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Across Time, Across Space and Intersecting in Complex Ways: A Framework for Assessing Impacts of Environmental Disruptions on Nature-Dependent Prosumers

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Across Time, Across Space and Intersecting in Complex Ways: A Framework for Assessing Impacts of Environmental Disruptions on Nature-Dependent Prosumers

Abstract

Environmental disruptions, such as extreme weather events or poisoning of natural resources, are increasing in frequency and intensity. These critical global problems demand market- and policy-based solutions. Adopting a transformative consumer research perspective, this article examines the effects of environmental disruptions on the livelihoods of a very vulnerable group: nature dependent prosumers (NDPs). NDPs often live in subsistence markets, but the impact of environmental disruptions on their lives can have repercussions throughout local and global systems. This article thus offers practitioners and researchers a framework– the 'cross-scale intersectionality matrix' (CSIM)— to better understand the differing impacts of environmental disruptions and envisage effective solutions. The CSIM reveals how environmental disruptions impact marketing systems' exchanges of production and consumption: i) across multiple spatiotemporal scales, resulting in cross-scale impacts (per eco-systems theory); and ii) in diverse ways for groups/individuals experiencing intersectional power asymmetries such as geo-political/economic power, classism/ableism and sexism (per intersectionality theory). Building on insights from the CSIM framework, this paper proposes improvements to research, and policy and market-based solutions intended to enhance the well-being of NDPs.

Keywords: Environmental Disruptions, Intersectionality, Subsistence marketplaces, Prosumers, Gender Injustices

Introduction: The Problem

The frequency and severity of environmental disruptions threaten societies world-wide; they are increasing due to the effects of human-made disasters, including the climate crisis. Droughts, typhoons, earthquakes, fires, tsunamis, erratic rainfalls, floods, mudslides, (plastic) pollution, oil or toxic spills, and resource depletions, represent some of the environmental disruptions that profoundly affect the well-being of ecosystems, communities, markets, and consumers. Those who depend on nature for their livelihoods—fishers, farmers, agro-forestry producers—are the most vulnerable to these disruptions (Hallegatte et al. 2015). We introduce the term 'nature-dependent prosumers' (NDPs) to emphasize their over-reliance on nature and the interdependent relationship between their income (production) and daily necessities (consumption). NDPs often live hand-to-mouth, growing, foraging-for or catching food and gathering other basic goods, such as water or firewood, to meet personal and familial needs. The majority of the 2.5 billion people classified as NDPs, exist in subsistence marketplaces where poverty and disenfranchisement are endemic (FAO et al. 2018).

A growing body of literature evidences the multiple hardships NDPs face, as key organizations call to put "vulnerable groups at the centre of responses" (FAO et al. 2018, p. 97). However, solutions aimed at addressing hardships can often face difficult tradeoffs. Do we promote: poverty alleviation or environmental protection; targeted localized solutions or rapidly scalable interventions (e.g., Hallegatte et al. 2015)? Solutions can likewise focus too narrowly and reactively on readily identifiable, shorter-term problems (e.g., food shortages), drawing resources away from systemic elements that, if proactively addressed, could have longer-term and more sustainable effects (e.g., addressing barriers to market access) (FAO et al. 2018; Loewenberg 2014). And they can unintentionally increase the vulnerabilities of NDPs as important differences between NDPs (class, gender, physical/mental abilities) may

be overlooked (Steinfield and Holt 2019). We posit that part of these challenges stem from the perspectives used to assess impacts of environmental disruptions.

In this article we thus present a framework—the Cross-Scale Intersectionality Matrix (CSIM)—to help policy makers, marketers and other stakeholders identify the complex impacts of environmental disruptions on NDPs, the reasons these impacts occur, and how they relate to production and/or consumption activities. The CSIM guides us as we explore three overarching research questions (RQs)[1]:

1) In what ways do environmental disruptions affect the livelihoods (production and/or consumption) of various NDPs, and in turn, other stakeholders, in the marketplace?

2) How do these experiences differ between and within genders as they intersect with class and physical/mental abilities, and what contributes to this?

3) Given these different experiences and the contributing elements, in what ways should research, market- and policy-based solutions be adjusted so they can address (versus perpetuate) vulnerabilities?

Below, before answering our RQs, we explain the components of the CSIM and its value. We then build an 'intersectionality' foundation, identifying the intersecting sources of power imbalances and injustices rooted in global and local conditions, which contribute to magnifying the vulnerabilities of NDPs (per RQ2). We build on this, evincing the 'cross-scale impacts' and resultant intersectional experiences of vulnerabilities related to market exclusion (or limited inclusion) in consumption and production spheres (per RQ1 and 2). In our discussion section (per RQ3), we demonstrate how the CSIM: (1) advances research perspectives; (2) impresses the import of combining policy- and market-based solutions to

[1] These questions, and our answers to them, emerged from a series of dialogic activities (at the 2019 Transformative Consumer Research Conference) amongst the authors of the article, who have conducted research with NDPs across a range of geographies (Asia, Africa, Latin America) and contexts (fishing, agro-forestry, and farming communities). Our shared insights captured varying perspectives (macro vs. micro), which allowed us to explore and contrast experiences of NDPs across genders, abilities, livelihoods, and contexts, and ultimately to create the CSIM.

achieve more equitable and sustainable outcomes; (3) prompts actors to adjust solutions from what we call '1.0 versions', which can perpetuate vulnerabilities and unfavorable tradeoffs, to '2.0 versions', which work to address the sources of vulnerabilities to environmental disruptions. We conclude by mapping out questions the CSIM raises for scholars, marketers and policy makers who work to address environmental disruptions in NDP contexts.

The Cross-Scale Intersectionality Matrix (CSIM)

The CSIM provides a constructive and more encompassing view of NDPs, market dynamics, and resulting vulnerabilities related to environmental disruptions, by drawing from three theoretical lenses—eco-systems, intersectionality, and marketing systems.

The first lens is an eco-systems perspective, which identifies the interconnectedness of natural and human elements that can heighten climate risk vulnerabilities. Scholars, notably in sustainability studies (e.g., Turner et al. 2003; see Viswanathan et al. 2014 for an example in marketing), use it to trace different temporal (short-term versus long-term) and spatial (local versus global) impacts, or what we call *cross-scale impacts*. For example, a tsunami or chemical spill that affects fishing villages immediately heightens food insecurities in the proximal NDP communities, yet can also spread into global markets by disrupting value-chains (fish shortages or toxic fish products) and causing human migration effects (climate-induced refugees). Adopting a cross-scale impact analysis accordingly expands assessments beyond localized, immediate conditions to consider potential global and longer-term effects; it moreover demonstrates how the vulnerabilities of NDPs cause ripple effects that influence other stakeholders and how interconnected elements in eco-systems create nested results or feedback loops. Nested scales capture the recursive cause-and-effect process in which long-term or global effects can loop back to shape short-term or local dynamics, and

vice versa (Turner et al. 2003). An eco-system, cross-scale assessment, however, may be used to direct attention and resources toward readily identifiable versus marginalized groups as it can lack the analytical emphasis our second lens—intersectionality theory—brings.

Intersectionality theory reveals the sources that cause people with intersecting identity characteristics (e.g., class, gender, age, ablebodiness) to experience a multiplicity of vulnerabilities (oppressions) or invulnerabilities (privileges) (Collins 2015). Oppressions can refer to injustices, discriminations, barriers, and/or disadvantages that augment vulnerabilities and hardships, and conditions that make one invisible or marginalized. Similar to eco-systems analyses, intersectionality theory examines the complex social structures, systems, practices, and beliefs (norms and ideologies) that shape (in)vulnerabilities. However, intersectionality theory goes further. It makes explicit the underlying *unequal/unequitable power relations* that permit the functioning of *overlapping* (*intersecting)* oppressions and privileges for different social groups (Steinfield et al. 2019b). Oppressions/privileges can be made evident by studying the experiences of a particular social group (known as intra-categorical intersectionality) or by comparing different social groups (known as inter-categorical intersectionality) (Corus et al. 2016). Intersectionality theory also prompts researchers and practitioners to be *self-reflexive* and to recognize how their own positions of power, assumptions, actions, and labels applied to people can create (in)visibilities, augment marginalizations and (re)produce hardships for certain groups/individuals. It thus draws attention to what may go unnoticed by 'asking the other question' in analysis: if unequal class-based relations are apparent, one would ask how unequitable gender-based relations or practitioner-recipient power dynamics increase vulnerabilities (Steinfield and Holt 2020). Per intersectionality's feminist origin and the perspective of this article, since these power relations and their personification in systems result in oppressions or unequal distribution of

privileges (Cho, Crenshaw, and McCall 2013), they need to be addressed if solutions are to work for vulnerable NDPs.

While intersectionality theory encourages scholars to connect micro-level (personal) experiences of (in)vulnerability to contributing sources of oppression at micro (inter-personal, community), meso (country-level) and/or macro (global) levels (Steinfield et al. 2019b), it often omits a more encompassing and dynamic view of how micro-level elements can have repercussions across space and time. By combining a cross-scale, (inter-categorical) intersectionality perspective, we thus reveal how *and* why environmental disruptions result in different experiences for male versus female NDPs with differing socio-economic and ableism (physical/mental abilities) statuses, in the short- and long-term, and in local versus global market spheres. We also assess how these can create recursive feedback loops. The CSIM accordingly contributes to the growing body of intersectionality literature in marketing and public policy (e.g., Corus et al. 2016; Steinfield et al. 2019b) by adding additional time/space dimensions to the analysis. By augmenting intersectionality analysis, we broaden perspectives so that more holistic solutions, which work to address short- and long-term dynamics, can be identified.

Finally, when applying the CSIM, we adopt a marketing systems perspective. Marketing systems theory, which is prominent in macromarketing studies, emphasizes the interconnectedness of macro-, meso-, and micro-level elements that shape *exchange in marketplaces* (e.g., Hein et al. 2016; Layton and Duffy 2018; Shultz and Peterson 2019). The benefit it offers in our analysis is that it reveals the import of complementary market- and policy-based solutions to address two different yet interdependent ways NDPs may experience vulnerabilities: in the exchanges revolving around NDPs' capacity to produce and to consume. It likewise allows us to trace how these vulnerabilities translate across spatial domains to affect production and consumption in local (micro/meso) and global (macro)

markets, as reflected in trade-offs incurred through the use of common resources (e.g., water) (Shultz and Peterson 2019) or in meeting needs of multiple groups (e.g., NDP migrants versus host communities) (DeQuero-Navarro et al. 2020). However, when scholars apply marketing system theory, they may not compare the nested effects disruptions can create in exchanges in the short- versus long-term *and vice versa* (e.g., Layton and Duffy 2018). Most studies also omit an intersectionality perspective, which can cause solutions to entrench power inequities and hardships (see Steinfield and Holt 2020 for a notable exception).

