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Uncertain predictions, invisible impacts, and the need to mainstream gender in climate change adaptations¹

Valerie Nelson, Kate Meadows, Terry Cannon, John Morton, and Adrienne Martin

Vulnerability to environmental degradation and natural hazards is articulated along social, poverty, and gender lines. Just as gender is not sufficiently mainstreamed in many areas of development policy and practice, so the potential impacts of climate change on gender relations have not been studied, and remain invisible. In this article we outline climate change predictions, and explore the effects of long-term climate change on agriculture, ecological systems, and gender relations, since these could be significant. We identify predicted changes in natural hazard frequency and intensity as a result of climate change, and explore the gendered effects of natural hazards. We highlight the urgent need to integrate gender analyses into public policy-making, and in adaptation responses to climate change.

Although 'gender' has been recognised as an important factor within development policy since at least the 1970s, there is still a lack of practice to match the rhetoric. Thus, it is not surprising that the gender dimensions of climate change have largely been neglected. This is despite the fact that the effects of climate change are *very likely* to be gendered. It is possible to infer this because of the strong relationship between poverty and vulnerability to environmental change, and the stark fact that women as a group are poorer and less powerful than men.

In this article we will explore some of the reasons why the impacts of climate change on gender relations have not been fully articulated. We consider climate change predictions. Long-term climate change will have an impact on agriculture, and ecological and human systems, and is therefore likely

to have ramifications for gender relations. Over longer timescales, broader issues of international policy, regional context, and politics will also affect social change. Extreme weather events are also expected to increase in intensity. Some studies of the gendered impacts of natural hazards are available, providing clues to the possible outcomes of climate change. Given the uncertainty about how climate change will manifest itself in different regions, prediction and quantification of consequent social changes will be difficult. Attribution of causality is also difficult because over a similar timescale, major shifts in gender relations have occurred in some countries. We finish this paper with a discussion of gender-aware public policy-making on climate change responses, and a call for further context-specific research.

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Neglect of the impacts of climate change on gender relations

The impact of climate change on gender relations has been neglected, due to the 'gender-blindness' still afflicting much development policy-making, and the slow response by development agencies to the development challenge presented by climate change. This is partly due to the uncertainty of climate change prediction, especially at the regional level (although this is improving) (Dalfelt 1998), and the lack of mainstreaming of environmental issues into development thinking. Further, many climate change studies focus only on very broad-brush areas of environmental impact.

Environmental degradation can increase both women's workload and their vulnerability, as their access to already scarce resources decreases. Poor or missing gender analysis can mean that planners depend on women assuming a central role in coping strategies, without taking into account the increased burden that this imposes on women. Assumptions may be made that women are 'closer to nature' than men, and therefore that the responsibility for environmental protection is exclusively, or largely, that of women. Relief and development projects may also rely too heavily on women's unpaid labour, when it is assumed that women are *naturally* predisposed to serve their families or communities by protecting the environment on which they depend for livelihoods.

Climate change predictions

Temperature increases are already affecting biophysical systems (IPCC 2001, 3-4). Certain natural systems are particularly vulnerable (mangrove forests, small island states, coastal areas, and so on). Negative outcomes may include declining crop yields in many tropical and sub-tropical areas, decreasing water availability in arid

regions of the sub-tropics, and an increase in vector- and water-borne diseases, heat stress mortality, flooding, and wildfire incidence. The spread of disease, and reduced drinking water availability in some areas, could have gender-differentiated impacts where women have less access to medical care than men. Positive outcomes are also possible – in some regions currently lacking water (e.g. parts of South-East Asia), more water may become available (IPCC 2001).

Climate change consists of both 'short and medium term climate variability together with long-term gradual climate change (changes in annual average temperature)' (Dalfelt 1998, 2). The increasing frequency of extreme weather worldwide (especially droughts and floods) seems to be correlated with the El Niño Southern Oscillation (ENSO), although further research is required to substantiate this connection.

