

Gender and Climate Change Framework for Analysis, Policy & Action

Dr. Jyoti Parikh



2007



Proponents of the sustainable development debate have been lobbying hard to ensure the sustainability component of the climate negotiating process does not remain a commitment on paper. Ensuring that key development issues such as poverty, adaptation and equity are given a primary role within the overall climate policy is equally important. Nations stand divided on the very principle of climate change, on who should undertake the burden of mitigation and a number of procedural issues. Within this maze of fragile consensus and deep-rooted divergence, addressing gender disparities in an environment where the very notion of gender remains alien is a huge challenge. More importantly, since a number of key strategic decisions on climate change and its policies are reached at different COP meetings, it is important to ensure that the gender aspects are accorded prime importance to ensure that poor women and men do not become the big losers within the wide range of stakeholders and competing interests.

This paper by **Jyoti Parikh** provides a framework to analyse gender and climate change concerns keeping in view the strengths and vulnerability of poor - women in particular. The author also provides policy recommendations for policies and actions. The author is grateful to Saudamini Sarma, Aleksandra Guo, Vinika Koul for their able research assistance and to Meenakshi Kathel, Gender officer, UNDP India for her frequent inputs and a review.

Table of Contents

1. Introduction	4
2. Framework for analysis	9
3. Vulnerability and Adaptation	11
Natural Resources Management	
Agriculture and Food Security	
Water and other resource shortages	
Forests and Himalayan Ecosystem	
Coastal Zones	
Risks and vulnerability	
Health	
Extreme events and disasters	
Basic Needs and Livelihoods	
4. Mitigation Efforts for Climate Change	29
Energy Efficiency	
Renewable Energy	
Recycling & Waste Management	
CDM Projects	
5. Engagement, Policy and Action	35
Programmes	
Institutions	
National Policies	
6. Way Forward	38
Strategies	
Short Term	
Medium term	
Long Term	

Mainstreaming Gender into Climate Policies, Programmes and Action Projects

1. INTRODUCTION

Physical impacts resulting from such accumulation such as rising temperature, rising sea levels, extreme events will dramatically alter the natural balance of local and global ecosystems and will infringe on human settlements (Figure 1). Consequently, vulnerable groups such as poor, especially women will be faced with problems such as food insecurity, loss of livelihood, hardships due to environmental degradation which also lead to displacement and a whole host of potentially devastating economic and social consequences. It is the poor women who are vulnerable and will bear the adaptation burden despite their insignificant contribution to GHG emissions.

Gender-disaggregated approach is required in order to shed more light on the levels of vulnerability, and coping mechanisms of different social groups and effectiveness of measures. These findings should feed into the climate negotiation as well as national debates to enable decision makers to have a better understanding of how different groups of people are affected and what kind of capacity and support is needed. It is observed that climate change impact and responsibilities are not gender – neutral.

Gender differentiated strategies for responses and capacity building is needed due to differences in gender specific roles and responsibilities created by the society .With literacy and empowerment, some of these differences have come down considerably. This is true in the developed countries as well as in the literate societies in the developing countries, especially in the urban metropolis societies.

Of course, in the rural areas women are as much involved in agriculture, fishing, and other livelihood activities as men are, however, their roles and rewards differ. If gender

roles in real life are clearly differentiated then each should be assisted to cope with the problems they face.

It is widely acknowledged that the negative effects of climate change are likely to hit the poorest people in the poorest countries the hardest, in other words: the poor are most vulnerable to Climate Change. Women form a disproportionate share of the poor in developing countries especially in communities that are highly dependent on local natural resources: Their problems should be addressed adequately.

Women bear disproportionate burden of climate change consequences

Decreased food security: With changes in climate, traditional food sources become more unpredictable and scarce. This exposes women to loss of harvests, often their sole sources of food and income. With cash crops becoming scarce, food prices increase and make the situation even worse

Impact on livelihoods: Women are more dependent for their livelihood on natural resources that are threatened by climate change. For instance, climate change causes a rise in the sea level, affecting the fishing community (both men and women) not only in terms of fish-catch but also with regard to water scarcity, as seawater gets into fresh water. Besides, when the land is inundated, infrastructure (roads and houses) are damaged. Large scale migration from inundated areas is expected and much of the burden of migration falls on women

Water resources - shortage and access: Climate change may exacerbate existing shortages of water. Women are largely responsible for water collection in their communities and are therefore are more affected when the quantity of water and/or its accessibility changes

Increased burden of care giving: As primary caregivers, women may see their responsibilities increase as family members suffer increased illness due to exposure to vector borne diseases such as malaria, water borne diseases such as cholera and increase in heart stress mortality

Source: Climate Change – A gender issue, Issue Paper, UNDP India

Figure 1. Illustrative examples of global impacts projected for climate changes

WATER	<p>Increased water availability in moist tropics and high latitudes</p> <p>Decreasing water availability and increasing drought in mid-latitudes and semi-arid low latitudes</p> <p>Hundreds of millions of people exposed to increase water stress</p>
ECOSYSTEMS	<p>Up to 30% of species at increasing risk of extinction</p> <p>Significant¹ extinctions around the globe</p> <p>Increased coral bleaching — Most corals bleached — Widespread coral mortality</p> <p>Increasing species range shifts and wildfire risk</p> <p>Terrestrial biosphere tends toward a net carbon source as: ~15% — ~40% of ecosystems affected</p> <p>Ecosystem changes due to weakening of the meridional overturning circulation</p>
FOOD	<p>Complex, localised negative impacts on small holders, subsistence farmers and fishers</p> <p>Tendencies for cereal productivity to decrease in low latitudes</p> <p>Productivity of all cereals decreases in low latitudes</p> <p>Tendencies for some cereal productivity to increase at mid- to high latitudes</p> <p>Cereal productivity to decrease in some regions</p>
COASTS	<p>Increased damage from floods and storms</p> <p>About 30% of global coastal wetlands lost²</p> <p>Millions more people could experience coastal flooding each year</p>
HEALTH	<p>Increasing burden from malnutrition, diarrhoeal, cardio-respiratory, and infectious diseases</p> <p>Increased morbidity and mortality from heat waves, floods, and droughts</p> <p>Changed distribution of some disease vectors</p> <p>Substantial burden on health services</p>

S

Source: IPCC Fourth Assessment Report. Synthesis Report.

As H.E. Mrs. Gro Harlem Brundtland (2007) observes “Poor people are more vulnerable to climate change due to their limited adaptive capacities to a changing environment. Among them, the rural poor, and rural women and girls are the ones most immediately affected. Climate change impacts are not gender neutral”. Poverty reduction through an integrated approach to local resource management is the key to development. There is a need to see gender issues in a broader perspective since they are still seen within rigid and restrictive lenses.

J. Parikh and F. Denton (2003), observe that gender is a significant dimension to take into account when understanding environmental change. It is important to understand how men and women may be affected differently by climate change considering their roles and responsibilities in the society. The knowledge thus gained would help improve actions taken to reduce vulnerability and combat climate change in the developing world. For example, perspectives, responses and impacts related to disaster events are different for men and women, as men and women have different social responsibilities, vulnerabilities, capabilities and opportunities for adjustment and unequal assets and power relations. Their physical abilities and the way they experience environmental changes and disaster can be different.

Additionally, they also observe that climate change has many gender-specific characteristics:

- 1) Women are affected differently, and more severely, by climate change and natural disasters because of social roles discrimination, poverty and intra-household inequity,
- 2) Women are still underrepresented in decision-making about climate change, greenhouse gas emissions and adaptation/mitigation,
- 3) There are gender biases in carbon emissions. They should be included not only because they are most vulnerable but also because they have different perspectives and expertise to contribute.

Gender - refers to the social roles and relations between women and men. This includes the different responsibilities of women and men in a given culture or location.

Gender roles - of women and men are socially constructed, unlike the sex of men or women, which is biologically determined, and such roles can change over time and vary according to geographic location and social context.

Gender equality means “equal enjoyment by women and men of socially-valued goods, opportunities, resources and rewards. Where gender inequality exists, it is generally women who are excluded or disadvantaged in relation to decision-making and access to economic and social resources. (...) [A] critical aspect of promoting gender equality is the empowerment of women, (but) (...) (t)he achievement of gender equality implies changes for both men and women (because) (t)he lives of men are just as strongly influenced by gender as those of women.”

Thus, gender perspectives are needed in adaptation and mitigation in terms of beneficiaries and decision making for climate strategies. These are the three dimensions added here.

IPCC (2007) remarks “there are societies and groups throughout the world with insufficient capacity to adapt to climate change. For example, women within subsistence farming communities are disproportionately burdened with the costs of recovery and coping with drought in many parts of the developing world”.