In sum, by combining these three perspectives—eco-system, intersectionality theory, and marketing systems—in the CSIM, we provide a more encompassing view of the effects of environmental disruptions on NDPs and local/global markets. We now turn to demonstrate the resulting analytical power of the CSIM.

The CSIM for NDPs: Mapping out the Sources of Intersectional Hardships for NDPs

Figure 1 demonstrates intersectional sources of hardships and inequities, which stem from unequal/unequitable power relations and frame cross-scale impacts of, and NDP responses to, environmental disruptions. Below, we briefly trace the sources of power and inequities across macro-meso-micro levels (Steinfield et al. 2019b), focusing on the intersectional power dynamics that foment classism-ableism-sexism inequalities.

INSERT FIGURE 1 HERE

(Geo)Political and Economic Power Dynamics (Re)producing Environmental Disruptions and Classism/Ableism

At the macro level, we find inter-locking elements that both perpetuate the occurrence of environmental disruptions as well as global and local class-based inequalities (poverty) and injustices of (mental/physical) ableism, which in turn accentuates NDPs' vulnerabilities.

One element is a globalizing, rapacious mode of *capitalism* (accumulating assets by exploiting others) advanced by a *neoliberal* ideology (favoring unfettered markets). Whether neoliberal capitalism is driven by corporate or nation-state investments, it promotes ideals that nature (property) is something to be owned, and results in the prioritization of economic growth (often to the benefit of a few) over social or ecological welfare (Kilbourne 2004). The production and consumption of NDPs and other stakeholders is shaped by the resultant dynamics. For example, China's upstream access and perceived 'rights' to the Mekong river, and its decision to build/fund hydropower dams along the river to aid its country's economic development, imperils the markets and livelihoods of NDPs in less powerful countries (e.g., Vietnam) reliant on the Delta for fishing or farming (Shultz and Peterson 2019). Similarly, the decision of some governments to support fossil fuel industries or over-fishing/farming, the lack of environmental regulation or enforcement, and the exploitative profiteering by some governments and enterprises, contribute to the occurrence of natural and human-made disasters that disproportionately harm NDPs (Carmody 2017; Harper and Sumaila 2019).

Second, new forms of geo-political/economic control have emerged to drive forward neoliberal agendas: *neo-imperialism and neo-colonialism*. Neo-imperialism represents the ideology that dominating other countries through forming dependencies is acceptable, while neo-colonialism is the 'soft forms' of (non-military based) power this ideology takes, such as controls over finances and/or markets through loans or trade agreement or creation of aid dependencies (Kasongo 2011). These power dynamics filter through macro-meso relations and can (re)produce class and/or able-based vulnerabilities and inequities. For instance, within macro-meso relations, influential global institutions and actors can use loan, project, and investment agreements to direct funds and attention either towards or away from the localized needs of NDPs. Privileged countries may channel their political and economic power through key financing organizations (e.g., International Monetary Fund (IMF)), which

may in turn pressure disadvantaged countries to practice 'fiscal discipline' (prioritizing debt repayments over social welfare investments). Resultantly, access to loans may require austerity measures while market interventions may lead to cuts in public spending. These often adversely affect social safety nets and public investments that NDPs need to break generational cycles of poverty and to improve their capacity to respond to environmental disruptions (i.e., universal basic income, healthcare, education, or infrastructure) (Woods 2014). Austerity measures can also entrench power asymmetries by causing borrower governments to habitually depend on international organizations to provide funds or aid for social and ecological needs (e.g., research and development in agriculture or fishing, medicines, food) (Loewenberg 2014; Steinfield and Holt 2020).

Unequal access to markets can result from these policies (Kasongo 2011). For example, more powerful actors governing loan agreements (e.g., IMF), investment schemes (e.g., China's development plans), or aid often push countries to adopt some harmful free market policies (e.g., Jones 2016). These dynamics increase NDPs' vulnerabilities as neo-colonial economic/political agreements and market structures often connect countries' resources (e.g., fish) to one-directional, global value-chains (supermarkets in wealthier nations) while holding in (geographical) place the position of NDPs' undervalued bodies of labor (e.g., underpaid fishers). The resources on which NDPs depend are exploited and their labor unfairly compensated so that those with more economic or political clout can capture the benefits (e.g., countries achieve economic growth, enterprises gain profits, consumers maintain their affordable lifestyles and food sources) (Béné 2003; Carmody 2017). This often results in unsustainable cycles that leave NDPs trapped at the bottom of global class-hierarchies: they remain reliant on devalued natural resources that are increasingly becoming depleted, degraded, and uncertain in the presence of ecological disruptions, while rigid borders curtail NDPs' mobility to other opportunities.

The effects of these overlapping power imbalances coalesce with other meso-micro level elements, including localized conditions of ethnic-, caste- (Khan et al. 2018), or race-based (Bolin and Kurtz 2018) favoritism and discrimination to (re)produce two interacting modes of classism/ableism: political and economic (dis)empowerment. NDPs are often left out of decisions made at macro-meso levels between governments and/or (global) organizations, which can render their needs invisible, overlooked or deprioritized. Decisions to enact austerity measures (limited investments in public education, infrastructure), the tolerance or support of the exploitation and degradation of natural resources, culturally and legally imposed limitations to opportunities (e.g., caste, gender, migrant status), the favoritism of certain socially and/or politically connected areas for development, and/or an over-reliance on external actors to determine investments, can result in overlapping disadvantages. These conditions often leave NDPs with financial, cognitive and physical limitations that can affect their ability to access capitals (e.g., financial, human/knowledge, social) necessary to move up the value-chain (Varman, Skålén and Belk 2012) or to safely and prosperously cross borders (Jones 2016). Consequentially, NDPs face consumption and livelihood insecurities as they remain economically and geographically excluded.

Neo-imperialistic power, however, can also be used to support efforts for more inclusive, sustainable growth. Evidence includes: the Green Climate Fund's (GCF 2020) redirection of resources to developing countries and mandates for gender impact assessments; and World Bank (2020) programs and the UN's Sustainable Development Goals promoting gender equality and ecological conservation (FAO et al. 2018). Yet neoliberalism can often thwart these efforts by holding people responsible for their own (in)abilities to access and utilize market structures: It (erroneously) assumes everyone has equal and equitable market-access. Thus, efforts purported to "empower" can perpetuate class inequities, exclusions and

vulnerabilities, particularly for NDPs who may not have requisite levels of market literacy or physical and financial access to markets (Steinfield and Holt 2020).

Patriarchal Power Dynamics and Gender Relations (Re)producing Sexism

Overlapping with geo-political/economic structures that perpetuate NDPs' class/ableism-based vulnerabilities are repressive patriarchal systems. Patriarchy advances the supremacy of men and domination of women, thus (re)producing gender-based oppressions/privileges. These, in turn, result in differing capacities, reactions to, and experiences of environmental disruptions by male versus female NDPs. Drawing from Walby (1989), we briefly outline six key, reinforcing sources of patriarchal power differentials.

1. Production Relations in the Household: Women tend to perform the majority of unpaid care and household duties, which increases their likelihood of time poverty (e.g., reduced time for education and social activities vital to well-being). For female NDPs, environmental disruptions can heighten time poverty as they are disproportionately responsible for harvesting/sourcing food, fuel, and water for familial use, and attending to children's needs (Nellemann, Verma and Hislop 2011). As noted in our analysis, these gender relations can inhibit female NDPs' independence: it decreases their ability to secure sufficient incomes and their power in household decision-making (Demetriades and Esplen 2008; Eastin 2018).

2. Relations in Paid Work: If female NDPs are allowed to work outside the home (which can be determined by additional sociocultural limits (e.g., caste (Khan et al. 2018)), they are often segregated into lower-paid, less-skilled jobs, and restricted in accessing markets, key inputs and assets. This affects their capacity to adapt to disasters and to achieve self-sustaining incomes (Harper et al. 2017). It also creates problematic invisibilities: female NDPs' labor and contributions to environmental disrupting conditions (e.g., over-fishing/farming) are

often overlooked, which feeds into their political and economic disempowerment (Harper et al. 2013; Harper and Sumaila 2019).

3. Relations in the State or Governing Institutions (at the Country and International Level): While the aforenoted macro-meso power dynamics affect state investments in social support systems, a traditional male-dominance in the political (meso-level) realm heightens gender oppressions (IPU 2019). The consequence of asymmetric public funding decisions, laws, and/or policies limits women's access to critical resources (e.g., land, financing, education, skills) (World Bank 2019). State decisions surrounding social investments, such as under-funding education and child benefits, feeds the economic exclusion and lower ableism-levels of women: Women represent two-thirds of all adults who are illiterate (UNESCO 2017); and they are disproportionately represented in the numbers of those who do not complete secondary school, particularly in rural areas (Banik 2014). Efforts by representatives in international and local institutions to incorporate women's rights in policies (including climate policies) and to increase women's political representation have made progress, yet have also been undermined by the historical dominance of aforesaid neoliberal ideals of marketization and economic empowerment (Westholm and Arora-Jonsson 2018) and by norms that work to marginalize the power of women (Kevany and Huisingh 2013). These forces collectively result in a lower likelihood of political change. Consequently, women are more likely to face constraining laws, norms, reduced assets, and encounter policy changes that can significantly limit their ability to navigate environmental disruptions (Eastin 2018).

4. Male Violence: Reoccurring in our analysis, we find that the permissibility of men to exercise control, and to subject the less powerful to threats or actual acts of rape, harassment, beatings and oppression, results in female NDPs disproportionately becoming trapped in exploitative, precarious systems of low-paid and dehumanizing labor, including human trafficking and the sex trade, when disasters occur (Kiss et al. 2015; Nellemann, Verma, and

Hislop 2011). Male violence also magnifies the hardships of environmental disruptions by limiting women's access to markets (Khan 2018; Steinfield and Holt 2020), particularly when women are most vulnerable, such as post-disaster (Seager 2014).

5. Sexual Relations and Control over Women's Bodies: In tandem with the acceptability of male violence is the regulation of women's bodies, supported through the naturalization of heteronormativity (Walby 1989). Heteronormativity in many NDP communities manifests as notions that women are expected to marry young, have children, provide for their familial needs, and obey their husbands. Unlike men, limits placed on women's bodies through threats of violence, laws, cultural norms and/or household relations, often deny females the same opportunities to work (UNDP 2019; Goh 2012). Heteronormative structures likewise expose single mothers, female-led households and widows to magnified hardships in securing means of livelihood when environmental disruptions occur (Nellemann, Verma, and Hislop 2011). They may, as a result, use their bodies to eke out a living (trading sex for goods), facing further marginalization from their communities, which men who buy sex do not face (Béné and Merten 2008). The control over women's bodies also emerges in the form of international heteronormative assumptions: global and local actors view women as worth-while investments, conditioned to reinvest their income in securing familial well-being, while men's role in fostering familial well-being is often marginalized (Steinfield et al. 2019a).