Gender impacts of climate change on agriculture and ecological systems

Long-term gradual climate change will affect agricultural and ecological systems. It may be difficult to disentangle the effects of increasing natural hazards, local environmental degradation, and long-term climate change. Nonetheless, it is clear that there will be a complex patchwork of alterations, difficult to predict accurately, which will challenge people's ability to cope, and governments' capacity to adapt. Crop and livestock responses will vary according to species, cultivar, pests, and so on. A whole range of adaptations in cultivation and husbandry are possible (IPCC 2001). Natural hazards are likely to have a more visible impact on people than the slower onset of changes in temperature and rainfall regimes, although the latter may be more significant in the long run for those dependent on farming.

Women in developing countries, who are often primary natural resource users and managers (for example, collecting firewood, forest products, and water), are often disproportionately affected by environmental degradation. Households dependent on women's labour in subsistence or cash cropping or on plantations are also badly affected by storms and droughts.

Some less-productive tropical climates will become unsuitable for agriculture as a result of climate change (Mendelsohn and Dinar 1999). Agricultural GNP (gross national product) may not be significantly damaged overall (because there are areas of productive temperate farmland in many developing countries, even in equatorial zones), but small-scale farmers may lack the capital and resources necessary to adapt to climate change, especially in comparison with larger enterprises (Mendelsohn and Dinar 1999). Such potential scenarios, and responses to them, need to be analysed with a 'gender lens' to try to identify the possible negative and positive outcomes in gender-differentiated terms.

Drought and gender

Drought can be considered to be a slow-onset disaster. The frequency and intensity of drought in great swathes of dryland Africa and West, Central, and South Asia, has increased over recent times and is predicted to increase further with climate change. In Iran, Afghanistan, and parts of Pakistan and India, there has been severe drought for four successive years. In Morocco, ten of the 16 years from 1984-2000 were considered drought years (MADREF/World Bank 2000). Northern Kenya experienced periods of severe drought in 1983-4, 1991-2, 1996-7 (Hendy 2001), and 1999-2001.

Beyond the increasing incidence of drought, dryland populations are increasingly vulnerable to drought resulting from socio-economic trends and local environmental pressures. There are circular

relationships between drought and desertification (Dregne 2000), and while the relationships between drought and human vulnerability are complex, there is evidence that the impacts of drought are gendered.

These impacts will be locally specific, but in different parts of the world, and for different socio-economic strata, they could include the following:

- male out-migration, generating increased work for women on farms – though the effects of this on women's autonomy can be complex, and female out-migration also occurs;
- cropping changes, with effects on gender division of labour and possibly income;
- livestock production changes (large-stock to small-stock, open-grazing to pen-feeding), with effects on gender division of labour and possibly income;
- increased difficulty in accessing resources (in particular fuelwood and water), hence increased workload for women;
- increased conflict over natural resources, exacerbated in some places (e.g. East Africa) by the ready availability of firearms;
- health impacts: direct impacts on women's health, and increased work for women as carers.

Besides the direct effects of drought and desertification, government and donor action in drought situations is now often massive in scale. Despite attempts to design cost-effective mitigation measures to support peoples' livelihoods at key points in the drought cycle (for pastoral livelihoods, see Morton 2001a), the backbone of international drought management is formed by direct food aid and labour-intensive public works projects. In recent years, drought has rarely become international news, and hence the vast scale of drought relief operations is not always appreciated. It would be surprising if such

massive interventions were not themselves having long-term, gendered effects on livelihoods, mediated by social, cultural, and institutional factors.

In Morocco, the Government allocated (from its own resources) over US\$400 million for labour-intensive public works to mitigate the effects of drought, in the 15 months from April 2000-June 2001 (a not exceptional level in recent times) (Morton 2001b). The work opportunities created in drought-stricken areas in Morocco (e.g. manual labour on roads) are regarded as being almost exclusively for males. Project planners are relatively unconcerned that households without able-bodied males may not benefit directly from these opportunities, because they point to the extended kinship ties that already offer support to widows and to households that are effectively female-headed as a result of labour migration. The combination of massive expenditure, and the association of manual labour with men only could, however, lead to the reinforcement of existing gender inequalities.

