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Adapting traditional livelihood practices in the face of environmental disruptions in subsistence communities

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ABSTRACT

This paper explores the impact of environmental disruptions on traditional livelihood practices in subsistence communities. Our research was conducted in a South Indian fishing community, which has faced several environmental disruptions over the last two decades. Our findings illustrate how environmental disruptions threaten livelihood security and bring into question the legitimacy of traditional livelihood practices. In the face of livelihood insecurity, the community legitimizes adaptations to traditional livelihood practices to reestablish livelihood security. We find evidence of three types of adaptations to traditional livelihood practices: (1) blending traditional livelihood practices with non-traditional livelihood practices, (2) expanding beyond the domain of traditional livelihood practices, and (3) altering the knowledge base underlying livelihood practices. Our findings also illustrate how various types of legitimacy push against each other during the change process and how the community resolves these tensions.

Earlier, we used to know what variety of fish you can catch where [in the sea], and we used to go correctly to that place and catch fish. But now the situation is such that the fish variety is not available in the place where it used to be. We can no more predict which variety will be available where. Such is the situation. So, our income is going down.

(Arun, a subsistence fisherman in South India)

1. Introduction

From the nomadic pastoralist tribes of East Africa to the hunter-gatherer societies of Australia, many subsistence communities around the world depend directly on the natural environment for their livelihood security—defined as “adequate and sustainable access to income and resources to meet basic needs” (Baro & Deubel, 2006, p. 528). Traditional livelihood practices in such communities are synchronized with the rhythms of nature, which are codified in the community's traditional knowledge (Drew, 2005). Traditional livelihood practices of interacting with the environment are locally evolved and inter-generationally transmitted to help communities follow environmental patterns and maintain livelihood security (Berkes, Colding, & Folke, 2000). For example, the Maasai tribe of East Africa uses its knowledge

of the environment to periodically migrate livestock to locations with water and greener pastures, thus ensuring livelihood security for present and future generations (Viswanathan et al., 2016). Traditional livelihood practices in such communities change gradually to keep pace with incremental changes in local environmental conditions (Homewood, Kristjanson, & Trench, 2009). However, what happens when disruptive environmental changes drastically diminish the efficacy of traditional livelihood practices in maintaining livelihood security? The relevance of this question is reflected in Arun's opening quote and informs the research we report herein.

We address our focal research question through an immersive study of a small fishing community off the coast of Bay of Bengal in South India. This community is reeling from the devastating impact of several environmental disruptions (tsunami, floods, and oil spill) in the last 15 years, which have completely changed the character of the sea and threatened the livelihood security of people living in the community. Our analysis of multi-source qualitative data from the fishing community advances two important insights. First, we find that environmental disruptions that threaten livelihood security in subsistence communities can call into question the legitimacy of traditional livelihood practices. Second, in the face of livelihood insecurity, the community exercises

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agency by legitimizing adaptations to traditional livelihood practices to re-establish livelihood security. We find evidence of three types of adaptations to traditional livelihood practices: (1) blending traditional livelihood practices with non-traditional livelihood practices, (2) expanding beyond the domain of traditional livelihood practices, and (3) altering the knowledge base underlying livelihood practices. Multiple constraints hamper the ability to bring about these adaptations to traditional livelihood practices. We label these constraints self-identity threat, self-efficacy threat, and continuity threat. Our findings illustrate how and why local subsistence communities balance these constraints to reestablish livelihood security.

Natural-resource-dependent livelihoods such as fishery, forestry, agriculture, and animal husbandry directly support a large fraction of the poor in subsistence marketplaces across both the developing and developed world (World Bank, 2000). For example, more than 75% of Africa's population is directly dependent on the natural environment for everyday survival (Thomas & Twyman, 2005). Consequently, any environmental disruption can pose a serious threat to livelihood security in these vulnerable sections of society, calling for scholarship of a transformative kind (Blocker et al., 2013; Mick, 2006). Our paper responds to this call by presenting policy recommendations that can enhance the welfare of subsistence communities threatened by environmental disruption.

The remainder of the paper proceeds as follows: we first review and synthesize key insights from prior literature that provide the conceptual ingredients for our study. Then, we describe the details of our methodology, after which we present our core findings. Next, we draw on the findings to outline policy interventions that have the potential to bring about transformative outcomes. We conclude the paper by discussing the implications of our research to marketing research in general.

2. Literature review

2.1. Livelihood security

Livelihood security entails having adequate and sustainable access to income and resources to meet basic needs (Baro & Deubel, 2006; Godinho, Venugopal, Singh, & Russell, 2017). It is a sense of assuredness that one has the means to support one's consumption and material needs such as food, shelter, and clothing (Voola, Voola, Wyllie, Carlson, & Sridharan, 2018). Livelihood security encompasses discourse on consumption security, food security, environmental security, and human security (Baro & Deubel, 2006; De Haan & Zoomers, 2005). All communities have a need to maintain livelihood security because doing so is fundamental to their sense of subjective well-being (Coulthard, Johnson, & McGregor, 2011; Martin & Hill, 2012). A wealth of research, therefore, examines livelihood security at the household or community level to better understand its impact on individual, household, and community well-being (Lindenberg, 2002).

Although livelihood security is a universal human concern, people who have little economic means or those whose livelihood is dependent on the natural environment (i.e., environment-dependent) live with greater concerns for their livelihood security (Baro & Deubel, 2006; Bhandari & Grant, 2007). Extant research on livelihood security has focused on people living in poverty, people in subsistence or rural communities in developing countries, and communities that depend on farming and fishing for their livelihood (Shackleton & Shackleton, 2004).

