Engendering adaptation to climate variability in Gujarat, India

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Most policy makers and practitioners have now started to recognise the different ways in which climate change impacts on poor, vulnerable, and socially excluded women and men. However, making adaptation policies and programmes sensitive to gender issues does not simply mean 'adding on' a concern for women. It also requires a nuanced understanding of gendered forms of vulnerability, and a stronger commitment of resources – financial, technical, and human – to address specific gendered priorities. Drawing on insights from coastal Gujarat, in India, this article illustrates how researchers and practitioners can collaborate to strengthen learning across communities and regions. Simple and practical tools for assessing vulnerability, as well as empirical research and documentation, can further and support advocacy on climate-resilient development policies.

Key words: gender; climate change; adaptation; vulnerability; Gujarat/India

Introduction

The recently announced National Action Plan on Climate Change (NAPCC) in India recognises that climate change has different effects on women and men, due to gender relations and roles, and it affects relations between them too. To quote the Action Plan: 'With climate change there would be increasing scarcity of water, reductions in yields of biomass, and increased risks to human health with children, women and the elderly in a household becoming the most vulnerable. With the possibility of decline in the availability of food grains, the threat of malnutrition may also increase. All these would add to deprivations that women already encounter and so in each of the Adaptation programmes special attention should be paid to the aspects of gender' (Government of India 2008, 12).

For the first time in India, a high-level policy document has acknowledged the significance of gendered impacts of climate change, and the need to address gender concerns in adaptation interventions. Unfortunately, this understanding has not been translated into the NAPCC's assessment of the effects of climate change or its outlines of mechanisms that could support people to adapt. Partly, this has to do with the lack

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of gender/sex-disaggregated data on climate risks, and the relatively poor documentation of adaptation programmes, or the lessons they can provide, in terms of building resilient communities. More to the point, however, is the fact that disaster risk-reduction in India, and indeed in much of the developing world, has focused on relief and rehabilitation, rather than long-term climate-resilient development. Intense climate events, such as drought, floods, cyclones, and storms have largely been seen as *natural* disasters, to which humanitarian response is often the only answer; technological solutions (for example, embankments in flood-prone areas), or administrative machineries (despite attempts at decentralisation), have failed to respond adequately.

Where adaptation activities do exist, they are *ad-hoc* and unco-ordinated at different scales and levels, neglecting the need simultaneously to create conditions that enable and support adaptive strategies, based on a clear analysis of differential vulnerability. In India – and across South Asia – gender identity intersects with other social stratifiers, including class, and discrimination based on caste or religion. These shape people's experience of poverty, which denies millions of people – women and men – their basic human and livelihood rights. Not only are poor, rural women and men faced with an agrarian landscape which is being challenged by environmental hazards, but the economic opportunities created by structural reforms have not trickled down. Meanwhile, the social fabric underlying collective mobilisation by civil society continues to be deeply embedded in the politics of identity. Thus, climate and disaster risks often overlay conflicts between different identity groups – making it even more difficult for vulnerable women and men to voice their concerns, or to participate in participatory processes of planning for change.

It is in this context of climate variability, contestation, and institutional complexity that collaborative partnerships between researchers, development practitioners, and policy advocates become so critical in terms of both laying a framework for adaptation and equally, trying to engender it. ISET (the Institute of Social and Environmental Transition) is an organisation which represents a unique attempt at crossing interdisciplinary and geographical boundaries, and building knowledge located in both theory and practice, while being committed to solidarity with poor and vulnerable people. Drawing on insights from coastal Gujarat, this article looks at how ISET members and partners have worked together to (i) identify differential vulnerabilities, and (ii) facilitate initiatives to strengthen the adaptive capacity of poor women and men, such as participatory livelihood diversification and decentralised disaster governance.[1] We begin with a brief introduction to ISET, outline our conceptual understanding of adaptation and vulnerability, and then move on to examine our learning from ongoing adaptation pilots.

