the gendered space in decision-making bodies and adaptation research is heavily skewed against women.

Some of the focus areas identified by the State governments for the Climate Change Action Plan are given in Table 4.3 above.

Implementation challenges

The challenge is twofold. One, the gender gap in the Action Plan itself and two, the lack of coordination between different departments at the ground level. On paper, village Panchayats are required to development village-level development plans in consultation with the gram sabha or the General Body of the village comprising all adults – women and men - voting from that village. Climate-proofing should, ideally, be integrated into the village development plan document prepared by Panchayats. In reality, as a Sarpanch from block Campierganj, district Gorakhpur, Uttar Pradesh, said, "The Panchayat secretary (government revenue official) and I make the village development plan." He also said that his Panchayat gave houses to poor women under the Indira Avaas Yojana[31] but "there are no other schemes for women." Questioned further, he said his Panchayat did implement the Swarnjayanti Gram Swarozgar Yojana (SGSY)[32] but could not give much information about the status of the scheme. "Buffalos, hens, etc are given to SHGs through the Block Development Office," he said. "We have the records."

Grain Bank in Sunderbans

A senior Panchayati Raj Institutions officer in the Uttar Pradesh government said, "We are concerned more with housekeeping and regulatory functions like revenue tax collection. We have to ensure the Panchayats get elected properly, they get training on their functions, there is proper staffing, accounting and auditing and they get computers. There are other departments which are concerned with development programmes. They have to liaison with individual Panchayats on their areas of work." The 'convergence' role that PRIs are mandated to play village-level upwards till the district-level did not seem to find much importance with the PRI Department. For information on the State-level climate change action plan, I was referred to the Environment Department. "I have no knowledge about it," the Panchayat department official said.

This above scenario was repeated in every State – Himachal Pradesh, Andhra Pradesh and West Bengal.

In Himachal Pradesh, the PRI department has come out with fresh training manuals for

31 'Indira Housing Programme' implemented by the Central Ministry of Rural Development

32 A self-employment scheme aimed at poor people, especially women through the formation of SHGs

the just-elected Panchayat leaders, majority of whom are women. These training manuals are being seen as a replicable model by the Central government. These manuals are silent on what Panchayat leaders can do on climate change. A huge opportunity lost indeed!

There are already several examples of what the consequences will be. For instance, under the NREGA, to be implemented by PRIs, *kuls*, the water arteries of the hill state, are being lined with concrete. This is preventing recharge of the aquifers, blocking free flow of water due to collection of garbage in the *kuls*, making the soil around sandy and slowly killing the flora around. With glaciers melting and reduced flow of water in *kuls*, this man-made disaster is making life more difficult for women. If the elected women were indeed empowered to take decisions, this would never have happened.

In Andhra Pradesh, as mentioned above, the PRIs are not actively involved in development programmes though they have the mandate to make village development plans and form functional committees and users associations on irrigation, agriculture, health, etc. Most of the development programmes are implemented through women SHGs – the Mahila Samakhyas or Women's Groups. The danger is that climate change adaptation will fall between the two parallel systems. Just like the growing gender gap in Andhra Pradesh despite the push by the government to implement development schemes through Mahila Samakhyas, or Women's (self-help) Groups. Take two indicators, child sex ratio and violence against women, both used by the UNDP in computing the Gender Empowerment Measure (GEM). The child sex ratio has witnessed a sharp decline from 961 girls per 1000 boys in Census 2001 to 943 girls to 1000 boys in Census 2011. Gender violence is on the rise in Andhra Pradesh, according to the National Crime Records Bureau which said that Andhra Pradesh had the worst record for crimes against women in 2007-08. The Capital city of Hyderabad was the second most unsafe city for women in India, after Delhi, in the same year. Of course, these high statistics can also be due to more reporting of crimes against women which shows that more women are willing to come out in the public with these reports. However, this may not be the likely reason because during the same time, the Andhra Pradesh Women Commission (APWC) chairperson was caught on camera in September 2007 for allegedly demanding a bribe of 50,000 rupees (1,000 US dollars) to help a woman who had suffered violence.

Though Mahila Samakhyas are implementing government schemes, these are predominantly top-down schemes with the women having no say in their formulation or design. They are not even part of the PRI system where they can work on the village development plan and village resource planning. There is no institutionalized feedback system wherein the Mahila Samakhyas can give upward feedback to district officers on changing the designs of schemes or the space to create their own programmes and use PRI resources for the same. Climate change adaptation requires local knowledge, outside scientific knowledge and information, the space to innovate and funds. Mahila Samakhyas may possess the first but do not have the other three elements to be able to drive climate-proofing in the arid State.

In West Bengal, a senior Panchayat officer said he was unaware of the State-level Climate Change Action Plan. "Yes, we would like to participate in its formulation," he said. "But the protocol demands that the Environment Department invites us to be on the drafting committee. I will then depute one of my officers to be on the committee." Of course, a male officer, he said. Senior women officers did not exist in the Department. This conversation happened though an official from the PRI Department was already on the drafting committee – his name was revealed to me by the Environment Department. Obviously, the officer had not thought it important enough to communicate this to his boss – yet!

