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Structures, Systems and Differences that Matter: Casting an Ecological-Intersectionality Perspective on Female Subsistence Farmers' Experiences of the Climate Crisis

Abstract. Based on research with subsistence farmers in Kenya, this article applies a gender and ecological-informed intersectionality lens to explore how and why overlapping modes of social injustices and ecological conditions augment subsistence female farmers' vulnerability and shape their (non)adaptive responses to the climate crisis. We uncover the inter-locking and underlying social/ecological power dynamics at macro (global; biosphere), meso (country; local ecosystems), and micro (interpersonal, personal; inter-populations/communities of organisms) levels, revealing how these human- and natural-world elements intra-act and affect consumers' actions/vulnerabilities and undermine the effectiveness of climate-resilient interventions. We call for scholars/practitioners to identify and address intersecting global and localized power dynamics (including their own positions of power), to add a gender- and ecological-focus, and to include the voice and perspective of all participants so that solutions do not increase (gendered) inequalities/inequities or vulnerabilities.

Keywords: Intersectionality, Climate Crisis, Subsistence farmers, Gender Injustices, Ecological Systems, Social Interventions

Introduction

Around the world female farmers living near subsistence levels are disproportionately bearing the effects of the climate crisis and resultant environmental disruptions. Farmers experience increases in erratic rainfalls, droughts, floods, disrupted planting cycles, fungal breakouts, insect infestations, and reduced crop harvests (Roy et al. 2018). Yet as this article reveals, for subsistence farmers in the developing world, notably women, a combination of factors such as global/local political and economic power dynamics, class-based inequalities and gender-based inequities, and ecological conditions, intersect and magnify the hardships or vulnerabilities they experience. These factors affect their ability to recover from and to adapt to the new realities the climate crisis brings.

If formal and informal exchanges of marketing systems, such as services (e.g., knowledge or skills training) or products (e.g., social innovations), are to play a constructive role in the creation of viable and equitable solutions, it is critical that the effects *and* sources of intersecting inequalities (unequal conditions) and inequities (injustices) be recognized. To achieve this requires that we augment macromarketing thought—its analysis of exchanges in markets, transnational phenomenon (e.g., the climate crisis), and contributors to quality of life (Peterson 2020)—by delving intentionally and more specifically into the multiple, underlying power asymmetries and dynamics supporting inequities/inequalities. One contribution of our article is thus to layer on an intersectionality perspective. This illuminates how overlapping power structures and elements amplify and vary the vulnerabilities subsistence farmers encounter and shape their (re)actions. Vulnerabilities here refer to situational vulnerabilities: they are “an outcome of economic, social and environmental conditions”, which reduce people’s ability to “act in their own best interests” (in this case, adopting mitigation or adaptation solutions), increase dependency, and result in the “materialization of risks”, notably loss of livelihood and increase experiences of poverty in various dimensions (Baker 2009, 116, 117, 118). To capture the contributing factors of vulnerabilities, we include the voices of those near the bottom of

the power pyramids, linking their experiences back to sources of inequalities/inequities vested in overarching power modes.

Second, by adopting an intersectionality analysis with a gender-informed lens, this article underscores the importance of capturing gender injustices, such as those vested in practices of patriarchy (social systems dominated by men) and sexism (gender inequities/ discrimination). We delve within the category of ‘women’ to reveal how these dynamics intra-act with other variables (nationality per geopolitical powers, ableism inequities resulting from mental/physical abilities, and ethnic/tribalism inequalities) to affect climate (in)justice. This article accordingly extends the work on intersectionality theory in (macro)marketing¹ (e.g., Saatcioglu and Corus 2014) and contributes to climate science (Ryder 2018) by going beyond systemic class-based elements to draw attention to how gender injustices matter and overlap with other inequities/inequalities to augment vulnerabilities to the climate crisis.

Our third contribution is to extend theories of marketing systems and intersectionality. These two theoretical lens concentrate largely on *social* systems, often omitting or treating ecological elements as peripheral, inert conditions (Campbell, O’Driscoll, and Saren 2013) or, in the case of disaster-related research (Baker 2009), as a situational variable. Yet ecological elements can likewise exert power and act intra-actively and recursively with the social world (Barad 2007) to magnify or reduce vulnerabilities. In this paper we thus introduce an *ecological-intersectionality perspective*, using our findings to demonstrate its applications and our discussion section to articulate the insights such an approach can offer.

Accordingly, in this paper we address the following questions:

- 1) *How*: How do intersectional vulnerabilities materialize? Specifically, in what ways do different farmers, especially poorer females, struggle to adapt to and mitigate against the impact of the climate crisis?
- 2) *Why*: Per an ecological-intersectionality perspective, what interlocking elements of oppression in social and ecological systems at macro (global, biosphere), meso (country, local ecosystems), and micro (personal, interpersonal, and inter-populations/communities of organisms) levels contribute to heightening or reducing vulnerabilities?

To start, we summarize the literature on the climate crisis and environmental concerns related to (macro)marketing and consumer behavior, detailing the gaps in knowledge that we seek to address. We then delve into what an intersectionality perspective entails to frame the analytical format we adopt in relating our findings. Correspondingly, we explore the intra-actions of macro-, meso-, and micro-level social practices/structures and ecological elements, elucidating various power asymmetries and intersectional injustices that cause those with intersectional identities to experience vulnerabilities. We conclude by reflecting on implications for practitioners and scholars, drawing attention to how the recognition of social-ecological intra-acting power dynamics, the inclusion of recipients’ voices and realities, and critical examinations of assumptions and positions of power, are key if proposed solutions are to have a positive effect.

Climate Crisis, Consumer Behavior and Marketing Systems

Since the 1960s, macromarketing scholars have studied sustainability and environmental crises, assessing how marketing systems inform the behavior of market actors and affects consumers’ quality of life (Mittelstaedt et al. 2014). As scholars elucidate, the underlying ‘dominant social paradigm’ (DSP) governing Western/Northern marketing systems supports neoliberal capitalism (favoring free markets), limits state intervention, encourages rapacious consumption and unlimited private property rights, supports technological advancements, pursues unlimited abundance and progress, and results in governments, businesses and consumers valuing economic growth over ecological and social wellbeing (Kilbourne, McDonagh, and Prothero 1997; Kadirov 2011; Lloveras and Quinn 2017). Asymmetric benefits result as more affluent societies exploit the natural resources of developing

¹ Our usage of (macro)marketing captures applicability to both marketing and macromarketing.

countries at cheap prices, while developing countries are left to bear the cost of resultant environmental degradation with limited economic growth to show for it (Patsiaouras, Saren, and Fitchett 2015; Shultz and Holbrook 1999). As Kilbourne (2004, 132) surmises, “the benefits of liberalization and open markets are not shared equally by all”, and the consequences of these (global) inequalities can have compounding effects.

To capture compounding effects, Kilbourne (2004) explicated, would require researchers to consider additional variables (including capabilities, education, and gender equality) and to include those in least developed countries. However, apart from a few notable exceptions (e.g., Viswanathan et al. 2014), macromarketing’s environmental studies remain focused on how marketing systems and/or the DSP influence behaviors, with a concentration on those in more developed nations. Rather than assessing *overlapping* (global) inequalities that magnify environmental injustices, and grappling with how to change sources of inter-locking inequities, scholars center on correcting flaws in marketing systems related to environmental footprints, or focus more narrowly on radically disrupting the DSP driving (over)consumption (Mittelstaedt et al. 2014).

Accordingly, because Kilbourne’s (2004) agenda remains largely muted, underdeveloped areas remain. Failure to explore inequalities has limited our understanding of the effects of *overlapping power imbalances* on people’s capacity to reduce their environmental footprint and their exposure to environmental crises. In many of the extant studies, power is ignored or left intact, or even leveraged in efforts to use marketing and political systems to bring about change (e.g., Peterson 2012; Press and Arnould 2009). For those that consider power imbalances, the analysis remains quite narrow. For example, scholars might acknowledge political power dynamics between stakeholders (Lloveras and Quinn 2017; Press and Arnould 2009; Prothero, McDonagh, and Dobscha 2010) or global power asymmetries (e.g., Patsiaouras, Saren, and Fitchett 2015), however, other significant, often localized experiences of power imbalances (e.g., class, ethnic/race or gender-based inequities) tend to be omitted.

The consequences of overlooking additional asymmetries are two-fold. First, proposed solutions assume that market actors, including consumers, can equally wield sufficient resources and political power (e.g., activism) to adopt proposed solutions or transform market spaces. These assumptions may not hold when you start to look beyond privileged consumers or market actors. Indeed, they stand at odds with studies on micro-level dynamics of consumer behavior (e.g., Boström and Klintman 2017) and wider work on market access in (macro)marketing (e.g., Saatcioglu and Corus 2014). Consumer behavior studies emphasize that the ability of market actors to affect change is premised on: i) personal resources (income or education levels); ii) shifting personal motives, attitudes, beliefs, or perceptions of consumers’ effectiveness; and iii) externally-imposed opportunities and pressures (eco-friendly options, legal reforms, tax credits, activism platforms, social pressures) (Moisander 2007).

Marketing scholars who more specifically study the relation between environmental crises and vulnerability allude to similar findings. Although focused predominately on Western countries and class dynamics (e.g., Baker 2009), they emphasize how the effects of resource and choice constraints can limit the capacity of actors to act and can heighten hardships. For example, Baker, Hunt and Rittenburg (2007) find that, given the pervasiveness of marketing systems, post natural-disaster, a USA-based community’s “dependence on external forces (e.g., social support; local, state, and federal assistance...) to restore control” and a semblance of normalcy increased (p. 17). While this work demonstrates the importance of considering disempowering conditions, it can be furthered. Additional elements, such as the effects of sexism and ableism and the inter-locking social systems that support these outcomes, remain overlooked. An intersectionality perspective that “expands the contextualization of lived consumer experiences” (Askegaard and Linnet 2011) is needed.

This ties into the second consequence of the limited appreciation of inequalities: research related to the climate crises has largely omitted the realities of consumers who are at the ‘bottom’ of these power pyramids. As Viswanathan et al. (2014) and our paper will describe, the realities of subsistence market consumers are vastly different than those in more affluent positions and markets. They have fewer financial resources and often less government aid to cope with environmental crises.

