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From abandonment to autonomy: Gendered strategies for coping with climate change, Isiolo County, Kenya

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Highlights

- Access to resources, both social and material, is central to securing livelihoods.
- Persistent drought has called into question male incomes from pastoralism.
- Women's growing contributions have enhanced expectations of reciprocity.
- · Conjugal relationships are being renegotiated in efforts to cope with change.
- Understanding the heterogeneity of household relationships is key to adaptation.

Abstract



Access to resources, both material and social, are central elements in responding to social and environmental transition, and adapting to change, yet the ways in which such access is negotiated within and across varying household structures is not well understood. In semi-arid Kenya, persistent drought has made male incomes from pastoralism insecure, and contributed to women's growing engagement with trade, farming and other independent enterprises, for survival. This has, however, raised questions about women's dependence on men for household provisioning, and enhanced expectations of reciprocity in both production and reproduction within households. While demographers note the rise in female headship in sub-Saharan Africa, and female headed households are often the target of policy attention, the situation on the ground is much more complex. Polygamy, separation and consensual unions, multi-generational and multi-locational households, point to a growing diversity in gender and generational relationships, in rights, responsibilities and norms. Based on data from household surveys, focus group discussions and life history interviews with differently positioned women and men within pastoralist communities in northern Kenya, the paper explores the implications of changing household structures beyond headship, in particular the loosening of marriage ties, frequent separation and regrouping, on relational vulnerability and the micro-politics of adaptation in the region.



Keywords

Marital strategies; Gender; Drought; Pastoralism; Borana; Kenya

1. Introduction

Recent research emphasises the distinct vulnerabilities and impacts of climate change on women and men across different social groups, and calls for a more nuanced and contextual analysis, including of intra-household relations, to fully understand the implications for adaptation (MacGregor, 2010, Dankelman and Jansen, 2010, Carr and Thompson, 2014, O'Brien et al., 2007, Bunce and Ford, 2015, Ravera et al., 2016, Rao et al., 2017). It also accepts that not all changes can be attributed to climate; rather climatic factors interact with and intensify the effects of broader socio-political and livelihood changes, including those resulting from development interventions (Field et al., 2014, Blaikie et al., 1994, Adger, 2006, Eriksen and O'Brien, 2007, Ribot, 2010, Taylor, 2013, Tschakert et al., 2013).

While acknowledging gender differences, the literature on adaptation, however, continues to homogenise men and women as distinct categories, not giving adequate attention to wit in FEEDBACK C

issues of power and meaning, embedded in social identity (Carr, 2008, Kaijser and Kronsell, 2013, Djoudi et al., 2016, Nightingale, 2017, Turner, 2016), and relations of ethnicity, race, caste, class, stage in the life-course, or gender (Crenshaw, 1991, Collins, 2010, Nightingale, 2011, Elmhirst, 2011, Rao, 2005, Taylor, 2013). Characterising men as seeking solutions in the domain of production, often unsuccessfully, and women as either victims of male incapacity or virtuous in singlehandedly carrying the burden of household maintenance (Arora-Jonsson, 2011, Okali and Naess, 2013), is not helpful in finding ways to build adaptive capacities or support women's agency (Simiyu and Foeken, 2013, Hodgson and McCurdy, 2001).

The reality on the ground is complex, involving both conflicts and cooperation, hence securing social legitimacy becomes critical for operationalising resource use and control, particularly for women (Sen, 1990, Rao, 2017, Nightingale, 2017, Eriksen et al., 2015). While social capital, especially group-based approaches implicated in community based adaptation interventions have gained recognition for their contribution to strengthening women's adaptive capacities (Ngigi et al., 2017, Anderson and Gabrielsson, 2012, Anderson et al., 2012, Eriksen et al., 2015, Guyo, 2017), the role of friendships and informal partnerships, both within households and kin-groups, and externally, in supporting women's economic and everyday practices for managing ecological risks, remain largely invisible (Pollard et al. 2015). With few exceptions (Carney, 1988, Watts, 1983, Schroeder, 1996, Nielsen and Reenberg, 2010, Carr, 2008, Warner and Kydd, 1996, Wangui, 2014, amongst others), there is little attention to intra- and inter-household relationships, and how resource access is negotiated across these institutions in contexts of social transition and climate change, in research, policy or practice. Analysis of households, if at all, tends to focus on headship, or at best spousal relations, ignoring the host of gender and generational relationships, be it as husbands and wives, elders and juniors, patrons and clients (Turner, 2016), and equally, the fluidity in household structures themselves (Bryceson et al., 2013a). While patriarchal domination is viewed as a disadvantage confronting woman within households, restricting their agency; by its very nature, and the everyday interdependencies it entails, it can also provide opportunities for resistance and asserting alternate pathways to overcome vulnerabilities (Kandiyoti, 1998).

This paper, by asking how household structures and relationships are manipulated by differently positioned women and men as a strategy to respond to multiple risks, both climatic and non-climatic, and adapt to change, ensuring livelihood security in the process, seeks to fill this gap. What are the terms of partnership in household production and reproduction that shape the micro-politics of adaptation? In what ways does the exercise of women's agency affect their own wellbeing, alongside longer-term adaptation?

The data for this paper comes from research with the pastoralist (Borana) and agro-pastoralist (Meru) communities in semi-arid Northern Kenya. It was collected as part of the ASSAR (Adaptation at Scale in Semi-Arid Regions) project, which attempted to develop robust evidence on the factors that can work as barriers or enablers to sustained, equitable and widespread FEEDBACK \bigcirc

climate adaptation that improves the well-being of the most vulnerable in semi-arid regions. The strategies adopted by a diversity of marital household types present in the research site are explored, with specific attention to gender and generational relationships. Through such an analysis, it seeks to identify more specifically those groups who become invisible analytically when gender is seen as a male-female binary.

In Section 2, I briefly set out the key conceptual tools for analysing inter and intra-household relations in a context of coping with and adapting to climatic variability, in this case, persistent drought leading to water and pasture scarcity. This is followed in Section 3 by a discussion of the context and methods. Section 4 presents the key findings in terms of everyday coping strategies, and thinking around longer-term adaptation in the locality. Drawing on these insights, Section 5 explores the changing meanings of marriage, and of the household more broadly, as forms of reciprocal partnerships, contributing to adaptive capacities. Section 6 concludes.

2. Framing the debate

The starting point for this paper is an understanding of vulnerability as relational and contextual, and the importance therefore of unpacking the micro-politics of experiencing and responding to risks and building adaptive capacities at the individual and household levels (O'Brien et al., 2007). From Amartya Sen's (1981) definition of vulnerability as a failure of entitlements, shaped by the economic, social and structural relations within which people are embedded, emerges the insight that there will be winners and losers in coping with change (Blaikie et al., 1994, Taylor, 2013, Ribot, 2010). It is not gender per se, but the social relations of production, cultural norms and broader political-economic institutions, mediating the nature of exchanges, opportunities and the distribution of resources, which contribute to the specific constructions and experiences of vulnerability, as well as capacities to respond and cope with climate stresses (Ibid.; Watts, 1983). The focus then needs to be on unpacking the power and politics in everyday life to better understand the reasons why and the mechanisms through which inequalities, including gender inequalities, persist (Eriksen and O'Brien, 2007, Ribot, 2010, Kaijser and Kronsell, 2013, Tschakert et al., 2013).

Central to analyses of vulnerability are understandings of peoples' adaptive capacities as 'multistranded livelihood strategies that are embedded in the larger ecological and political-economic environment' (Ribot, 2010: 58). Livelihoods involve not just physical resources like land, credit or tools, but equally information, cultural knowledge, social networks and legal rights (Blaikie et al., 1994: 9). While there is a large body of work on the gendered nature of rural income diversification and 'deagrarianisation' in East Africa in the context of both climatic changes and shifts in the larger political economy contexts over time (Bujra, 1977, Bryceson, 2002a, Bryceson, 2002b, Ellis, 2000, Francis, 1998), there has been less emphasis on such disaggregated and historical analysis in pastoralist societies (c.f Scoones, 1995, Catley et al., 2013), the focus of this paper.

In reviewing the changing land and labour relations by gender and age in Africa from 1980 to 2015, Bryceson (2019) importantly highlights a weakening of dependency ties within family units, a tendency for younger and middle-aged women to question the social worth of being a housewife (especially in contexts of declining male incomes), and older women providing a fallback for migrant household members. While women's labour autonomy has increased, with many rejecting marriage, so have their work burdens, as labour productivity has not kept pace due mainly to women's unequal access to assets, whether land, labour or capital. This paper focuses on uncovering the distinct nature of trends and strategies available to women in different types of marital households in pastoralist societies, given that marital status, alongwith wealth and livestock specialisation is considered an important marker of difference (Hodgson, 2000, Brockington, 2001).