ISET: collaborative partnerships which respond to change

Built over the past decade, ISET is an innovative collaboration between organisations, which involves researchers and development practitioners. It seeks to evolve a framework for shared learning through dialogue. Empirical research by ISET is used to inform policy debates critically, and to respond to basic societal needs, through supporting sustainable, gender-just policy interventions.[2] ISET has members, individuals and organisations (NGOs, research institutes) and partners in South Asia (India, Pakistan, Nepal), North America, Europe, and, more recently, South-East Asia. They work as a community of practice, linked virtually, rather than physically. From its earlier work on the politics of water management in South Asia, ISET has been trying to build an approach towards both understanding adaptation and facilitating small adaptation pilots based on participatory, iterative methodologies for assessing vulnerability and the benefits and costs of disaster risk-reduction measures.[3] Both authors are senior associates of ISET, and have been working to support gender and vulnerability analysis in ISET research and practice. This support is both conceptual and methodological.

Understanding adaptation

Our understanding of adaptation moves beyond conventional notions of 'coping'. Rather, we view adaptation as 'the capacity of social actors to *shift* livelihood strategies under stress, and to develop supporting systems that are resilient and *flexible* to absorb and respond to the impacts of [climate] change' (ISET forthcoming 2008, 6).[4]

Adaptation can be defined as either autonomous or planned, although in practice, both strategies are often interconnected:

- *Autonomous* adaptation depends on underlying systems that enable people and organisations to take advantage of opportunities available in the new environment, or constrain their ability to shift livelihood strategies as conditions evolve.
- *Planned* adaptation depends on the ability to:
  - proactively identify, and respond to, emerging constraints and opportunities;
  - enable autonomous adaptation processes by supporting the development of flexible, resilient, and accessible social and physical infrastructure systems; and
  - establish social protection systems capable of ameliorating the impact of climate change on vulnerable groups.

ISET has undertaken extensive action research in South Asia, which has led us to identify a variety of systems that enable poor women and men to adapt – in both planned and autonomous ways. These include communication, public infrastructure, transport (mobility), and finance (Moench and Dixit 2004, 2007). Underlying these systems are social and power relations that facilitate *access* for different socio-economic groups, men and women, including rights and entitlements to productive resources or

assets (land, water, labour, credit), social networks, capacity-building, and the transfer of new knowledge to support livelihood diversification. Governance considerations, such as accountability, transparency, and the informed participation of vulnerable women and men in community decision-making on disaster management, are equally important to ensure that those directly affected can negotiate access to discussions and decisions, and ultimately build their capacity to adapt.

Understanding vulnerability

Central to adaptation is vulnerability, which is not the same as poverty, and is often more difficult for policy makers to understand (Ahmed and Mustafa 2007). We follow the Hyogo Framework 2005–2015,[5] in defining vulnerability as a 'set of conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards,' (adopted by the UN at the World Conference on Disasters in 2005). This emphasises the need to look at vulnerability not simply as a result of, or response to, environmental extremes (Cutter 1996; Vincent 2004). Rather, vulnerability is rooted in the construction of *everyday* social space or social existence; that is, vulnerability needs to be seen as context (for example, unequal access to opportunities) rather than outcome (Bohle *et al.* 1994).

Analysing vulnerability requires us to recognise how different factors – physical, social, and attitudinal – are interconnected. These factors combine to affect the degree to which hazards affect individuals or communities, and also define their ability to adapt. Across South Asia – and particularly in India, given its huge population, more than 80 per cent of whom live on less than $2 per day (UNDP 2007) – women, children, and elderly people carry disproportionate 'vulnerability bundles', and these place them in the category of highest risk (Ariyabandu and Wickramasinghe 2003; Wisner *et al.* 2004). In our own research, this is borne out in women's discussions of their vulnerability to food insecurity. Poor women in flood-prone villages in eastern Uttar Pradesh described the difficulty in accessing food after floods as living with 'half-full stomachs' (focus-group discussion, Gorakhpur, November 2006). Women in semi-arid villages in Kutch, Gujarat changed this metaphor slightly, to state that 'drought lives in our stomachs' (focus-group discussion, Bhuj, October 2007).

Measuring vulnerability

If we understand vulnerability to be a relative term with multiple dimensions, can we really measure who is vulnerable – and vulnerable to what? Vulnerability analysis tends to be based on the experience of past hazards/disaster events and can only be, at best, predictive (looking at an individual or community's *likely* susceptibility). However, if vulnerability is viewed as a dynamic process, this takes into account the *risk* of exposure and susceptibility. Equally, this enables us to assess the strength of different responses, and/or the potential for building people's capacity to adapt. Then,

we may have a better indication of *who* is vulnerable, *when*, and *how*. We can also look at opportunities for addressing vulnerability, and enhancing adaptive capacity.