Due to low literacy, they face cognitive predilections that can undermine their capacity to adopt preventive measures (Steinfeld and Holt 2019). Thus, the agency they enact will look very different than the political power or activism yielded by more affluent consumers. Additionally, the study of subsistence markets calls for a shift in how most (macro)marketers study environmental issues. Rather than problems of over-consumption it is under-consumption. And rather than treating the environment as an inert, externality of marketing systems, it directly intra-acts with the production and consumption capacity of consumers (Viswanathan et al. 2014), as illustrated by subsistence farmers.

In sum, expanding on Kilbourne (2004), we find that current understandings of and solutions posed for climate issues need to: 1) consider multiple social injustices and power dynamics; and 2) capture how these social elements interact with ecological elements to affect consumers' (re)actions and well-being/vulnerabilities. In essence, there is a need for an ecologically-informed, intersectionality perspective.

Intersectionality Theory

An intersectionality lens calls researchers to be attentive to overlapping/inter-locking power relations and social injustices so that the resulting oppressive conditions can be brought to light, and sources of inequalities and inequities challenged and changed (Collins 2015). It is particularly concerned with oppressions that result at the intersection of *multiple categories of difference*, such as gender, race/ethnicity, class, able-bodiedness or -mindedness, age and/or nationality. As intersectionality theory points out, people in categories that differ from the naturalized norm (e.g., Western, white, educated male) can experience a multifold of oppressions because “social practices, institutional arrangements, and cultural ideologies” are vested with, and reflect the power of, dominant groups and their interests (Davis 2008, 68). Dominant groups historically constructed these practices (e.g., sexism or preferential treatment of males), arrangements (e.g., classism or systems/policies that benefit upper classes at the cost of lower classes), and ideologies (e.g., the DSP's neoliberal capitalism). Supporting these sources protects the dominant's group privileged positions and way of life (MacKinnon 2013). The result of these power asymmetries is thus systemic conditions that give rise to experiences of overlapping privilege or support for some, while for others they result in compounding or intersecting outcomes of oppression. Oppressions may take different forms including discrimination (unjust treatment), additional hardships, disadvantages, marginalization, invisibilities, and/or (mis)recognitions. In turn, they can augment vulnerabilities.

While marketing scholars have applied intersectionality theory to study some consumer groups and market conditions ([see Steinfeld et al. 2019b for an overview](#)), methodologically and theoretically it remains under-explicated in the field. Thus to clarify our approach, we briefly outline these considerations.

First, from a research planning perspective, intersectionality theory encourages scholars to: i) examine the experiences of persons or groups who face overlapping oppressions that are linked to their intersecting identity categories; and ii) to collect evidence and adopt a perspective that can identify how problems of “sameness and difference” relate to “power” (Cho, Crenshaw, and McCall 2013, 795). Second, methodologically, it pushes scholars to seek a goal of inclusion when collecting data, that is, to “give voice to the oppressed” and their multiple marginalizations (Choo and Ferree 2010, 131). ‘Giving voice’ moves their experiences from the margins to the center of theorizing, raises awareness of social injustices and the need for change, and challenges theories and practices premised on the experiences of the dominant group (Collins 2000).

Third, during analysis, an intersectionality lens calls scholars to “ask the other question” to identify obvious and non-obvious forms of oppression: if something looks sexist one could ask, ‘Where are the class interests or racism in this?’ (Matsuda 1991). It thus applies an inductive and deductive approach. Inductively it works to find patterns in experiences of oppression and/or privilege based on the voices of people. Yet it also requires researchers to deductively identify the unnamed elements – elements that remain undiscussed because they are naturalized, taken for granted – and to question “what does the ‘not said’ mean” (Winker and Degele 2011, 57). An intersectionality analysis then assesses the *interactivity* of the (un)spoken inequalities/inequities and their effects, and how they *mutually shape* one another (Walby, Armstrong, and Strid 2012). To accomplish this scholars propose

a process that combines, compares and fluctuates between data from the lived experiences and additional data that supports deductive assessments of structural elements and power relations (Winker and Degele 2011).

Fourth, theoretically, intersectionality theory advocates for a critical praxis that embodies a “motivation to go beyond mere comprehension of intersectional dynamics to transform them” (Cho, Crenshaw, and McCall 2013, 786), yet it also asks scholars and practitioners to be self-reflexive of their own actions, involvement and impact, and how privileges or oppressions affect their worldviews (Jones 2010).

Building on this, we posit that to capture a more holistic view of injustices, intersectionality theory, like (macro)marketing, needs to recognize the dynamic life and power vested in *ecological elements*. As Campbell, O’Driscoll and Saren (2013) contend, “viewing non-human...things as inert non-agentic entities... downplays their importance and fails to account for how such resources can co-create...social reality” (p. 318). Accordingly, in our findings we demonstrate how reality is complexly co-created between social/human and ecological/natural systems, and how injustices and the ability of subsistence consumers to adopt mitigation and adaptation strategies can be influenced by both.

Methods

The primary data for this study forms part of a collaborative research project on social innovations related to the climate crisis, which was conducted with 41 subsistence farms near Nanyuki, a rural community of Kenya (Laikipia county). Farmers involved in the project were given key inputs (e.g., seeds, fertilizer) and training to adopt conservation agriculture (CA) techniques, as well as materials to create simple solar cookers. Farmers were sourced from relations built with two community organizations, with all members joining (n=21; n=19). Of the 41 farms, an elderly husband-and-wife team worked the small plots of land on three farms, women took care of 34 plots of land, and men oversaw the remaining four farms. The farmers were predominately older in age, with half being low-literate, and lived at subsistence levels (their houses that exhibited a basic standard of living). Six farmers had better living standards due to the occupations of household members.

We explored the ability of subsistence farmers to adopt: 1) mitigation strategies, which included CA techniques and social innovations (e.g., solar cookers) that could help lower CO₂ emissions and deforestation produced by farming and household activities; and 2) adaptation strategies, including water ponds (implemented by other actors) that could help farmers adapt to dryer and more erratic rainfall conditions; and our CA techniques and inputs that could improve the soil’s micro-biological composition, water retention, and fertility, crop yields and familial self-provisioning.

Per intersectionality theory’s call for self-reflexivity of researchers, we detail the timeline of our study, our interventions, and the interview and focus groups we did over four years of fieldwork in Table 1.

INSERT TABLE 1 HERE

To answer our research question related to ‘how’ and ‘why’ farmers struggled with adaptation and/or mitigation strategies, for all the interviews, we probed for potential differences that could affect their experiences. Observations of each farmers’ physical condition and identity factors (e.g., able-bodiedness, age, gender, marital status, literacy and cognitive skills), the ecological conditions (soil fertility/type, crops, pests, disease), and farmers’ adoption of solutions (water ponds, solar cookers, CA) were recorded in field notes. Soil samples were taken and analyzed to support our observations of depleted/fertile ecological conditions. In the CA intervention, we gradually reduced the sponsorship of key inputs (e.g., seeds, fertilizers) over three years of planting. This enabled us to trace how intersectionality vulnerabilities materialized and to more readily comprehend the impeding factors that limited uptake. It likewise allowed us to identify how farmers exhibited agency in their efforts to be more resilient to climate crises, which is in line with scholarship that advocates for a more balanced view of power dynamics (e.g., Steinfeld et al. 2019a).

Additional fieldwork included visiting the regional agricultural ministry and government warehouses (where farmers accessed inputs and information), and multiple interviews with an elderly

community member involved in helping local farmers. All interviews and focus groups were recorded and conducted in the local language, with local translators assisting. We use pseudonyms to preserve anonymity.

We complemented our interview material with additional primary and secondary data to identify the underlying and interacting macro-, meso- and micro-level power dynamics (after [Steinfeld et al. 2019a](#); Winker and Degele 2011), as summarized in Table 2. This helped explain ‘why’ subsistence (female) farmers struggled and illuminated elements that went undiscussed in interviews. We confirmed with interviewees more knowledgeable about the specificities of social (e.g., political) or ecological dynamics, such as the agricultural officer, elderly community member, and our local researcher, that our interpretation of this additional data was appropriate.

INSERT TABLE 2 HERE

The analysis thus adopted a confirmatory hermeneutical process (after Thompson (1997)). We allowed for categories and codes to first emerge from interviews, and to evolve and expand as we discerned patterns (and differences) across interviews by going back and forth between the data and related literature. From the initial phase of assessment, key identity constructs emerged that signaled differences in how farmers coped with the interventions. These included gender, class, marital status, able-bodiedness and -mindedness, ecological conditions (e.g., quality of land), and ethnicity (tribe). These were coded and tied back to the systemic conditions that shaped these experiences per our additional primary/secondary data search. Notably, when analyzing the interaction of macro-meso-micro level elements, we constantly asked “the other question” (Matsuda 1991, 1189) and probed for what was unsaid. We also included a critical assessment of our own actions and power, and asked participants questions (in our last field visit) to confirm our analysis.

Findings: Manifestations and Consequences of Power Relations

In the following analysis we take a concentric approach to identify how and why power dynamics increase female farmers’ vulnerabilities and affect their capacity to mitigate against or adapt to the climate crisis. We start with over-arching ecological and macro-meso social power dynamics, and then elucidate how these intra-act with more localized (micro-level) elements of inequalities/inequities and vulnerabilities. Figure 1 provides a visual diagram of these dynamic and recursive (cause and effect) intra-actions between ecological (or natural-world) and social (or human-world) systems (as denoted by the bi-directional arrows), which create experiences of oppression/privilege and increases/decreases in vulnerabilities. In turn, these feed into consumers (in)actions and (re)actions.

The Natural World: Over-arching Ecological Intra-activities

At the macro-ecological level, one of the most apparent power dynamics is that exerted by greenhouse gases (GHGs), such as CO₂. The additive layer GHGs create in the atmosphere traps incoming solar and outgoing thermal radiation, creating heat that biosphere intra-actions geographically redistribute. These affect global temperatures and the hydrosphere (water levels) in the air (IPCC 2014), and create reactions at meso and micro ecological-levels. The result is environmental instabilities that heighten vulnerabilities for certain farmers.