Shifting livelihoods in contexts of drought and consequent water and pasture scarcity imply shifts in the gender divisions of labour, alongside control over incomes and processes of decision-making. Much of the literature on diversification and adaptation has focused on production relations, changes in agricultural practices and crop choices, or composition of herds in the case of pastoralists. Women were centrally involved in milk collection, processing and sale, but with livestock moving further away from home and for longer periods of time in search of pasture, they have lost this source of income, and the power and identity it gave them (Dahl, 1990, Anderson et al., 2012). While women's growing responsibilities for household provisioning, with few resources, have been noted, the domain of reproduction and household maintenance remains largely invisible². In conceptually challenging the production-reproduction binary, feminist scholars have highlighted that social reproduction involves 'various kinds of work – mental, manual and emotional – aimed at providing the historically and socially, as well as biologically defined care necessary to maintain existing life and to reproduce the next generation' (Laslett and Brenner, 1989, Edholm et al., 1977). In fact, recent research on care work calls for a closer examination of its distribution across social institutions – the family, community, markets and state – in order to address both gender and class inequalities (Razavi, 2007, Elson, 2017, Rao, 2018).

The focus on divisions of labour within and across households as both coping and adaptive strategies, point not just to household members' engagement in multiple activities, involving informal sector work, use of common property resources, pooling of labour and other assets, changing consumption patterns, seeking new technologies, drawing on state social protection, investments, borrowings and savings (Shipton, 1990, Ellis, 2000), but equally the switching of tasks and responsibilities ascribed by gender, changing the intensity and mix of multiple occupations, and strengthening forms of social organisation and support (Jiggins, 1986). While the blurring of the gender division of labour in agriculture has been captured by the literatures on feminisation (FAO, 2012) and deagrarianization in Africa (Bryceson, 2019), within pastoral communities too, with contributions from men not forthcoming, women have little option but to step out of the boundaries of appropriate behaviour to support themselves and the FEEDBACK Contributions from the property of the step out of the boundaries of appropriate behaviour to support themselves and the FEEDBACK Contributions from the property of the step out of the boundaries of appropriate behaviour to support themselves and the feedback contributions from the the feedback contributions fro

(Hodgson and McCurdy, 2001). Engaging in different kinds of wage labour and income generating activities, including 'illicit' activities such as beer-brewing (Bryceson, 2002b), casual sex work (Hogg, 1980, Mosberg and Eriksen, 2015), and in the case under study, trade in miraa,³ can give women economic freedom and enhance agency (Djoudi et al., 2016, Livingstone and Ruhindi, 2012), challenging in the process the stereotype of the 'patriarchal pastoralist' (Hodgson, 2000: 1). Yet in contexts of extreme vulnerability, it can potentially expose them to additional work burdens, alongside engaging with more risky, if flexible ventures, with negative wellbeing effects (Arora et al., 2017). For many women, whose labouring bodies are their main asset, their invisible networks, including with mothers and female kin, become the major, if not only, source of support (Bujra, 1977, Cooper, 2017, Moore, 1986, Moore, 1988), despite the potential tensions therein (Rao, 2016).

Changes in everyday responsibilities and interactions are leading to a renegotiation of the 'conjugal contract', that is, 'the terms on which husbands and wives exchange goods, incomes, and services, including labour, within the household' (Whitehead, 1981: 88). While clearly there are inequalities of power embedded within these negotiations (Caretta and Borjeson, 2015), both women and men exercise agency in different ways, be it overt or covert, across genders and generations. With declining herds, the strong control over resource allocation by gerontocratic institutions comprising male elders, appears to be declining (Borgerhoff Mulder et al., 2010, Guyo, 2017, Holtzman, 2001, Smith, 1998). At the same time, gendered household dynamics too are changing rapidly, from greater cooperation to conflict and fragmentation, from polygamy to serial monogamy or promiscuity, reflecting changing conceptualisations of marriage, gender ideologies, property rights and power relations (Francis, 1998, Bryceson et al., 2013a).

When in positions of power, women can strategically manipulate these relationships to ensure favourable outcomes, as in the case of some of the older women discussed in this paper (c.f Rasmussen, 2000); for others, they use any opportunity available at a particular time and place in order to get by, what de Certeau (1984) calls 'tactics'. This idea of the 'everyday', of short-term tactics, draws attention to issues of embodied practice, of differences in knowledge and experience in the lives of women seeking to make a living in contexts of climatic variability, shifting demographics and economic opportunities (Ravera et al. 2016). It highlights that women's (or men's) agency cannot be understood in binary terms, as constraints and freedoms, barriers and enablers, or by its presence or absence. Rather, shaped by time-place conjunctures, and their personal and social circumstances, it is a complex mix of both the active and passive (Reader, 2007).

As a result, it is difficult to predict the direction of outcomes, both productive and welfare, as strategies for increasing incomes might negatively impact on health and wellbeing (c.f Eriksen and O'Brien, 2007). What is important is to locate women's choices and practices within the particular context of their use (de Certeau, 1984: 33), the focus here being the structure of the (marital) household itself. This would help better identify gendered vulnerabilities and power

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relationships, but equally tactics and strategies, some more risky and precarious than others, adopted by differently positioned women 'to enlarge their freedom of social manoeuvre' (Bujra, 1977: 13), and address them in sensitive ways.

3. Context and methods

The pastoralist (Borana) and agro-pastoralist (Meru) communities in Isiolo and Meru counties in semi-arid Northern Kenya confront multiple livelihood risks, resulting primarily from rainfall variability, water scarcity and frequent droughts. These aggravate pre-existing pressures on pastures due to demographic growth, the expansion of water-intensive, commercial crop cultivation in the rangelands around Mt. Kenya (Hertkorn et al., 2015), and unfavourable state land use policies including the establishment of conservancies for the protection of wildlife, and irrigation projects (Brockington, 2001, Owuor et al., 2011).

This paper focuses primarily on the Borana pastoralists in two sites – one rural, the other periurban. Rather than comparing the two sites, they are used to explore the continuum of coping and adaptive strategies across spatial contexts. The former is a small settlement of about 100 houses, roughly 60% Borana, and the remaining Meru, on the main Isiolo-Garbatulla road. It has a series of small shops, a police post, and a primary school. Semi-arid rangelands surround the village. The borehole water is unfit for consumption, hence a filtration system has been installed by the EU Community Development Trust Fund, but this is not functional. In the interim, over 60% of households purchase water, either from a local entrepreneur, who brings jerry cans from Mutuate (in Meru county), or from Borana women, who bring head/donkey loads from the neighbouring settlement. Both cost 20–50 kes⁴ per can across seasons. Those who cannot afford to purchase water, use the borehole.

While the Borana men are mainly engaged in pastoralism, there are significant generational differences in their coping strategies. With persistent drought, older men are seeking to adapt by changing their herd composition, appointing herders to travel longer distances from home for longer periods to access pasture and water, while younger men, lacking herds, are either employed as herders or move to urban centres in search of work. The Merians are involved in trade or enterprise, their residence here often temporary. Women of both communities engage in small-scale trading, including of water, firewood, soda ash and miraa. They also rent small shops and guesthouses, restaurants and bars, which sell provisions, and provide hospitality to people passing by the main road or the resident police officials (c.f Nori, 2010). In fact, like the recent rise in beer brewing amongst the Samburu pastoralists in the region (Holtzman, 2001: 1041), the sale of miraa or casual sexual services, need to be understood as potential options for women to obtain cash for a range of household needs, and an acknowledgement of the difficulties confronting men in providing food. With most of these products and services consumed locally, often by the wealthy and the 'elders', this becomes a way of redistributing money from men to women. Seen as socially unacceptable and low status in normal times, in a contex FEEDBACK 💭

drought and male incapacity to provide, there is little stigma attached to these choices (Bujra, 1977, Bryceson, 2002b). Very few engage in cultivation or casual labour. Generational differences are visible, with older women more secure in their livelihood choices than their younger counterparts.

The peri-urban site on the northern border of Isiolo town, with approximately 600 houses, mainly Borana, has grown rapidly over the past three decades. The settlement has been regularised and has some provision for water, sanitation and electricity, apart from several small shops, schools, a mosque, church and community hall. Some households have access to agricultural land, and while farming is a family enterprise, it appears to be primarily women's responsibility to cultivate maize, beans and sorghum for household consumption. Women additionally engage in petty business, buying and selling vegetables, provisions, miraa and small stock, and casual work including the provision of domestic cleaning and laundry services. Men engage in livestock trade, labouring tasks, construction and transportation (boda boda business). Those without any pastoral links are often destitute, suffering from drug and alcohol problems (c.f Little et al., 2008).

In order to understand changes in the domestic domain, in patterns of production and provisioning, and its implications for marriage and reciprocal relations, and in turn, on the adaptive capacities of men and women in the locality, multiple sources of data are used. A household survey in three rural sites, conducted with 297 households as part of the larger project, helps build a broad understanding of household demographics in these sites (Annex 1). Occupational profiles of men and women confirm the discussion above (Annex 2).

The survey was supplemented with life history interviews (10 households in each site), wherein households were purposively selected to include various marital types - monogamous, polygamous, separated, consensual/cohabitation, widowed, and multi-generational (Table 1). Interviews were conducted separately with at least two members of each household; in the case of separated men or women, their sister, mother, aunt, neighbour, or any person who supported them. Additionally, focus group discussions (differentiated by gender and age) were conducted in each site to understand the social norms guiding everyday practice. Participatory social and mobility mapping was used to understand settlement and mobility patterns. The data was collected between October 2014 and May 2017 in three fieldwork periods.

Table 1. Marital household types.

