

Gender, Climate Change and Human Security

Lessons from Bangladesh, Ghana and Senegal

Prepared for ELIAMEP

May 2008

This report has been prepared by The Women's Environment and Development Organization (WEDO) with ABANTU for Development in Ghana, ActionAid Bangladesh and ENDA in Senegal

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1. Introduction¹

Climate change is increasingly recognized as a major human security issue that poses serious global threats. For the world's poor the impact will be most severe, disproportionately affecting their livelihoods and security. Women comprise 70% of those living below the poverty line. As a result, they are most likely to bear the heaviest burdens when natural disasters strike. At the same time, women are more often overlooked as potential contributors to climate change solutions, and thus to the security of all human beings.

The Hyogo Framework for Action that emerged from the United Nation's 2005 World Conference on Disaster Reduction states that "a gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information management, and education and training" (ISDR, 2005: 4). It is, therefore, imperative that governments and other stakeholders build into their policies and programs strong links between gender, human security and climate change.

This study presents a gendered analysis of how climate change impacts on human security. It also assesses whether adequate scope exists for women to participate in improved human security in a scenario of changing climate. Based on this analysis, recommendations are given for enhancing the integration of a gender perspective in climate change and human security policies and programs.

While the study focuses on gender equality, it emphasizes the effects of climate change on women, the most disadvantaged and neglected social group in society. Women's contributions to climate change adaptation are also examined, as are related policies including National Adaptation Programmes of Action (NAPAs). Global policy frameworks and goals are reviewed, including the Hyogo Framework, the United Nations Framework Convention on Climate Change (UNFCCC) and the Millennium Development Goals (MDGs).

The study is commissioned by the Hellenic Ministry of Foreign Affairs (MFA), supervised by the Hellenic Foundation for European and Foreign Policy (*ELLAMEP*) and executed by the Women's Environment and Development Organization (*WEDO*) in cooperation with the national partners *ENDA* in Senegal, *Abantu for Development* in Ghana and *Action Aid* in Bangladesh. This publication addresses government representatives of the Human Security Network, decision-makers and planners in the areas of human security, climate change and gender issues, as well as civil society actors active in these areas.

The methodology of the report consists of a review of general literature and web-based documentation on gender, climate change and human security. Partner-organizations compiled case studies from their respective countries (Senegal, Ghana and Bangladesh). The data used in the study are qualitative and quantitative in nature and come mainly from secondary sources.

¹ Introduction by Irene Dankelman

The study is organized into 8 chapters. It begins with an introduction, which is followed by an overview in Chapter 2 of the issues related to climate change, human security and gender. Chapter 3 provides a policy framework. Chapters 4-6 contain country-specific case studies from Senegal, Ghana and Bangladesh. Major outcomes and conclusions of the study are presented in Chapter 7. Finally, Chapter 8 delivers a set of policy recommendations for improving human security in the context of climate change from a gender perspective.

Glossary of Terms

climate change: the regional or global-scale changes in historical climate patterns arising from natural and/or man-made causes and resulting in both intermittent but increasingly frequent, extreme impacts (e.g. large storms and heat waves) and slow on-set, pervasive, cumulative effects (e.g. extinction of life forms and sea level rise) (Simon, 2007); climate change involves the interactions of many systems, such as the atmosphere, hydrosphere, cryosphere, and biosphere, as well as the human systems.

environmental security: the protection of people from short- and long-term ravages of nature, man-made threats to nature, and deterioration of the natural environment.

gender: the socially or culturally constructed roles and relationships between women and men, contextually specific and often changing in response to altering circumstances (Moser, 1993).

gender equality: equal visibility, empowerment, access to resources, rights and participation and decision-making power of women and men in all spheres of public and private life.

hazard: a potentially damaging physical event, phenomenon or human activity that may cause loss of life or injury, property damage, social and economic disruption or environmental degradation (UN/ISDR, 2004).

human security: the protection of “the vital core of all human lives in ways that enhance human freedoms and fulfillment” (Ogata & Sen, 2003); the security of individuals, their livelihoods, and human rights including economic security, food security, health security, environmental security, personal security, community security and political security.²

vulnerability: “the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards” (UN/ISDR, 2004).

² The concept of “human security” was first introduced by UNDP in 1994 and then developed further in the report of the UN Commission on Human Security, co-chaired by Sadako Ogata and Amartya Sen, *Human Security Now* (2003). The environmental dimension of human security has been addressed by an international team working on Global Environmental Change and Human Security (GECHS), in several studies by the United Nations University Institute for Environment and Human Security (UNU-EHS), and further developed in Kofi Annan’s report *In Larger Freedom: Towards Development Security and Human Rights for All* (2005). The UNDP *Human Development Report 2007-2008* focuses on the relationship between human development and climate change.

Acronyms

ADB	Asia Development Bank
AFES- PRESS	Peace Research and European Security Studies
BBS	Bangladesh Bureau of Statistics
BCAS	Bangladesh Centre for Advanced Studies
BPoA	Beijing Platform of Action
BREAD	Bureau for Research in Economic Analysis of Development
CBDs	Convention on Biodiversity
CBOs	Community Based Organizations
CDM	Clean Development Mechanism
CDP	Centre for Policy Dialogue
CDPC	Community Disaster Preparedness Committee
CEDAW	Convention on the Elimination of all Forms of Discrimination against Women
CENSUDI	Centre for Sustainable Development Initiative
CII	Country Implementation Institution
CILSS	Countries form the Permanent Interstate Committee for Drought Control in the Sahel
COMNACC	National Committee on Climate Change
COP	Conference of Parties
CSW	Commission on the Status of Women
DDR	Disaster Risk Reduction
ELIAMEP	Hellenic Foundation for European and Foreign Policy
ENDA	Environmental Development Action in the Third World
EPA	Environmental Protection Agency
ERPA	Emission Reductions Purchase Agreement
FHH	Female Headed Household
GGE	Greenhouse Gas Emission
GINC	Ghana's Initial National Communication
GPRS	Ghana Poverty Reduction Strategy
HIPC	Highly Indebted Poor Countries
ICESCR	The International Covenant on Economic, Social and Cultural Rights
ICPR	The International Covenant on Civil and Political Rights
IPCC	Intergovernmental Panel on Climate Change
ISDR	International strategy for Disaster Reduction
IUCN	International Union for Conservation of Nature
KP	Kyoto Protocol
LDCs	Least Developed Countries
MDGs	Millennium Development Goals
MOFA	Ministry of Food and Agriculture
MOWAC	Ministry of Women and Children's Affairs
NALAG	National Association of Local Authorities in Ghana
NAPA	National Adaptation Programmes of Action
NCWD	National Council on Women and Development
NEMAP	National Environmental Management Action Plan
NETFUND	Navrongo Campus and Northern Education Trust Fund
NETRIGHT	Network for Women's Rights in Ghana
PAHO	Pan American Health Organization
PRSP	Poverty Reduction Strategy Paper
RMG	Ready-Made Garment
SAPs	Structural Adjustment Policies
SNC	Second National Communication

SNEEG	National Strategy on Equity and Gender Equality
UNCCD	United Nation Convention to Combat Desertification
UNDP	United Nations Development Program
UNECA	United Nation Economic Commission for Africa
UNECLA	United Nations Economic Commission for Latin America
UNEP	United Nation Environment Program
UNFCCC	United Nations Framework Convention on Climate Change
UNIFEM	United Nation Development Fund for Women
UNU-EHS	United Nations University Institute for Environment and Human Security
WALWA	Women and Law in West Africa
WHO	World Health Organization

2. The Issues at Stake: Gender, Climate Change and Human Security³

This chapter describes how climate change and human security are related. It examines the gender aspects of (natural) disasters, the impacts of climate change on women, and women's strategies to strengthen human security when climatic changes occur. Based on these findings, an analytical framework on gender, climate change and human security is presented at the end of this chapter.

2.1 Climate change and human security

Natural variations in climate have existed for millennia: ice ages and (sub)tropical periods have alternated. However, anthropogenic climate change has gradually emerged since the industrial revolution, especially since the 1950s, due to the availability of cheap fossil fuels such as coal, oil and natural gas, and the dramatic increase in its consumption (IPCC, 2007). The Intergovernmental Panel on Climate Change (IPCC) in its Fourth Assessment Report underlined that greenhouse gases and other changes to the ecosphere are a certain contributor to climate change. The panel also concluded that climate change has started to manifest with results that are multifaceted and will be dramatic unless immediate mitigating actions are taken (IPCC, 2007).

Climatic changes result in a variety of direct problems, including increased frequency of extreme weather events, flooding, storms, drought, desertification, increases in sea temperatures, heat and cold waves, the melting of glaciers and permafrost. In the long run, sea level rise and abrupt changes in sea currents pose major threats to coastal areas, ecosystems and geophysical cycles. These developments will have significant ecological, social, economic and political impacts, including effects on food production, water availability, intensification of wildfires, mud-streams, bleaching of corals, changes in epidemic vectors and extinction of pollinators.

The *2007-2008 Human Development Report: Fighting Climate Change: Human Solidarity in a Divided World* concludes that climate change threatens progress towards development itself, and progress towards the 2000 UN Millennium Development Goals—a set of eight numerical and time-bound targets intended to improve living conditions and remedy key global imbalances by 2015—in particular, and will undermine the raising of the Human Development Index in many countries (UNDP, 2007). This perspective moves climate change away from a purely technical subject and brings it to the center of (sustainable) development policies and strategies.

The nature and extent of climatic changes not only hinders human development and environmental conservation, but also forms a major threat to human security at national and livelihood levels. Eminent persons, such as David King (UK government chief scientific adviser), John Reid MP (then British Secretary of State for Defense and now Home Secretary), as well as Peter Randall and Doug Schwartz (for the U.S. Department of Defense) concluded in 2004 that climate change is a great threat to national and global security (Brauch, 2004; Russell and Morris, 2007).

³ Chapter 2 by Irene Dankelman

In a statement at the January 2007 *Conference on Climate Change: the Global Security Impact* (Royal United Services Institute) John Ashton, UK Foreign Secretary's Special Representative for Climate Change, said, "There is every reason to believe that as the 21st century unfolds, the security story will be bound together by climate change... Climate change is a security issue because if we don't deal with it, people will die and states will fail" (Vogel, 2007: 1).

Climate change may spark conflict between and within nations, as resources and safe places become scarcer, and disasters destroy livelihoods, increasing the number of migrants and refugees. For example, Edward, Shankar and Sergenti (2007) explain how shortfalls in seasonal rains that result in drought and economic distress increase the likelihood of civil war by up to 50%.

On 17 April 2007, the UN Security Council took up the issue of climate change for the first time in history as an important human security challenge. Although there was common agreement that climate change is threatening geopolitical security, there were reservations by developing countries who regard climate change as a socio-economic development issue to be dealt with by the more widely representative General Assembly.

At that meeting Margaret Beckett, UK's Foreign Secretary, warned about migration on an unprecedented scale due to flooding, disease and famine. She also said that drought and crop failure could cause intensified competition for food, water and energy. "It is about our collective security in a fragile and increasingly interdependent world," she said (UN, 2007). Climate change also has major economic implications. According to a 2006 report by Sir Nicholas Stern the costs of adapting to climate change could be as much as 10% of world economic output (Stern, 2006).

But climate change is not just a political and economic issue. Most of all, it is a human issue, where the livelihoods of numerous communities are threatened and their security is at stake. Wisner, Fordham et al. (2007) have developed an analytical model in which the interactions between climate change and human security issues are outlined. Human security is threatened and conflicts arise where climate change impacts on food, health and water availability. Sea level rise, which will result in large scale displacement, will also contribute to conflicts.

Authors also see potential conflicts occurring between food and fuel production in competition for land and other resources and in the promotion of biofuels and other mitigation measures. Even adaptation—for example the construction of big dams—can contribute to inequity and become a source of conflict (including mega-projects). O'Brien (2007) warns that in our globalizing world, human security in one place or for one group is increasingly linked to the actions and outcomes of others. From a social perspective, climate change mitigation and adaptation may potentially create new inequities, vulnerabilities and insecurities.

Although climate change affects everyone regardless of race, caste, ethnicity, sex and level of income, its impacts are more heavily felt by poor nations and communities, and climate change magnifies existing inequalities. In the large number of weak and crisis-prone nation states, climate change will increase chronic instability. The IPCC concluded: "Poor communities can be especially vulnerable, in particular, those concentrated in high-risk areas.

They tend to have more limited adaptive capacities, and are more dependent on climate-sensitive resources such as local water and food supplies” (IPCC 2007:9).

The consequences of climate change are closely related to the context in which individuals or groups experience the changes (O’Brien, 2007). Therefore, a vulnerability approach to climate change is advocated for by authors such as Wisner et al. (2004), Lambrou and Piana (2005), and Oswald Spring (2007).

Wisner et al. (2004: 4 and 11) define vulnerability as “the characteristics of a person or group and their situation influencing their capacity to anticipate, cope with, resist and recover from the impact of natural hazard.” They argue that a vulnerability approach to natural disasters is necessary, as “the risks involved in disasters must be connected with the vulnerability created for many people through their normal existence”. This means that there is a need “to identify, delineate, and understand those driving forces that increase or decrease vulnerability at all scales” (Cutter, 2003:7).

Apart from seeing climate change as an apocalyptic global problem that has to be tackled, some authors point us to the fundamental challenges that climate change brings about. “Ironically, climate change offers humanity an opportunity for a quantum leap in sustainable development and peace making” (Wisner, Fordham et al., 2007:11). O’Brien (2007) regards climate change as one of the greatest opportunities in history for addressing inequities and enhancing human security, and as an extraordinary opportunity for responding to and creating social change. As Margaret Beckett emphasized during the special session of the Security Council (in April 2007), “Climate change can bring us together, if we have the wisdom to prevent it from driving us apart” (UN, 2007).

2.2 Gender aspects of (natural) disasters

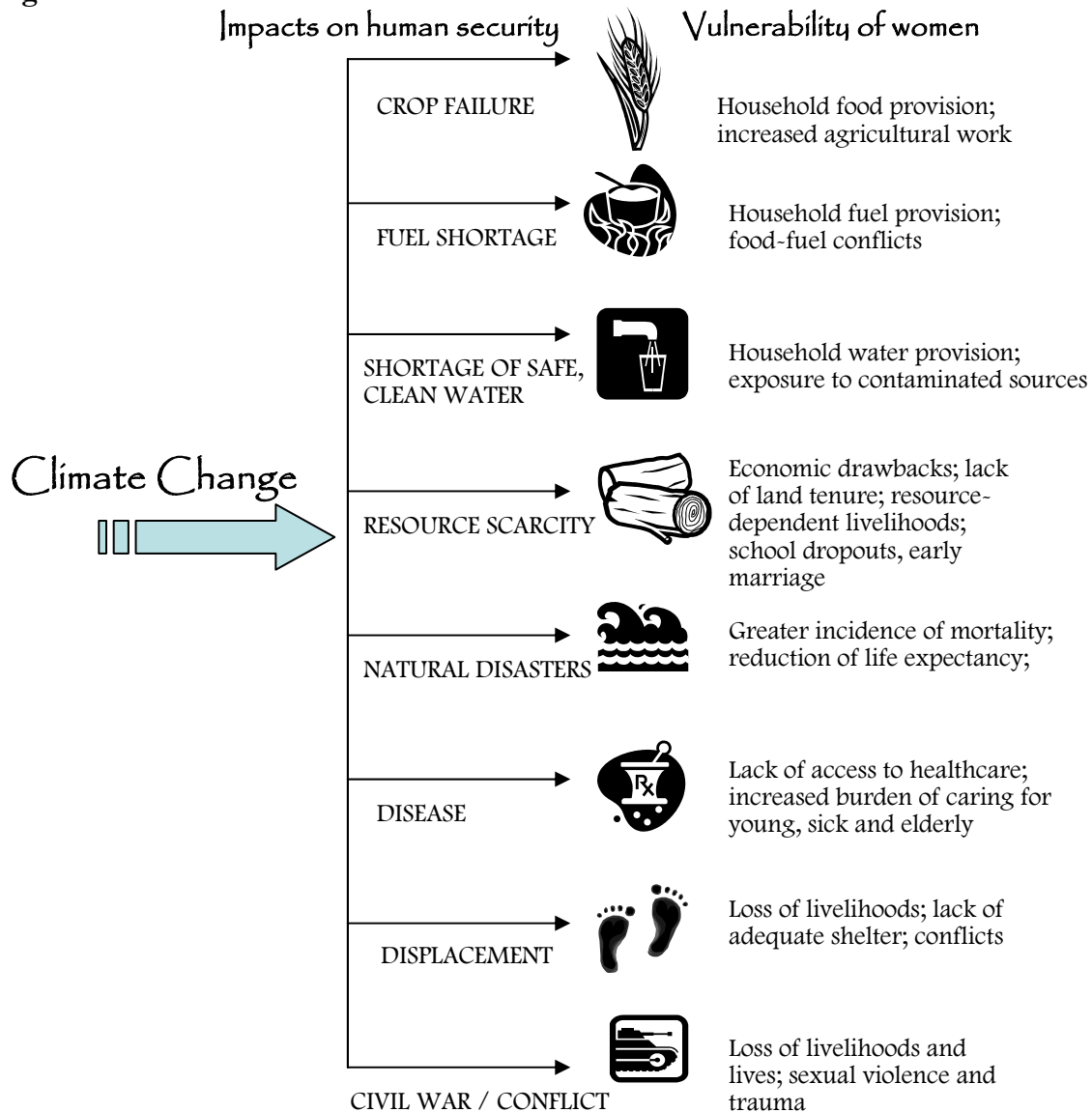
Many of the implications of (natural) disasters on women and men are documented in existing literature. The gender and disaster network presents lessons learned from the field on their website www.gdnonline.org. In many societies vulnerability to (natural) disasters differs for women and men. Women are often more vulnerable to disasters than men through their socially constructed roles and responsibilities, and because they are poorer (Pan American Health Organization, 1998; Mitchell et al., 2007).

In general, women have less access to resources that are essential in disaster preparedness, mitigation and rehabilitation. Gendered divisions of labor often result in the over-representation of women in agricultural and informal sectors, which are more vulnerable to disasters. Women, in general, are also responsible for reproductive tasks such as food collection and energy supply for the household as well as many care-giving tasks, such as caring for the children, sick, elderly, the home and assets (Enarson, 2000).

Water, sanitation and health challenges put an extra burden on women, adding to the double burden of productive and reproductive labor when there is a disaster and a collapse of livelihood (Patt et al., 2007). In many societies, socio-cultural norms and care giving responsibilities prevent women from migrating to look for shelter and work when a disaster hits. Self-sacrifice even hampers women’s own rescue in any type of disaster.

Women also face indirect problems when natural disasters strike. They are often less mobile, more likely to be confined to the house and have less decision-making power. All of which contributes to their lack of participation, and lack of access to information regarding

Figure: 1



(WEDO, 2008)

potential hazards and possible coping strategies. Besides diminishing their visibility, these realities deprive women of opportunities to look for alternative sources of income, adversely affecting their bargaining power in the household and community.

In a recent study by the London School of Economics, the University of Essex and the Max-Planck Institute of Economics, a sample of 141 countries in which natural disasters occurred

during the period 1981-2002 was analyzed (Neumayer and Plümper 2007). The main findings are that: (a) natural disasters lower the life expectancy of women more than that of men; (b) the stronger the disaster, the stronger this effect on the gender gap in life expectancy⁴; (c) the higher women's socio-economic status, the weaker this effect on the gender gap in life expectancy. The conclusion is that it is the socially constructed gender-specific vulnerability of women built into everyday socio-economic patterns that leads to the relatively higher female disaster mortality rates compared to those of men. For example, the 1991 cyclone in Bangladesh killed 138,000 people, many of whom were women older than 40 years (Bern et al., 1993).