It seems that in each State, the Climate Change Action Plans are going to be implemented sectorally, with little convergence in planning, resourcing or implementing. With the District Rural Development Agencies (DRDAs) and the PRIs being the two critical convergence units in the governance system, climate-proofing has to flow through them – with women and men participating at every level.

5

Key Policy and Practice Recommendations

"We have started earning; it doesn't always mean that we have access to money."

Dulari Ghosh
Village Bankra, Block Hingalganj, District North 24 Parganas, West Bengal

The language used in a policy or a plan document reveals for whom it is meant and what weightage is to be given to different stakeholders. For instance, recognition and involvement of the business sector's role in social development in recent years sees specific reference to the business sector players in the UNFCCC documents and national governments' climate documents including India's Mission documents.

The Green India Mission document talks of making the Mission a 'people's programme' and mentions 'business houses' with children, farmers, NGOs, panchayats and the media among others but not women and men as different stakeholders. The Water Mission refers to 'privatization in implementation' but is silent on the need for gender differentiation that is required in implementing the Mission itself. The private sector is envisaged to play a large role in India's agriculture sector and the Mission on Sustainable Agriculture recognizes this, including working out revenue models for automatic weather stations to be set up by the private business players. The Himalayan Eco-system Mission talks about public-private partnerships on several fronts including for 'investments in forest operations' to sustain the Himalayas. The Strategic Knowledge Mission commits to 'at least three viable public-private partnerships in the area of adaptation….'

Incorporating gender-responsive language and gender-responsive outcomes in the national adaptation Missions and State adaptation plans is the starting point for gender equality.

Language is also important to understand the aim of State policies. An analysis of India's climate change related policies reveals that these policies and plans primarily address women's economic needs within the existing gender division of labour, not their strategic needs wherein women can achieve gender equality and autonomy. Economic empowerment is a necessary but not a sufficient condition for women's empowerment because of deeply entrenched gender-biased inequities. Internationally too, India is mandated to achieve this goal of gender equality as a signatory to the UN Committee on the Elimination of Discrimination Against Women (CEDAW)[33], which enjoins upon UN member-states to end gender discrimination by making gender equality a central objective in their official documents. Interestingly, CEDAW notes the common tendency to use the term 'gender equity' instead of 'gender equality' in States' official documents because this limits States' responsibility of just providing equity in the distribution of resources but not across the board gender equality (IWRAW Asia Pacific, 2009).

India's 11th Five Year Plan has a section devoted to 'Gender Equity' (see chapter 4 for details). 'Budgeting for Gender Equity' is the mission adopted by India's Ministry of Women and Child Development, the nodal agency for gender budgeting. India's Department of Science and Technology celebrated National Science Day 2010 with 'gender equity' as the theme. Incorporating gender-responsive language and gender-responsive outcomes in the national adaptation Missions and State adaptation plans is the starting point for gender equality.

33 Adopted in 1979 by the UN General Assembly, the CEDAW Convention is a human rights treaty for women and is often seen as an 'international bill of rights for women.' CEDAW defines what constitutes discrimination against women across the spectrum. Members-states are mandated to report to CEDAW, at least every four years, national actions to end such discrimination.

Hours spent in this back-breaking job are not counted in the national GDP. Women in semi-arid Mahbubnagar district, AP

Prioritising Adaptation and Gender Concerns

The Centre must prioritise adaptation. The learning curve on adaptation is high and the yawning development gap and the gender gap in India makes it that much more important to deal with climate change adaptation. To strategise on adaptation, India must set up a core group on 'Moving beyond development to inclusive adaptation' at the Planning Commission. The core group must incorporate gender and development aspects into climate change adaptation strategies as well as review India's ongoing poverty reduction and development policies to incorporate gender and climate change adaptation strategies into all development programmes at the national- and state-level, not just into selected programmes. The setting up of the core group must be on similar lines as the Planning Commission's Expert Group on Low-carbon inclusive growth that is helping India strategise the new low-carbon pathway to economic growth. India's 12th Five Year Plan, to be launched on April 1, 2012, will have 'low carbon inclusive growth' as one of its key pillars (Planning Commission, 2011). Another key pillar of India's 12th Five Year Plan must be 'development-plus adaptation' with gender-just objectives and outcomes.

To ensure gender equality at all levels, each of the National Adaptation Missions and State-level Climate Change Action Plans must incorporate into all its programmes and schemes:

- A gender-disaggregated baseline data based on gender-differentiated practical and strategic needs.
- Gender-specific objectives to meet the identified needs.