Household type	Borana		Meru		Total	
	No.	%	No.	%	No.	%
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Household type	Borana		Meru		Total	
	No.	%	No.	%	No.	%
Never married	11	8	10	6	21	7
Monogamous	60	44	65	41	125	42
Polygamous	5	4	16	10	21	7
Separated (single)	10	7	16	10	26	9
Separated (remarried)	15	11	15	9	30	10
Consensual/cohabitation	6	4	11	7	17	6
Widowed	30	22	27	17	57	19
Total	137	100	160	100	297	100

Source: Survey data.

The decision to unpack the category of 'female headship' by focusing on types of marital households, was supported by analysis of long-term trends from the Demographic Health Surveys (Fig. 1). While smaller households, with 1–5 members have been increasing since the early 1990s (from 23% to 44% between 1989–90 and 2014–15), this does not necessarily reflect an increase in nuclear, heterosexual households, as is easily assumed. On the contrary, it points to possible 'abandonment' of wives, due to the growing instability of pastoral mobility and marriage patterns. At least a part of the rise in female-headed units, from 32 to 36% during the same period, can be attributed to this. It is also interesting to note that medium-sized households (6–10 members) constitute over 50% of total households, indicating the persistence if not reinforcement of multi-generational, and often matrifocal, households (c.f Brock-Due, 2000, Talle, 1987). Such stratification helped nuance understandings of how the household structure itself can be a source of risk, or an enabling strategy for women and men in particular subject-positions (Rao, 2008), with marriage embracing a diverse mix of relationships: from total independence, to the consideration of marriage as a business partnership, a source of sexual pleasure or emotional support, to a notional provision of status (c.f Bryceson et al., 2013b).



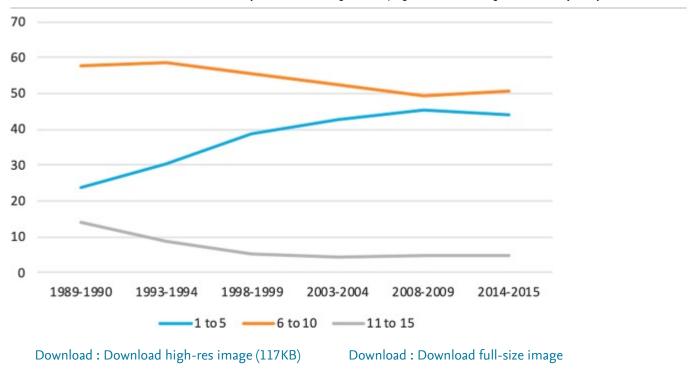


Fig. 1. Percentage of households by size-group.

Source: DHS several years.

4. Climate change, pastoral livelihoods and the Borana domestic economy

The study area is largely semi-arid and arid; the vegetation predominantly grassland and thorny bush with a few shrubs, and a recorded rainfall of 300–650 mm per year (Government of Kenya, 2013). The rainfall pattern is bimodal with short rains in October-November and long rains between March and May. The main sources of water are from rivers (Ewaso Ngiro and Tana), rainwater harvesting in pans and ponds, and wells or boreholes (Ibid.). Most households surveyed noted that the climate has become dryer over the past 5–10 years (96%), with erratic rainfall (82% pointed to delayed onset and early end during growing season), drought (93%) and destructive winds (80%).

Close to 90% of our respondents reported a decline in availability of water for both livestock and household consumption and a decline in rangeland for grazing, while over 70 percent noted a decline in soil fertility for farming. This has led to a breakdown of local resource access and sharing norms⁵ and intensified conflicts amongst pastoral groups, and with agropastoral groups (c.f Smith, 1998). As Mohamed (60), an elder in the rural site noted:

Life was easy in the old days but things have changed. There is no mercy between people these days; no milk as before, as a result of bad weather. I have less expectation of success going forward. I expect to turn my kids into entrepreneurs, hoping to train one of my sons as a mechanic.

A 40-year-old separated woman identified the persisting drought as the most significant event in her life. "Prices of everything have gone up, for instance, sugar now costs a hundred shillings per kilogram". There are several issues that these narratives raise, about the rising costs of commodities, the need to diversify to survive, the decline in food consumption and nutrition (availability of milk), the need for income to purchase water, growing competition between people for resources and dropouts from education.

Mobility has always been a central theme in pastoral livelihoods and wellbeing, shaped by the availability of water and grazing lands across seasons (Anderson and Brock-Due (1999)). A majority of the pastoralists in the rural site spent roughly a third of their time away from home. Yet, with climate variability and political-economic transformations, generational shifts are visible. As Abdul (45, married) said:

Depending on whether the herder is a relative or an employee, we still need to visit the herd every two weeks to check on the quality of pasture, watering, health of the animals. I pay my herder 4000 kes per month. Many of them, from their earnings, buy livestock, and build up their herds. They can then get married.

In addition to pastoral mobility, individuals and households are also moving for casual work or business enterprises. Ali, an elderly Borana pastoralist noted, "I moved to Mutuate for a short while (1992–1994) because of the Miraa business, but after my children started talking the Meru language, I felt afraid of them getting into the Meru culture and brought them back here." Mobility here is not just defined in terms of physical or spatial movement; it also includes the building and transformation of social networks and relationships, as well as the symbolic pathways through which status and wellbeing are negotiated. A fear of losing social connections can inhibit migration decisions as articulated by Ali. Migration in search of employment opportunities, not dependent on natural resources, then is limited to the youth.

Brock-Due's (1999: 51) insight, from her study of Turkana pastoralists in Northern Kenya, that poverty is not necessarily seen as a result of droughts and raids alone (leading to loss of cattle), but rather the inability of a person 'to move things his/her way', is central to understanding the decisions made by different members of the community. This ability to 'move things' includes the skill of managing herding and husbandry decisions on an everyday basis (identifying sources of pasture and water for the herds, looking after animal health etc), given particularly the seasonal cycles of dry and wet, scarcity and plenty. It also includes the ability to build a web of human relationships and social networks to access drought reserves and other support, primarily through expanding marriage and kinship relations (Hogg, 1992). In an FGD in the peri-urban site, older women pointed to the persistence of polygyny, with locationally dispersed wives, due to such mobility: "Men need women to care for them when away from their families. Regular spatial and temporal movements enabled the maintenance of second and third wives in the locations they frequent. Our religion also allows this". This idea of mobility or movement allowed for the joint reproduction of



the herd and the household, with gendered labour contributions to livestock management shaped by age and place in the domestic life cycle (Brock-Due, 2000).

Despite the challenges confronting pastoral mobility, recent studies note that the pastoralists of northern Kenya are not so impoverished that they will abandon pastoralism if other alternatives were available (Little et al. 2008, 588), especially as those diversifying may have greater cash, but are generally worse off than those dependent on herd production and reproduction (Hicks et al. 2017). Assets in terms of herds remain critical as a source of income and diversification, and play a social insurance function, emphasizing the material, relational and embodied elements of wealth in pastoral communities (Little et al., 2008, Borgerhoff Mulder et al., 2010, Hogg, 1980), including possibilities for employment of herders and gift-giving (c.f Bourdieu, 1977), symbols of status and class. As one of the wealthiest men in the rural site, Dabo, 55, noted, "I engage in cattle herding as my main source of livelihood. My wife operates the kiosk, when I am away looking after the animals. These are my key assets. She also takes care of the house and children".

The importance of having a herd, or at least a few animals, for Borana men to get married and maintain a household, was confirmed by 25 year old Bira, mother of a three year old daughter, living in the peri-urban settlement.

My husband goes regularly to my father's place in Kulamawe to herd his cattle. My parents are separated; my father moved out and has a second wife there. My younger brother died a few years ago, and so my father now treats my husband as his son. He is away for 2–3 months at a time, but I carry on with my daily life. The benefit is that my father sends a live goat back with him or the proceeds from the sale of a goat.

Bira's father seems to have followed a traditional mobility pattern that involved having wives in multiple locations; her own husband, however, lacking in stock, works as a herder for her father, in the process hoping to build up his own asset base. Having access to the labour of his son-in-law contributes to her father's status and adaptive capacity, the impacts for Bira's household, however, are less clear. While the domestic domain is constituted of reciprocal relations between women and men, seniors and juniors, clearly these relationships are not equal. Vulnerabilities and adaptive capacities are linked to the ability to successfully manoeuvre resources, especially labour and livestock. Without cattle to pay for bridewealth, marriage itself is becoming more fluid, as discussed next, replaced instead by informal ties.

5. Renegotiating the conjugal contract

I turn here to the possibilities and strategies open to women in different forms of marital households to make choices for sustaining their livelihoods that challenge established gender norms and relationships. I focus particularly on monogamous, polygamous, separated (single and remarried) and consensual or cohabitational relationships, problematising in the process ongoing gender and generational political and cultural dynamics. Clearly, resource access mediates the choices women can make, more so, as material contributions remair FEEDBACK \bigcirc

discretion of men. New forms of matrifocal, multi-generational households are emerging, often with widows and older women, who even if not heading these households, provide essential material and social support to their daughters and nieces, especially those seeking separation. Where possible, generational differences are discussed.

5.1. Monogamy, business partnerships and ties of reciprocity

50-year-old Abadaso, running a shop in the rural settlement, has had a stable partnership with her husband, a hospital cleaner till he retired a few years ago. She said:

His income was not sufficient to support me and our 7 children, all of whom were in school. My father had cattle and helped us with meat, milk and cash. Around 10 years ago, Samburu bandits raided our cattle, my brother was killed, and my father died of shock soon after. This is the worst thing that can happen to a pastoralist. I then moved here and started a miraa business. After saving money for two years, I managed to open a small grocery shop. It was not easy to come to a new place and start life but thanks to Almighty I managed. After he retired, my husband came here and helps in the shop. He is not good at networking, nor does he have business ideas, but I can trust him to look after the shop when I am selling miraa. I know how to invest cash and get profit, so have the final say financially.