6. Cultural Institutions or Social Norms: Tied closely to all these sources of inequities are cultural institutions that link ideals of masculinity (assertiveness, risk-taking, muscular strength) and femininity (passivity, cooperativeness, care-giving) to biological sex. These notions demarcate what men and women do, regulating the divisions of unpaid and paid labor and expectations of how they should spend income earned (Walby 1989). For example, since females are often viewed as more dutiful, some (often younger) female NDPs have given up traditional livelihoods, migrating to urban areas for work in garment factories (if richer/

literate), or as domestic care or sex workers (if poorer/low-literate) (Fleury 2016). Men, to reaffirm their identities of dominance, may engage in risky behaviors (e.g., fish blasting, unprotected sex). Socio-cultural institutions expressed through religious or community beliefs, can also result in misrecognition by perpetuating gender stereotypes that keep men and women from expressing identities or adopting behaviors outside of the norm (e.g., Steinfield et al. (2019a)). This can keep some female NDPs in submissive roles, entrenching the aforesaid denial of vocational, educational, social and marketplace opportunities (Denton 2002). For example, socio-cultural institutions can contribute to girls being denied schooling and being married young, compromising their agency, cognitive ableisms, and recourse for alternative means of livelihood, which increases their vulnerability to domestic and/or sexual violence (UNDP 2019). These conditions perpetuate economic and political disempowerments and lessen their capacity to recover from disruptions.

Tracing the Cross-Scale Impacts of Environmental Disruptions

The above intersectional dynamics and sources of power asymmetries help us to identify the cross-scale impacts of environmental disruptions on different categories of NDPs (per class-gender-ableism levels). Using the CSIM (Figure 1), we trace impacts along multiple spatial (local to global) and temporal (short-term to long-term) scales and explain these in light of intersectional dynamics. We capture different forces (e.g., power imbalances) and outcomes of oppression (e.g., disempowerments), but also note how NDPs leverage opportunities/ privileges and exercise their own power to counteract the oppressions (e.g., empowerments). We also work to make evident how impacts are interdependent and nested within one another. Figure 1 depicts these cross-level influences through the bidirectional arrows across spatial and temporal scales. To contextualize our marketing system focus on the activities and

(in)securities of consumption and production (livelihood, income, labor per Figure 1), we narrow our assessment to the implications that environmental disruptions have on NDPs in fishing communities. We provide a summary of analysis including that of another NDP (subsistence female farmers) in Table 1.

INSERT TABLE 1 ABOUT HERE

Short-Term and Local Impacts of Environmental Disruption

NDPs, such as fishers, live with the risk of seasonality in their occupation caused by natural cycles. However, the known risk of seasonal, fluctuating volumes of fish, is exacerbated by both natural (e.g., cyclones, droughts, tsunamis) and human-made (e.g., oil/toxic spills, plastics, over-fishing/farming) environmental disruptions. Disruptions can reduce the quality and/or availability of the fish, alter where fish are found, and/or what kind of aquatic species exist (Badjeck et al. 2010; Venugopal et al. 2019), which adversely affect *consumption* and *livelihood* (income) *insecurities* in local communities, particularly for NDPs, given the classist, ableism, and gendered structures they encounter.

The consequences of class/ableism-based inequities are reflected in the consumption realm through limited cash and asset-based reserves of poorer NDPs, relative to more affluent counterparts. Insufficient social assistance programs and investments in community infrastructures (e.g., clean water or hygienic sanitation, schools, health facilities) and housing (due to macro-meso relations/decisions and neoliberal assumptions of self-help) magnify these vulnerabilities when climate crises strike. While better off households can leverage their class privileges by preserving their consumption habits, selling assets or sending (often literate) family members to find work elsewhere, poorer, less-abled NDPs face greater limitations, tradeoffs and risks in pursuing these strategies (Asif 2019; Nayak 2017). Selling assets under conditions of duress can restrict NDP households' investments in health, education and nutrition, ingraining longer-term cycles of reduced ableism and poverty (Goh

2012; Nayak 2017). NDPs' limited economic reserves can trap them in local areas and prevent needed shifts in consumption practices (Gioli et al. 2014). As Venugopal et al. (2019) found, when an oil spill affected a village in South India, low-income fishers continued to consume contaminated fish out of necessity. More affluent consumers could switch to other forms of animal protein and purchase a wider source of food items to prevent malnutrition. Similarly, when environmental disasters result in infrastructure destruction (e.g. by typhoons) (Badjeck et al. 2010) or put inadequate infrastructures under further strain (e.g., as migrants locate to popular coastal fishing areas such as Mumbai (Bose et al. 2018)), the poorest 'trapped' NDP households unduly bear the consequences of these heightened consumption inadequacies: The resultant slum living conditions and inadequate sanitation breed diseases.

In addition to these class/ableism-based inequities, traditional patriarchal elements magnify consumption insecurities for female NDPs, which is not experienced to the same extent by their affluent female or poor male counterparts (Goh 2012; Khan et al. 2018). Naturalized gender norms, for example, encourage women to be submissive and selfless, and push motherhood to be their primary identity. They are, as a result, often "the last to eat," which increases their risks of malnutrition when environmental crises strike (Noone 2018, n.p.). The possession of fewer assets and lower levels of education by poorer female NDPs—due to governing institutions' androcentric laws and/or policies, household gender relations, and gender beliefs—reduce their economic flexibility and capacity to maintain consumption behaviors, decreases their ability to support their children's needs, and increases their dependency on men or state provisions when disruptions occur (Demetriades and Esplen 2008). These dependencies in part explain their trading sex for fish—a consumption practice that can have longer-term effects on personal and family health, should they contract infectious diseases such as HIV/AIDS (Béné and Merten 2008).

Environmental disruptions likewise unsettle production capabilities unequally. While more affluent fishers may purchase technological advancements (GPS) to help them navigate changes in spatial distribution of fish, or vessels that go beyond toxic spill areas, poorer fishers may engage in riskier fishing tactics to cope (Venugopal et al. 2019). Moreover, low-skilled migrants who come to coastal fishing communities in reaction to climate crises can increase competition and over-fishing (Crona and Rosendo 2011). This can reduce fish yields, resulting in debt traps for struggling fishers given that boats, nets, and tackle gear require upkeep (Asif 2019). Livelihood insecurities can enter a downward, recursive spiral.

Female NDPs encounter additional livelihood insecurities. Those who engage in more dangerous processes of fishing are often marginalized and misrecognized because offshore or commercial fishing is considered to fall under the male auspice. Fishermen do not acknowledge these women: doing so would undermine their role as primary providers. Female NDPs may be rendered invisible by policy makers, creditors *and* researchers as well, which contributes to their economic and political disempowerment and exclusion from key decision-making bodies and resources in the fishing community (Harper et al. 2013, 2017).

The patriarchal practices and beliefs that inform public and private (household) divisions of labor often keep female NDPs tied to fishing activities: meant for household consumption; in under-paid activities that depend on the success of fishermen, such as post-harvest elements of the trade (drying, processing, and peddling of fish); and/or limited to collecting the less profitable seafood available from shorelines (e.g., shellfish) (Harper et al. 2017). When disruptions happen, men have the capability to venture further to find fish, including entreating into global spaces by temporarily migrating to other areas (Abobi and Alhassan 2015). More affluent females may (pending sociocultural limits such as caste) draw on their educational privileges to benefit from capitalistic markets by also migrating or shifting to higher-valued work (e.g., in foreign-owned factory or entrepreneurial ventures), or

they may leverage assets to forego the need to work. Poorer female NDPs, however, are often more under-educated and face limited alternatives they can pursue (Djoudi et al. 2016; Fleury 2016). These gender- and abled-based economic exclusion dynamics mean that when environmental disruptions reduce fish supplies, women's dependency on men is heightened. As with their consumption insecurities, these gendered conditions, when overlapped with outcomes of macro-meso relations (inadequate welfare systems) and assumptions of neoliberalism (provide for yourself), can cause some women to use sex to reduce production insecurities, that is, to access fishing grounds or to secure rights to sell fish catches (Béné and Merten 2008; Koralagama, Gupta, and Pouw 2017). Moreover, the geo-political/economic and gender-class-abled nexus leave poorer women (and their children) disproportionately represented in 'trapped' populations who, despite the severity of environmental disruptions, struggle to leave local areas (Gioli et al. 2014).

The ideal of heterosexual relations, neoliberal norms, and men's identity as primary providers can also exacerbate livelihood insecurities among the elderly and/or less-abled. When men's bodies or minds are unable to undertake strenuous activities, their wives often must work to supplement familial income. Even though these women assume the role of primary provider, their relegation to lower-paid work limits their ability to gain sufficient earnings (Dela Pena and Marte 1998). Meanwhile, their time poverty increases as gender roles and household division of labor still leave women responsible for household duties. Environmental disruptions further heighten time poverty for the prior reasons noted (e.g., extended time earning sufficient income, collecting water, firewood, etc.), and also undermine women's health as they are more likely to bear the emotional and physical toll of ensuring family consumption needs are met (Goh 2012; Nellemann, Verma and Hislop 2011). Overtime, these short-term measures can deplete a woman's capacity to earn income, exposing her and her family to increased insecurities.

These examples are not to suggest that poor female NDPs are always more vulnerable on all counts than are male NDPs. Indeed, social norms that expect male fishers to 'provide' or to be 'heroes' can cause them to fall into debt traps (Nayak 2017), suffer through mental traumas (Denton 2002), or engage in more risky fishing activities, such as blasting or dynamiting schools of fish (Koralagama, Gupta and Pouw 2017; Pet-Soede, Cesar and Pet 2000). Men can thus be exposed to severe physical harm and financial and mental stresses, which places their livelihoods—and the other NDPs who depend on them—at risk.

Although these power relations influence the response of NDPs to environmental disruptions, NDPs are able to exercise a level of agency, albeit constrained. This can result in both positive and negative outcomes. For example, when environmental disruptions force fishermen to migrate to other regions or cause older men to struggle with adapting to new realities, opportunities can open for women to assume the role of primary decision maker or to be recognized as a key contributor to familial income and the community (Denton 2002). Taking advantage of these opportunities is an incremental step towards economic inclusion, offering at least a step toward shifting norms (Djoudi et al. 2016). These short-term changes may have trickle down effects in the long-term: increasing the number of women involved can set a precedent and can make them more visible in society. Longer-term, this may heighten opportunities for female NDPs' voices to be included in policy, marketplace, and household decisions, and to alter consumption and production vulnerabilities (Fleury 2016; Gioli et al. 2014). On the other hand, neoliberal, geopolitical pressures on governments to forego key investments in social assistance means the agency of NDPs can often lead to sub-optimal choices that, in the short-term, resolve immediate needs (i.e., securing fish through sex or fish blasting) but that can have longer-term maladaptive outcomes. NDPs can downplay, become desensitized to or be ignorant of the longer-term consequences of their actions, including social exclusion or health compromises, or destruction of their key natural

resources. Resultantly multiple hardships can ensue—decreased ableism, disconnection from critical social networks, debt traps, or depletion of resources—that heighten NDPs' vulnerabilities and inabilities to navigate future disasters (Béné and Merten 2008; Nayak 2017; Pet-Soede, Cesar, and Pet 2000). Decisions made in the short-term can have prolonged effects that feedback to shape future realities.