Given the complexities of what makes people vulnerable, some factors are easy to identify and measure (such as the location of physical settlements, buildings at risk, or environmental degradation). Others are less visible, and sometimes more difficult to assess, such as resource tenure, or changes in attitudes. Ideally, research into vulnerability should include both a qualitative understanding of the context, and a quantitative assessment, based on well-defined indicators of change.

Phase 1 of ISET's approach to vulnerability assessment in coastal Gujarat (2006–2007) began with participatory assessments of vulnerability, drawing on various frameworks for assessing the three dimensions of vulnerability – physical, social, and attitudinal (Anderson and Woodrow, 1989; ActionAid 2005). Information/data was collected through participatory exercises, often with women and men separately, such as historical time-lines of disasters or seasonality calendars to identify monthly variations in food, water, and livelihood security.

Over the past year, in a parallel ISET project on disaster risk-assessment, we have developed – and are testing – the Vulnerability Capacity Index (VCI), a simple quantitative vulnerability index based on 11 'drivers of vulnerability', with some modification between household and community levels, and rural/urban communities (Mustafa and Ahmed 2008). Scores are attached to the different indicators, and the three dimensions of vulnerability are then weighed to come up with a composite score. The index is not comprehensive; it is, rather, indicative – and the main drivers of vulnerability are consistent with similar quantification exercises by others (e.g. Bosher *et al.* 2007).

Limitations of space make it difficult to discuss the VCI and methodological challenges in more detail, but Table 1 illustrates the parameters and indicators with which we are working.

Vulnerability assessments have been supported by shared learning dialogues at different levels – community, district, and state. Shared learning dialogues are essentially well- facilitated dialogues between government functionaries, disaster-prone communities, NGOs, and representatives from financial and market-based institutions to understand different perspectives on climate change (Moench and Dixit 2007). They have often led to consensus around possible and innovative adaptation measures, and provided opportunities for networking and collaboration between different social actors.

In the next section, we look at how vulnerability and shared learning dialogues have helped in the identification of gendered strategies for strengthening adaptive capacity and building resilient communities, by ISET's NGO partner, Utthan, in drought- and flood-prone villages in coastal south Gujarat.

Table 1: Indicators of vulnerability at the rural household level (illustrative)

Material Vulnerability Weightage: 35%	Institutional Vulnerability Weightage: 50%	Attitudinal Vulnerability Weightage: 15%
• Income source – local/non-local, land or non-land based • Educational attainment, particularly for women • Assets – fungibles • Exposure to risk – distance from river, coast, landslide zone	• Social networks • Extra-local kinship ties – response at times of adversity • Infrastructure – access to roads, water, sanitation, electricity, health services, communication • Proportion of dependents in household • Reliability of early warning systems • Belonging to the disadvantaged – caste, religious or ethnic minority	• Sense of empowerment, derived from: • Access to leadership at different levels – community, regional, national • Knowledge about potential hazards
Source: Drawn from Mustafa and Ahmed 2008.		

Exploring the physical aspects of vulnerability: a case from coastal Gujarat

Gujarat has the longest coastline (1,600km) among all the Indian states. It is a coast which is rich in biodiversity, but also very prone to many hazards, including extreme cyclones, and salinity intrusion, or ingress (the gradual seeping of salt into the soil and into freshwater aquifers), flooding, and drought. Salinity ingress, though not directly attributable to climate change, affects nearly 30 per cent of the land area of the state (GHDR 2004: 92) and in turn, has an impact on agricultural productivity and the quality of drinking water available. While data on climate variability is mixed, cyclones are likely to increase in strength and intensity, though perhaps not in frequency. This may lead to more wind damage to crops, buildings, and other infrastructure. There have also been some changes in rainfall patterns. Over the last two years, the monsoon season has been characterised by short periods of intensive rainfall, often leading to floods, followed by increasing gaps in the number of rainy days. These changes, in turn, are causing more surface runoff (overland flow of excess water that can not be absorbed by the ground), soil erosion, and sedimentation of tanks. This makes it more difficult to store water in small dams which fill with sediments or do not adequately capture water, and increases the probability of flash floods. On the other hand, increase in summer temperatures and short heat-wave conditions, as well as shorter winter months and an increase in average winter temperatures, could have a positive impact on the amount of plants providing ground cover, and the amount of organic matter breaking down into the soil. This is important

to reduce erosion, buffer the effect of storms, and assist groundwater to recharge or replenish itself. The effects of climate change in coastal Gujarat are aggravated by growing populations, urbanisation, and the recent political demarcation by the state of large coastal areas as Special Economic Zones for industrial development, posing a challenge to livelihood security and natural resource-management interventions.