J. Parikh & F. Denton (2003), note that the effects of climate change manifested in the increase of extreme weather conditions such as hot summers, droughts, storms or floods, impact women more severely than men, both in developing and in developed countries. For example, the 20,000 people who died in France during the extreme heat wave in Europe in 2003 included significantly more elderly women than men. These may be more due to biological differences but also due to roles women play. Deaths due to heat stress are happening regularly even now in the developing countries.

Adaptation to climate change is also about injecting social equity within the overall climate policy so that vulnerable people are not worse off as a result of environmental degradation. However, the key development issues such as poverty, adaptation and equity have been sidetracked at best and blatantly omitted at worst in discussions on climate policy, which is seemed to be driven by economic payoffs and considerations. Assessing the degree of vulnerability of poorer communities is essential to addressing some of the stark asymmetries that are present particularly in key areas such as the productive sectors where women’s’ contributions remain undervalued and invisible.

On the other hand, according to WEDO (2007) “Women are often perceived primarily as victims and not as positive agents of change. However, women can be key agents of

adaptation and mitigation to climate change. Their responsibilities in households, communities and as stewards of natural resources position them well to develop strategies for adapting to changing environmental realities”.

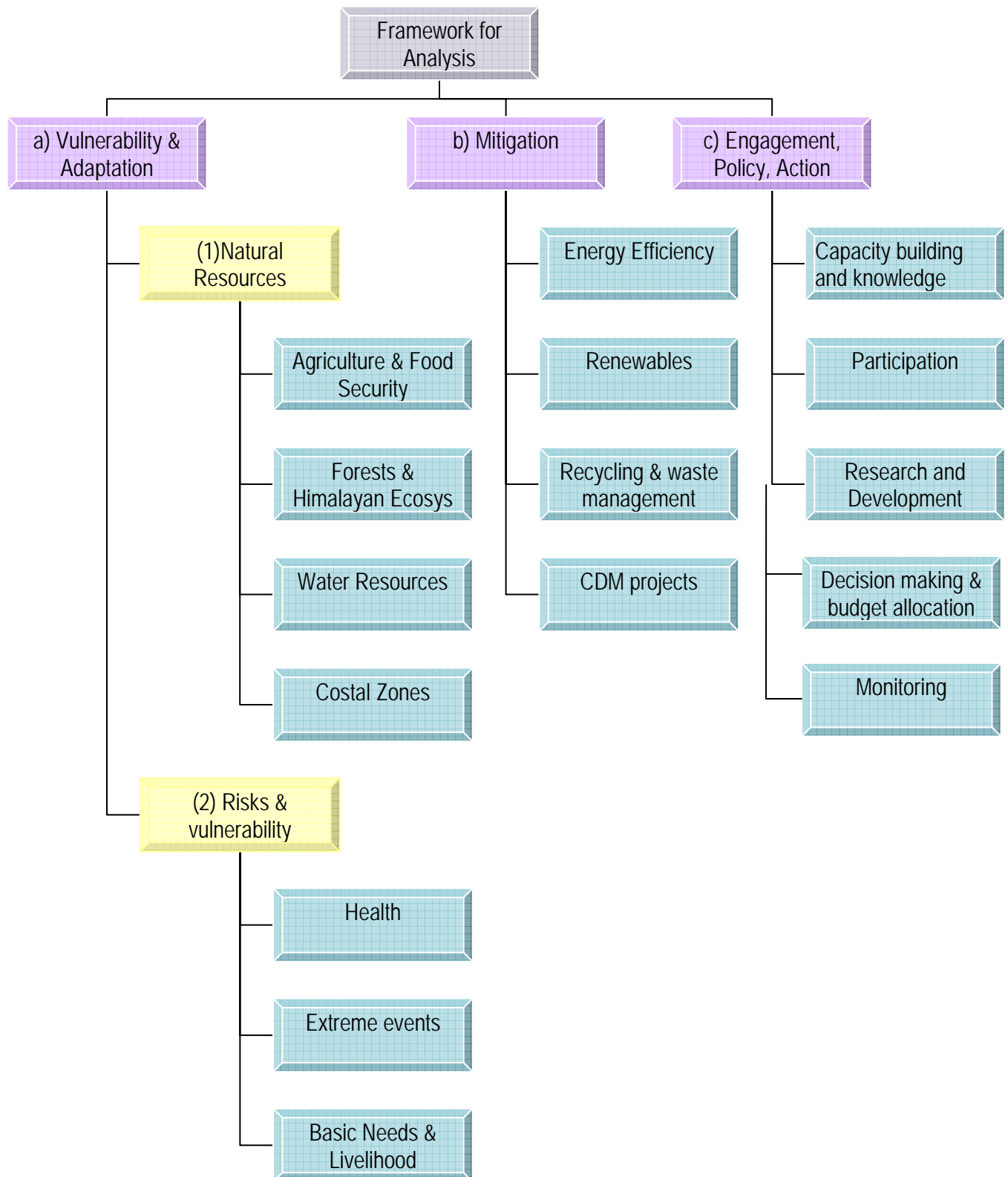
Thus we need a framework that addresses various dimensions of climate change.

2. FRAMEWORK FOR ANALYSIS

Rural women in developing countries are still largely responsible for securing food, water, and energy for cooking and heating. Drought, deforestation, and erratic rainfall cause women to work harder to secure these resources. So far, Climate change has largely been conceived as a scientific process and less in social realms (IPCC, 2001). Gradually new approaches are coming forward, e.g. Oxfam (2002), WEDO (2003), Genanet (2004)

We attempt to make a framework for such socio-economic analysis. Figure 2 shows that gender and climate change are addressed by three different themes: adaptation, mitigation and institutions, policies and governance needed for engagement of women to address their own problems from their own perspectives. Adaptation to climate change and gender is divided in two streams: Natural Resources management and Risks and vulnerability. The former includes agriculture, Forests & Himalayan Ecosystem, Water Resources and Coastal Zones. Risks and Vulnerability include Health, Extreme Events & Disaster and Basic needs & Threats to Livelihood. Mitigation includes energy efficiency, renewables, Recycling & waste management and CDM projects. Engagement focuses on Capacity building & Knowledge management, Participation, research & development, Decision making & budget allocation and Monitoring.

Figure 2. Framework for analysis, policy and action.



A) Vulnerability and Adaptation

IPCC (2007) “societies across the world have a long record of adapting to the impacts of weather –and climate- related events such as floods, droughts and storms, and some planned adaptation to climate change is already occurring on a limited basis. Many adaptations are embedded within broader development and sectoral planning initiatives. However, vulnerability to climate change can be exacerbated by non-climatic stresses such as rapid population growth and urbanisation, construction and settlement in high-risk areas, poor management of natural resources and the loss of traditional coping skills. (4.2)”

The IPCC (2007) also notes: “climate change impacts will be differently distributed among different regions, generations, age classes, income group, occupations and genders. The impacts of climate change will fall disproportionately upon developing countries and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water, and other resources.” People living in poverty are more vulnerable to environmental changes. The gender-poverty links show that 70 percent of the poor in the world are women and their vulnerability is accentuated by race, ethnicity, and age.

In IPCC Fourth Assessment Report (2007) is said that viable adaptation options can be implemented at low cost, and/or with high benefit-cost ratios, in sectors such as sea level rise, agriculture, energy demand for heating and cooling, water resources management and infrastructure. Empirical research also suggests that higher benefit/cost ratios can be achieved by implementing many adaptation measures early on, compared with the costs of retrofitting long-lived infrastructure at a later date. Following the framework of figure 2, we discuss various types of adaptation.

(1) Natural Resources Management

Women's role in natural resource management is considerable whether it is water, agriculture, forest or wildlife ecosystem, and coastal zones. Climate change will have an impact on the biomass which is the the vital source for food, fuel, fibre, construction material and livelihood activities.

a) Agriculture and Food Security

Climate change could mean extra hardship for farming activities, often carried out by women, especially (in Africa but also in Asia where they farm) e.g. in paddy cultivation, cash crops such as cotton and tea plantations and so on. Women's contribution and participation can help or hinder environmental resource management. High dependency on agriculture, forest sectors and bio-fuels could increase vulnerability and heighten the risk of environmental depletion.

J. Parikh and F. Denton (2003) remark that most developing countries especially in Africa, South Asia and small islands have few resources to contend for these impacts. For instance, agriculture will be seriously affected as developing countries, largely characterised by their vulnerability, weak institutional capacity and precarious financial situation, try to grapple with the problems of climate change.

