

# How Subsistence Communities Reconfigure Livelihood Systems in Response to Climate Change: A Coupled-Systems Perspective

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## Abstract

A defining societal challenge in the era of climate change is ensuring consumption adequacy in subsistence communities. To understand the intricacies of this challenge, we have conducted an ethnographic study of a low-income community that relies on subsistence fishing to maintain consumption adequacy. Based on our data analysis, we advance a conceptualization of subsistence livelihood systems that models the tight coupling among its three constituent subsystems: the market system, the social system, and the environmental system. These three subsystems are highly interdependent and operate in concert to maintain consumption adequacy. We then show how climate change-induced environmental disruptions threaten consumption adequacy by disequilibrating livelihood systems in subsistence settings, as well as unpack the self-directed adaptation and mitigation strategies employed by the community in response to the threat of consumption inadequacy. These response strategies create feedback loops to either preserve or attenuate the tight coupling among the three subsystems.

## Keywords

subsistence, poverty, consumption inadequacy, environmental disruption, climate change

## Introduction

In the era of climate change, the principal macromarketing challenge in contexts of affluence is curbing hyper-consumption to mitigate climate change (Kilbourne, McDonagh, and Prothero 1997; Little, Lee, and Nair 2019; Varey 2010). Contrastingly, in subsistence communities around the world that depend on nature for their everyday survival, the principal macromarketing challenge is ensuring consumption adequacy in the face of climate change (Hill and Martin 2014; Mai, Rahtz, and Shultz 2014; Peterson 2012; Steinfield and Holt 2020; Viswanathan et al. 2014b). Over the last decade, macromarketing research has made significant advances in understanding the factors that promote or curb hyper-consumption in contexts of affluence (Helm et al. 2018; Kadirov 2011; Klein and Laczniak 2021; Mittelstaedt et al. 2014; Prothero et al. 2011). However, our understanding of how climate change threatens consumption adequacy in subsistence settings remains nebulous (Chakrabarti and Mason 2014; Steinfield et al. 2021). This gap in knowledge should be disconcerting to macromarketers for two important reasons that have to do with (a) who is impacted and (b) how many are impacted.

In terms of who is impacted, impoverished communities around the world often depend on nature-based livelihoods such as fishing, agriculture, and forestry to maintain consumption adequacy (Bohle, Downing, and Watts 1994; Farrell and Hill 2018). Climate change-induced environmental disruptions disequilibrate nature-dependent subsistence livelihoods and

threaten consumption adequacy (Cochrane et al. 2009). The prospect of impoverished consumers falling below the threshold of consumption adequacy is a distributive justice issue of enormous relevance to macromarketers (Ferrell and Ferrell 2008; Laczniak and Santos 2011). In terms of how many are impacted, it is estimated that hundreds of millions of people living in extreme poverty work in rural areas in developing countries, where maintaining consumption adequacy depends heavily on nature-based livelihood systems, such as agriculture (Angelsen et al. 2011). Therefore, environmental disruptions are likely to precipitate a massive societal crisis by adversely impacting the well-being of these hundreds of millions of subsistence consumers. The sheer scale of the potential impact implores macromarketers to devote more attention to studying this vital issue (Ekici, Genc, and Celik 2021; Sridharan, Barrington, and Saunders 2017).

Recognizing the societal importance of the topic, recent scholarship in marketing has begun addressing the impact of climate change on resource-constrained subsistence livelihood

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systems (Shultz and Peterson 2019; Steinfeld and Holt 2020; Venugopal et al. 2019; Viswanathan et al. 2014b). Recent developments in this stream of research reveal that the impacts of climate change are systemic in nature and create feedback loops that alter the very structure of subsistence livelihood systems (Steinfeld et al. 2021). We root the present research in this emerging conversation and advance it in distinctive ways by asking the following research question: How are resource-constrained subsistence livelihood systems reconfigured in response to climate change-induced environmental disruptions? More specifically, we are interested in exploring how the strength of coupling among the livelihood system's sub-components changes based on agentic actions sparked within the community in response to environmental disruptions.

To answer this research question, we conducted an ethnographic study in a small subsistence fishing community off the coast of the Bay of Bengal in South India. The community has been experiencing climate change-induced environmental disruptions over the past two decades, allowing us to study the disequilibrating effects of environmental disruptions on a subsistence livelihood system. Furthermore, our data also help us theorize how the agentic responses to environmental disruptions within the community create feedback loops to alter or preserve the strength of coupling among the livelihood systems subcomponents.

The research reported in this article makes several contributions to macromarketing scholarship on climate change. Firstly, extant macromarketing scholarship anchored in affluent settings has examined how marketing systems are reconfigured in response to the limits to growth imposed by the natural system (Duffy, Layton, and Dwyer 2017). However, we complement this line of research by exploring the distinctive ways in which communities reconfigure resource-constrained subsistence livelihood systems in response to the impacts of climate change. Secondly, our research asserts that in addition to focusing on reducing society's aggregate consumption, macromarketing scholarship on climate change and sustainability should also examine the all-important issue of maintaining consumption adequacy in subsistence settings. We substantiate this assertion by illuminating in vivid detail how climate change unleashes threats to consumption adequacy in subsistence contexts.