Macro-Meso Ecological Intra-actions

In Kenya, GHGs’ redistributive powers and effects have changed meso-level (localized) weather patterns. Average temperatures have risen by about 1°C since 1960 (World Bank 2020). In Nanyuki, the frequency of droughts has increased, occurring every two to three years, alongside erratic rains, floods and humidity levels that affect traditional planting seasons (MoALF 2017). As posteriorly detailed, the effects of these are disproportionately born by farmers from lower socio-economic classes, particularly women, who rely on rain-fed agriculture and face limitations in buying inputs needed for replanting lost crops.

For example, when questioned as to how their crops did, farmers, such as Emma, responded that: “The rains were too much. The maize got ruined. So I did not sell any. I kept the 85kg I got for family consumptions”; or, as Charity described, “We experienced some drought in the beginning...

the rains came later than expected.... I might get 20 kgs. I normally get 90 kgs”. More affluent farmers with access to resources, such as George, noted that they would take preventive measures, “plant[ing] maize seed that takes less time to grow since the weather here is not okay... The rains are unpredictable”. Resultantly, heighten states of income and food insecurities occur. As the most recent indicators relate, 75% of households in Nanyuki rely on agriculture, with 80% of households, in 2013, not having sufficient food to meet dietary needs. Notably, 94% of female-headed households experienced food insecurity (MoALF 2017).

Macro-Meso-Micro Ecological Intra-actions

GHGs and its effects on the hydrosphere further vulnerabilities as they cause an over-abundance of water/under abundance of sunshine at the meso-level (e.g., rains at harvest) that affects micro-level components (e.g., inter-population, (micro)organisms): crops can be destroyed by millipedes, rots, and molds like aflatoxin (MoALF 2017). As Tom, the elderly community farm expert explained, aflatoxin, which is “in the ground” strikes the dampened maize. If eaten, it can cause cancer and liver damage. When aflatoxin occurs, the government warns farmers to not sell their wet maize. The only way to deal with it, as Tom described is:

Artificial drying... and that costs a fortune.... [Most subsistence farmers] hang up [the maize] in all sorts of ways, under the eaves... But for a small quantity, that still takes a long time to dry because humidity is high and it's gone up.

We witnessed how subsistence female farmers, who often lack a proper place to store the maize or to dry it, are forced to sell their crops at reduced prices or to not sell any at all.

Recursive Intra-actions

The environmental instabilities produced by GHGs feeds a recursive cycle that prolongs and exacerbates farmers' vulnerabilities as humans react back to the intra-activity of ecological elements. On subsistence farms, due to posteriorly discussed social injustices, most female farmers resort to traditional methods of planting, manually digging and turning the soil with “jembes”. Tilling soil releases the carbon (soil carbon) that plants sequester (trap) into their roots, which feed the micro-organisms. The loss of micro-organisms and fungi leads to a loss of nutrients and lowers the soil's water retention and crop yields (Harden et al. 2018). In turn, crop intensification occurs as farmers try to obtain a sufficient yield for income and food, contributing to a recursive dynamic. Moreover, when tilling releases soil carbon into the atmosphere, more CO₂ is produced as it mixes with oxygen. Although subsistence farmers' contributions may be small in comparison to larger farmers' emissions or fossil fuel emissions, ‘agriculture, forestry and other land use’ does account on average for 11% of CO₂ emissions (IPCC 2014). A devastating cycle ensues: as the power of GHGs grows, the environmental instability of global warming and resultant human reactions are perpetuated, and with it the aforesaid vulnerabilities.

The Human World: Overarching, Social Macro-Meso Intra-actions

Inter-woven with these ecological elements are social macro-meso intra-actions and interlocking systems, notably those that stem from historical and ongoing power imbalances in (macro-level) geopolitical and ideological dimensions, and (meso-level) political (racist) practices and patriarchal systems.

Asymmetric Geopolitical Power Relations

Unequal geopolitical power relations contribute to farmers' vulnerabilities by supporting emissions of GHGs. These power asymmetries, visible in the application of global policies (e.g., the 2015 Paris Agreement), allow key emitters such as China and the USA to choose how they will gradually implement their commitments, regardless of the imminent effects born elsewhere (i.e., Kenya farmers). Although progress is being made, these countries have chosen to advance a deadly nationalism: They prioritize their citizens' way of life, country's growth, and political power (Steves and Teytelboym 2013) over the wellbeing of ecological systems and other countries' citizens.

Corollary, climate-related initiatives, while appearing politically-neutral, often perpetuate the power asymmetries through directing responsabilization. For example, the global Green Climate Fund's (GCF) espoused purpose is to support "the efforts of *developing countries* to...limit or reduce their [GHG] emissions and adapt to climate change" (Green Climate Fund 2019a, n.p., emphasis added). While we are not downplaying the significance of strategies such as GCF projects, what we emphasize is that the current enactment allows global political/nationality-based and class-based power asymmetries and inequalities to persist. The consumption and production habits of those in more affluent nations or positions are allowed to be protected at the cost of lower-classes' livelihoods in less affluent countries, such as Kenya (Bracking 2015). These power asymmetries hold in place intersectional disadvantages by maintaining the ecological conditions detrimental to farmers' livelihoods, while increasing dependency on other market/policy actors to 'help' with adaptations to the climate crisis.

Ideologies: Neoliberalism

Neoliberalism is the belief that marketing systems, instead of state intervention, are the most appropriate means of development. It contributes to increasing the gap between the haves and the have nots and perpetuating vulnerabilities in numerous ways. For example, it is the driving force behind the principles of volunteerism and marketization (the championing of market-based solutions in lieu of public interventions), which have contributed to the prior noted climate (in)actions and consequences (Ciplet and Roberts 2017).

Secondly, neoliberalism holds citizens accountable for lifting *themselves* out of poverty (Varman, Skålén, and Belk 2012), or in this case, navigating the effects of the climate crisis. This ideology, we find, magnifies vulnerabilities because it largely ignores differences in power and resultant inequalities and inequities: it assumes everyone is capable of participating equally in the economy or interventions. It can thus perpetuate 'isms', notable ableism. For example, although GCF mandates 'gender assessments' and 'gender action plans' for projects, these reports often overlook mental or physical (in)capabilities: Kenya's gender action plan (Green Climate Fund 2019b) calls for the participation of women and men in consultative processes, trainings, and committees, while omitting considerations of physical or cognitive differences that could limit effective participation of elderly, disabled or low-literate people. The less-abled become marginalized. Likewise, in our climate-resilient intervention we initially assumed that every farmer could implement CA. It was only after assessing *failures* that we identified that people had varying mental (e.g., low literacy) and physical (e.g., elderly/fragile bodies) capabilities.

Thirdly, we find that neoliberalism can result in invisibilities as only the components of farmers' lives that help the project achieve its goals are considered. In Kenya's GCF project for fuel-efficient cookstoves, the consultants decided to target only women given that men "may link cookstoves with the need to perform household chores... [This would be "detrimental for the marketing of the [cookstoves]" (Schuttelaar 2019, 41). Their goal of increasing the uptake of stoves meant they overlooked "the gendered division of household labour and childcare" (bid), entrenched country-level patriarchal practices and gender barriers, and consequentially increased a key source of women's vulnerability: time poverty.

Geopolitical Neo-colonial Arrangements, Meso-level Ethno-favoritism & Patriarchy

Connecting with and driving forward neoliberalism are consequences that stem from geopolitical arrangements that enact 'soft' modes of power. This includes neo-colonial arrangements where economically powerful countries use non-military forms of power to influence the development of countries (Ndlovu-Gatsheni 2013), notably i) financing; and ii) free market trade. In Kenya, the outcomes of neoliberalism/neo-colonialism overlap with a (meso-level) form of racism/tribalism, called ethno-favoritism, and patriarchal systems (which span meso and micro levels). Ethno-favoritism occurs when government actors use their budgets or connections to benefit constituents that are of the same ethnicity (tribe) of the ruling party (Burgess et al. 2010).

Neoliberal/Neo-colonial financing: Global financial institutions, such as the World Bank and IMF (largely financed by the Global North), exercise neoliberal/neo-colonial power by shaping the

capacity of borrower governments to invest in public resources required for equitable development, such as education and social welfare systems (e.g., pensions, child benefit payments) (Sachs 2006). To receive low-interest, long-term loans, countries are mandated to practice ‘fiscal responsibility’.

In Kenya, fiscal responsibility has increased class- and gender-based inequalities/inequities. For example, under-investments in Kenya’s education system and androcentric government decisions have caused many of its lower-class citizens to receive poor service, or to forego education altogether. Patriarchal practices/sexist beliefs that women require less education to do ‘their’ housework further the likelihood that poorer females, particularly those who are older, will be low-literate (Omwami 2011). As we elaborate, low literacy reduces the ability of farmers to adopt solutions (Steinfeld and Holt 2019), augmenting their vulnerability to the effects of the climate crisis. Deficient infrastructure also exists, resulting in a lack of access to markets as unpaved roads can be difficult, timely, and costly to traverse. When overlapped with sexist structures, poorer female farmers become susceptible to being cheated or forced to take the price for produce/livestock they are offered by “traders” (typically men with means of transportation).

While public investments may be constricted due to fiscal restrictions, ethno-favoritism can further deprive farmers of timely interventions to counteract the climate crisis. Funds can be redirected as governments rely on neo-colonial funding. Tom explained:

Our whole government system is taken up by salaries. So there’s none left for research. For research we depend on our development partners as we call them... the likes of the [Foundation for Food and Agricultural Research], USAID, and EU [to supply] the money.

Our review of government expenditures finds confirmatory evidence. It was only after the government received a low-interest \$250-million loan from the International Development Agency in 2017 that it launched the ‘Climate Smart Agricultural Project’. This was despite evidence that the state-produced (and subsidized) hybrid maize seed was inadequate for the ecological conditions (Sironko 2019). Subsistence households thus reaped inadequate yield, heightening multiple dimensions of poverty, while more affluent farmers could purchase improved seed from global players, such as Monsanto (as the prior quotes from Charity and Emma versus George reveal).

The interlocking social practices of neo-colonialism and ethno-favoritism likewise meant that some farmers could, because of their government/tribal connections, take advantage of opportunities for (limited) subsidized water ponds. Others, particularly those from lower socio-economic households missed these possibilities. Belinda, an older, widowed farmer described a common situation when asked why she did not have a pond.

When [the joint NGO-government project] came, I wasn’t a member of [the selected group], so I did not get a pond. I know the ponds have benefits. I plan to build a small one myself. I will do it bluntly... when I get money.