- Gender-specific indicators for meeting both practical and strategic needs. For instance, household food and water security can be two measures, gathered at every Panchayat-level because climate vagaries will acutely affect household food security. Other indicators could include number of village-level grain/seed/fodder banks; and number of village-level community-based disaster management committees and their membership.
- Gender-focused monitoring and evaluation including dimensions such as time-use, workload, labour/drudgery, health, income, ownership and control over productive resources, decision-making, etc in the context of climate vagaries.
- Gender-specific capacity building of women and men across the board, horizontally across villages and vertically through the 3-tier governance structures, line agencies and other decision-making bodies.
- Collaborative working mechanisms with NGOs and community-based organizations – to promote cross-learning, including traditional knowledge with women, and scaling up of viable adaptation models in a gender-just way.
- Gender-responsive investment of 'additional' financial resources for adaptation with gender budgeting based on gender-differential data, not limited to 30% when the proportion of women involved are up to 90 per cent.
- Gender-responsive auditing of the programmes and resources.
- A gender-responsive communication strategy to inform and garner input from the general public with active participation of women in the public debates and feedback systems.

An empowered Ministry of Women and Child Development (MoWCD) must ideally partner the Ministry of Environment and Forests (MoEF), the overall nodal ministry for all adaptation plans, to ensure incorporation of gender equality and gender empowerment (see Box 5.1) in the Plans. The Ministry of Women and Child Development must invest in building its capacity on climate change adaptation while the Ministry of Environment and Forests must make the former its partner for developing and implementing the adaptation plans at the national level and in the States. For instance, time-use statistics for women's long hours spent in subsistence farming need to be included in India's GDP, especially with additional hours being added due to climate vagaries. This is where the Ministry of Women and Child Development, as the nodal ministry for gender budgeting, must build its capacity to incorporate this 'additionality' in India's climate adaptation cost. This will include working with the Census of India to record

Box 5.1

Assessing Gender Empowerment

A useful tool for measuring gender empowerment is the Women's Empowerment Framework[34] which aims to measure the degree of control that women enjoy over factors of production and their degree of participation in the development process. The Framework measures five progressive levels of equality arranged in a hierarchal order with the highest level of 'control' being the highest level of empowerment. The five levels of equality are: Control, Participation, Conscientisation, Access, Welfare.

Traditional welfare-oriented policies and the more recent orientation towards access to resources will not empower women in a business-as-usual scenario. In the wake of climate change, the changing nature of the natural base for women's livelihoods will require women to have the wherewithal – the conscientisation - to actively participate in decision-making fora, including their homes, and take quick decisions to control their own and their dependents' lives. "Now that I have control over our grain bank, my husband comes to me to ask my opinion during the lean period or when our crop fails due to a storm or erratic rainfall," said Gauri from village Indraprastha, block Patharpratima, South 24 Parganas, Sunderbans, West Bengal. "Earlier, he did not think that I could give an opinion to cope with an emergency. He used to take all decisions on his own. Now he consults me on when we should borrow paddy from the grain bank, how much we should take and by when we should think of returning it."

Davanam Ramanamma from village K. Bathalapalli, Andhra Pradesh also feels she is in control ever since she learnt how to do non-pesticide management (NPM). Devanam said, "I was trained on NPM and after my success I am now teaching other women farmers these technologies. Earlier our land was undulated and strewn with boulders. Under the NREGA, we removed the boulders, laid out *bunds* (small earthern dams), applied tank silt (silt given by the government) and made our land fit and healthy for agriculture. Because of these works, our lives are benefitted and our soil condition improved a lot. My husband was earlier reluctant to practice NPM but I could persuade him to take it up. As a result, I am standing on my own feet. Now I do not have financial worries and am not dependent on others. My family is respecting me and cooperating with me in every aspect. Even my husband does not bother me like earlier."

While there may be several examples of women having control over their livelihoods even in the wake of climate vagaries at the village-level, the fact remains that India's gender empowerment programme has not succeeded in including women on high level decision-making platforms.

34 This was developed by Sara Hlupekile, a gender expert from Lusaka, Zambia.

Since all financial and other resources as well as administrative functions rest with the Panchayats, women-only SHGs are alienated from the mainstay governance systems

women's productive roles realistically so that these gender-differentiated statistics inform India's adaptation strategies and programmes.

'Local Action Plans on Adaptation' (LAPAs)

Unlike the Missions on mitigation, India's adaptation Missions and State-level Plans must adopt a decentralized approach and mandate development of participatory and gender-just 'Local Action Plans on Adaptation', or LAPAs, including required 'additional' resources. Panchayats have the mandate to develop village-level development plans. National Adaptation Missions and State-level adaptation plans must mandate Panchayats to factor in climate-proofing in these plans to prepare LAPAs. Given that women are most vulnerable to climate change impacts and yet are key to climate-proofing, these LAPAs must give a central role to women – building their knowledge-base, investing in their capacities, learning from their traditional know-how and real-life experience, funding their initiatives and ensuring their right to vote at decision-making tables, to have a voice and self-determination.