According to Cline, W.R. (2007) in the long-term, small increases in temperature are, in aggregate, expected to reduce crop yields and the area of arable land to a greater extent than other regions. Some project up to a 9% decrease in potential agricultural land by the 2080s and a reduction in yield of up to 10 and 18% for cereals and maize, respectively, by 2050. Results of Kumar, K.S. Kavi and Parikh (2001b) for India also support this. In addition, FAO/GIEWS (2007) Global Watch reported two million hectares of crops were either damaged or completely lost to the water in 2007 in the Ganga (Ganges) river basin that connects Nepal, India and Bangladesh. Months after the rains stopped many had still not recovered their livelihoods.

Women's active involvement in agriculture and their dependence on biomass energy would mean effective environmental management. The need to diversify energy resources and facilitate the introduction of substitution fuels for household energy consumption could well constitute the essential part of adaptation strategies.

Current approaches to poverty reduction are exemplified by the UK Department for International Development's (2005) in their Agriculture Policy Paper, which highlights the critical role of agricultural productivity in stimulation agricultural growth and poverty reduction. Small farms are generally owned and operated by the poor, often women, who use locally-hired labour, and distribute income within nearby locales, creating multipliers. These small farms have some advantages over the large farms in certain types of transaction costs: the supervision of labour, local knowledge, and food purchase for self consumption and risk reduction. But, if climate change also means that there is less agricultural land available, and the area of low-potential land is increased, the need to increase land productivity to stimulate agricultural growth becomes all the more pressing.

Downing T .E., Sokona Y and Smith J.B (2000) observe women are increasingly getting involved in agriculture, food-processing industry, etc – all of these are potential income generating activities. Land clearance for agriculture and commercial purposes is causing deforestation, restricting access to forestry products and placing women increasingly under strain given the fact that a large amount of time is spent trekking in search of diminishing fuel wood. Consequently, this will lead to severe adverse changes in soils, arid-lands, coastal zones and tropical and boreal forests. In addition, wetlands and vulnerable species would be under severe threat.

Climate change is predicted to reduce crop yields and food production in some regions, particularly the tropics. Women are responsible for 70–80 percent of household food

production as they are often subsistence farmers, producing their own food. Traditional food supply sources may become more unpredictable and scarce as the climate changes thus invariably affecting women. It is crucial that women have land rights so that they are empowered and can carry out sustainable agriculture.

L. Aguilar (2004) mentions that “in some regions, such as sub-Saharan Africa and Asia, the majority of women are responsible for subsistence food production. With changes in climate, traditional food sources become more unpredictable and scarce. This exposes women to loss of harvests, often their sole sources of food and income. With cash crops becoming scarce, food prices increase and make the situation even worse”

Actions Needed

- Capacity building for new and gender specific programmes for adaptive farm practices.
- Integrated biomass strategies for food, fuel, fodder, and other basic needs including income generation.
- Investment in irrigation and rain harvesting schemes.
- Capacity building for waste management.
- Practices to prevent to adopt soil less and draught resistant varieties.
- Managing droughts and floods.

b) Water and other resource shortages

Climate change may exacerbate existing shortages of water. Women, largely responsible for water collection in their communities, are more sensitive to the changes in seasons and climatic conditions that affect water quantity and accessibility which makes its collection even more time-consuming. UNDP (2007) reports that in northern Kenya the increased frequency of droughts means that women are walking greater distances to collect water, often ranging from 10 to 15 km a day. This confronts women with personal security risks, keeps young girls out of school and imposes an immense physical burden –a plastic container filled with 20 litres of water weights around 20 kg. The large

river basins of the Niger, Senegal and Lake Chad as well as those of South Asia have experienced a 40-60% reduction in the water level, according to UNEP figures.

According to L. Aguilar (2004) “Without secure access to and control over natural resources (land, water, livestock, trees), women are less likely to be able to cope with permanent climatic change or less willing to make investments in disaster mitigation measures”. Strengthening water resources and delivering systems will be done best with women’s help and involvement.

UNDP (2007) also notes that glacier retreat in the Himalayas could cause the Ganges to lose two-thirds of its July-September flow, causing water shortages for over 500 million people and one-third of India’s irrigated land area. Agriculture and power generation are fully dependent on the freshwater supply fed by the discharges of the Himalayan glaciers.

Women’s specific knowledge in soil conservation is now recognized by planners which incorporate low-cost techniques adapted to local conditions, according to FAO (2007). For example, an agro-forestry project in Yatenga, Burkina Faso, relies on the harvesting of scant rainfall to keep fields and crops moist throughout the growing season. It has successfully combined a traditional technique of collecting water in small pits spaced across fields with the construction of rock banks following the shallow-sloping field contours - and much of the bank building is done by women. Crops in these fields can now survive up to two weeks of drought, producing larger and more reliable yields.

Thus, women’s role in adaptation programmes for water management is necessary to ensure effective delivery.

c) Forests and Himalayan Ecosystem

Forests

Forests are vital for food resources. Their unsustainable use would result in a shortage of non-timber forest products (NTFP) – which could lead to malnutrition and infant mortality.

Narpat S. Jodha (2006) says an increasing number of women depend upon forest resources as a major source of their livelihood. Forest products also serve as a source of nutritional and food supplement thus providing alternative nutrients, minerals and vitamins to the usual staple food. M. M. Skutsch (2002) also comments already there are a number of forest management programmes in Burkina Faso, Mali, Nepal and India that are contributing a lot to agricultural and community forest management. The Developing Countries Fund can be seen as a good enough vantage point to implement climate adaptation and as such target women and men in reducing deforestation, promoting cleaner biomass projects and assisting poorer households to reach more sustainable options. Preservation of non-timber forest products with women's help will ensure livelihood and food security.

Women's strong role in preservation is remembered by "chipko movement" in the Seventies, where women hugged the trees to prevent them being cut by timber companies. Their participation in Joint Forest Management (JFM) is well known. Rawat (1996) in GEO Year Book (2004) reports in 1974, state government and contractors diverted the men of Reni Village to a fictional compensation payment site, while labourers disembarked from trucks to start logging operations. Under the leadership of Gaura Devi, a 50-year old illiterate woman, women left their homes to hug the trees and prevent them from being cut. A four-day standoff ended in victory for village women.

Himalayan Ecosystems

Himalayas span 8 Countries over 2600 km. For India there are 7 states directly on it and other 5 states that are partly covered by Himalayan Mountains. It is a biodiversity hotspot and gives rise to 3 major rivers which are lifelines for northern and eastern India. The local population needs to be prepared for changes in temperature, rainfall, ecological, socio-economic dimensions that impact them. On one hand we need special

task forces and on the other incorporate climate change as a component, in the existing programmes.

The changes in the precipitation pattern will impact significantly the water resource situation in the subcontinent, point out R.K. Mall *et al.* (2007) of the Central Ground Water Board.

J. Parikh (2007) points out that the Himalayan mountains are not only important from the standpoint of climate and as a provider of life- giving water to a large part of the Indian subcontinent, but also harbour a rich variety of flora, fauna, human communities and cultural diversity. Moreover, this region is one of the mega biodiversity hotspots of the world. Despite plenty of natural resources, most of its people are marginalized and still live on subsistence level. The inappropriate use of natural resources is leading to increasing environmental degradation and aggravating impacts of natural hazards. The consequence is rapid destruction of biodiversity as well as threatening to extinction of wild flora & fauna. Accordingly, there is a need to evolve new paradigm to restore balance between economic interests and ecological imperatives with due regards to socio-cultural principles. Poor, especially women, suffer most.

d) Coastal Zones

India not only has 7516 km coastal line but has highly populated areas and major cities on the coast. Climate change causes a rise in sea level, affecting the fishermen and fisherwomen not only in terms of fish-catch but also water scarcity, as the seawater gets into fresh water. Moreover, livelihoods from fishing in which women are equally involved may also be affected as the sea level rises and intrusion of saline water in freshwater systems takes place. Besides, when lands are inundated, infrastructure is damaged, road sand houses. Large scale migration from inundated areas is expected. E.g. Migration again leads to extra hardships for women.

The National and the State Governments have to build embankments to protect the population and infrastructure in danger. In order to commit this task the government could use women's labour force. Women can be protected and also help protect themselves.

(2) Risks and vulnerability

According to OFDA & CRED (2007) climate generates a distinctive set of risks like droughts, floods, storms, etc. Vulnerability is different from risk. Climate change threats illustrate the distinction between risk and vulnerability. People living in the Ganges Delta and New York, especially lower Manhattan share the flood risks associated with rising sea levels. They do not share the same vulnerabilities. The reason: the Ganges Delta is marked by high levels of poverty and low levels of infrastructural protection.

According to UNDP (2007) with limited access to formal insurance, low income and meagre assets, poor households have to adapt to climate shocks under more constrained conditions. In an effort to protect current consumption, poor people are often forced to sell productive assets, compromising future income generation. When incomes fall from already low levels, women may have no choice but to reduce the number of meals they eat, cut spending on health, or withdraw their children from school to increase the labour supply.