In comparison, an agricultural officer built a larger, double-sized pond. It cost her 45,000KHS (\$450USD) to rent a digging machine, while the government provided a “liner ... worth 100,000 KHS (\$1000 USD)”. She confessed: “I decided to use the opportunity although it was not right for me to do it... but because I was the one who was [leading the project] and having the same problem with water, I did it”.

In our study, a lack of connection also caused some recipients eligible for social assistance (those 70 or above), such as Catherine, to have to wait for the government to “come and get another list” of recipients. It had been well over six years since that had occurred. Given neoliberal/neo-colonial pressures to reduce “pro-poor spending”, including pensions, until the government can “rebuild fiscal space” (World Bank 2019, xii) it is unlikely the list will be updated in the near term.

Marginalized farmers are thus denied income (pensions) or support needed for key inputs (e.g., more resilient seeds; water ponds) that the marketization of climate action demands.

Neoliberal/Neo-colonial free market structures: Opening up a country’s economy was and remains a

condition of many of the global finance loans (Toussaint and Millet 2010) and underlies the development strategy advanced by major country investors, like China (Carmody 2017). In this process, international corporations or state-owned enterprises tend to maintain control over flows of finance and key resources (Carmody 2017), including essential inputs for the farmers: seeds, fertilizers, and sprays.

In Kenya, the primary crop—maize—is grown primarily with hybrid seeds modified to improve yields. Using hybrid seeds is said (by the government and corporations alike) to improve the ability of plants to resist drought, diseases and pests. However, farmers must purchase seeds every year, which limits what they can plant. In the fieldwork we saw few farmers using more affordable, alternative solutions, such as naturally pollinating maize, even though studies have found them to be equivalent or more resilient than hybrids to weather-induced stresses (Lana et al. 2017).

To achieve productive yields farmers also need to purchase fertilizer, and herbicide and pesticide sprays. Many subsistence farmers lacked finances for this, substituting insufficient amounts of manure for fertilizer (when possible) even though they credited “mulch and fertilizer” with making “a difference [in our harvest]” (Henry). Some participants recorded growing as much maize on their 10mx10m plot (that used all inputs— quality seeds, fertilizers, herbicides and pesticides) as they did in the entire acre of land they farmed. They planned to use the money on “things like school fees” (Henry). However, we also found these benefits to be short lived. In the final year in which no seeds, fertilizer or sprays were provided by the research team, most female farmers did not use sprays nor sufficient levels of fertilizer. The interlocking social systems that deprive poorer women of needed income limits what inputs they can purchase, yet they remain locked in a global value chain because it is perceived as “tradition” to plant “maize and beans in the long rains” (said Nancie), and because of the pervasive use of these products on other farms.

Repeated years of poor yields can thus magnify subsistence farmers’ vulnerability as they may struggle to repurchase or repay debt taken on to buy the inputs, or to adopt mitigation/adaptation strategies. As Winnie explains:

I had money problems. I received no crop last year because of weather. I could not come up with all the initial capital to pay for the [large bag of government] subsidized fertilizers.... So I bought only a little bit of [the expensive] fertilizer from the store.

Similar effects were evident in 2018 when a saturated market of maize left subsistence farmers at risk of having their “invested capital” left in “inventory...we have to pay school fees” (Eunice). The government, using (neo-colonial) aid-related funds, bought too much imported maize from traders. For some, particularly females at the lower end of the socioeconomic scale, pressures to meet short-term familial needs (school fees) caused many to turn to a crop that “brings money much faster”, such as potatoes (explained Claudine). Potatoes, planted the traditional way, require extensive soil disruption, which in turn can affect future crop yields. We see in these examples how the coalescing of macro-meso elements that structure markets can disadvantage female farmers, undermine climate mitigation strategies, and limit the ability of farmers and micro eco-systems to recover.

Human and Natural World Intra-activities: The Localized Effects of Macro-Meso-Micro Power Dynamics

Combining the effects of macro-meso-micro intra-actions, we find inter-locking elements that, at the localized level, manifest through various discriminatory norms, practices, systems, and ecological conditions. These shape and are held in place by not only macro/meso social/ecological elements but by interpersonal relations and personal conditions, capabilities, and/or (dis)empowerments (per a social micro-level analysis). Per Figure 1, they result in structural barrier and magnify oppressions/privileges through overlapping experiences of social “isms” (sexism, classism, ableism, etc.) and ecological instabilities/injustices. Below we explore these norms, practices, systems and ecological injustices, revealing how these intra-act, often recursively, to increase female farmers’ exposure to vulnerabilities.

Patriarchal Practices/Norms

In Kenya, meso-level patriarchal practices are reflected within the micro-level household where traditional gender norms, roles and divisions of labor remain (Walby 1989). Priscilla and Elenor, for example, described expectations of female submissiveness: women are taught “not to quarrel” and that they should not “ask a man anything”. These norms hold in place the status of men as the head of their households and final decision makers (Bikketi et al. 2016). A woman’s ability to implement solutions was often determined by her husband: she may be supported or discouraged and overruled pending whether he recognized its merits. As Joy’s supportive husband, Henry, related:

I am very proud of my wife. She was the one who came with the idea [of doing CA] and brought it back to the family... Now we’ve got more harvest...it makes me feel more secure in [ensuring] our household [has provisions].

In comparison, Martha’s husband controls household decisions: he prevents her from selling surplus on the market (although she admitted selling maize “bit by bit” to neighbors to eke out an income). He permitted her to trial the CA intervention but on a very infertile piece of land. He eventually plowed over her land.

Likewise, sexist norms, positioning women in inferior positions to men, maintain a detrimental division of labor between the genders. “The role of the men”, Amy stated, was to “go look for casual jobs” located outside of the house. They were to be the primary breadwinners. A woman’s job, conversely, was described as an extensive list of time-consuming, domestic-orientated tasks. Women were expected to “cook...[and] wash the children”, clean the house, fetch water and firewood, attend to “the children [and] the husband”, and do the “farming”, weeding, planting and “milking” (Angela). While men might grow cash crops, women were to grow crops to feed the family. Norms such as these reproduce male privilege and the power relations between the genders by naturalizing behaviors and practices (Walby 1989). Things are done because they are perceived to be “tradition”. This normative power is a dynamic that other scholars highlight as problematic in nature-dependent households (e.g., Dankelman 2010). It perpetuates vulnerabilities. Women’s responsibilities heighten their dependency (more so than men) to produce crops to meet basic familial nutritional needs. Resultantly, they often exercise power over the land that significantly degrades micro-ecological systems, feeding the aforementioned recursive cycle of GHG/CO₂’s social-ecological intra-actions. Women’s endless ‘domestic tasks’ also contribute to an income-gap and time-poverty cycle that can curtail her ability to adopt resilience solutions.

When interventions are linked to women’s work, they can also fail to gain household support. Water ponds, linked tightly to the production of kitchen gardens and women’s terrain, exemplified this. They were often women’s responsibility. Repairing them commonly meant hiring a man. As Nancie noted, she had to wait “two months without water [in the pond] since she did not have the money” [70KSH] to pay “the local man” who fixed it.

We see in these examples how the neoliberal assumptions of solution-makers, if augmented by gender-blindness or ideas supportive of patriarchy (per the GCF example), can thus expand inequalities between those women from supportive versus unsupportive households, allowing structural barriers and vulnerabilities to the climate crisis to persist.

Discrimination in the Education System: Effects of Low Literacy on Capabilities

Discriminatory practices in education occurs as neoliberal/neo-colonial pressures to under-invest in education intersect with patriarchal beliefs and practices. Beliefs regarding who might benefit more from the limited schooling available— boys as future breadwinners or girls as caregivers—and the tendency for girls to miss or leave school to help with domestic chores (Omwami 2011) meant many of our study’s older female farmers were low-literate.

As Steinfield and Holt (2019) and Viswanathan et al. (2014) describe, low-literate consumers process information in concrete ways as they struggle to think abstractly. Thus, in our study, they might understand that, per CA methods, they needed to cover their fields (with weeds or maize stalks), yet they would not understand how much covering they needed nor the real reason why. Resultantly, their actions feed ecological instabilities: they at times provided too much covering, which could result in worms or millipedes, or too little covering, which did little to preserve soil

fertility levels. Moreover, by not understanding the ecological dynamism occurring with CA, they were more likely to forego the practice when trade-offs occurred or when the research project ended and they had no one to be accountable to (i.e., the researchers). When asked what they would do when the project ended, a few responded like Mercy that they would continue “digging ...because they are used to that”, and indeed, many did.

In addition, it was difficult for lower-literate farmers to comprehend and apply their CA knowledge to other crops, such as potatoes. Ivy, a low-literate, older aged farmer, when asked if she would continue to use the ‘planter’ we gave her, replied: “No, I will continue to use the jembe instead as I need to mix the top soil and bottom soil... I will try to plant potatoes since the soil is fertile”. When probed for whether she knew why she should not disrupt the soil, she remained silent. In comparison, Viona, a younger farmer literate in Kikuyu and semi-literate in English, noted that she “[P]lanted potatoes by laying terraces rather than digging up the entire soil”.

The construction and maintenance of water ponds encountered similar findings. Participants struggled to translate what they saw at demonstrations to their own plots where conditions varied, and they had difficulties with gauging the cost-benefit trade-offs of getting ponds promptly fixed. Brenda, a low-literate, elderly female farmer had an empty water pond because her “liner got ripped from getting too much sun. I'm hoping that the NGO comes back and gives us another one”. The idea of saving money to fix the liner was not considered even though it could save her time and money required to source water. When probed for what she knew about ponds, she could not recount key ideas covered in the demonstrations, notably the importance of planting trees around it to protect it from the sun.

In querying the results, community members explained to us that those who “can speak English are more educated [and] reason better because [they] can understand better” (Jacob, fully-literate). Angela, the local agricultural officer, likewise noted that:

Those people who talk English, they have been interacting with other people... Through interaction you can learn a lot....It looks like they can do more. They don't have a problem with communication.... When you don't have fear you can learn and interact with people. So they have that courage to face anything.

Low literacy caused by discrimination in the education system undermined adaptation/mitigation solutions, leaving farmers less likely to break with tradition and more dependent on others. Their vulnerabilities persisted.