The pitfall to avoid is planning women-specific schemes at the cost of mainstreaming gender equality. Women-specific schemes per se are fine. So, for instance, monthly meetings of women farmers with agriculture extension workers or an exclusive capacity building programme for women farmers with annual learning/exposure trip to successful adaptation models, etc is highly recommended. However, limiting adaptation plans to focus only on women without gendering the dominant adaptation plans is not gender transformative. It is gender 'ghettoisation.' Thus, women's SHGs are fine as an entry point but focusing only on SHGs for empowerment or implementing selected schemes is inadequate

Box 5.2

SHGs and Panchayats

The face-off between women SHGs and Panchayats is very strong in most places. SHGs have no faith on Panchayats, even when their back is to the wall. "We get nothing out of the Panchayat," said Laxmidevi from an SHG in Anantapur district, Andhra Pradesh. "Panchayats are of no use to us. We only get the NREGA implemented through them."

In Himachal Pradesh, many of the gram sabhas held for the outgoing Panchayats in December 2010 did not even have full quota of members. Women outnumber men in several of the villages in Himachal Pradesh because of the high male migration in the State. Did the women not want to meet the Panchayat members? "No one from the block office comes here and the Panchayat tells us nothing," said Nokhrudevi from village Ladi, Kangra district. "This village is 1.5 Km below the main road and there are only mud pathways to walk on. Block officers sometimes call us to tell us to come up and take seeds from the block office. Panchayat members don't bring it closer to us."

In the Sunderbans village Dokhin Govindpu, the last hamlet before the mouth of Bay of Bengal begins, Alka Bhokla said, "We will die starving but not go to the Panchayat. We get nothing from the Panchayat. No Panchayat member comes here because they would need to walk 2 km on a bund (mud and stone embankment) to reach us. Even our BPL(below poverty line) cards were washed away in AILA (cyclone) almost three years back and only some of us have so far got duplicate ones from the Panchayat."

In district 24 South Praganas, Sunderbans, West Bengal, Mosumi, Rakhi, Anakmita, Shifali Sen, Aparna Das, Bulurani, Dipali Mangan, Shoibulini, Namita, Anjali Giri and others, all from government programme SGSY-initiated SHGs from different villages, sat at a meeting and had this to say about their Panchayats: "We don't know what the Panchayat can give to us women farmers. Women don't have time to go to the Panchayat. But NGOs come to us. Panchayats may give us a one-day training but that is often insufficient to implement something. Panchayat members do not listen to us, like the NGOs do. They do not respect us, like the NGOs do. Panchayat members question everything we say. When we go as a group, in our SHG, they may listen to us. But if they still do not do what we asked them to do then we feel even more disregarded and disrespected."

"I feel empowered after every meeting with someone from the NGO," said Dipti. "I feel disrespected after I've been to a Panchayat office for something. I do not want to go there unless its absolutely essential!"

In village Chak-Pitambarpur, women said, "Panchayats give benefits to people who support their political parties. They often announce the evening before for a meeting to be held the next day. How can we go to attend the meeting without making some arrangement for someone to do our work back home? NGOs come here and hold a gram sabha with all villagers and then decide with us what is to be done. PRIs must have a vision document that we can all agree to. Obviously, no Panchayat is serious about making village development plans in consultation with the gram sabha."

Women said they would prefer to have Panchayat members come to their village and meet them – as individuals and in their group. "It would save our time," they said. Comparing Panchayats to NGOs, women said, "NGOs do hand holding, we learn by doing. NGOs do PRAs (participatory rural appraisals) and listen to us so they know our individual agricultural problems. Our individual food insecurity problems."

as it leaves a whole lot of other schemes skewed in favour of men. Since all financial and other resources as well as administrative functions rest with the Panchayats, women-only SHGs are alienated from the mainstay governance systems (see Box 5.2). Climate change adaptation and climate-proofing will require working with the governance system to plan cross-sectorally and leverage different kinds of resources. Gender mainstreaming of the PRIs functioning is the best way forward.

Women must be central to the implementation of development and climate change adaptation schemes implemented by Panchayats and the District Rural Development Agencies (DRDAs), the two hubs at the village and district level where development and climate adaptation schemes converge. Double mainstreaming must be ensured in implementation of all schemes at these two levels. Each of the national- and state-level adaptation plans must incorporate strengthening of the 'women's wing' in the DRDAs where the staff must be empowered through capacity-building and must participate equally at the decision-making table. The governing body of DRDAs brings together all agencies, including elected legislators, who must work together towards decentralized climate change adaptation. DRDA also has the mandate to engage in action research in collaboration with government research institutions and agencies. National- and State-level adaptation plans must also incorporate capacity building on gender and climate change adaptation for line agencies, members of DRDA governing bodies and of elected legislators and Panchayat members. Panchayats already have the mandate to build their capacities on government programmes and schemes. The nodal ministries for adaptation plans and the Ministry of Women and Child Development must provide technical assistance and expand their coordinating and collaborating role with the Rural Development Ministry/State-level Rural Development Departments.