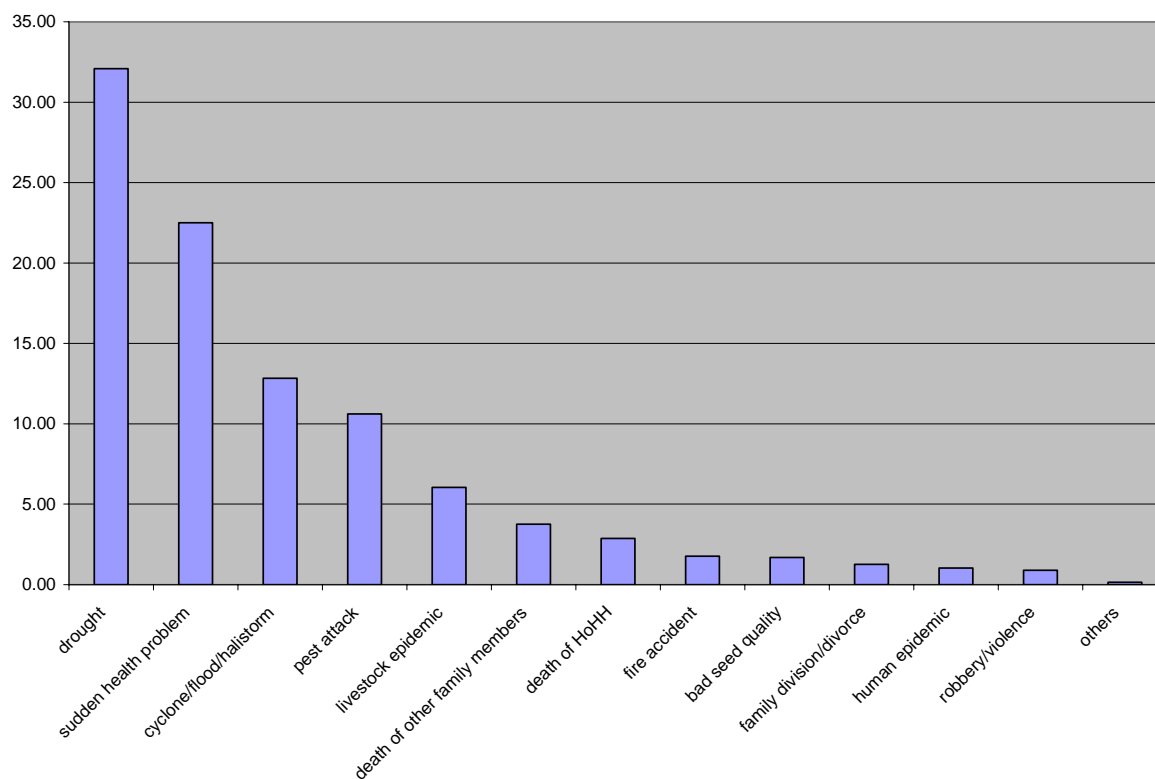
On the other hand in India S. Mahendra Dev, K. Subbarao, S. Galab, C. Ravi –DSGR- (2007) carry out a study about safety nets in three different states in India - Orissa, Madhya Pradesh and Karnataka-. It is interesting that the study is not about climate change but regarding safety nets viz. non-contributory transfer programmes targeted to the poor and those vulnerable to poverty and shocks in general. These programmes help households manage risks. This study is based on household-level and village-level surveys on the profile of household risks and the functioning of safety net (anti-poverty) programmes. They find that well-designed safety nets may also promote high risk/high return private investments by households, and prevent adverse welfare outcomes (such

as pulling children out of school) during periods of acute shocks/crises. Gender differentiated safety nets may be more effective. Targeted policies could reduce cost and help where it is needed. The issue is how climate change will impact the safety net programmes described in the study.

The state has a role to play in the design, financing and execution of safety net programmes though the extent of state involvement may vary with the level of development of a country and the degree of uninsured risk faced by households (Subbarao et. al. 1997). In India, providing some measure of income security and ensuring a minimum level of well-being to the poor has been a central plan of public policy since the independence. Towards this end, a number of safety net programmes, known popularly as anti-poverty programmes, have been launched.

It is rather surprising that while we think that climate risks are still in future, already risks related to drought, cyclones dominate “all risks” in the three states where the studies are carried out viz Orissa, Madhya Pradesh and Karnataka based on a detailed survey of 45 villages. Moreover, there are other risks listed which include pest attacks, robbing livestock epidemic, fire accident and human epidemic. These could also be indirectly increased with climate change in some ways, although it would be have to ascertain with more research.

Figure 3. Percentage of households reporting different risk events (All 3 states)
Climate related risks are leading the rest



Source: S. Mahendra Dev, K. Subbarao, S. Galab, C. Ravi –DSGR-(2007)

The respondents have also reflected on the role of alternative institutions, viz., Non-governmental organizations (NGOs), PRIs (Panchayat Rja Institutions) and women self-help groups in implementing the safety net programmes. The respondents from Karnataka state are not totally in favor of NGOs. They have preferred PRIs to NGOs. This indicates the trust of the targeted communities in PRIs. Moreover, this also indicates that the NGOs are crowded out if the PRI institutions function well. However, in Orissa and Madhya Pradesh NGOs were preferred. S. Mahendra Dev, K. Subbarao, S. Galab, C. Ravi (20002) observe that *Women’s self-help groups are preferred as alternatives to improve the implementation process of safety net programmes in all the states, by and large.*

In addition UNDP (2007) says that research in Indian villages in the 1990s found that even slight variations in rainfall timing could reduce farm profits for the poorest quartile of respondents by one-third, while having a negligible impact on profitability for the riches quartile.

a) Health

Climate change may affect health in a variety of ways, including:

- Increased spread of vector-and water-borne diseases
- Reduced drinking water availability
- Food insecurity due to reduced agricultural production in some regions and hence malnutrition or disturbance of traditionally balanced diets
- More cases of heat stress and respiratory illness.

IPCC (2007) highlights effects of climate change on human health. For low income populations, projected changes in climate by 2030 under a range of emissions scenarios are expected to increase rates of mortality from climate change, principally due to increases in malnutrition and diarrhoeal diseases. Women are more prone to malnutrition as they are the last to eat after feeding the family. As primary caregivers in many families, women may see their responsibilities increase as family members suffer increased illness. Further, in the developing world, women often have lesser access to medical care than men.

- Women are more likely to suffer heat stress and account for heat-related deaths, perhaps due to biological reasons.
- High precipitation tests the integrity of water management systems and increases the risk of outbreaks of water-borne disease. The impacts of flooding are particularly severe in areas of environmental degradation, and where basic public infrastructure, including sanitation and hygiene, is lacking. Women are more in contact with water; they are more likely to be impacted.

- Increases in ground-level ozone concentration could increase respiratory and cardiovascular morbidity and mortality. This is in addition to indoor pollution that women suffer which also leads to the same problems.
- Increases in mean temperature could facilitate the spread of malaria and dengue fever along the current edges of their geographic distribution in some regions, and increase the length of the transmission season for malaria, although the magnitude of the effect is thought to be smaller than previously estimated.
- Increases in daily temperature will increase numbers of cases of food poisoning in temperate regions; warmer seas may contribute to increased cases of human shellfish and reef-fish poisoning (ciguatera) in tropical regions. As women tend to eat left-overs and inferior food even within the poor house-holds, this issue is of importance.
- There are important prerequisites for adaptation that are currently not met in many parts of the world, e.g., access to primary health care and basic education.
- There has been progress in the design and implementation of climate-health warning systems, established to reduce effects of weather extremes as well as for the seasonal prediction of infectious diseases. Limited evidence suggests that such systems can be effective, provided women are also introduced to this and are aware.
- *Health Protection measures:* Capacity building for avoiding vector borne diseases, malnutrition due to food scarcity and heat stress need to include women.

On the above mentioned study, conducted by S. Mahendra Dev, K. Subbarao, S. Galab, C. Ravi –DSGR-(2007) can be observed that risk patterns varied by states. Figure 3 shows the relative importance of various risks in the three states and for all states combined. Risks that have been persistent for many years will become worse with climate change as they are climate related. In the relatively more developed state like Karnataka, the

incidence of health risk is about one half of the incidence of drought (which is not surprising because Karnataka has a large proportion of arid zone) whereas in a relatively poorer state like Orissa health risk dominates (which is also not surprising given the preponderance of malaria) alongside covariate risks. Madhya Pradesh is somewhere in between – health risk is about two-thirds of weather-induced covariate risks. Another interesting difference is that in *Orissa not only health risk is hitting humans, but it is also hitting livestock* – highest proportion of households experienced epidemics of livestock in Orissa in comparison with the other two states.

b) Extreme events and disasters

J. Parikh and F. Denton (2003) observe that in natural disasters that have occurred in recent years, both in developing and in developed countries, it is primarily the poor who have suffered.