Economic Exclusionary Practices/Systems

Patriarchal divisions of household labor and inequities of education coalesce with and magnify the economic exclusion of women. Those with limited education and skills often use what they can—their bodies and nature—to earn a livelihood (Béné 2003). When combined with inadequate government investments or social assistance (per neo-colonial fiscal restrictions and ethno-favoritism), farmers can remain caught in lower-valued economic activities, unable to escape their dependency on ecological conditions.

This form of classism overlaps with sexism as apparent in work and wages. The typical wage for ‘casual’ lower-skilled labor, such as masonry (a man’s job), was 1000KHS per day (\$10USD/day); unskilled labor, such as digging or weeding on other people’s farm plots, was 500KHS per day (\$5USD/day) for a man but only 200-250KSH (\$2-\$2.50USD/day) for a woman. Gender beliefs maintain that physically demanding activities (which pay more) are something only men should do: Just like a man could “not cook”, a woman was thought to be unable to “pick up a hammer or screw a nail” or do “digging” (Geoffrey). These beliefs exist despite evidence that women do engage in these activities, albeit unpaid (e.g., helping husbands to dig their own ponds), and they perform tasks that are just as physically demanding in relation to unpaid farm work.

Added to these dynamics are patriarchal restrictions: women are expected to prioritize their *unpaid* household duties over earning income. Regardless of their class, women’s income is typically viewed as supplementary, unless external conditions (husband’s death, sickness, or arrest) push

women to assume the primary provider role. The lower income can limit her access to needed resources (like fertilizer) or ability to afford the upkeep of key mitigation/adaptation strategies. For example, Eunice's husband "is a taxi driver" while she is "left here to take care of everything: cows, goats, children, washing clothes and cooking". She had a broken water pond that was not fixed:

My husband says he will repair it but...we've had other small problems to attend to and a lack of money... My husband was sick and unable to fix it. So now I have to go and get water from the borehole, which takes about an hour because you have to stand in line and wait.

These types of income constraints can also heighten risks associated with adopting new practices, making it more likely that a female farmer will resort to doing the traditional thing and/or only narrowly apply strategies. Nadine, a single mother of three, plowed her fields on either side of the study's 10x10 plot to grow the faster-income generating crop of potatoes. These structural barriers brought about by classism/patriarchy/neo-colonial/ethno-favoritism can leave female farmers with insufficient resources yet facing time-sensitive demands that leave them at a higher risk for not adopting or maintaining solutions.

Discriminatory Practices in Division of Land Ownership

In Kenya, while rich landowners hold vast portions of lucrative land, subsistence farmers live off the remaining, smallhold portions. Additionally, although the Kenyan government passed the Matrimonial Property Act in 2013, increasing women's rights to own, inherit and manage land, women's ability to exercise their rights is impeded by a lack of awareness, community pressures and cultural traditions (Mbugua 2018). Most women remain dependent on their husbands for the land they can farm. They are often given the more infertile land while men use the fertile land for larger crop production. A woman's ability to gain the investments and knowledge needed to fix the infertile land can be significantly reduced if she comes from lower socioeconomic standings given her predisposition to being under-educated and under-resourced (per patriarchy/classism/neo-colonial/ethno-favoritism effects).

Women's access to fertile land is further affected by hetero-normative dynamics that can (in supportive circumstances) privilege those who are married and disadvantage widows or single mothers who are placed into precarious situations. Non-married women became reliant on family who may, out of charity, provide a plot of land. In the case of Ella, an unwed mother, this land was highly infertile, strewn with batteries, plastics and waste. Our soil samples indicated low nutrient levels. As we withdrew project support, she faced an insurmountable disadvantage given that she did not have the financial ability to buy fertilizer to rectify these ecological conditions on her own. Our neoliberal assumptions of equal access and abilities, when compounded with these pre-existing discriminatory practices, did little to reduce vulnerabilities to the climate crisis that some female farmers faced.

Exploitative Market Systems and Norms of Male Violence

Classism-sexism overlaps also manifested at the micro (relational) level between women and the more powerfully-positioned traders (typically men) in modes of exploitative market systems. Traders are able to unfairly extract "surplus labor" from the lower-class farmers, denying farmers their "fair share" of the economic benefits (Béné 2003, 963). Often, women selling surplus crops did not receive a higher selling price even if demand exceeded supply. These dynamics crossed over with other patriarchal, neo-colonial/ethno-favoritism elements—limited funds, time for transportation, and inadequate infrastructure—leaving women susceptible to traders who would buy directly from them but who could cheat them out of a fair price. As was recounted:

When the [trader] comes, he might say, a kilo is 30 KHS. If you say no, he will go to the neighbor and the neighbor [and if they need money] they might say, okay. But maize is the only source of cash crop. So when the [trader] comes, I have to sell. I need money. They set the price. [Ella]

Our research assistant, Fredrick further explained that "If a woman does not have someone to check the weighting" the trader will trick them by holding the bag or using inaccurate scales. "A man will be able to see and he will say, 'no, this is mine'. But a woman, she will not argue with the trader... the

ladies are shy”. Indeed, when many women were probed as to how they prevented themselves from being cheated by the brokers, most confessed that although they “know it might not be accurate” (Sylvia) or that they are being “conned” (Harriet), they felt as if they “have no choice” (Charity). Patriarchal notions of women’s submissiveness (or shyness) combine with a fear of violence that women must carefully manage. The often-smaller physical statures of women and frailty of older women heightens their fears. Worried that traders will “come back” at night and “take that money” (Ruth), women leverage their male connections, ensuring either a husband or son is home, or they ask the traders to come during the day, leaving time to transfer money.

While not all traders acted violently towards women, traders did have a unique advantage over women in the market system: they could access multiple markets to command a higher price. A trader, Patrick, to whom we spoke, explains what happens:

There are [traders] that come, buy from you a low price, and then sell for two times what he paid... If you have no means of transport [like] the farmers who have 5 sacs, 3 sacs, they are left with no choice but to sell to the brokers. And the farther the broker can get away from the source, the more money he can make.

This was, in part, what caused the suppressed price for maize in 2018. Traders bought maize from Uganda and resold it to the government at a higher price. The resulting surplus negatively impacted farmers’ ability to sell their crops. The traders “got rich” (Frederick) at the expense of Kenyan farmers. These vulnerabilities manifested in market systems and relations thus contributed to reducing the ability of women to gain the funds demanded by the neoliberal/neo-colonial-informed climate action agenda (e.g., buying better hybrid seeds or fertilizer, fixing water ponds, etc.).

Androcentrism in Government Practices/Norms: Effects of Political Disempowerment

Although the Kenyan government has committed to reduce gender inequalities by ensuring a 30% minimum representation of women in its ministries, women remain politically disempowered (Speranza and Bikketi 2018). Patriarchal, androcentric (male-centric) norms govern how the “male-dominated policy-level leadership makes decisions” (Omwami 2011, 21). These conditions cross with neo-colonial pressures to adopt fiscal responsibility and neoliberal ideals of self-provisioning. Consequently, child benefits remain non-existence (World Bank 2019). Similarly, while the government has offered ‘free’ education since 2003, fees still occur. In our study, those households who sent children to school reported paying around \$100 per term (\$300 per year). These fees can constrain subsistence families, particularly women who, per neoliberal/gender ideals, are often responsible for paying them. While using income “to pay for school fees” (Eunice) was one reason female farmers gave for not buying inputs (seeds, fertilizer), or not fixing pond liners, the unsaid elements of missing social welfare payments (child care, pension plans) that allow classism dynamics to reproduce were likewise contributory.

The political disempowerment of women was also evident in the way the government creates access to key resources. The government’s fertilizer program seemed to be a gender-blind solution that was more appropriate for farmers growing cash crops (i.e., men and/or richer, large landholders). The subsidized fertilizer, which cost 1800KHS, was for a 50kg bag. The government offered no loan-structures to enable farmers to purchase the bag. Thus, many female subsistence farmers “did not access it because [they did] not have income to afford the big bag” (Ivy). Funds from doing casual labor on farms of the more affluent came “too late to buy the fertilizer and apply it to their crops” (Angela). The big bag also posed problems in being transported back to farms. The needed motorcycle ride cost approximately 400-600KHS (equivalent for many to 1-2 days’ worth of wages). The registration process required (often male-owned) land deeds and access to government registries in different towns. As Ruth, an elderly farmer explained:

We bought subsidized fertilizer once... but the process is a problem. You have to go to the agriculture office with your land title, which you have to first get from the chief’s office.... and you have to hope that you get them in the office. They are located about 7km away. It takes 3 hours to walk there and back. Then you have to go to Nanyuki, which is 12kms away to buy the fertilizer from the government... and then get the fertilizer back [to the farm].

The costs of transportation, time (and foregone work), and effort outweighed the perceived benefits for many. Consequentially, many (female) farmers bought “bit by bit as we need” (Amy) from the shops, where it sells for 80KHS per kilo (\$0.80USD/kilo) (an equivalent cost of 4000KHS for a 50kg bag). On average they would buy only three to five kilos to spread meagerly over their crops—an insufficient amount to restore key nutrients. Subsistence female farmers remain exposed to riskier ecological conditions through political disempowerment fostered by patriarchal, neoliberal/neo-colonial practices and norms.

Discriminatory Local Ecological Conditions

Ecological elements, beyond the effects of GHGs, (re)produce injustices and vulnerabilities as they materialize the intersectional effects of classism, sexism and neoliberalism/neo-colonialism. Notably, many interventions fail to consider localized ecological conditions, which enable vulnerabilities to persist. For instance, in our intervention soil conditions created privileges and disadvantages: those with pre-existing infertile lands (often given to under-valued or single women) had limited micro-organism biodiversity and thus less resilient crops. As Charity detailed, the “drought in the beginning” of the long rains meant she lost almost 80 per cent of the maize she had planted, which heightened food and income insecurities. Micro-ecological, inter-population conditions, such as infestations of worms or millipedes, bugs, and fungi/rot that either killed (ate) seedlings or compromised plant yields (e.g., aflatoxin), undermined our CA intervention. Crops could not be sold. The income to buy neocolonial-controlled inputs (e.g., fertilizer and maize seeds) languished. Many poorer female farmers shifted to lower-cost crops that disrupted soil, like potatoes with informal seeds that spread harmful bacteria. This contaminated the soil and reduced potato yields for several years.

