

Gendered Vulnerabilities to Climate Change: Insights from the Semi-Arid Regions of Africa and Asia

Abstract

Emerging and on-going research indicates that vulnerabilities to impacts of climate change are gendered. Still, policy approaches aimed at strengthening local communities' adaptive capacity largely fail to recognize the gendered nature of everyday realities and experiences. This paper interrogates some of the emerging evidence in selected semi-arid countries of Africa and Asia from a gender perspective, using water scarcity as an illustrative example. It emphasizes the importance of moving beyond the counting of numbers of men and women to unpacking relations of power, of inclusion and exclusion in decision-making, and challenging cultural beliefs that have denied equal opportunities and rights to differently positioned people, especially those at the bottom of economic and social hierarchies. Such an approach would make policy and practice more relevant to people's differentiated needs and responses.

Keywords: gender, vulnerability, semi-arid regions, Africa, India, water scarcity.

1. Introduction

Emerging research indicates that vulnerabilities related to climate change and its impacts on communities are gendered (Dankelman et al., 2008; MacGregor, 2010; Babugura, 2010; Goh, 2012; Moosa and Tuana, 2014, Morchain et al., 2015). Yet, nearly all policies aimed at developing and strengthening the adaptive capacity of local communities, fail to recognize the gendered nature of everyday realities and experiences (Alston, 2013, Terry, 2009), hence either completely overlook or incorrectly formulate gender issues in policy development (Arora-Jonsson, 2014). They typically portray women as vulnerable, weak, poor and socially isolated, rather than seeing them as negotiating and dealing regularly with different kinds of change in their lives (Okali and Naess, 2013). Men are virtually invisible from much of this discourse, and if at all mentioned, their absence from the locality is only seen as enhancing women's vulnerability to risks and stresses.

There is a further important omission in this discourse. Both research and policy are often framed in terms of climate change impacts alone. What emerges from the field is the ‘multiplicity, intersectionality and everyday nature of the risks and stresses that characterize life for poor people’ (Terry, 2011). The IPCC fifth assessment report has acknowledged the overlapping and intersecting nature of risks – geophysical, agro-ecological and socio-economic, when it states with ‘very high confidence’ that differences in vulnerability and exposure arising from non-climatic factors shape differential risks to climate change (Field et al., 2014). Hence, developing a broad-based understanding of gendered vulnerability as emerging from poverty and social discrimination, and socio-cultural practices in different political, geographical and historical settings, apart from climatic variability and environmental /natural risks (Blaikie et al., 1994, Few, 2007), is central to understanding people’s capacities to cope with and adapt to change.

Such understanding of the different adaptive strategies used by men and women of different classes and social groups to secure their livelihoods, both in the short and medium term (Shipton, 1990), is however still insufficient. Access to resources (land, water and money), is important, but how these link to social roles, norms, values and cultural identities in different contexts needs exploration (Ribot and Peluso, 2003; Moosa and Tuana, 2014). How, for instance, do differences in household structures and conjugal relations, the divisions of labour, and rights and responsibilities embedded therein, shape adaptation? What are the trade-offs involved in the choices people make – between short-term coping and longer-term adaptation, between nurturing social relations of reciprocity and interdependence and seeking individual welfare? This paper builds on a regional diagnostic analysis of vulnerability and adaptation to climate change in semi-arid regions (SARs) across Africa and Asia conducted by the ASSAR (Adaptation at Scale in Semi-Arid Regions)¹ project, along with preliminary field observations, to explore some of these puzzles.

2. Deconstructing vulnerability: Women as victims?

As indicated above, women are largely seen as a ‘marginalised group’ within debates on climate change. Lacking in resources of various types, they are portrayed as ‘victims’ of development, yet stoically carrying the burden of survival as subsistence food producers,

¹ The purpose of the ASSAR research project is to develop robust evidence on the factors that could enable sustained and widespread climate adaptation that improves the well-being of the most vulnerable in SARs.

bearers of water and fuelwood, and guardians of household food security (Okali and Naess, 2013). Men, in contrast, are largely absent from the discourse, and if visible at all, are viewed as lazy, or choosing to leave agriculture and rural areas, with no apparent responsibility towards their family and community. While women's vulnerability may indeed increase in a context of male absence; men migrating for survival due to climate and livelihood shocks often end up in urban slums, working hard in poor living and working conditions, developing a range of health problems that may in fact enhance male morbidity and mortality in the medium term (Mitra et al., 2015). This can further enhance the care burdens on women.

A similar discourse of virtuous women and negligent men is prevalent across other development domains: of food and nutrition security, poverty reduction, population control and improved health. Arora-Jonsson (2011) points out how the focus on women's vulnerability and virtuousness deflects attention away from the real inequalities in decision-making and resource access, as well as the institutional norms that exacerbate women's exclusion. These discourses around marginalisation and vulnerability are driven by particular sets of political and moral values that seek to empower women, to help overcome disparities in wellbeing outcomes, by enhancing their access to a range of resources, and hence cannot be easily dismissed. Yet, by ignoring the causal processes that make women more vulnerable, and perpetuate gender inequities within wider social relations of production and reproduction, they end up instrumentalizing women's labour for achieving development goals.

The implications of such discourses, be it of victimhood or virtuosity, are several. First, they homogenise the experiences of women, without reflecting on possible differences based on their social location of class and ethnicity, alongside geographical and agro-ecological contexts. Several feminist scholars have pointed to the need for a more nuanced understanding of intersectionality in terms of the multiply determined, simultaneous and interlinked experiences of power and inequality, privilege and oppression, across scales, from the micro to the macro (Crenshaw, 1991, Yuval-Davis, 2006). The differences emerge and are produced out of everyday practices (Nightingale, 2011), whether in farming, managing natural resources, migrating, participating in community or project activities, as historical legacies, among others. For instance, in the context of changing seasonal patterns of temperature and rainfall, Mhaskar (2010) found a stark difference in both the vulnerabilities and coping strategies of households with seasonally irrigated land, those dependent entirely on rainfed farming, and landless labourers, in the semi-arid district of Ahmednagar in Maharashtra state, western India.

Workloads increased most for women in rainfed farming households due to fluctuating crop yields, longer distances to travel for fuel, fodder and water for their livestock, with adverse health consequences. The landless moved to non-farm labouring work outside the village, as in brick kilns, and in households with irrigation, there were some shifts in work patterns due to the adoption of short duration crops. Both these groups however were able to cope better than those dependent on rainfed farming. If policies focused only on the lack of assets, in this case, land-holding, the most vulnerable households, namely, the rainfed farming households, and women within them, would be missed out. Gender here works not on its own, but in interaction with the nature of farming practised.

Second, a universalising discourse of victimhood cuts out the space for exploring and understanding women's agency in such contexts, across social groups and classes, often discounting innovations and strategies adopted in their everyday struggle for survival. It also misses the workings of power, the negotiations and manipulations, the give and take, which are a part of people's lives, but shaped by contextual specificities. It sets up an artificial binary, often oppositional, between women and men, with the former virtuous and the latter not, rather than viewing gender relations as embracing a host of emotions and actions, involving both cooperation and conflict (Sen, 1990). Bryceson (2013) documents the range of relationships and partnerships – economic and sexual - that are being formed and negotiated between men and women in a context of stress and competition for scarce resources in Tanzanian gold-mining settlements; a similar phenomenon is visible in semi-arid and arid settlements in Northern Kenya (field notes: author, October 2015).