In addition, L. Aguilar (2004) notes that during emergencies, due to climate causes are likely to drive migration. Men migrate more often than women do, both seasonally and for a number of years. In dry land areas, the female-headed households left behind are often the poorest, and wives of seasonal migrants may not receive remittances or have sources of income. The workloads of these women, their children and the elderly increase significantly as a result of male out-migration. UNDP (2007) affirms that Monsoon floods and storms in South Asia during 2007 season displaced more than 14 million people in India and 7 million in Bangladesh.

Although tsunamis are not climate related, WEDO (2007) figures show that women are more vulnerable to extreme events. As climate change exacerbate natural disasters can be deducted that more women will be affected if the proper measures are not taken. Women accounted for 55-70% Banda Aceh tsunami deaths; in the worst affected village in the North Aceh, district of Indonesia, Kuala Cangko, 80% of the deaths were women;

70% of the deaths during the 2003 European heat wave were women. In addition, Hansen et al. (2006) reports that floods frequently claim far more female victims because their mobility is restricted and they have not been taught to swim. When Bangladesh was hit by a devastating cyclone and flood in 1991, the death rate was reportedly five times higher among women. Also, according to L. Aguilar (2004) women constitute up to 80% of refugees and displaced populations worldwide, and in emergency situations women and children may typically make up 70 to 80% of those needing assistance.

J. Parikh and F. Denton (2003) observe that an increase in extreme events such as storms, floods, cyclones etc, even today, put the burden of devastation and destruction on women who have to keep the family together. At the time of catastrophe, the burden to nurture the family, especially young children, with daily essentials is often largely borne by women. Lorena Aguilar (2004) remarks during emergencies, women are less likely to have access to information about assistance than men. In Bangladesh women suffered the most following the cyclone and flood of 1991. Among women aged 20-44, the death rate was 71 per 1000, compared to 15 per 1000 for men. Warning information was transmitted by men to men in public spaces, but rarely communicated to the rest of the family. Also, women were not allowed to leave the houses without a male relative, and many perished waiting for their relatives to return home and take them to a safe place. More women than men died during 2003 European heat wave and as a result of the 2005 Hurricane Katrina in the United States. This may happen to urban women in the developing countries as well.

Preparedness for early warning systems is needed from floods to droughts but also more extreme events such as storms, cyclones, heavy snowfall, avalanche and GLOF events. Ensuring capacity building programs that capacity building programmes that explain the events and early warning systems include both men and women can save lives. In fact they should be specially designed for women to instruct them about how to handle children and household at the time of disasters. In addition special programmes

can be also designed keeping in view their limited availability to run, swim, hold on to things against forceful events etc. Specially designed shelters and conveying information on how to access them can help immensely.

Successful projects in disaster prevention can take place with women participation. In La Masica, Honduras, early warning and relief activities were conducted with women and men involved on an equal footing, where women took control of the early warning system while men left their posts. When Mitch Hurricane reached the region the residents of La Masica knew what to do. People in vulnerable areas were promptly evacuated, citizens were mobilized for rescue missions, food was distributed, and repairs begun on damaged schools. In the end, La Masica was the only region in Honduras with zero lost lives, informed IDB America news.

Another case of how women's knowledge can be used in disaster situation is reported by ISSC (2005) were women living in villages in the Ganges Delta in West Bengal in India are constructing elevated bamboo platforms known as machan on which to take refuge above monsoon floodwaters, which have been aggravated with climate change.

United Nations Secretary-General's High-level Event on Climate change (2007) concluded that "we need to reduce the risk of disasters and increase the resilience of communities to increasingly extreme weather phenomena through systematic planning and capacity building. This dimension should be integrated into all development planning that countries do and support should be provided to them by development agencies for doing so. To help leverage the synergies between the disaster reduction capabilities"¹

L

¹ Chair's Summary. United Nations Secretary-General's High-level Event on Climate change. 24 September 2007

c) Basic Needs and Livelihoods

Because of women's marginalized status and dependence on local natural resources, their domestic burdens are increased, including additional work to fetch water, or to collect fuel and fodder. In some areas, climate change generates resource shortages and unreliable job markets, which lead to increased male-out migration and more women left behind with additional agricultural and household duties. Poor women's lack of access to and control over natural resources, technologies and credit mean that they have fewer resources to cope with seasonal and episodic weather and natural disasters. Consequently traditional roles are reinforced, girls' education suffers, and women's ability to diversify their livelihoods (and therefore their capacity to access income-generating jobs) is diminished.

More women than men work in the informal sector and in small enterprises. "These sectors are often the worst hit and the least likely to recover from the effects of disasters (because of their low levels of capital accumulation, weaker access to credit and information, among others)" according to L. Aguilar (2004). Women usually have fewer assets than men to recover from natural disasters, and they often do not own land that can be sold to secure income in an emergency.

UNFCC (2005) shows that shortage of natural resources can lead to conflict and conflict amplify existing gender inequalities. Shortfalls in seasonal rains have resulted in drought and economic distress that lead to a 50% increase in the likelihood of civil war.

According to H.E. Gro Harlem Brundtland (2007) women are more "dependent for their livelihood on natural resources that are threatened by climate change. These detrimental effects can already be felt in the short-term – through emergencies such as landslides, floods and hurricanes."

According to L. Aguilar (2004) “Improved ownership rights to small, medium and large livestock has helped women living in dry lands to feed their families and earn income, even in times of drought and when household men have migrated to cities”.

T. Mitchel (2007) conducted a research in villages located in Muzaffarpur district in Bihar state, in India. With climate change higher peak flows in rivers and increases in flood magnitude/frequency the loss of crops, livestock and property increases. Women have little choice but to work as wage labourers again or to borrow money at a very high interest rate. The main economic activities of women are share cereal cropping, agricultural wage labour and animal husbandry. Litchi and mango crops for export provide an important source of cash for the local population. CPD (2000) Female-headed households are an important part of the rural Indian economy, comprising 35%. Besides food and seed prices increase as they get damaged from the floods when they are stored, making them unaffordable for day labourers. As a result, the research found that people were suffering from anxiety and lack of sleep and generally feeling desperate and helpless, having women to cope with these psychosocial impacts.

Women are also affected when climate change obliges their male counterparts to migrate because of extreme events. Male out-migration may happen due to resource shortages, generating increased work for women. Typically, the task of supplying water and fuel for the family is the responsibility of women, which will be also affected due to climate change, especially the problem of water supply. L. Aguilar (2004) further notes that the improvements in family incomes have reduced the need for males to migrate to urban and other areas, thereby increasing rural labour availability for anti-desertification and reclamation practices (e.g., soil and water conservation, cut-and-carry fodder systems and intensive agro-forestry systems) and enabling traditional ecosystem management practices to be passed on by both women and men”.

IRADe notes that a distinction between increase in income and women's empowerment should be done. Income, time and decision making power are important indicators and we should measure all of them. The number of hours spent by women in a day is an important indicator. Reduction in women's drudgery for fuel supply needs to be addressed by plantations for fuel. Women cannot get getting employment for producing seeds, nursery, irrigation, etc. from biofuel plantation or briquetting or in traditional water mill that is used for grinding wheat to generate electricity.

According to the International Centre for Integrated Mountain Development ICIMOD (2006) the majority of rural mountain people do not have regular sources of cash income. Climate change coupled with market forces is reducing women's ability to diversify their income. However, there are some successful projects that show it is possible to improve mountain people income and being sustainable at the same time. ICIMOD and its partners have been implementing the Himalayan Honeybee Management Project as a means to diversify incomes in rural mountain areas and maintain essential pollination services. The project has resulted in measurable socioeconomic, environmental, and ecological benefits. Another direct benefit is pollination services provided by the bees to horticultural plants especially in China's Sichuan province and India's Himachal Pradesh. This project has helped Himalayan women to increase their incomes.

ICIMOD (2006) has also implemented the Medicinal and Aromatic Plants Programme in Asia (MAPPA), which develops and promotes methods, strategies, technologies and other sustainable solutions for conserving, growing, and using medicinal and aromatic herbs-based niche products. The programme directly helps to raise incomes of mountain people while also assisting the conservation of rare, endangered, and threatened medicinal plants. MAPPA has set up networks – including community groups and national level stakeholders – for helping farmers to build supply value chains to link them with markets.