Panchayats have the infrastructure to garner knowledge, liaison with local Krishi Vigyan Kendras and ICAR-affiliated regional universities, they can house weather measuring devises and local weather data, collaborate with local NGOs in building capacities of the various issue-based Panchayat committees and to galvanise the local elected legislators or the representative to India's Parliament. Specific adaptation activities that PRIs can promote include grain banks, fodder banks, inputs for vegetable gardens, small animals, organic inputs (tank silt in Andhra Pradesh), proper implementation of NREGA for water harvesting, drainage in water-logged villages and afforestation. Village Panchayats must also promote leasing of its common/public land to women's groups for planting trees. "Plantation can be done in empty spaces, like road side, pond bund etc. We should plant the local trees. We know which trees serve better as fuel wood," said Kajal from village Chakpitambarpur, block Basanti, South 24 Parganas, West Bengal.

Panchayats are the most suitable entities to monitor local climate variables - temperature, precipitation and humidity – over time and space as well as climate impacts and promote local adaptation measures. Panchayats have the mandate to consult with all women and men through the gram sabhas and ensure that the climate impacts on the most vulnerable groups are being recorded and addressed. Panchayat committees can design, modify and implement government schemes to involve and benefit those most affected by climate change. Panchayats also have the wherewithal to involve and work with outsiders to ensure that their constituency is climate-proof. Panchayats also have the mandate to assess, monitor and evaluate schemes in collaboration with user

Women must be central to the implementation of development and climate change adaptation schemes implemented by Panchayats and the District Rural Development Agencies (DRDAs)

Panchayat land on mud embanckment leased to villagers to plant useful trees, Sunderbans

Seed Bank in Sunderbans

groups and must carry out these activities in a gender-responsive and participatory manner for LAPAs The failure of Panchayats has led the Centre and State governments to operate through SHGs which do not have the circle of influence that Panchayats have and which will be needed for viable, cross-sectoral adaptation measures. This is also why the excellent work done by NGOs towards adaptation interventions (elaborated in Chapter 3) is not able to expand but remains limited to few models. This is where national- and state-level adaptation plans' mandate of 'development-plus' integrates with the mandate of Panchayats who must be responsible for development of LAPAs, keeping women at the centre of such plans, involving them and collaborating with them, not just informing them or consulting them.

The failure of Panchayats has led the Centre and State governments to operate through SHGs which do not have the circle of influence that Panchayats have and which will be needed for viable, cross-sectoral adaptation measures.

State legislators and Parliamentarians work closely with DRDAs and Panchayats and can play a leading role to:

- Invest in their capacities on climate change adaptation and climate-proofing as well as on gender-responsive governance
- Close the gender development gap by actively participating in formation of adaptation plans in their states and in their constituencies. India's elected representatives hardly contributed to even the National Action Plan on Climate Change (NAPCC)
- Ensure availability of gender-disaggregated data, including on all natural resources-dependent livelihoods
- Secure development of LAPAs, keeping women cenre-stage
- Promote equal representation of women at all decision-making fora
- Integrate sustainability into decision-making and implementation within the DRDAs and inspire Panchayats to do the same

Perhaps the biggest challenge that elected representatives can help crack is the lack of coordination between local departments and the tension between the PRIs and local bureaucracy because only a holistic approach can deliver successful LAPAs – climate-proof the area and making people resilient to climate vagaries.

Networked Institutions for Adaptation

This research reveals that three components – local and scientific knowledge, awareness of one's rights and capacities and right action – help deliver successful climate change adaptation. Each of these components lie with different sections of society and LAPAs can be delivered only though collaborative PPP – Public People Partnership – institutions. Here 'public' denotes PRIs, government agencies and government adaptation research institutions while 'people' denotes NGOs and people's organizations including user groups, farmers' bodies, forest committees, etc.

For Panchayats to integrate traditional and scientific knowledge into the development and implementation of LAPAs, there is a need for a strong gender-responsive scientific manpower and scientific research including a substantial increase in the number of senior women scientists. The Department of Science and Technology, as the agency responsible for this and two of the Missions being discussed here must:

- Increase the number of women scientists especially at senior decision-making levels by working on this in a Mission mode and taking forward the work started by the National Task Force for Women in Science
- Involve men and women scientists to
  - Recognise women's climate-related

observed data at the local level through documentation

- Collaborate with local women to collect and analyze climate-related data at every level – in the field, in the laboratories and in academic research
- Scientifically validate women's traditional knowledge and build on it

NGOs too have a critical role to play in the PPP institutional model though apolitical NGOs find it very difficult to work with politically-charged PRIs. Yet, working with civil society organizations as equal stakeholders is necessary for successful climate proofing. The strengths that NGOs bring to the PPP institutions are:

- Adaptation requires collective action and NGOs, not government departments, are equipped to mobilise women and men and build their awareness.
- Adaptation requires innovation and different ways of doing things and NGOs can inspire vulnerable women and men to think 'outside the box' and take chances knowing that NGOs will give them continued support.
- Adaptation requires sustained and ongoing capacity building and hand-holding. Again, NGOs, and not government departments, are skilled in playing this role.
- Adaptation requires networking across stakeholders and NGOs are capable of bringing people across sectors to the table.
- Adaptation requires small-scale models, innovations, risk-taking and NGOs are willing partners with villagers to invest in small-scale adaptation models, often with women being the driving force behind this experimentation.

