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RESEARCH ARTICLE

Gendered vulnerabilities to climate change: insights from the semi-arid regions of Africa and Asia

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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 (Babugura, 2010; Dankelman et al., 2008; Goh, 2012; MacGregor, 2010; Moosa & Tuana, 2014; Morchain, Prati, Kelsey, & Ravon, 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 & 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, Cannon, Davis, & Wisner, 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 (Moosa & Tuana, 2014; Ribot & Peluso, 2003). 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

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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, bearers of water and fuelwood and guardians of household food security (Okali & 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, Wajih, & Singh, 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 marginalization and vulnerability are driven by particular sets of political and moral values that seek to empower women, to help overcome disparities in well-being 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 homogenize 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, landholding, 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 universalizing 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: Nitya Rao, October 2015).

While water collection is primarily a female task, a study by Ipinge, Phiri, and Njabili (2000a, 2000b) 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’ (Pottier, 1994; Whitehead, 2000) 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). The 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 SARs, while land access and ownership are important, equally crucial for survival are 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: Nitya Rao, 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: Elaine Lawson, March 2015; cf. Nyantakyi-Frimpong & Bezner-Kerr, 2015; Wossen & 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: Nitya Rao, October 2015). Rather than seeing women and men as autonomous entities, working independently of each other, hence always constrained by the absence of independent, individualized resource control (Carr, 2008a; Sugden et al., 2014), 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 generalizing, but more importantly, to recognize 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 SARs

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 0.5°C and 3.5°C 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 industrialized 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 SARs 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 & 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, Deshpande, Dubey, & Verschoor, 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 (Daron, 2014; Devereux, 2009; UNEP, 2011). 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: Nitya Rao, 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 organization 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, Twyman, Osbahr, and Hewitson (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 utilization 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, Tolossa, & Gebru, 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 & 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.

4.1. Water scarcity and drought

Multiple and inter-related risks affect people's livelihoods and well-being, 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.

4.2. 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 causes 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: Wapula Raditloaneng, November 2015).

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 (field notes, Wapula Raditloaneng, November 2015). 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 become 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 (field notes, Wapula Raditloaneng, November 2015).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 & 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.

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 & Moench, 2006), farmers taking further loans to pay off previous loans, perpetuating and increasing indebtedness (Prabhu & Deshpande, 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, Roesch, Venkatasubramanian, & Kumar, 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 & Bedi, 2007).

In order to temper farm household income shocks, men increasingly engage in off-farm labour work (Kocher, 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, Swaminathan, & Rawal, 2002; Rao, 2014). This strongly emerged in focus group discussions conducted with women between the ages of 22 and 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: Divya Solomon, 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 & 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, Brown, and Kelly (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: Nitya Rao, October 2015), domestic arrangements appeared fluid, with a large number of female-headed households, engaging in a range of transient relationships to help survival (cf. 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 (cf. Roncoli, 2006) 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.

4.3. *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, p. 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, led 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 a 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: Nitya Rao, October 2015).

We have briefly referred to youth aspirations in the last section. In view of the state discourse on modernization 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: Wapula Radiloaneng, November 2015). While an important initiative, in a context of globalization 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).

4.4. 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; Rao, 2008; Whitehead, 1984). 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 is seen to help adapt to increasing variability in production patterns (Goh, 2012). In the case of the Nile basin in Ethiopia, Deressa, Hassan, Ringler, Alemu, and Yesuf (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 feminized 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 fertilizers, provided both by the public and private sectors, women remain subsistence producers (Ahmed, Lawson, Mensah, Gordon, & Padgham, 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 (cf. 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 (Carr & Thomson, 2014; Rademacher-Schulz & Mahama, 2012). 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: Elaine Lawson, 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; Carr & Thomson, 2014; World Bank, 2005), 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

utilization, linked to sedentization 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: Nitya Rao, July 2016). In Ghana too, the 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%, the female head of household in 34%, and the wife in 27% of the cases. It was similar in the case of livestock production, with the man deciding on land allocation for pasture in 49% and the woman in 24% of the cases (Ipinge et al., 2000a). While men appear to be the primary decision-makers, the data provides 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 (Ipinge et al., 2000a), 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 (Cleaver, 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 well-being (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 (Flintan, 2010; Rao, 2008). 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 industrialized 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.

4.5. 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 & Menjono, 2014). The focus on the public and the productive in policy interventions tend to invisibilize 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 (cf. Angula, Conteh, & Siyambango, 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 Gabrielsson 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 well-being 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 (Andersson & Gabrielsson, 2012; Goulden, Naess, Vincent, & Adger, 2009; Reid & 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, Lamboll and Mvumi (2013) claim that the limited discussion of climate impacts on post-harvest 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: Divya Solomon, November 2015; cf. Zwarteween & Neupane, 1996).

What these examples reveal is the need to recognize 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 well-being 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 (Tschaket, 2007; Tschakert, Van Oort, Lera St. Clar, & LaMadrid, 2013). 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 recognizing 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 organizations 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 (Lawson, 2016; MESTI, 2014). 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 & 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 well-being 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 reorganization 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 monetization and commoditization 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 and is negotiated and renegotiated over time and place.

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Notes

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.
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.
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.

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