Long-Term and Local Impacts of Environmental Disruption

Over time, an over-reliance on capitalistic markets and neoliberal assumptions can cause environmental disruptions to broaden *income* and *consumption inequalities* (per Figure 1 and Table 1). Government subsidies, for example, aimed at maintaining or growing fishing levels (subsidies for boats, gear, fuel, etc.) to support markets and value-chains, without sufficient investments to protect or rejuvenate marine life, can deplete stocks (Harper and Sumaila 2019). While more affluent fishers or companies can benefit from these conditions by accessing technology, poorer NDPs face prolonged production and income disadvantages.

The cumulative effects of suppressed incomes, and increased frequency and scope of environmental disruptions create a debilitating pattern that degrades the well-being of poorer, low-literate NPDs (Goh 2012; Shultz and Peterson 2019). The reaction of NDPs to pursue riskier behaviors and the physically-demanding nature of their labor can result in poorer health for men and women (Badjeck et al. 2010). Women's higher levels of malnutrition and household demands (per gender norms and relations) can exacerbate this (Goh 2012). Likewise, the occurrence of environmental disruptions can increase health issues (malaria, asthma, diarrhea) (Badjeck et al. 2010), while decreasing local medicinal herbs NDPs traditionally use (Goh 2012). When combined with a lack of decent healthcare (which can stem from neo-imperialistic and/or caste/ethno-favoritism pressures), the health issues of NPDs in the short-term can accumulate into chronic injuries and illness in the long-term. This

lack of able-bodiedness can undermine their capacity to earn future income (Badjeck et al. 2010). Moreover, the need to allocate scarce financial resources for adequate healthcare can exacerbate NDPs' vulnerabilities to poverty and debt traps (Hallegatte et al. 2015). Ongoing income constraints, as occur with debt traps, can feedback on short-term dynamics: when future disruptions occur, these NDPs are at an increasingly vulnerable position. The previously noted effects of classism/ableism on NDPs' consumption and production in the short-term are reinforced and compounded.

Patriarchal structures exacerbate class/ableism-based consumption inequities, perpetuating the feminization of poverty. The lack of government investments in education (per macro-meso relations/decisions), combined with gender norms, can reduce the ability of girls in subsistence contexts to access healthcare and education. Over time, this translates into the production realm, decreasing the ability of females to enter higher-valued jobs. It can reduce their meaningful participation in key community decision-making bodies, allowing gender discriminatory policies and practices to remain (Eastin 2018). As such, the aforesaid vulnerability of women to environmental disruptions and the gender inequities in consumption/production spheres persist. Conversely, when supportive structures are in place—such as social collectives that distribute information regarding rights, entitlements, and opportunities—environmental disruptions can foster social movements that gradually challenge the structures reproducing the feminization of poverty. Disruptions can thus help empower women. If supported, collectives and other forms of organization can help ensure that female NDPs' voices are included in policy and marketplace decision-making processes and, over time, affect change (Deveaux 2018; Gopal et al. 2020).

Another way the local level can be affected in the long-term—in positive and negative ways— is through out-migration of NDPs. Out-migration may lead to an influx of remittances, thereby helping those who remain in local communities to maintain survival or

to gradually improve their consumption levels and livelihoods (e.g., replace or fix fishing gear) (Asif 2019). If migrants return, they may bring new skills back to their communities (Fleury 2016). On the other hand, neoliberalism's 'self-help' protocols, neo-colonial controls, and limited government support for migrants, means those who are more likely to profitably migrate are the physically and mentally able (often younger) people, and/or from families that can afford initial migration costs. Costs of migration and differences in remittances can widen class-based divides in local areas (Asif 2019). Out-migration can also leave a greater number of older people and (pending local patriarchal practices/beliefs) women to take care of themselves/each other in the local community for prolonged periods of time (Black et al. 2013; Fleury 2016). Communities that lose their most abled individuals to migration face the prospect of having less skill and innovation in the community. In turn this can cause local community members to be more vulnerable to future disruptions, dependent on remittances, and unable to take full advantage of future production opportunities or to cope with local consumption demands for necessities such as healthcare (Eastin 2018; Fleury 2016).

Additionally, when men migrate to pursue short-term seasonal labor, they tend to live alone in temporary communities. Hyper-masculinity norms, which encourage men to engage in sexual relations when abroad, can increase the potential for them to return to their villages with transmittable diseases (Abobi and Alhassan 2015). When combined with patriarchal practices that accede men control over their wives' bodies, or structures that increase women's economic exclusion and willingness to engage in sex trade, the decisions men make can transfer to women's bodies (e.g., HIV/AIDS), affecting the long-term health of women (Goh 2012). If NDPs have little recourse to social security, the physical and mental-health effects of diseases can augment healthcare costs and threaten social isolation. The social stigma surrounding HIV/AIDs, and fears of violence can also prevent women from getting tested, increasing risks that they will pass the disease on to their children (Turan et al. 2011).

The well-being of entire communities (men, women, and children) can be undermined, and with it their ability to earn sufficient income to meet (future) consumption needs.

As disadvantageous as these conditions are, similar to environmental crises prompting women (through collectives) to seek change, studies show that migration can likewise act as a catalyst. Migration of men can open up opportunities for some female NDPs who remain to increase their political or economic pursuits. Over time, this may help women to challenge patriarchal laws, gender relations and norms (Djoudi et al. 2016; Fleury 2016). However, power imbalances between external actors (government, organizations, etc.) and women can undermine these advances. Androcentric views of some actors who use women's collectives to help achieve their mandates (e.g., improved sanitation) can cause gender inequity within markets or households to be disregarded. This can leave women facing time constraints and limited opportunities to earn more income (Priyadarshini 2018). Without structural changes, gender imbalances remain. Thus, while the limited empowerment women can achieve when men migrate can improve decision-making power, this does not always translate to sustained decision-making power when men return. The attainment of greater gender-equity within household consumption/production decisions may only come through intergenerational change brought about through investments in the education of girls (Gioli et al. 2014). NDPs' ability to escape the devastating, accumulating effects environmental crises can have on consumption/production spheres rests in decisions and investments (e.g., education of girls) made in the short-term, albeit with longer-term benefits to women's and societal well-being. For many NDPs, particularly the most destitute, this is a significant challenge.

Short-Term and Global Impacts of Environmental Disruption

The effects of environmental disruptions lead to global, short-term impacts as local nuances of NDPs' lives have ripple effects beyond geographical borders. As related, when disruptions

lead to livelihood insecurities (e.g., income, debt, food), NPDs may migrate—locally, regionally or across borders—for short periods of time or during months of low-productivity (Asif 2019; Nayak 2017). Their migration to pursue jobs in comparatively unaffected areas is propelled and affected by the aforesaid political-economic dynamics of erroneous neoliberal, market assumptions and macro-meso, neo-imperialistic relations. These power dynamics can leave inadequate social safety nets and under-developed local market opportunities.

The 'markets of migrations' NDPs enter can cause them to experience *livelihood displacements* (per Figure 1 and Table 1) as their work (production) and living conditions (consumption) can shift. These outcomes are conditioned by the gender-class-abled nexus. Pending gendered perspectives of whether women should work,[2] more affluent (privileged) families may send their daughters or sons abroad and into better forms of work (e.g., safer, more lucrative), while those who are less affluent often accept precarious forms of labor within their country's borders (Fleury 2016). Moreover, increased demand for women to work in factories to support global industries (garments) and process-related production (given women's under-paid status and gender-work identities), means (literate) females are more likely to receive skills training while lower-income (illiterate) women may be pushed into care or sex work (Fleury 2016). Men may remain in low-paid fishing activities (Abobi and Alhassan 2015), yet desires by countries to control resources and borders may deny them access to fishing rights (Crona and Rosendo 2011). This can lead them to fish illegally, or to migrate to non-fishing areas where they may be relegated to low-skill/low-paying options (e.g., tuk tuk drivers) and/or to sell their labor on a more haphazard basis (i.e., construction jobs) (Asif 2019; Fleury 2016).

[2] Our review of the literature as well as our own research experiences find a notable divide between regions that allow women to migrate, notably countries in Southeast Asia (Cambodia, Laos, Vietnam) and Africa (e.g., Abobi and Alhassan 2015; Asif 2019; Fleury 2016), and those, such as India, where women's bodies were more tightly controlled and limited to either the home or seeking employment in local markets pending restrictions imposed by other sociocultural influences (e.g., caste) (Khan et al. 2018).

The pressure for migrants to remit their wages to those back home, combined with more costly living expenses (e.g., food, housing) and/or denial of social provisions, can contribute to substandard living conditions (Crona and Rosendo 2011; Horlings and Marschke 2019). Neo-colonial modes of governance and/or ethno-favoritism can reduce living conditions further as they may curtail governments' abilities (e.g., loan restrictions) or desire (over-reliance on markets; (de)prioritizing of community needs) to rapidly provide the infrastructure or regulations needed to meet the heightened demands placed on goods, such as water, housing, hygienic sanitation, and transportation. The rise of slum cities (DePaul 2012) and privileging of water supplies to export processing zones over community needs (Horlings and Marschke 2019) are exemplar of these conditions. Costly water purchases (ibid) or health ramifications from living in unsanitary conditions (e.g., diarrhea) (Molla et al. 2014) can further strain incomes, which can lower remittances and aggravate consumption inadequacies for those remaining in the local area.

Applying a gender lens, we find an under-appreciation of women's labor, (threats of) violence, and neo-imperialistic/capitalistic market dynamics can further disrupt their lives. Limited wages, fear of abuse, and demands of global value-chains force many women to work overtime in factories (Horlings and Marschke 2019). Others, particularly those from poorer households who enter industries not covered by labor protections (domestic work/sex trade), may face repeated acts of abuse and sexual violence (Fleury 2016).

Taking a global perspective allows us to also identify how the impact of environmental disasters has consumption effects beyond NDPs. They can cause *global consumer value-chain disruptions*, for example, affecting those whose diet includes fish. Because neo-imperialism and neoliberal pressures have increased the interconnectedness of global markets, if environmental disruptions restrict the flow of fish to global markets, increases in prices and food insecurities can occur for consumers in external markets

(Sumaila et al. 2011). Likewise, as co-authors of this article witnessed in Vietnam following a toxic spill, livelihood insecurities prompted some NDPs in the locally affected area to sell contaminated fish, resulting in potential health consequences for consumers across a global value-chain. The impacts of environmental disruptions thus move beyond local levels of consumption to pose threats to the overall health, nutrition, and food security of communities reliant on these global value-chains for their food.