Abadaso is relatively better off now, though she has struggled to attain this position. She had inherited, albeit informally, some cattle from her father, which helped educate her children, and later set up a miraa business and shop. She trusts her husband enough to manage the shop, but herself controls the resources, especially money, and how it is saved or invested. Her husband does not object, as apart from not having livestock or any independent source of wealth, he seems to recognize her abilities and skills. While her access to cattle was central to her survival strategies, she notes the difficulties of marrying for younger men, with shrinking resources and rising bridewealth costs.

My son married last week. I settled his entire dowry with my savings. I had to pay 30,000 kes and give 15 goats. It is very difficult to marry now unlike the old times. You need to pay money and some livestock, but these days the girl needs extra make-up, clothes, furniture for the house and many other things. It was not like that earlier.

Amongst the younger generation of Borana women, while they do receive some livestock, usually goats, at the time of their marriage (c.f Aguilar, 2000), this doesn't necessarily ensure access or stability. In a focus group discussion with young, married women in the peri-urban site, one of them, Dado, 22, said:

I got a cow from my father when I got married, they have multiplied and I now should have five. He maintains them with his herd. Sometimes he sells them and keeps the proceeds, so my herd has not grown a lot. Still, these are my assets.

As one of them said about her parents, "they took the bridewealth and sold us into marriage". Several younger women particularly resented their mothers' participation in their marria

for bridewealth payments. While we did not come across cases of female genital mutilation (FGM), in many pastoral societies, mothers foist this on their daughters, ostensibly to improve their marriage prospects (Talle, 1987). Yet when their marital relationships confront tensions or are close to collapse, both mothers and daughters appear to consciously invest in rebuilding relationships of trust and mutual support with each other.

Many of these younger women appeared resentful that their husbands often humiliated them when they asked for money. Most run small enterprises or businesses independently, but need support in terms of capital from their husbands. They felt they had sacrificed their lives for marriage – neither could their husbands provide adequately, including helping them set up small businesses, nor did they have the freedom or opportunities that they might have had if not married. Yet given the structural disadvantages they confront in a patriarchal society, such as wage differentials in gender-segregated labour markets, restrictions on their mobility, complete responsibility for domestic and unpaid care work, lack of education⁶, and unequal access to assets, especially land and livestock, they were keen to build reciprocal partnerships with their husbands. In a context of crisis and scarcity, the economic dimensions of relationships are central to building adaptive capacities.

5.2. Polygamous marriages and spaces for negotiation

This is visible in the continued monopolisation of the supply of wives by older and richer polygamous men, especially with escalating brideprice expectations, unless older women like Abadaso can pay for the marriage of their sons. Barely 22 years old, Salo was married in 2013 to 55 year old Dabo, the wealthiest man in the rural site, as his third wife. His first two wives had sought separation. About his successive marriages, Dabo said,

My first wife wanted to control all decisions in the home. This was unacceptable, as the Borana culture does not allow it. The man is responsible for major decisions; those days I was a very strong and no-nonsense person. How could she want the power of a man for herself? So she asked me to release her and I accepted. I married another wife, but she had a relationship with another man and asked for divorce, which I granted in 2010. Now I have only one wife, but all my children depend on me for their needs. I am proud I am able to support them all.

Cases such as this, bring out the importance of marriage for pastoralist men, as much as, if not more than, for women, as women are needed to maintain the home and care for the children while the men are away with their livestock. This dependence provides women some agency in terms of negotiating the conjugal contract, though differently inscribed and played out at different stages in their life (Waller, 1999, Brock-Due, 1999). For Salo, her parents did not tell her that the man was older or married earlier, but as they were getting three cattle and 20,000 kes for her, they asked her to accept (c.f Hertkorn et al. 2015). "I don't like marriage, I am not happy, but there is no option. I respect my parents and can't question their decision", she said. Her husband has 100 cows and 150 goats, so they have enough to maintain a good quality of life. She emphasised, "he treats me well, so there is no complaint". Here, the bridewealth exchange committed Salo to FEEDBACK P

man, not of her choosing, but to whom she was expected to be respectful (Hodgson and McCurdy, 2001). Her vulnerability is deeply intertwined with the security of her husband (c.f Turner, 2016).

While statistics might place Dabo's first two wives as 'separated' or 'abandoned' (Table 1), they requested divorce, taking the initiative to create and expand spaces for themselves, even though he had wealth and was able to provide for their needs (c.f Bujra, 1977). His sense of masculinity, couched in cultural terms, made him want to have full and unilateral control over all household decisions. This was not acceptable to them; and in the process of negotiation they sought to transform the boundaries of appropriate gender behavior, and indeed the conjugal contract. Dabo's second wife set up a restaurant with his capital, but later developed a secondary relationship, which was more equitable and less authoritarian. The man is a herder, he comes when he can, but doesn't interfere in her independent business activities. Salo, 22, Dabo's third wife, has two young children to care for, and this makes her accept his authority, even though she is not happy about it. "My husband is sometimes away for 4–5 days. I cook in the morning, then sit in the shop. I have no help, there is nobody with whom I can leave my children, so just have to manage on my own".

50-year old Abdia, the second wife of Waris, had an interesting story to tell about both herself and her daughter. She was in a polygynous marriage but got on well with the first wife; they shared tasks and brought up their children together. The first wife died of typhoid, and Waris, though wealthy, did not marry again. In recent years, they have had frequent disagreements, mainly around property, as Abdia felt that Waris was discriminating against her children. She is determined to secure her fair share as inheritance for her children, and has taken the matter to the clan elders, a legitimate space for negotiation available to the 'good wife' (c.f Wangui, 2014). After several decades of serving him and bringing up his children, she has a clear sense of her entitlement. Six months ago, Abdia left his house to stay with her separated daughter, and her three young children. This was another strategy for negotiation, as responsible for farming the land they have by the river, without her labour, the land now lies uncultivated.

5.3. Co-habiting and consensual relationships

Abdia now looks after the home and children, while her daughter, a miraa trader, works till late at night to earn enough for their upkeep and education. She narrated,

My daughter was not married, but got pregnant, so her father got angry and threw her out of the house. She went to her brother's house in Nairobi with this man, but in 2014, he was killed in a cattle raid. She then met a Bantu man and had a child with him. He left her but is paying school fees for the child. She had a third relationship, but when the child, a son, was a little over a year old, this man too left her and doesn't help in any way. She is an attractive girl, even her face can earn her money. They see her in the market and ask if they can be friends, and she brings them home.



While we could not speak to her daughter directly, she aspires to give her children a 'good life' and this involves good quality higher education, which is not cheap. In the rural site too, there are several household groups with women and young children, without resident men. With a police post close by, it is possible that some of the women provide food and sexual services to the bachelors at the post. Rather than seeking a specific payment for sexual services, the relationships are based on daily social interactions and some sense of reciprocity, a relationship described as 'cohabiting girlfriend-wives' by Bryceson et al. (2013b: 45). Some of the women also have relationships with mobile herders, who come to the village to eat and rest when in the vicinity, like Dabo's second wife. Often of a temporary and ambiguous nature, precluding any long-term obligations, these relationships may occur between marriages, based on reciprocal exchanges of food and gifts, and at times cash (Stevens, 1995). They carry the possibility of resource redistribution from men to women within the community, similar to beer-brewing (c.f Holtzman, 2001) or the miraa trade. In the absence of information on contraception or protection, they are however prone to pregnancies, and like Sheena, discussed in the next section, could be at risk of infection.

5.4. Abandonment, separation and divorce

The account of Bira, 22, and her mother, 50, points to interesting connections but also divergences in women's experiences of separation and abandonment across generations and its implications for their lives, livelihoods and adaptive capacities.

My mother sells miraa in the market and from her earnings buys food for us. I have a small kiosk outside our house. I bought the goods and my mother helped by constructing the structure for me. This side of town is very remote, so I buy what I can from the wholesaler in town. Sometimes if they know you they will extend 200–300 kes of credit, but there is not that kind of trust for it to be larger amounts. There are now lots of kiosks here so 5000 kes worth of goods will last a whole month and ten days into the next. I could get more if the location was better.

Bira is constrained by a young child, but also the responsibility for the three children of her brother, who died the previous year. While she earlier noted that her husband herded cattle for her father, his income was clearly unreliable and occasional; in fact, according to her neighbours, her husband no longer visited. With male incomes from pastoralism increasingly uncertain, her mother is her main support, and jointly they provide for the extended household. Bira has been saving in a self-help group (SHG) of nine members; and received 9000 kes as credit the previous month. However, she had to spend half this amount on wiring work in the house, so had a small amount left as capital for investment in her kiosk. Constraints of location, care-work and multiple responsibilities are making it difficult for her to grow her business.