While water collection is primarily a female task, a study by Iipinge et al., (2000a and b) in Namibia found that in contexts of scarcity, where long distances had to be travelled to collect water, men used donkey carts to do this. In fact, male invisibility from the household economy and branding as 'useless' or 'lazy' (Whitehead, 2000, Pottier, 1994) can have several negative effects – ranging from male withdrawal to expressions of violent masculinities. With provisioning a central element of male identities, non-recognition and even vilification for neglecting their responsibilities, can aggravate male sensitivities, giving truth to the discourse of 'men as a problem'. More meaningful here would be a relational analysis of power and authority in shaping access to water, through community, market and state-level institutions, and understanding how gender plays out in terms of labour contributions, decision-making roles, differential knowledge and access to productive resources, in this process (Rao, 2017).

A second lesson for policy then is to support and facilitate cooperation within households and communities, rather than targeting either men or women, often placed in opposition to each other.

Third, resource access and control are clearly central themes in the literature on vulnerability and adaptation; yet resources too have different material and symbolic meanings and access mechanisms (Rao, 2008). In the arid and semi-arid regions, while land access and ownership is important, equally crucial for survival is the availability and access to water. In the pastoralist savannah in Northern Kenya, settlements are based on the availability of water and pasture lands, rather than cultivable land. Water scarcity, however, is forcing these communities to diversify, often with negative consequences. Extending crop production in the rangelands is leading to conflicts over their use; charcoal production, has implications for forest degradation; and petty trade in drugs (*miraa*) and arms are feeding into crime (field notes: author, October 2015). Those with social support systems and some assets, both men and women, are potentially better able to manage climatic and livelihood uncertainties than those without. But here it is important to consider resource access not only at the individual, household level, as a personal asset, but rather how it is distributed and governed across scales, from the local community to the region and even nation-state. We discuss this further in section 4, but highlight here the importance of political economy considerations in mediating resource access.

Finally, it is important to understand diversification as a household coping strategy, with gender norms shaping the possibilities and opportunities open to men and women within households and communities. In the Upper West region of Ghana, migration during the dry season is largely undertaken by men, who appear to have limited options for local employment, unlike women, who engage in selling firewood, making shea butter or soap. Increasingly young people, both girls and boys, are also moving, the girls largely confined to working as head porters in urban areas. Yet most return before the rains in order to prepare the land for the next farming season (field notes: author, March 2015; c.f Nyantakyi-Frimpong and Bezner-Kerr, 2015; Wossen and Berger, 2015). In the Kenyan example noted above, while women engaged in cultivation and some petty trade, men got involved in a host of insecure and often semi-legal activities (field notes: author, October 2015). Rather than seeing women and men as autonomous entities, working independently of each other, hence always constrained by the absence of independent, individualised resource control (Carr, 2008a; Sugden et al., 2015), we

need to acknowledge their differentiated, but complementary roles, shaped by cultural values and social norms, in agriculture, building livelihoods, and shaping adaptation responses to climatic and other stresses.

Given the multiplicity of contexts and experiences, the key lesson for policy, practice and research seems to be the need to exercise caution while generalising, but more importantly, to recognise differences in strategies, and engage with them in nuanced and disaggregated ways. Gender analysis provides a methodology for moving beyond the counting of numbers to unpacking relations of power, of inclusion and exclusion in decision-making processes, and challenging cultural beliefs that have denied equal opportunities and rights to differently positioned people, especially those at the bottom of economic and social hierarchies. It engages with social complexity in terms of the intersections of gender, race, ethnicity/caste, or class in specific local settings, and calls for an exploration of the ways in which men and women, together and separately, in their different and changing roles, cope and adapt to changing circumstances, while also shaping the outcomes of external interventions.

3. The Context: Livelihood Challenges in Semi-Arid Regions

The semi-arid context across Asia and Africa is one of great environmental, political and socio-economic diversity. A complex range of topography, biodiversity and variability in rainfall and micro-climatic conditions has meant frequent exposure to droughts and floods, with implications for agricultural production, ecosystem services and social relations. Climate trends predict increases in temperature between 0.5C to 3.5C by 2050 (Daron, 2014), increased rainfall variability with decreasing rainfall in some parts of the world, and a greater exposure to extreme weather events (Field et al., 2014). Unpredictability and uncertainty, especially of rainfall patterns, are presently the biggest challenge to on-the-ground resilience and adaptation.

East Africa, for instance, is home to an ethnically heterogeneous population, consisting of pastoralist and agro-pastoralist groups, with different forms of production, degrees of mobility or sedentarisation and gendered cultures. Apart from rising population, an important driver of change is rapidly shifting aspirations; youth in particular seeking education and regular jobs, preferably white-collar, in preference to pastoral or agricultural lifestyles – the mainstay of their present livelihoods. This is influenced by the States' development visions of transforming

into industrialised nations, through programmes focused on agricultural intensification, irrigation and infrastructure development (Few et al., 2015: p 15).

Similar trends in youth aspirations and migration from the rural areas can be seen in Western and Southern Africa, as well as in India, driven by development paradigms that favour the urban over the rural, industry over agriculture (World Bank, 2008). Communities in the semi-arid regions of Southern Africa, dependent on rainfed agriculture and primary production, are confronted by limited infrastructure and opportunities for diversification, hence vulnerable to higher rates of poverty and food insecurity, especially in a context of reduced water availability, and declines in crop and livestock productivity (Spear et al., 2015). The semi-arid region of Ghana has the highest incidence of extreme poverty in the country, driven by colonial and post-colonial neglect of these regions, alongside high levels of climate variability and severe droughts (Songsore, 2003). The current emphasis on agriculture intensification and liberalization of the sector has favoured large-scale developments, including the proliferation of foreign direct investment in biofuels, reinforcing radical land fragmentation, land grabbing and marginalization of smallholder farmers (Nyantakyi-Frimpong and Bezner-Kerr, 2015). Evidence from India too suggests that economic growth in the 2000s enhanced inequalities between the rural and urban, between social groups (especially the exclusion of Scheduled Castes, Tribes and minorities) and across genders (Rao et al., 2008).

Yet the promises in terms of agricultural modernization and infrastructure development are far from being met. Irrigation has hardly been developed, and most of the land is rainfed and dominated by small-scale production systems. Crop yields have been falling due to lack of inputs, unreliable rainfall, soil degradation, land fragmentation, and new forms of crop and livestock disease, a possible result of rising temperatures across the region (UNEP, 2011; Devereux, 2009; Daron, 2014). Sufficient jobs of desirable quality are not available to the rural youth, and with inequalities more visible, frustrations are reflected in growing crime and violence - between ethnic groups and within households – signals of maladaptation.

The gendered implications in terms of food and nutrition security, and labour allocations, within and across households and communities, however, have yet to be fully understood. This would include the reorganization taking place within domestic groups and settlements, with shifts in the forms of marriage, expectations around male and female contributions to household welfare, and reciprocal, resource-sharing arrangements (field notes: author, October

2015). In the next section, we attempt to build an understanding of context-specific social relations, including gender relations, in negotiating responses to both threats and opportunities in the context of climate change. We seek to draw out the implications of these insights for policy and practice, while also pointing to the gaps in knowledge which need to be addressed.