B) MITIGATION EFFORTS FOR CLIMATE CHANGE

Mitigation

J. Parikh (2002) highlighted the possible role of women in Clean Development Mechanism (CDM) as women are engaged in a number of activities such as brick making, charcoal making waste management or agro processing where energy efficiency can lead to CO₂ mitigation. CDM, through carbon sequestration from afforestation, and reforestation can also be done by poor rural women. They too can organise themselves to reduce CO₂ emissions and possibly earn carbon credits.

Urban women's role can be significant to implement energy efficiency programmes at the household level dealing with lighting, appliances, heating and cooling, residues, while rural women are already playing role in using biomass, biogas, plantation and solar devices. *Capacity building and information campaigns can result in substantial gains.*

However, in the name of climate change women should not be denied the use of fossil fuels like LPG or Kerosene. If the climate change problem requires the reduction of use of fossil fuels, then, especially rich (or not so poor) are required to play a key role in mitigating GHG emissions by managing energy saving appliances. Poor women, without access to modern energy are faced with problems relating to indoor air pollution and bear huge health burdens as a result of high incidences e.g. bronchitis, asthma, miscarriages and other health problems. Consequently, projects on potential renewable options should not leave women yet again on the margins of decision-making. Part of reducing vulnerability to climate change would mean finding appropriate technologies that take into account the specific socio-economic realities of different rural areas, reduce women's workload, free up time and enable them to become *micro or macro entrepreneurs.*

Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilisation levels and resulting long term equilibrium temperature changes.

Role of women can be seen in the following activities:

- Energy efficiency
- Renewable energy including hydro
- Afforestation, Joint Forest Management (JFM) and reforestation.
- Recycling and waste minimization (partly due to poverty and due to culture, tradition and habits, we are still a low- waste society, in comparison to developed countries)
- Active in CDM –highest in top two in the world, in no. of projects, carbon credits and corresponding investments made in India.
- Declining, energy intensities and energy per PPP dollars.

a) Energy efficiency

J. Parikh (2002) stressed that under the name of climate change, further constraints on women should be discouraged. For example, there are concerns expressed that if women switch to modern fuels, CO₂ emissions will increase. Some even point out problems with balance of payments or fossil fuel scarcity. Whether a woman wants to use traditional biofuels, petroleum products or renewable energy sources, should be entirely her choice as women are not responsible either for excessive GHG emissions or for foreign exchange imbalance, or for fossil funds scarcity. Poor rural women have not contributed to any of these problems. These responsibilities lie with the 'rich' who over consume. For example, a rural poor person in India emits only 100 to 300 kg of carbon dioxide as compared to urban rich at 2000 kg, world average of 4100 kg and 15000 kg average in the USA. *The choice of fuel should be theirs and should not be taken away in the name of climate change problem.* Gathering, transporting and purchasing

household fuels are a responsibility of women, which can get more difficult with dwindling fruits and biomass availability.

S. Reddy (2007) expressed that there are a limited amount of available energy resources available that are not utilized efficiently. The realization of resource base is dependent on two types of interests i.e. individual and societal and if the individual interests meet the societal interests, more can be achieved. The individual with short term horizon put emphasis on the quantity and price of energy, its supply, cost of technology used, lifestyle needs whereas at the societal level we need to take a long term vies with quality of environment protection and resource effectiveness. In the pattern of household energy consumption, biofuel still dominates with no distinctive changes in other fuel sources. Also there is a question of affordability that means with increase in income there is a shift in household energy use from low energy carrier to high-energy carrier. The same goes for accessibility i.e. location of household also has an implication on the types of cooking energy demand. The actors at all the three levels can be linked in a women centric framework where women have the facility for fuel choice with access to local supply agents, energy service companies, entrepreneurship, women self help groups, etc. Micro finance institutions (MFI) and NGOs can play an important role in making cheap finance available to needy households who cannot afford the initial investment costs needed for energy efficient appliances. Attitude/behaviour of male has also bearing on gender dimension of energy needs.

IRADe reports how women-oriented energy services emphasize access to 'affordable' energy service and link with rural employment, as it is a prerequisite for their growth, development and reduction in poverty. Programmes should be demand driven and not supply driven. Concentrate on energy services on small scale and focus on energy services required by women. Access to non-polluting sources that does not damage women's health should have an important part in the climate adaptation programmes.

Women have role in mitigation energy through conservation within house-holds especially through appliances.

b) Renewable energy

In the wake of dwindling hydro-carbon resources and concerns for climate change the investment in renewables have gone up to \$70.9 billion in 2006 (UNEP, SEFI, New Energy Finance (2007)) Can women benefit from this investment?

J. Parikh (2000) has suggested that rural population can grow their own oil from non-edible seeds for cooking, lighting, irrigation pumps, agriculture machinery and operate bio-diesel generators for electricity. They provide rural employment to poor, including women.

Workshops and special programmes can help in creating awareness about the renewable energy and the role of these clean energy technology in rural areas. There should be gender training for Panchayats so that women's needs are a part of Panchayar programmes. Women should be trained on the technology used so that they can handle independently. There should be option for soft loans, as women are always willing to pay for the services unlike men. Technology needs to be introduced differently from gender point of view: Biogas – a biogas plant that works in all temperature conditions throughout the year, which can use all kinds of household wastes, etc. catering to women needs in different situations such as the one which works both in rural and urban areas. Improved stoves – An improved stove with multi-fuel facility with which both rural and urban women can use with ease.

Solar energy - Despite the fact that Solar Photo Voltaic (SPV) does not provide energy round the clock, the specific time periods during which the sun is available is known in advance and, hence, the users could plan some of the social and economic activities

according to these hours. (Reliability is a problem even in conventional energy sources, such as electricity, where there are occasional power cuts that could not be anticipated in advance. So even the rural electrification does not ensure reliable energy supply).

Wind energy - With the corporate sectors venturing to wind energy and its conjunctive use with farming suggested by Suzlon company(Irade, 2007), it is crucial to integrate gender issues where women and women's groups should be given the rights to cultivate on the land under wind farms.

A successful case in Bangladesh shows how women can be involved in renewable energy projects that tackle climate change and give them a source of income at the same time. An alternative energy sources project was developed in Char Montaz in the southern region of Bangladesh. As electric grid extension to this area was not economically viable, and was not included in the national plan for the next 20 years, a solution was needed to give energy to the population, but in a sustainable way. Surveys showed that demand was high for battery-operated lamps that provide an alternative to kerosene for lighting, noted Hasna, J. Khan. UNDP (2001).

The project has shown that with proper training, the rural women are capable of assembling and marketing electric lamps to meet local needs. The women involved in the project are certified by the local government to do business as a cooperative, and run the manufacturing plant that produces the lamps. In a country where rural electrification is viewed as a public service, the project has identified a niche for private-based operations that support broader rural development. It is the first model of its kind. Empowerment of women through acquisition of technical skills, generate income, play a role in decentralised energy service delivery, improve their quality of life through better lighting, and raise their status in the household and community. Besides, usage of lanterns and other lighting system are very crucial for ensuring women's safety at night.

This project not only shows how climate change can be mitigated by renewable energy projects, but also how benefits women in many different ways.

More projects like the aforementioned are needed. UNDP (2001) reports women are especially vulnerable to the adverse impacts of deforestation, desertification and ecosystem disruption. The fuel-related burdens experienced by women in developing countries hinder social and economic progress throughout the community and have long-lasting impacts when personal and social development opportunities are lost. One can see the difficulties women are suffering because of the unavailability of clean and efficient energy source in sufficient quantity in J.Parikh, V. Laxmi, S. Karmakar and P.Dabrase (2003). Nearly 5 billion days per year are wasted due to energy, water, sanitation and health problems. This situation may worsen as clean fuels and water get expensive, perhaps due to shortages of hydro-carbon and water. This time spent can be utilized efficiently in some other works, which could be more productive. Availability of clean energy sources will save their time which they can utilize in other economic activity and generate money for them. This is an important question which needs to be addressed under gender budgeting.

There is a need to empower the women to convert them from 'user' of energy to 'producer' of energy through Self-Help Groups, micro-enterprises making women entrepreneurs. A distinction between increase in income and women's empowerment should be taken into consideration. Income and time are both important indicators.

c) Recycling and waste management

Women's role in recycling and waste management within the house holds includes a variety of opportunities to make women an important agent in resource conservation. Moreover, rag-picking women serve useful purpose and reduce municipality budget for garbage collection. Some successful experiences are observed in Mexico, where poor women set up a profitable recycling company from municipal solid waste management.

Also, women in rural areas can have some new energy sources as gas from waste. Women from urban areas can contribute recycling the waste at home, as they are most of the times in charge of home cooking and housekeeping and therefore domestic waste. Capacity building and demonstration projects can increase replication and impact.

d) CDM projects

CDM is not a panacea for solving either climate problems or gender's inclusion but it can offer alternative approaches of integrating gender issues into climate change. Moreover, we need to also put the problems in the context of millennium development goals for which energy services will be needed. Along with huge investments, efforts to reduce climate change and to face the challenge of adaptation and mitigation will be needed.