"Women understand what is possible faster than men," several NGOs have shared. "They are intimately involved with the problems and so are more keen than men to find solutions. They also understand the fine points faster, often because they question us deeply before deciding either way. It is more fruitful working with women than with men. And women don't go away like men, leaving things mid-way."

NGOs also build women's capacities in a more sustainable manner than training modules by government agencies or Panchayats (see Box 5.2). Most important, NGOs often provide a model of adaptation that can be replicated by the Panchayat and the larger government machinery.

NGOs, however, themselves require:

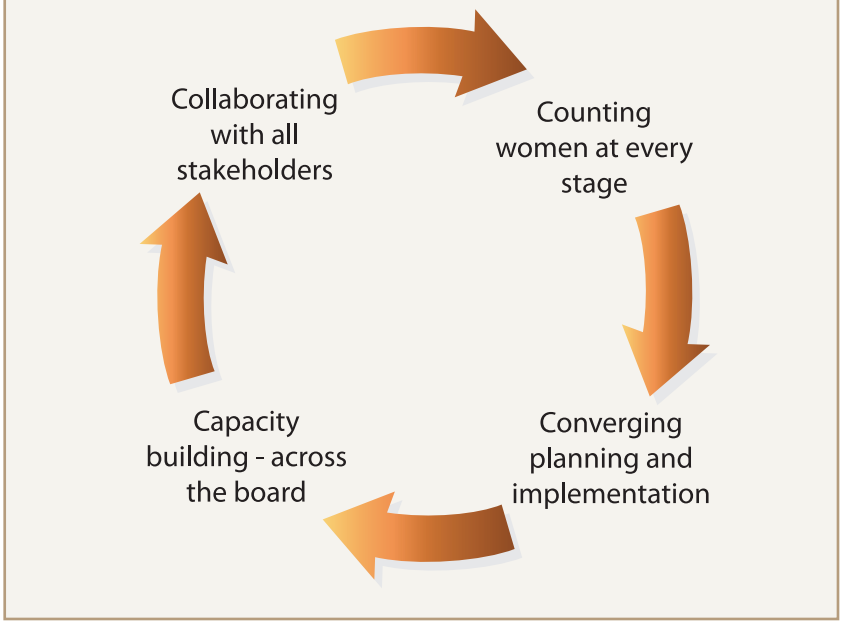
- A strong internal gender policy addressing practical and strategic roles of women.
- A strong motivation to collaborate with government agencies and with adaptation research institutions.
- A strong gender-oriented advocacy agenda with the government and a strong gender-focused influencing role to play with adaptation research institutions.

India's Adaptation Missions and plans must perhaps be built around four 'Cs':

- Counting women in at planning, designing, implementing, resourcing and evaluating stages of all programmes and schemes
- Converging programmes and schemes at the planning and design stage through multi-sectoral and multi-ministerial bodies and at the implementation stage through DRDAs/PRIs.

Perhaps the biggest challenge that elected representatives can help crack is the lack of coordination between local departments and the tension between the PRIs and local bureaucracy

Figure 5.1 The Four 'Cs' for Adaptation Missions and State Plans in India



- Capacity building and empowering women and men at the level of local Panchayats, line agencies, NGOs and community-based organizations to build institutions that will be adaptation-responsive.
- Collaborating with key stakeholders – adaptation researchers, government line agencies and departments, PRIs, user groups and civil society groups – to build resilience among the most vulnerable people through participatory innovation, utilisation of traditional and local knowledge, adding value through scientific and technological interventions and converging all resources.

The above policy and practice recommendations are summarised below (Table 5.1) delineating what action has to be taken by which agency.