Similarly, in the case of the water ponds, those with the less porous black cotton soil, could “just decide to dig a pond”; they “did not need a liner” (Ruth). Those with red volcanic soil needed a costly liner or else their ponds would not hold water. Liners could be ruined by rocks, bugs and sunlight. Consequently, red volcanic soil introduced upfront/maintenance costs that further disadvantaged those with limited income, yet this was not considered by project managers.

The coalescing of localized ecological conditions with overarching social systems and practices traps poorer female farmers in cycles that perpetuated ecological injustices while undermining their ability to maintain solutions.

The Combined Effects of Intersecting Social and Ecological Elements: Vulnerabilities of Time Poverty Cycles

While the intra-actions of ecological and social system dynamics result in food and income insecurities for subsistence households, there is an additional hardship and source of vulnerability that female subsistence farmers face: time poverty. Time poverty reflects their inability to enjoy non-work activities (Vickery 1977), which neither their male counterparts nor more affluent female counterparts experience to the same extent. As participants described, female farmers had “no time to relax” because they had “a lot of work to do” (Milly). Husbands, on the other hand, could relax and “not worry about the family” when they arrived home in the evening (Nadine). The demands placed on women’s time increased if they were from lower socioeconomic families or widowed. The less income a family had, the less likely they were to have time-saving devices, such as water ponds or gas stoves.

Importantly, by not adopting and/or maintaining the mitigation or adaptation strategies, a woman’s time poverty increased; yet time poverty also prevents her from adopting or maintaining solutions. *This recursive cycle can further the divide between the haves and the have nots.* For example, Ella, a single mother, had no water pond but had a solar cooker, which she only used “twice a week when I am at home and not out working. I am a day laborer, digging in other people’s farms, so I cannot use it during the days I work. I get back too late”. Consequently, she had to either buy/collect wood or charcoal, which adds time demands and contributes to CO₂. In comparison, Hope, who was literate, had a solar cooker, water pond, kitchen garden, and a means of income that allowed her more discretion over her time. She used her solar cooker “whenever it is sunny”:

I just put water out and I get laundry done...make tea and everything is ready... I used to use firewood. It would take me 1 hour to collect the wood and boil water. I save about 3-4 hours a week. Now I can use that time to...read the bible, wash clothes, relax... I also sell more secondhand clothes door to door.

Her ability to have the means and time to earn income from selling clothes meant she also had the ability to purchase sufficient fertilizer and allow her fields to rest and replenish.

In the case of the CA intervention, we found that patriarchal, neo-liberal pressures on women to balance domestic work with familial-income needs led to time poverty that caused some women to forego CA techniques. Some disrupted the soil as they switched to faster growing crops (potatoes). Others, such as Faith, admitted:

I did not use the planter because the time for planting was catching up with me, so I used my panga, which I can use faster. I also did not cover things with weeds because I had no time. I've seen benefits to covering with weeds... but I didn't have time. Next year I will start early and try to cover it before the rains come.

These practices resulted in “more weeding” and “digging” (Brenda), and, as aforesaid, introduced ecological instability (released carbon, disrupted micro-organisms, reduced resilience of soil/plants to erratic weather) that lowered yields. Correspondingly time poverty would increase: To supplement familial food women would do more work on their farms or other people's farms (reducing their ability to use solar cookers). As Belinda, a poorer, widowed, female farmer, who did not have a water pond, described: “It can be so dry, and you are expecting you can harvest and you can't... I must do casual work [for better-off farmers] to cope...for survival, because now the crop has failed”.

In comparison, women who adopted CA “saved a lot of time” (Hope) since covering the ground lessened weeds and softened soil, making it easier to plant. Farmers used this saved time to pursue entrepreneurial ventures like chicken farming, which raised their potential earnings and resilience to climate crisis instabilities.

Similar effects unfolded with kitchen water ponds. With a pond, farmers could save time fetching water and increase household food security through growing kitchen gardens. Yet to get the NGO-provided liner (worth 30,000KHS+ and essential for those with red volcanic soil), “everyone [had] to dig [the pond], must install [the liner], and have a kitchen garden”. The neoliberal belief was that “by sharing the cost the farmer will value it” (Angela). Yet some farmers struggled to manually dig their own ponds due to either physical limitations of their bodies—as was the case with older farmers—or due to sexist norms that discouraged females from digging ponds on their own. If they could not dig, farmers outsourced this at a cost of at least 3000KHS. Water ponds were consequently infeasible for many poorer, older farmers. As Charity, an older woman recounted: “I paid 500KHS (\$5USD) a day to have three laborers dig it, and they dug for a week. But there were too many rocks.... I ran out of money”. To put her constraints into perspective, the cost of digging the pond (4500KHS) was more than she would have received from selling her surplus corn that year or earned from almost a month's wage. As a consequence of not having a pond, she spent energy and time—1½ hours—“to get water every day when it is dry”, detracting from her ability to earn income needed to pursue mitigation/adaptation strategies.

Households where women were responsible for being the primary provider stood at a distinct disadvantage, particularly given the limited nature of government social welfare systems and sexist, economic exclusions. Consequentially, they often did not have a pond or experienced longer waiting times to have water ponds fixed. For example, Sarah described how she “did not have the ability to pay for a [new] liner” since her husband “was in jail”:

I had to pay for school fees. I was also breastfeeding so I couldn't [dig on other people's fields]. I got money from buying maize from farms and selling it in the market, but I couldn't spend the money on the pond because I have to spend the money on school fees. If the government found out that kids are at home instead of in school, I'd get in trouble.

Cognitive predilections of low literacy also contributed to time poverty through instigating disuse of ponds or CA practices. Farmers did not know how to correct their mistakes and were often unwilling to invest more money into something that, for reasons beyond their understanding, did not work. They viewed their efforts as “wasted”. They chose to forego the potential time savings, thus remaining trapped in the time poverty cycle and exposed to the vulnerabilities and environmental instabilities perpetuated by the climate crisis.

EmPOWERment in/from Farmers’ Actions

Although female subsistence farmers face many challenges, and some remain more challenged than others, they do exhibit agency and high levels of resilience and adaptability that should not be overlooked. It is the farmers that implemented the practices and made the interventions ‘successful’, creating *innovation effects*: they used their control over available natural resources or leveraged their social connections to find workable alternatives or what Steinfield and Holt (2019) note as (re)production through bricolage. Farmers, for example, built on their basic understandings of CA by running their own experiments to see what ways of planting and/or crops would be more resilient or have better yields given their farmland. Some women substituted dead branches for mulch to cover the soil, or cultivated manure when they could not afford fertilizer. Hope used stalks for mulch, gathering “some from my farm”. She also leveraged her social ties, gathering stalks from farms where CA was not practiced. Her higher yields allowed her, in the following year, to “find a man to cut” and “a woman” to help her carry the stalks back to her farm. Likewise, a few women took the easy-to-reproduce solar cooker and helped others to create their own, often charging a fee to do so.

In this light, social innovations/interventions become viewed as catalysts. They enabled some female farmers to gradually challenge the ‘traditional’ way of doing things. For farmers who used CA activities, their labor efforts reduced significantly. When done alongside functioning ponds, they increased familial food security. By using the solar cooker women reduced household expenditures on firewood, increasing income security. As Ken recounted “We used to pay someone 20KHS to trim a tree every week. When my wife uses the solar cooker...our firewood will now last two weeks”. Importantly, although interventions create moments and spaces of privilege, it is the women who exercise their agency, innovatively navigating their constraints, which translated privilege into tangible outcomes.

We also note one other significant change that occurred in mindsets and recognitions. By adopting these practices many female farmers noted that others, including male farmers, came to ask them for advice. As Oliva stated, “I feel like I’m a preacher to them... I feel respected”. Their voice within the community increased and they used this to spread information about the interventions to others, producing *diffusion effects*. While political disempowerment, cognitive predilections and patriarchal structures may prevent female farmers from engaging in policy formations or grassroots movements like consumers in more affluent markets, they can still make an impact. The (em)power(ment) of subsistence farmers to bring about change through their willingness to spread the information demonstrates the way they positively feedback into the system, creating opportunities and conditions of privilege for others.

Discussion: Implications for (Macro)marketers, Practitioners and Future Research

Our findings reveal a complex and dynamic picture regarding how and why intersectional vulnerabilities occur and affect consumers’ (re)actions to the climate crisis. Importantly, these findings exhibit a need for (macro)marketers to add (i) an intersectionality and (ii) gender-focused lens to studies on the climate crisis; and for both (macro)marketing and intersectionality theories to (iii) capture not only social or human world elements but also ecological or natural world dynamics.

Augmenting (Macro)marketing Theory and Climate Crisis Studies: A Gender and Ecologically-Informed Intersectionality Perspective

An intersectionality lens augments the analysis of social interactions of marketing systems (e.g., Layton and Duffy 2018) and the climate crisis (Ryder 2018) as it makes apparent the *overlapping* inequities or inequalities vested in power dynamics/asymmetries at macro-, meso- and micro-levels. As illustrated in Figure 1, our findings reveal how social and ecological modes of power intra-act

across these multiple levels, encapsulating and buttressing one another. Power enacted in governing ideologies (DSP, neoliberalism), geo-political relations and institutions is channeled through the discourse and mandates of neo-colonial policies, investment decisions, and sponsored projects, coalescing with local modes of discriminatorily applied power in the political sphere (e.g., ethno-favoritism), market or community (e.g., classism/sexism) and household (e.g., patriarchal practices). These can result in structural barriers that pre-empt access to or adoption of solutions, and can give rise to (mis)recognitions or invisibilities when varying levels of people's capabilities are silenced by neoliberal perspectives. These collide with and support, in an inter-locking way, manifestations of devastating environmental instability (caused by GHGs/CO₂ macro-meso-micro ecological intra-actions) and environmental injustices (soil conditions or micro-infestations). Together, the coalescing elements heighten injustices and vulnerabilities for certain farmers, particularly less-abled, poorer, female farmers.

Furthermore, within these conditions we witnessed how farmers enacted various modes of agency, which, pending their personal conditions, capabilities, (dis)empowerments, could create recursive oppressive effects, such as food and income insecurities or time poverty traps, but also diffusion and innovation effects that could lessen vulnerabilities and bring about privileges (i.e., a new sense of self or recognition, knowledge or confidence to engage in bricolage).