Utthan and its work

Utthan, which means 'upliftment' in Hindi, was formed in 1987 to facilitate participatory, community-led, and gender-sensitive development in drought- and conflict-prone villages in Gujarat. Under an ISET project, funded by the International Development Research Centre (IDRC),[6] Utthan has initiated adaptation pilot projects in three villages in the coastal district of Bhavnagar: Sartanpar, Tarasara, and Katpar. All three villages are affected by periodic drought, salinity ingress, cyclones, and water-logging, during the monsoons, when there are floods caused by intensive rainfall, coupled with storm surges or high tides. Little protection is afforded by the village embankments. The pilot projects are based on Utthan's participatory assessment of vulnerability and collective identification with village members and other stakeholders through shared learning dialogues, of strategies to strengthen adaptation. The VCI is actually being used by Utthan now as a monitoring tool; earlier assessments of vulnerability and coping were largely through participatory appraisals – time-lines of disasters, seasonal calendars on food and income security, and so on.

Utthan has also set up a People's Learning Centre for Livelihood Security and Disaster Mitigation in Coastal Communities (PLC-Coastal). The intention is to make this a space for integrating diverse voices, concerns, and experiences within coastal communities susceptible to drought, salinity, and cyclones.[7] PLC-Coastal also addresses patterns of social discrimination, with a focus on integrating rights and experiences of the most vulnerable women and men. Utthan and PLC-Coastal were key partners in the implementation of this project.

Social dimensions of vulnerability in project villages

The participatory vulnerability assessments also yielded important information about the social dimensions of vulnerability. Gujarat has a relatively better history of collective mobilisation compared with other states in India, and this is visible in the effective functioning of a variety of local institutions, including temple groups, self-help groups (SHGs), *panchayats* (elected local village councils), disaster committees, and a range of community natural resource-management institutions, facilitated by NGOs. Both Sartanpar and Katpar have active *sarpanches* (elected *panchayat* leaders), and strong women's participation in local community institutions. They have been able to negotiate with district-level government departments for basic primary health facilities, a secondary school particularly for girls, and better roads. In Tarasara, in

contrast, there is a distinct lack of community organisations, and the village is clearly divided by factional politics.

Caste intersects with gender in all three villages to determine who is vulnerable, where they live, and their access to resources, including communication and information systems. In Sartanpar, for example, poor tribal groups reside in low-lying, flood-prone areas on the outskirts of the village, making it difficult for them to access relief, or get information on impending disasters. The village temple provides the only safe sanctuary for people during floods and cyclones, but space is limited, and it is possible, though difficult to prove, that lower-caste groups are denied access because of social practices – ritual pollution – that discriminate against them.[8]

Most of the households are dependent on farm labour – which is seasonal, and also insecure – or high-risk activities, such as fishing and salt-farming, which are affected by dangerous storms or annual flooding. Those who have managed to diversify their livelihoods, or migrate, are households which have relatively good recourse to social networks, skills, and capacities (for example, some education).

Fall-back mechanisms in the event of climate-change-related disasters include social networks, extended family support, and dependence on moneylenders after a disaster event, but the degree to which people can rely on these varies from household to household and the extent or magnitude of the calamity.

The participatory research showed women in all three villages to be more vulnerable than men from the point of view of gender identity, but the experience of gender inequality is mediated by other aspects of social identity. Hence, the vulnerability of individual women varies, according to their socio-economic group and access to entitlements. For example, women from small and marginal landholding families, where male migration is high, often do not have clear legal title over land, either in their name, or jointly with their husbands, despite land reforms and changes in the property law. This makes it difficult for women to access various resources which could help with adaptation; for example, water for irrigation, or credit and extension services, which are often tied to land ownership where land serves as collateral, and recognition as a 'farmer' or 'head of the household'.[9] In addition, water-supply systems are unreliable, insufficient, or brackish, and not accessible when the villages are waterlogged, thus increasing women's workload as they have to walk further to find and fetch potable water.