4. Gendered Vulnerabilities and Adaptive Responses: Regional Comparisons

Any form of change including climatic variability is likely to disparately impact the lives of women and men belonging to different wealth, age and status groups, potentially enhancing, though in different ways, the risks and vulnerabilities they face. In the process, gender relations and the organisation of social reproduction are likely to change, though the direction of change is not necessarily predictable. In some instances, women's position and capacity to bargain may be strengthened, in others, already existing gender inequalities may get further intensified.

While there is some analysis of the gendered differences in perceptions of risk, they often fail to unpack the institutional responses to these differences and their implications for final outcomes. For instance, Thomas et al. (2007), in a study of risk perception in South Africa note that while more women recognized heavy rains as a distinct risk, more men were worried about drought, given their gender-specific livelihood activities. In an almost reverse case, in Botswana, as most women were engaged in the utilisation of veldt products as a source of both food and income generation, they were more vulnerable to drier climate and variable rainfall patterns (Omari, 2010). In Ethiopia, men were concerned about livestock prices, while women's concerns focused on food availability (Getachew et al., 2008). Further, the young worried more about land scarcity, as land-poor households were the most vulnerable to drought, resulting in young men in particular being obliged to migrate to earn a living (Gray and Mueller, 2012).

While documenting such differences in perceptions is important, we need to also question dominant narratives about men's and women's roles in the economy, and unpack what these differences mean in terms of everyday responses to climate change. What are the processes through which particular groups, or interests, are classified as 'vulnerable' or 'deserving', picked out for drought relief, for instance, and what might this mean for cooperation or conflict

with others, not similarly classified? In the rest of this section, we focus on highlighting differences and similarities in vulnerabilities, adaptive capacities and strategies at different institutional levels across the ASSAR sites, while at the same time drawing out the more generic lessons emerging from this evidence.

Water Scarcity and Drought

Multiple and inter-related risks affect people's livelihoods and wellbeing, and shape choices. These include rainfall variability, drought, flood hazards, resource degradation, resource conflicts, depletion of livestock, food insecurity, human health, plant and animal diseases, lack of opportunities for the youth, and shortfalls in institutional capacities at various levels (Few et al., 2015; Spear et al., 2015). While these risks are interlinked, we focus here on water scarcity as an illustrative example. Starting with the intersections of gender and wider social relations in shaping intra-household negotiations, we examine the shifts and interdependencies created by market mechanisms, and the politics of state policies, especially in the provisioning of social protection and other state services.

4.1 Bargaining within and beyond the household: gender and wider social relations

Preliminary fieldwork in Bobirwa district in Botswana found drought and water scarcity to be the main cause of poor yields in subsistence farming; but even within communities, some parts of the village had more water shortages than others. The array of problems mentioned included: "No rain, no grass, no grazing, no *mokolwane*² reeds for basketry, high temperatures, harsh effects on and death of livestock, reduced livestock products, reduced livestock fertility". Men seemed particularly distressed by this: "We rear livestock for both consumption and income. We can't sleep if we lose our livestock. We have no income for school fees, hence school dropouts, poor school attendance, and no payment of daily bills". This inability to provide led to a host of risky behaviours including drug and alcohol abuse, truancy, criminal activities and family breakdown. (field notes: author, November 2015).

² *Mokolwane* is the leaf or reed collected from the *makalani* palm tree (fan palm). Women make baskets both for sale and use at home.

Issues of water availability/scarcity are socio-culturally of major concern to women and their children, given their responsibility as carriers of water for household use. The Botswana saying “*Ke nyorilwe-Ke kopa sego as metsi*”, translated as “I am thirsty, I am here to ask for a water calabash”, when asking for a woman’s hand in marriage, is a good example that a woman/wife’s critical role includes making sure water (literally and metaphorically) is available for household use (Ibid.). Further, most of the subsistence crop farmers being women, they are hit hardest by crop failure resulting from lack of water. Managing household food and nutrition security becomes a challenge, making them potentially dependent on handouts and food baskets. Supplementary feeding provided in public health facilities, however, creates an additional demand on women’s time, as the women are expected to take children for welfare days and feeding at the clinics.

Modern farming methods based on drought resistant crop varieties and groundwater irrigation have been proposed as a solution to crop failures, however, such farming is expensive and usually done for commercial purposes by men who have the means to own large commercial farms. With such commercial farmers using government subsidies and packages rather than reciprocal arrangements, traditional labour and livestock sharing practices, which provided support during times of crisis, have also declined (Ibid.).³ Clearly the policy response here was both gender and class-blind, providing technical solutions, without reference to the people or groups it was addressing. The technologies suggested not just ignored the multiple, including domestic, uses of water, but also the resources available to subsistence farmers, primarily women. The lack of rain affects all social groups, but it affects them differently, depending on the resources they have and the alternate opportunities available.

The Bhavani basin in southern India presents a different picture of water scarcity. Agriculture in the region has shifted from subsistence, rainfed farming to intensive irrigated cash-crop cultivation, primarily due to state sponsorship of surface and groundwater irrigation. (Mohanasundari and Balasubramanian, 2015). Over dependence on groundwater has increased due to poor rainfall, in the process, shifting control over water resources from communities to individuals, exacerbating existing inequities of caste, class and gender.

³*Mafisa* or men loaning cattle for draft power, and *majako* or women providing labour in others’ fields, in return for bags of crops harvested, have all but disappeared.

Farmers in the region take loans to finance borewell digging, these loans are usually taken from local money lenders who charge exorbitant interest rates. Decreasing water tables have resulted in 'competitive digging', (Janakarajan and Moench, 2006) farmers taking further loans to pay off previous loans, perpetuating and increasing indebtedness (Deshpande and Prabhu, 2005). Chronic indebtedness not just contributes to increasing the vulnerability of rural households, but this is gendered, as debts, particularly those taken from local money lenders, often include a social form of repayment which women have to commonly bear; it could entail favours such as domestic work and in some cases sexual exploitation (Guerin et al., 2013). Gold jewellery is an asset over which women have relatively more control, yet increasing indebtedness is likely to lead to a loss of this valuable asset, and potentially a decline in women's status, as dowry demands rise for funding borewells (Srinivasan and Bedi, 2007).

In order to temper farm household income shocks men increasingly engage in off-farm labour work (Kochar, 1999). Decreased agricultural work also forces women to look for alternate means to supplement their income; they shift to low paid work such as caring for small ruminants and cattle, or piece-rated, home-based work (Ramachandran. et al., 2002; Rao, 2014). This strongly emerged in focus group discussions conducted with women between the ages of 22-45 belonging to the Scheduled Caste community, in villages around Bhavani Sagar. Young women move to nearby towns to work in garment factories, a practice mainly observed during drought years (field notes: author, November 2015).

Migration emerges as an important adaptive strategy in the face of climate and other livelihood risks and uncertainties. Migration patterns are gendered, and in South Asia, largely male. Married women here face a somewhat contradictory position, though this seems to vary by class, ethnicity, age and location. While better off women face enhanced controls, poor women and those belonging to the lower castes and ethnic minority groups are confronted with increasing work burdens, loss of support, and in the face of limited resources, enhanced vulnerability (Rao and Mitra, 2013). In South Africa too, with increasing male migration, women take on extra workloads in their efforts to cope; adopting a host of diversification strategies (including trade) to provide food for the household (Babugura, 2010).