The disadvantaged position of women means greater difficulty in coping with disasters. For example, in a country like Bangladesh where women are more calorie-deficient than men, women have more problems recovering from the negative effects that flooding has on their health (Cannon, 2002). An increase in the number of female-headed households (because of male out-migration) also amplifies women's responsibilities and vulnerabilities during natural disasters. After a disaster hits there are often inadequate facilities available for women to cope with their household tasks or to find shelter. Disaster relief efforts pay insufficient attention to women's reproductive and sexual health, and as a result, women's health suffers disproportionately.

In the aftermath of disasters, an increase in domestic and sexual violence often occurs. During or after disasters, such as long periods of drought, more girls drop out of school to reduce household expenses by saving on school fees, or to assist in the household with tasks such as fetching water, or as a result of pregnancy and early marriage (Eldridge, 2002). A study in Malawi (2001) showed that girl-children are married off early in times of drought, usually to older men with numerous sexual partners. They were even forced to sell sex for gifts or money, which resulted in the accelerated spread of HIV/AIDs in the country (Malawi Government, 2001).

Lower levels of education reduce the ability of women and girls to access information—including early warning mechanisms—and resources, or to make their voices heard. This is an extra challenge when women want to make innovative changes in their livelihoods.

Empirical studies reveal that women and men make decisions differently. Whereas men are more risk-taking, women tend to be more risk averse. Men are more overconfident, thinking that they can predict and handle the future themselves, whereas women are more willing to adapt their strategies and behavior. Women usually listen to external advice, but men will not easily ask for directions. In general, women are more aware of social bonds, showing greater reciprocity and altruism. However, when social bonds are weak, men can be observed to be more cooperative than women. These findings have major implications for disaster management and could form important underlying motives for women's and men's reactions to hazards (Brown-Kruse, 1993; Patt et al., 2007).

This also indicates that gender-differentiated roles don't always result in higher losses for women. For example, immediate mortality caused by Hurricane Mitch in Central America

⁴ Generally life expectancy is higher for women than it is for men; if the gender gaps in life expectancy decrease due to an event it means that relatively more women die, or they die at an earlier age.

was higher for men, not only because they were engaged in outdoor activities when the disaster struck, but also because they tended to be more overconfident in their behavior toward risk (Bradshaw, 2004).

2.3 Women and climate change

Although climate change affects everyone, it is not gender neutral. Climate change magnifies existing inequalities, reinforcing the disparity between women and men in their vulnerability to and capability to cope with climate change (UNDP, 2007; Mitchell et al., 2007).

Women, as the majority of the world's poor, are the most vulnerable to the effects of climate change (WEDO, 2007). Poor women more are likely to become direct victims (mortalities and injuries) of climate change disasters, such as hurricanes and flooding (Neumayer and Plümper, 2007). During natural disasters, often more women die than men because they are not warned, cannot swim or cannot leave the house alone (UNFCCC COP, 2005). When poor women lose their livelihoods, they slip deeper into poverty and the inequality and marginalization they suffer from because of their gender, increases. Therefore, climate change presents a very specific threat to their security.

Women made up 55-70% of the Banda Aceh (Indonesia) tsunami deaths, and in the worst affected village Kuala Cangko, in the North Aceh district, 80% of the deaths were women (UNIFEM, 2005; Oxfam Briefing Note, 2005). According to BBC News online, of the 2003 French heat wave toll of 15,000, about 70% were women. And in the U.S., Hurricane Katrina entrenched poor African-American women, who were already the most impoverished group in the nation, into deeper levels of poverty (WEDO, 2007).

Women's responsibilities in the family make them more vulnerable to environmental change, which is exacerbated by the impacts of climate change. They are being affected in their multiple roles as food producers and providers, as guardians of health, care givers, and economic actors. As access to basic needs and natural resources, such as shelter, food, fertile land, water and fuel, becomes hampered, women's workload increases. Poor families, many of which are headed by females (e.g. 15% in Bangladesh, 10% in Nepal and 35% in rural India) (Mitchell et al., 2007), often live in more precarious situations, on low lands, along dangerous riverbanks, or on steep slopes.

Drought, deforestation and erratic rainfall cause women to work harder to secure (natural) resources and livelihoods. In such situations, women have less time to earn income, get an education or training, or to participate in governing bodies. Girls regularly drop out of school to help their mothers to gather wood and water. "Loss of livelihood assets, displacement and migration may lead to reduced access to education opportunities, thus hampering the realization of Millennium Development Goal 2 (MDG2) on universal primary education. Depletion of natural resources and decreasing agricultural productivity may place additional burdens on women's health and reduce time for decision-making processes and income-generating activities, worsening gender equality and women's empowerment (MDG3)..." (UNDP-2, 2007:1).

Conflict that arises from a shortage of natural resources amplifies existing gender inequalities, while the relocation of people has severe impacts on social support networks

and family ties—mechanisms that have a crucial value for women, and in their coping capacity (Patt et al., 2007).

2.4 Women’s coping strategies: strengthening security

Too often women are primarily perceived as the main victims of climate change and not as positive agents of change and contributors to livelihood adaptation strategies. As highlighted by Enarson (2000) and O’Brien (2007) natural disasters could also provide women with a unique opportunity to challenge and change their gendered status in society. Women have been willing and able to take an active role in what are traditionally considered ‘male’ tasks in responding to disasters, e.g. following Hurricane Mitch in Guatemala and Honduras in 1998 (Schrader and Delaney, 2000).

In general, women have proved effective in mobilizing the community to respond to disasters, and in disaster preparedness and mitigation. For example, after Mitch struck women engaged in housing reconstruction. The NGO Puntos de Encuentro in Nicaragua organized the information campaign “Violence against women is one disaster that men can prevent”. The campaign proved effective in changing men’s attitudes towards violence against women, and therefore tackled existing power structures (www.puntos.org.ni, in: Pan-American Health Organization, 1998).

Women usually have fewer assets than men to recover from natural disasters, and usually do not own land that can be sold to secure income in an emergency. Among the problems women identify when having to adapt to climate change, are lack of safe land and shelter, lack of other assets and resources, limited access to material and financial resources, lack of relevant skills and knowledge, high prices of agricultural inputs and other materials, and cultural barriers limiting women’s access to services (Mitchell et al., 2007).

However, worldwide women are starting to adapt to a changing climate and can articulate what they need to secure and sustain their livelihoods more effectively. Local strategies for adapting to climate change provide valuable lessons.

In studies from areas where flooding was problematic, women’s adaptation coping strategies and mechanisms included:

- moving to safer places: higher locations, making of temporary shelters, increasing the plinth level of their houses or homesteads, and migration;
- saving their assets: trying to store seeds and moving livestock to high places;
- dietary adaptations: skip meals or eat non-traditional foods (such as water hyacinth), or preserving food to be used in the lean time;
- energy-saving: use of alternative energy-related technologies (solar, biogas, improved cooking stoves);
- adapting their agricultural practices: e.g. switching to other crops and varieties that are flood or drought resistant, multiple cropping and intercropping practices, alternative irrigation facilities, mixing fertile with sandy soil, changing cultivation to more easily marketable crop varieties or to other animals (e.g. in Nepal: rearing goats and poultry farming; in Bangladesh, ducks instead of poultry)

- earning income or saving money: working as wage (bound) laborers, borrowing money from money lenders at high interest rates, secretly saving part of their earnings, or distress sale of livestock;
- alternative health care: the use of traditional medicine;
- organizing and collective action: e.g. setting up of community-based self-help groups and networks, and group savings, or systems of group labor (e.g. through the Nepalese system of *parma*), are popular ways that women apply in coping with disasters (Mitchell et al., 2007; Patt et al., 2007).

Not all coping strategies are sustainable; for example, adaptation in diets, or money lending⁵. Women often have a clear sense of what they need to adapt better. In several studies (Mitchell et al., 2007; Oxfam, 2005) women have voiced their priorities in times of disaster:

- safety: a safe place to live for their families and themselves; including relocation to safe areas, shelters, and adaptation *in situ* by the construction of solid houses; the storage of their harvest and livestock;
- adaptation in agricultural practices, including crop diversification;
- better access to information;
- access to services such as doctors and pharmacists, and agricultural extension;
- development of their capacities, through training and information (including through exposure and exchange visits about adaptation strategies and livelihood alternatives);
- access to resources, including climate-related finances (Skutsch, 2004); improved access to credits and markets, to implement effective strategies and overcome constraints;
- ecological restoration.

There could be important synergies between climate policy and gender equality, e.g. linking carbon sequestration with poverty reduction (See Box: Women's Capacity to Adapt), clean energy for cooking that reduces indoor air pollution and related diseases, cheap voltaic energy that lights houses and enables education, and ecosystem improvement promoting sustainable development and lightening women's tasks.⁶

⁵ Dr. Renate Christ, Board Member International Panel on Climate Change (IPCC), at the Roundtable on Climate Change and Human Security: women, a most vulnerable group. Vienna, 13 March 2008.

⁶ Ibid.

Women's Capacity to Adapt

1. In the midst of a drought in the Federated States of Micronesia women used their experience working the land to dig into the ground and create a new well filled with drinkable freshwater. But planners and decision-makers had not considered their possible contributions (WEDO, 2007).
2. In November 2006, the Kenyan women's organization Green Belt Movement and the World Bank's Community Development Carbon Fund Project signed an Emission Reductions Purchase Agreement (ERPA) to reforest 2,000 hectares on two mountain areas in Kenya with thousands of indigenous trees (Green Belt Movement, 2006).
3. In a CARE project in Bangladesh, women tended to prioritize adaptation strategies that could be implemented close to home, such as homestead gardening and duck rearing. In the project, which recruited female field officers, women comprised 58% of total project participants (Patt et al., 2007).

Women, more than 50% of world population, also play important roles in climate change mitigation: not only do they manage most of the households, childcare and education, they are also often ready to take action to mitigate climate change as a means of risk aversion.

2.5 An analytical framework: gender, climate change and human security

In order to analyze the relationship between human security, climate change and gender issues, an analytical framework is presented in Figure 1. The framework shows that if we define human security as security of survival (mortality/injury, health), security of livelihood (food, water, energy, environmental, shelter, and economic security), and dignity (basic human rights, capacity, participation), climate change has different effects on these respective security aspects and show gender specific characteristics. Women have developed specific adaptive strategies to cope with these problems. There are a wide range of (policy) opportunities in which adaptive measures can be taken to address women's priorities in times of climate change that threaten their security.

Figure 2: Human Security, Climate Change and Gender (Dankelman, 2008)

Human Security	Security Aspect	Climate Change	Gender aspects	Adaptive strategies women	Opportunities (policy, etc.)
Security of survival	Mortality/injury	* Mortality through different extreme weather events	* More women than men injured or die	* Looking for safe shelter; improving homes and houses * Disaster risk reduction	* Disaster preparedness * Early warning systems * Gender-specific (women's participation and access/control)
	Health	* Increased infectious diseases vectors * Physical and mental stress	* Women bear the brunt of taking care of the sick, disabled. * HIV/AIDS increases due to early marriage, forced prostitution, etc. * Women lack access to (reproductive) health services * Loss of medicinal plants/biodiversity	* Medicinal plants and application of other preventive or alternative methods * Increase in caring tasks	* Access to health facilities and services (for women) * Monitoring health situation * Reproductive health facilities
Security of Livelihood	Food security	* Agricultural production changes * Fishery stocks decrease	* More time and energy needed for food production * Increased work-burden * Calorie-deficiency/hunger * Budgetary problems	* Adapting the agricultural practices: switching to other crops, animals, or to other methods * Saving food, seeds and animals. * Adaptation diets. * Buying food	* Agricultural extension in adaptive strategies, e.g. mixed cropping, better adapted crops/livestock * Affordable and ecologically-sound agricultural inputs * Better nutrition * Land rights for women * Marketing facilities
	Water security	* Lack of water * Pollution and salination of water * Flooding	* More time and energy needed for water provision (household/agriculture) * Increased work-burden * Health problems	* Water-saving practices, including rainwater harvesting * Purchasing water from water-vendors	* Safeguarding of affordable drinking water * Safe sanitation facilities * Preservation of wetlands
	Energy security	* Lack of biomass fuel * Dysfunctioning hydropower	* More time and energy needed for fuel collection * Increased work-burden. * Inferior energy-sources: indoor pollution	* Switching to other energy-sources * Use of energy saving devices * Advocacy	* Provision of fuel sources * Provision of (and training in) energy-saving devices * Ecological regeneration
	Environmental Security	*Environmental processes and services	* Poorest women living in insecure environments most	* Building more secure houses	* Ecological restoration * Safe shelter areas

		jeopardized	affected	* Cleaning up the environment * Regenerating the environment	
	Shelter security	* Housing, infrastructure and services destroyed	* Limited land rights * excluded from land planning * Male out-migration	* Building more secure housing * Seeking shelter: migration	* Safe shelters and solid housing
	Economic security	* Decreased income generating and credit opportunities	* Women working in informal sector most affected * Costs for household budget increase (e.g. buying water) * Male out-migration: increase female headed households	* Saving on expenses or money for lean times * Selling of assets and services * Alternative income generating activities	* Affordable credit and financial facilities for women * Provision of alternative livelihood options
Dignity	Basic human rights	* Triggers violation of basic human rights: stress factor increases.	* Violence against women: at household level, in conflicts	* Organization of women * Social networks	* Supporting facilities (including counseling, community based organizations (CBOs) * Defense of women's rights
	Capacity	* Lack of education and income generation opportunities	* Girls dropping out of schools * No time left for education, training, income generation	* Self-training, support groups and networks	* Education * Skills training
	Participation	* No/limited part in decision-making; lack of information	* Lack of women's participation in climate change adaptation activity * Priorities neglected	* Organization * Advocacy * Participation	* Access to information * Ensure women's participation (in planning and decision-making) * Involvement of men in gender training

3. International Policy Framework: Human Security, Gender Equality, Sustainable Development ⁷

This chapter provides a short overview of the global policy framework that can address the human security challenges of climate change from a gender perspective.⁸

3.1 Human rights and human security

The Charter of the United Nations (1945) describes the establishment and purpose of the United Nations. It contains multiple references to people's strategic and material security and sets a framework for ensuring human security at every level. The first section on strategic security rights encompasses civil and political rights; the second includes material security and economic, social and cultural rights (Moore, 2004).

The Universal Declaration on Human Rights (1948) that links strategic and material rights has attained the status of customary law and obliges states to promote human security. For example article 3 affirms "...the right to life, liberty and dignity". The declaration also stresses the non-discriminatory character of human rights, including the equal rights of women and men.

The International Covenant on Civil and Political Rights (ICPR) of 1966 ensures the equal right of women and men to the enjoyment of civil and political rights set forth by the covenant. The *International Covenant on Economic, Social and Cultural Rights* (ICESCR) of 1966 forms a blueprint for establishing human security through enumeration of specific socio-economic rights. The ICESCR affirms the equal right of women and men to the enjoyment of economic, social and cultural rights, therewith ensuring material and social security. The responsibility to attend to human security is also recognized in international humanitarian law, including the *Geneva Conventions*.

At the 1993 *World Conference on Human Rights* in Vienna, 171 states adopted the Vienna Declaration and Programme of Action. Article 11 of the Declaration states, "The right to development should be fulfilled so as to meet equitably the developmental and environmental needs of present and future generations." The outcome documents urge treaty monitoring bodies to include the status of women and the human rights of women in their deliberations and findings, making use of gender-specific data. It also urges governments and regional and international organizations to facilitate the access of women to decision-making processes.

At its seventh session in March 2008 the *UN Human Rights Council* adopted by consensus a resolution on Human Rights and Climate Change, in which the concern was expressed that

⁷ Chapter 3 by Irene Dankelman

⁸ Sources for this chapter: UNEP, 2003. *Women and the Environment*. UNEP, Nairobi; Rebecca Pearl, 2007. *Info/Doc 3 Paper* developed for Network of Women Ministers of Environment, for UNFCCC COP-13, Bali. WEDO; IUCN, 2007; Ulrike Röhr, 2008. *Report on Gender and Climate Change: networking for gender equality in international climate change negotiations*. Gendercc-Women for Climate Justice, Berlin, 2008; Jennifer Moore, 2004. *Collective security with a human face: an international legal framework for coordinated action to alleviate violence and poverty*. *Denver Journal of International Law and Policy*, 22 December 2004.

climate change poses an immediate and far-reaching threat to people and communities around the world and has implications for the full realization of human rights. The Office of the High Commissioner was encouraged to execute an analytical study of the relationship between climate change and human rights.

3.2 Gender equality policies and agreements

The 1979 *Convention on the Elimination of all Forms of Discrimination Against Women* (CEDAW) is commonly referred to as the bill of rights for women. It asserts that state Parties are bound to guarantee women and men equal opportunities in terms of civil, political, economic, social, and cultural rights. Parties agree to incorporate the principle of equality of women and men in their national constitutions and/or other appropriate legislation. And to ensure, through law and other appropriate means, the practical realization of this principle. In a provision with relevance to climate change, the Convention obliges parties to take “all appropriate measures to eliminate discrimination against women in rural areas in order to ensure, on a basis of equality of men and women, that they participate in and benefit from rural development” and, “participate in the elaboration and implementation of development planning at all levels”, and “in all community activities”. The protocol provides a mechanism whereby women can submit communications requesting that violations of the rights established in CEDAW be investigated.

The outcomes of the 1995 *Fourth World Conference on Women* in Beijing are presented in the *Beijing Platform of Action* (BPoA). Strategic Objective K of the BPoA commits to securing the active involvement of women in environmental decision-making; integrating gender concerns and perspectives in policies and programmes for sustainable development; and strengthening or establishing mechanisms at the national, regional and international levels to assess the impact of development and environmental policies on women. The 49th session of the Commission on the Status of Women (CSW) in 2005, also known as ‘*Beijing+10*’, called on Member States to enhance rural women’s income-generating potential, the importance of greater security of land tenure and property ownership for resource mobilization and environmental management.

The 52nd session of the *Commission on the Status of Women* (2008) has identified gender perspectives on climate change as its key emerging issue. In the agreed Resolution 21(jj) on Financing for Gender Equality and the Empowerment of Women (E/CN.6/2008/L.8), governments are urged to: “Integrate a gender perspective in the design, implementation, monitoring and evaluation and reporting of national environmental policies, strengthen mechanisms and provide adequate resources to ensure women’s full and equal participation in decision-making at all levels on environmental issues, in particular on strategies related to climate change and the lives of women and girls”.

3.3 Sustainable development and environmental agreements

Agenda 21, the outcome document of the 1992 *UN Conference on Environment and Development* in Rio de Janeiro, offers a roadmap towards sustainable development. Chapter 24, entitled “Global Action for Women towards Sustainable Development”, calls upon governments to eliminate all obstacles to women’s full involvement in sustainable development and public life. Agenda 21 is to be achieved through government policies, national guidelines, and plans to secure equity in all aspects of society, including women’s key involvement in decision-making and environmental management.

At the 2002 *World Summit on Sustainable Development* in Johannesburg, the importance of women's equal access and full participation in decision-making for sustainable development was reaffirmed. The *Johannesburg Plan of Action* calls for mainstreaming gender perspectives in all policies and strategies, the elimination of all forms of discrimination against women and the improvement of the status, health and economic welfare of women and girls through full and equal access to land, economic opportunities, credit, education and health-care services.

Of the so-called Rio-conventions, the *Convention to Combat Desertification* (UNCCD, 1994) most clearly recognizes the role of women in rural livelihoods and encourages the full participation of women and men in the implementation of the convention. The UNCCD stresses the important role played by women in regions affected by desertification and/or drought, particularly in rural areas in developing countries. It instructs national action programs to provide effective participation of women and men, particularly resources users, including farmers and pastoralists and their organizations.

Although the 1992 *Convention on Biodiversity* recognizes the role of women in conservation and sustainable use of biological diversity and affirms the need for the full participation of women at all levels of policy making and implementation, only recently have steps been taken to ensure gender mainstreaming in the convention's implementation. The CBD's Subsidiary Body on Scientific, Technical and Technological Advice highlights women's knowledge, practices, and gender roles in food production.