Gender inequality also affects women's access to information and communications which could ensure their safety, and the safety of their dependants. In the event of an emergency such as a flood, access to early-warning information is 'gendered'. This information often comes through communication media such as television, radio or, in some pilot activities, mobile phones, which are more frequently used by men than by women. According to the vulnerability assessments in the villages, most women cannot swim, whereas at least 40 per cent of the men can. In many rural communities in Gujarat (and elsewhere in India), girls and women are not encouraged to learn how to swim,

largely for reasons of cultural appropriateness or modesty. Those women who can swim, or at least keep themselves afloat, are from the traditional fishing communities, who literally walk into the water, using their hands or simple nets to fish.

Facilitating adaptation: gender, livelihoods, and governance

As stated above, based on the information gained in the participatory research, Utthan, together with PLC-Coastal, is facilitating adaptation pilots in three villages. These pilot activities address the systemic factors we outlined in our earlier definition of adaptation: namely, access to resources and knowledge to support livelihood diversification, adaptive infrastructure, and capacity-building of poor women and men, to ensure that they are able to participate in decision-making processes.

1. Livelihood diversification

   Given increasing salinity and declining agricultural productivity, the shared learning dialogues facilitated by Utthan and ISET clearly indicated the need for poor women and men in these villages to look for alternative livelihoods.

   The coastal belt of Gujarat is suitable for spiny or rock lobsters which are commonly found along rocky shores. With the support of the non-profit company, the Coastal Salinity Prevention Cell,[10] pilot demonstration projects on lobster fattening were implemented by Utthan at two selected sites. This involved women and men from two self-help groups (within which 70 per cent of the members come from households below the poverty line). Prior to Utthan's intervention, the majority of lobsters caught in this area used to fetch a lower price in the market as they weighed only around 100 grams. After one project cycle of six months, the fattened lobsters (weighing 150 grams) could command a better price in the market.

   This programme so far has directly benefited 48 families, and has generated employment for 120 people-days per household in a year. Loans of about $130 were provided to each participating family for a one-time investment in the cages, or pits, in which lobsters are reared. The recurring cost associated with feeding the lobsters is primarily for the fish, which women and men catch locally. While lobster-rearing is done by both women and men, marketing is almost entirely women's responsibility – mostly in local markets and nearby villages. However, over time they have been able to negotiate better prices from buyers as a collective. The buyers are now coming directly to the sites to buy from them, saving them the trouble and cost of travel; public transport is limited, and private options are costly.

   Following this pilot demonstration, the National Centre for Sustainable Aquaculture and the Marine Products Export Development Authority have both shown interest in copying and scaling up this activity in other coastal villages. The first

round of loans to the self-help groups has been repaid, and a federation of self-help groups involved in fishing is in the process of being registered. Training on the technical, marketing, and management aspects of lobster-rearing is being planned for fisher-folk from the three adaptation pilot villages, and another ten villages.

In Katpar village, many small and marginal farmers, and some fisher families, are involved in rope-making from mill cotton waste, as a source of supplementary income. Recently, an exposure visit was organised for a group of 11 men and four women from Tarasara. The Katpar families are ready to help them initiate this activity, and have suggested that the Tarasara group take the raw material and market it through Katpar's existing contacts initially, prior to making their own contacts. Efforts are also being made to engage women's self-help groups in rope-making by linking them up with Area Level Federations of self-help groups,[11] so that they can give them training on rope-making, and help facilitate access to raw materials and to markets.

2. Adaptive infrastructure for water and sanitation

Access to appropriate sanitation facilities and potable drinking water are two priorities consistently raised by women in flood-prone areas, as women are largely responsible for domestic water collection, and need safe and secure spaces to meet their sanitary and hygiene needs with dignity. Under the state sector reforms programme, Utthan is supporting *pani samitis* (village water committees) to work in partnership with the government Water and Sanitation Management Organisation (WASMO). Together, they are developing infrastructure and management mechanisms to ensure access to safe drinking water for all. Women are actively involved in these committees, but their roles and responsibilities on the committees need to be explored and critiqued from a gender perspective.