Environmental crises can likewise put immediate pressures on businesses involved in global food value-chains to source products, such as fish, elsewhere. The power/privilege asymmetries within capitalistic value-chains often result in business priorities (e.g., profits) and global consumer demands taking precedence over NDPs' livelihoods. A shift in sourcing products reduces income flowing into NPD communities (Sumaila et al. 2011), which in turn is conditioned by local class and patriarchal structures. In families too poor to withstand demand fluctuations, the aforesaid results may increase (e.g., debt traps, out-migration, over-fishing, female malnutrition or engagement in sex trade, etc.). Global level impacts thus feedback at the local level in an intersectional way.

Long-Term and Global Impacts of Environmental Disruption

At a global, long-term level, as environmental disasters continue and increase in frequency, restructuring of global value-chains and diminished fish supplies will heighten livelihood and consumption insecurities, increase the potential for conflict, and, in turn, contribute to an estimated 200 million to 1 billion climate-induced migrants by 2050 (Brzoska and Fröhlich 2016). These trends are perpetuated by macro-meso relations that protect neo-imperialistic, neoliberal capitalist structures and global hierarchies (Jones 2016): Solutions tend to center on managing outcomes of climate-induced migration rather than mitigation efforts that could help vulnerable (often poorer) countries (McNamara and Gibson 2009).

NDPs' production and consumption are shaped by these decisions. To survive or to escape the indirect effects of environmental crises (e.g., conflict), NDPs undertake more permanent or extended modes of migration. These forms include the climate-induced migration of households to refugee camps (Jones 2016), and/or the migration of families or (often) younger women and men (Fleury 2016) to areas in other low-income countries, such as megacities like Delhi (DePaul 2012), or to more affluent countries (often illegally) (Jones 2016). This migration can often (re)produce class/able-based, *labor-market exclusions* and exploitations due to geo-political power asymmetries that determine whose bodies can cross borders. As Jones (2016) relates, in a 'free-market', capitalist economy where the mobility of goods is encouraged, the mobility of people is tightly controlled. Those who possess the financial and human capital that is valued by more affluent countries (i.e., more affluent, educated people) are granted legal mobility. Although they may experience gender/ethnic discriminations and be under-employed or pushed to pursue entrepreneurial ventures (Minor and Cameo 2018), they are more privileged than NDPs who are often denied legal entry or only given temporary residency because their embodied forms of capital are not valued. Indeed, the USA and European Union (following UN guidelines) do not recognize environmental disruptions as a life-threatening condition that qualifies one for asylum. If denied, NDPs may choose to enter illegally, which can result in higher levels of exploitation given the unprotected nature of their work and the demeaning identity given to their status: Neoliberal perspectives and desires to retain global hierarchies, build up narratives that frame migrants as "undeserving of help and sympathy" (Jones 2016, p. 60). Thus, many of the poorest NDPs migrate to lower-income regions and countries, or remain for prolonged periods in refugee camps.

When migrating, NDPs risk being excluded from markets because they may initially lack social connections to opportunities and face differing marketplace norms in host

contexts or restrictive circumstances (Shultz et al. 2020). When disruptions force NDPs to relocate to refugee camps (Betts et al. 2017) or other communities (Connell and Lutkehaus 2017), they often leave with limited financial wherewithal or resources to invest in productive activities in their host locations. They can become trapped in the areas to which they migrate or are forced to go (Black et al. 2013). Their resource constraints are exacerbated if they cannot practice their traditional livelihoods to earn an income or pursue entrepreneurial opportunities. Labor market exclusion results. This can occur if fishers resettle into non-coastal regions or areas in which their fishing rights are denied by law, by existing landholder rights, or by community structures that control natural resources (Connell and Lutkehaus 2017; Crona and Rosendo 2011). Likewise, in some camps, refugees are not allowed to engage in formal work out of fear that it may result in their permanent residence. A destructive sense of dependency on insufficient aid can result (Betts et al. 2017).

When migrants do exercise agency and attempt to eke out a living, host communities can be positively and determinately affected. Migrants' entrepreneurial activities can spawn new markets, consumer goods, and jobs for others (Betts et al. 2017) and lead to more inclusive and sustainable market systems (DeQuero-Navarro et al. 2020). Yet the presence of cheaper migrant labor can also further class-based divides in host communities. Strains on natural resources (proximal water/firewood) can perpetuate time poverty for both female hosts and migrants/refugees (Whitaker 2002). The clearing of land/trees to accommodate migrants or refugees can heighten risks of future environmental crisis for host communities (DePaul 2012). Deadly conflicts can erupt as resources and cultural identities are threatened (Brzoska and Fröhlich 2016). Sociocultural and economic exclusions often result.

The tensions and exclusions can translate into *consumer market*s lowering the capacity of migrant (Connell and Lutkehaus 2017) and refugee (Betts et al. 2017) NDPs to obtain sufficient housing or sanitary conditions, food, health services, and/or educational

opportunities for their children (either because children must work or are denied schools). In megacities, NDPs' insufficient incomes and limited access to (government) aid can cause them to be disproportionately represented in slums. When overlaid by the effects of neo-imperialism and patriarchy, the resultant lower education levels of mothers (affecting able-mindedness) and a lack of government infrastructure investments, leave females and children at a great risk of illnesses (diarrhea, asthma): They are more likely to adopt unsafe practices in water, sanitation (defecating in the open) and cooking (using charcoal indoors) and are at a higher risk of malnutrition (Goh 2012; Molla et al. 2014). Exposure of children to these conditions significantly decreases their health and longevity (Molla et al. 2014). Inter-generational poverty is perpetuated as these consumer-market exclusions are compounded by the inadequate education of children, the continuation of NDPs' labor-market exclusion (Betts et al. 2017; Connell and Lutkehaus 2017), and/or exposure to healthcare expenses and debt traps (Hallegatte et al. 2015). Short-term livelihood/consumption insecurities continue.

Adding a gender/ableism lens illuminates how the limited economic opportunities male NDPs face, can, over time, increase mental health disparities as they grapple with transformations in their identities, and feelings of disempowerment and uncertainty (Connell and Lutkehaus 2017; Martin 2004). On the other hand, NDP females, particularly those who can exercise class privileges by paying agents to enter the 'market of migration', can find more permeant solutions: they can benefit from heteronormativity norms that open up possibilities of migration through marriage (Fleury 2016); and/or leverage certain modes of women's identities (e.g., lower paid workers) to gain wage work in factories (Horlings and Marschke 2019) or to flow into relatively richer communities as domestic workers, or caretakers (Ehrenreich and Hochschild 2004). They may be able to leverage social networks and ableism to form entrepreneurial ventures (Gu 2012; Martin 2004). Over the long term, these conditions can shift the perception of girls from being less desirable than boys

(Bélanger and Linh 2011). They can also (sometimes) help women alter expectations around their (un)paid work, particularly if women can control remittances and act as key providers (Bélanger and Linh 2011; Gu 2012). These opportunities can feedback to decrease the insecurities they face in the short-term when environmental disruptions occur: They are less dependent on natural resources and men for their income and, in turn, their consumption. However, as the jobs women pursue suggest, migration trends can also reinforce prevailing patriarchal assumptions of what type of work women should be doing, and do little to adjust the under-valuation of 'women's' work or exploitative class-gender dynamics (Ehrenreich and Hochschild 2004). Additionally, when families struggle with displacements or encounter ethnic/racial discrimination in new countries, females may support traditional gender norms and stay at home to protect familial well-being and to maintain a sense of cultural identity (Gu 2012; Martin 2004). The limited resources of lower-class NDP households, and women's exclusion from labor markets, can cause poorer female NDPs' short-term consumption insecurities to become prolonged consumer-market exclusion as they remain caught in expectations to do domestic/care work within squalid conditions and deprived consumer markets (e.g., slums, refugee camps) (Betts et al. 2017; Molla et al. 2014).

In addition, females' engagement with labor and consumer markets in refugee camps and host communities is often conditioned by male violence and imbalanced gender relations. If husbands experience emasculation or stress, marital conflict, divorce or domestic violence can ensue. Neoliberal, economic, and political/legal dynamics that augment women's precarious migrant status, and gender relations (inequalities in pay and/or familial threats of denying food, housing) can cause migrant (Goodman et al. 2017) and refugee (Krause 2020) women to stay in abusive relations and to withdraw from the labor market. If divorced, migrant women risk country expulsion (Ehrenreich and Hochschild 2004). If single, separated from their families, or rejected by their families (for not following gender norms),

they face increased risks of exclusion from consumer markets (e.g., denial of housing, food, or school fees) (Goodman et al. 2017; Krause 2020). Outside of the family, norms of violence can cause female migrant NDPs to face (threats of) physical and sexual violence, which can result in debilitating post-traumatic stress disorder (Goodman et al. 2017), and/or dissuade them from pursuing employment or entrepreneurial ventures (Horlings and Marschke 2019; Khan et al. 2018). Refugee camps and journeys of undocumented, climate-induced migrants are particular (global) spaces where the lives of females, and to a lesser extent males, are affected by sexual and physical violence due to inadequate justice, enforcement, protection and access to health systems (Goodman et al. 2017; Krause 2020). Patriarchal controls over women's bodies, economic exclusion, and acceptability of male violence heightens the risk that a female NDP may: be forced to marry when young (Krause 2020); trafficked (Kiss et al. 2015; Nellemann, Verma, and Hislop 2011); or, if struggling with debt due to familial or spousal death or a divorce, engage in sex work (Fleury 2016). Thus, the risks females face, underscored by male violence and exacerbated by the global (controlled) spaces in which they reside, influence them to adopt behaviors that maintain their risks of labor and/or consumer market exclusion in the long-term and insecurities in the short-term.

Discussion, Solutions, and Implications for Marketing and Public Policy

The CSIM's analytical and practical impact lies in its attentiveness to cross-scale impacts *and* intersectional power differentials. Using it to answer our research questions (1 and 2) reveals numerous complexities that interact with environmental disruptions to shape NDPs' vulnerabilities and engagement with the market, and (per RQ 3) calls for changes to how scholars and practitioners envision and address vulnerable populations. We now turn to explore this latter contribution.

Contributions to Theoretical Perspectives and Research

We extend marketing and public policy studies in five key ways. First, by applying an intersectionality perspective to study the consumption and production elements of marketing systems, the CSIM encourages scholars to make power asymmetries/dynamics explicit, recognizing both oppressive and agentic forces and their interaction (e.g., Steinfield et al. 2019a). This allows the underlying and overlapping elements that shape the actions, choices, and outcomes of NDPs' (and (subsistence) consumers/entrepreneurs more broadly) to be identified so that these elements—versus their consequences—can be redressed (if oppressive) or leveraged (if helpful). For example, it allowed us to identify how and why power exercised through marketplace elements— such as policies or practices related to neo-imperialism, markets of migration, or global value-chains—may simultaneously be solutions for, or sources of, inequality. This highlights the CSIM's second contribution: it advances scholarship (and practice, as detailed below) by offering a transformative framework that draws attention to sources of oppressions/privileges so that market- and policy-based solutions can work in tandem to resolve injustices.