The *UN Framework Convention on Climate Change* (UNFCCC), however, failed to recognize the gender aspects of climate change and omits the issues of gender equality and women's participation entirely. Also, its Kyoto Protocol, that outlines reductions in greenhouse gasses until 2012, fails in integrating a gender perspective in its operationalization and mechanisms, such as the Clean Development Mechanism. The current inter-governmental negotiations under the UNFCCC are evolving around the key areas: mitigation, adaptation, technology and finance. At the 2007 United Nations Climate Change Conference (COP13) in Bali, negotiations began for the post-Kyoto regime (2012 and beyond). Women's caucuses since the Conference of Parties (COP-11) meeting in Montreal (2005) have strongly lobbied for a gender approach in all these critical areas. At the last COP13 in Bali, the *gendercc - Women for Climate Justice* network of women's organizations and individuals, as well as the *Global Gender and Climate Change Alliance* of UN organizations, IUCN and WEDO along with other international organizations were established.

The General Debate of the *UN General Assembly* and the *High-Level Event on Climate Change* convened by the Secretary-General, September 2007, shows that climate change has risen to the very top of the international policy agenda. On that occasion a 'Roundtable on Gender and Climate Change' was convened by WEDO and the Council of Women World Leaders. The event was moderated by H.E. Mary Robinson, and featured key note speaker Dr. Gro Harlem Brundtland, special UN Envoy on Climate Change. Consequently, the *International Women Leaders Global Security Summit* in New York, November 2007, acknowledged that climate change poses significant security risks, particularly for women, and that women have to be included in decision-making at all levels.

3.4 Towards gender equality in environmental and human security

The *Millennium Declaration* (Millennium Summit, 2000) commits signatories to promote equality between sexes and the empowerment of women as effective means to combat poverty, hunger and diseases, and promote a truly sustainable development. The emerging *Millennium Development Goals* are of particular interest to gender equality in environmental and human security through their parallel goals of poverty eradication (MDG1), gender equality and women's empowerment (MDG3) and environmental sustainability (MDG7). Although in practice, these goals are often still operationalized separately, together these establish a platform of fundamental interrelated values on gender, poverty, and environment.

The clearest mandate on gender and disasters, which is easily extended to climate-induced disasters, is the *Hyogo Framework for Action* that emerged from the *World Conference on Disaster Reduction* (2005). The Hyogo Framework states that “a gender perspective should be integrated into all disaster risk management policies, plans and decision-making processes, including those related to risk assessment, early warning, information management, and education and training”.

3.5 National adaptation plans of action (NAPAs)

Although the UNFCCC itself fails to incorporate gender equality as a cross-cutting issue, gender equality is a guiding principle in NAPA design and it was advised to include gender expertise in NAPA teams.⁹ Many of the national reports submitted by signatory nations to the UNFCCC Secretariat emphasize the vulnerability of women and the importance of gender equality—albeit in broad terms. Most countries include some reference to the MDGs or national commitments to empowering women, but few detail how urgently women are affected by climate change, much less how they might be identified as powerful actors and agents for change.

Adaptation to the rapidly increasing impacts of climate change is crucial for vulnerable populations, and the UNFCCC requires developing countries to assess their immediate needs with regard to adaptation (UNFCCC, “Implementing Adaptation”¹⁰). National Adaptation Programmes of Action (NAPAs), the national reports submitted by least developed countries (LDCs) and funded by the Convention's financial mechanism, prioritize adaptive activities in order to highlight specific sectors and populations most vulnerable to climate change impacts. While nearly every NAPA acknowledges immediate and dangerous impacts on health, water, sanitation, food security, land security, and even literacy and education rates, few draw a direct parallel with the economic, political and social status and vulnerability of women.

As of March 2008, 30 of the 50 LDCs have submitted NAPAs to the UNFCCC. From Bhutan to Zambia, least developed countries are experiencing widespread and worsening impacts of climate change. Women are widely recognized as bearing the burden of household duties, such as the collection of water, fuel and food, and women are generally included in the poorest and most vulnerable populations. Some NAPAs illustrate examples

⁹ Erwin Kuenzi, Member of UNFCCC Least Developed Country Expert Group, Austrian Development Agency, at the Roundtable on Climate Change and Human Security: Women, a most vulnerable group. Vienna, 13 March 2008.

¹⁰ http://unfccc.int/adaptation/implementing_adaptation/items/2535.php

of the impacts climate change has on women's lives: Tuvalu notes that the increased time spent on securing water and fuel is directly related to the decreasing rates of girls' enrollment in school and literacy rates. Uganda's NAPA describes "famine marriages" which occur in times of drought when families marry off young daughters, securing dowry for their survival, but increasing the spread of sexually transmitted diseases via older husbands who tend to have had many sexual partners. And because families in Tanzania have been forced to start purchasing water because of its scarcity, women must forego other productive activities such as subsistence farming of cash crops that need irrigation.

Few NAPAs target women as actors in adaptation activities. Malawi, a notable exception, has identified gender as its own sector, not merely as a cross-cutting issue: "Several interventions are proposed that target women in highly vulnerable situations, including: (i) empowerment of women through access to microfinance to diversify earning potential, (ii) ensuring easier access to water and energy sources by drilling boreholes and planting trees in woodlots, and (iii) use of electricity provided through the rural electrification program" (Malawi NAPA, March 2006, x-xi). Zambia prioritizes women's micro-credit activities in its NAPA, suggesting that women and their families would benefit from increased livelihood security (October 2007), and Tanzania makes reference to the strengthening of women's groups to support community participation (September 2007).

Prioritized activities for the rest of the NAPAs, however, fail to include women as contributors (holders of knowledge) or target groups for adaptation (only Sao Tome and Principe plans to train both women and men as emergency health technicians, for example, but with no specifics on numbers) (STP NAPA, November 2007). Women's groups and ministries are listed as general consultants to the preparation of several national reports and, as exemplified above by Tanzania, women's groups are sometimes included as necessary for community participation. But consultations with women's groups do not automatically result in concrete actions for women's involvement. Women are still largely portrayed as the victims in the climate crisis and without the ability to be involved in negotiations or strategic project planning. Consultation to the NAPA preparation is certainly a start for many countries in order to emphasize the vulnerability of women, but women's direct involvement in both policy and project planning should be fostered.

4. Case Study: Gender, Human Security and Climate Change in Senegal

This chapter is based on a Case Study conducted by Yacine Diagne Gueye of ENDA (Environmental Development Action in the Third World) in Senegal. It gives an overview of the climate change situation in Senegal and draws out the implications for women's livelihood, security and gender equality. The situation of women in Senegal is also discussed in terms of how they manage to cope with the overall challenges of poverty and inequality, with specific reference to the consequences of climate change. Finally, national strategies and adaptation measures are reviewed from a gender perspective.

4.1 Climate change in Senegal



Figure 1: Map of Senegal and its position in Africa

Senegal lies in the westernmost point of the African continent and is a country that belongs to the Sahel¹¹ group. Senegal has a Sudanic and Sahelian climate dominated by two very distinct seasons: a dry season from November to June and a rainy season from July to October¹². The climate is governed by the dynamics of strong winds. The duration of the rainy season and the intensity of seasonal distribution of precipitations vary from North to South, the annual heights of rains estimated between 1200 mm and 200 mm in the North. In general, precipitations are unstable and irregular from one year to another, and they can be very random in the northern part of the country.

There is climate insecurity characterized by recurrent droughts. The most devastating one that affected Senegal occurred between 1968 and 1972. It was during that period of great

¹¹ From Senegal to Chad, these countries have one thing in common: drought and climate uncertainty. They are located in the South of the Sahara and the Sudanic regions of the South. These countries form the Permanent Interstate Committee for Drought Control in the Sahel (CILSS).

¹² Season distribution changes from one year to another depending on eco-geographical regions of the country.

drought that the term desertification was born, in order to explain the desolation and “dramatic consequences on the ecological equilibrium and all human activities undertaken in regions North of the Saloum” (Sagna and Roux, 2000). Rains are important especially for rain-fed agriculture, hydrology and all farming activities. Therefore, climate insecurity constitutes a source of vulnerability for Senegal.

The issue of climate change in Senegal has become a reality today for experts and local communities. The impacts of climate change for people and the environment are now well understood. With a high rate of temperature rise all across the country, changes are felt by everyone.¹³ Research on climate predicts that Sahelian Africa will experience a 4°C rise of average temperatures around 2100 and concurrently there will be a 20% decline in rainfall compared to present rainfall conditions (Diagne, 1997). Local populations recognize climate variability from what they experience on a daily basis and look for ways to deal with the consequences.

4.2 Women’s position and gender issues

In Senegal, significant advances have been made on gender issues despite constraints related to women’s rights, social, and economic empowerment. Senegal has signed¹⁴ a number of international conventions and passed some laws. They are reinforced by the new Constitution of 2001 that reaffirms the principle of equity and gender equality and prohibits all forms of discrimination based on gender. However, not much has been done to apply national laws in favor of women’s advancement; also most of the provisions contained in international instruments on women’s rights have not been made available in most of the national legislation.

Yet Senegal is committed to halving gender inequalities through its National Action Plan on Women (1997-2001) that ended with an assessment leading to the adoption of the National Strategy on Equity and Gender Equality (SNEEG) in 2003, in compliance with recommendations from the Beijing Platform for Action, strategic orientations from the Poverty Reduction Strategy Paper (PRSP) and the Millennium Development Goals (MDGs). That strategy is the national gender reference framework and the operational instrument designed to integrate gender in the development of sectoral policies.

In public and political life, as well as in the unions, there are a good number of women ministers, members of parliament and other public officials at all levels. In 2002, the President appointed the first woman Prime Minister and drafted and proposed a bill on gender equality in public office.

However, the most important challenge remains the daily lives of women who are still confronted with hardships, especially in rural areas where they constitute approximately 70% of the labor force. They operate with very limited resources and they ensure 80% of agricultural production. They are vulnerable to poverty due to lack of resources and income.

¹³ January is usually a cool month with temperatures in Dakar between 16 and 22° but this year the heat wave is alarming in the peninsula.

¹⁴ CEDAW – Convention on the Elimination of All Forms of Discrimination against Women in 1985; Provision of the African Chart on Human and People’s Rights related to the rights of women in 2004.

With regard to women's access to social services, namely education and health, Senegal has been implementing different types of programs. The government is trying to reach parity in school enrolment even though a large majority of women are illiterate: 67.9% of women are illiterate today (compared to 78% in 1995 and 72% in 2001). In the health sector, attaining all the set objectives has been particularly challenging, especially due to high maternal mortality and morbidity rates during childbearing (410 deaths for 100,000 childbirths). Access to social services is hampered by distribution of health centers and lack of infrastructure.

Despite their large number in the labor force, women have less access to employment. According to SNEEG, in rural and urban areas, among the 37.2% of unemployed population, 66.8% are women. In Dakar, 41.1% are men and 62.1% are women.

Although women's activities are not really taken into account (according to the Gender Audit of Energy policies in Senegal in 2007), they greatly support the livelihoods of the majority of households (budget and time). The absence of gender-disaggregated data hampers a realistic interpretation of statistics related to the real contribution of women in the national economy.

However, gender roles tend to undergo transformations because of the changes that occur in people's lifestyles. As living conditions worsen, and poverty escalates, there is a greater need to generate earnings, thus reshaping relationships between men and women. Women acquire more freedom. They get involved in women's organizations; they sell in local markets, if they have capital. Today, women want to be able to meet their needs and look out for their own interests. Nevertheless, they are still dependent on the environment, the opinion of their husbands and the expectations assigned to gender roles in public life.

4.3 Impacts of climate change and women: vulnerability in accessing resources

Women who were interviewed by ENDA in the field state the following: "We walk for long hours to find wood. Our wells are empty. Goods for sale are hard to find. Our land becomes idle. We don't have money. It doesn't rain the way it used to before" (Denton, 2005). Women who have been exposed to hardships and environmental insecurity have changed their lifestyles due to these issues. Today, we can assert that they are the primary victims of climate change in light of all their responsibilities in the family and the community.

Rainfall is a big determinant in women's activities since most of their activities to sustain livelihoods revolve around the environment and depend on natural resources. However, since 1996, there has been a 35% decline in rainfall, shortening of the rainy season and making the drought season more frequent (Diagne, 1997). The relationship between gender and climate change can be assessed best through a development approach because it encompasses all data related to health, education and women's training to improve their socio-economic conditions. To better analyze the impact of climate change on women, studies should be undertaken in the sectors where women are most active, such as water and fuel wood collection, agriculture, fishing and forestry.

Access to water

The 35% decline in rainfall in Senegal—with a range of magnitude from 20 to 40% depending on the region—has been confirmed by a recent study on the impact of climate change on water resources (Ndiaye, 2007). In this context, women experience great difficulty accessing water, particularly in areas where there are no bore-wells, electric wells, or worse, no connection to a water distribution network. Water collection has become a heavy burden that demands a lot of patience because women have to shuttle back and forth in order to keep checking the water level in the wells. Most wells have been drilled with a 45 to 50 meters depth because of the downward trend of the low water table, and sometimes they don't reach the drawing level. This is explained by climatic variability on underground resources which are affected by the discharge process during rainfall shortage periods. The decline has been measured up to 5 to 10 meters in the Northwest and 15 to 20 meters in the South of the country, where the drinking water coverage ratio remains low and below the standards established by World Health Organization (WHO)¹⁵ (Malou, 1998).

Women have to walk long distances to fetch drinkable water because of challenges such as salinity, dry wells or water impurities. Despite the existence of 1000 electric pumps, 1500 manual pumps and more than 4600 modern wells, women still have problems accessing water (Ndiaye, 2007). Water quality and all the physical efforts affect their health and their children's health. The functionality of the infrastructure is not guaranteed, and water drawing is done in a traditional manner according to the women's testimonies featured in Denton's 2005 study on gender, energy and poverty. Since it is difficult to access water, women are unable to grow out-of-season vegetables for commercial use, neither can they deal with reforestation or engage in other creative opportunities despite their willingness to do so.



Photo 1: A water well



Photo 2 : Women collecting water

¹⁵ Water coverage ratio needs in rural areas is about 64% but varies from 26 % (Kolda) to 76 % (Saint-Louis).

In critical situations and when distances are too long, men pitch in and use donkey-driven carts, which women and children can use, too. That way, large quantities of water can be collected and stocked in casks.

Testimony: Ndèye Faye, Village of Kalom

Located in the groundnut basin, the Village of Kalom faces many problems. The primary problem is the water supply. The water table is very deep; there is a lot of salt in the water and overall the water is of bad quality. It cannot even water our livestock. All of us women, we are very tired. The only way to get water is through the tank truck that the president of the rural community has placed at our disposal. Everyday, the truck fetches water from other villages and brings us supplies.

We have to limit our needs in water because it is an expensive commodity. If we abuse the tank truck, it may break down and in that case, we will be left to fend for ourselves for a long time. Before we had the tank truck, we used to spend half a day going around looking for water. It was a burden for everybody, especially for us women, and also for men and children, who most of the time, had to drive the carts to go and fetch water.

Energy

Because of the prevalence of traditional biomass as the main source of energy in Senegalese households, the energy sector remains one of the most critically affected by climate change, particularly for women. The 2005 annual report on the energy sector shows that wood and charcoal constitute 35% of total energy consumption, and 65% of household energy consumption, despite the introduction of butane gas by the government of Senegal (which contributed 7.8% of total energy consumption). The primary reason for introducing butane gas was to protect the country against the degradation of natural resources exacerbated by desertification, and to encourage urban populations to adopt modern fuels like gas since they were the biggest consumers of charcoal. The overall burden on rural women was not lessened by the initiative.

Even though they encounter numerous problems in fuel supply and their health and their children's health is affected, rural women are still dependent on traditional biomass. Finding wood is an enterprise in itself in parts of the country where forest degradation has become a serious obstacle. Women don't have a choice but rely on non-conventional¹⁶ use of fuels that cause continuous health hazards; the reason is a lack of other alternatives. The main causes of the extinction of forest resources in Senegal are of environmental and anthropogenic origins. Senegal has rainfall shortfalls, cyclic droughts and a low rate of vegetation re-growth. Deforestation that is undertaken to find wood-fuel and to produce charcoal¹⁷, along with agricultural development and exports of wood-made articles, deplete environmental

¹⁶ Cow dung, plastics, crop residue.

¹⁷ Statistics from the Direction de l'Énergie du Sénégal indicate that 104,000 tons of gas have saved in 2002 337,500 tons of charcoals that would have demanded the deforestation of 40,500 ha of forests. The increase in gas consumption continues to save approximately 700,000 cubic meters of forest woods.

resources. Consequences are dramatic for women: they face constraints related to accessing fuels and they suffer financial loss because there is an increasing scarcity of forest products.

However, problems related to energy in the framework of climate change are not limited to cooking, but encompass a whole range of issues. Limited access to energy services also impacts access to health services, water, education, and engagement in business development, productivity, and participation in decision making.

Testimony: Satou Diouf, Village of Gadiag

We the women are responsible for feeding our families. The bush has now become a desert shrub in my area and there is nowhere to go to fetch wood. It is prohibited to cut acacia trees. If caught, one has to pay a fine. Every morning, we go to the bush with our bassinette to fetch cow dung for cooking. Unfortunately, during the dry season, it is rare to find foraging livestock. Therefore, we don't have a choice but to go against the Department of Water and Forests and cut acacia trees.

One day, unable to find enough wood after a long search, I used some branches to cook. Since the wood was not enough, I cut my plastic bassinette in pieces to fuel the fire. My bassinette was gone before I finished cooking. Then I took the wooden bench where I was seated and cut it to feed the fire. That was not enough. I also had to use my bed sheet for the fire so the food could cook.

After serving the food, my mother-in-law refused to eat. She said she didn't think food cooked with plastic bassinette and bed sheet was edible. I told her that if she doesn't eat, the children would eat her portion. Still, she refused.

Since that day, I have been crying whenever I think of that incident. My children who don't understand why my eyes are always watery keep asking me why I cry, and I tell them that I am not crying; that's the way my eyes have become!

Agriculture

In Senegal, beyond the flood zones and the intra-dune basins, over 90% of agriculture depends on the amount of precipitation that varies from year to year. The unreliability of rain has resulted in loss of soil fertility, poor harvests, food shortages, and impoverished populations, especially in rural areas. The poor conditions have led to out-migration of men in search for employment in urban areas. Women largely have been left to fend for themselves and their families, although they are now beginning to migrate too. Those remaining adopt intensive agriculture practices and extend the cultivation of land to combat the effects of climate change. Unfortunately, this type of agriculture has further diminished the productiveness of the soil.

Over 70% of women are active in the agriculture sector, yet they own only 13.4% of land.¹⁸ They farm family lots. In addition, they are also responsible for agricultural processing. The annual report on the energy sector shows that agriculture in Senegal is not modernized.

¹⁸ Audit on Gender and Energy Policy and Programs in Senegal. ENDA-ENERGIA 2007.

Farmers use only 6.4% of energy—0.1% of the overall energy allocation in that sector. Women use rudimentary tools and are subjected to tough physical activities in the field and at home where they have to do household chores.

In rural areas, agriculture takes up a lot of women's time because they have to deal with problems related to soil erosion and impoverished, infertile land. Limited access to energy services exacerbates their predicaments.

Case: Women's vulnerability in the rural communities of Keur Moussa.

The Rural Community of Keur Moussa is located between Dakar and Thiès and comprises a number of villages; the majority of them lie on the Ndiass single-wall buttress. The Ndiass is a plateau with a maximum elevation of 120m. Surrounded by the massifs, villages and their surroundings are exposed to fast-running surface water because of steep slopes. Water erosion is a serious problem here and has drastic consequences on the environment (resource degradation, soil pickling, gully erosion, absence of water infiltration) and on the communities (deadly accidents, housing collapse, inaccessibility to resources).