Pilot community-sanitation units have also been implemented: one each in two villages (Katpar and Sartanpar), with each elevated unit having two latrines. These are cement structures, designed for coastal areas prone to salt-water erosion. They have been designed with technical support from Utthan's engineering team, and are primarily meant for the families who live in the low-lying flood-prone areas. At the moment, the toilets are only used by women and children, and are kept clean by the participating households.

3. Capacity-building for disaster governance

Village-Level Disaster Committees (VLDCs) have been formed in all the three pilot villages – a process that took some six months to a year, with extensive discussions

on roles and relationships with the local *panchayat*. The VLDC has sub-committees for various tasks, and these are outlined in Table 2. Each sub-committee has six members (though this number varies), half of whom are meant to be women. At least two of the six members are supposed to come from vulnerable groups in the village. In practice, however, the representation of women on the sub-committees is nominal – there are no women on the Rescue and Relief committees, and no women on the committees for Temporary and Permanent Shelter. Women's absence from the former is not surprising, given that most women cannot swim. However, the committee is responsible for the distribution of relief, and the lack of women on the committee raises a number of gender concerns regarding the distribution of food between and within households. Women's absence from the Temporary and Permanent Shelter committee raises other gender concerns about the question of women's safety and security in temporary shelters, particularly that of adolescent girls (Ahmed 2006).

Table 2: Women's representation in sub-committees for disaster management

Committee	Responsibilities	No. of Members			No. of Women		
		T	S	K	T	S	K
Communication	Collect and share information on impending disasters with village, close contact with government functionaries	4	6	6	0	1	3
Health	Trained in first-aid, awareness of communicable diseases during/post disasters, coordinate with Primary / community health centres	6	6	3	1	2	0
Rescue & Relief	Knowledge of various provisions used during disaster emergencies, awareness of safe place to shift people to, access to necessary equipment	5	5	5	0	0	0
Water and Sanitation	Knowledge of water availability and quality which can be accessed, sanitation.....	3	5	5	0	4	0
Temporary and Permanent Shelter	Trained to construct temporary shelter provisions during emergency, ability to explain importance of retrofitting houses – earthquakes, cyclones	*	9	3	*	0	0

Source: Drawn from Utthan / PLC Report, August 2007-January 2008.
Note: T = Tarasara; S = Sartanpar; K = Katpar * No sub-committee formed yet

There are no women as yet on the Water and Sanitation Committees, except in Sartanpar village, where there is a water-supply project being implemented under the state sector reforms programme.[12] Not surprisingly, women *are* present on the sub-committees for health in each village – although not in the numbers that they should be – while there are also a few women on the Communication committee. This is both a technical function – accessing information about impending disasters from district functionaries – as well as one of outreach to others in the village. Women can perform an important role here, quickly identifying and reaching vulnerable elderly people, widows, and children with early warnings.

Initial insights: implications for policy and practice

As the activities described are in initial stages and the projects are still under way, it may be too early to discuss 'lessons' as such. However, these experiences do generate initial insights and point to – or reinforce – areas that need to be strengthened in policy and practice more widely in order to engender adaptation efforts. These areas are outlined below:

The importance of simple and practical tools to understand vulnerability

The complexity and interconnectedness of social, physical, and behavioural factors that contribute to vulnerability make it a difficult concept to capture and assess. At the same time, understanding these complexities is crucial in order to support and enable effective adaptation strategies of the most vulnerable people. The conceptual tools that we need to do this must be simple and manageable, and we need practical indicators that can be used by different stakeholders in communities to gather data. Tools such as vulnerability mapping, and the VCI used in this project, are steps in this direction, though they need more refinement. Already they have helped communities to broaden the way they understand vulnerability, beyond physical exposure to risks, and to understand better how women, men, children, and different social groups may be affected differently by climate change, or may have more limited ability to adapt. Of course, to understand gender differences, it is important also to use these tools at intra-household levels.

Strengthening social networks as fall-back mechanisms for women

Social networks can be key factors in building resilience and reducing vulnerability to climate-change impacts (Fussel 2007; Twigg 2007), providing financial and social safety nets at times of need. This was well-illustrated in the quantitative vulnerability assessment for the VCI conducted by ISET and Utthan in Sartanpar village in 2007. There, an agricultural labourer, Tappuben, who lives in a low-lying area of the village, has identified strong-social support networks within and beyond family relations as important to helping her at times of adversity. Her active involvement in several village organisations, including the Disaster Management Committee and the Village

Water Committee, has helped her gain confidence and articulate her views in decision-making (Mustafa and Ahmed 2008). Apart from only *recognising* the importance of social networks, we feel that it is important to explore mechanisms that can *strengthen* these networks to enhance women's access to information, financial resources, and social support. For example, these networks may also be used to channel information on climate or disaster preparedness, or on alternative livelihood options.