Food relief in drought situations can fuse with more direct effects of drought and environmental degradation to create a process of sedentarisation of pastoralists, with complex effects on gender relations. In some areas of northern Kenya, food-for-work has become an important part of livelihoods, and has led to the settlement of previously nomadic pastoralists around missions or administrative centres (Baxter 1993). This has acted as a trigger for longer-term settlement processes. Differences are emerging amongst settled, semi-settled, and nomadic pastoralist women. While women in more mobile pastoralist groups consider themselves 'economically' better off, as mobility increases their access to pasture and fuelwood, they are in their own words 'treated as children', with little input into pastoral movement decisions or in donor initiatives. Semi-settled women also have low input into major household decisions, while reduced mobility increases

the difficulties of water and firewood collection. Settled women suffer the greatest resource pressures, but they enjoy the greatest autonomy. While they have started to earn an income from market sales of firewood, they have to walk further for it; although they have considerable control over small-stock, movement to pasture is difficult. Some also sit on the Environmental Management Committee. 'These townswomen were somewhat disdainful of those on the periphery, and [said they had realised that] "two heads are better than one" in household decision-making. They considered this difference to be a product of "ignorance" among the non-settled.' (Meadows 1999)

Natural hazards and gendered impacts

How will the likely increased frequency and intensity of natural hazards (one of the outcomes predicted for climate change) affect poor people, and specifically women?

Men's and women's differing experiences of natural hazards are not well-researched, particularly in developing countries. However, it is well known that women experience high levels of *pre-disaster* poverty, often experiencing unequal status in the workforce, being more likely to be employed in the informal sector, and having 'less equitable access to land and other natural resources compared to men' (Enarson 2000). The impact of a natural hazard depends upon the social context within which it occurs. This socially-constructed vulnerability extends to the contextual gender and power relations (Blaikie *et al.* 1994; Enarson 2000). Those living in areas most at risk are often those with least social and economic power, and who are least able to cope with, and recover from, disasters. Women are often key to household survival when disasters strike, although their responsibilities in the

domestic sphere make them economically vulnerable before such an event occurs. Groups of women likely to be particularly vulnerable to natural hazards include refugees, those on low incomes, homeless, elderly, and disabled women, recent migrants, and so on.

Women's work can be affected in a variety of ways by natural hazards. Productive assets may be lost, pushing women into low-wage labour. More women than men work in the informal sector and in small enterprises. These sectors are often worst-hit, and least able to recover as a result of disasters. Natural hazards cause women to lose jobs and work-time disproportionately, and conditions of work often deteriorate. On the other hand, some women – middle class women in particular – can benefit in terms of changed access to employment opportunities (Enarson 2000).

In some places and situations, women are more at risk because of culturally-specific pre-disaster gender norms. Female mortality was much higher than male mortality in the 1991 cyclone floods in Bangladesh. Of the flood-affected population in the 20-44 age group, 71 females per thousand died compared with 15 males per thousand (cited in Baden *et al.* 1994, 49). Most were drowned. Cultural norms relating to the preservation of female honour through seclusion mean that women may delay leaving the home to seek refuge, until it is too late. Norms relating to what may be considered appropriate activities for women and men mean that women are also less able to learn to swim. An increase in flood frequency and intensity might thus increase female mortality.

Gender norms also affect the behaviour of men during disasters. Ideas about masculinity may encourage risky 'heroic' action in a disaster, and may also mean that men are less likely to seek counselling afterwards (Enarson 2000). More men died than women in Hurricane Mitch, for example,

showing that relationships between natural hazards and gender do vary (Delaney and Shrader 2000).

Mortality and morbidity are only part of the range of impacts of hazards. Gender relations are unlikely to improve spontaneously as a result of increased hazard risks. There are gender dimensions to what happens in the aftermath of a hazard strike in the relief, coping, and recovery phases, where there is strong evidence of considerable inequality between men and women.