Eriksen et al. (2005), in their study of smallholder responses to climate stress in Kenya and Tanzania also note that married women are excluded from profitable activities due to local taboos as well as domestic responsibilities. They get confined to activities such as rearing

chicken at home. In Central Ghana, Carr (2008b) argues that male household heads adopt livelihood strategies which maintain the gender status quo, even though they may be less profitable in terms of household incomes. When the pressures on them become too burdensome, women potentially opt out of marital relationships, retaining responsibility only for themselves and their children. In a few settlements visited in Northern Kenya (field notes: author, October 2015), domestic arrangements appeared fluid, with a large number of female headed households, engaging in a range of transient relationships to help survival (c.f Bryceson, 2013). Across other regions in Africa too, one finds a rise in the number of female headed households. What emerges here is a complex picture involving the role of debt and resource access, shaped both by the larger development environment and socio-cultural norms around status, that play a significant role in shaping individuals' and households' vulnerabilities and abilities to respond to risks.

While there are a few exceptions (c.f Roncoli et al., 2001) to this rather gloomy picture in terms of the effects of vulnerability on the status of married women, as Whitehead and Kabeer (2001) point out, despite women's central role in production processes in Africa, intra-household gender relations reflect a host of inequalities, taken for granted by both communities and researchers. In the context of stress and scarcity, when policy responses fail to take account of changing gender roles and domestic arrangements, it is not surprising to find women and men renegotiating marriage and kinship relations, to support processes of adaptation.

4.2 The Individual versus the Collective: Norms, Values and the Temporality of Choice

Adger et al. (2009) focus conceptually on how places and environments become imbued with symbolic meaning for the people who live in them, and how this might set psychological limits on adaptation, yet empirical studies exploring cultural influences on adaptation are rare. One of the few exceptions is a Burkina Faso study by Nielsen and Reenberg (2010:142) . They analyse how culturally-specific views of 'the good life' as well as historical processes have led two ethnic groups living in the same Sahelian village to take different livelihood paths in a context of drought and economic pressure. Because of their cultural self-image, the Fulbe have turned their backs on the main adaptive strategies practiced by the Rimaiibe, whom they regard as inferior. While Rimaiibe married women are active in independent income generation, the Fulbe's isolated way of life in the bush prevents Fulbe women from being so. They suggest that Fulbe men, deploring the greater independence of Rimaiibe women compared to their own

wives, could be one reason why they prefer to follow a traditional life rather than moving to towns where they would have a wider range of options. As a consequence of these differences, the Rimaiibe, who used to be slaves to the Fulbe, are now better-adapted to local conditions and exceed their former masters in income and assets.

In Isiolo county of Northern Kenya, the persistence of drought and water scarcity has contributed to enhanced conflicts between ethnic groups, rather than cooperation in resource use. State recognition of drought conditions has led to the distribution of fodder for livestock in a few pastoral settlements. However, agro-pastoral communities in neighbouring regions, also struggling with water scarcity, received no such support. This enhanced tensions between men of the two groups, leading to violent incidents involving livestock thefts, and also a few human deaths. These tensions, were visible also in women's access to water for domestic use. In one mixed settlement, with no source of water, Borana women (of the pastoralist group) traded in water collected from the water-point in a neighbouring village; yet their only customers were other Borana women. The agro-pastoralists depended on water brought by truck from a distant source. It was more expensive and availability more unpredictable. While cooperation over the use of pasture amongst the men and domestic water supplies amongst the women could have supported the livelihoods of both groups, one finds status hierarchies and cultural norms coming in the way of cooperation, aggravated by state support, perceived as both partial and partisan (field notes: author, October 2015).

We have briefly referred to youth aspirations in the last section. In view of the state discourse on modernisation and development, the youth, in particular, are looking for alternatives, which can provide them a modern persona. Investment in education has been one strategy, but large-scale unemployment has led to frustration and related problems of poverty, crime, prostitution and destitution. Evidence from Bobirwa in Botswana suggests that unemployed young women were prone to pregnancy, abortion and baby dumping, while young men engaged in robbery, stealing, alcohol and drug abuse. Youth offices were tasked with ensuring the national rollout of business grants to youth (18-35 years), as officers reported that many youth had given up on agriculture and migrated to towns in search of real and imagined employment opportunities (field notes: author, November 2015). While an important initiative, in a context of globalisation and increasing competition, small businesses, without adequate technical and financial support, are likely to remain at best short-term coping strategies, unable to fulfil youth aspirations for a secure and respectable career. To be effective, responses to threat have to be

culturally imagined, whether as incremental changes to the old way of life or abrupt disjunctures (Terry, 2011).

4.3 Access to and control over resources and assets: the importance of scale

Ownership and control over assets, in particular land, is a subject of debate within gender and development; as women's lack of assets is seen as a major constraint to both gender equality and improving productivity (Agarwal, 1994; Whitehead, 1984; Rao, 2008). This view is reflected in the literature on adaptation to climate change, as access to assets such as land and water rights, agricultural technologies, livestock, knowledge and social capital are seen to help adapt to increasing variability in production patterns (Goh, 2012). In the case of the Nile basin in Ethiopia, Deressa et al. (2009) highlight the importance of access to information, extension and credit in shaping farmers' choices, as much as personal characteristics of the household head such as gender, age, wealth and education. Across contexts, be it in India or Ghana, while agriculture is increasingly feminised in terms of women's labour contributions, this has not resulted in increased access to productive resources, - land, credit or technology. Often excluded from extension and training opportunities, such as the use of machinery or fertilisers, provided both by the public and private sectors, women remain subsistence producers (Ahmed et al., 2016). At the same time, gender wage gaps persist even in casual agricultural wage work, with women agricultural wage labourers paid about half of male wage rates (Mhaskar, 2010; Rao, 2012; Whitehead, 2009). While household cooperation may be rising in a context of migration, such discriminatory practices in labour markets and resource provisioning, could serve to reproduce rather than challenge inequalities even at the household level. This is because institutions, from the household and community to market and state levels, are not autonomous, rather they shape and are in turn shaped by changes in other institutional domains (c.f S.F Moore, 1986).

As in India, inheritance is patrilineal in many parts of West Africa, with access to land mediated by men who also control decisions on the allocation of resources within the household (Rademacher-Schulz and Mahama, 2012; Carr and Thompson. 2014). In a focus group discussion in Lawra in the Upper West region of Ghana, women participants described how they are given barren lands to farm, and this too is insecure. In instances where they improve the productivity of the land, men are liable to take the land back, though they noted that poor men also suffer the same fate at the hands of landowners. Similarly, in Jirapa district, women

are allocated land in valley bottoms that are only suitable for rice cultivation. If they manage bumper rice harvests, they are again susceptible to having their land taken over by men (field notes: author, March 2015).

A key justification for women's land claims relates to their significant labour contributions to farming, yet insecurity in terms of returns or benefits. Judith Carney (1988) in her Gambian study documents the struggle over crop rights, rather than rights to land per se, in line with gendered responsibilities for providing either the staple or soup ingredients to the household. With the introduction of irrigation, women found themselves providing labour to two rice crops, in a context where rice, a staple, was classified as a male crop, and men's obligation to the household. This left them little time to grow vegetables or groundnuts, which either directly or indirectly formed their contribution. Such a cultural understanding of cropping practices and crop rights can help explain why women in Jirapa found it hard to resist male take-over of the rice-lands. In all the examples provided so far, in Botswana, Ghana or India, state responses are presented as technical fixes, not sensitive to people's differential needs and priorities on the ground, or indeed to the cultural meanings attached to gendered resource control.