Livelihood insecurity can lead to risks such as hunger and food insecurity, diseases, health epidemics, and homelessness (Baro & Deubel, 2006; Devereux, 2001). Ample research has explored the adverse impacts of livelihood insecurity, but scant research has examined community responses to re-establish livelihood security. External interventions by state and philanthropic organizations to address livelihood insecurity have often been problematic and ineffective, providing only short-term solutions that, in turn, create many unintended negative

consequences that disrupt existing social ties (De Haan & Zoomers, 2005; Devereux, 2001). Furthermore, research to understand the efforts made by the affected communities has focused on community risk management solutions and coping strategies suggesting that subsistence communities have weak resilience (Lindenberg, 2002). Yet, how communities exercise agency to re-establish livelihood security has been under-investigated.

2.2. Traditional livelihood practices and livelihood security

Approximately 75% of the people in extreme poverty live in rural areas, where livelihoods are heavily dependent on the environment (Morton, 2007). In these regions, characterized by low-levels of literacy (Venugopal & Viswanathan, 2017; Viswanathan, Echambadi, Venugopal, & Sridharan, 2014), livelihood security is maintained through traditional livelihood practices, which are shaped by traditional knowledge within communities (Beninger & Francis, 2016; Drew, 2005). Traditional knowledge is the information non-industrialized communities hold that provides reliable understandings of ecosystem functionality, organism interactions, and sustainable living (Freeman, 1992; Snively & Corsiglia, 1998). Subsistence communities employ this knowledge as a principal knowledge base that guides members in navigating the physical and economic world (Godinho et al., 2017). In contrast with the formal channels of learning through which scientific knowledge is obtained, traditional knowledge is produced and transmitted through generations of experimentation and discovery, providing empirical insight for survival and livelihood purposes (Huntington, 2000; Zarger & Stepp, 2004). Traditional knowledge is enacted through traditional livelihood practices, which ensures livelihood security in diverse livelihood domains such as subsistence agriculture, forestry, and fishing (Viswanathan, Jung, Venugopal, Minefee, & Jung, 2014).

The presence of traditional livelihood practices in subsistence communities sustains livelihood security, so long as the environmental patterns remain consistent and predictable (Agrawal, 2002). Many researchers across disciplines agree that traditional knowledge underlying livelihood practices offers crucial points of learning and complements, or even substitutes, for scientific knowledge (Turner, Ignace, & Ignace, 2000). For example, traditional knowledge underlying livelihood practices can provide understanding of how various aspects of the local environment relate to one another, providing useful insight into topics such as how and when to harvest certain plants (Turner et al., 2000). In this vein, Huntington (2000) attests that Eskimo whalers provide a more accurate estimate of whale populations than scientific instruments, due to long-standing Eskimo whale location knowledge. Traditional knowledge entails understanding the context in which a decision is made, with the implication that if this context is lost, understanding is lost as well (Alfange, 1993).

Traditional livelihood practices are not static, however; they evolve gradually over time as new knowledge is assimilated with traditional knowledge within communities. Given the deeply embedded nature of traditional livelihood practices within subsistence communities, any proposed changes often confront resistance unless they are readily beneficial, adoptable, or of a similar nature to existing practices (Brandao, McCarl, & Schuh, 1984). However, other factors from outside subsistence communities can influence change, such as exposure to outside knowledge and access to support programs (Bekele & Drake, 2003). Given the reliance on the natural environment for everyday vocation and survival, these changes are often related to shifting relationships between the community and the natural environment. Changes can range from relatively simple upgrades in technology leading to more efficient work methods to more complex changes in land use strategies for an entire community (Mertz, Wadley, & Christensen, 2005). Even in the face of forces that operate relatively slowly over time subsistence communities can adapt their traditional livelihood practices to survive (Kofinas et al., 2010).

While the presence of gradual environmental changes can lead to increased resilience and, thus, to greater long-term well-being for subsistence communities (Nelson, Adger, & Brown, 2007), evidence suggests that these communities are less equipped to adapt to more sudden, disruptive, non-linear environmental changes (Carmack, McLaughlin, Whiteman, & Homer-Dixon, 2012; Western & Manzollilo Nightingale, 2003). In these instances, subsistence communities often bear a great burden, in terms of both damage to the natural environment on which they depend and the personal and psychological toll these events take (Palinkas, Downs, Petterson, & Russell, 1993; Picou, Gill, Dyer, & Curry, 1992). Such sudden and dramatic environmental disruptions radically change the local environment at a pace that surpasses traditional knowledge's slow and gradual adaptation. Ultimately, the implication is that traditional livelihood practices that depend on traditional knowledge are less efficacious in the face of environmental disruptions in maintaining livelihood security.

2.3. Legitimacy of traditional livelihood practices

Legitimacy is a generalized perception or assumption that certain social practices are “desirable, proper or appropriate within some socially constructed system of norms, values, beliefs, and definitions” (Suchman, 1995, p. 574). Although research has examined several aspects of legitimacy (e.g., Deephouse & Suchman, 2008), a useful way to consider legitimacy comes from the pragmatic–moral–cognitive trichotomy that Suchman (1995) describes. Each of these three types of legitimacy carries important consequences in subsistence marketplaces, as Godinho et al. (2017) highlight in their examination of the adoption of money in traditionally barter-based subsistence communities. First, pragmatic legitimacy entails the self-interested calculations of social actors (Suchman, 1995). Thus, traditional livelihood practices possess pragmatic legitimacy so long as they are efficacious in serving the goal of livelihood security in subsistence communities (Viswanathan, Rosa, & Ruth, 2010). The second type, moral/normative legitimacy, addresses whether traditional livelihood practices effectively promote “societal welfare, as defined by the audience's socially constructed value system” (Suchman, 1995, p. 579). This type of legitimacy also resonates deeply within subsistence marketplaces, given the importance of social relationships that permeate everyday activities in subsistence communities. Third, cognitive legitimacy pertains to the taken-for-granted nature of traditional livelihood practices (Godinho et al., 2017), to the point that traditional livelihood practices are enacted repeatedly without much conscious reflection.