Third, by merging eco-system, cross-scale analysis with intersectionality theory and (macro)marketing systems, we are able to illustrate how environmental disruptions intertwine with (in)vulnerabilities because of varying local *and* global conditions. The CSIM thus extends work on subsistence markets, which often centers on local markets (e.g., Venugopal et al. 2019), and macromarketing, which often assesses interconnected (global) marketing systems (e.g., Shultz and Peterson 2019): it illuminates the importance of understanding and combining perspectives on both local *and* global spaces.

Fourth, the CSIM addresses calls by scholars to identify the dynamism of structural inequalities/inequities in marketplaces (Hein et al. 2016; Saatcioglu and Ozanne 2013) and

their intersectional nature (Corus et al. 2016; Steinfield et al. 2019b). It extends this work by adding a more encompassing view of not only spatial but also *temporal impacts*, enabling practitioners to capture the recursive and nested nature of injustices. The case of NDPs exhibits this intersectional dynamism in multiple ways. Per Figure 1, when the historical and ongoing remnants of (globalized) neo-imperialistic relations and neoliberal mentalities lead to a lack of (localized) social welfare systems and public goods (e.g., education), NDPs may temporarily or permanently migrate when faced with the impacts of environmental disruptions. Their actions extend beyond local levels to affect other (global) communities (resources stress, conflict) and natural elements (overfishing/farming), which in turn can perpetuate environmental disruptions and migrations. When done within the confines of additional class, ableism, gender discriminatory structures and (dis)empowerments, these actions can allow short-term income/consumption insecurities to perpetuate and, in the longer-term, widen income and consumption inequalities between the haves and the have nots: The most vulnerable NDPs become trapped in cycles of intergenerational poverty while more privileged NDPs can escape these poverty cycles by entering more favorable markets of migration. The long-term labor market exclusions for those less fortunate migrants or the heightened income inequalities for those who remain, maintain NDPs' (present/short-term) livelihood insecurities, which act recursively with their consumption insecurities (inability to access inputs, proper health care, food, housing, etc.).

Tracing these paths of different NDPs illuminates the intersecting challenges many poorer, less-abled female NDPs face, but importantly, it also allows us to capture the plight of men. This reveals the fifth contribution of the CSIM: it can create a more balanced and inclusive perspective of the different ways (in)vulnerabilities manifest, serving as a *meta-intersectional* lens. It can consider both intra-categorical (female NDPs) and inter-categorical (female versus male NDP or non-NDP communities) intersectionality. The CSIM thus

encourages future research to extend beyond the common practice of studying one gender (e.g., Hein et al. 2016) and/or one type of intersectional group (see Corus et al. 2016). It calls for scholars to delve *within the genders* and supports work that can reveal how the under-researched aspects of *privileges* and privileged groups' livelihoods (including our own) vary in comparison to oppressions/oppressed groups.

Taken as a whole, the CSIM offers an encompassing view: the CSIM is at once processual (within loci of power), dialogical (between structures and agency), intersectional and systemic (across time and space of various social structures), nested (recursive in causes and effects), and reflexive (accountability for power and actions).

Contributions to Transformative Actions: Toward 2.0 Policy & Market-Based Solutions

From a practical and applied perspective, the CSIM encourages practitioners to move beyond traditional, or what we term '1.0 solutions', to '2.0 solutions', which are designed with an intersectional understanding of extant power structures, and executed to account for how these structures may perpetuate marketplace exclusion for vulnerable NDPs in different ways. Table 1 summarizes and discusses a number of these 2.0 solutions based on vulnerabilities and experiences of hardships or exclusions the CSIM identified. Although rare in the real world, we present in the online Appendix A a 2.0-orientated solution.

Per CSIM's intersectionality perspective, 2.0 solutions emphasize the need for marketplace solutions to work in tandem with key policies and partners to *secure rights and to address sources of inequality/inequities*. Given the intergenerational nature of cultural change, this key element spans both short and long-term and local and global solutions (per Table 1). Moreover, 2.0 solutions recognize that neoliberal mandates of 'market-based empowerment' need to be tempered so that the critical role of the state is supported and challenges to equitable access addressed. For example, to be effective, proposed solutions

should leverage marketing tactics, using social marketing campaigns and working through social collectives or other organizations to gradually challenge detrimental gender and class norms, to raise awareness of rights, and to affect inclusion and social justice. These elements are often overlooked in scientific, environmental analysis, or market-based solutions, yet are central to challenging sources of vulnerability (Venugopal et al. 2019; Hein et al. 2016). This is particularly the case for women, as many societies promise equal rights, but fewer have equal rights in practice (Westholm and Arora-Jonsson 2018). Marketing solutions thus need to be accompanied by policy decisions in investments and training related to enforcement and protection of rights by governments as well as international actors (particularly for refugee camps). Further, as the CSIM highlights, policy design, proposed solutions and marketing campaigns must not perpetuate the patriarchal modes of gender roles and divisions of labor that permeate current global discourses (i.e., invest in women who will invest in families) (Steinfield et al. 2019a). Nor should they be gender exclusive (i.e., focus only on women) as many Green Climate Fund's gender plans do (Steinfield and Holt 2020). Rather, policy, outreach efforts and campaigns need to be gender inclusive and framed such that men re-evaluate how they can also contribute to familial and community well-being.

Second, CSIM's three lenses emphasize the need for 2.0 versions to address elements that can affect NDPs' capabilities and willingness to participate in the market and to exert choice, particularly for those most vulnerable or marginalized. As our recount of NDPs' lives demonstrates, this includes local- and global-spanning socio-cultural/political structures that may contribute to things such as low literacy, income inequalities, political disempowerment, violence, etc., as well as vagaries of the natural world. Notably, it calls for policymakers, global actors (e.g., IMF, UN), businesses, and scholars to recognize their own positions of (neo-imperialistic) power and to start by: 1) questioning the appropriateness of neoliberal assumptions (equal/equitable access to markets), and current modes of capitalism (e.g., one-

directional value-chains); and 2) recognizing the disenfranchisement and invisibilities their agendas may create (e.g., a focus on migration instead of mitigating causes of migration; goals of profit, economic growth over sustainable, equitable sourcing; exclusion of disadvantaged social groups such as women, migrants, less-abled people, etc.).

Solutions for NDPs thus demand a combined focus on: building capabilities necessary to ensure NDPs' successful interaction with markets (e.g., market literacy, mental health programs) (Venugopal et al. 2019); adopting efforts that increase marketplace inclusion and rights (Hein et al. 2016; Scott et al. 2011); *and* researching, developing, and implementing more sustainable solutions for the environment (Harper and Sumaila 2019). Tracing the long-term implications of short-term decisions can aid with this. However, the complexities of pursuing such a transformative marketing system will hinge on the capacity of actors to coordinate activities across global and local levels (Shultz et al. 2020), including the involvement of a variety of NDPs who can illuminate differing intersectional oppressions and ways to sustainably support their efforts to increase their livelihoods and well-being (see Ozanne et al. (2009) for enactments of this in deliberative democracy processes and Ozanne and Saatcioglu (2008) in participatory approaches).

Overall, in moving toward a 2.0 version of capitalism—a more humane capitalism—we propose practitioners truly adopt a stakeholder theory approach that shifts away from competitive, acquisitive-driven capitalism or neoliberal modes of development through markets, and moves toward creating value for a variety of stakeholders on a more sustainable basis (Freeman, Martin and Parmar 2007). While this is gaining momentum among international organizations through inclusionary projects and business mandates (Ludema and Johnson 2019), its potential to be accelerated, presents opportunities for policy makers and marketers. For example, in the short-term, progressive laws, tax practices (i.e., demanding accredited triple bottom line reports), private-public partnerships (PPPs),

marketing efforts to raise awareness, and the shoring up of enforcement capacity can help advance (longer-term) protection and support for the natural environment and for communities, particularly those most marginalized. Additionally, while stakeholder theory requires market actors to use their power responsibly, the CSIM extends this call: Practitioners and policy makers should ensure the voices of those at the bottom of power pyramids (e.g., NDPs) are included in market research and decision-making bodies (e.g., Ozanne et al. 2009), and that the cross-scale implications of their decisions are mapped-out so that exclusionary and destructive consequences at and between local/global levels (e.g., tragedy of the commons, destabilizing levels of climate-induced migration) can be avoided.

As an example, applying a CSIM-informed stakeholder theory approach to solutions for inclusionary and sustainable market efforts would take a 1.0 version of circular economies and shift it to a 2.0 solution. In a circular economy, products at the end of their original life cycle are used as components for new products. For instance, the byproducts of fish, such as collagen, could be used in cosmetics and pharmaceuticals instead of treated as waste (Burch et al. 2019). To ensure re-use of goods is more equitable, efforts at creating circular economies at the local level would need to be combined with: immediate (short-term) bottom-up, inclusionary community meetings (representations of different able-body/minded genders, castes, etc.) and the creation of varied work opportunities conducive to all NDP genders/able-levels; and ongoing, longer-term effort to shore up marginalized NDPs' rights (laws and social marketing campaigns) and capabilities (e.g., market literacy programs and training), and enforcement of policies that encourage and protect marginalized groups' (e.g., female NDPs) access to these opportunities. Enabling NDPs to use waste to capture more of the 'value-add' in the processing of goods could result in more equitable and sustainable (global) value-chains, while using social marketing campaigns and policies to change patriarchal structures (division of (un)paid work) could help rectify (local) gender

imbalances and female NDPs' heightened vulnerabilities to environmental crises. Similar efforts could be made to augment entrepreneurial efforts, particularly in migrant/refugee communities. 2.0 versions could help alleviate (global-space) social conflicts (caused by job/resource losses) and pressures for government and/or organizations to continually provide basic needs (DeQuero-Navarro et al. 2020), while addressing the significant gender- and ableism-based disadvantages that often occur in local and global spaces (Betts et al. 2017).

In addition to an improved approach toward sustainable practices, the CSIM also emphasizes the need for solutions that can limit the impact of disruptions on NDPs by addressing the causes. This calls for shifts in who bears responsibility for pro-environmental behaviors from being significantly placed on NDPs (e.g., the Green Climate Fund) (per neoliberal, neo-imperialism tendencies) to actors in powerful positions over global value-chains, the degradation of the environment, and/or depletion of a country's resources. To this end, we see constructive efforts occurring. For example, Coca-Cola (2018) has pledged to reduce its environmental footprint by ensuring that its plastic can be used multiple times. Similar circular economy efforts are needed; yet, they also need to be performed inclusively, with a stakeholder mindset, such that marginalized, disadvantaged groups are able to benefit.