Gender and the aftermath of hurricane impacts: the example of Hurricane Mitch

Gender differences and inequalities are most pronounced in the *aftermath* of a hurricane, and these differences may persist for months and years. These include many aspects, ranging from the increased workload of women, to their greater exposure to violence as a result of raised aggression levels in men. The 1998 Hurricane Mitch directly affected more than two million people in Honduras and Nicaragua alone. Damage estimates were placed at nearly US\$5 billion. Those most affected were the most marginalised (small producers, street children, and female-headed households) (Delaney and Shrader 2000, 5). Women endured a disproportionate amount of the burden immediately following the storm and in later rehabilitation, because of their triple roles in maintaining the household, engaging in community organising, and productive work in the informal economy. Women had the main responsibility of caring for children and the elderly. Men generally tried to return to their pre-disaster role of earning wages outside the home, whilst women found it difficult to return to waged work. This, combined with the fact that more men than women had died, led to large increases in female-headed households (rising to 40 per cent of total households in Nicaragua and half in Honduras) (*ibid.*).

Household food hierarchies exist (placing females below males), and disasters can reduce the overall amount of food available, exacerbating the unequal position of women. Women are likely to have poorer nutritional status and resistance to disease, and so are likely to be more at risk than men (Blaikie *et al.* 1994). Combined with their poorer access to medical care, the health of women is disproportionately affected. During rehabilitation, whilst women maintained the household and social networks, men were involved in dangerous reconstruction efforts; some men were also taking part in increased gambling, increased consumption of alcohol, and some were displaying greater aggression (*op. cit.*).

The social disruption and altered inter-group relations that can occur as a result of a disaster may enable women to challenge or override existing gender norms. This may affect traditional divisions of labour, or enable the organising of new forms of social capital and disaster preparedness (PAHO 2001, 2). Gender norms are challenged when women take on tasks traditionally ascribed to men, gaining new skills and changing prevalent views as to women's capabilities. This occurred after Hurricane Mitch when women were observed building shelters and wells (PAHO 2001, 2).

Towards gender-sensitive climate change policy responses

Responses to the impact of climate change on agriculture will need to be gender-aware, otherwise government policies and development programmes aimed at supporting adaptation by farmers could further exacerbate gender inequalities. Public policies need to be more responsive to the livelihood decisions faced by local people, and the potential impacts of these on power and gender relations.

Many factors will influence social change, including global and regional political economy. The impact of economic and agricultural policies need to be taken into account in terms of how they affect the future resilience of poor peoples' livelihoods to climate change. In the past, agricultural policies in developing countries have promoted cash- and mono-cropping, and an export orientation. However, it is possible that such agricultural systems are less resilient to climate change than more diverse agro-ecological systems. The latter include a wide band of species, enabling farmers to spread the risks of disease and crop failure under climatic stress. In Kenya, for example, colonial and post-colonial agricultural policies had exactly this kind of export-, cash-, and mono-cropping orientation, which undermined the intercropping of diverse bean species (e.g. *Lablab niger* and *Dolichos lablab*) by women, and reduced seed stock diversity (World Bank 2000). Women's key role in maintaining biodiversity, through conserving and domesticating wild edible plant seed, and in food crop breeding, is not sufficiently recognised in agricultural and economic policy-making; nor is the importance of biodiversity to sustainable rural livelihoods in the face of predicted climate changes.

Social change, climate change adaptation, and gender

Further research is required to explore how climate changes will manifest themselves in different regions and on different time-scales, and how social and natural systems will co-evolve. There are no 'given or *a priori*' sets of driving forces (such as technologies, markets, policy imperatives, or cultural values) that generate particular social arrangements or patterns of change, only complex sets of connectivities between material, cognitive, social, and non-human elements' (Long 1997, 109). This is why

predictions in patterns of social change and future social arrangements resulting from (uncertain scenarios of) climate change are so difficult to identify. Feminist and environmental anthropology, and the already extensive body of knowledge on rural gender relations, will provide some insights as to potential social changes in rural areas and in agriculture. Studies on the global forces at work in shaping agricultural production, rural societies, and food production are also relevant. Further work is required to analyse climate change predictions as they improve, and to consider the potential impacts of climate change on humans. Rural livelihoods and gender and power relations are embedded in social, institutional, and cultural contexts. Context-sensitive studies focusing on on-going struggles over livelihoods, status, and resources are therefore needed. These should consider the types of changes that may be in store as a result of climate change.