The legitimacy of traditional livelihood practices may make them resilient to change due to deeply internalized feelings of obligation that demand isomorphism/conformity with traditional livelihood practices within the community (Meyer & Rowan, 1977). However, creating a new set of norms and expectations, through mechanisms such as the media, can affect assessment of legitimacy and spark change (Humphreys & LaTour, 2013). Many subsistence marketplaces are characterized by the presence of long-standing traditional livelihood practices in which conformity is crucial. This force of continuity in traditional livelihood practices co-exists with the force for change brought about by situations such as environmental disruptions. In the face of this sort of disruption, there is a need for subsistence communities to question the legitimacy of traditional livelihood practices and legitimize adaptation strategies to ensure livelihood security. Our research findings examine the community's responses in the face of such sudden environmental disruptions that undermine the pragmatic legitimacy of traditional livelihood practices, by threatening livelihood security. But first, we discuss our research methodology.

3. Methodology

3.1. Research site

We conducted our research in Nandikuppam (pseudonym), a small fishing village in Chennai, South India, for more than a year. The choice of site was driven by theoretical concerns with understanding the impact of environmental disruptions on traditional livelihood practices in subsistence markets. In the past decade and a half, the community we studied has suffered two natural disasters — tsunami (2004) and floods (2015) — and a man-made oil spill disaster (2017) that have seriously affected the community's dependence on the sea for its subsistence fishing livelihood.

3.2. Approach

To address our research questions, we gathered qualitative data within the context of a broader and ongoing community action research project in Nandikuppam focused on girl's education. Community action research involves participatory research in a community through collaboration and joint action with key stakeholders in the community (Ozanne & Anderson, 2010; Ozanne & Saatioglu, 2008). The lead author has been running a non-profit education center in the community for more than two years. Thus, during this period, the researchers built relational trust with the community through engagement with community members and commitment to their welfare. Tightly knit subsistence communities, such as the fishing community we studied, tend to be suspicious of outsiders. Therefore, building goodwill in the community was crucial for fostering researcher credibility and, in turn, enhancing data quality (DeBerry-Spence, 2010; Viswanathan et al., 2016). Consequently, a local leader who works with the lead researcher's non-governmental organization (NGO) was instrumental, not only as a key informant but also in providing entry into the community by vouching for the credibility of the researchers and supporting their legitimacy through association in the early stages of the project (McKenna & Main, 2013).

3.3. Sampling and data collection

We based our data collection on a multi-technique approach that included in-depth interviews, photography, and community walks. The use of multiple qualitative data sources provided rich contextual details and data points (Cayla & Arnould, 2013). In total, we held 28 interviews with 25 informants (Table 1). We used a purposive sampling strategy to capture subsistence fishers who had different fishing and life experiences within the community. Thus, we purposively recruited fishers who use a variety of fishing approaches: those fishing in estuary on foot; small, one-person paddle boats; catamarans with sails; motorized fiberglass small boats; and large, commercial boats. We also sampled for a range of fishing experience (e.g., those who had been in the profession their entire lives, those who had been fishing for a few years), boat ownership status (e.g., those who owned their own boats, those who worked on others' boats), and occupational diversity (e.g., those whose sole occupation was fishing, those who had additional sources of income). Finally, we interviewed some people working in fishery-related businesses, such as fish sellers.

We conducted interviews in Tamil (local language), and then a professional translator transcribed and translated them into English, preserving the voice and meaning of informants. All informants were interviewed once; one key informant was interviewed three times, and another key informant was interviewed twice. All interviews were audio-recorded and lasted 45–60 min; informants were modestly compensated 200 rupees (approx. \$3).

We also relied on photographs as an additional source of data to gain visual insight that better captured informants' lived experiences and milieu (DeBerry-Spence, 2010; Ozanne, Moscato, & Kunkel, 2013).

Table 1
Informant details.

Pseudonym	Gender	Age	Occupation	Education
Arun	Male	40	Fishing [fiberglass boat]	10th grade
Cheenu	Male	54	Fishing [fiberglass boat]	7th grade
Easwar	Male	39	Fishing [fiberglass boat], clerk	8th grade
Elango	Male	35	Fishing [fiberglass boat]	8th grade
Ganesh	Male	44	Fishing [commercial boat]	8th grade
Jeya	Female	48	Fish vending, snack shopkeeper	3rd grade
Kamala	Female	34	Fish vending	3rd grade
Kamana	Female	48	Fish vending	5th grade
Mahesh	Male	68	Fishing [paddle boat]	8th grade
Malini	Female	26	Fish vending	None
Mangai	Female	58	Fish vending	None
Manigandan	Male	47	Fishing [fiberglass boat]	5th grade
Manu	Male	36	Fishing [fiberglass boat], fish vending	5th grade
Maran	Male	55	Fishing [fiberglass boat]	5th grade
Mithun	Male	50	Fishing [commercial boat]	5th grade
Padma	Female	46	Fish vending	None
Palanisami	Male	77	Fishing [on foot fishing – retired]	None
Pavitra	Female	38	Fish vending	None
Raman	Male	40	Fishing [catamaran]	None
Ranga	Male	39	Fishing [fiberglass boat], driver	6th grade
Satyan	Male	36	Fishing [fiberglass boat]	6th grade
Suman	Female	45	Fish vending	None
Surya	Male	34	Fishing [fiberglass boat]	5th grade
Varun	Male	36	Fishing [fiberglass boat], boat engine mechanic	Bachelor's degree
Vimal	Male	24	Fishing [fiberglass boat]	10th grade

We gave cameras to key informants to capture local scenes and situations that represented important practices for their fishing businesses, livelihoods, and community. The informants were then shown some of the photos and asked about the meanings they attached to them. In addition, the lead researcher used community walk with local members as a form of participant observation. In principle, this is similar to the community mapping exercise employed in participatory action research and allows for the surfacing of community knowledge (Chambers, 1994). This was a vital data technique that enabled immersion into the everyday community life and social practices that are the backbone of subsistence business and consumer experience (Viswanathan et al., 2016).