Land tenure security is viewed as crucial for both pastoral and agrarian livelihoods. While customary laws and institutions are often seen as perpetuating unequal power relations between men and women in access, ownership and use of land resources (Bugri, 2008; World Bank, 2005; Carr and Thompson, 2014), this is not necessarily the case. Flintan (2010) notes that pastoral women's property rights in Ethiopia are afforded a certain degree of protection by customary institutions, which see land, water and pasture as collective resources belonging to God. As these institutions weaken in the face of resource conflicts and government policies for resource distribution and utilisation, linked to sedenterisation and settled agricultural practices, such protection is also likely to weaken. While the labour demands on pastoralist women have increased, many now working as wage labourers in state-run sugarcane plantations, their rights to resources, pasture or water, now seen as private or state property, have diminished. Families are forced to live across multiple locations in order to survive (field notes: author, July 2016). In Ghana too, institutionalization of resources have posed restrictions on women's livelihoods, given that access now requires bureaucratic permissions (Ahmed et al., 2016).

In the Omusati region of Namibia, while both men and women had access to agricultural land, the person deciding on land allocation for crop production was the husband in 47 per cent, the

female head of household in 34 percent, and the wife in 27 per cent of the cases. It was similar in the case of livestock production, with the man deciding on land allocation for pasture in 49 per cent and the woman in 24 per cent of the cases (Ipinge et al., 2000). While men appear to be the primary decision-makers, the data does provide evidence of sharing and joint decision-making as well. The reasons need further exploration – they could relate to the matrilineal descent system amongst the AaWambo, implementation of Article 10 of the Namibian Constitution, guaranteeing equality and freedom from discrimination (ibid.), the large number of female-headed households as revealed by the 2011 National Census, or indeed an emphasis on reciprocal and supportive relations central to the effective management of common property resources (Clever, 2000).

What is important to note here is that assets are not just material resources in the hands of individuals and communities, a means for making a living, but are imbued with symbolic meanings around security, status and respectability. They are deeply embedded in social relations, and contribute to perceptions of wellbeing (Rao, 2017). To maintain their position as leaders, customary chiefs often support women's voice and choice, both formally and informally, as this in a way signifies their own power and authority in the community (Rao, 2008; Flintan, 2010). With shifts in development paradigms, whether through state control or competitive markets, the meanings and values of assets too change. While land is still coveted as an element of male identity and male provider roles in the SARs, this is no longer the case in the industrialised countries of Europe or even South East Asia. The gendered meanings of assets then need to be understood in particular contextual settings. Rather than focusing on individual productivity and profitability alone, this could encourage greater cooperation to confront climate change. Universal policies around assets are not always practicable, nor will they necessarily enable progress towards gender equitable or indeed transformative adaptation.

4.4 *Collective action, voice and decision-making: What is Visible to Policy?*

Within the literature on climate change adaptation, decision-making is often considered in the context of formal institutions such as village councils and other governance structures. In Namibia, men play leadership roles in society and hold decision-making positions both at national and local levels. Women, however, do retain a role in making decisions on household maintenance and parenting on a daily basis (Angula and Menjono, 2014). The focus on the public and the productive in policy interventions tend to invisibilise adaptive responses that lie

in the private or reproductive realm (using cheaper foods, skipping meals), in the process also excluding women from the more strategic decisions in relation to allocation of both household and community resources (c.f Angula et al., 2012).

Collective action to address climate change impacts, through participation in groups, can and does have empowerment effects, beyond the immediate purposes of resource conservation and management. It contributes to a sense of social support and solidarity that can help challenge oppressive gender and wider social relations. A good example from Kenya is provided by Gabriellsson and Ramasar (2013) with reference to widows and divorced women affected by HIV and AIDS, one of the most marginalized groups in the locality. Apart from contributing to sustainable livelihoods through the provision of credit, pooling of labour and other assets to more effectively confront the multiple challenges of soil degradation, water stress, poor market integration and disease burdens, women, through the collectives, were able to invest in sustainable innovations like rain water harvesting and agroforestry. Specific benefits in terms of wellbeing and intra-household bargaining were noted as a result of group training to women in agroforestry and business administration (Caretta, 2014). The gains made were not just material, but also personal and relational – strengthening skills and dignity on the one hand, and gaining voice within groups and networks on the other.

Farmer's groups, community networks, credit groups and village councils are all seen to have a positive influence on adaptation (Goulden et al., 2009; Reid and Vogel, 2006) Perhaps it is such insights that have contributed to a range of interventions focusing on collective action as a strategy to support community-level adaptation. Yet 'Whose voice is heard and counts?' (Cornwall, 2003) is an important question that we need to answer in relation to not just household and community-level institutions, but equally market mechanisms, including labour markets, as well as state laws and policies. Stathers et al. (2013) claim that the limited discussion of climate impacts on postharvest systems, perhaps because of women's control over post-harvest processing in Eastern and Southern Africa (this is also true of South Asia), has meant a lack of investment in upscaling the use of post-harvest knowledge in strengthening adaptive capacity.

Alongside this more visible form of collective action, participation and voice, one must not forget the everyday forms of decision-making and influence, often more significant for coping and survival under stress. Flintan (2010) notes the subtle ways in which women's voices and

priorities are heard within customary pastoralist institutions in Ethiopia, while Nielsen (2010) points to the public display of women's hard work and sense of responsibility during an NGO visit to the community as a strategy for gaining leadership positions. In both these instances, voice was ensured by playing their 'gender roles' rather than challenging social rules and norms. Similar negotiations are seen in the tribal sub-belt of the Moyar basin in Tamil Nadu, India. Collection of broom grass and other Non-Timber Forest Produce (NTFP) are an important source of income for the local people, yet irregular rainfall and invasive species have decreased their availability. Most leaders of Joint Forest Management committees, meant to ensure the equitable distribution of scarce forest resources, are men. Women rarely participate in group meetings, yet younger women were able to negotiate their rights, through their husbands or elder male members of the family (field notes: author, November 2015; c.f. Zwarteween and Neupane, 1996).

What these examples reveal is the need to recognise cooperation and conflict between men and women in households, and across institutions, and the continuous negotiation of power relations, both through overt struggles and more covert, backstage forms of influence. This is inevitable, given that adaptive responses and in fact people's livelihoods, occur in the realms of both production and reproduction, diversifying incomes and smoothing consumption, often by stretching both time and effort. Negotiations then get reflected in private adjustments as well as more public forms of claims-making and collective action. Women's strategies, in particular, span the two domains, yet policy attention largely targets the more public and visible, rather than alleviating women's everyday burdens at the same time.

5. Some Tentative Conclusions: Areas for Policy, Practice and further Research

Vulnerability is a core concept in discussions on adaptation, defined usually as a function of the exposure, sensitivity and adaptive capacity of a given system (Blaikie et al., 1994). Research in this field aims to identify means through which wellbeing can be enhanced through reducing risk and promoting resilience (Adger, 2006). In unpacking the complex issue of vulnerability, it is critical to identify and articulate not just the climatic drivers, but also the social, economic and political conditions that contribute both to intensifying vulnerability, but that also shape the ability to adapt to current and future climate change. Across the semi-arid contexts we have examined in this paper, high levels of poverty, lack of social safety nets,

natural resource and climate-dependent livelihoods and low asset bases increase sensitivity to drought and water scarcity. Assets are often liquidated as a short-term coping strategy (be it the distress sale of livestock or gold jewellery), but these are gendered and differentially intensify vulnerability.