Bira's mother, though not legally divorced, was virtually abandoned by her husband, when he took another wife. Yet she established a successful miraa business and brought up her two young children with only occasional support from him. She, Bira, and her son's widow and children live together and as explained by Bira, she continues to support Bira monetarily, socia FEEDBACK \bigcirc

physically, in fulfilling her responsibilities. Older women like her, or Abdia (between polygamy and separation), having faced hardship early in their lives, are relatively more secure now, able to manage their enterprise, support their families and take strategic life decisions in the best interests of themselves and their children. Whatever their formal marital status, they have no expectations of financial or other substantive support from their husbands and have learned to negotiate a degree of peace and security in their lives.

Unlike Bira, who reported being in a monogamous marriage, and her mother a senior wife in a polygynous arrangement (though long separated), Noor, a 30-year old woman, recently left her two older children with her husband's family and moved back to her mother's home with her 10-month old baby. Her husband was cheating on her, and rather than putting up with emotional distress, she felt it was better to be independent.

I have these last few weeks been taking up casual cleaning jobs. I washed clothes and got paid 300 kes. Housework is done on a daily basis and payment depends on the type and amount of work. More the work, more the pay. There are no proper timings and sometimes I get home late. I have no option, I need money to feed my baby, all the responsibility is now on me. I am trying to set up a vegetable business. If this succeeds, I hope to buy a plot and construct my own house. That will be a better life.

In Noor's case, she spends long hours working outside the home, while her mother or aunt care for her child. Younger women like Bira or Noor clearly have difficult lives. With young children to care for, and no support from their husbands, they take on any task they can, to feed their children and support their household (Hodgson and McCurdy, 2001, Hogg, 1980, Djoudi et al., 2016). While reflecting agency in maintaining themselves, sometimes women's everyday practices and strategies can be risky, with negative effects on their health and wellbeing. 35 year old Sheena, now separated, moved to work in Nairobi in 2003 as her parents could not afford to send her to secondary school. She narrated,

I worked at a company that makes jeans and other clothes as a helper for three years. My salary was 7000 kes per month. I met my husband there; he used to sell drugs and that was our source of income. I knew I was HIV positive when I got pregnant with my first child. He left me when we found out, so I moved back to Isiolo, and started selling mirra at night. My customers are mostly men, so when the business was not good, I started having sex for money. I had to bring up my child. This is how I met the father of my second child. When I told him I was pregnant with his child, he rejected me, saying I had affairs with many men. Occasionally I do casual work like weeding, but I can't work regularly. I am not stressed about my status and believe that it is only God who gives and takes life. My cousin, who works at the slaughterhouse, helps pay my bills, and my aunt gives my children and me food. I don't like asking relatives for help, but I have no choice. I don't believe in marriage now, and only want the best future for my children.

Sheena's move to Nairobi, abandonment after she got pregnant, and subsequent use of her body, her only resource, to feed her child, led to her exposure to HIV. What seems clear is that sexual FEEDBACK

compromise or transactional sex of an occasional nature is a coping mechanism adopted by women, reeling under pressures of famine and uncertain male incomes, to fulfil their needs for food and survival (Bujra, 1977, Bryceson and Fonseca, 2006). In the case of pastoral households, this appears to be a relatively new phenomenon, though not unknown in times of crisis.⁷

Recognising the support of her kin, and in many ways her dependence on them, for both material support and a sense of belonging and identity, Sheena is not keen to enter into another marriage. She prefers to invest in recreating and strengthening her bonds with her natal kin, for its potential role in mediating her future security (Cooper, 2017, Shipton, 2007). Noor too does not think of going back to her husband or any other man. The sexual promiscuity of her husband, alongside close monitoring of her movements, a total lack of trust and reciprocity, was unacceptable to her and changed her perspective about marriage itself. But rather than seeing themselves as 'alone', these women seek to actively create a new family, with their mothers or aunts, constructing a sense of 'relatedness' (Carsten, 2000), through a sharing of everyday lives and practices. Marital breakdown is not conflated with social breakdown; rather they construct their identities as members of women-centred, multi-generational, matrifocal units, sharing resources and domestic labour (Francis, 1998: 92).

This is evident also from the case of Hussein, 33, in the peri-urban site, married in 2004, but separated in 2007. He noted the growing difficulties faced by young men in providing for their wives and families. "She was so demanding, I was unable to maintain her. She asked for a divorce and I had to agree, but I am heartbroken. And now without any work, it is unlikely I can marry again". Hussein was trading in miraa in Nairobi, but after his wife divorced him, he returned to Isiolo. In fact, much of the story of 'female abandonment' is really about women seeking separation from men for multiple reasons, ranging from male inability to provide adequately, as in the case of Hussein, or persistent male desire to exercise complete authority over their wives and children, as in the case of Dabo. Women resent both male control and male incapacity. With their growing contributions to both household production and reproduction, they have enhanced expectations of reciprocity in their relationships, be it with male partners or matrifocal kin, as the only way to cope with change.

6. Some concluding remarks

Increasingly uncertain and precarious livelihoods have raised the importance of understanding the changes taking place in the domestic domain, and how differently positioned women and men are renegotiating and manipulating gender and wider social roles and relationships to cope with varied forms of vulnerability. In a context of drought and scarcity, the fluidity in marital relations and indeed material conditions is shaped by the ways in which gender, generation, class or ethnic identity mediate access to both material and cultural resources, with implications for the consequent choice of livelihood activities. Those most vulnerable, in this case, young, separated women, are pushed into more risky ventures than others. Such a nuanced FEEDBACK CP

understanding is key to planning for and supporting sustainable adaptation, based on principles of livelihood security, social equity and environmental justice.

Centrally involved in household production and reproduction, with their responsibilities enhanced in periods of crisis and change, women seek both recognition and support for their contributions from their male partner - capital for production and time and care for reproduction. Where such support or an element of reciprocity is not forthcoming, they use their labour, and indeed intellect, to bargain for a better deal, an effort really to challenge and transform the power relations within marriage. Their everyday tactics involve diversification of their activities, at times risky, withdrawal of labour from male enterprises, or indeed moving out of their marital home and creating an independent life for themselves. In the process, they also seek a redistribution of resources and wealth from senior men to women within the community.

Enduring marriages, though an ideal, are no longer the norm. While older women, whether married or separated, have accepted the lack of male support and developed strategies, through their life-time, to cope with uncertainty, young women struggle to survive, and at times desperately seek to achieve interdependency and establish reciprocal relations with men. With high aspirations for their children, especially if they were denied opportunities for education and employment, they are willing to experiment with new types of households, from polygamy, to serial monogamy, cohabiting relationships, and husbands and wives living in different locations. Such choices, however, involve trade-offs, as the fluidity of the household structure can have adverse consequences for wellbeing, especially their health, both physical and emotional, as men continue to have a greater license to be promiscuous and have multiple partners/wives. Yet younger men in particular noted the difficulties they were facing in both getting married and sustaining their relationship; many of them like Hussein confronting depression and a sense of uselessness, taking drugs and engaging in violence. From the 'ability to move things his/her way', the focus now is on financial flows, child support and residential arrangements, 'the ability to get by', at least in the short-run.

The research provides insight into women's agency in the face of severe constraints, pointing to potential areas of support and intervention that can address the dynamics of the domestic domain – both through production support and creating an enabling environment for household reproduction. Borana women are often dependent on their fathers or husbands for capital to set up an enterprise. While there is a customary practice of allocating some stock for the use of their wives and daughters, with persistent drought, this is under threat. A few NGOs have initiated savings and credit schemes for women, especially in the urban site. These schemes, however, can also be constraining, as access to loans depends on women's savings, and not necessarily their capital requirements. Over half the loan received by Bira was spent on house repairs, making it difficult to invest in the expansion of her business.

With insecure material back-up, younger women in particular are dependent on their older female kin, mothers, sisters or aunts, for physical, material and moral support wi FEEDBACK 💭

domestic work. In the absence of basic services like clean drinking water, cooking fuel, good quality health or child-care services, these women would be unable to survive, or indeed adapt, without such support (Brock-Due, 2000, Jackson, 2015, Pollard et al., 2015, Rao, 2016). Abdia's daughter may herself suffer ill-health in the future, but is able to educate and feed her children with the support of her mother, who is additionally trying to secure for her a share of inheritance, so she could have a more stable and less risky livelihood. Apart from child-care, sexual and reproductive health services too, including contraception, are hardly available.

Despite adversity, or perhaps as a result, not many amongst the Boranas have been able to access good quality higher education that can open up opportunities for remunerative employment. In its absence, pastoralism remains central to the livelihood strategies of communities in northern Kenya, preferable in terms of both incomes and status to other forms of casual, unskilled work. Nevertheless, in confronting drought and scarcity, community structures for enforcing male responsibility for family provisioning have broken down; and with state support grossly inadequate, there is no option for women but to manipulate the household to the extent possible. Without a deeper understanding of the heterogeneity of household relationships and the relational vulnerability these entail, the micro-politics of resource access and distribution between different categories of 'men' and 'women', and importantly, the social relations and networks in which they are embedded (Rao, 2017), adaptation that is both sustainable and equitable is unlikely to occur. Given the multiple drivers of change and vulnerability, such understanding has the potential to open up alternate pathways for building adaptive capacities, whether explicitly through protecting livelihood assets or strengthening institutions (including state provision of basic services and labour markets) that can help transform unequal power relations.