3.4. Data analysis

We carried out hermeneutical analysis of the interview data and field notes (Thompson, 1997) and critical visual analysis of the photographs (Schroeder, 2002). Each author independently coded the data, generating emerging research themes across informants and data sources (Thompson, 1997). All researchers then collaborated, building on both convergent and divergent codes to glean theoretical insights, through iterative engagement with extant literature on livelihood security, livelihood practices, and subsistence marketplaces. This data analysis approach follows the best practices in analyzing multi-source qualitative data (e.g., Grier & Brumbaugh, 1999; Zhao & Belk, 2008).

4. Context

In this section, we describe the traditional way of life in the local community through the voices of our informants. Our informants indicated that their lives revolve around traditional livelihood practices of fishing that are reproduced within the community over time and across actors. Manu's words illustrate this reality:

Fishing has been our business for generations. We don't know of any other business. My mother and father both are fisher folk, and we have been in this business ever since.

Traditional livelihood practices are meant to reduce uncertainty and foster stability in social life (Scott, 1995). This manifests in our research site through community members entering the ancestral fishing trade without much consideration of alternative livelihood practices. Most of our informants entered the fishing trade as young children just like their parents and reported that fishing was the only occupation they considered legitimate. This taken-for-granted nature of traditional livelihood practices reveals the cognitive legitimacy it enjoys within the community.

Furthermore, there is a perception within the community that traditional livelihood practices of fishing circumscribe the domain of moral legitimacy within which community members can engage in action. Members often perceive other occupational domains outside fishing as alien. This sentiment arises time and again in informants' statements:

We cannot adapt ourselves to other industries, and we won't get interested in them. For generations we have been doing this [fishing], and we can't change over.

(Surya)

We fishermen know the entire sea. But we don't know the world that lies beyond the road [outside the community].

(Manigandan)

These comments suggest that informants are uninterested in diverging from the traditional livelihood practices of fishing and are unequipped to do so, as being fishermen is a central part of their self-identity.

Traditional livelihood practices of fishing are codified into and transmitted through traditional knowledge. Traditional knowledge is a form of folk science (Berkes, 2012), and for our informants, it operates as the principal knowledge base that shapes and sustains the way of life within the community. Traditional knowledge is comprehensive, providing an inter-generationally accumulated experience with the patterns of the sea (Drew, 2005), including water levels, fishing locations, fishing seasons, types of fishes, measurements, and appropriate equipment. Thus, fishers continually rely on this knowledge to understand their everyday interactions with the sea to maintain livelihood security. This imbues traditional livelihood practices with pragmatic legitimacy. Manigandan briefly explains how traditional livelihood practices build confidence and self-efficacy in predictably navigating the sea for fishing:

The persons who learn very meticulously about this [fishing] trade can just look at a place and say the variety of fish that can be caught from there, and they can tell us about the geography of the sea. They know where there is sand, water level, rock, etc.

5. Findings

We present our findings in two sequential stages. The first stage represents the condition after environmental disruption when the pragmatic legitimacy of traditional livelihood practices is brought into question because of their diminished efficacy in maintaining livelihood security. The second stage discusses how the community exercises agency by adapting traditional livelihood practices to re-establish livelihood security. We also consider the constraints negotiated by community members in the process of re-establishing livelihood security.

5.1. Eroding legitimacy of traditional livelihood practices

The community is accustomed to gradual changes in the character of the sea and has evolved traditional livelihood practices to deal with such gradual changes. During the past decade and a half, however, the community experienced radical and unprecedented natural (tsunami and floods) and man-made (oil spill) environmental disruptions that

altered the patterns of the sea and aquatic life. The sea changed drastically, outpacing the ability of traditional livelihood practices to evolve and adapt. Thus, traditional fishing practices, experientially developed through past interactions with the sea, have been rendered less capable of helping fishers navigate the sea and obtain a reliable catch of fish. This has fostered a perception of livelihood insecurity widely perceived in the community, as exemplified by Arun:

Earlier days, our elders used to say “this month you will get this fish; this month there will be this weather,” and so on. But that is not the situation nowadays; everything has changed. After the tsunami and storms, the weather is also changing day-by-day and fish varieties are also getting depleted.

A noteworthy feature of Arun's statement is the reference to tsunami as the central event that separated the world before and after the environmental disruption. Invoking such stark, publicly visible events to question the pragmatic legitimacy of traditional livelihood practices is often the starting point for collective agency (Kotter, 1995). Environmental disruptions diminish the efficacy of traditional livelihood practices in helping fishers navigate the sea. Such radical changes threaten the pragmatic legitimacy of traditional livelihood practices and the legitimate authority of “elders” who are regarded as the masters of traditional livelihood practices. Now incapable of knowing where to fish, these fishers end up with smaller catches and empty nets, which in turn affect their income, consumption, and livelihood.