Enhancing gender-equitable access to information and capacity development

Individuals, families, and communities that have diversified livelihood strategies are better able to manage risk and cope with impacts of climate change. Their strategies may include diversification into non-farm livelihoods less sensitive to climatic variability, such as the expansion of rope-making in Katpar and Tarasara villages. Alternatively, they may also include the identification of agriculture or aquaculture opportunities that enable people *to take advantage of* changing climate conditions and their associated effects, such as the case of lobster-breeding in increasingly brackish water systems. Development of these livelihood options requires access to training and skill development, and information on technologies and ways of adding value to create a profit. Apart from technical support, poor women and men also need to develop market linkages, facilitate business planning, and enhance their capacity to negotiate for better prices. This also requires access to credit, which can be a significant challenge for poor women, given the changing macro-policy environment on micro-finance in India.[13]

However, 'extension systems' – that is, systems to deliver training and other inputs – often perpetuate a male bias in agriculture and aquaculture, privileging and predominantly reaching men (see Duvvury 1998; Kelkar 2007). Alternative strategies and gender-sensitive extension systems are needed to target, engage, and support both women and men in accessing the skills and resources they need for successful livelihoods. Strengthening informal social institutions, such as co-operatives or self-help groups, may be one vehicle to improve economies of scale and negotiate power structures, thereby enhancing potential returns from smaller-scale enterprises.

Innovations and dedicated resources to respond to women's priorities

The research which underpinned the project discussed in this article suggests that local authorities need to identify and validate women's priority needs in flood, drought, and intense storm conditions. Validation must be translated into attention to women's interests and needs, and resources (financial, human, and technological) need to be channelled to women to enable them to meet their needs in ways which support greater gender equality. Innovations, such as the example of providing toilets which are specially adapted to function in low-lying flood-prone areas, can have tremendous impact on women's security and dignity, and even on managing health and the spread of disease. However, scaling up these pilots to ensure a wider impact requires

resources and partnerships with other organisations. In this case, Utthan is exploring such partnerships with WASMO and private-sector actors.

Strengthening gendered participation and voice in disaster governance

Strengthening community-based institutions for co-ordinated planning for managing disasters and impacts from extreme climate events is an important step towards enhancing adaptation. Village Disaster Committees, such as those in Tarasara, Sartanpar, and Katpar, can facilitate access to climate information in order to manage water more effectively. They can also plan agricultural activities; plan and deliver health services; improve early warning for extreme events; and facilitate relief efforts. But despite facilitation by a gender-sensitive NGO like Utthan, it is still a challenge in these villages to encourage women's participation in management committees, despite this being a very important element in ensuring that women's priorities are met. Political actors, NGOs, and civil society need to facilitate the participation of both women and men in community disaster governance, to ensure the voices of both sexes are heard. Strengthening women's confidence in their own knowledge, and in learning more about climate change and adaptation through awareness-raising activities and the community efforts described above are steps towards this. Training to promote the leadership skills of women may also help them to be more active in community organisations.

Concluding remarks

As our experiences in Gujarat demonstrate, engendering adaptation strategies in India is an ongoing challenge. Initial efforts in Gujarat by Utthan, ISET, and partners are generating preliminary insights that point to directions for policy and practice that can help us move towards this goal. These reflections need to be supplemented by ongoing documentation and learning from pilot initiatives, such as the ones outlined in this article, in order to promote gender-sensitive and gender-inclusive adaptation. In the case of Gujarat – and globally – explicit attention to engendering climate-change adaptation 'on the ground' is still relatively new, and there is a need for rigorous documentation and analysis *with communities* on successes and challenges.