Women have difficulty accessing water. They also encounter all sorts of problems with agriculture. They are unable to grow off-season vegetables. Arable areas are lost due to soil degradation. Available lots are infertile because of water flow that uproots vegetation and crops. Therefore, agricultural yields diminish and earnings dwindle. Young people migrate and leave women and the elderly to fend for themselves. In the villages of Landou, for instance, there are about 118 women and only twenty or so men.

Water flow on slopes is not compatible with the infiltration of groundwater. This situation exacerbates water shortages especially in the areas where wells have been dry for two months during the winter season. In some places around the massifs, the level of groundwater is at 30m below the sea (Ndiaye, 2007), thus contributing to the intrusion of salt water and the breakdown of hydraulic equipment such as drilling machines.

Organizations have helped women control erosion in order to retain water and soils, and recover arable land for better agricultural yields: this is a good example of adaptation to climate change.



Photo 3: Water Erosion



Photo 4: Half moon pit to retain rainfall water

Fishing

Apart from agriculture, fishing represents one of the main activities for women in Senegal: more than 90% of women are involved in fishing processing. The processing sector is controlled by women. This activity takes place along the Atlantic shorelines where fishing products are discharged.

The fact that Senegal is located on the Western coast offers great opportunities for communities to invest in fisheries and in various economic enterprises, since the main industrial and economic activities of the country are concentrated in the coastal area. However, the Senegalese coasts are exposed to climate change through the erosion of sandy shorelines, as experienced in the backtracking of the shoreline of 1.25 to 1.30m a year (Niang-Diop, 1997). Erosion destroys the infrastructure and housing in sensitive areas. There is no doubt that there will be drastic biophysical and socio-economic consequences.

The fishing industry will suffer from major disturbances due to limited resources. Social and economic impacts will be inevitable. Women will be affected by the disappearance and the displacement of their work centers and habitat inland. Even though resettlement sites exist already in Rufisque, Djiffer and Mbour, it is predicted that the worst resettlement will take place between 2050-2100. There is also a lot of insecurity in the processing sector due to the hard working conditions women encounter and due to the lack of energy services in the drying of fishing products.

4.4 Women's contribution to climate change

Women's contribution to climate change has not been well documented in Senegal. All human activities contribute to greenhouse gas emissions (GGEs) and in order to quantify women's contribution, their roles must be analyzed. The inventory of GGEs in Senegal shows that women are involved in the following sectors: energy, agriculture, land, forest exploitation, and wastes. If they appear to be users and operators, their activities impact the entire population.

The use of resources depends on how much power and control women have over them. In most cases, they are still dependent on the male head of the family; they own only 13.4% of arable land and 22% of livestock¹⁹. In forestry exploitation, they became operators in wood and charcoal processing thanks to the Program for Sustainable and Participatory Management of Traditional and Alternative Energy (PROGEDE). Originally, that sector was exclusively run by men. However, agriculture and traditional fuels are considered the main source of GGE. These fuels have been counted from the source; in this case, women cannot be held responsible. Furthermore, despite the weakness of forest resources regeneration, women are very much involved in reforestation. They have also adopted some modern technology to improve their households. Therefore, they often contribute to reducing GGEs.

Nevertheless, women belong to the most vulnerable group and are deeply affected by poverty. The condition of fragility can lead them to use resources irrationally. That is the reason why they walk long distances and spend a lot of time fetching water, fuels and means of livelihood for their families. Consequently, they are the first ones to endure the impacts of climate change. The impacts on the population, and on women specifically, should bring the Senegalese government to identify adaptation needs that will help address all potential risks.

4.5 Women's adaptation to climate change

Many strategies are being implemented in Senegal in various sectors such as energy and forestry, agriculture, water resources and trade. They contribute to sustainable development and generate earnings at different levels.

Reforestation and Energy

With the assistance of organizations, women draw lessons from their daily dealing with the environment and develop their own adaptation solutions, including reforestation and energy management. For a number of years, women have formed associations according to their field of work, cognizant that they have to use their own resources in order to cope in precarious situations. They have become very strong actors and can easily mobilize support for every action that they undertake.

The adaptation strategy adopted by the Regroupement des Femmes de Popenguine to control the degradation of natural resources and to protect their environment has drawn international attention and shown amazing results. This group lives between the mangrove area at the Atlantic coast and a region of stony soils inland. They wanted to regenerate the mangroves and reforest part of the forest. They looked for partners to sustain their activities and received a lot of support. Their achievements contribute to combating desertification, protecting biodiversity and mitigating the effects of climate change, even if it is low-scale.

Even though villagers engage in low-scale reforestation activities, they contribute to the strengthening of forest resources in villages. Reforestation is sometimes undertaken by the whole village, but women are the ones who initiate it and are joined later by men and young people. The upgrading of forest resources achieves three goals: (i) land regeneration, (ii) availability of fuel-wood in the village, and finally, (iii) availability of financial resources

¹⁹ ENDA-ENERGIA: Audit on gender policies and energy programs.

generated by log sales. However, in some cases, men abuse reforestation activities and the capital gained from selling logs.

To complement reforestation, some interesting initiatives, such as modernization of households and use of butane gas, were introduced. They were mostly funded by tontines—small, informal savings and loan associations—whereby the contributors pay premiums for a limited period at the end of which the subscribers divide the total amount between them. In some villages, they set up gallery stores in order to ensure that local populations buy and become familiar with products like butane gas.

The use of wind and solar-based energy technologies have helped women access water²⁰, commercialize dry fruits and vegetables, and process agricultural products.

Agriculture

Women invest a lot in agriculture in areas characterized by problems related to frequent periods of food insecurity and erratic climatic conditions. Random agricultural yields exacerbate people’s poverty and disturb the family equilibrium. Depending on the region, problems related to agriculture are different from one region to another, and women are often the ones who search for solutions. In the rural community of Keur Moussa (Pout), women have suffered a lot, but they have worked hard. Their efforts have paid off, and they are now reaping the benefits of their hard work. (See Box) With the assistance of external partners, they acquired new techniques and knowledge in combating land degradation by improving the quality of soils and their productivity.



Photo 5: Women building an anti-erosion ring



Photo 6: Work in progress

²⁰ In the region of Thiès, through the VEV program wind pumps have freed women from heavy chores.

Case: Adaptation strategy by women of Pout in the agriculture sector

The Rural Community of Keur Moussa is composed of 37 villages; 17 villages are subjected to erosion and land degradation, which cause inadequate agricultural yields. Three villages (Santhie Sérère, Kessoukhatte and Landou) have been selected as experiment sites dedicated to control erosion in the framework of the Agrobio Niayes Program by ENDA Pronat. The project has been initiated by local populations and women in particular following consultations on problems and solutions to erosion, disappearance of arable land, uprooting of crops and trees, water scarcity and inaccessibility to villages. Committees were established according to priorities. The Anti-erosion Committee, in which women are very active, is one example.

To control water flow, they built stone barriers and engaged in reforestation. Those barriers are built along the shorelines of the rainwater and consist of stony borders, half-moon canals, vegetation fascines, infiltration ditches, and open trenches that slow water speed and direct it towards infiltration points.

Women are interested in solving the erosion problem because it is greater than what they encounter in agriculture and it makes it difficult to access drinking water. If they were given a choice, their priority would be to have more water resources. They are very active in building stony barriers. The impact of that hard work was immediately visible—groundwater is recharged, water bodies are created, soils are stabilized, rain water flow is slowing down; the vegetation is regenerating and there is diversity in herbal surface. The president of the organization said, “Now, there is a lot of water in our wells, and this year we spend less time drawing water, meaning 1 to 1.3 hours to recharge the well compared to 2 to 3 hours last year. We will continue our anti-erosion campaign for better results.” Agricultural yields improved and women began trading herbal plants, which they had not done in a long time.

Trade

Trade is one of the highly valued activities for women. They sell cereals, fruits, vegetables and everyday products and find ways to build their own capital. However, they are exposed to many hardships: precarious living conditions, variable temperatures, and bad health due to poverty. They are left to fend for themselves without a husband, a son or a brother to send them money regularly. Sometimes they pack up and move to urban areas where they sell cereals, become domestic workers and, when the going gets tough, they become beggars.

Lack of initiatives at the local level triggers the exodus. If there were new initiatives in villages, women could undertake income generating activities instead of migrating. Partners and the public sector need to enhance sectoral development policies that will enable women to have better access to production tools, health and education, as well as to encourage their participation in decision-making. If these priorities are met, women will feel encouraged to become more active in sustainable development.

Women do not just devise adaptation strategies because of dry wells, loss of fertile soils, rain shortfalls or degradation of natural resources. Conflicts constitute another constraining

factor for them, such as in Casamance, in the south of the country, where insecurity has been reigning for decades. Women abandoned their lucrative fruit picking businesses in good food production areas because the areas had become too dangerous, and women had to run away. When they moved, they had to start up new businesses such as fishing processing and trade.

4.6 Climate change policies in Senegal

The Direction de l'Environnement (Direction of Environment) that oversees the follow up on the Convention on Climate Change set up a National Committee on Climate Change (COMNAC) and took necessary measures for its implementation. Senegal has a low capacity of greenhouse gas production²¹ with a net emission of 3321 Gg ECO₂²² in the following sectors: energy (40.6%), agriculture (31.7%), wastes (24%), industrial processes (3.7%) and forests with a sequestration capacity of 64%. The emissions have been calculated based on the IPCC methodology that was developed to conduct inventories. In order to respect its commitment, Senegal followed IPCC instructions and GIEC evaluation reports on climate evolution in the world. Countries have the obligation to limit GGEs and devise adaptation strategies.

So far, Senegal has produced national reference documents on climate change, has conducted specific technical studies on vulnerability to climate change and has devised possible adaptation strategies. The first inventory document on greenhouse gas emission (1994) was followed by the Initial National Communication (1997), which is an update of the first inventory, the National Strategy for UNFCCC Implementation (SNMO 1999), and the National Adaptation Programme of Action (NAPA). They were all complemented by sectoral studies. In order to identify the needs for a specific adaptation program, studies on vulnerability and adaptation were conducted in 2007 in water resources, fishing and coastal erosion.

The next step will be to draft a second national communication that will draw from all studies on vulnerability. It will focus on mitigation and adaptation strategies in all areas of the water sector, including supply and demand, water and health, agriculture, fishing, erosion and clean-up.

Unfortunately, gender was not on the agenda in the national documents on climate change. However, reference to women was made in the environmental programs and projects that were part of the implementation strategies of the NAPA²³. Women participated in public consultations organized in every region in order to collect information on adaptation solutions at the local level because indigenous knowledge is important to the search for sustainable results.

The Poverty Reduction Strategy Paper (PRSP II 2006-2010) is the reference document that encompasses all strategies because it integrates new programs and sectoral policy guidelines. The integration of the component *Social Protection, Prevention and Management of Risks and*

²¹ Compared to the rest of the world Senegal produces 4 emissions parts of 10,000 out of biomass.

²² Initial National Communication of 1997

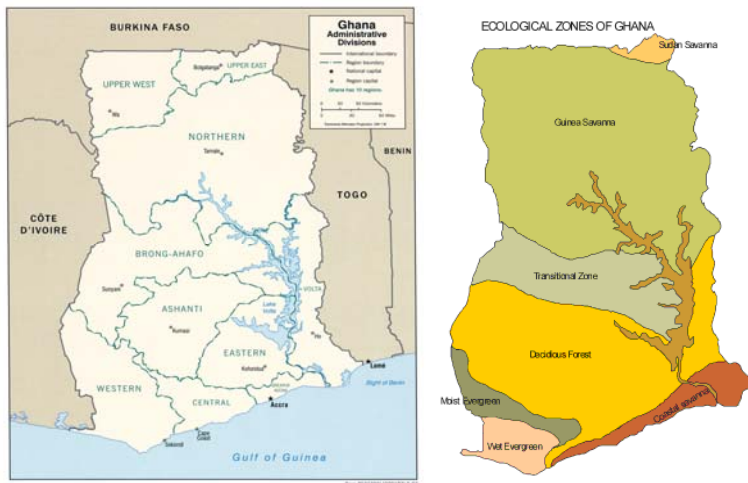
²³ Different activities are undertaken for women and young people: wood, community tree-nurseries, micro credit, and training (NAPA 2006).

Catastrophes in the new version of the PRSP, acknowledges that natural cycles have negative effects on the economy and living conditions of the populations (e.g. droughts, floods, locust plagues and off-season rains).

5. Case Study: Gender, Human Security and Climate Change in Ghana

This chapter is based on a Case Study conducted by Rose Mensah-Kutin from ABANTU for Development in Ghana. It provides an overview of climate change in Ghana and draws out implications for women's livelihood security and gender equality. The situation of women in Ghana is also discussed in terms of how they manage to cope with continued deprivation and poverty with specific reference to the consequences of climate change. Finally, national strategies and adaptation measures are reviewed from a gender perspective.

5.1 Climate change in Ghana



Map showing Ecological Zones of Ghana

Administrative Map of Ghana

Source: www.lib.utexas.edu

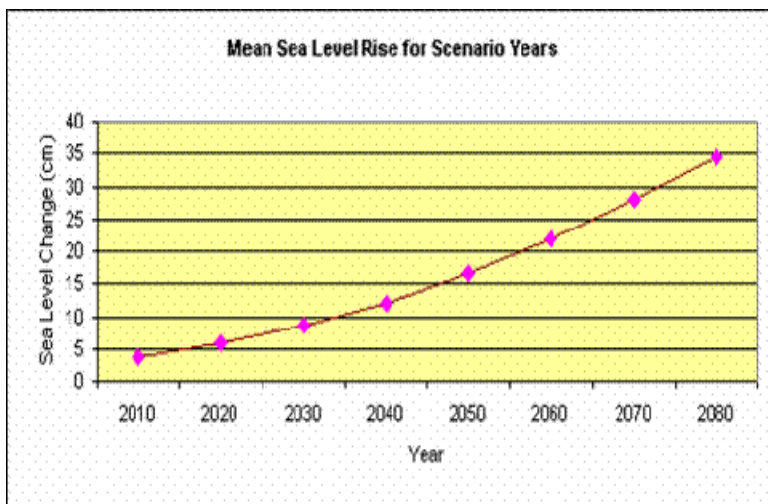
According to a newspaper report by the *Daily Graphic* on February 16, 2008, Ghana must prepare for the worst case climate change scenario this year. Torrential rains, excessive heat and severe dry winds are expected. This is in addition, to more floods and droughts. Similar to other countries in Africa, the sustainability of the country's ecosystems are at risk in areas such as terrestrial and aquatic ecosystems, habitats and wildlife. The Environmental Protection Agency (EPA), the institution that hosts the National Focal Point on climate change issues, also envisages adverse effects on soil, lands, coastal zones and tropical forests. Generally, national vulnerability assessments have established negative impacts around critical human security sectors such as agriculture, fisheries, water resources, land, health and energy (EPA, 2000)²⁴.

About 57% of the total land area of Ghana is suitable for agriculture (Dampney, 2007). Land problems include growing land scarcity, competition over land use, as well as environmental and land degradation. Projections by EPA indicate that if present trends in deforestation and

²⁴ The analysis focused on some specific issues in the various sectors identified. For example, one of the key focuses of the analysis on agriculture is on cereal production. This paper has therefore drawn on the specific components used in Ghana's Initial National Communication (GINC). For an elaboration see (EPA, 2000).

climate change should continue, the natural forests in the managed and protected tropical forest reserves would decrease by 45,000 hectares. Total closed forests would decrease by 343,000 hectares, and natural savanna woodlands by about 600,000 hectares.

If the sea were to rise as projected below, low-lying sandy coastal areas in the country could be severely affected. According to the EPA (2000) about two-thirds of the total land area can be at risk as a consequence of the rise of the sea level in Ghana. According to the EPA's projections, a total of 1,110 km² of land area may be lost as a result of a one-meter rise in sea level (2000). When this happens, a total population of 132,000 mostly living within the East Coast area would be affected.



Scenario for Mean Sea Level Rise (Taking Present Trends into Account)
Source: Environmental Protection Agency, Accra (EPA, 2004)

Additionally, there would be direct inundation of low lying wetland and dryland areas and erosion of soft shores by increasing offshore loss of sediment. Other worrying effects that are likely include increases in salinity of estuaries and aquifers, raised coastal water tables, and exacerbated coastal flooding and storm damage (EPA, 2000). Such changes in the climate will be associated with grave human security and gender impacts as they would influence coastal habitats, biodiversity and a range of livelihood activities. Dampety and Mensah (2005) have noted, for example, that there would be changes in water quality which would negatively affect freshwater fish. Some of the facilities on the beaches would be threatened and some groundwater resources would be salinated. Valuable agricultural lands would also be inundated.

5.2 The situation for women in Ghana

It is important to examine the social, economic and political status of women in Ghana to determine whether their condition can provide a sense of well-being in light of the worrying projections about climate change.

Women's economic empowerment

In Ghana, years of colonial domination and poor economic policies since independence have made the country underdeveloped and poor. Women and men occupy distinct positions in the economy largely as a result of a gender division of labor within households

and the society at large. This allocates the bulk of reproductive activities to women, leaving men time to pursue more market-valued productive activities and resulting in extensive gender segregation in production and reproduction across different sectors of the economy (UNECA, 2004). Women's unpaid labor is critical for livelihoods and the security of household and family members. It involves repetitive and time-consuming tasks, such as collection of firewood, water fetching, childcare, sweeping, garbage disposal and cooking, as well as the reproduction of social relations in the household and the community. Ghanaian women spend more than two times as much time on domestic work as men (UNECA, 2004).

In agriculture, most women in the rural areas of the country are predominantly engaged in food crop cultivation and small scale trading, while their male counterparts are involved in both food and cash crop cultivation generally and on a relatively larger scale. It is estimated that women cultivate almost 40% of all land holdings under production in Ghana. In urban areas where women are predominantly found in the self-employed informal sectors of the economy, mainly in trading and other service activities, men have the majority share of the public and private formal sector wage jobs (Bortei-Doku Aryeetey et. al, 2000).

Structural Adjustment Policies (SAPs) privilege a small public sector and a large reserve army of labor in the informal sector. Generally, incomes and conditions of work in the informal sector are far less secure and stable, relative to formal sector employment. Workers in the informal sector are usually not protected by labor laws and conventions and have no basic rights such as minimum wage or health care. In addition to their lower levels of involvement in wage work, women as an economic category occupy lower positions in the formal labor sector and, therefore, earn much less money than men in waged work (WMC, 2004).

Women's experience of inequality is also expressed in their limited access to and control over resources. In Ghana, women's unequal land rights affect their access to other resources and their economic, social and political status. Ghana has a pluralistic system of land tenure which is a legacy of colonial rule and which has been characterized by the co-existence of British-derived land interests and customary land tenure interests, which have affected women's land interests (Kotey and Tsikata, 1998; Kasanga, 2002, WMC, 2004). Women's access to land is affected by tenurial arrangements, inheritance and land use patterns. Thus, although women have land usage rights, their access to the resource depends on its availability and the goodwill of men who control it (UNECA, 2004).

Years of Structural Adjustment Policies (SAPs) in the 1980s have created widespread poverty and insecurity, with particular ecological zones and social groups such as women and children suffering specific forms of hardships. Since 2000, a government decision to join the Highly Indebted Poor Countries (HIPC) initiative and the subsequent adoption of the Ghana Poverty Reduction Strategy (GPRS) has led to a continuation of the SAPs approach (WMC, 2004). Even though women in Ghana have been identified as a category that suffers disproportionately from poverty, the sectors where women are in the majority are not

prioritized in both GPRS I & II. There are also no measures in place to address women's experience of poverty in a systematic way.²⁵

Women and social policy

In Ghana, the overriding concern with macro-economic stability has relegated social welfare, social security and human development issues to the background. There is no social policy and no universal and equitable access to social services and public resources, so the delivery of an acceptable minimum level of service provision to promote human security is inadequate. Thus even in periods of economic growth, levels of poverty, disease and insecurity have increased affecting women the most (WMC, 2004).