Low-income women and female-headed households have often been singled out as being the most vulnerable to climate change. Specific areas of inequality in relation to adaptation include women's limited access to and control of land, high household work burdens that include the responsibility for water and fuelwood collection, high levels of responsibility for agricultural production, and lack of access to formal education. Gender disparities in wage and employment are other important facets of vulnerability. While it is important to support such women, and strengthen their ability to bargain and negotiate for their just rights across institutional sites, the evidence presented in this paper suggests an understanding of gender that goes beyond seeing women as 'victims'. We have demonstrated the need to view women through a lens of multiple, intersecting social identities, women's agency and resource access as mediated by power relations across scales, and livelihood choices by material factors but equally cultural norms of socially appropriate behaviour. From this perspective, it might be equally important to enhance household cooperation through recognising and supporting male endeavours too, especially helping young men face the livelihood crisis they are confronting. This is because, women are fast reaching the limits to which they can stretch themselves, and are turning to family and kin relationships, renegotiating them in the best way they can, to ensure not just survival, but a degree of stability and reciprocity in their lives. In times of crisis, social relations trump all other resources, material and non-material.

At the level of policy and practice, what emerges is a move towards a landscape approach to adaptation strategies, rather than either group or resource-based interventions (Ahmed et al., 2016; Batterbury, 2001). This will enable policy responses to address a host of interconnected issues in terms of barriers and enablers within a particular landscape. Grassroots interventions led by development organisations have already started capturing diverse experiences with regard to knowledge, resources, and power within and between groups, including of women, across contexts (Morchain et al., 2015). Policies, however, especially relating to the use of land and water resources, still largely remain gender blind, reflecting technical fixes rather than social complexities.

Engendering policy at higher levels of aggregation, such as the national level, is not an impossible task, and can be achieved by setting in place a process of deliberative dialogue and consultation, which consciously gives space and voice to diverse groups and individuals to articulate their specific vulnerabilities and priorities. In Ghana, the formulation of the National Climate Change Policy involved broad-based consultations with diverse stakeholders from climate-sensitive livelihood locations, with feedback loops ensuring their voices were heard at every stage of the process (MESTI, 2014; Lawson, 2016). In India, the National Action Plan on Climate Change, while acknowledging the gendered nature of impacts, could not translate this into its mechanisms for adaptation, mainly due to the lack of appropriate data, disaggregated by gender, class, education, access to assets and social networks (Ahmed and Fajber, 2009).

In the semi-arid areas considered, vulnerability arising from climatic and non-climatic factors are inextricably linked, the severity of effect mediated by gender and wider social relations. While not suggesting one solution across contexts, what is clear is that certain configurations of conditions, both material and non-material, jointly shape adaptation responses and wellbeing outcomes at the local level. Even a cursory analysis of these configurations, based on both participation and socio-demographic data, with a gendered lens, can contribute to engendering climate change adaptation policies at national and local levels.

In terms of a research agenda, our preliminary observations have thrown up a host of questions and puzzles that need further exploration: from the reorganisation of domestic groups and the rise in numbers of female-headed households, especially in the African context, to growing resource conflicts around both water and land use and management, and their gendered subtexts, particularly with the monetisation and commoditisation of these resources. New forms of diversification and collective action are emerging, especially by women, and trade-offs between short-term coping strategies and longer-term processes of adaptation are becoming more apparent. All of these changes need to be better understood in terms of how gender works, is negotiated and renegotiated over time and place.

References

Adger, N (2006) Vulnerability. *Global Environmental Change*, **16**: 268-281.

- Adger, W. N, S. Desai, M. Goulden, M. Hulme, I. Lorenzoni, D.R. Nelson, L.O. Naess, J. Wolf and A. Wreford (2009). Are there social limits to adaptation to climate change? *Climatic Change*, 93(3): 335-354.
- Agarwal, B. (1989). Rural Women, Poverty and Natural Resources: Sustenance, Sustainability and Struggle for Change. *Economic and Political Weekly*, 24(43), WS46–WS65.
- Agarwal, B. (1994). *A field of one's own: Gender and Land Rights in South Asia*. Cambridge University Press, Cambridge.
- Alston, M. (2013). Gender mainstreaming and climate change. *Women's Studies International Forum*. <http://dx.doi.org/10.1016/j.wsif.2013.01.016>.
- Ahmed, A., Lawson, E. T., Mensah, A., Gordon, C., & Padgham, J. (2016). Adaptation to climate change or non-climatic stressors in semi-arid regions? Evidence of gender differentiation in three agrarian districts of Ghana *Environmental Development*. <http://dx.10.1016/j.envdev.2016.08.002>
- Ahmed, S and E. Fajber (2009) Engendering adaptation to climate variability in Gujarat, India. *Gender and Development*. 17(1): 33-50.
- Andersson, E. and S. Gabrielsson (2012). ‘Because of poverty, we had to come together’: collective action for improved food security in rural Kenya and Uganda. *International Journal of Agricultural Sustainability*, 10(3): 245-262.
- Angula, M., Conteh, M., and Siyambango, N. (2012). Gender and Climate Change Vulnerability Assessment: If it is not engendered, it is endangered. UNDP: Windhoek.
- Angula, M.N., & Menjono, E., (2014), Gender, culture and climate change in rural Namibia, *Journal for Studies in Humanities and Social Sciences*, vol.3 no1&2, 225 – 238.
- Arora-Jonsson S (2011): Virtue and vulnerability: Discourses on women, gender and climate change. *Global Environmental Change*, 21, 744–751.
- Arora-Jonsson, S (2014) Forty years of gender research and environmental policy: Where do we stand? *Women's Studies International Forum* 47(B), 295–308.
- Babugura, A. (2010). *Gender and climate change: South Africa Case Study*. Cape Town: Heinrich Böll Stiftung - Southern Africa.
- Baguma, D., et al. (2013). Safe-water shortages, gender perspectives, and related challenges in developing countries: The case of Uganda. *Science of The Total Environment*, 442 (0): 96-102.
- Batterbury, S. (2001). Landscapes of diversity: a local political ecology of livelihood diversification in south-western Niger. *Cultural Geographies*, 8, 437-464.
- Blaikie, P., T. Cannon, I. Davis and B. Wisner (1994) *At Risk: natural hazards, people's vulnerability, and disasters*. London, Routledge.
- Bryceson, D (2013). Prostitution or partnership: Wifetypes in Tanzanian artisanal gold-mining settlements. *The Journal of Modern African Studies*. 51(1): 33-56.
- Bugri, J. T. (2008). The dynamics of tenure security, agricultural production and environmental degradation in Africa: Evidence from stakeholders in north-east Ghana. *Land use Policy* 25(2), 271-285.
- Caretta, M. A. (2014). “Credit plus” microcredit schemes: a key to women's adaptive capacity. *Climate and Development*, 6(2): 179-184.
- Carney J (1988) "Struggles over crop rights and labor within contract farming households in a Gambian irrigated rice project" *Journal of Peasant Studies*. 15(3): 334 – 349.
- Carr, E. R. (2008a). Men's crops and women's crops: the importance of gender to the understanding of agricultural and development outcomes in Ghana's Central Region. *World Development* 36 (5), pp. 900-915.
- Carr, E. R. (2008b) Between structure and agency: Livelihoods and adaptation in Ghana's Central Region. *Global Environmental Change*, 18(4): 689-699.