Table 5.1 Summary of Policy and Practice Recommendations

Responsible Agency	Policy and Practice Recommendations
Prime Minister's Council on Climate Change	Set up a core group on 'Moving beyond development to inclusive adaptation' at the Planning Commission. Make 'development-plus adaptation' with gender-just objectives and outcomes a key pillar of India's 12th Five Year Plan. Promote women as drivers of change and build on women's agency for climate change adaptation in the Approach Paper to the 12th Five Year Plan.
Every Nodal Ministry for National Adaptation Missions and Nodal State Departments for State-level Climate Change Action Plans: National Level Ministry of Environment and Forests Department of Agriculture and Cooperation, Ministry of Agriculture Ministry of Water Resources Department of Science and Technology, Ministry of Science and Technology State-level Departments of Environment	Incorporate gender-responsive language to promote gender equality. Mandate gender-disaggregated baseline data based on gender-differentiated practical and strategic needs. Set gender-specific objectives to meet the identified needs. Set gender-specific indicators for meeting both practical and strategic needs. Mandate gender-focused monitoring and evaluation including women's practical and strategic needs and notify DRDAs/PRIs etc to implement these. Incorporate gender-specific capacity building of women and men across the board, horizontally across villages and vertically through the 3-tier governance structures, line agencies and other decision-making bodies. Incorporate collaborative working mechanisms with NGOs, PRIs, government agencies and community-based organizations. Earmark 'additional' financial resources for adaptation with gender budgeting based on gender-differential data. Audit programme and resources in a gender-responsive manner. Incorporate a gender-responsive communication strategy to inform and garner input from the general public with active participation of women in the public debates and feedback systems. Promote a decentralized approach and mandate development of participatory and gender-just 'Local Action Plans on Adaptation' or LAPAs, at the Panchayat level.
Ministry of Environment and Forests/State-level Departments of Environment	Partner, support and collaborate with Ministry of Women and Child Development (MoWCD)/State-level departments on the Adaptation Missions and Plan and help build capacities on climate change adaptation within the MoWCD.
Ministry of Women and Child Development/State-level departments	Invest in building its capacities on climate change adaptation and the role of women therein, including investment of adequate additional financial resources. Partner and collaborate with Ministry of Environment/Environment departments in the States and other nodal adaptation ministries and State nodal departments.

continued...

Table 5.1 Summary of Policy and Practice Recommendations (continued)

Responsible Agency	Policy and Practice Recommendations
Department of Science and Technology at the Centre and State-level departments	Increase the number of women scientists especially at senior decision-making levels by working on this in a Mission mode and taking forward the work started by the National Task Force for Women in Science Involve men and women scientists to ■ Recognise women's climate-related observed data at the local level through documentation ■ Collaborate with local women to collect and analyze climate-related data at every level – in the field, in the laboratories and in academic research ■ Scientifically validate women's traditional knowledge and then build on it
Gram Panchayats	Develop participatory and gender-just LAPAs including required additional resources. Ensure double mainstreaming – incorporating gender and development aspects in all climate change adaptation programmes and incorporating gender and climate-proofing in all development and poverty reduction schemes at the implementation stage. Invest in building its capacities on climate-proofing, including carrying out local measurement of climate variables and gender-disaggregated impacts of climate change keeping women centre-stage. Collaborate with government agencies, relevant external agencies including NGOs, adaptation research institutions and user groups. Implement adaptation plans in a participatory, holistic, gender-just manner with adequate additional resources. Facilitate gender-responsive, participatory assessments, monitoring and evaluation of LAPAs in collaboration with user groups.
District Rural Develoment Agencies (DRDAs)	Strengthen 'women's wings' by investing in building staff capacities on climate change adaptation and empowering them though participation in decision-making at all levels. Ensure double mainstreaming – incorporating gender and development aspects in all climate change adaptation programmes and incorporating gender and climate-proofing in all development and poverty reduction schemes at the implementation stage. Work closely with PRIs to roll out LAPAs. Involve and collaborate with relevant external agencies including NGOs, adaptation research institutions and user groups to implement climate change adaptation programmes. Engage in action research on climate change adaptation in collaboration with relevant players – PRIs, government agencies, adaptation research institutions including universities, NGOs and user groups. Facilitate gender-responsive, participatory assessments, monitoring and evaluation of adaptation programmes and schemes; as also of development and poverty reduction schemes to assess for delivery on gender and climate change aspects.
Elected Legislators – State level and Parliamentarians	Invest in their capacities on climate change adaptation and climate-proofing as well as on gender-responsive governance. Close the gender development gap by actively participating in formation of adaptation plans in their states and in their constituencies. India's elected representatives hardly contributed to even the National Action Plan on Climate Change (NAPCC). Ensure availability of gender-disaggregated data, including on all natural resources-dependent livelihoods. Secure development of LAPAs, keeping women centre-stage. Promote equal representation of women at all decision-making fora. Integrate sustainability into decision-making and implementation within the DRDAs and inspire Panchayats to do the same. Effectively deal with lack of coordination between local departments and the tension between the PRIs and local bureaucracy to promote a culture of holistic work towards LAPAs.

continued...

Table 5.1 Summary of Policy and Practice Recommendations (continued)

Responsible Agency	Policy and Practice Recommendations
NGOs and other Civil Society Organisations/Entities	Mobilise women and men and build their awareness for collective action towards adaptation. Inspire vulnerable women and men to think 'outside the box' to innovate and evolve different ways of working towards adapting to climate vagaries. Build capacities and hand-hold vulnerable people, especially women, in an on-going and sustainable manner. Promote women as drivers of change and build on women's agency Network across stakeholders to help deliver successful adaptation models to those most vulnerable to climate vagaries. Mandate a strong internal gender policy for the organization, addressing practical and strategic roles of women. Motivate staff to collaborate with government agencies and with adaptation research institutions to deliver holistic adaptation models that can be up-scaled. Adopt a strong gender-oriented advocacy agenda with the government and a strong gender-focused influencing role with adaptation research institutions.