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Annex A. Household Demographics (Survey) in three rural sites

Variable	Values	Kenya N	Kenya N=298		
		Rural	Rural site	Rural	
		Meru	K	В	
Number of HH	N	96	103	99	
Sex of HH Head	Male	46.9	57.3	60.6	
(% HH)	Female	53.1	42.7	39.4	
Ethnicity of HH Head (% HH)	Meru	99	55.3	0	
	Borana	1	41.8	100	
	Somali	0	2.9	0	
Average No of days away from home - HHH	Mean	0.4	1.6	7.4	
Average days duration of residence (HHH)	Mean	42.7	24.2	44.3	
% Female-Headed HH	%	53.1	42.7	39.4	
% HH where HH Head did not complete any schooling		39.6	57.3	57.6	
Income diversification las ten years (% HH having diversified)	%	13.5	35.9	4.8	
% HH shift from pastoralism to agro-pastoralism		13.5	3	0	
% HH members working as casual/hired labour		15.8	2.2	0.19	
% HH members Pastoralists		0.86	6.9	25.4	
% HH cultivating own land		26.7	2.7	0.6	
Main source drinking water (dry season – % HH)	Piped	5.3	0.9	8.9	
	Supply outside house	1.1	0	0.9	
	Public/communal	0	1.8	90.3	
	Bowser/truck	32.6	4.6	0	
	Purchased in jerry cans	61.1	92.7	0	
Main source drinking water (rainy season – % HH)	Piped	0	(FEEDB	ACK 🔽	

Variable	Values	Kenya N=298		
		Rural Meru	Rural site K	Rural B
	Supply outside house	16.1	1.4	0
	Public/communal	12.6	4.2	0
	Bowser/truck	12.6	87.5	100
	Purchased in jerry cans	58.6	6.9	0
Mean travel time to dry season drinking water source	Minutes	36.9	30.1	46.7
Mean travel time to rainy season drinking water source	Minutes	12.4	27.7	46.7

Annex B. Occupation by gender (N=475)

Occupation	Male	Female	Total
Farming	61 (27.5)	93 (37)	154 (32.5)
Pastoralism	60 (27)	59 (23)	119 (25)
Trade/business	24 (11)	59 (23)	83 (17.5)
Casual/hired labour	32 (14.5)	6 (2.5)	38 (8)
Private/public sector job	14 (6)	5 (2)	19 (4)
Charcoal/firewood	7 (3)	19 (7.5)	26 (5.5)
Student/others	19 (8.5)	11 (4.5)	30 (6.25)
Does not work	5 (2.5)	1 (0.5)	6 (1.25)
Total	222	253	475

Source: Household survey. Figures in brackets our percentages.

Recommended articles Citing articles (6)



References

Adger, 2006 W.N. Adger

Vulnerability

Global Environ. Change, 16 (2006), pp. 268-281

Article 🎵 Download PDF View Record in Scopus Google Scholar

Aguilar, 2000 M.I. Aguilar

Pastoral disruption and cultural continuity in a pastoral town

D.L. Hodgson (Ed.), Rethinking Pastoralism in Africa: Gender, Culture and the Myth of the Patriarchal Pastoralist, James Currey, London (2000), pp. 249-264

View Record in Scopus Google Scholar

Anderson and Brock-Due, 1999 D.M. Anderson, V. Brock-Due

The Poor are Not Us: Poverty and Pastoralism in Eastern Africa

James Currey, Oxford (1999)

Google Scholar

Anderson et al., 2012 D.M. Anderson, H. Elliott, H.H. Kochore, E. Lochery

Camel herders, middlewomen, and urban milk bars: the commodification of camel milk in Kenya

J. Eastern Afr. Stud., 6 (3) (2012), pp. 383-404

CrossRef View Record in Scopus Google Scholar

Anderson and Gabrielsson, 2012 E. Anderson, S. Gabrielsson

"Because of poverty, we had to come together": collective action for improved food security in rural Kenya and Uganda

Int. J. Agric. Sustain., 10 (3) (2012), pp. 245-262

Google Scholar

Arora et al., 2017 D. Arora, J. Arongo, S. Burkart, N. Chirinda, J. Twyman

Gender (Im)balance in Productive and Reproductive Labor Among Livestock Producers in Colombia: Implications for Climate Change Responses

CCAFS Info Note, Copenhagen (2017)

Google Scholar

Arora-Jonsson, 2011 S. Arora-Jonsson

Virtue and vulnerability: discourses on women, gender and climate change

Global Environ. Change, 21 (2011), pp. 744-751

Article Download PDF View Record in Scopus Google Scholar

Blaikie et al., 1994 P. Blaikie, T. Cannon, L. Davies, B. Wisner

At Risk: Natural Hazards, People's Vulnerability and Disaster



Routledge, London (1994)

Google Scholar

Borgerhoff Mulder et al., 2010 M. Borgerhoff Mulder, I. Fazzio, W. Irons, R.L. McElreath, S.

Bowles, A. Bell, T. Hertz, L. Hazzah

Pastoralism and wealth inequality: revisiting an old question

Curr. Anthropol., 51 (1) (2010), pp. 35-48

CrossRef View Record in Scopus Google Scholar

Bourdieu, 1977 P. Bourdieu

Outline of a Theory of Practice

Cambridge University Press, Cambridge (1977)

Google Scholar

Brock-Due, 1999 V. Brock-Due

Remembered cattle, forgotten people: the morality of exchange and the exclusion of the Turkana poor

D.M. Anderson, V. Brock-Due (Eds.), The Poor Are Not Us: Poverty and Pastoralism in Eastern Africa, James Currey, Oxford (1999), pp. 50-88

Google Scholar

Brock-Due, 2000 V. Brock-Due

The fertility of houses and herds: producing kinship and gender among Turkana pastoralists

D.L. Hodgson (Ed.), Rethinking Pastoralism in Africa, James Currey, Oxford (2000), pp. 165-185

Google Scholar

Brockington, 2001 D. Brockington

Women's income and the livelihood strategies of dispossessed pastoralists near the Mkomazi game reserve, Tanzania

Hum. Ecol., 29 (3) (2001), pp. 307-338

View Record in Scopus Google Scholar

Bryceson, 2002a D.F. Bryceson

The scramble in Africa: reorienting rural livelihoods

World Dev., 30 (5) (2002), pp. 725-739

Article Download PDF View Record in Scopus Google Scholar

Bryceson, 2002b D.F. Bryceson (Ed.), Alcohol in Africa: Mixing Business, Pleasure and Politics, Heinemann, Portsmouth, NH (2002)

Google Scholar



Bryceson and Fonseca, 2006 D.F. Bryceson, J. Fonseca

Risking death for survival: peasant responses to hunger and HIV/AIDS in Malawi

World Dev., 34 (8) (2006), pp. 1654-1666

Article Download PDF View Record in Scopus Google Scholar

Bryceson et al., 2013a D.F. Bryceson, J.B. Jonsson, H. Verbrugge

For richer, for poorer: marriage and casualized sex in East African artisanal mining settlements

Dev. Change, 45 (1) (2013), pp. 79-104 Google Scholar

Bryceson et al., 2013b D.F. Bryceson, J.B. Jonsson, H. Verbrugge

Prostitution or partnership: Wifestyles in Tanzanian artisanal gold-mining settlements

J. Modern Afr. Stud., 51 (1) (2013), pp. 33-56 View Record in Scopus Google Scholar

Bryceson, 2019 D.F. Bryceson

Gender and generational patterns of African deagrarianization: evolving labour and land allocation in smallholder peasant household farming, 1980–2015

World Dev., 113 (2019), pp. 60-72

Article Download PDF View Record in Scopus Google Scholar

Bujra, 1977 J. Bujra

Production, property, prostitution: 'Sexual politics' in Atu

Cahiers d'etudes Africaines, 17 (65) (1977), pp. 13-39

CrossRef View Record in Scopus Google Scholar

Bunce and Ford, 2015 A. Bunce, J. Ford

How is adaptation, resilience, and vulnerability research engaging with gender?

Environ. Res. Lett., 10 (2015), pp. 1-11

Google Scholar

Caretta and Borjeson, 2015 M.A. Caretta, L. Borjeson

Local gender contract and adaptive capacity in smallholder irrigation farming: a case study from the Kenyan drylands

Gender, Place Cult., 22 (5) (2015), pp. 644-661

View Record in Scopus Google Scholar

Carney, 1988 J. Carney

Struggles over crop rights and labour within contract farming households in a gambian irrigated rice project

J. Peasant Stud., 15 (3) (1988), pp. 334-349

CrossRef View Record in Scopus Google Scholar

FEEDBACK 💭

E.R. Carr

Carr, 2008

Between structure and agency: Livelihoods and adaptation in Ghana's Central Region

Global Environ. Change, 18 (4) (2008), pp. 689-699

Article

Download PDF

View Record in Scopus

Google Scholar

Carr and Thompson, 2014 E.R. Carr, M.C. Thompson

Gender and climate change adaptation in agrarian settings: current thinking, new directions, and research frontiers

Geogr. Compass., 8 (3) (2014), pp. 182-197

View Record in Scopus CrossRef Google Scholar

Carsten, 2000 J. Carsten (Ed.), Cultures of Relatedness: New Approaches to the Study of Kinship, Cambridge University Press, Cambridge (2000)

Google Scholar

Catley et al., 2013 A. Catley, J. Lind, I. Scoones (Eds.), Pastoralism and Development in Africa: Dynamic Change at the Margins, Routledge, London (2013)