- Carr, E. R and Thomson, M. C. (2014) Gender and climate change adaptation in agrarian settings: Current thinking, new directions, and research frontiers. *Geography Compass* 8(3), 182–197
- Cleaver, F (2000). Moral ecological rationality, institutions and the management of common property resources. *Development and Change*. 31: 361-83.
- Cornwall, A, (2003) Whose Voices? Whose Choices? Reflections on Gender and Participatory Development. *World Development*. 31(8): 1325-42.
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review*, 43(6), 1241–1299.
- Dankelman, I., Alam, K., Ahmed, W.B., Gueye, Y.D., Fatema, N. & Mensah-Kutin, R. (2008), ‘Gender, Climate Change and Human Security Lessons from Bangladesh, Ghana and Senegal’, report prepared by The Women’s Environment and Development Organization (WEDO) with ABANTU for Development in Ghana, ActionAid Bangladesh and ENDA in Senegal. <http://wedo.org/gender-climate-change-human-security/>
- Daron, J.D. (2014) “Regional Climate Messages: Southern Africa”. Scientific report from the CARIAA Adaptation at Scale in Semi-Arid Regions (ASSAR) Project. Ottawa.
- Deressa, T. T., R. M. Hassan, C. Ringler, T. Alemu and M. Yesuf (2009) Determinants of farmers’ choice of adaptation methods to climate change in the Nile Basin of Ethiopia. *Global Environmental Change*, 19(2): 248-255.
- Deshpande, R. S., & Prabhu, N. (2005). Farmers' Distress: Proof beyond Question. *Economic and political weekly*, 4663-4665.
- Devereux, S. (2009). Why does famine persist in Africa? *Food Security*. 1: 25-35.
- Eriksen, S. H., K. Brown and P.M. Kelly (2005) The dynamics of vulnerability: locating coping strategies in Kenya and Tanzania. *Geographical Journal*, 171: 287-305.
- Few, R. (2007) Health and climatic hazards: framing social research on vulnerability, response and adaptation. *Global Environmental Change: Human and Policy Dimensions*, 17(2): 281-295.
- Few, R, Satyal, P, McGahey, D, Leavy, J, Budds, J, Assen, M, Camfield, L, Loubser, D, Adnew, M and W. Bewket (2015) Vulnerability and Adaptation to Climate Change in the Semi-Arid Regions of East Africa. *ASSAR Working Paper*. ASSAR PMU. South Africa.
- Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R., White, L.L. (eds) (2014). IPCC: Summary for policymakers. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Cambridge University Press: Cambridge.
- Flintan, F (2010). Sitting at the table: securing benefits for pastoral women from land tenure reform in Ethiopia. *Journal of East African Studies*. 4(1): 153-78.
- Gabrielsson, S. and V. Ramasar (2013). Widows: agents of change in a climate of water uncertainty. *Journal of Cleaner Production*, 60(0): 34-42.
- Gachathi, F. N. and S. Eriksen (2011). Gums and resins: The potential for supporting sustainable adaptation in Kenya's drylands. *Climate and Development*, 3(1): 59-70.
- Getachew, G., D. Tolossa and G. Gebru(2008) Risk perception and coping strategies among the Karrayu pastoralists of Upper Awash Valley, Central Ethiopia. *Nomadic Peoples*, 12(1) 93-107.
- Goh, A.H.X. (2012). *A literature review of the gender-differentiated impacts of climate change on women’s and men’s assets and well-being in developing countries*. CAPRI Working

- Paper No. 106. Washington, D.C.: International Food Policy Research Institute. <http://dx.doi.org/10.2499/CAPRiWP106>.
- Goulden, M, L. O. Naess, K. Vincent and W. N. Adger (2009) Accessing diversification, networks and traditional resource management as adaptations to climate extremes. *In: Adger, W.N., I. Lorenzoni, K.L. O'Brien (eds) Adapting to climate change: thresholds, values, governance*. Cambridge, Cambridge University Press.
- Gray, C. and V. Mueller (2012). Drought and Population Mobility in Rural Ethiopia. *World Development*, 40(1): 134-145.
- Guerin, I., Roesch, M., Venkatasubramanian, G., & Kumar, S. (2013). "The social meaning of over indebtedness and creditworthiness in the context of poor rural South Indian households (Tamil Nadu)". *Microfinance, Debt and Over-Indebtedness. Juggling with Money, Routledge, Londres* (2013): 125-150
- Ipinge, E.M., Phiri, F.A., and Njabili, A.F. (2000a). *The national gender study*. (vol.1). Windhoek: University of Namibia.
- Ipinge, E.M., Phiri, F.A., and Njabili, A.F. (2000b). *The national gender study*. (vol.2). Windhoek: University of Namibia.
- Janakarajan, S., and Marcus Moench. "Are wells a potential threat to farmers' well-being? Case of deteriorating groundwater irrigation in Tamil Nadu." *Economic and Political Weekly* (2006): 3977-3987.
- Kochar, A. (1999). Smoothing consumption by smoothing income: hours-of-work responses to idiosyncratic agricultural shocks in rural India. *Review of Economics and Statistics*, 81(1), 50-61.
- Lawson, E.T. (2016). Negotiating stakeholder participation in the Ghana National Climate Change Policy *International Journal of Climate Change Strategies and Management*. 8 (3), <http://dx.10.1108/IJCCSM-04-2015-0041>
- MacGregor, S. (2010). Gender and climate change: From impacts to discourses. *Journal of the Indian Ocean Region*. 6(2). 223-238.
- MESTI (2014). The National Climate Change Policy. Ministry of Environment, Science, Technology and Innovation, Accra.
- Mhaskar, B (2010). Community responses to seasonal variation – Learnings from a watershed village. *In: What are we in for? – Rural dynamics in a context of climate change*. Watershed Organisation Trust. Pune.
- Mitra, A., S. Wajih and B.K. Singh. (2015). *Wheezing Ecosystem, Depleting Livelihood Services and Climate Change Resilience: The Saga of Gorakhpur City, Uttar Pradesh, India*. Gorakhpur: Gorakhpur Environmental Action Group and London: International Institute for Environment and Development (IIED).
- Mohanasundari, T., & Balasubramanian, R. (2015). Impact of Climatic and Anthropogenic Factors on Groundwater Irrigation in South India. *In Conflict Resolution in Water Resources and Environmental Management*. Springer International Publishing: p 277-291.
- Moore, S. F. (1986) *Social Facts and Fabrications: 'Customary' Law on Kilimanjaro, 1880–1980*. Cambridge: Cambridge University Press.
- Moosa, C.S. and Tuana, N. (2014). Mapping a Research Agenda Concerning Gender and Climate Change: A Review of the Literature. *Hypatia*. 29 (3), 676-694.
- Morchain, D., Prati, G., Kelsey, F and L. Ravon (2015). What if gender became an essential, standard element of Vulnerability Assessments? *Gender and Development*. 23(3).
- Morton, J. F. (2007). The impact of climate change on smallholder and subsistence agriculture. *Proceedings of the National Academy of Sciences of the United States of America*, 104(50): 19680-19685.
- Nielsen, J.O (2010). The outburst: climate change, gender relations, and situational analysis. *Social Analysis*. 54(3): 76-89.