In a similar way, if technology is to help intersectionally-disadvantaged NDPs address the impact of environmental disruptions, it must be supported by inclusive policies and market opportunities that ensure: NDPs have the abilities and rights to access and use the technology (e.g., physical and affordable access, training); and marginalized groups are not made invisible (overlooked). Technologies such as social media and phones, for example, can be used in global-spaces to help climate-induced migrants or refugees maintain communications across large distances but also to find others with similar language and culture in new, unfamiliar locations. This could lessen experiences of displacements and exclusion. Likewise, phones/social media could aid women who may, despite social

marketing campaigns or enforced laws, face (threats of) violence. They could also be leveraged to disseminate literacy or mental health programs in appropriate languages or visual modes (for low-literates). Emerging technologies, such as blockchain, when merged with more inclusive phones, could digitize records in such a way that they lower transaction costs for purchases, remittances, or insurance (Kshetri and Voas 2018), and trigger automatic payments to NDPs when environmental disruptions occur (Singer 2019). Blockchain can also assist governments to answer calls for improved management and protection of natural resources (Harper and Sumaila 2019), for example, collating different data points to improve modeling and projections of changes in abundance/depletion of fish stocks in various locations. Global and local organizations can leverage this information to coordinate PPP outreach efforts to vulnerable populations (a need noted by the UN (FAO et al. 2018)). This, in turn, can help actors more effectively channel resources to address the short- *and* long-term sources of consumption and production insecurity and inequality (versus one or the other). Artificial intelligence (AI) could similarly be used to help governments or NGOs manage and distribute social welfare programs or project notifications/benefits by automating these tasks, with cryptocurrency or mobile money used to safely transfer any payments.

Key, however, to ensuring that these technological solutions do not take on a 1.0 version that (inadvertently) perpetuates inequities or that makes certain groups invisible (Pilkington 2019) is for policy makers and market researchers to actively ensure that the voice and needs of intersectionally-disadvantaged people are incorporated into planning phases for the use of newer technologies (e.g., AI, blockchain, cryptocurrency) or revamps on older technologies (e.g., phones). Involving different groups of NDPs could ensure that solutions benefit from the range of NDPs' expert knowledge in navigating challenges (which is often overlooked), obtain buy-in, and limit potential disadvantages. By recognizing NDPs' diverse needs, less evident nuances may become apparent. For example, technology geared

toward NDPs would require low-literate friendly interfaces. To avoid inequities, the distribution of technologies may require the accompaniment of campaigns that frame the importance of ownership (phones) or involvement (blockchain/AI) for all genders. Actors may also need to ensure that access to devices, as well as the knowledge to use these devices, flow to women and less-abled individuals. Leveraging PPPs, such as connecting educational or promotional efforts through existing channels that serve women (social collectives or community groups), could help achieve more equitable access.

What emerges from these and other CSIM-evinced solutions (see Table 1) is that they will require coordinated, sustained efforts among policy makers, marketers, and consumers, both locally and globally. Equal rights will need to be protected and translated to communities, in coordination with deliberative democratic processes, training and market access that can overcome the legacy and ongoing effects of neo-imperialistic and patriarchal structures (e.g., low literacy, particularly of women). While circular economies, technology, and other envisioned solutions can help reduce the vulnerabilities to environmental disruptions and exclusions, if not properly managed, they risk allowing the benefits to accrue to those currently with power.

Directions for Future Research

Many of our proposed solutions will require researchers and practitioners to apply an intersectionality, cross-scale perspective to markets and systems. Accordingly, in Figure 2, we provide a set of guiding questions. These questions prompt researchers/practitioners to start with an intersectional approach and then to move to a cross-scale impact analysis. Recognizing the multiple, intersecting, and recursive nature of vulnerabilities will be key to ensure that solutions are effective and do not perpetuate or magnify injustices.

INSERT FIGURE 2 HERE

These questions likewise suggest avenues for future research, such as identifying and examining other sources of oppression *and* privilege less explored here that could result in (in)vulnerabilities to environmental disruptions (e.g., religion, race, linguistics), as well as sources of invisible power. Research is needed to shed light on how these sources are held in place to the detriment of some groups, as well as how NDPs or vulnerable consumers exercise power to change intersectional oppressions. Notably, invisibilities are a key element that researchers can uncover for policy makers and marketers. For women, this includes a recognition of their expressions of agency (such as leveraging their social networks or collectives): Much of the literature on environmental disruptions focuses on their vulnerabilities (e.g., Nellemann, Verma, and Hislop 2011). For men, many of their experiences of oppressions remain less visible (i.e., mental, emotional). Yet their vulnerabilities and resultant actions have cross-scale impacts that affect their own lives as well as the well-being of their families, communities, and natural environments. Thus, in addition to addressing gender-related gaps, we also advocate for more balanced perspectives that contrast inter-categorical experiences of men and women versus adopting a singular view. We recognize that, given the gender-blind nature of some solutions, it would be detrimental to take the focus away from women; however, we posit that by providing a more comparative view, a more inclusive and sustainable way forward can be found, and we may unearth sources of privilege that could be leveraged to help NDPs recover from disruptions.

Creating empowering, transformational policy and market solutions to address the impacts of environmental disruptions is a complex but urgent task. The CSIM offers guidance to this call. We urge scholars and practitioners to adopt the CSIM so that more encompassing analysis and equitable solutions can be obtained.

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Figure 1: The Cross-Scale Intersectionality Matrix (CSIM)