Google Scholar

Collins, 2010 P.H. Collins

The new politics of community

Am. Sociol. Rev., 75 (1) (2010), pp. 7-30

View Record in Scopus Google Scholar

Cook et al., 2016 J. Cook, P. Kimuyu, D. Whittington

The costs of coping with poor water supply in rural Kenya

Water Resour. Res., 52 (2016), pp. 841-859

View Record in Scopus Google Scholar

Cooper, 2017 E. Cooper

Beyond the everyday: sustaining kinship in western Kenya

J. R. Anthropol. Inst., 24 (2017), pp. 30-46

CrossRef Google Scholar

Crenshaw, 1991 K. Crenshaw

Mapping the margins: intersectionality, identity politics, and violence against women of color

Stanford Law Rev., 43 (1991), pp. 1241-1299

View Record in Scopus Google Scholar CrossRef

Dahl, 1990 G. Dahl

Mats and milk pots: the domain of Borana women

FEEDBACK 💭

A. Jacobson-Widding, W. van Beek (Eds.), The Creative Communion: African Folk Models of Fertility and the Regeneration of Life, Acad. Upsaliensis, Uppsala (1990)

Google Scholar

Dankelman and Jansen, 2010 I. Dankelman, W. Jansen

Gender, environment and climate change: understanding the linkages

I. Dankelman (Ed.), Gender and Climate Change: An Introduction, Earthscan, London (2010), pp. 21-54

Google Scholar

De Certeau, 1984 M. De Certeau

The Practice of Everyday Life

University of California Press, Berkeley (1984) Google Scholar

Djoudi et al., 2016 H. Djoudi, B. Locatelli, C. Vaast, K. Asher, M. Brockhaus, B.B. Sijapati

Beyond dichotomies: gender and intersecting inequalities in climate change studies

Ambio, 45 (3) (2016), pp. S248-S262

View Record in Scopus Google Scholar

Edholm et al., 1977 F. Edholm, O. Harris, K. Young

Conceptualising women

Critique Anthropol., 3 (9&10) (1977), pp. 101-130

View Record in Scopus Google Scholar

Ellis, 2000 F. Ellis

Rural Livelihoods and Diversity in Developing Countries

Oxford University Press, Oxford (2000)

Google Scholar

Elmhirst, 2011 R. Elmhirst

Migrant pathways to resource access in Lampung's political forest: gender, citizenship, and creative conjugality

Geoforum, 42 (2) (2011), pp. 173-183

Article Download PDF View Record in Scopus Google Scholar

Elson, 2017 D. Elson

Recognize, reduce, and redistribute unpaid care work: how to close the gender gap

New Labor Forum., 26 (2) (2017), pp. 52-61

CrossRef View Record in Scopus Google Scholar

Eriksen and O'Brien, 2007 S. Eriksen, K. O'Brien

Vulnerability, poverty and the need for sustainable adaptation measures



Clim. Policy, 7 (4) (2007), pp. 337-352

View Record in Scopus Google Scholar

Eriksen et al., 2015 S.H. Eriksen, A.J. Nightingale, H. Eakin

Reframing adaptation: the political nature of climate change adaptation

Global Environ. Change, 35 (2015), pp. 523-533

Article Download PDF View Record in Scopus Google Scholar

FAO, 2012 FAO

Women in Agriculture: Closing the gender gap for development

The State of Food and Agriculture (SOFA) Report 2010–11 Food and Agriculture Organisation of the United Nations, Rome (2012) Google Scholar

Field et al., 2014 C.B. Field, V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, L.L. White (Eds.), 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 (2014)

Google Scholar

Francis, 1998 E. Francis

Gender and rural livelihoods in Kenya

J. Dev. Stud., 35 (2) (1998), pp. 72-95

CrossRef View Record in Scopus Google Scholar

Government of Kenya, 2013 Government of Kenya

Isiolo County Integrated Development Plan, 2013–2017

G.O., Nairobi. Kenya (2013), p. 221

View Record in Scopus Google Scholar

Guyo, 2017 F.B. Guyo

Colonial and post-colonial changes and impact on pastoral women's roles and status

Pastoral.: Res. Policy Pract., 7 (13) (2017), pp. 1-19

CrossRef Google Scholar

Hertkorn et al., 2015 M.-L. Hertkorn, H. Roba, B. Kaufmann

Caring for livestock: Borana women's perceptions of their changing role in livestock management in Southern Ethiopia

Nomadic Peoples, 19 (2015), pp. 30-52

CrossRef View Record in Scopus Google Scholar



```
J.H. Hicks, M. Kleemans, N.Y. Li, E. Miguel
```

Hicks et al., 2017

Reevaluating agricultural productivity gaps with longitudinal microdata

NBER Working Paper No. 23253

National Bureau of Economic Research, Cambridge, MA (2017)

Google Scholar

Hodgson, 2000 D.L. Hodgson (Ed.), Rethinking Pastoralism in Africa: Gender, Culture and the Myth of the Patriarchal Pastoralist, James Currey, London (2000)

Google Scholar

Hodgson and McCurdy, 2001 D.L. Hodgson, S.A. McCurdy

"Wicked" Women and the Reconfiguration of Gender in Africa

James Currey, Oxford, UK (2001)

Google Scholar

Hogg, 1980 R. Hogg

Pastoralism and impoverishment: the case of the Isiolo Borana of Northern Kenya

Disasters, 4 (3) (1980), pp. 299-310

CrossRef View Record in Scopus Google Scholar

Hogg, 1992 R. Hogg

Should pastoralism continue as a way of life?

Disasters, 16 (2) (1992), pp. 131-137

CrossRef View Record in Scopus Google Scholar

Holtzman, 2001 J.D. Holtzman

The food of elders, the 'ration' of women: Brewing, gender, and domestic processes among the Samburu of northern Kenya

Am. Anthropol., 103 (4) (2001), pp. 1041-1058

View Record in Scopus Google Scholar

Jackson, 2015 C. Jackson

Modernity and matrifocality: the feminisation of kinship?

Dev. Change, 46 (1) (2015), pp. 1-24

CrossRef Google Scholar

Jiggins, 1986 J. Jiggins

Women and Seasonality: coping with crisis and calamity

IDS Bull., 17 (3) (1986), pp. 9-18

CrossRef View Record in Scopus Google Scholar

Kaijser and Kronsell, 2013 A. Kaijser, A. Kronsell

Climate change through the lens of intersectionality



Environ. Polit., 23 (3) (2013), pp. 417-433 Google Scholar

Kandiyoti, 1998 D. Kandiyoti

Gender, power and contestation: rethinking bargaining with patriarchy

C. Jackson, R. Pearson (Eds.), Feminist Visions of Development, Routledge, London (1998), pp. 135-151

Google Scholar

Kaye-Zweidel and King, 2014 E. Kaye-Zweidel, E. King

Kenyan pastoralist societies in transition: varying perceptions of the value of ecosystem services

Ecol. Soc., 19 (3) (2014), p. 17 Google Scholar

Laslett and Brenner, 1989 B. Laslett, J. Brenner

Gender and social reproduction: historical perspectives

Annu. Rev. Sociol., 15 (1989), pp. 381-404

CrossRef View Record in Scopus Google Scholar

Little et al., 2008 P.D. Little, J. McPeak, C.B. Barrett, P. Kristjanson

Challenging orthodoxies: understanding poverty in pastoral areas of East Africa

Dev. Change, 39 (4) (2008), pp. 587-611

CrossRef View Record in Scopus Google Scholar

Livingstone and Ruhindi, 2012 J. Livingstone, E. Ruhindi

Women and economic diversification in pastoral societies: a regional perspective

C. Catley, J. Lind, I. Scoones (Eds.), Pastoralism and Development in Africa: Dynamic Changes at the Margins, Routledge, London (2012)

Google Scholar

MacGregor, 2010 S. MacGregor

Gender and climate change: From impacts to discourses

J. Indian Ocean Region, 6 (2) (2010), pp. 223-238

CrossRef View Record in Scopus Google Scholar

Moore, 1986 H. Moore

Space, Text and Gender: An Anthropological Study of the Marakwet of Kenya

Cambridge University Press, Cambridge (1986)

Google Scholar

Moore, 1988 H. Moore

Feminism and Anthropology



University of Minnesota Press, Minneapolis (1988)

(Chapter 3: 'Kinship, Marriage and Household: Understanding Women's Work')

Google Scholar

Mosberg and Eriksen, 2015 M. Mosberg, S.H. Eriksen

Responding to climate vulnerability and change in dryland Kenya: the role of illicit coping strategies in the politics of adaptation

Google Scholar

Global Environ. Change, 35 (2015), pp. 545-557

Article Download PDF View Record in Scopus

Ngigi et al., 2017 M.W. Ngigi, U. Mueller, R. Birner

Gender differences in climate change adaptation strategies and participation in group-based approaches: An intra-household analysis from rural Kenya

Ecol. Econ., 138 (2017), pp. 99-108

Article Download PDF View Record in Scopus Google Scholar

Nielsen and Reenberg, 2010 J.O. Nielsen, A. Reenberg

Cultural barriers to climate change adaptation: a case study from Northern Burkina Faso Global Environ. Change, 20 (2010), pp. 142-152

Article Download PDF View Record in Scopus Google Scholar

Nightingale, 2011 A.J. Nightingale

Bounding difference: intersectionality and the material production of gender, caste, class and environment in Nepal