An additional blow from these disruptions came in the aftermath of the oil spill, when fish that were caught were deemed unhealthy for consumption and consequently unsalable, resulting in a significant loss of income. The cumulative impact of diverse types of environmental disruptions has led to a collective sense of insecurity in the community regarding its future, as exemplified by Satyan: “I am very confused about my own future. I am not able to run my family or do anything else using this meager income.” Livelihood insecurity as experienced by the community creates a sense of helplessness (“am very confused”), which Phipps and Ozanne (2017) call ontological insecurity. In their study of water management practices during the Australian drought, Phipps and Ozanne document how informants felt similarly incapacitated when the materiality on which practices depended failed to support the practices because of radical environmental changes. Satyan's confusion about his future is tied to his diminishing “meager income,” on which his and his family's livelihood depends. Not knowing where to fish is equivalent to not knowing if he and his family will be able to eat. For those whose livelihood security depends on enacting traditional livelihood practices, the inability of traditional livelihood practices to maintain livelihood security eats away at the pragmatic legitimacy of these practices. In our context, the weakened pragmatic legitimacy of traditional livelihood practices is prompting the community to adapt aspects of traditional livelihood practices to re-establish livelihood security.

5.2. Adapting traditional livelihood practices

5.2.1. Blending traditional and non-traditional practices

Traditional livelihood practices involve using traditional navigational routines for fishing. Community members indicated how they use the movement of the sun and the position of the stars as information to navigate the sea. They also explained the elaborate system of practices and rules related to fishing that were experientially generated and inter-generationally transmitted through an apprenticeship model that was common throughout the community.

Traditional livelihood practices can be strongly resistant to change (Scott, 1987). Such resistance is due to the lack of moral legitimacy of new practices (Suchman, 1995). This insight surfaces time and again in subsistence literature. For example, barter-based indigenous communities in Australia resist the practice of using cash because they perceive cash as being imposed from the outside and disconnected from the way of life in the community (Godinho et al., 2017). Similarly, subsistence

farmers in East Asia resisted the practice of sowing high-yield varieties of seeds because of the lack of moral legitimacy of such practices (Scott, 1977).

However, as environmental disruptions have diminished the magnitude of catch and introduced more unpredictability in fishing, community members are legitimizing the blending of non-traditional fishing practices with traditional fishing practices to cope with the changes. One important change we observed in the community was the adoption of modern information technology that provides additional information about the sea and supplements traditional knowledge. The community has legitimized the adoption of this new technology because it ameliorates the uncertainty that has been injected into the fishing trade by environmental disruption. Manigandan reflects on this technology adoption process:

We need technologies, yes. We cannot live like the earlier days. It [technology] is good only and doing good for people. Like even for us, during 1984–85, etc. there was only a compass that could show directions on the sea. But now if you see, there are many gadgets like GPS, which show the exact area where the fish swim in the sea. It shows where there are fish, sand, rock, etc. in the sea, the waves.

However, a constraint in using such technology is that it requires higher levels of literacy and income, which activates self-efficacy threat within the community. This highlights how members of the community may differentially experience legitimizing changes to traditional livelihood practices. What may be a simple, pragmatic evolution to a modern technology for some may prove to be a barrier for others. Arun, who is a 40-year-old fisherman with a 10th-grade education elaborates on the difficulties inherent in the adoption of modern technologies such as GPS.

Only people who are a little more educated use such gadgets. People like me who don't know anything cannot use it for livelihood. We have to spend money for buying such things also. For example, there is something called GPS, which shows our location, etc. but it costs about Rs. 12000 ... and we are not economically sound to buy that. Even if we buy that, we need some literacy to use it. It all comes in English.

One way to achieve pragmatic legitimacy is through social relationships within the community that facilitate the adoption process. We found that community members overcame the constraint of self-efficacy threat arising from low literacy by relying on young adults in the community who had more exposure to modern technologies and could teach the older fishermen how to use the scientific devices. Surya explains this process of learning:

Outsiders don't come and teach us [GPS use] ... we only teach amongst ourselves. We ask our educated boys only... Then if we use it for few days, then we can learn. We make a note of things and that is how we learn.

In a similar fashion, community members have also adopted the use of motorized fiberglass boats that allow them to go deeper and faster into the sea to boost their catch. This shift away from traditional wooden boats with paddles and sails is primarily driven by a shift in what is considered pragmatically legitimate. During times of abundance in fish stock, traditional boats were adequate to meet the community's livelihood security. However, in the face of unpredictability injected by environmental disruption, the community is switching to fiberglass boats in search of efficiency. The community is aware of this trade-off in moving away from traditional boats, as Mahesh explains:

Nowadays, there are engine boats which have made it easy for travel, but there are other such kinds of difficulties. In catamaran, loss of life was very less, but in boats with engines, more accidents and loss to life occur.

Although use of fiberglass boats is now common, the legitimizing of this new practice was conditional on the household's income level. We observed that many fishermen did not use other safety equipment such as

life jackets to deal with the attendant dangers of more powerful machines. Thus, fishing accidents have become more common in the community. Despite being aware of the increase in dangers, the community has been pushed into adopting more powerful boats in an effort to maintain livelihood security.

We found, however, that not everyone in the community adopted new knowledge and practices in the face of threats to their livelihood security. Instead of allowing for evolution in traditional livelihood practices, some informants persisted with the traditional knowledge and practices of fishing, sentimentalizing its heritage and functional value and rejecting the legitimacy of new technologies. Elango notes:

Traditional knowledge shall always hold relevance pertaining to sea. This knowledge is transmitted over generations... We can understand the tendency of the ocean better than the meteorological department. While sailing we know just by reading the tide its character whether it is going to be devastating or strong or favorable. Fisher folk learn two days in advance, on what's going to be the nature of the tide... May be the new modern techniques like GPS hold accuracy but traditional knowledge is lifesaving.