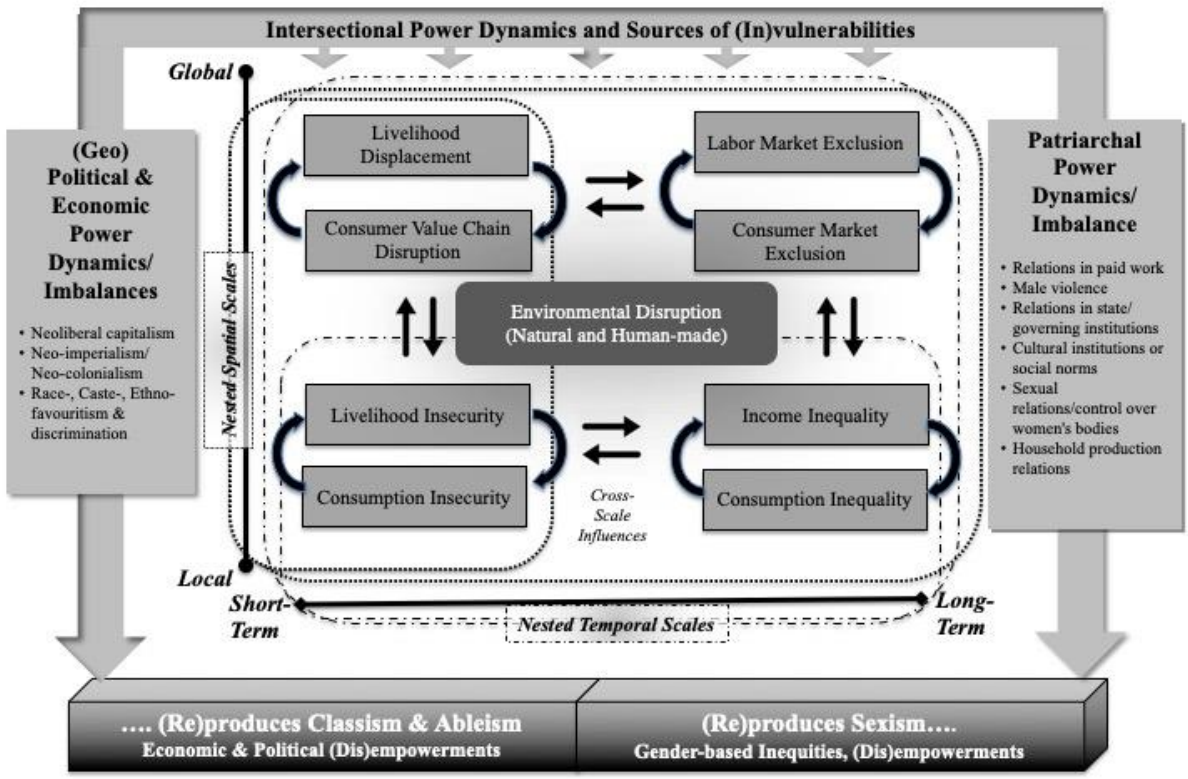

Figure 2: CSIM-Guided Questions for Researchers, Policy Makers and Marketers

Table 1: Impacts of EDs on NDPs and Shifting Potential Solutions from 1.0 to 2.0

Spatial Scale	Temporal Scale	NDP Domain	Examples of Impacts of Environmental Disruptions (ED) on Intersectional Groups (Illustrative Case of Low-Income/Less-Abled Women)	Potential Solutions
Local	Short- Term	Fishing	**Livelihood Insecurity** (*Production*)**:** • Macro-meso relations & gender norms reduce women's education levels; Patriarchal gender norms/division of work relegate women to lower-income activities such as gathering on the sea shore (Harper et al. 2013) • Technology and political decision making-bodies are often not inclusive of low-literate women fishers/traders (Harper and Sumaila 2019) • Thus…Women are less-able to cope with ED and remain trapped at local levels, unable to migrate (Gioli et al. 2014) **Consumption Insecurity** (*Consumption*): • Women disproportionately absorb the shock of food inadequacy (e.g., missing meals) within households due to gender norms (e.g., self-sacrificing mother, submissive wife) (Noone 2018) • Sexism/androcentrism in markets/state decisions reduce women's ability to access key inputs to earn own income & can lead to the trade of sex-for-fish (Béné and Merten 2008) and keep her (and her children) trapped in poor living conditions in local areas/slums (Gioli et al. 2014; Molla et al. 2014).	**Potential 1.0 Solution:** Use of technologies/financing solutions to help: • Fishers adapt to the impact of EDs in the oceans (e.g., fishing in unfamiliar waters, fishing during different seasons, new fish migration patterns) • Farmers adapt to the impact of reduced water availability and changing weather patterns (e.g., irrigation, moisture sensors, conservation agriculture techniques) or to insure against crop loss (micro-insurance) **Potential 2.0 Approaches:** • Ensure that women have rights to land and inputs, including ability to enforce these rights (leverage social collectives/organizations to disseminate info about rights and to provide channel to register/address denials of rights) • Use social marketing campaigns to adapt local norms regarding the level of education that girls receive and the expectation of household roles of women vs. men • Provide vocational training to ensure women can use new technologies/financial solutions and create opportunities for access to markets/labor opportunities (e.g., circular economies) • Accompany dissemination of solutions with (social) marketing campaigns to demonstrate benefits of both genders accessing technologies/solutions • Involve women and less-abled NDPs in planning phases of (new/revised) technologies & decisions on allocation of/ investments in natural resources and development of local economy (e.g., using deliberative democracy processes)
		Farming	**Livelihood Insecurity** (*Production*): • Division of household labor leave women responsible for gathering firewood, water, and growing food to feed family; laws/gender structures mean they may not possess land/water use rights (Nellemann, Verma and Hislop 2011) • Time poverty increases when EDs occur; combined with low education/literacy levels (per macro-meso relations), female farmers' ability to pursue income earning opportunities decrease (Steinfield and Holt 2020) • Gender norms & ethno-favoritism investments in public infrastructure can restrict access to produce markets & (threats of) male violence limit fair compensation by traders, reducing income (ibid) **Consumption Insecurity** (*Consumption*): • EDs (droughts, etc.) mean families cannot grow sufficient food to eat; Women are 'last to eat' (gender norms) + poorer NDPs are unable to grow gardens = lower diet diversity = micronutrient malnourishment (Birdi and Shah 2016) • Low levels of education (ableism), inability to afford key inputs, and time demands due to household division of labor can prevent women from growing gardens or adopting social innovations (water ponds) to aid with resilience to EDs – causes recursive cycle of vulnerability to EDs (Steinfield and Holt 2019)	
	Long-term	Fishing	**Income Inequality** (*Production*): • Current generations exposed to chronic illness (HIV/AIDS) when migrant men return and/or when women's economic exclusion increases dependency on sex with men = results in health-expense debt traps (Béné and Merten 2008) • Lack of government investments in education/markets (cf. neo-colonialism/ caste-ethno favoritism/sexism) and gender norms, trap generations of women in poverty, leaving women with lower literacy levels and access to technology, information, markets, and income (Eastin 2018) **Consumption Inequality** (*Consumption*): • Poorer female NDPs' can remains dependent on remittances of those who can (due to neoliberal/gender/socio-cultural norms) out-migrate (Gioli et al. 2014) • EDs heighten women's consumption inadequacies (slum conditions, malnutrition) contributing to health-expense debt traps (Eastin 2018)	**Potential 1.0 Solution:** • As able-bodied, males migrate in response to EDs, circular economy approaches in fishing and agriculture can find new, potentially lucrative uses of local waste materials in new applications (e.g., fish collagen in cosmetics, local crops as superfoods, sugar cane or coconut fibers in materials) **Potential 2.0 Approaches:** • Maintain diffusion/enforcement of: women's rights to assets, opportunities, control over their bodies; and social marketing campaigns to address inter-generational causes of poverty (girl's education/ division of labor/risky sexual behavior, etc.) • Ensure that women & less-abled NDPs who may be relegated to less lucrative jobs, are able to benefit from more lucrative opportunities alongside men • Support social collectives that can ensure women and less-abled NDPs continue to play active roles in local decision making, particularly ones with a lot of power • Leverage social marketing campaigns and market-development forms to encourage male-dominated professional networks to become more gender inclusive • Ensure access for women and less-abled NDPs to markets and to technology to connect with the developed world to bring current market information
		Farming	**Income Inequality** (*Production*): • Cultural, patriarchal norms dictate that women farmers focus on food production for family consumption, leaving cash crop production for men (Steinfield and Holt 2020) = segregation of lucrative economic opportunities deepen inequalities between men and women (Arndt et al. 2011). • Out-migration of men can increase/decrease market opportunities for women pending sociocultural contexts, leading to more (in)dependence on remittances and (in)vulnerability to EDs (Djoudi et al. 2016) **Consumption Inequality** (*Consumption*): • Patriarchal structures (laws, gender norms) drastically limited women's access to productive assets (land and capital) compared to men (Djoudi et al. 2016) • Reoccurring levels of malnutrition and risks of HIV/AIDs result in chronic illnesses, straining income that could be used for children's schooling/other basic expenses (Goh 2012) = Intergenerational poverty occurs (Eastin 2018)	

Spatial Scale	Temporal Scale	NDP Domain	Examples of Impacts of ED on Intersectional Groups (Illustrative Case of Low-Income/Less-Abled Women)	Potential Solutions
Global	Short-term	Temporary Migrant Fishers and/or Farmers	**Livelihood Displacement:** • Lack of government safety nets & gender norms of what women's bodies can/should be used for can push poorer female NDPs into precarious 'markets of migration' (sex trade) when EDs occur (Fleury 2016; Nelleman et al. 2011); They are also less likely to be able to recover their means of livelihoods after EDs (Goh 2012) • More costly living standards, inability to grow/catch food, inadequate infrastructure provisioning, and the need to send remittances (as a 'dutiful daughters'/'caring mothers') can lower living standards, leading to health issues (Horlings and Marschke 2019; Molla et al., 2014) • Different marketplace goods and conflict over limited resources needed for household consumption (e.g., wood, water) in host communities can heighten stress and sense of displacement (Connell and Lutkehaus 2017) **Consumer Value-chain Disruption:** • Capitalism's systems of global value-chains can be affected by: - Reduced stock of fish/produce heightens prices of food items (e.g., Sumaila et al. 2011) - Response of NPDs to EDs, including selling contaminated products, can lead to potential health consequences for consumers in other markets • EDs can shore-up dehumanizing global value-chains (sex/labor trafficking rings) as women may become desperate for immediate income to buy familial provisions (Nelleman et al. 2011)	**Potential 1.0 Solution:** • As EDs impact work migration patterns, use of technology (mobile banking, blockchain-based cryptocurrency) can increase security and efficiency in sending remittances back to local contexts **Potential 2.0 Approaches:** Compliment technology with activities that: • Ensure women migrants have rights secured/ communicated (thru social collectives & marketing) • Raise awareness of the 'feminization of migration' to counter male-orientated narratives that can create invisibilities of female NDPs (use social marketing campaigns; PPP forums) • Employ technologies to help (low-literate) women signal injustices they may face as migrant laborers (e.g., violence, exploitation) • Create channels (organizations/collectives) & leverage technology to allow women to get denial of rights/injustices addressed • Ensure women and less-abled migrants have access to financially-connecting technologies and are educated on how to use devices • Use AI/blockchain technology/cryptocurrency/mobile money transfers to coordinate PPP efforts to ensure women have safe housing structures and provisions to prevent against need to enter sex-trade • Involve a range of migrant NDPs (female/male, (low) literate, etc.) in participatory, community discussions on creation of technology, infrastructure needs, and how community resources could be sustainably shared and maintained (e.g., using deliberative democracy processes)
	Long-term	Permanent Migrant-Refugee Fishers and/or Farmers	**Labor Market Exclusion (Production):** • Household/socio-cultural gender norms can reduce women migrants' ability to access entrepreneurial opportunities in host markets when relocated with family (Moreno 2016) • Patriarchal structures that allow men to enact violence on women result in female climate-induced refugees being excluded from income generating opportunities (e.g., firewood business) through violent means such as rape (Jacobsen 2002; Martin 2004) • Poorer NDP women are at greater risk of being 'sold' or entering sex trafficking rings (Nelleman et al. 2011) or being in precarious employment conditions (illegal status, subject to threats of violence, etc.) (Enrenreich and Hochchild 2004) **Consumer Market Exclusion (Consumption):** • Additional stress of males/families caused by climate-induced displacement can heighten desires to control women; access to key goods can be used to enact control (Krause 2020) • Tolerance of violence against women, their lower-literate status (due to prior macro-meso relations) and control over their ability to enter labor markets, increase vulnerability to being denied proper housing, food, education (by familial members) if gender norms are not followed (Goodman et al. 2017) • Females may be married young and denied education. Intergenerational poverty persists (Krause 2020)	**Potential 1.0 Solution:** • As climate-induced migrants or refugees leave for longer periods of time/on more permanent basis, the use of technologies (e.g., mobile phones, social media) can help migrants/refugees find work and gain social support, and reduce costs in sending/ receiving remittances **Potential 2.0 Approaches:** • Maintain prior work outlined on securing, disseminating and enforcing rights for migrant/refugee women, particularly in ownership over assets, rights to work, freedom from violence. • Develop technology that women can leverage to secure their safety in engaging in labor/consumer markets • Conduct social marketing campaigns and health provisions to address men, their mental stresses, and forms of male violence; • Ensure women and less-abled migrants have access to socially/financially-connecting technologies and are educated on how to use devices such that they are able to shape how new technologies are used to connect to global value chains • Involve range of migrant NDPs (female/male, (low) literate, etc.) in participatory, community discussions to create entrepreneurial opportunities & use technology to connect host/migrant communities together to build more inclusive economic growth • Conduct gender sensitivity training for male decision makers and gatekeepers to ensure gender inclusive decision-making

Web Appendix A: The Impact of Environmental Disruptions on East African NDPs

The Problem: The Mount Meru ecosystem in East Africa is crucial for climate stability and water supply in the entire region. However, owing to environmental disruptions such as desertification, many regional NDP communities, such as the Maasai, are substantially impacted. The Maasai are a barter-based, nomadic, pastoralist tribe in East Africa, who are completely dependent on their livestock for subsistence. Owing to severe desertification, many Maasai communities are unable to sustain their traditional livelihoods and consumption patterns. Changing environmental patterns have reduced the availability of water, pastures, and firewood. Maasai women are disproportionately impacted by this because they are the ones who fetch water and firewood for the entire household, which is typically headed by a patriarch with multiple wives. Furthermore, Masai women have limited rights, tend to be low-literate, and have fewer income generating opportunities since they can't own assets or engage with external markets.

The Solution: Oikos (East Africa) is a sustainable development NGO that works with several NDP communities in the Mount Meru region. Oikos (East Africa) provides a demonstrative example of what we call 2.0 strategies that span across multiple spatial and temporal scales and pay particular attention to gender-poverty-ableism intersectionality.

	Short-Term	Long-Term
Local	Water shortage necessitated that women travel long distances in search of water and endure the physical strain of carrying back the water in rugged terrain. To address this short-term problem, Oikos conducted dialogues with local communities and eventually partnered with them to construct a water reservoir that reduced the need for women to travel long distances to fetch drinking water. Oikos also works with another social enterprise, called MWEDO, to educate Maasai women about their rights, provide women access to health care, and to promote within Maasai communities the need for, and benefits of, women having equal rights.	Acknowledging the need for sustainable forms of energy generation and use, Oikos created energy committee composed of multiple stakeholders including government officials and women's groups. The women's groups were actively involved in the design and production of sustainable energy solutions such as jatropha oil or improved stoves. Marketing these sustainable solutions not only provided income for women but they also addressed some women-centric problems. For example, most Maasai women cook indoors with firewood, which increases their exposure to smoke. Improved cookstoves reduce women's exposure to smoke. Through their work with MWEDO, Oikos also ensures that Maasai girls receive education and to provide a basic literacy program for low-literate Maasai women.
Global	Identifying the traditional skill of beaded jewelry making among Maasai women, Oikos formed a group of 80 Maasai women and helped them start a small business. Oikos created a value chain by connecting the women's group to external markets, thereby helping them earn their own income for the first time.	Oikos recognized the need for Maasai women to cultivate new skills, livelihoods, and innovations in response to changing market conditions. To create this entrepreneurial resilience, they partnered with Subsistence Marketplaces Initiative at the University of Illinois to create a marketplace literacy education program especially designed for Maasai women, most of whom had no formal education. Equipped with this literacy, Maasai women are capable of sustaining their involvement in the value chain/economic empowerment program, thus creating a more sustained source of living and reducing their and their families' vulnerabilities to environmental disruptions.