Basic access to water and sanitation has been privatized in Ghana to ensure full cost recovery under World Bank policy frameworks. This has wide implications for women and girls because they have to walk long distances to fetch water with repercussions on their time and health. Related to this, in spite of their primary role as users of water, women are largely absent from critical decisions around water.

In the area of health, in spite of a 1999 Ministry of Health policy document for promoting gender equity in health, there is evidence that poor women's health needs are not guaranteed. The Demographic and Health Surveys indicate that chronic malnutrition, low weight and under-five mortality are higher in boys than in girls. Women also have a higher life expectancy than men, at a ratio of 60.3 years to 56.6 years, respectively (GSS, 2000). But women in Ghana are at a high risk of dying from pregnancy-related cases. Maternal Mortality Ratios (MMR) in Ghana is estimated at 214 per 100,000 live births compared with 10 per 100,000 live births in developed countries. The situation is worse in the three northern regions of the country where the experience of poverty is also highest.

With specific reference to the incidence of HIV/AIDS, prevalence rates bring the gender inequality dimension into clear focus. In Ghana more than 90% of all AIDS cases are found in sufferers between ages 15-49. Of this figure, three out of five or 61% of reported cases between 1986 and 2002 were female. Gender differentials in educational levels, women's poorer access to economic opportunities, resources, knowledge and reproductive health information put women at a higher risk than men (UNECA, 2004; WMC, 2004).

According to the Ghana Living Standards Survey, 44.1% of women as opposed to 21.1% of men have no formal education (GLSS2, 2000). This has implications for women's access to formal sector employment. Enrolment and retention figures are no better: at the basic school level, average enrolment rates for males are 66.2% and 58.2% for females. More girls than boys also drop out of school at all levels of the educational ladder. Factors such as poverty, early marriage and teenage pregnancy affect women's ability to study up to higher levels. There is however evidence that women's entrance into tertiary institutions is increasing over time (UNECA, 2004).

²⁵ GPRS processes were highly contested by women's rights organizations for lack of gender sensitivity. In 2004, greater effort was made by the government to address the concerns of women. Thus, GPRS II is an improvement over the first one, in terms of responsiveness to gender issues (GPRS I & II, 2002, 2004).

Women in politics and decision-making

Participation in politics and decision-making is also critical for women's ability to contribute to and benefit from climate change discussions, mitigation and adaptation measures. At the level of the legislative framework for participation in public affairs, there are no specific provisions to enhance gender equality, even though the national constitution generally accepts the equal rights of all citizens (1992). Within the local governance system, women's participation as elected members is extremely low and not proportional to them being of 51% of the population. Participation stands at a low of 10.1% even though representation has been increasing over time. In 2002, the National Association of Local Authorities in Ghana (NALAG) estimated that women constituted 35.5% of appointed members in 97 out of the then 110 districts.

In the current (2004-2008) parliament of 230 legislators, only 25 are women (or 10.8%). Women are also under-represented in almost all key public services and professional syndicates and civil society organizations in the country, from trade unions, employers associations, the judiciary, NGOs and CBOs. In the public service, women are found clustered in lower managerial and non-managerial positions and are mostly found in the health, education and social services sectors. Only 13% of senior civil servants are women (Allah-Mensah, 2004).

Beyond numbers, it is obvious that political participation has tended to ignore issues of gender relations and many public policy issues are handled from a gender neutral perspective.

Institutional mechanisms for women

Ghana established the National Council on Women and Development (NCWD) in 1975 as a response to the UN's mandate that member countries demonstrate commitment to the promotion of women's rights by setting up national machineries. In spite of the many challenges and obstacles that faced the NCWD, it succeeded in supporting women in a number of areas, such as providing micro-credit opportunities for income-generating activities, passing a number of laws such as the Intestate Succession Law (PNDC Law III) and the Law against Female Genital Mutilation, and building awareness and sensibilization.²⁶ The NCWD was transformed into the Ministry of Women and Children's Affairs (MOWAC) in 2001. In spite of contestation about the ideology, mandate, organizational character and form, the Ministry has managed to contribute to women's well-being along similar lines as the NCWD. In the area of legislation for example, it has supported the passage of the Trafficking Law (2006) and the Domestic Violence Law (2007). However, similar to the NCWD, MOWAC has not succeeded in articulating specific gender concerns in policy arenas. Even though it has actively participated in the Ghana Poverty Strategy Paper (GPRSP), as well as the Growth and Poverty Reduction Strategy (GPRSP II), the outcome documents have not sufficiently taken gender relations into account.

²⁶ Micro-credit is useful for women but it has proved led to any marked changes in women's experience of poverty and inequality. Even though women have been noted as reliable in paying back loans, the dynamics of gender relations in the household has tended to limit women's ability to control monies received. Some women in Ghana sometimes end up borrowing from other sources to pay back loans.

This is clearly exemplified by the treatment of environmental issues as gender neutral. Ghana has many laws, policies and programs aimed at preserving and protecting the quality of the environment. But gender responsiveness is woefully limited. At the level of conception, process or implementation, many of such policies have failed to sufficiently acknowledge and take into account women's multiple responsibilities, alternative uses of environmental resources or their vulnerabilities. To a large extent therefore, many of the policies on the environment and their implementation overlook the distribution of power and environmental resource use between women and men.²⁷ The broader reason for this is that policy makers tend to see development in the restricted sense of economic growth, measured by gross national product, and so prescriptions for development are confined to an economic agenda involving investment, trade negotiations, and foreign aid. Issues of gender equality, affirmative action and environmental sustainability are treated as marginal when addressed at all (NETRIGHT, 2005).

5.3 Impacts of climate change on women

The changes in the climate coupled with the precarious socio-economic conditions of women in Ghana mean that any disaster is likely to have the worst impacts on women. As has been noted before, women are not sufficiently represented in high decision-making levels and structures. Their participation in the scientific disciplines and in the structures in place for environmental and climate change issues is also limited. This is likely to limit the ability of women to articulate their specific concerns to affect mitigation and adaptation measures.

Land and agriculture

"I am a blind widow with two young children: a girl and a boy.....As I am blind I did not farm and therefore could not have harvested anything even if the drought and floods had not destroyed people's farms. The looming hunger following the crop failure has had a disastrous impact on me because all those who used to support me have become as needy as me...Additionally, my children who would have helped me to move around are away trying to eke out a living for themselves." (Wombavuluma Dabong, 50 years; Wakii, Talensi-Nabdam District, Upper East Region – interviewed by CENSUDI)

Land relations are critical for women's rights in Ghana. This is because of the centrality of land as a resource for the livelihoods of the majority of the population (WMC, 2004). Without secure land rights these climatic changes are likely to affect women's ability to use available land. In Ghana there are different categories of land users who face problems of access and control to land. Women are an especially vulnerable group in this regard and experience discriminatory cultural practices. Particularly in agriculture, women's contributions are devalued. Their interests in family lands are limited by marital residence. They are also often given land of poor quality and size. The clearing of land is customarily assigned to men. These practices afford men the opportunity to use and control land and has prevented the majority of women from securing control over virgin land belonging to their lineage (Kotey and Tsikata, 2000).

²⁷ See footnote 15 about NETRIGHT.

The unequal experience of women in relation to land comes into sharp focus when examining the productive activities of women in the wake of climate change conditions. An analysis of the impact of climate change on cereal production by the EPA indicates that both the maximum and minimum temperatures increased over the years in all the agro-climatic zones of Ghana²⁸ (EPA, 2000). Based on the findings of the study, it was projected that the percentage decreases in maize yield in the Transition Zone will range from 0.5 percent in the year 2000 to 6.9 percent in the year 2020. Millet yields will not be affected by the projected climate change, as millet, a major local staple in the three northern regions in the country, is more drought tolerant. The other aspect relates to vegetation cover which has been severely affected by human activities. Logging activities in the forest zones coupled with bushfires in the savannah region have tended to reduce the composition and density of vegetation with negative implications for widespread acceleration of erosion, reduced crop yields and desertification (EPA, 2000). These processes are increasing climate change with negative implications for women in terms of their productive efforts in the agricultural sector. Since socio-cultural and land tenure practices deny women sufficient access to fertile lands, their plots are the ones which tend to be affected primarily by climate change processes.

The *Ministry of Food and Agriculture* (MOFA) established the *Women in Agricultural Development* directorate in 1989 as a means of enhancing policy-making and implementation of gender sensitive measures to benefit women's agricultural productive activities. Even though MOFA has developed a gender strategy on agricultural development, the interventions outlined have not taken climate change impacts into account.

Fisheries

Fishing activities in Ghana are gendered. Men go out to sea while women and children are responsible for the negotiation, purchase, storage, processing and marketing of fish (Dampney and Mensah, 2005). Support to the fisheries sector by development planners has been particularly limited and gender specific measures and interventions have not been forthcoming. This is problematic given the extent of reliance by several groups of women on fish selling as an income generating activity. The majority of households in Ghana also rely on fish as a major source of protein. It has, for instance, been estimated that fish constitutes about 60% of animal protein in Ghana (DFID, 2004). Any semblance of support to the activities of women in the sector has come in the form of micro-credit facilities which are often given without a proper gender analysis of the social relationships between women and men in the fishing activities and the household.²⁹ To this end the sector is generally not re-generating itself and has not succeeded in addressing the gendered experiences of poverty of women and men. This situation can further be worsened by climate change impacts and leads to loss of income for poorer women, increases in the price of fish, and lower levels of protein in diets (Dampney and Mensah, 2005).

²⁸ Ghana's Second National Communication is expected to be ready this year, 2008.

²⁹ There is evidence that credit facilities given to women are sometimes controlled by men in their capacity as heads of households and husbands. Some alternative energy technologies have been promoted among women who smoke fish to reduce the drudgery of work involved in the activity. Energy and gender experts have consulted with both women and men in household relationships to promote acceptability and support (Mensah, Sabina, 2001).

Water

Lack of good access to water has implications for women's experience of poverty and therefore their sense of social security. Water is not only a basic need, it is also critical for farming activities, especially in the rural areas of the northern region where small-scale irrigation systems and hand dug wells are used. The provision of water for households is the primary responsibility of women and girls in Ghana as it is in most parts of the world, especially Africa. Women usually spend long hours walking long distances to fetch and carry heavy loads of water every day. This has negative consequences for their time, energy and health. Because of its direct association with women, the provision of water for households is not considered a critical area for policy-makers (WMC, 2004).

It has been estimated that 70% of women and men living in rural communities in Ghana with populations between 500 and 5000 have no access to potable water (Ayensu, 1994). This situation has worsened since the year 2000 with the implementation of World Bank water privatization measures to ensure full cost recovery. Such policies are also likely to limit access further and make water accessible to only those who can afford it. Women are mainly at a disadvantage as they are unable to pay for the cost of such basic services. Even though they are major providers and users of water, women are also not sufficiently consulted about such decision-making initiatives (WMC, 2004).

In assessing the impacts of climate change on water resources, three water systems were examined by the EPA. These were the Pra River from the South Western, Ayensu from the Coastal and the White Volta from the Volta systems in the country (2000). The major findings of these studies are critical for looking at climate change from a gender perspective. It was noted that change in precipitation or rise in temperature can cause a reduction in runoff and reductions in groundwater recharge of between 5 percent and 22 percent by the year 2020. These scenarios could have adverse effects on irrigation water demand as well as hydropower generation. There are additional socio-economic impacts on health, nutrition and energy-based industrial activities (EPA, 2000). These include lack of access to potable water, loss of income and status.

Energy

"I have seven children (4 boys and 3 girls)... The floods collapsed our three rooms and washed away our crops: maize and late millet. As a result, we harvested nothing. Hunger stared us straight in the face. I have been traveling long distances every morning to collect firewood for sale to feed my family. Getting firewood is now very difficult and most times I have to climb trees to check for dried branches to cut. Sometimes I do this with my 9 month old baby on my back...." (Atibzel Abaande, 45 years; Boya-Zooyanga, Bawku West District)

The bulk of Ghana's energy consumption is from biomass in the form of firewood and charcoal, which accounts for about 59% of total energy consumption. This is an indicator of extreme poverty and an obstacle to improved livelihood conditions. The household sector accounts for 52% of total energy consumption (Ministry of Energy, 2000). The energy sector has begun to show signs of being susceptible to climate change. In particular, the effect of highly variable precipitation, and increased temperatures in some areas, can lead to a reduction in biomass production resulting from water stress on woody plants and general

land degradation. This will further increase the long hours women and girls spend every day collecting wood, agricultural residues and dung for use as fuel.³⁰

Health

Extreme weather events such as heavy precipitation, floods and drought, which are attributable to climate change, could impact on the health of women and children and affect their socio-economic status and well-being. In Ghana, it is predicted that climate change can also create serious health problems associated with cardiovascular, respiratory and other diseases. In the event that climate change results in flooding, women and children would be most vulnerable to death and injury given their limited chance for involvement in planning for disaster preparedness.³¹ Cases of cholera, diarrhea, malaria, malnutrition and heat related deaths may increase depending on varied climate scenarios. Pregnant women and children are particularly susceptible to malaria which also contributes to pre-natal mortality, low birth weight and maternal anemia (Dampney, 2007). Climate change could also affect the availability of certain plants needed for medicinal purposes with its intended effect on the health of the vast majority of women, especially rural poor women who rely on traditional medical plants for their health needs.

5.4 Women's strategies and adaptation to climate change

Given the reality of women's socio-economic position and the limited opportunities for obtaining support for their livelihoods, women have adopted various mechanisms to cope with any adverse impacts with which they may be confronted from time to time. Much evidence suggests that women have developed coping strategies for their own survival and for that of their families in crisis situations, including periods of economic crisis such as structural adjustment (Manuh, 1994). Women have also demonstrated initiatives in dealing with their vulnerability to climate change impacts, as presented in the examples below.

Strategies in the fisheries sector

One important example of how women cope with the impact of climate change in the fisheries sector has been documented by Dampney and Mensah in their study of women in the fish trade in villages in the Volta Region of Ghana (2005). Women who live in the Keta District along the coast are involved in fish processing. Some of the fish, namely shrimps and anchovies, are smoked; others are either salted or dried in the open sun. Women in this location have observed a dramatic change in the weather over the past ten years. Even though there is no accessible institutional mechanism or framework for the women to obtain formal knowledge and information about what may be happening, they have made some sense of the situation using their own historical and socio-cultural knowledge and awareness of the coastline and the behavioral characteristics of the fish. The women referred to the inadequate and erratic rainfall pattern, as well as the swift flow of current from the Volta River, which has also led to the deposition of a considerable amount of silt, making the beach very shallow and not favorable for fish to breed. Changing fishing practices, where fishermen use unapproved nets, also disturbs breeding grounds and destroys fingerlings.

In discussions with different groups of women, the researchers encountered similar reports: fish stocks are declining as a result of fishing activities by trawlers, pirate fish vessels and the

³⁰ See Mensah-Kutin (2007) in Karlsson, Gail (ed.) "Where Energy is Women's Business" (ENERGIA).

³¹ See the case study on the Flood Disaster in the three Northern regions of the country under section 4.3.

use of unapproved nets by local fishermen. To come to terms with this situation, women have involved themselves in multiple economic activities in addition to the fish processing activity. Those who have had access to formal education up to the basic school level have had a chance to access credit to support their petty-trading activities. Some of them have also started daily savings practices with informal saving schemes. Other strategies include organizing themselves into co-operatives, financing fishing gear and providing money upfront for men to go to sea so they can have first access to the day's catch.

In spite of these measures, the effect of the dwindling fish stocks has affected the whole social structure of the communities and limited their ability to maintain the security of their families. Many of them complain about their inability to pay for school fees and medical bills.³²

Strategies by women farmers



Photo 1: (left): Women resort to contaminated water in times of crisis. Photo 2: (right): Dry land caused by climatic changes, hindering sustainable farming. Photo Credit: Foundation for Female Photojournalists, Ghana

In the farming community known as Kwanyako, which lies within the Ayensu Basin in the Central Region of the country, land is becoming scarce due to seasonal flooding. The majority of the women in this community are engaged in mixed-crop farming on small plots. The crops are mainly maize, beans, cassava, yams and sweet potatoes. Engaging in the cultivation of long-term crops like oranges, cocoa and palm oil is one of the strategies being used by women to supplement their livelihoods. Some of the farm produce is sold and some processed into staple foods for sale, both within and outside of the community. Proceeds from these activities are used for daily subsistence, and many of the women are unable to save, limiting their ability to expand their farming activities or make any investment. The women in the community do not have access to extension services or access to credit facilities.

³² There is currently a Schools Feeding Programme by the state targeting vulnerable groups. A National Insurance Scheme is also underway to minimize the cost of healthcare. Implementation of these policies is, however, slow. Sometimes also they do not reach those whose needs are a priority.

*Disaster in Northern Ghana: strategies and measures*³³



Photo 3: The flood disaster in the northern sector of the country has affected families. Clearly, women's burdens have not decreased, as the man walks alone while the woman carries a baby and a head load! Photo Credit: AFP

The three northern regions of the country, namely Northern, Upper West and Upper East, were devastated by a three-pronged disaster in September 2007. The disaster was the result of a combination of a series of weather events. First, the rains delayed the period for planting and therefore jeopardized the early harvesting of millet, a major staple. The delay in rainfall was followed by torrential rains which led to flooding that inundated farms, killed poultry and livestock, and collapsed houses and other infrastructure. Finally, an early dry season caused crops to wilt before maturity. A humanitarian crisis resulted from these weather events, the magnitude of which nearly ruined the safeguards which the communities had established to meet their livelihood needs. At least 20 people died and an estimated 400,000 were rendered homeless. Many of the houses in the area are built with mud and thatch and many of them simply washed away. In this situation, the most vulnerable groups were women and children.

In the midst of the crisis, women developed a number of coping strategies, including providing one meal a day to family members, selling the remaining livestock not washed away by the floods, sending young people to major towns in southern Ghana to work and send remittances back home, collecting twigs for firewood from long distances and berries for food. In the Bolgatanga area of the Upper East Region, women were willing to do any work for any wages to survive.

The magnitude of the disaster also required active state and NGO intervention. A women's rights organization, the Centre for Sustainable Development Initiative (CENSUDI), for example, worked to ensure that social inequalities were not widened as a result of the disaster and the national effort to address it. CENSUDI received donations from the Network for Women's Rights in Ghana (NETRIGHT), the Navrongo Campus and

³³ A telephone interview with staff of CENSUDI, one of the women's groups in the Upper East Region involved in managing the disaster, provided information for this section.

Northern Education Trust Fund (NETFUND) and individuals.³⁴ CENSUDI focused on meeting the immediate food needs of some of the most vulnerable women, men and children in each community whose coping capacities in times of crises had been jeopardized. Since many households are extremely poor and had low food stocks, CENSUDI, utilized the donations to buy dried anchovies, rice and pepper. The most vulnerable female and male disaster victims in nine project communities benefited from the initiative within a period of two months. Apart from food, CENSUDI also distributed blankets and mosquito nets to pregnant women, lactating mothers, the sick and the elderly. CENSUDI also worked with the disaster victims to identify the medium-to-long-term needs of agricultural recovery (dry season gardening and livestock and poultry rearing), shelter reconstruction, micro-credit for women and disaster risk reduction. This initiative is being supported by Care International and Christian Aid.

5.5 Policy framework in Ghana

In Ghana, a number of national institutions and private organizations exist whose mandates and activities relate to climate change issues. These include the Ministry of Environment, Science and Technology, the Meteorological Services Department, the Remote Sensing Applications Unit, the Council for Scientific and Industrial Research, Water Research Institute and the Environmental Protection Agency. But each of these institutions function as “pure scientific entities”; they do not prioritize a framework for building policies and actions from an overall social justice, human security and gender equality perspective.