ANNEX

GENDER EQUALITY LANGUAGE IN THE UNFCCC CANCUN AGREEMENT ON ADAPTATION

The Cancun Agreement: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (Page 2)

Noting resolution 10/4 of the United Nations Human Rights Council on 'Human rights and climate change', which recognizes that the adverse effects of climate change have a range of direct and indirect implications for the effective enjoyment of human rights and that the effects of climate change will be felt most acutely by those segments of the population that are already vulnerable owing to geography, gender, age, indigenous or minority status and disability;

I. A shared vision for long-term cooperative action (Page 4)

7. Recognizes the need to engage a broad range of stakeholders at global, regional, national and local levels, be they government, including subnational and local government, private business or civil society, including the youth and persons with disability, and that gender equality and the effective participation of women and indigenous peoples are important for effective action on all aspects of climate change;

II. Enhanced action on adaptation (Page 4)

12. Affirms that enhanced action on adaptation should be undertaken in accordance with the Convention, should follow a country-driven, gender-sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate;

IV. Finance, Technology and Capacity-building (Page 16)

C. Capacity-building (Page 22)

130. Decides that capacity-building support to developing country Parties should be enhanced with a view to strengthening endogenous capacities at the subnational, na-

tional or regional levels, as appropriate, taking into account gender aspects, to contribute to the achievement of the full, effective and sustained implementation of the Convention, by, inter alia:

1. ***Appendix IV***
   Composition and mandate of the Technology Executive Committee (Page 30)

   3. Parties are encouraged to nominate senior experts to the Technology Executive Committee, with a view to achieving, within the membership, an appropriate balance of technical, legal, policy, social development and financial expertise relevant to the development and transfer of technology for adaptation and mitigation, taking into account the need to achieve gender balance in accordance with decision 36/CP.7.

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ANNEX

GENDER EQUALITY LANGUAGE IN THE UNFCCC CANCUN AGREEMENT ON ADAPTATION

The Cancun Agreement: Outcome of the work of the Ad Hoc Working Group on Long-term Cooperative Action under the Convention (Page 2)

Noting resolution 10/4 of the United Nations Human Rights Council on 'Human rights and climate change', which recognizes that the adverse effects of climate change have a range of direct and indirect implications for the effective enjoyment of human rights and that the effects of climate change will be felt most acutely by those segments of the population that are already vulnerable owing to geography, gender, age, indigenous or minority status and disability;

I. A shared vision for long-term cooperative action (Page 4)

7. Recognizes the need to engage a broad range of stakeholders at global, regional, national and local levels, be they government, including subnational and local government, private business or civil society, including the youth and persons with disability, and that gender equality and the effective participation of women and indigenous peoples are important for effective action on all aspects of climate change;

II. Enhanced action on adaptation (Page 4)

12. Affirms that enhanced action on adaptation should be undertaken in accordance with the Convention, should follow a country-driven, gender-sensitive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional and indigenous knowledge, with a view to integrating adaptation into relevant social, economic and environmental policies and actions, where appropriate;

IV. Finance, Technology and Capacity-building (Page 16)

C. Capacity-building (Page 22)

130. Decides that capacity-building support to developing country Parties should be enhanced with a view to strengthening endogenous capacities at the subnational, na-

tional or regional levels, as appropriate, taking into account gender aspects, to contribute to the achievement of the full, effective and sustained implementation of the Convention, by, inter alia:

1. ***Appendix IV***
   Composition and mandate of the Technology Executive Committee (Page 30)

   3. Parties are encouraged to nominate senior experts to the Technology Executive Committee, with a view to achieving, within the membership, an appropriate balance of technical, legal, policy, social development and financial expertise relevant to the development and transfer of technology for adaptation and mitigation, taking into account the need to achieve gender balance in accordance with decision 36/CP.7.

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This pilot research, carried out over a nine-month period, sets out to demonstrate that successful adaptation to climate change will require recognition of women as critical partners in both driving and delivering solutions, especially in disaster-prone areas. Changes in policy, practice and adaptation research have been recommended using a gender analysis framework. This research documents some of the gender-differentiated climate change impacts and adaptation interventions in four agro-climatic zones across four States:

- The Himalayan eco-system in Himachal Pradesh
- The flood plains of Eastern Uttar Pradesh
- The Sunderbans coastal area in West Bengal and
- The drought region of Andhra Pradesh

Specific gender-responsive policy and practice recommendations for the implementation of the four adaptation-focused Missions (on sustainable agriculture, water, forests and the Himalayan eco-system) under India's National Action Plan on Climate Change (NAPCC) are given. Recommendations for the Mission on Strategic Knowledge are also included. The recommendations given are relevant for State-level Action Plans on Climate Change, now under preparation. The research outlines the roles of different actors including national and state-level government agencies, Panchayat Raj Institutions, the scientific community and civil society organizations.

We hope that this research report will help incorporate gender-just adaptation policies and programmes in the forthcoming 12th Five-year Plan through which the NAPCC and the State climate plans are to be resourced and implemented.

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