There are a number of viable CDM development projects on waste management, afforestation, reforestation and energy projects such as biofuels of charcoal making that could make potentially good CDM projects which can benefit women but these need to be made known, scaled up and replicated for greater impacts. Ulrike Rohr (2007) observes that out of more than 6000 CDM projects, hardly 5 projects include women. They too can organise themselves to reduce CO2 emissions and possibly earn carbon credits. *Gold standard carbon credits can be issued to those projects which bridge inequity among gender and include poor.*

C) ENGAGEMENT, POLICY AND ACTION

Engagement focuses on capacity building, knowledge management, divert participation, research & development and decision making. This would require policies, institutions, governance and monitoring. We now discuss the broad features of figure 1 in detail in rest of the paper.

In this section action needed at various levels viz. grassroots, national and international in short, medium and long term is identified. Women can be engaged in dealing with

challenge of climate change if there is capacity building, knowledge, policies and programmes.

a) Programmes

There is a need for an integrated approach to climate change monitoring & adaptation based on livelihoods of vulnerable communities. The integrated approach shall:

- Make and demonstrate a compelling case for alternative approaches to climate change adaptation based on vulnerability reduction, including gender, especially vulnerable poor.
- Promote natural resource based approaches for the reduction of vulnerabilities and mitigation. The approaches will provide multiple benefits such as generate immediate economic returns to poor people, sustain and diversify their livelihoods and conserve ecosystems.
- Offer convincing demonstrations of how on-the-ground livelihood activities can be linked with policy processes to reduce existing and future climate related vulnerabilities of poor.
- Identify multi-stakeholder, participatory processes those for selection, implementation and appraisal of adaptation strategies.
- Critique and analysis the prevalent policy approach for addressing adaptation and the assumption that adaptation needs to focus on global rather than local processes.

The ultimate goal is to implement a model on bio-socio-economic field for sustainability as well as poverty reduction and conservation of biological diversity.

b) Institutions

Gender mainstreaming is needed in the on-going processes, such as, Inter-Governmental panel on Climate Change (IPCC), Conference of Parties (COP) and various discussions relating to vulnerability adaptation and mitigation. Climate change bodies like IPCC, SBSTA and especially SBI should ensure that this issue gets attention. A fair balance of gender participation in climate change debate at COP is also needed. Perhaps

a special report could be commissioned so that more information and analysis is generated.

The future COP should have gender-specific events, not only side events but a more formal discussion is needed. UNFCCC should also ensure gender involvement in CDM projects, technology transfer, capacity building and in other initiatives. It is time to consult stakeholders for vulnerability and adaptation issues for integrating gender into National Adaptation Programme of Action (NAPA). We need to ensure that institutions such as the Global Environment Facility and other UN specialised agencies start mainstreaming gender into adaptation programmes.

c) National Policies

J. Parikh and Denton (2003) conclude that gender is absent institutionally, in climate decision making, in semantics and in financial allocations and budgets. Climate change will pose a challenge to women in terms of land degradation, drought, loss of biodiversity etc and hence, vulnerability, adaptation and mitigation issues are very important.

Unless gender matters are taken seriously and effective ways of mainstreaming gender issues are found, development alternatives of reaching out to the poor will remain incomplete. The recurrent problem of poor implementation of development programmes was also mentioned and that they remained largely sectoral is also seen as a part of the problem.

Lack of information and understanding is still a problem and unless the relevant information is made available, such opportunities are not going to be exploited by potential beneficiaries. Concerns were raised on the lack of synergies between the

conventions. Mainstreaming gender is not relevant to climate change convention alone but to also to convention for biodiversity. There was certainly a lot of interest expressed in having similar discussions and workshops to increase our understanding of the issues and promote further research and action.

WAY FORWARD

Since climate change is a long term issue, we need to focus on long term goals first and then see how to get there step- by – step through medium and short term measures. For our purpose we define short term as 1 to 5 years, medium term 5 to 15 years and long term beyond 15 years. However, even medium and long term strategies will have to start their trajectories **so that when the 5th year comes**, preparatory ground is ready. Better understanding, knowledge and information is needed and the approach should be flexible to steer as new information and knowledge open up.

Moreover, gender considerations cannot be detailed more than national climate action reports, and plans but one can certainly insist to ensure that while they are being formulated in the area of adaptation, mitigation and CDM projects, there should be substantial involvement not only in terms of beneficiaries but in their say in decision making.

Short term strategies

- *Budget allocation*: This is the best way to ensure beneficiaries get the required attention. The budgets are needed for preparation of the medium term capacity building and R&D and demonstration project.
- *Early warning systems*: Specific early warning systems need to be design for particular circumstances (e.g. location, housing) in which women live, making sure their participation leverages the project.
- *Task force to upgrade urban infrastructures*: Municipalities need technical and financial help to upgrade infrastructure and to build capacity to deal with

frequent floods, water shortages and other events as to help vulnerable population.

- Coping strategies for livelihood: Fishermen, farmers and poor population in coastal, mountain and arid zones will have to be trained to adapt to changing climate and continue to make a living.
- Risk and insurance: While India is asked to share burden of mitigation, counter gesture on sharing adaptation burden through global insurance for poor facing disasters and distress is in order. Perhaps a protocol to address this need to be initiated. Such a protocol, if developed, should give special assistance to women.
- *Role of media*: Short films can explain what is climate change and how it could affect them .A plan of media exposure has to be made such that different areas and regions get different focus depending on what is most vital for them. Language barriers have to be considered.

Interministerial task force:

Interministerial task force suggested as the issue cuts across many ministries. The gender audit and climate protection should not include only renewable energy and Ministry of New and Renewable Energy and Ministry of Environment & Forest. It is important to involve more bodies like the Planning Commission, Ministry of Power (for electrification), Ministry of Oil and Natural Gas (Kerosene), Ministry of Rural Development (Biofuels), Ministry of Finance; Ministry of Women and Child Affairs, etc. which will provide ample data regarding the issue. NGOs are of great help at the grassroots level and obtain information about the local population in a more affordable and quicker way than the central government. Examples are the District Advisory Committee (DAC) for Renewable energy covering 500 villages. The government audit on energy need to focus more closely on renewable energy as it can help reduce the poverty, empower women with options for livelihood activities.

Medium term strategies

Research and development:

The UN Commission on Sustainable Development (CSD) does include gender as a cross-cutting issue, but focused on climate change only during its 2006-2007 sessions. The connection between gender equality and sustainable development is not new: in fact, every major global agreement on sustainable development acknowledges the importance of gender equality. WEDO (2007) notes that national level action is especially important and government agencies and other stakeholders should ensure that gender equality is at the forefront of climate change initiatives by:

- Undertaking a gender analysis of national or local climate change policies, programs and/or budgets. For example, examine how national adaptation or other climate change plans include or exclude gender equality.
- Developing gender-sensitive indicators for governments to use in national reports to the UN Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, and the Clean Development Mechanism (CDM).
- Creating practical tools that allow gender equality to be incorporated in climate change initiatives. For example, develop a mechanism for the CDM to fund projects that make renewable energy technologies more available to women.
- To make gender sensitive climate policies, it is required to create awareness to planners and policy makers on gender mainstreaming, more women need to be appointed in high-level decision making positions.
- Understand gender differentiation at the state level and create data bases through surveys.
- Which risks such as drought, floods, cyclones and storm affected where and how?
- Who were the affected people – women, children, and elderly, poor?
- Which could have helped them better?

- What type of information training, knowledge and capacity could have reduced the risk and damages?
- Role of gender in agriculture, fishing and climate- sensitive livelihood for founded

Capacity building, knowledge management and participation:

- Prepare of training module for training NGOs and private sector for various ecosystems and manifestation on climate change. There should not be too detailed to start with, but give broad hints and understanding for evolving programme with consensus.
- Impart pilot training to a few countries and redesign modules and manuals from the ground level feed back. Replicate training on a larger scale.
- These are needed for adaptation as well as mitigation. Women’s knowledge in adaptation could be used as a resource and needs to be documented. Often, this knowledge may be community-specific.
- Women’s participation is imperative if efforts to combat global warming are to succeed without their participation, many programmes may not succeed. We expect that the households with higher social capital to have higher probability of participating in dealing with climate change. Women’s inclusion in decision making will ensure success and may reduce costs. Their insights may be not just valuable but essential.
- Women’s participation in decision making is important to handle the issues in new perspectives of governance. Societies with greater role of women in energy planning and decision-making one likely to formulate better village level or cluster level plans. The proportion of budget women received can measure women’s empowerment and effective participation.