An intersectionality lens thus highlights how consumers' differing responses to the climate crisis are not just due to: the ideological power of the DSP (Prothero, McDonagh, and Dobscha 2010); or neoliberalism's imposition of destructive capitalism (Kadirov 2011) or ableism (Varman, Skålén, and Belk 2012); or geo-political, economic, and technological asymmetries in marketing systems (Patsiaouras, Saren, and Fitchett 2015). It is all of these combined *and more*. By providing a more holistic perspective, as illustrate in Figure 1, intersectionality theory prompts (macro)marketers to go beyond researching solutions that challenge the DPS or that fix marketing systems (Mittelstaedt et al. 2014) or consumer behaviors (Boström and Klintman 2017). It calls scholars and practitioners to identify and address global *and* localized power dynamics so that solutions do not further disadvantages.

The Importance of Adding Ecological Dynamics

Specific to our third contribution, our findings and Figure 1 also reveal how there are more than *human-human* social intra-actions that need to be considered: the natural or ecological world matters. Indeed, there are *natural-natural*, *natural-human*, and *human-natural* intra-actions that we find as the two 'worlds' of Figure 1 interweave together.

Natural-natural world intra-actions (or the dynamic interplay between levels of ecological factors) were evident in the GHGs' 'control' of atmospheric and hydrosphere conditions and the resultant erratic rains, the occurrence of pests, fungi, bacteria and deadly molds, and the affected crop yields. These intra-actions form the basis of many of the technocratic, science-orientated reports on the climate crisis (e.g., IPCC 2014), yet they are often omitted from marketing-related studies on consumers' behaviors and experiences (e.g., Moisander 2007), are overlooked in considerations of equitable market access (e.g., Peterson 2012), or are treated as external, one-off catalysts that incite changes in social systems (e.g., Layton and Duffy 2018).

Subsistence farmers' interdependent relationship with nature makes evident how ecological elements matter in a dynamic way. They can introduce significant variability into social systems (GHGs/erratic rains), perpetuate vulnerabilities (droughts/pests), be a source of injustices (soil condition), and affect consumers' intra-actions with marketing systems (mold/rots). Importantly, these types of intra-actions shift the directionality of most (macro)marketing analysis from humans acting on the natural world, or what we call *human-natural* world intra-actions, to the natural world and its elements (re)acting back on humans (Campbell, O'Driscoll and Saren 2013), or what we call *natural-human* world intra-actions. Furthermore, we underscore how the relationship between the natural and human worlds is not one-way but is recursive.

As our findings relate, GHGs became a powerful, politicized, ecological element through geopolitical power structures. Yet while the nationality dynamics of GHGs' geopolitical wars may

cause all farmers in Kenya to be increasingly exposed to environmental instabilities, intra-activities mean female subsistence farmers stand to be further disadvantage. Their cognitive predications caused by gender norms and depleted education systems coalesced with infertile land, erratic rains and pests/molds to increase food and income insecurities. Likewise, neoliberal assumptions of ableism, patriarchal/class systems, and ecological injustices (soil conditions) denied some females functioning water ponds, exacerbating the time poverty induced by droughts. Weather vagaries that support the neo-colonialized global industry of maize, when combined with political disempowerment (inadequate government support) and class structures, reduced female farmers' capacity to recover from attacks of aflatoxin and droughts. In turn, subsistence female farmers faced competing and conflicting trade-offs that contributed to them feeding sources of the climate crisis, such as emitting CO₂ through tilling land, or pursuing deforestation to source firewood. In the absence of a functioning welfare system and cognitive and/or physical capabilities, farmers often take actions to secure food and income that are detrimental to both ecological elements and in turn, their own sustainable livelihoods.

These experiences of Kenya's subsistence farmers are but one demonstration of how injustices stemming from both the natural and human worlds can be caused by common sources yet have distinct local and personal enactments. Thus, we encourage scholars to advance Figure 1 to explore other ways intersectional (gender) injustices and vulnerabilities occur through social-ecological intra-actions.

The Importance of a Gender-Informed Perspective

While (macro)marketers may not be able to capture all the personal nuances that shape lived realities and vulnerabilities to the climate crisis, our findings emphasize the importance of capturing gender dynamics. Patriarchy and its gender norms or unequal gender relations can magnify vulnerabilities and undermine climate action in multiple and significant ways— whether in the political arena, the market or community, the home, or through personal embodiments in (decreased) capabilities. The case of the female farmers demonstrated this. Their poverty in time, food and income, and the resulting negative effects on their wellbeing and climate action stemmed from overlaps of: gender divisions of labor and household politics, unequal access to education, undervaluation of their work, divisions of and control over land, androcentric government programs, social norms that diverted crop investments to children's education, market discrimination, and fears of violence from traders.

Given that intersectionality theory can be adopted sans gender (Saatcioglu and Corus 2014), we push against this shift. We call for scholarship that can illuminate how gender-based hardships vary pending context. To not consider how gender dynamics affects experiences of marketing systems or transnational phenomenon, or influences wellbeing, is to overlook critical elements that shape realities for all of the worlds' population.

Our findings demonstrate a need, however, to also extend gender analysis of injustices (after Hein et al. 2016; Steinfield et al. 2019a) so that we consider intersects, going deeper *within* and *beyond* the gender binaries of 'women' and 'men'. By breaking open the category of 'women', and asking 'the other question', we illustrated how (in)conspicuous elements, such as classism, androcentric views and/or neoliberal assumptions in policies and projects, make other identity variables (class, heteronormativity, able-ness) also matter. Being a poorer, single female, or an older and less physically- or mentally-able farmer, led to decreased capacity to implement solutions, and increased oppressions and vulnerabilities.

Our findings thus support a call for future marketing scholarship to move beyond a class-based analysis of environmental crisis (Baker 2009; Viswanathan et al. 2014) or for that matter, any (macro)marketing analysis of inequalities (Saatcioglu and Corus 2014), compounding effects or assessments of wellbeing (Kilbourne 2004) if we are to fathom lived realities and create solutions that can address (versus perpetuate) vulnerabilities.

Extending (Macro)marketing Perspectives of the Climate Crises with Gender and Ecological-Intersectionality Lenses

Combining a gender and ecologically-informed intersectionality lens together can likewise deepen theories on *how* consumers experience, in (gendered) ways, different journeys, and *why* their willingness does not always translate into actual adoption of solutions (the attitude-behavior gap) (Boström and Klintman 2017). These insights, which (macro)marketing is keenly positioned to provide, can advance climate crisis scholarship (Ryder 2018).

For example, as we witnessed, subsistence farmers have high levels of motivation and willingness to try to adopt solutions yet this did not readily translate to action. Our findings and Figure 1 illustrate how this attitude-behavior gap stems from privileges and oppressions arising from cascading, inter-locking and intra-acting power asymmetries, inequalities and injustices, which shape consumer journeys (localized effects). Some farmers encountered a journey in which they readily translated their willingness into actual adoption of the mitigation/adaptation practices by leveraging pre-existing and compounding social and ecological privileges: education, (government) connections, (familial) income, better inputs, soil conditions, time saving devices, market/entrepreneurial opportunities, etc. Other female subsistence farmers adopted suboptimal behaviors because their position in overlapping power asymmetries—neoliberal/neo-colonial value chains and policies, sexist preclusions from education, economic exclusion, hetero-normativity, political disempowerment, market exploitation, disadvantageous ecological conditions—changed the equation of trade-offs they faced: should they spend money on fixing water pond liners, getting better seeds or fertilizer, or on school fees? Their consumer journeys were shaped by identity conflicts and consumption decisions that were less about willingness (per Barnhart and Mish 2017) and more about managing trade-offs of risks under severe constraints. Sarah, whose husband was in jail, decided to spend her limited time earning income to send her children to school, foregoing the work and investments necessary for a functioning water pond and garden. While she secured her identity of being a good mother, she also undermined her capacity to be a self-sufficient farmer, more resilient to the effects of climate crises.

Our analysis also revealed how someone's willingness to adopt solutions can be disrupted if, because of structural barriers that limit their education, they are hampered by cognitive predilections and a fear of the unknown. Sticking to 'tradition' does not equate to a lack of motivation but may be more about a lack of capabilities. Likewise, the physicalities and gender norms governing people's bodies matter, as our older female farmers who could not dig or fix ponds illustrated.

These findings demonstrate that it is not only access to knowledge and resources, motives or identities, or (seemingly neutral) external opportunities that influence consumers' journeys and efforts to adopt mitigation/adaptation strategies (Boström and Klintman 2017; Press and Arnould 2009), but also whether individuals have the cognitive and physical abilities, *supportive* household or community structures, and *gender inclusive* market access to bear the risks, mitigate effects of the climate crises, access and adopt solutions, break harmful cycles, and work through barriers faced. Our work thus calls for scholars and practitioners to recognize the coalescing disparities in resources and opportunities, vested in multiple levels of (gendered) power asymmetries and social/ecological systems, in the (neoliberal) assumptions we project, and in the bodies and minds of consumers. These are key elements that affect agentic actions, heighten risks and vulnerabilities in consumers' journeys, and undermine climate action and justice efforts.

The Implications of an Ecological-Intersectionality Perspective

Finally, while an ecological-intersectionality analysis can help practitioners and researchers to identify the problematic arrangements, norms, systems, practices, embodied differences, and potential solutions, it also raises to the fore the importance of acknowledging their positions of power and human predilections that can impact solutions. This is a tenet of intersectionality theory that is often overlooked—the capacity to be self-reflexive of one's own actions, involvement and impact, and to note how privileges or oppressions affect one's worldviews (Jones 2010). The naturalized neoliberal assumptions and perspective many scholars/practitioners hold, and which reaffirm their way of life, can have unintended consequences. The GCF projects, our CA interventions, and the NGO water pond scheme, are cases in point.

The GCF consultants, fixated on achieving the goal of cookstove uptake, marginalized men and misrecognized women, making women problematically visible as the custodians of familial duties

of care. Their neoliberal goal-driven demands caused gender-negligence, despite their gender assessments. Our mitigation/adaptation strategies and the water pond projects had underlying expectations that participants should co-create or co-produce social innovations to prevent dependency. These expectations, untempered by an ecological-intersectionality lens, threatened to perpetuate social divisions between the haves and the have-nots and amplify vulnerabilities. An un-reflexive analysis can thus result in project coordinators implementing ideas regardless of whether the ‘ask’ is appropriate, creating unintended consequences.