- Nielsen, J. O. and A. Reenberg (2010). Cultural barriers to climate change adaptation: a case study from Northern Burkina Faso. *Global Environmental Change*, 20: 142-152.
- Nightingale, A. J. (2011). Bounding Difference: Intersectionality and the Material Production of Gender, Caste, Class and Environment in Nepal. *Geoforum*, 42 (2): 153–62.
- Nyantakyi-Frimpong, H. and Bezner-Kerr, R. (2015). The relative importance of climate change in the context of multiple stressors in semi-arid Ghana. *Global Environmental Change* 32, 40–56.
- Okali, C and L.O. Naess (2013) Making sense of gender, climate change and agriculture in sub-Saharan Africa: creating gender-responsive climate adaptation policy. *WP 057*. Future Agricultures Consortium. IDS. Sussex.
- Omari, K. (2010). *Gender and climate change: Botswana case study*. Cape Town: Heinrich Böll Stiftung - Southern Africa.
- Pottier, J (1994). Poor men, intra-household bargaining and the politics of household food security. In: Yngstrom, Y, Jeffery, P, King, K and C. Toulmin (eds.) *Gender and environment in Africa: Perspectives on the politics of environmental sustainability*. Centre for African Studies, University of Edinburgh. Edinburgh: 156-74.
- Rademacher-Schulz, C. and Mahama, E. S. (2012). “Where the rain falls”, Project case study: Ghana. Results from Nadowli District, Upper West region, Ghana. (Report No. 3). Bonn: United Nations University Institute for Environment and Human Security (UNU-EHS).
- Ramachandran, V. K., Swaminathan, M., Rawal, V. (2002). Agricultural workers in rural Tamil Nadu: a field report. In *Agrarian studies: essays on agrarian relations in less-developed countries*. pp. 445-472. Tulika Print Communication Ltd. New Delhi.
- Rao, N, Deshpande, A, Dubey, A and A. Verschoor (2008) Gender Caste and Growth Assessment – India, April. Report to DFID. <http://www.uea.ac.uk/dev/publications/RPP8>.
- Rao, N & A. Mitra (2013) Migration, Representations and Social Relations: Experiences of Jharkhand Labour to Western Uttar Pradesh, *Journal of Development Studies*, 49(6): 846-860.
- Rao, N, (2008) "*Good women do not inherit Land*": *Politics of Land and Gender in India*. Social Science Press and Orient Blackswan, New Delhi.
- Rao, N. (2012). Gender differentials in access to land and productive assets. Report prepared for the World Bank Country Office, India.
- Rao, N (2014). Caste, Kinship and Life-course: Rethinking Women’s Work and Agency in Rural South India. *Feminist Economics*, 20(4): 78-102.
- Rao, N. (2017). Assets, Agency and Legitimacy: Towards a Relational Understanding of Gender Equality Policy and Practice. *World Development*. <http://dx.doi.org/10.1016/j.worlddev.2017.02.018>.
- Reid, P. and C. Vogel (2006). Living and responding to multiple stressors in South Africa: glimpses from KwaZulu-Natal. *Global Environmental Change: Human and Policy Dimensions*, 16(2): 195-206.
- Ribot, J.C and N. Peluso (2003). A theory of access. *Rural Sociology*, 68, 153-181.
- Roncoli, C. (2006) Ethnographic and participatory approaches to research on farmers’ responses to climate predictions. *Climate Research*, 33(1): 81-99.
- Sen, A. (1990). Gender and cooperative conflicts in I. Tinker (ed.). *Persistent Inequalities: Women and World Development*. New York, Oxford University Press: 123-149.
- Shipton, P (1990) African famines and food security: Anthropological perspectives, *Annual Review of Anthropology*, 19, 353-394.
- Songsore, J., (2003). *Regional Development in Ghana: The Theory and the Reality*. Woeli, Accra, Ghana.

- Spear, D., Baudoin, M., Hegga, S., Zaroug, M., Okeyo, A., and Haimbili, E. (2014). Vulnerability and Adaptation to Climate Change in Semi-Arid Areas in Southern Africa. CARIAA/ASSAR Regional Diagnostic Report. IDRC, Ottawa
- Speranza, C.I. (2011). *Promoting gender equality in responses to climate change. The case of Kenya*. [Discussion Paper No. 5/2011]. Bonn: German Development Institute.
- Srinivasan, S., & Bedi, A. S. (2007). Domestic violence and dowry: Evidence from a South Indian village. *World Development*, 35(5), 857-880.
- Stathers, T., et al. (2013). Postharvest agriculture in changing climates: its importance to African smallholder farmers. *Food Security*, 5(3): 361-392.
- Sugden, F., Maskey, N., Clement, F., Ramesh, V., Philip, A. And Rai, A. (2014). Agrarian stress and climate change in the Eastern Gangetic Plains: Gendered vulnerability in a stratified social formation. *Global Environmental Change* 29, 258–269.
- Terry, G (2011). Climate, change and insecurity views from a Gisu hillside. PhD Thesis. University of East Anglia, Norwich.
- Terry, G. (2009). *Climate change and gender justice*. Practical Action Publishing: Oxfam GB: Warwickshire.
- Thomas, D.S.G, Twyman,C., Osbahr, H., and B. Hewitson (2007). Adaptation to climate change and variability: farmer responses to intra-seasonal precipitation trends in South Africa. *Climatic Change*, 83(3): 301-322.
- Tschakert, P. (2007). Views from the vulnerable: Understanding climatic and other stressors in the Sahel. *Global Environmental Change*, 17, 381-396.
- Tschakert, P., van Oort, B., Lera St. Clair, A. and LaMadrid, A. (2013). Inequality and transformation analyses: A complementary lens for addressing vulnerability to climate change. *Climate and Development*, 5(4), 340-350.
- UNEP (2011). Food security in the horn of Africa: the implications of a drier, hotter and more crowded future. http://www.unep.org/pdf/Nov_11_Horn_of_Africa.pdf.
- Whitehead, A. (1984). ‘Women and Men, Kinship and Property: Some General Issues’, in R. Hirschon (ed.), *Women as Property*. New York: St. Martins: 176-193.
- Whitehead, A. (2000). Continuities and discontinuities in political constructions of the working man in rural sub-Saharan Africa: The ‘lazy man’ in African agriculture. *European Journal of Development Research*. 12(2): 23-52.
- Whitehead, A. (2009). The gendered impacts of liberalization policies on African agricultural economies and rural livelihoods. In S. Razavi (Ed.), *The gendered impacts of liberalization: Towards ‘embedded’ liberalism?* (pp. 37-62). London: Routledge.
- Whitehead, A. and N. Kabeer (2001). *Living with uncertainty: gender, livelihoods and pro-poor growth in rural sub-Saharan Africa*. Working Paper 134. IDS Working Papers, Institute of Development Studies, University of Sussex, United Kingdom.
- World Bank (2008). *World Development Report 2008: Agriculture for Development*. Washington D.C. the World Bank.
- World Bank. (2005). Gender issues and best practices in land administration projects. A synthesis Report prepared for Gender and Rural Development Thematic Group (PREM/ARD) and the Land Policy and Administration Thematic Group (ARD) of the World Bank.
- Wossen, T. and Berger, T. (2015). Climate variability, food security and poverty: Agent-based assessment of policy options for farm households in Northern Ghana. *Environmental Science and Policy* 47, 95-107.
- Yuval-Davis, N (2006). Intersectionality and feminist politics. *European Journal of Women’s Studies*. 13: 193-209.

Zwarteween, M and N. Neupane (1996) Free-riders or victims: Women's non-participation in irrigation management in Nepal's Chhatis Mauja Irrigation Scheme. *Research Report 7*. Colombo. IWMI.