Poverty and environment linkages do not inevitably entail a downward spiral.

There is a great deal of variability in the ways in which local people relate to and manage their environments. Local people may respond to environmental degradation by developing technical and institutional innovations in natural resource management to reduce risks or reverse processes of degradation (Leach and Mearns 1996). Some changes are not, however, easy to detect without modern technology (e.g. the spread of disease-carrying organisms). It is important to avoid assumptions about how people will adapt to environmental change, including climate change, and the consequences of this for gender relations.

Public policies formed on the basis of the urgent need to adapt to climate change will only form a part of the actual response on the ground, since many are not enforced. Mechanisms are needed to ensure public participation in adaptive planning for climate change. Direct representation of poor people, particularly women, in

developing adaptation responses is critical if such responses are to be responsive to their interests. Whilst specific actors can make decisions, act, and innovate, different visions of the future and certain courses of action are legitimised by others (Long 1997). This is true of public policy-making and has to be borne in mind in terms of the kinds of adaptations that will be legitimised in relation to climate change, and how these might in turn affect equity in gender relations. For example, public policies could rely upon coping strategies that are dependent upon women's unpaid labour if gender-awareness is lacking.

Deliberative democracy approaches, (participatory processes and mechanisms, such as citizen juries, which enable citizens to reflect upon and research issues of importance to them) have been used to encourage public debate about the consequences of complex scientific developments and political processes (e.g. genetically-modified organisms), and might be an option for increasing civil society awareness of, and engagement with, climate change.

Donors have been slow to face up to the potential significance of climate change, but this is starting to change. The World Bank, United Nations Development Programme (UNDP), Department for International Development (DFID), and the European Union (EU) have recently commissioned work on how climate change could affect the achievement of the Millennium Development Goals.² Since several of these goals relate to gender issues, it is hoped that the study will address gender issues. Technical research includes developing new crop varieties tolerant of salt, water, and heat stress, which could reduce women's workload (e.g. new West African rice varieties that smother weeds) (DFID 2002). Research analysing Kyoto-related projects has found that sustainable forestry, land use, and livelihood criteria need to be integrated into international carbon offset policies (DFID 2002). Gender mainstreaming should be added to that list.

'No-regrets' measures (providing benefits now and possibly in the future) are required. Measures are needed that promote increased resilience of poor peoples' livelihoods and that tackle gender inequality *now*, whilst increasing climate change 'preparedness' for the *future*. A great deal of work is on-going in areas such as sustainable agriculture, agro-ecology, advocacy for farmers' rights, and disaster planning, but more support for such work is required, and particularly for gender awareness to be integrated. Such measures should challenge stereotypes about gender roles, women's unpaid time, and their centrality in coping strategies, and take account of the varied and changing relationships between people, poverty, and their environments. Government and civil society capacity-building in poorer countries and vulnerable regions is urgently needed. Combined with context-specific vulnerability studies, this will assist in the identification of appropriate policy options, regional collaborations, and adaptation mechanisms. Importantly, such studies could also contribute to making visible the potential gender impacts of climate change – otherwise gender inequalities will be exacerbated.

Conclusions

The impacts of climate change on gender relations have not been widely studied to date – they therefore remain invisible. Despite the difficulties of prediction, it is clear that the impacts of climate change will be gendered, and that these require further research. Pre-existing vulnerability to natural hazards and long-term climate change means that those most at risk of, and least able to cope with, slow- or rapid-onset disasters and environmental change, are the poorest, including poor women. There are also possibilities for positive changes to occur, as we have seen in the aftermath of disasters, when women take on new roles, challenging gender stereotypes.

Public policies need to ensure that gender analysis is fully integrated to avoid exacerbating gender inequalities and to promote gender equity.

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Notes

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- 2 Correspondence with DFID adviser A. Herbert (2002).

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