Here, Elango recognizes the benefits of new technology but discounts its stature in comparison with inter-generationally developed traditional knowledge. Prior research has also shown that traditional knowledge is reliable and, in some cases, more accurate than scientific knowledge—the official predictions of the weather and sea patterns provided by the government's meteorological department (Berkes, 2012; Inglis, 1993). For many informants, the proven dependability of traditional knowledge imbues it with pragmatic legitimacy. Thus, Elango chooses to persist with traditional knowledge and practices to re-establish livelihood security rather than adopt new technology and materials.

5.2.2. Expanding domains of practices

Historically, fishing served as the primary domain of livelihood activity that enjoyed moral legitimacy within the community. However, in view of the threat to livelihood security, community members are gradually taking on other jobs in addition to fishing, with the goal of diversifying their income sources. For example, in addition to fishing, Varun has another job as a boat engine mechanic, and Easwar works as a clerk at a local firm. These types of jobs, which were unheard of within the community years ago, have now increased, as the additional sources of income create pragmatic legitimacy within the community.

The expansion into new domains of practices should not be construed as an abandonment of traditional livelihood practices, given the moral legitimacy associated with fishing. Instead, community members needed to find a way to balance continuity and change by trying to retain and respect that moral legitimacy, while allowing for increased pragmatic and cognitive legitimacy of other vocations. Ranga is a fisherman who also works as a driver to supplement his household income, and he provides an example of the balance between new pursuits and maintaining the family trade:

My father, grandfather... were doing this fishing business. So I have come to this so that the family lineage is not lost. I am also a driver, but fishing is my main profession, my family profession. It would be difficult for us to leave the fishing trade completely. Tomorrow if they send us away from our other jobs, we will naturally turn towards this fishing profession only. Since our life is based on this, we don't want to leave it.

Efforts to expand away from traditional livelihood domain are met with many constraints. Beyond providing livelihood security, fishing carries other elements of moral legitimacy. Self-identity within the community is often anchored within the role as a fisher, and the community must carefully negotiate the threats to the legitimacy of that self-identity (Elsbach, 2003). Thus, Ranga maintains his fishing occupation so that his family identity as fishers “is not lost” despite his foray into another occupation. Our informants also spoke about the cultural pride that

prevented them from expanding into livelihoods beyond fishing. They explained that working under a boss in the formal economy was antithetical to the pride they took in being autonomous beings, who engaged in daily battles with nature to earn a living. The following quote from Ranga captures the threat to moral legitimacy that comes from migrating into new domains of practice:

There is a vast difference in running one's own business and going and working for someone else with folded hands [cultural symbol of subordination]. We find it very difficult. One who fights against nature will never bow in front of another human being.

In addition to a lack of moral legitimacy of vocations beyond fishing (e.g., threats to self-identity and cultural pride), the informants expressed a potential lack of cognitive legitimacy in new domains of practices in the form of insecurity over their lack of skills within the new domains. We asked our informant Kamana whether she would consider new types of income-generating activities in response to her declining income from the fishing trade. In response, she expressed her reservations by stating “I don't know much about other business, and we feel comfortable in doing the business we know about, and not others.”

Despite the multifarious constraints to expanding into other domain of practices, the goal of maintaining livelihood security enjoys primacy and provides the much-needed thrust in legitimating change. This tension between moral and pragmatic legitimacy is reflected in the hypothetical situation described by Ranga:

When we work as watchmen etc., when we are being ill-treated, we get angry. I have noticed that few rich persons with money ill-treat [and abuse] the poor... We have to bow down only at such circumstances. What to do. We have to think of our children.

Serving as a watchman (nighttime security) is a foreign livelihood domain for Ranga that requires him to “bow” to others and endure disrespect to gain the income he direly needs but is no longer guaranteed through fishing. He prioritizes his livelihood security despite the indignities of this new domain. In summary, community members attempt to expand beyond the traditional livelihood domain to open new income-generating opportunities and re-establish livelihood security. However, there are some inherent tensions between moral and pragmatic legitimacy that the community negotiates to bring about the change.

5.2.3. Altering knowledge base underlying practices

Growing consensus in the community is that relying exclusively on traditional forms of knowledge is limiting members' opportunities to augment their incomes by working outside the fishing trade. Thus, the viability of the traditional knowledge base is being eroded in terms of both pragmatic and cognitive legitimacy. Kamala explained this by expressing how non-traditional knowledge, in this case, language and literacy, is important in new environments.

Since I am not educated, I don't have any knowledge, and cannot converse properly if I go to a new place. They will talk in English and Tamil, and they might ask us to read. So I am stuck with fishing business.

Aspirations of formal education are widespread within the community and are now considered legitimate ways to increase opportunities for finding employment, as the legitimacy of the vocation of fishing is diminishing and formal employment is becoming more legitimate. Manigandan's statements capture this notion:

I keep telling our children to study well, and only then they can take up some job outside and settle down in their life. We have somehow lived on till now. This job [fishing] does not hold any future prospects. We keep explaining to them the difficulties that we undergo and that they should not go through the same. So, they have to study, get some good jobs outside [the fishing domain].

One question we asked all informants during our interviews was about their aspiration for their children's future. The near-unanimous response to our question was their desire to have their children get a good education to have better lives than they themselves have. This desire reflects the decreasing level of cognitive legitimacy associated with fishing, a significant departure from traditional livelihood practices of the past when children in the community would drop out of school at a young age to learn traditional fishing practices. A feeling among the adults was that because they were already socialized in traditional livelihood practices, it was now too late for them to pursue new forms of knowledge. However, the young people in the community, who were not yet socialized into traditional livelihood practices, were free to acquire formal education. Community members widely believed that formal education would obviate the need to toil every day to maintain livelihood security, reflecting an increase in the perceived pragmatic legitimacy of formal education. The following quote from Manu captures the essence of the widespread reality in the community:

I love this fishing industry and live with it, but I want my children to study well and hence am giving them good education. I don't know any other way of living, but I want my children to study well and come up in life.