A self-reflexivity is needed that calls us to be cognizant of how the power we have, as researchers or practitioners, can affect change in the lives of others. We are often protected from the interventions we impose. Free to leave the field after the work is complete or to choose to no longer engage in the social interventions, our nationality and class status give us privilege. This privilege demands that we become more responsible—aware of the (in)visibilities we determine matter, the expectations and assumptions we impose on others, and the potential consequences these can have. Rather than assuming we are the experts, it calls for more participatory approaches in which we seek to learn *with* others (Ozanne and Saatçioğlu 2008). This may be one way to pre-empt a cycle of dependency. Imperatively, it is important to recognize that individuals, regardless of their income and education levels, are the experts in their lives. While we may be able to suggest new ideas, they are the ones who will be the final implementers. Their voices and agency need to be acknowledged, understood and respected.

Accordingly, to help guide future endeavors, we pose, in Table 3, eight questions that can advance scholars and practitioners’ awareness and inclusion of intersectional (dis)advantages and self-reflexivity.

INSERT TABLE 3 HERE

These eight questions make visible assumptions, (mis)recognition, invisibilities, and unintended consequences, and aid those working through tensions and trade-offs. They are a starting point that we encourage others to take forward and to use to explore additional social/ecological elements and intra-actions, or experiences of oppression, privilege and vulnerabilities, and to develop appropriate and just solutions for the climate crisis.

Conclusion

This paper, by adopting a gender perspective and ecological-intersectionality lens, adds to current (macro)marketing theory on the climate crisis. Informed by the voices of Kenya’s subsistence farmers, our findings underscore how solutions aimed at increasing resilience need to recognize the complex intra-actions between asymmetric, intersecting social-power relations of the human world *and* ecological dynamics of the natural world. Our findings emphasize the importance of scholars/practitioners grappling with the root causes of injustices and resource disparities, capturing the experiences and voices of those who are disadvantaged, and adopting a self-reflexive view of their positions of power and the assumptions they project onto others. It evidences the significant insights we can gain from looking within the genders, detailing how differences—created by unequal power dynamics—matter. We encourage fellow scholars to advance this approach, deepening our understandings of the causes of oppression versus privilege across various (gendered) experiences and (macro)marketing topics.

Likewise, our article highlights the compounding effects of hardship (extending Kilbourne 2004), which result in localized and differing consumer journeys and challenges to adopting solutions. Additional research is needed to thus grasp variances with other types of vulnerable communities. This information is critical for actors involved in addressing the climate-related crises of developing economies, particularly in light of the direction adopted by the GCF and our insights that vulnerabilities can be unknowingly perpetuated.

In summary, the urgency of addressing the climate crisis propels research and solutions forward. This process needs to adopt a gendered, ecological-intersectionality analysis so that we—

researchers, consultants, program managers, government officials, and policy makers—do not inadvertently perpetuate injustices and inequalities, especially for women.

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Figure 1: An Ecological-Intersectionality Perspective of Human & Natural World Intra-actions and Climate Change Vulnerabilities

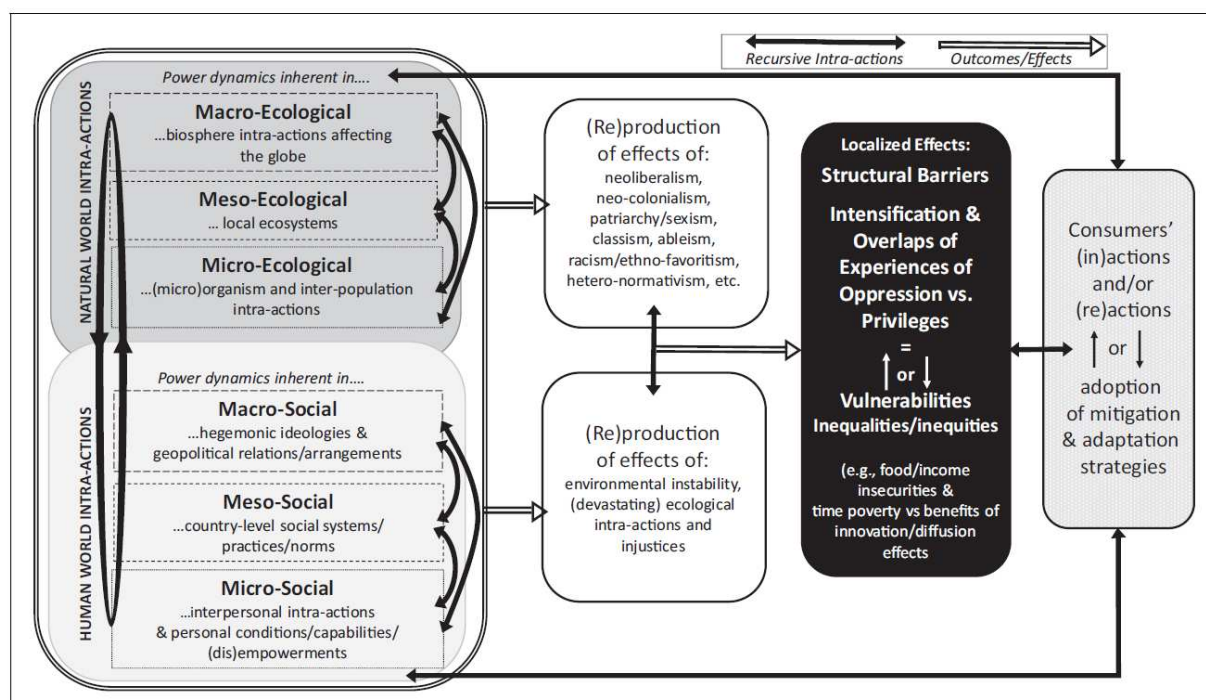


Table 1: Timeline of Fieldwork

Oct 16	Held training sessions on how to use a planter in a demonstrative manner with two community groups.
	Left materials (glue, tinfoil) for groups to make solar cookers; groups had to source cardboard.
Jan 17	Gave each farmer [name brand] maize seeds, fertilizer, and a planter tool; pesticides and herbicides sprayed later in the season by community research assistant
	Collected baseline soil samples and GPS coordinates; marked off, with farmers, 10x10 meter areas for the study.
	Conducted initial interviews. Asked about farming experiences, key sources of income, education levels, family status (married, single, children, etc.). Field notes and photos captured farmer's physicality, household and farm conditions.
Aug 17	Conducted longer interviews. Captured farmers' experiences with the intervention (i.e., what they did and why)
	Collected soil samples. Noted and photographed effects on maize and changes in farmers' plots.
	Gave legume seeds for the short rains (Oct-Dec) to farmers to plant after harvesting maize.
Dec 17	Did focus groups with community groups, exploring effects of interventions, and challenges with harvesting and accessing markets.
	Followed-up with one-on-one interviews at each farm to explore personal experiences with growing and selling crops, and relations with traders.
	Interviewed the older community member, Tom, confirming common findings.
	Handed out [name brand] maize seeds, fertilizer to each farmer for the long rains (Mar-May); pesticides and herbicides sprayed later by the community research assistant. No inputs provided for short-rains (Oct-Dec).
Jan 18	Started hermeneutic, intersectionality-informed analysis; collected additional information on what is not being said (per Table 2)

Oct 18	Conducting interviews and observed what farmers did with CA intervention. Probed for impact of CA. Asked about adoption/benefits of other social innovations (water ponds, solar cookers). Explored experiences of time poverty and household/market gender relations. Photos taken of fields, ponds, cookers.
	Collected soil samples. No inputs given to farmers.
	Took videos/photos of government warehouses; discussed with employees the advice, support (subsidized inputs) offered to farmers. Discussed with government officials preliminary findings.
Dec 18	Continued hermeneutic, intersectionality-informed analysis; became aware of neoliberal assumptions.
Nov 19	Conducted long interviews with farmers to understand what they had done, challenges and opportunities experienced, why they had/had not continued with CA, or adopted/maintained other social innovations (solar cookers, water ponds). Explored/confirmed preliminary findings of analysis with farmers and Tom (older community member).
	Collected soil samples; noted observations/photographed conditions of farms and water ponds

Table 2: Overview of Additional Primary and Secondary Data Sources

<ul style="list-style-type: none"> • Kenya’s governmental reports on climate action plans and budgets (2013-2018) • Inter-governmental reports on agricultural support and policies, and social provisions (pensions, education, etc.) (e.g., World Bank 2019) • Reports and secondary literature on climate (in)actions and policies (Kyoto/Paris Agreements, Green Climate Fund) • All Kenyan Green Climate Fund projects related to agricultural communities, including their “Gender Assessments” and “Gender Action Plans (n=3) • Secondary data on the region of our investigation related to poverty levels (e.g., <u>MoALF 2017</u>), patriarchal structures (e.g., <u>Omwami 2011</u>), and tribalism/ethno-favoritism practices (e.g., Burgess et al. 2010) • Intergovernmental Panel on Climate Change reports (2007, 2014, 2018) • Statistics on greenhouse gases (World Bank 2020; Global Carbon Project 2019) • Reports on ecological elements such as rainfall levels, temperatures, and localized farming conditions, pests/diseases
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Table 3: Questions an Intersectionality Lens Asks Researchers/Practitioners to Consider

1. Who are the actors and ecological actants (element) involved at micro, meso and macro levels who shape the realities experienced by the consumers/project participants?
2. What are the power relations between actors (including ourselves and consumers/project participants) and actants, and how do actors and actants express their power?
3. What forms of oppression—including inequalities and/or inequities personified in discriminations, hardships, disadvantages, marginalization, invisibilities and/or (mis)recognitions—do these power relations result in? (i.e., what is the ‘ism’ or source of injustice?)
4. How do these overlap? (ask ‘the other question’: if something look classism, ask where is sexism, racism, ableism or ecologic injustices/dynamism?)
5. How do these magnify experiences of oppression and/or privilege and result in (in)vulnerabilities for consumers/project participants?
6. What do disadvantaged consumers/project participants disclose as helpful remedies that can prevent their experiences of oppression/vulnerabilities or enable their experiences of privilege/invulnerabilities?
7. How might we (as researchers/practitioners) inadvertently reproduce problematic asymmetric power relations and perpetuate oppressions and vulnerabilities?
8. How can we use our positions of privilege to change unjust power relations and/or sources or forms of oppression and vulnerabilities?