The establishment of the Ministry of Environment was a major outcome of the 1992 Earth Summit. The Ministry has an advisory committee with a secretariat to facilitate the implementation of Agenda 21. The membership is dominated by men from public and civil society institutions. Ghana also enacted the Environmental Protection Agency Act 1994 (Act 490) as a regulatory and enforcement agency, which makes non-compliance to environmental regulations criminal, liable on conviction to fines or to terms of imprisonment (EPA, 2000). The Act also ensures the application of a set of systematic measures to promote compliance in accordance with Environmental Impact Assessment procedures and measures.

A national Committee on Climate Change is hosted by the Ministry of Environment. This committee has the mandate of reviewing policies and programs to complement national priorities and contribute to reduction of greenhouse gas emissions and an increase in carbon sinks. The Ministry is the focal point for UNFCCC activities (Agyeman-Bonsu, 2007a).

Ghana signed the UNFCCC in June 1992 in Rio de Janeiro. The Convention entered into force globally on 21 March 1994 and specifically for Ghana on December 5, 1995, three months after Ghana ratified the Convention. In 2002, Ghana’s Parliament passed a resolution to ratify the Kyoto Protocol (KP) and the KP entered into force globally on 16 February 2005 (Agyeman-Bonsu, 2007b).

³⁴ The Network for Women’s Rights in Ghana (NETRIGHT) is a network of organizations and individuals established in 1995 to promote a gender perspective in economic and land rights in Ghana. In the wake of the disaster, it donated an amount of \$1,000 to women through CENSUDI.

As mentioned earlier, the Environmental Protection Agency (EPA) is the main Country Implementation Institution (CII) for the technical coordination of activities on climate change, the UNFCCC and other environmental conventions ratified by Ghana (EPA). A national climate change focal point is in place under the Conventions and Projects Implementation Department to act as the “desk” for the implementation of climate change-related issues. The “desk” coordinates the activities of working groups and climate change study teams to support the implementation of Climate Change Project activities.³⁵

The Second National Communication (SNC) is under preparation and expected to be ready in late 2009 (Agyeman-Bonsu, 2007c). It is expected to provide an update on the greenhouse gas emissions inventory and include all sectoral vulnerability assessments, as well as climate change mitigation options in energy, waste, industry, agriculture and forestry. The technology needs for both climate change mitigation and adaptation is also to be assessed. With regard to the implementation of the Kyoto Protocol, the Environmental Protection Agency has been nominated as the Designated National Authority to access the Kyoto Protocol Clean Development Mechanism (CDM). National CDM approval guidelines have also been developed to assist in assessing how CDM projects contribute to sustainable development (Agyeman-Bonsu, 2007d).

It is clear that the government of Ghana views the issue of climate change as a critical one for policy-making, particularly in terms of how international commitments are translated into national measures and strategies for mitigation and adaptation. However, just as the efforts at the international level are limited, so are those in Ghana to incorporate gender concerns into the climate change discourse and processes. Whereas there is clear evidence of a direct link between gender relations and adaptation to climate change, women’s voices and participation in decision-making structures and processes is woefully inadequate. Even though National Adaptation Plans are in the process of being developed, gender issues and the involvement of women is limited.

“I have been contemplating leaving my village. But what keeps haunting me is what will happen to my family. I am grateful to CENSUDI for bringing me some rice and soup ingredients just after the floods. This was a real lifesaver because at the time my family had nothing to eat. CENSUDI is also giving my family food aid which hopefully will last for 6 months. My worry now is what will happen to us after this food aid ends...”
(Atibzal Abaande, 45 years; Boya-Zooyanga, Bawku West District (Upper East Region) – interviewed by CENSUDI).

³⁵ The ‘desk’ produced the Ghana Initial National Communication in 2000. It also covered the following: Greenhouse gas emissions (from 1990-1996); Vulnerability and adaptation assessment for water resources, coastal zone and agriculture (cereal production); Climate change mitigation options with energy and forestry sectors. Other initiatives include: Climate scenarios have been developed using base data 1960-2000 and projection up to 2080 for all agro-ecological zones; Climate change and poverty incidences.

6. Case Study: Gender Human Security and Climate Change in Bangladesh

This chapter is based on a case study conducted by independent consultants Khurshid Alam, and Naureen Fatema and Wahida Bashir Ahmed of ActionAid Bangladesh. It gives an overview of the climate change situation in Bangladesh and reveals the implications for women's livelihood security and gender equality. The vulnerability of women in Bangladesh is discussed in terms of how they cope with continued deprivation and poverty during and in response to climatic disasters. A review of national policies, institutional frameworks and adaptation measures from a gender perspective conclude this section.

6.1 Climate change in Bangladesh



Figure 1: Map of Bangladesh

With two extreme weather disasters, the year 2007 was unique in the disaster history of Bangladesh: widespread flooding occurred in July and August, quickly followed by the category-4 cyclone Sidr in November. The flood alone caused 3,363 casualties, affected 10 million people and reduced crop output by at least 13%. While the flood rehabilitation was underway, the coastal part of the country was hit again by a 240 kilometer-speed cyclone, Sidr, that affected 30 districts (out of 64), impacting the lives and livelihoods of 8.7 million people, and damaging nearly 1.5 million houses and some 4.1 million trees.

There is consensus among scientists that South Asia is among the regions most impacted by climate change. The International Panel on Climate Change (IPCC) 4th Assessment Report (2007) defines the following as the main climate change impacts in the region: increased

frequency of droughts and floods affecting local production negatively; sea-level rise exposing coasts to increasing risks, including coastal erosion and increasing human-induced pressures on coastal areas; and glacier melt in the Himalayas, increasing flooding and rock avalanches. Crop yields could decrease up to 30% in Central and South Asia by the mid-21st century. Within South Asia, Bangladesh is the most vulnerable country because of its regional connectivity through geo-physical and hydrological features and its livelihood reliance on trade.

Bangladesh is experiencing a moderate temperature increase in post-monsoon seasons and strong warming (0.1° C -0.3° C/ per decade) during monsoon seasons. The regional temperature is also rising; there has been a general rising trend in surface temperature in the order of 0.5° C ±0.1° C over the entire South Asian region during the past century. The available predictions suggest an increase of 0.5 to 2.0° C by 2030, and the sea level is expected to rise by 30 to 150 cm by 2050.

Most modeling predicts an increase in average rainfall from 8% to 15% by 2030. Increased rainfall is already resulting in flooding within the country and throughout the region. Bangladesh will be highly susceptible to increased flooding, both in terms of extent and frequency.

With the highest disaster mortality rate in the world (UNDP Vulnerability Index), Bangladesh lost 516,239 men, women and children between 1970-2005, during 171 disaster events. Its geographical location as a delta of the major river systems of the Ganges, Brahmaputra³⁶ and Meghnap, lack of adequate governance structures and an impoverished population are three major contributors to Bangladesh's vulnerability to disasters.

Floods and flooding

The current trend of flooding in Bangladesh is changing: frequency, length and intensity of floods is increasing, with more damage to people, homes, crops and other assets; floods have become more unpredictable in terms of onset and scale (Alam 2007); sources of vulnerability have changed (i.e. collapsing embankments and structures and faulty design of structures); and the flood plains are extending.

“The flood pattern has changed a lot...The laws that used to hold earlier are no more there. We are not able to understand the strange things God is showing us... When summer is supposed to be over and monsoon is supposed to begin, the fields are still burning with heat. But by the time the rain starts and we try to sow seeds, by then there is flood. We are engulfed by trouble from all sides.” Komela Khatun, 56, female headed household (FHH), Char Banktarpur, Pabna.

Measures have been taken to improve the responsiveness to flooding, resulting in a decreased flood-related mortality rate, but an increased impact on the economy. A pluralistic institutional environment has been developed, where diverse public and private actors are

³⁶ Studies have indicated that the impact of snow melting in the high Himalayas will lead to flood disasters in Himalayan catchments. Impacts will be observed more in the western Himalayas as the contribution of snow to the runoff of major rivers on the western side is about 60% compared to 10% on the eastern side (IPCC 2001).

engaged in preparedness and quality post-disaster services.³⁷ However, women interviewed felt that the recurrent flooding during recent years has increased loss, since people hardly had time to recover from the first flood when the second hit.

“In earlier times, flood water used to come gradually and Aman paddy used to grow with flood water. But this year (2007), because the water came at once, the entire paddy was destroyed. The water of this year’s flood has lasted more than ever and there has been two floods in a year, though we also faced two floods in 1998 which were also severe. But if we had not increased our plinth level, then the damage from this year’s flood would have been double of that in 1998.” Shukorjan, 60, FHH, Gulzar Mondol, Faridpur.

Cyclones and tidal surges

Over 5 million Bangladeshis live in areas highly vulnerable to cyclones and storm surges.³⁸ Roughly 55% of the coastal population lives within 100 km of the 710 km-long coastal belt of Bangladesh. The majority of those living in this area are low-income agricultural workers; 70% of whom are landless and relatively asset-poor.

The country faced 48 major cyclones between 1584 and 2007. In November 1970, between 300,000 to 500,000 people died, and 400,000 houses and 3,500 schools were damaged. During a storm in May 1991, about 140,000 people died, and damage and displacement caused an estimated loss of US\$2.4 billion. By most estimates, the intensity and frequency of cyclones is likely to increase. Mirza (1992) estimated that the frequency of cyclones rose from 0.51/year in 1877-1964 to 1.12/year during 1965-1980. The IPCC projected intense and more frequent tropical cyclone activity with extreme high sea level (excluding tsunamis) (2007).

Sea level rise and salinity

Sea-level rise will lead to a potential loss of 15,668 km² land, which is expected to affect 11% of the population or 5.5 million people. If the sea level rise goes up by one meter, the implications will include a 20.7% land loss, affecting 14.8 million people. The direct and indirect consequences of sea level rise include saltwater intrusion into surface and groundwater systems, drainage congestion, decreased water logging potential and devastating effects on mangroves. About 2.8 million hectares of coastal soil has already become salinized due to heavy withdrawal of surface water and groundwater for irrigation and intrusion of seawater.

6.2 Position of women and their vulnerabilities

Roughly half of Bangladesh’s population is made up of women (48.9 percent in 2004, according to the World Bank gender profile), 80% of whom live in rural areas (BBS 2001).

³⁷ There is a general consensus that the response after the 1998 floods was more effective than in 1988. Bacos et al (1999: 55) summarizes, “There was a general feeling of immense success, especially in those agencies with institutional memories dating back to the floods of 1988. The 1998 response was faster, much more comprehensive and better organized, and in the end truly served the victims of disaster.”

³⁸ But the number is certainly higher, as the recent category IV cyclone, Sidr, has hit more inland, and even in the capital city Dhaka. This is considered a recent phenomenon.

Women bear multiple responsibilities at home, including food preparation, provision of cooking fuel, health care, and caring for children and their education.

Women play an important role in a wide range of income-generating activities, but their contribution to the national economy is largely unaccounted for. Women in low-income households are heavily involved in economic activities, mostly around homestead-based production, which contributes up to 16% of the household income in Bangladesh (CPD 2004). Independent livelihoods managed by women-headed households are also an important aspect of the rural economy of South Asia and contribute to 15% of the rural households in Bangladesh (CPD 2000). Neither of these percentages are accounted for in the GDP.

Women's contributions to rural production activities include raising seedlings, gathering seeds, post-harvesting, cow fattening and milking, goat farming, backyard poultry rearing, pisciculture, agriculture, horticulture, food processing, cane and bamboo works, silk reeling, handloom weaving, garment making, fishnet making, coir production and handicrafts. A significant number of rural women, particularly from extremely poor landless households, also engage in paid labor in construction and earthwork and field-based agricultural work, activities that traditionally have fallen within the male domain.

Over the years, a gradual change in social attitudes has allowed many women to take advantage of new economic and social opportunities, adding significantly to improvements in key development indicators. Participation of women in the wage labor force has increased, particularly in the ready-made garment (RMG) sector, where women make up over 90% of the 1.5 million workers that currently contribute approximately 70% of the country's foreign currency earnings; these earnings also enhance the incomes of many families (CPD cited in ADB 2004). Women migrants, mostly from female-headed households (FHHs), now contribute a major share of the informal urban labor market³⁹. Increased access to microfinance also has helped transform women's household labor into cash contributions to household income.

Due to increased access to services and cash, more women are able to use health services. As a result, female life expectancy has increased from 58.1 years in 1997 to 60.9 years in 2001, while that of men has increased from 58.2 percent in 1997 to 60.1 in 2001 (UNDP 1999 and 2003; ADB 2004). Female adult literacy rates have also increased from 27.4% in 1997 to 30.8% in 2001, while that of men has remained steady at 49.9% (Ibid). Increased literacy directly relates to increased employment opportunities for women. The rate of enrollment of girls in primary school is similar to the rate of enrollment of boys which reflects a change in the family and community attitudes towards the value of girls and their rights.

Women's participation in politics and administration, which has been negligible in the past, has also increased. At present, there is a provision for 3 out of 12 seats (25%) to be reserved for women in the Union Council and 3 to 5 out of 12 to 15 for municipalities. The country has had two women prime ministers to date.

³⁹ Migration to cities is a coping/adaptation strategy for many single women. The trends suggest that the majority of migrants come from the areas most affected by weather disasters.

However, although women play a key role in household and community disaster recovery, discussions on the impact of disasters and recovery support favor livelihoods dominated by men⁴⁰. The policy assumption remains that women benefit once men's livelihoods are secured. This assumption is not well verified because of limited research on how women's own lives and livelihoods are affected by climate change and disasters.

6.3 Impacts of climate change on women

This section will describe the actual and potential impacts of climate change on women's lives and livelihoods.



Photo 1: Life during disaster

Impact on the lives and health of women

While there has been a significant decrease in disaster-related deaths in Bangladesh, data is gender-neutral, limiting the ability to determine how men and women are affected. But a few studies following the cyclone and flood disasters of 1991 revealed that, among women aged 20-44, the death rate was 71 per 1000, compared to 15 per 1000 for men (UNEP 2005).

In a cyclone, even if a warning is issued, many women die while waiting for their relatives to return home and accompany them to a safe place. A study conducted by the Bangladesh Centre for Advanced Studies (BCAS) after the devastating cyclone of 1970 revealed that 25-

⁴⁰ For example, see *Daily Prothom Alo* (Bengali daily in Bangladesh), 5 September 2005.

30% of the women in the affected areas had died from the cyclone (Mirza, 1992). Similar threats exist during flooding.

Deaths, diseases and injuries occur from waterborne diseases, snake bites, drowning, slipping, large trees and structures falling on women, lack of medical facilities, malnutrition, lack of uncontaminated drinking water and lack of proper sanitation facilities. Women and adolescent girls suffer as sanitation systems are destroyed: many women reported that they refrain from using the toilet during the day and consequently suffer from urinary tract infections. Pregnant women, lactating mothers and differently disabled women suffered the most, as they found it difficult to move before and after the cyclone hit.

Anxiety for her unborn child

Begum, from Kolubari village of Sapleza union, Mothbaria Upazila, tied herself to a tree trunk to survive on the night of the cyclone. She was pregnant and suffering from malnutrition. After a while, she was unable to stand due to pain in her lower abdomen. The child in her womb stopped moving. She did not have any money to go to a doctor. She was panicked, doubting whether her unborn child would see the light of the world, even if she herself survived (SIDR assessment report, CARE, 2000).

With increasing climate variability, salinization of drinking water sources is becoming a major problem for the people of southwest Bangladesh. During the dry season, when lack of potable water becomes an acute crisis for households, it becomes the responsibility of women, irrespective of their physical condition, to provide drinking water for their families. Since water sources in the neighborhood are all affected by high salinity, women need to travel long distances, sometimes up to ten kilometers on foot every day over rough terrain, in search of water. This consumes an enormous amount of their time.

“Male members do not go to bring non-saline water. I walked around 2 kilometers to fetch water even before the day I gave birth to this daughter (4 years now). Just two days after her birth, I had to start fetching water again and now I am suffering from physical problems.” Laily Begum, Shathkhira.

Impact on women’s physical security and dignity

Women in Bangladesh still experience various types of violence⁴¹, and physical, sexual and emotional violence increases during and after a disaster.

a.) Domestic violence

As psychological stress increases during disasters, and more men are left without employment, male relatives of many women have been reported to vent this increasing frustration via abusive language or exertion of physical force. Reasons given for this abuse range from women not being able to manage resources properly, to not serving food on time, to not being able to procure relief materials.

Domestic violence as a result of inability to procure relief

Nasima, 25, from Madartake, Nandi Para, used to provide domestic help to neighboring households. “I am

⁴¹ The UNDP Human Development Report of South Asia, 2002, ranked Bangladesh third of the countries in which violence against women is highest and most regular.

unable to work now due to having headaches all the time. When my husband gets angry, he hits me in the head". Nasima says that, although her husband has been violent since their marriage began, "it has increased after the flood of 2007. My fault is that I was not able to get relief... Whenever he is angry, he hits me in the head, waist and legs and asks, 'How do other women receive 20/ 30 kg of rice?' 'Why don't you beg for rice from the Commissioner?' He does not give us food regularly but is regular in beating." Nasima feels that as long as he can feed the family, she is willing to digest all his beating (Mabbuba Nasreen, 2007 for ActionAid Bangladesh).

b.) Harassment and loss of privacy in flood and cyclone shelters

Many women refrain from going to shelters during a disaster or when a warning signal is issued in fear that they would have to share a room with strange men. Pregnant women and nursing mothers tend to be reluctant to share space with or nurse in front of strangers. Some women with disabilities also mention facing some form of violence in shelters, including mental abuse and physical torture.

c.) Harassment in relief queues

Women often face additional physical insecurity and loss of dignity while collecting relief during or after a disaster. In many cases, they have to walk long distances through water, their wet clothes clinging to their bodies, to collect relief. During collection they have to stand in long queues with male strangers. Sexual harassment is often reported.

Impact on women's economic livelihoods

Floods and cyclones damage livestock (i.e. cows, goats, buffaloes), poultry (i.e. chickens, ducks), fisheries, trees, crops (i.e. rice, wheat, nuts, chilies, lentils), seeds and animal fodder. Productive tools such as ploughs and nets are also washed or blown away. Increased salinity after a cyclone and the difficulty in plowing wet soil after flooding decreases soil productivity. Sand deposition as a result of flood and river erosion affects production of crops such as nuts. During and after weather disasters, the lack of fodder for livestock and poultry results in reduced milk and meat production.

The impacts of floods and cyclones on the livelihoods of women specifically include:

- **Housing and homestead:** The destruction of houses by floods and cyclones is a common impact in disaster prone areas.
- **Crop production loss:** Bangladeshi women, who control homestead-based livelihoods, lose income when crops are blown or washed away.
- **Livestock death:** Cows and goats are the most valuable assets of poor people in flood-prone areas. During flooding, collection of fodder for livestock is a significant challenge, particularly for goats who need green grass (which often becomes flooded.) It also becomes difficult for veterinarians to visit the villages or for villagers to travel to buy medicine.
- **Loss in productivity:** Flood water and sand deposition decreases soil productivity.
- **Supply shortage and price of inputs:** Shortages during flooding leads to increased prices for inputs such as seeds, fertilizers, oil for running irrigation pumps, fodder for animals, transport costs and veterinary fees.
- **Limited access to market:** With damages to infrastructure and communications systems, women cannot access the market to buy or sell food such as milk, eggs,

vegetables or other products. Women are forced to trade within the village or accept lower prices offered by male buyers from other areas.

- **Loss of income, savings and employment:** Loss in production, lack of storage and destruction of access roads result in assets (e.g. cattle) or products (e.g. milk) being sold at low prices. The selling price decreases while the shortage in supply induced by floods results in increased prices for essential goods. Moreover, floods and cyclones reduce employment opportunities, especially for women working in agricultural fields. As a result, there is a net loss in income which, in turn, leads to a loss in savings, thus making it even harder for households to cope with disasters.