As the community is increasingly venturing out of the fishing trade, there is growing emphasis on winning the respect of outside actors. This shift in the perception of legitimacy also reflects a source of tension, particularly regarding the moral legitimacy that comes with the core values of the community. Most of the informants believed that the rest of society looked down on the fishing trade and considered fishers “primitive.” Thus, they believed that acquiring formal education and a steady-income job was a pathway toward winning the respect of outside actors and elevating the status of their families.

When we asked them if there was any downside to the pursuit of formal education, they indicated the threat of continuity to their way of life. The cognitive legitimacy enjoyed by fishing practices creates a desire for such continuity, even in the face of diminishing pragmatic legitimacy. Manu explains this tension:

Though I have not made my children get into my line [fishing], I am feeling a little bad, since the sea and fishing will be over with my generation only. Our children might not come. If everyone chooses to go outside, the sea and fishing industry will get spoiled. Somebody should come into this also.

Our data clearly reveal that the community has overcome several tensions in adapting traditional livelihood practices to re-establish livelihood security in the face of environmental disruption. By the same token, there are also some unintended fallouts of the change process that are not in the best interest of the community, as the community members acknowledged themselves.

6. Policy recommendations

Addressing major societal issues such as the impact of environmental disruption on livelihoods requires concerted efforts on the part of multiple stakeholders, at both global and local levels. In this section, we provide some concrete policy recommendation, directed at diverse stakeholders, which could enhance well-being in subsistence communities that are dependent on nature for their livelihoods. [Table 2](#) provides a list of our recommendations.

6.1. From scientific framing to human security framing

The central feature of our research is that it adopts a human security framing instead of a scientific framing for environmental disruption. Ample research has established that climate change is one of the most significant drivers of environmental disruptions affecting communities like the one we studied ([Kitcher, 2010](#)). At the global level, however, the discourse on climate change and environmental disruptions has

increasingly evolved into a debate over its scientific validity and extent of human (anthropogenic) causes ([Kitcher, 2010](#)). Some pundits have questioned scientific evidence that climate patterns are changing, and they certainly disagree with arguments that climate change is the cause of environmental disruptions such as floods, tsunamis, and droughts ([Hoffman, 2011](#)). This debate has also become heavily polarized along political lines. In the United States, for example, while 76% of Democrats believe that climate change is affecting the planet, only 35% of Republicans support this perspective ([Pew Research Center, 2018](#)). This polarization of opinions on climate change is palpable among policy makers in the United States. Consider, for example, Jim Inhofe, a U.S. senator from Oklahoma, who brought a handful of snow to Congress as evidence disputing claims of global warming.

These polarized debates have increasingly numbed public sentiments to the negative outcomes global climate change and its resulting environmental disruptions are having on people's lives and livelihood. With the discourse on climate change becoming increasingly about the science, the matter has become more abstract and removed from lived reality. According to construal level theory, events and experiences deemed abstract create a larger psychological distance between people and those events or experiences ([Trope & Liberman, 2010](#)). In turn, such abstractness relegates into the distance the human suffering and loss of lives and livelihood ensuing from climate change induced environmental disruptions.

Advocates urgently need to refocus global attention on those whose lives and livelihoods are changing from unprecedented climate change and environmental disruptions. We therefore recommend a necessary shift in the macro discourse on climate change from the science of climate change (scientific framing) to the drastic impact of climate change and environmental disruption on nature-dependent subsistence communities around the world (human security framing). This shift will require multi-stakeholder involvement. Such collective action must not be top-down but participative, involving the concerted efforts of multiple actors ([Carlsson & Berkes, 2005](#); [Folke, Hahn, Olsson, & Norberg, 2005](#)).

We suggest that local communities whose livelihoods are being affected by environmental disruptions should be provided platforms to share their lived experiences on a global stage. A recent [Pew Research Center \(2018\)](#) report indicates that people living close to coastlines are more likely to agree that climate change affects their communities, further illustrating that climate change is real and near, not an abstract concept. People whose stories are not shared and heard, however, will remain distant from policy makers who tend to engage more in the scientific framing of climate change and its impact on nature.

In this regard, the media must also capture the voices of local community members and tell their stories instead of privileging the voices of experts alone. The media's power to shape global discourse is unprecedented, and it is critical that subsistence communities whose livelihoods are being affected by environmental disruptions are given a seat at the table to influence the public discourse on a subject.

It is also incumbent on scholars to humanize their technical research by focusing on the impact of climate change on vulnerable individuals and communities. As exemplified in this paper, we call for further academic research to document and bring to the discourse evidence of the impact of climate change and its resulting environmental disruptions on local communities across the globe. By mapping out the continuing deterioration in people's lived experiences due to climate change, researchers are more likely to sensitize public consciousness to and empathy in human suffering caused by activities that increase global warming and subsequent climate change.

Similarly, NGOs, pressure groups, activists who work to influence governments, companies, and consumers wanting to participate in climate change mitigation must also re-frame the discourse as a matter of human security to make serious headway. Rather than using hard facts that only become academic (e.g., average temperature is rising above 2 °C), advocates could produce human stories that use the emotional

Table 2
Policy recommendations.