Geoforum, 42 (2011), pp. 153-162

Article Download PDF View Record in Scopus Google Scholar

Nightingale, 2017 A. Nightingale

Power and politics in climate change adaptation efforts: struggles over authority and recognition in the context of political instability

Geoforum, 84 (2017), pp. 11-20

Article Download PDF View Record in Scopus Google Scholar

Nori, 2010 M. Nori

Milking drylands: Gender networks, pastoral markets and food security in stateless Somalia

PhD Thesis

Wageningen University (2010)

Google Scholar

O'Brien et al., 2007 K. O'Brien, S. Eriksen, L.P. Nygaard, A. Schjolden

Why different interpretations of vulnerability matter in climate change discourses

Clim. Policy, 7 (1) (2007), pp. 73-88

FEEDBACK 💭

View Record in Scopus Google Scholar

Okali and Naess, 2013 C. Okali, L.O. Naess

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 (2013)

Google Scholar

Owuor et al., 2011 B. Owuor, W. Mauta, S. Eriksen

Strengthening sustainable adaptation: examining interactions between pastoral and agropastoral groups in dryland Kenya

Clim. Dev., 3 (1) (2011), pp. 42-58

CrossRef View Record in Scopus Google Scholar

Pollard et al., 2015 G. Pollard, M.I.J. Davies, H.L. Moore

Women, marketplaces and exchange partners amongst the Marakwet of northwest Kenya

J. East Afr. Stud., 9 (3) (2015), pp. 412-439

CrossRef View Record in Scopus Google Scholar

Rao, 2005 N. Rao

Questioning women's solidarity: the case of land rights, Santal Parganas, Jharkhand, India

J. Dev. Stud., 41 (3) (2005), pp. 353-375

CrossRef View Record in Scopus Google Scholar

Rao, 2008 N. Rao

"Good Women do not Inherit Land": Politics of Land and Gender in India

Social Science Press and Orient Blackswan, New Delhi (2008)

Google Scholar

Rao, 2016 N. Rao

Mothers, daughters and wellbeing: A Santal perspective

N. Rao (Ed.), Disciplinary Dialogues on Social Change: Gender, Early Childhood and

Theatre, Academic Foundation, New Delhi (2016), pp. 277-299

View Record in Scopus Google Scholar

Rao, 2017 N. Rao

Assets, agency and legitimacy: towards a relational understanding of gender equality policy and practice

World Dev., 95 (2017), pp. 43-54

Article Download PDF View Record in Scopus Google Scholar

Rao et al., 2017



N. Rao, Elaine T. Lawson, Wapula N. Raditloaneng, Divya Solomon, Margaret N. Angula

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

Clim. Dev. (2017), 10.1080/17565529.2017.1372266 Google Scholar

Rao, 2018 N. Rao

Global agendas, local norms: mobilizing around unpaid care and domestic work in Asia Dev. Change, 49 (3) (2018), pp. 735-758

CrossRef View Record in Scopus Google Scholar

Rasmussen, 2000 S. Rasmussen

Exalted mothers: gender, aging, and post-childbearing experience in a tuareg community D.L. Hodgson (Ed.), Rethinking Pastoralism in Africa, James Currey, Oxford (2000), pp. 186-207

View Record in Scopus Google Scholar

Ravera et al., 2016 F. Ravera, I. Iniesta-Arandia, B. Martin-Lopez, U. Pascual, P. Bose

Gender perspectives in resilience, vulnerability and adaptation to global environmental change

Ambio, 45 (3) (2016), pp. S235-S247 Google Scholar

Razavi, 2007 S. Razavi

The political and social economy of care in a development context

UNRISD Gender and Development Programme Working Paper No. 3 United Nations Research Institute for Social Development, Geneva (2007) Google Scholar

Reader, 2007 C. Soran Reader

The other side of agency

Philosophy, 82 (2007), pp. 579-604

CrossRef View Record in Scopus Google Scholar

Ribot, 2010 J. Ribot

Vulnerability does not just fall from the sky: toward multi-scale, pro-poor climate policy

R. Mearns, A. Norton (Eds.), Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World, The World Bank, Washington D.C. (2010), pp. 47-74 View Record in Scopus Google Scholar

Schroeder, 1996 R.A. Schroeder

```
Can. J. Afr. Stud., 30 (1) (1996), pp. 69-87
```

View Record in Scopus Google Scholar

Scoones, 1995 I. Scoones (Ed.), Living with Uncertainty: New Directions in Pastoral Development in Africa, International Institute for Environment and Development, London (1995)

Google Scholar

Sen, 1981 A. Sen

Poverty and Famines: An Essay on Entitlement and Deprivation

Oxford University Press, Oxford (1981)

Google Scholar

Sen, 1990 A. Sen

Gender and cooperative conflicts

I. Tinker (Ed.), Persistent Inequalities: Women and World Development, Oxford University Press, New York (1990), pp. 123-149

View Record in Scopus Google Scholar

Shipton, 1990 P. Shipton

African famines and food security: anthropological perspectives

Annu. Rev. Anthropol., 19 (1990), pp. 353-394

CrossRef View Record in Scopus Google Scholar

Shipton, 2007 P. Shipton

The Nature of Entrustment: Intimacy, Exchange and the Sacred in Africa

Yale University Press, New Haven (2007)

Google Scholar

Simiyu and Foeken, 2013 R.R. Simiyu, D. Foeken

"I'm only allowed to sell milk and eggs": Gender aspects of urban livestock keeping in Eldoret, Kenya

J. Modern Afr. Stud., 51 (4) (2013), pp. 577-603

View Record in Scopus Google Scholar

Smith, 1998 K. Smith

Farming, marketing, and changes in the authority of elders among pastoral Rendille and Ariaal

J. Cross-cult. Gerontol., 13 (1998), pp. 309-332

View Record in Scopus Google Scholar

Stevens, 1995 L. Stevens

Bananas, babies and women who buy their graves: matrifocal values in a patrilineal

Tanzanian society



Can. J. Afr. Aff., 29 (3) (1995), pp. 454-480

View Record in Scopus Google Scholar

Talle, 1987 A. Talle

Women as heads of houses: The organization of production and the role of women among pastoral Maasai in Kenya

Ethnos, 52 (1987), pp. 5-7

Google Scholar

Taylor, 2013 M. Taylor

Climate change, relational vulnerability and human security: rethinking sustainable adaptation in agrarian environments

Clim. Dev., 5 (4) (2013), pp. 318-327

CrossRef View Record in Scopus Google Scholar

Tschakert et al., 2013 P. Tschakert, B. van Oort, A.L. St. Clair, A. LaMadrid

Inequality and transformation analyses: a complementary lens for addressing vulnerability to climate change

Clim. Dev., 5 (4) (2013), pp. 340-350

CrossRef View Record in Scopus Google Scholar

Turner, 2016 M.D. Turner

Climate vulnerability as a relational concept

Geoforum, 68 (2016), pp. 29-38

Article Download PDF View Record in Scopus Google Scholar

Waller, 1999 R. Waller

Pastoral poverty in historical perspective

D.M. Anderson, V. Brock-Due (Eds.), The Poor Are Not Us: Poverty and Pastoralism in Eastern Africa, James Currey, Oxford (1999), pp. 20-49

View Record in Scopus Google Scholar

Wangui, 2014 E.E. Wangui

Livelihood shifts and gender performances: space and the negotiation for labor among East Africa's pastoralists

Ann. Assoc. Am. Geogr., 104 (5) (2014), pp. 1068-1081

CrossRef View Record in Scopus Google Scholar

Warner and Kydd, 1996 M.W. Warner, J.G. Kydd

Beyond gender roles? Conceptualizing the social and economic lives of rural peoples in sub-Saharan Africa

Dev. Change, 28 (1) (1996), pp. 143-168

Google Scholar



Watts, 1983

M.J. Watts

Silent Violence: Food, Famine and Peasantry in Northern Nigeria

University of California Press, Berkeley (1983)

Google Scholar

Whitehead, 1981 A. Whitehead

'I'm hungry, mum' - The politics of domestic budgeting

K. Young, C. Wolkowitz, R. McCullagh (Eds.), Of Marriage and the Market: Women's Subordination in International Perspective, Routledge and Kegan Paul, London (1981), pp. 93-116

View Record in Scopus Google Scholar

- See Carr and Thompson (2014) for a brief review of this literature.
- There is some work on the time and effort involved in the collection of drinking water (Cook et al., 2016).
- The Kenyan term for khat, a plant intoxicant widely consumed in the region, the local retail sales of which is largely in the hands of women.
- 4 144 Kenyan Shillings=1 GBP.
- Kaye-Zweidel and King (2014) indicate that this may be due to varying perceptions of scarcity, assigning different values to ecosystem services, and the degree of social capital available to engender collective action.
- Our survey revealed that only around 12 per cent of women had secondary education, and a third had a few years of primary schooling. Noor had studied till class 3, Salo class 6. Bira has completed secondary education and wanted the same for her children. Boys, however, don't fare much better amongst the Boranas, only 18 per cent have completed secondary education.
- Hogg (1980) records how younger Borana women, pushed out of pastoralism following the shifta wars in the 1960s took to formal and informal courtesanship.

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From abandonment to autonomy: Gendered strategies for coping with climate change, Isiolo County, Kenya - ScienceDirect

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