For instance ICIMOD (2006) - International Centre for Integrated Mountain Development- has been undertaking community-based capacity building activities in

land use planning for addressing two major concerns that climate change brings about: livelihoods needs and conservation. The methods include modern participatory 3-dimensional modelling (P3DM) and community-based decision making, with traditional institutions taking a lead in micro-planning and policy making in teams representing women and all other social groups residing in the area. Participatory land use planning and action research are underway in northeast India, Bhutan, and Nepal. The Nagaland State Government has adopted it as a component of its land management policy.

Achieving and accelerating MDG's

Literacy and empowerment include development of safety nets, social and physical infrastructures and poverty eradication. These could be the best response strategy and efforts in that diversion here to be accelerated .They will bridge the gender gaps and eventually reduce gender differences

Long term stratgies

- Monitor the follow –up of medium term plans and identify barriers
- Observe and gaps where needed
- Ensure that gender gaps are adequately addressed.

Hopefully, in the 15 years gender will be mainstreamed and from them on routine monitoring may be needed.

Monitoring

It is necessary to ensure progress in gender inclusion in adaptation and mitigation to climate change projects by monitoring with specific indicators to measure the progress and establish adequate accountability mechanisms for monitoring gender mainstreaming in order to identify areas where gender needs to be taken into account. Monitoring can be done through “budget conditioned” projects that must show some progress in order to grant money for subsequent stages of the project. In addition, T.

Mitchell, T. Tanner and K. Lussier (2007) recommend including disaggregated gender sensitive indicators which show how funds are securing aspects of women's livelihoods, food security or equal access to social services.

Monitoring agencies should evaluate effectiveness of different plans started by the government and quasi government organizations. Coherency is needed among different plans initiated by the government and private sector. The gender audit of budget allocated for adaptation and mitigation can lead to sustainability.

Ulrike Rhor (2006) states that gender mainstreaming of climate change-related research, policy making and implementation needs to be monitored at the national and international levels. This can be summarized within three main goals:

- Closing knowledge gaps relating to gender aspects of climate change in the industrialized world, for example, through research and the collection of gender-disaggregated data.
- Including more women and gender experts in climate protection-related negotiations and decision making at all levels.
- Integrating gender-related knowledge into policy making, implementation, monitoring, and communication strategies and materials.

REFERENCES

1. Chair's Summary. United Nations Secretary-General's High-level Event on Climate change. 24 September 2007
2. UNFCCC COP (2005). Global Warning: Women Matter, Women's Statement, December.
3. IPCC (2007) WGII AR4. SPM
4. IPCC (2007) Fourth Assessment Report – Synthesis Report Draft for joint expert/government review.
5. IPCC (2007). Working Group. "Contribution to the Intergovernmental Panel on Climate Change". Fourth Assessment Report. Climate Change Impacts, Adaptation and vulnerability.
6. R. Masika, Editorial Gender and Development (2002) Volume 10, Number 2, July, p 4
7. H.E. Mrs. Gro Harlem Brundtland. 2007. Keynote Address: Levers of global security: examining how a changing climate impacts women.
8. WEDO (2007) Changing the climate: why women's perspectives matter? Available on-line in <http://www.wedo.org/files/climatechange-orng2ebook.pdf>
9. F. Denton. 'Gendered Impacts of Climate Change – A human security dimension', Energia News, Volume 3, Issue 3, October 2000 N.Wamukonya and M.Skutch 'Is there a gender angle in the climate negotiations?' Paper prepared for Energia for the CSD9 (Commission on Sustainable Development, Session 9, New York, 16-27 April 2001 and 'COP 6: the gender issue forgotten?' Energia News4(1): March 2001
10. Gender and Development, Climate Change, Volume 10, Number 2, July 2002 – Oxfam Journal
11. J. Parikh and F. Denton (2003). *Gender and climate change at COP8: A forgotten element*

12. J. Parikh and F. Denton (2002), Gender and Climate Change: Vulnerability, Adaptation, Mitigation and Financial Mechanisms: Proceedings and Thematic Paper *Prepared for COP8, 2002*
13. J. Parikh., Mainstreaming gender issue in rural energy (2002) ENERGIA paper prepared for WSSD.
14. J. Parikh, K. Parikh, Vijay Laxmi, Shyam Karmakar and Pramod Dabrase (2003). Lack of Energy, Water and Sanitation: Impact on Health and Human Resources in Rural North India.
15. Kumar, K.S.Kavi, and J. Parikh (2001b): 'Indian Agriculture and Climate Sensitivity', *Global Environmental Change*.
16. Downing T .E., Sokona Y and Smith J.B., Action on Adaptation to Climate Change, Presentation to the UNFCCC Workshop on Article 4.8 and 4.9 of the Convention: Adverse Effects of climate Change 9-11 March 2000, Bonn, Germany, Oxford Environmental Change Institute, University of Oxford, 2000.
17. L. Aguilar (2004) Climate Change and Disaster Mitigation (IUCN) available on-line: <http://www.iucn.org/congress/women/Climate.pdf>
18. N.S. Jodha (2006) Mountain Commons: Changing Space and Status at Community Levels in Himalayas. Sr. Research Associate (Policy Analyst) International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal
19. M.M. Skutsch, 'Protocols, treaties, and action: the 'climate change process' viewed through gender spectacles' in *Gender and Development*, Volume 10, No 2, July 2002, p 31.
20. 1st International Workshop on Climate Change & Himalayan Ecosystem, 2007. Climate Change & Himalayan Ecosystem- Monitoring, Adaptation & Capacity Building for Mega-Biodiversity Conservation
21. M. Evan (2007). From Risk to Opportunity: Insurer Responses to Climate Change in www.ceres.org

22. S. Mahendra Dev, K. Subbarao, S. Galab, C. Ravi (2007). Safety Net Programmes in India: Outreach and Effectiveness *Village Level Perspectives in Three States* Economical and Political weekly,
23. S. Reddy (2007) from Indira Gandhi Institute of Development Research Goregaon. Presentation at "IRADe Workshop on Gender Audit of National Energy Policies in India. Oct 10. New Delhi
24. G. Kelkar (2007) presentation given at "IRADe Workshop on Gender Audit of National Energy policies in India", October 10. New Delhi.
25. Bahuguna, Vimala (1990), "The Chipko Movement" in I. Lina Sen [ed], *A Space Within Struggle: Women's Participation in Peoples Movements*, Kali for Women, New Delhi.
26. B. Agarwal (1990): 'Gender Relations and Food Security: Coping with Seasonality, Drought, and Famine in South Asia'.
27. UNDP (2007). Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world.
28. OFDA and CRED (2007) in UNDP Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world. P. 78
29. Hansen et al. (2006) in UNDP Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world.
30. UNDP (2001). Generating Opportunities. Case studies on energy and women.
31. Rawat (1996) in GEO Year Book (2004).
32. ICIMOD. International Centre for Integrated Mountain Development. Annual Report (2006)
33. Hasna, J. Khan. UNDP (2001) Battery-Operated lamps produced by Rural Women. P. 77.
34. Arzu-Rana-Deuba UNDP (2001). Rural Micro Hydro Development Programme.
35. ISSC – International Scientific Steering Committee- (2005) in UNDP Human Development Report 2007/2008. Fighting climate change: Human solidarity in a divided world. P 171.

36. T. Mitchell, T. Tanner and K. Lussier (2007). We know what we need. South Asian women speak out on climate change adaptation. Institute of Development Studies.
37. FAO/GIEWS Global Watch, Floods Have Adversely Affected Crop Prospects and Food Security of Millions of Small Farmers in South Asia. Available in <http://www.fao.org/giews/english/shortnews/sasia070814.html>.
38. CPD (2000) Centre for Policy Dialogue. World Bank 1991. Gender and poverty in India, A World Bank country study. The World Bank, Washington DC, 1991
39. R.K. Mall et al (2007). In Frontline. India's National Magazine. Volume 24. Issue 04. Feb 24 March 09.
40. UNEP, SEFI, New Energy Finance (2007). Global Trends in Sustainable Energy Investment 2007. Endorsed by REN21. Available in http://www.ren21.net/pdf/Glob_Sust_Energy_Inv_Report_2007.pdf
41. IDB America news. Reported by Petter Bate. Available in <http://www.iadb.org/iadbamerica/archive/stories/1999/eng/e899f4.htm>
42. Cline, W.R. (2007) 'Global warming and Agriculture' *Centre for Global Development Brief*, September 2007
43. Ulrike Rhor (2006). "Gender and climate change". *Tiempo*. Issue # 59. April. Available in <http://www.cru.uea.ac.uk/tiempo/portal/archive/pdf/tiempo59low.pdf>