Policy goal	Collective goal (what?)	Actors and roles (who and how?)	Research insight (why?)
Climate change mitigation (global)	To shift the macro discourse on climate change from the science of climate change (scientific framing) to the drastic impact of climate change on nature-dependent subsistence communities around the world (human security framing)	Local community representatives: Sharing lived experiences of climate change on a global stage Media: Capturing voices of local community members Academic researchers: Documenting and bring to the discourse evidence of the impact of climate change on local communities across the globe NGOs and activists: Influencing governments, businesses and consumers in proactively participating in climate change mitigation	Climate change is threatening livelihoods of vulnerable communities that are dependent on nature for their survival
Climate change impact mitigation on life and livelihood (local)	Build or strengthen safety nets to cushion the impact of livelihood insecurity in subsistence communities	Social enterprises: Provide access to finance to smooth consumption during livelihood distress Government: Environmental disaster preparedness (health, food, mental health); property rights on natural environment	Life and livelihood in subsistence communities are more drastically affected by climate change than more affluent communities
Climate change adaptation (local)	Build or strengthen sources of resilience in local communities to prevent the impact of climate change on life and livelihood	Local communities and social workers: Augment and sustain social capital to learn new technologies and mitigate risks associated with adopting new technologies	Resilience reduces the impact of climate change on livelihood security

route of persuasion and concretize the impact of climate change in terms of its impact on human life, income, and social structures. In addition, rather than talking about the impact of climate change on the future, they could re-frame the discussion around its impact on people's lives and livelihoods now. This human security approach will reduce the psychological distance that a scientific framing creates in the minds of policy makers.

6.2. Cushioning the impact of environmental disruption

The second category of recommendations are related to the ability of subsistence communities to withstand the impact of livelihood insecurity generated by environmental disruptions. A real outcome of climate change is the increase in traumatic environmental disruptions at a scale that necessitates regional or national-level governmental interventions (Keim, 2008). Government efforts in these circumstances have often focused on providing immediate sustenance and access to physical healthcare.

However, our informants highlighted several cognitive tensions, such as self-identity threat, self-efficacy threat, and continuity threat that can create mental health problems in the community. Given that mental health issues can be exacerbated for significant periods when consumers are faced with natural disasters (Nolen-Hoeksema & Morrow, 1991), particularly in developing countries (Norris, Friedman, & Watson, 2002), we recommend that government responses to environmental disruptions should not just focus on physical well-being, but mental well-being, as well. We echo the calls of others who have urged local governments to not only have plans and provisions in place to support community members both physically and mentally, but also to educate and prepare community members so that their disaster resilience increases (Keim, 2008).

Additionally, environmental disruptions can result in chronic, ongoing threats to livelihood in subsistence communities. Our informants communicated how the unpredictable nature of climate change has severely hampered the predictability of income, thereby eroding the legitimacy of traditional livelihood practices. Thus, we recommend action from stakeholders that will create or strengthen safety nets in a systemic manner.

Much like communities that have been devastated by tornadoes in subsistence communities, market exchange activities must emerge that enable a continued way of life (Baker, Hill, Baker, & Mittelstaedt, 2015). Here, access to finance is a crucial service that can cushion the impact of livelihood insecurity during environmental disruptions. However, finance is not easily available in subsistence communities due

to the high transaction costs (Venugopal, Viswanathan, & Jung, 2015). Therefore, social enterprises that provide access to micro-finance in subsistence communities will go a long way in buffering the impact of livelihood insecurity. In this regard, social enterprises must establish legitimacy within subsistence communities by ensuring that micro-finance efforts are paired with relevant programming to ensure that livelihood insecurity is overcome in a systemic manner. This can be done with partnerships established organizations already working in subsistence communities, or through internal efforts to establish long-term relationships and provide vocational knowledge and/or training.

6.3. Building local resilience to climate change

We present a final set of recommendations regarding the building of resilience to prevent environmental disruptions from affecting livelihood security. Our first recommendation is the creation of spaces that foster the cultivation, maintenance, and harnessing of social capital within communities for the specific purpose of new technology adoption (Weidner, Rosa, & Viswanathan, 2010). In particular, we recommend the creation of learning spaces that employ trusted local individuals, with an understanding of technology, as teachers. Local resilience to climate change can increase with the adoption of technologies that reduce reliance on nature for livelihood security. For example, the use of geographic information systems (GIS) can help better navigate the physical environment, and the use of aquaculture provides more control over fish harvest. Introduction of such technologies must go hand-in-hand with building of human capital that allows the community to benefit from these technologies. Multiple informants noted that they relied on their children and other educated young people from the community to teach them how to use technology. A concerted effort through these early adopting family members or local organizations could demonstrate the usage of technology in a hands-on manner. This sort of direct introduction to technology can increase the adoption of new products by subsistence individuals by helping them overcome fear and uncertainty by increasing the legitimacy of these products (Dadzie, Dadzie, Winston, & Blankson, 2013; Udimal, Jincai, Mensah, & Caesar, 2017). Such learning spaces should train individuals not only on the use of new technologies but also on the attendant safety precautions necessary to prevent harm.

7. Conclusion

Instead of adopting a scientific framing, we employ a human security framing to examine the impact of environmental disruptions on

livelihoods in subsistence communities. Our research shows how environmental disruptions disproportionately affect subsistence communities because their livelihoods are directly dependent on nature. Furthermore, we show how subsistence communities adapt traditional livelihood practices so as to re-establish livelihood security in the face of environmental disruptions. Despite these adaptations, subsistence communities continue to exhibit many vulnerabilities to the impacts of environmental disruptions, as underscored in our findings. We build on our findings to offer concrete recommendations for multiple stakeholders spanning global and local levels to alleviate the adverse impact of environmental disruptions on subsistence communities. As exemplified in this article, low-income communities will be affected first, and affected the most, by environmental disruptions. We believe that there is an urgent need for more transformative research focused on various facets of environmental challenges in poverty settings. Such research stands to make significant contributions to human welfare, while advancing novel theoretical insights.

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