“The price of everything goes up after a flood. The price of seeds, fertilizer and oil all increase. The price of food for man and animals also increases... We have to eat less and feed our livestock and poultry less.”
Aleya Khatun, 42, MHH, Baktarpur, Pabna.

“The roads get submerged and slippery. Even if I have paddy at home I can’t go to the market to sell it. We are also unable to sell the milk and the vegetables we produce. So we have to accept low prices from buyers within the village or external buyers who approach us.” Momena, 45, FHH, Gulzar Mondol, Faridpur.

6.4 Women’s current coping strategies and adaptation

Long term monitoring and research is needed to have a full understanding of whether the current coping strategies of poor households, and particularly of women, are significantly or sufficiently contributing to adaptation to climate change. The factors responsible for success or failure of these coping strategies may be relevant for future planning.



Photo 2: Violation of security, dignity and privacy



Photo 3: But life goes on...

The following are some of the micro-strategies used by poor women in Bangladesh to cope with frequent disasters.

Avoidance or Prevention Strategies

People living in the disaster-prone areas of Bangladesh employ an array of measures to safeguard their lives and property against disasters. The majority of the people do have a clear understanding about the effectiveness of each of the preparedness measures, as well as their limitations. Often these measures do not help them because of the magnitude of disasters.

a.) Predicting and preparing for disasters

In the flood-prone areas, vulnerable people have used their own science and arts to predict floods. This traditional tool is becoming of little help, however, due to the changing nature of disasters, leaving the community with no choice but to rely on whatever early warning system is in place.

b.) Protecting houses and homesteads

Before the flood or cyclone season, families try to make their houses more resilient to disasters by reinforcing walls and roofs with locally available resources, increasing the plinth level of households and elevating the level of cow sheds. More financially secure households raise the level of tube wells.

c.) Storing essential items

Women preserve fuels, matches, dry food (such as rice, peas, puffed rice, flattened rice and molasses), ropes and medicine at home and prepare portable mud stoves for future use. Women often collect firewood to store in dry places for later use.

“You can borrow some rice from a neighbor’s house, but how do you manage firewood? People may have the grains to cook, but if they do not have fuel, they cannot eat anything.” Female participant from Sonatani Char, Sirajganj.

Women also store fodder for domestic animals, seeds, food, harvest, blankets and valuables on machas (high wood or bamboo structures for storage), which are also used to protect goats and poultry from flood water. Many women store cooking utensils, productive assets (i.e. ploughs, fishing nets) and other valuables under the soil to protect them from being washed away by cyclones.

d.) Teaching children

Educating the younger generations about how to protect themselves has been a key strategy employed by households living in disaster areas. Teaching life-saving skills such as swimming and understanding cyclone signals are examples of how parents prepare their children. No formal mechanism for teaching children disaster preparedness exists, however; children usually learn from family discussions or meal-time conversations. Various other activities such as animal rearing, grazing and taking part in plantation work with their parents, during which children have an opportunity to learn their parents’ indigenous knowledge, are additional examples.

Managing Strategies

a.) Safety of family members

During disasters, women must constantly look after children, elderly and disabled family members, and animals to ensure their safety. In flood-prone areas, women prepare elevated platforms for family members with disabilities, using the *chouki* (traditional bed) and bamboo. Often, to ensure that young children remain safe and are not carried off by flood water, parents construct a ‘fence-in’ to keep toddlers in one place.

b.) Ensuring food security

Since most households are dependent on agriculture, flooding season is particularly threatening. In general, there is an overlap between flooding time and the crucial rice harvesting period. If a flood comes early in the monsoon season, it destroys the standing crop, which results in food shortages⁴². Disasters also affect the local economy, which is vital for generating employment opportunities for non-farmers in both rural and urban areas.

When a household faces a food crisis during or after a disaster, women are responsible for adjusting household food consumption by changing the type of food eaten (instead of consuming rice, for example, they resort to alternate foodstuffs such as *kaisha* or *kolmi*, local vegetation,) or by consuming less. Various studies acknowledge that since women’s work is closely related to agricultural production, family food and income generation, the burden of food shortage falls on them.

c.) Protecting assets

When flood water reaches the level of the livestock shed, people no longer keep their animals at home. In some cases, they send their cattle to relatives. Some poor families try to sell livestock in an attempt to hold cash security, preparing against the possibility that regular income could be jeopardized.

d.) Household work

Workload distribution within the family disproportionately affects women during a disaster. When husbands or male members become unemployed, daily work for women increases even more as they have to manage resources, feed the family and look after the elderly. In most cases, caretakers for people with disabilities are also female. However, new studies have also documented that work distribution is changing: a significant number of female participants mentioned how their husbands changed their usual habits during flooding; many cook at home or take care of children (Alam 2007).

e.) Managing finance by borrowing credit, selling and mortgaging assets

In order to meet household financial needs, assets such as livestock, poultry and boats are often sold. Selling other valuables, mortgaging, or borrowing against assets, or borrowing from neighbors are other common strategies for survival. Many women in rural areas are now part of microfinance organizations, using their memberships to access loans.

f.) Migration and alternative employment

⁴² According to the assessment reports of the 1998 flood, 15.6% of flood-exposed households became food insecure.

In many cases, especially in FHHs, women migrate as an adaptation strategy. Migration⁴³ for employment increases after disasters, when people move out of areas with job deficits in search of work. Female migration, mostly from FHHs, contributes a major share of the informal urban labor market⁴⁴. The major activities that employ women in urban areas include serving as domestic help, brick breaking, sewing, jute bag making, ash selling, fish and vegetable vending, selling rice cakes and working in the RMG industry. For earning, they sometimes compromise with their values and dignity (i.e. begging). Women who have alternative livelihood options prefer not to migrate as laborers; households that have boats, for example, earn incomes by ferrying people. Some even open small shops on the boats. Selling advance labor for money is another common practice; farmers often view this as ensuring future employment, although it also makes for financial shortages in the future since they have already been paid.

Recovery Strategies

Rebuilding houses, re-stocking livestock, securing an income, repaying borrowed money, treating affected family members, and restoring other aspects of life such as children's education are all parts of recovery from disasters. In all of these activities, women are actively involved.

6.5 Women's constraints in coping with disasters

“Because this flood lasted longer, people have suffered more than in the past. If the soil doesn't dry, we can't cultivate onions, garlic or any vegetable. Now we'll have to plant a month late and reap a month late. So there'll be less money. Our day labor has also stopped because of the flood, so there's even less cash in our hands. Everything is costly now. On top of that we were attacked by flood twice this year. We had barely managed to meet finances from the first round when the second round hit us.” Momena, 42, FHH, Gulzar Mondol, Faridpur.

As mentioned above, the social, economic and political context for women in Bangladesh makes them overall more vulnerable to climate change. The following factors are among those exacerbating women's difficulty in coping with climate disasters: limited access to early warning information; lack of preparedness⁴⁵; limited access to critical services and facilities (i.e. shelters with adequate spaces for women and with proper sanitation); lack of access to financial security (i.e. loans provided to women often have highly unfavorable repayment conditions); limited market and communication access; limited access to decision-making arenas; social expectations of “appropriateness” for women's actions; increased responsibility to the household; difficulty in accessing relief goods; and physical constraints⁴⁶.

⁴³ A study conducted by the CLP in the Gaibandha Chars found that between 70% and 90% of extremely poor households had at least one member migrating seasonally. For the village as a whole, as per the CLP baseline survey, it was found to be 33%. Day laborers were the most severely affected: their employment fell sharply from 19 days per month in 1997 to only 11 days per month in July through October 1998.

⁴⁴ Migration trends suggest that the majority of people come from areas affected by weather related disasters, but other social dynamics exist, as well.

⁴⁵ Studies have shown that many families have a high level of awareness about flood preparedness but they do not have the ability or resources to implement actions (Alam 2007).

⁴⁶ During disasters, women in general face greater trouble while swimming or moving in the presence of wind and water since their saris tend to float away; their long hair often gets tangled with their body and

“During these tense moments, women cannot manage their clothing and hair because of the wind. On top of that, they head towards shelter with their children in one hand and household goods in the other, all of which becomes difficult to manage and, in many cases, becomes the cause of their deaths. Many children cannot run because they refuse to get down from their mothers arms, as a result of which the mothers cannot run either. That’s why women and children suffer more.” Marium, 60, Char Kukri Mukri.

6.6 Opportunities for women’s participation in disaster preparedness and response

Although women in Bangladesh are generally more vulnerable than men, gender related perceptions are changing in the community. Women’s involvement in activities outside of the home, such as participation in meetings, standing for election and leading of community mobilization, is widely accepted. Community and religious leaders generally acknowledge that women’s awareness and participation must be increased for disaster reduction.

Compared to the 1980s, barriers to women’s involvement in decision-making have been largely removed, although women still face challenges in influencing processes that matter most to them. Since the 1991 cyclone, many women in Bangladesh are now involved in various disaster committees at the local level, initiated by the government, the Red Cross and NGOs.

The opportunity for participation in and access to local political power spheres are critical for women, but most women report that during or after a disaster, they are not consulted in any community-level decision-making. They said that their participation in the community’s decision-making processes could help highlight women-specific problems, as well as potential solutions.

Women’s leadership

Numerous case studies suggest that women play a lead role in the recovery of their households after a cyclone. Evidence also suggests that many communities are now ready to see women leading their cyclonic risk reduction. However, the unaddressed specific vulnerabilities of women mentioned above are the barriers to women playing meaningful leadership roles at community level.

Some initiatives have already been taken by Community Disaster Preparedness Committee (CDPC) members; for example, the vice chairperson of CDPC of Char Kukrimukri has formed a small women’s group:

“I have already facilitated the formation of a small group at my constituency. At first, my female neighbors were not willing to form a group, but I motivated them. I told them that in order to save our lives we need to be organized. They did not want to give their name and asked how they would be benefited as a committee member, and I told them that four meetings will be held in a month and you will get snacks and allowance. I told them that their enrollment in the committee means they will get something and they will be given priority

other nearby objects, making it difficult for them to maneuver. Women often have small children who cling to their bodies, making it even harder for them to move.

in receiving relief goods in time of cyclone. They will learn about cyclone preparedness and share their learning with others.” Fatema, Vice Chair, CDPC, Kukrimukri.

6.7 Policy framework and institutions on climate change in Bangladesh

Climate change became a focus when it was first integrated in the National Environmental Management Action Plan (NEMAP), which was prepared in 1995 in order to initiate the process of addressing climate change issues as long-term environmental concerns for Bangladesh.

Bangladesh signed onto the United Nations Framework Convention on Climate Change (UNFCCC) on 9 June 1992, ratified it on 15 April 1994 and ratified the Kyoto Protocol on 22 October 2001. The country is a non-Annex I Party to the Protocol, which means that it is not bound by specific targets for greenhouse gas emissions. The Department of Environment within the Ministry of Environment and Forestry is the focal point for the UNFCCC and coordinates climate-related activities in the country. Now a Climate Change Cell (CCC) has been established to address several issues, including adaptation.

Several institutions are involved in technical analyses of climate change including the Bangladesh Meteorological Department, the Flood Forecasting and Warning Center, the International Centre for Diarrheal Disease Research Bangladesh, the International Training Network Centre (dealing with water management issues), Climate and Environment Geographical Information Services and the Bangladesh Centre of Advanced Studies.

Bangladesh was one of the first countries to finalize a National Adaptation Programme of Action (NAPA) in accordance with the UNFCCC. The NAPA was completed in 2005 and is the first official initiative for mainstreaming adaptation into national policies to cope with climate change and vulnerability. The NAPA suggests a number of adaptation strategies, such as the provision of potable water to coastal communities, including climate change issues in education, and mainstreaming climate change across sectors and into the planning of infrastructure.

Bangladesh has already included most elements of mainstreaming climate change adaptation into its recent 2005 Poverty Reduction Strategy Paper but as yet, there has been little progress in implementing the stated goals and targets of the NAPA.

Although it contains brief references to gender and women, the NAPA does not include women as stakeholders or actors in proposed adaptation actions. In developing the NAPA, “indigenous women” were noted as consultants, but no details are provided as to the ratio of male to female participants, and no women’s rights or gender-equality organizations or gender experts are mentioned as contributors. Women are repeatedly referred to as one of the most vulnerable groups, yet no statistical or factual evidence is provided on gender-differentiated income levels, occupations or demographics. Particularly striking is the omission of women in discussing the public health situation of the country (i.e. no mention of gender-differentiated access to health care, differences in life expectancy or breakdown of government expenditures by gender). The NAPA presents women as victims of climate impacts; women are not considered active participants in adaptation to those impacts (WEDO 2008).

7. Conclusions⁴⁷

Based on existing insights and literature, the analysis contained in this paper, and the country case studies that were provided on human security, gender and climate change, the following can be concluded.

Climate change and human security

Climate change is an emerging human security issue that threatens numerous communities. The nature and extent of climatic changes not only hinders human development and environmental security, but also forms a major human security threat at national and livelihood levels, particularly for the world's most vulnerable groups.

A vulnerability approach is needed as different people in diverse contexts have different vulnerabilities. Insecurity and conflicts occur where climate impacts on food, water, and the availability of resources, and migration increases.

Climate change, its mitigation and adaptation may potentially also create new inequities, vulnerabilities and insecurities (O'Brien, 2007). However, authors also mention that this global phenomenon with its local impacts, offers interesting opportunities to challenge existing paradigms and practices and to develop alternative livelihoods. The best way to mitigate the negative impacts of a disaster is to be prepared for it.

Gender aspects of climate change: threatened human security

Climate change is not gender neutral, and gender is an important determinant in climate change mitigation and adaptation. As climate change tends to magnify existing inequalities, with gender inequality being one of the most pervasive, it has major impacts particularly on women. Women are likely to experience worsening inequalities of different magnitudes as a result of climate change impacts through their socially constructed roles, rights and responsibilities, and because they are often poorer.

It is now widely acknowledged that negative effects of climate change affect women the most because they depend on natural resources and the environment for all their activities and the basic needs of their families (Diagne Gueye, 2008).

As a result of climate change, women face specific risks and vulnerabilities in a range of sectors. Gender-specific climate change vulnerability and adaptive capacity are place and context specific. Already in several countries, including the case study countries, women experience the impacts of climate change through increased frequency, intensity and impacts of floods, droughts and cyclones. This changing nature also has an impact on their ability to cope, and therefore has major consequences on their security and that of their families.

Climate change not only affects women's health and wellbeing directly, but it also impacts negatively on their work burdens, opportunities and capacities through changes in their livelihoods. Apart from changes in their livelihoods that result from climate change, other

⁴⁷ Conclusions by Irene Dankelman

important factors are lack of access to adequate (early warning) information, education, training and facilities to cope with these disasters.

Since agriculture is the primary source of livelihood for the majority of rural women and since agro-based activities are highly sensitive to climatic conditions, women's livelihood options, which are already threatened by natural disasters, is expected to be exacerbated in the future as a result of climate change (Bangladesh case study).

Fisheries in many societies will be worsened by climate change impacts. This leads to loss of income for poorer women, increases in prices of fish, and lowering of protein levels in diets (Mensah-Kutin, 2008; Campsey and Mensah, 2005).

Women who are responsible for securing households and assets are particularly affected by climate change impacts on water availability and quality. Such water stress can be worsened by water privatization. Similar situations occur regarding fuel availability.

In order to understand the implications of climate change on women and men, many lessons can be learned from existing literature and insights from the disaster-gender field. Women often face greater hurdles than men in a disaster. For example, early warning information does not reach women as fast as men. Women face privacy issues (including lack of safe sanitation) and they are often subjected to greater domestic abuse and violence during and after a disaster.

Adaptive capacity: strengthening human security

Gender differences must be considered not just in terms of differential vulnerability, but also as differential adaptive capacity. Women play a key role in protecting, managing and recovering their household and assets during a disaster. They have been strong advocates for preparedness measures at the community level because they understand what disaster means to the day-to-day realities of life. Many women have the knowledge and capacity to contribute towards adapting to the changing nature of disasters, and they themselves continue to develop innovative strategies to address climate change impacts as has been clearly outlined in the case studies. Opportunities and barriers for women to cope with disasters today could play similar roles in adapting to climate change.

Women have been active community mobilizers in disaster response, and demonstrate diverse adaptation coping strategies and mechanisms: moving to safer places, saving their assets, dietary adaptations, energy-saving, adapting agricultural practices, earning income or saving money from alternative sources, alternative health care, organization and collective action. They also have a clear sense of what is needed to adapt better to climate change.

There are several factors that affect women's ability to adapt to climate change: women's access to assets, protection of their economic livelihood, access to services, political participation in decision-making, access to information and enhanced leadership. In general, women's access to assets is limited and their economic contribution continues to be overlooked in economic planning as well as in disaster assessment. As a result, they often do not get a fair share from the post-disaster assistance. Their participation in disaster-related decision-making is still limited, as well.

However, natural disasters could also provide women with a unique opportunity to challenge and change their gendered status in society. Over the years, there has been a shift in community's perception of women's roles: there is more acceptance of women leading their disaster risk reduction.

There are practices at the micro-level that promote women's leadership in various activities, such as disaster risk reduction, economic and political empowerment. But until now, there have been limited efforts to learn from these and to scale these activities up (Alam et al., 2008).

Policy responses: gender responsiveness in climate change to enhance human security

The policy environment has yet to fully recognize the gender-specific characteristics of vulnerability and adaptive capacity. Environmental issues, including policies, laws and programs, are often treated as being gender neutral. This is reflected in the inadequate representation of women in the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

Whereas there is clear evidence of a direct link between gender relations and impacts of and adaptation to climate change, women's voices and participation in decision-making structures and processes are still inadequate. Climate change debates, processes and mechanisms at national level often fail to sufficiently adopt a gender-sensitive strategy, and there is little evidence of specific efforts to target women in adaptation activities funded by bilateral and multilateral programs. Therefore, the unique opportunity to change traditional gender roles that is presented when a disaster occurs, is often wasted.

Women are often portrayed as victims of the climate crisis and without the ability to be involved in negotiations or strategic project planning. The majority of relief efforts are intended for the entire population of a disaster-affected area. However, if they rely on existing structures of resource distribution that reflect the patriarchal structure of society, women are marginalized in their access to relief resources.

A broader evaluation of women's vulnerability to climate change can be done through the National Adaptation Programmes of Action (NAPAs) and by estimating the degree of vulnerability to natural risks. Many NAPAs emphasize the vulnerability of women and the importance of gender equality in broad terms. However, few NAPAs describe how women are affected by climate change, much less how they might be identified as powerful actors and agents of change. Prioritized activities in many NAPAs fail to include women as contributors and target groups. Where NAPAs take gender aspects into consideration, substantial work has to be done to implement gender mainstreaming in climate change policies. The Millennium Development Goals (MDGs) and Poverty Reduction Strategies (PRSPs) could serve as important reference documents in that respect.

Civil society groups play an important role in mobilizing for critical action in support of marginalized groups and in addressing equity considerations. Therefore, they play an important role in strengthening gender responsiveness in climate change, enhancing human security.

Greater inclusion of women and inclusion of a gender-specific approach in climate change adaptation and decision-making may reverse the inequitable distribution of climate change impacts. And greater inclusion could improve adaptive decision-making itself, reducing the negative impacts on the entire community, thus enhancing human security.

8. Recommendations

In this study, the relationship of gender, climate change and human security has been examined on a global level and in three specific country case study countries: Senegal, Ghana and Bangladesh. The following recommendations are based on the outcomes of this study:

Climate change and human security

- Research and integrate climate change as a human security issue into human rights frameworks, mechanisms and legislation, including the Hyogo Framework for Action.
- Apply a human security framework to climate change at all policy levels.
- Conduct a vulnerability analysis of climate change mitigation and adaptation and promote an integrated human and environmental security approach that is proactive and inclusive and combines top-down measures (e.g. institutional consolidation, laws, norms and policies) with bottom-up participation and resilience-building for exposed communities.