At the same time, there is a need to scale up these lessons to policies and practice at state and national levels. But first, more emphasis needs to be placed on ways to engender the processes and strategies for adaptation to reach and respond to women's and men's differing priorities and needs in various communities. That is, the focus should extend beyond scaling up specific interventions – in this case, lobster-fattening, adapting sanitation structures, and facilitating disaster management committees –

although there is the potential to reach a much larger population with these initiatives, and this should not be understated. However, state actors and civil society also need to ensure gender issues are integral to their approaches and explicitly engage women and men of different social groups in priority-setting and development of interventions most relevant to their situation. This also involves building gender concerns into the underlying systems that have been identified as necessary to enhance adaptation: livelihood diversification, infrastructure, communication, access to skills and knowledge, and community-based disaster governance. Furthermore, the current disjunctures between the disaster risk-reduction and development sectors must be bridged, to ensure that strategies are both short-term to address immediate impacts, but also long-term to reduce vulnerability and risk, and enhance more climate-resilient development.

All of these efforts require strengthening the capacities of communities, sector agencies, development actors, and policy makers to understand climate change and adaptation, and gendered impacts and strategies. At ISET, we are moving towards this by building capacity to use the VCI as a simple monitoring tool to provide baseline data about the different physical, social, and attitudinal vulnerabilities of women and men in households and communities, and to assess changes resulting from adaptation interventions. The Shared Learning Dialogues are also broadening our understanding of the issues, and facilitating active engagement in developing strategies and interventions. Finally, we ourselves, together with Utthan and other partners, are continuing to build our own capacities in understanding gendered adaptation needs and priorities of communities, in order to develop practical strategies, methods, and tools to address these, and to communicate lessons to inform policy and debates.

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Notes

1 While this article builds on insights from two specific ISET projects (namely, one funded by DFID (Department for International Development, UK) on the costs and benefits of disaster risk-reduction measures and the other funded by IDRC (International Development Research Centre) on understanding vulnerability and adaptation to climate variability), it also draws on other ISET climate-change projects. The authors would like to thank the Utthan team, as well as ISET colleagues, for sharing their work with us.

2 See www.i-s-e-t.org (last accessed November 2008).

3 See www.climate-transitions.org (last accessed November 2008).

4 Our understanding of adaptation draws on ISET's collective analysis and conceptual framework which is rooted in research and practice around climate variability in South Asia.

5 The Hyogo Framework for Action 2005–2015: Building Resilience of Nations and Communities was adopted by participants (government, international organisations, civil society, scientific community) at the World Conference on Disaster Reduction held 18–22 January 2005 in Kobe, Hyogo, Japan. It outlines strategies and actions to guide governments and civil society on reducing vulnerability and improving resilience to disasters and environmental change. See www.unisdr.org/eng/hfa/docs/Hyogo-framework-for-action-english.pdf (last accessed November 2008).

6 The project 'Adaptation and Livelihood Resilience', supported by the IDRC, is being implemented by ISET and partners in Gujarat, Uttar Pradesh, Chennai, and Nepal, from 2006–2009. A key component is the development of pilot activities at community and state levels to enhance adaptation and resilience.

7 PLC-Coastal was established in 2006 with support from the American India Foundation to Utthan. See www.plccoastal.org/ (last accessed November 2008).

8 Groups of higher castes or higher social standing may perceive those of lower caste as being 'polluted' or 'dirty', and will not permit them to share social spaces such as temples, even in times of need.

9 For a full discussion on gender and land rights in India, see Agarwal (2003). Despite recent reforms in Hindu property laws to give women (wives, daughters) equal inheritance rights over land as men/sons, the implementation of such laws varies from state to state in India. In Gujarat, there is an active civil-society land-rights network, which Utthan is a part of, and which has successfully helped many small and marginal women farmers claim their just rights over land they had inherited.

10 See www.cspc.org.in (last accessed November 2008).

11 Self-help groups are small (10–15 people), voluntary groups, primarily of women, that were initially facilitated by NGOs with the intent of mobilising collective savings and empowering women economically through access to credit, bypassing exploitative moneylenders. Gradually, self-help groups have been linked to banks for larger loans, and federations are being promoted to support micro-enterprises as well as raise larger gender-rights issues.

12 Women are actively involved in several village water committees, facilitated by Utthan under various decentralisation programmes. They are not part of the water sub-committees as these are largely responsible for accessing safe water and sanitation after a disaster, rather than for daily water governance.

13 The proposed Micro-financial Sector (Development and Regulation) Bill (2007), which is still under consideration by Parliament, has been strongly opposed by civil society for its anti-poor and anti-women implications.

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