Gender aspects of climate change: ensuring human security

- Include a gender perspective in global and national climate change policies, documents, programs and budgets.
- Guarantee women's participation in climate change decisions, and amplify women's voices in global, national and regional institutions, as well as in open dialogue at the community level.
- Acknowledge across sectors that women are among the most affected by climate change because of their social and economic situations and because of their role in the family.
- Enhance institutional capacity to mainstream gender in global and national climate change and Disaster Risk Reduction (DRR) policies and operations through the development of gender policies, gender awareness, internal and external gender capacity and expertise, and the development and application of relevant mechanisms and tools.
- Conduct gender-specific vulnerability assessments, and apply a gender analysis to global climate change policies and institutional mechanisms.
- Develop gender-sensitive indicators for use by governments in national reports to UNFCCC and related policies and mechanisms.

- Create gender-specific disaster reduction policies to address the effects of climate change in disaster-prone areas, as well as pragmatic national and international interventions to ensure food, energy and water security, economic resilience and security of place/habitat, particularly for poor and migrating women and their families.
- Promote women's empowerment through capacity-building before, during and after climate-related disasters, as well as their active involvement in disaster anticipation, early warning and prevention as part of their resilience building.
- Guarantee women's rights in climate change mitigation and adaptation, including their rights to knowledge, skills, land ownership, participation in decision-making and access to services.
- Construct a legal regime that safeguards the security of women affected by climate change, including mechanisms to review land-use planning and infrastructure work (Alam et al., 2008).
- Incorporate climate change in discussions on women's rights and related interventions, which often focus on political, social and economic empowerment and protection in a non-disaster context (Alam et al., 2008).
- Ensure that government policies and programs on human rights, women's rights and climate change are coherent and reinforce each other.
- Encourage the women's movement to take full responsibility and ownership of the gender and climate change discourse to ensure that implementation of UNFCCC and Kyoto Protocol (and post-KP) measures take their specific concerns into account (Mensah-Kutin, 2008).

Adaptive capacity: strengthening human security

- Build on and strengthen women's experiences, knowledge and coping capacity in adaptation policies and ensure that women's needs are considered in livelihood adaptation strategies.
- Integrate a gender approach and enhance women's human security in all National Adaptation Programmes of Action (NAPAs).
- Foster women's direct involvement in both policy and project planning in NAPA preparation.
- Create an environment in which women's engagement in adaptation discussions and governance structures is fully supported—in order to do so, existing coping strategies and constraints to adaptation should be studied.

- Empower women as agents of adaptation, and provide women with opportunities to control greater percentages of resources (including land) and services and to make independent decisions.
- Prevent cultural practices from hindering women’s capacity to adapt.
- Support and promote practical solutions to enhance women’s adaptive capacity and livelihoods including alternative agricultural practices, equitable employment opportunities, access to credit, labor-saving technologies and equipment, safe shelter and facilities, energy and water supplies and services (Diagne Gueye, 2008).
- Assist women and their coalitions and networks at community, national and international levels to ensure that recovery and adaptation measures respond to women’s needs and concerns.
- Provide training to women’s organizations, networks and support groups and opportunities to share experiences—women and their organizations should demonstrate exemplary leadership and serve as gender advocates and credible ambassadors on climate change (Mensah-Kutin, 2008).
- Acknowledge women’s social, economic, physical and psychological vulnerabilities in community-based preparedness and response plans in order to reduce the impact of disasters on women.
- Recognize women’s abilities and incorporate them into disaster relief efforts with the goal of changing gendered roles and perception of rights.
- Endeavor to ensure that activities are appropriate for women, and that they receive positive encouragement and support for participation.

Financing mechanisms

- Integrate human security for women into climate change funding mechanisms, to ensure that poor women get a fair share of funds—practical tools such as accountability mechanisms would support gender equality’s incorporation into climate change initiatives, including the Clean Development Mechanism (CDM).
- Consider developing a mechanism for the CDM to fund projects that make renewable energy technologies available to women. For example, NAPAs should target women as important actors in adaptation activities.
- Set up adaptation funds, according to principles of democratic governance and civil society participation to play a key role in promoting women’s rights and to prioritize poor women’s needs.

- Ensure women’s engagement in adaptation financing mechanisms (Alam et al., 2008).
- Create adaptation finance mechanisms that support livelihood adaptation priorities of poor women, and include gender-disaggregated indicators in adaptation funds for targeting and monitoring the benefits to poor women.

Further research⁴⁸

- Conduct a gender-based approach to the study and analysis of climate change and natural disasters and collect more research, particularly supported by sex-disaggregated data.
- Apply lessons from the Global Environmental Change and Human Security (GECHS) program (one of the science programs of the International Human Dimension Program) to climate change research, and use participatory research tools to study the impacts of climate change on women’s livelihoods.
- Promote women’s equal participation in climate change science and research.

Capacity building and networking

- Invest more into strengthening the capacity of women and gender activists on climate change issues and apply affirmative action principles to draw women into climate change institutional structures and policy-making arenas.
- Enhance cooperation with women climate change organizations, including the Global Gender and Climate Alliance, WEDO, IUCN, ENERGIA, gender-cc Women and Climate Justice network, Gender-Disaster Network, and national partners.

⁴⁸ Research is not an end in itself, but a means to better mitigate and adapt to climate change, as well as a mechanism to enhance gender equality.

References

- ADB, 2004. *Country Briefing Paper on Women in Bangladesh*. Asian Development Bank.
- Aguilar, Lorena, Ariana Araujo and Andrea Quesada-Aguilar, 2007. *Gender and Climate Change*. Fact Sheet. IUCN (World Conservation Union), San José.
- Agyeman-Bonsu, William Kojo, 2007a. *National Climate Change Adaptation Strategy*. Paper presented during a workshop on National Adaptation Strategy Development. Akosombo.
- Agyeman-Bonsu, William Kojo, 2007b. *Overview of Climate Change Programme in Ghana*. Paper presented during the National Forum on Climate Change. Accra.
- Agyeman-Bonsu, William Kojo, 2007c. *Overview of Climate Change Programme in Ghana* (Unpublished paper). Accra.
- Agyeman-Bonsu, William Kojo, 2007d. *National Climate Change Adaptation Strategy* (Unpublished paper). Accra.
- Ahmed, Ahsan Uddin, 2006. *Bangladesh Climate Change Impact and Vulnerability: a synthesis paper*. CDMP, Dhaka.
- Ahmed, Ahsan Uddin, Neelormi, Sharmind and Adri, Neelopal, 2008. *Climate Change in Bangladesh: Concerns Regarding Women and Special Vulnerable Groups*. CGC, Dhaka.
- Alam, K. et al., 2007. *Drowning Sand and the Holy Banana Tree*. Handicap International, Dhaka.
- Alam, Khurshid, Naureen Fatema and Wahida Bashir Ahmed, 2008. *Gender, Climate Change and Human Security in Bangladesh*. ActionAid, Dhaka.
- Allah-Mensah, Beatrix, 2004. *Women in Politics and Public Life in Ghana*. Printridge, Accra.
- BBS, 2001. *Statistical Year Book of Bangladesh*. Bangladesh Bureau of Statistics, Ministry of Planning, Government of Bangladesh, Dhaka.
- Benneh. G., R.K. Kasanga and D. Amoyaw, 1995. *Women's Access to Agricultural land in the Household: a case study of Three Selected Districts in Ghana*. FADEP, Accra.
- Bern, C, J. Sniezek, G.M. Mathbar, et al., 1993. Risk factors for mortality in the Bangladesh Cyclone of 1991. *Bulletin of the World Health Organization*, 71: 73-78
- Bortei-Doku Aryeetey, Ellen, 2000. The Participation of Women in the Ghanaian Economy. In: Aryeetey, E., J.Harrigan and M. Missanke (eds) *Economic Reforms in Ghana: the Miracle and the Mirage*. James Currey, Oxford Woeli Publishing Services, Accra.
- Brauch, Hans Günter, 2004. *Abrupt Climate Change and Conflicts: Security Implications from a European Perspective – Hobbesian vs. Grotian Analyses*. Friedrich Ebert Foundation and Carnegie Endowment for International Peace, Washington, DC, 29 March 2004. http://www.afes-press.de/pdf/Brauch_ClimateChange.pdf
- Bradshaw, Sarah, 2004. *Socio-economic Impacts of Natural Disasters: a gender analysis*. United Nations Economic Commission for Latin America(ECLA). Serie Manuales 32.
- Brown-Kruse, J. and Hummels, D., 1993. Gender effects of laboratory public goods contributions: do individuals put their money where their mouth is? *Journal of Economic Behavior and Organization*, 22: 255-267
- Cannon, T., 2002. Gender and climate hazards in Bangladesh. *Gender and Development*, 10: 45-50
- CARE, 2007. *Rapid Gender Assessment of SIDR Response*. CARE, Dhaka.
- CDP, 2001. *Bangladesh Facing the Challenges of Globalization: a review of Bangladesh's Development*. Centre for Policy Dialogue. CDP, Dhaka.

- CDP, 2004. Coastal Newsletter on Reducing Vulnerability to Climate Change through Awareness, Action and Advocacy. CDP, Dhaka.
- Cutter, S.L., 2003. The vulnerability of science and the science of vulnerability. In: *Annals of the Association of American Geographers*. 93(1): 1-12
- Dampitey, Patience and Angelina Mensah, 2005. Women and Climate Change in Ghana (Unpublished Research Report). Accra.
- Dampitey, Patience, 2007. National Forum on Climate Change (Unpublished paper). Accra.
- Dampitey, Patience T.M., 2007. *Climate Change and Women's Livelihoods*. Paper presented during the National Forum on Climate Change. Accra.
- Dankelman, Irene, 2008. *Gender and Climate Change: local security in an era of global environmental change*. Draft. Radboud University, Nijmegen.
- Diagne Gueye, Yacine, 2008. *Genre, Changements Climatiques et Sécurité Humaine: le cas du Sénégal*. ENDA Programme Energie, Dakar.
- Diagne Gueye, Yacine. 1997. *Impacts potentiels des Changements Climatiques sur la production alimentaire au Sénégal: synthèse des résultats*. ENDA Programme Energie, Dakar.
- Denton, Fatma, Emmanuel Seck et al., 2005. *La Visage de la Pauvreté énergétique à Travers la Femme au Sénégal*. ENDA, Dakar.
- Diagne, Madiagne, n.y. *Impact des Changements Climatiques sur a production alimentaire au Sénégal. Synthèse des résultats et perspectives*. ISRA/ Agroclimatologie et Télédétection.
- Diagne, Astou Diop, n.y. *Stratégie Nationale pour l'égalité et l'équité du genre au Sénégal, SNEEG 2015*. Ministère de la femme, de la famille et du développement social, Dakar.
- Edward, Miguel, Satyanath Shankar, and Ernest Sergenti, 2003. *Economic Shocks and Civil Conflict: An Instrumental Variables Approach*. Bureau for Research in Economic Analysis of Development (BREAD), Working Paper no. 040.
- Eldridge, C., 2002. Why was there no famine following the 1992 Southern African drought? The contributions and consequences of household responses. *IDS Bulletin – Institute of Development Studies*, 22 (4), 79-87
- Enarson, E., 2000. *Gender and Natural Disasters*. IPCRR Working Paper no. 1. International Labour Organization, Geneva.
- ENDA-ENERGIA, 2007. *Audit Genre dans les Politiques et Programmes énergétiques – le cas du Sénégal*. ENDA, Dakar.
- EPA, 2000. *Ghana's Initial National Communication under the United Nations Framework Convention on Climate Change*. Accra.
- Green Belt Movement, 2006. *Green Belt Movement/ World Bank Biocarbon project*. November 2006. at: www.greenbeltmovement.org/a.php?id=197
- ISDR, 2005. *Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters*. Extract from the report of the World Conference on Disaster Reduction. United Nations International Strategy for Disaster Reduction, Geneva.
- IPCC (Intergovernmental Panel on Climate Change), 2001. *Climate Change 2001, Scientific Basis. Summary for Policy Makers. Third Assessment Report*. IPCC, Geneva.
- IPCC (Intergovernmental Panel on Climate Change), 2007. *Summary for Policymakers. Climate Change 2007: Impacts, Adaptation and Vulnerability*. Contribution of Working Group II to the Fourth Assessment Report of the IPCC: 7-22
- Johnson-Latham, Gerd, 2007. *A study on Gender Equality as a Pre-requisite for Sustainable Development*. Environmental Advisory Council, Stockholm.
- Kasanga, K., 2002. Land Tenure, Resource Access and Decentralisation in Ghana. In: Toulman, C. et al., (eds). *The Dynamics of Resource Tenure in West Africa*. IIED, London.

- Kotey, N.A. and D. Tsikata, 1998. Gender Relations and Land in Ghana. In: K.Kuenyehia. *Women and Law in West Africa: Situational analysis of some key issues affecting women*. WALWA, Accra.
- Lambrou, Yianna and Grazia Piana, 2005. *Gender: the missing component in the response to climate change*. FAO, Rome.
- Malawi Government, 2001. *Sexual and Reproductive Health Behaviors in Malawi: a literature review to support the situational analysis for the National Behaviour Change Interventions Strategy on HIV/AIDS and Sexual and Reproductive Health*. National AIDS Commission and Ministry of Health and Population. Lilongwe, Malawi.
- Malou, R. Dacosta H. et al., 1998. *Etude de la vulnérabilité des Ressources en Eau, Mesures d'Adaptation et d'Atténuation*.
- Mensah-Kutin, Rose, 2003. Gender and Energy in Africa: Regional initiatives and challenges promoting gender and energy. In: Gail Karlson (ed). *Where Energy is Women's Business*. ENERGIA, Leusden.
- Mensah-Kutin, Rose, 2008. *Decentralisation and Women's Rights in Ghana: issues, gaps and options*. Paper presented during an IDRC Workshop on Decentralisation and Women's Rights in sub-Saharan Africa, 21-22 January, Dakar.
- Mensah-Kutin, Rose, 2008. *The Intersection of Gender, Climate Change and Human Security in Ghana*. ABANTU for Development, Accra.
- Mitchell, Tom, Thomas Tanner and Kattie Lussier (IDS, UK), Nov.2007. *We Know What We Need: South Asian Women Speak Out on Climate Change Adaptation*. ActionAid International, Johannesburg/London.
- Mizra, M.M.Q., 1992. *Natural Disaster and Environment in Bangladesh*. Centre for Environmental Studies and Research, Dhaka.
- Moore, Jennifer, 2004. Collective security with a human face: an international legal framework for coordinated action to alleviate violence and poverty. *Denver Journal of International Law and Policy*, 22 December 2004.
- Nasreen, M., 2000. Coping Mechanisms of Rural Women in Bangladesh During Floods: Gender Perspective. In: *Disaster: Issues and Gender Perspectives*. Conference Proceedings, University of Dhaka, June 23 & 24, 2000, Dhaka.
- Nasreen, Mahbuba, 2007. *Violence Against Women during Flood and Post-Flood Situations in Bangladesh*. Dhaka.
- Ndiaye, Gora, 2007. *Impact du Changement Climatique sur les Ressources en Eau du Sénégal*.
- NETRIGHT, 2006. *The Status of Women in Ghana Report*. (Unpublished report), Accra.
- Neumayer, Eric and Thomas Plümper, Jan.2007. *The Gendered Nature of Natural Disasters: the impact of catastrophic events on the gender gap in life expectancy, 1981-2002*. London School of Economics, University of Essex and Max Plank Institute for Economics, London.
- Niang-Diop, Isabelle, n.y., *Vulnérabilité des Zones côtières. Contribution à la Communication Nationale du Sénégal*.
- O'Brien, Karen, 2007. *Commentary to the Paper of Úrsula Oswald Spring, Climate Change: A Gender Perspective on Human and State Security Approaches to Global Security*. Paper presented at: International Women Leaders Global Security Summit, 15-17 November 2007, New York.
- Oswald Spring, Úrsula, 2007. *Climate Change: a gender perspective on human and state security approaches to global security*. Paper presented at the International Women Leaders Global Security Summit, 15-17 November 2007, New York.
- Oxfam, 2005. *Gender and the Tsunami*. Oxfam Briefing Note, March 2005. Oxfam, Oxford.
- Pan American Health Organization (Regional Office of the World Health Organization), 1998. *Gender and Natural Disasters*. Women, Health & Development Program. Fact Sheet. PAHO, Washington.

- Patt, Anthony, Angie Dazé and Pablo Suarez, 2007. *Gender and climate change vulnerability: what's the problem, what's the solution?* Paper presented at the International Women Leaders Global Security Summit, 15-17 November 2007, New York.
- Röhr, Ulrike, 2008. *Report on Gender and Climate Change: networking for gender equality in international climate change negotiations – UNFCCC COP-13/CMP3*. Gendercc-Women for Climate Justice, Berlin.
- Russell, Ben and Nigel Morris, 2006. Armed forces are put on standby to tackle threat of wars over water. *Independent*, 28 February 2006.
<http://news.independent.co.uk/environment/article348196.ece>
- Schrader, E. and P. Delaney, 2000. *Gender and Post-Disaster Reconstruction: The case of Hurricane Mitch in Honduras and Nicaragua*. World Bank Report. Washington.
- Sagna, Pascal and Marcel Roux, 2000. *Atlas du Sénégal*, édition Jeune Afrique.
- Stern, Sir Nicholas, et al. (2006) *Stern Review on the Economics of Climate Change*. Cambridge University Press, Cambridge.
- Skutsch, Margaret, 2004. *CDM and LULUCF: What's in it for women?* Note for the Gender and Climate Change Network, July 2004. at:
www.gencc.interconnection.org/skutsch2004.pdf
- UN (United Nations), 2007. UN Security Council/SC/9000, 17 April 2007.
www.un.org/News/briefings/docs/2007/070404_Parry.doc.htm
- UNDP (United Nations Development Program), 2005. *Human Development Report 2005: International Cooperation at a Crossroads: Aid, Trade and Security in an Unequal World*. Palgrave Macmillan, New York.
- UNDP, 2007. *Human Development Report 2007-2008: Fighting Climate Change: Human Solidarity in a Divided World*. Palgrave Macmillan, New York.
- UNDP-2, 2007. *Poverty Eradication, MDGs and Climate Change*. UNDP, Environment and Energy. At: www.undp.org/climatechange/adap01.htm
- UNECA, 2004. *African Gender Development Index*. UNECA, Addis Ababa.
- UNEP (United Nations Environment Programme), 2004. *Women and Environment*. UNEP, Nairobi
- UNEP, 2005. *Mainstreaming Gender in Environmental Assessment and Early Warning*. UNEP, Nairobi.
- UNFCCC, *Global Warning: Women Matter*. UNFCCC COP Women's Statement, December 2005.
- UNFCCC website – National Adaptation Programmes of Action (<http://unfccc.int>)
- UNIFEM, 2005. *UNIFEM Responds to the Tsunami Tragedy – One Year Later: a Report Card*. UNIFEM, New York.
- Ben Vogel (2007) “Climate change”; The Global Security Impact” 5 February 2007.
<http://www.e3g.org/index.php/programmes/climate-articles/climate-change-the-global-security-impact/>
- WEDO (Women's Environment and Development Organization), 2007. *Changing the Climate: Why Women's Perspectives Matter*. Fact sheet. WEDO, New York.
- Ben Wisner, Maureen Fordham et al., 15 April 2007. *Climate Change and Human Security*. Simultaneously uploaded to Radix (Radical Interpretations of Disaster): www.radixonline.org/cchs.html; disaster diplomacy: <http://www.disasterdiplomacy.org>; Peace Research and European Security Studies (AFES-PRESS): <http://www.afes-press.de/html/topical.html>