Thirdly, drawing on the theoretical apparatus of marketing systems research (Layton 2007; Sredl, Shultz, and Brečić 2017; Wooliscroft 2021), we demonstrate the importance of adopting a systems perspective in understanding the impact of climate change on livelihood systems. Livelihoods are complex, adaptive systems composed of a vast array of interlocking structures and processes (Mittelstaedt et al. 2014). Therefore, we assert that reductive modes of analyses for complex livelihood systems tend to provide, at best, a deficient understanding—and at worst, a defective understanding—of the system's functioning (Wooliscroft 2021). Finally, prior operationalizations of systems research have tended to investigate structure and process in isolation, ignoring the insights from prior macromarketing research that structure and

processes are mutually constitutive (Steinfeld and Holt 2020). Structure-oriented accounts tend to highlight how the system's configuration and attributes shape its performance (Aiyar and Venugopal 2019). Process-based accounts, on the other hand, aim to understand the evolution of marketing systems over an extended sweep of time (Leblebici et al. 1991). Our simultaneous consideration of structure and processes provides a balanced account of system dynamics, which is crucial for deriving effective policy solutions (Wooliscroft 2021).

## Literature Review

### *The Structure of Livelihood Systems in Subsistence Marketplaces*

"Livelihood system" refers to the bundle of assets, capabilities, and practices that a community harnesses to maintain consumption adequacy (Chambers and Conway 1992). In this research, we have viewed consumption adequacy as the ability of a community to meet its basic consumption needs—in other words, its subsistence needs (Martin and Hill 2012). We have employed a livelihood systems perspective, which is consonant with the systems perspective adopted in macromarketing literature (Wooliscroft 2021). Systems research requires us to clearly define the boundaries and scale of the system under investigation. For the present study, the local community is the unit of analysis and establishes both the scale and the boundaries of the livelihood system. Baker et al. (2015) view the community as being anchored in a specific context and composed of a set of actors suspended in a dynamic web of relationships. Our use of the term "community" is akin to their conceptualization of the term.

A livelihood systems perspective is germane to our study of a subsistence fishing community for several vital reasons. Firstly, a livelihood systems approach focuses its analytical gaze on the assets and capabilities that subsistence communities possess and harness to maintain consumption adequacy. This lies in stark contrast to deficit-based perspectives that begin their analysis with a focus on what subsistence communities lack (Rakodi and Lloyd-Jones 2014). Deficit-based perspectives exhibit a denuded understanding of how prevailing livelihood systems function in subsistence marketplaces (Moser 1998). Consequently, they tend to prescribe the prevailing norms and practices of developed markets as a solution to the problem of poverty (Viswanathan et al. 2012). Secondly, a subsistence community's practices to maintain consumption adequacy are best understood within the context of the macro livelihood system in which they are embedded (Steinfeld and Holt 2020; Venugopal et al. 2019). Livelihood systems in subsistence marketplaces have a nested structure, and prior research on subsistence marketplaces has underscored the importance of employing a systems perspective and acknowledging cross-level influences within the system (Lindeman 2014; Viswanathan, Shultz, and Sridharan 2014a).

Finally, there is significant interdependence among the subsystems that constitute the livelihood system in subsistence

marketplaces (Ostrom 2009). Although prior research into the structural characteristics of subsistence livelihood systems does not explicitly model these subsystems—the environmental system, the social system, and the market system—it does reveal the tight coupling that exists among these three subsystems (Steinfeld et al. 2021; Venugopal et al. 2019; Viswanathan, Rosa, and Ruth 2010). Comprehending such interdependence warrants a holistic perspective that lies at the core of systems thinking (Layton and Grossbart 2006). Our livelihood systems approach acknowledges the fact that one cannot understand the functioning of the system as a whole through a reductive analysis of the system's isolated subcomponents (Wooliscroft 2021).

### *The Processes Unleashed by Environmental Disruptions Within Subsistence Livelihood Systems*

Environmental disruptions caused by climate change have a disequilibrating effect on livelihood systems in subsistence marketplaces, threatening consumption adequacy (Venugopal et al. 2019). Environmental disruptions represent changes in the character of ecosystems that “render it, temporarily or permanently, unsuitable to support human life” (El-Hinnawi 1985, p. 4). Environmental disruptions are often caused by exogenous shocks to the system, such as climate change (Steinfeld et al. 2021) or catastrophic weather events like tsunamis (Chakrabarti and Mason 2014). However, they can also be caused by endogenous processes within the system, such as excessive resource extraction from natural systems or human-caused environmental disasters, such as oil spills (Shultz 2005; Venugopal et al. 2019). Subsistence livelihood systems are disproportionately vulnerable to the impacts of climate change for two important reasons. Firstly, subsistence livelihood systems such as agriculture, fisheries, and forestry are more strongly coupled to the environment for their basic survival compared to livelihood systems in more affluent communities (Bohle, Downing, and Watts 1994). Secondly, subsistence communities have limited access to financial and institutional resources to buffer themselves from the impacts of external shocks, such as climate change (Martin and Hill 2015; Morduch 1995).

For these two reasons, climate change-caused environmental disruptions disequilibrate subsistence livelihood systems, threatening consumption adequacy. The prospect of falling below the threshold of consumption adequacy is an ever-looming threat in subsistence marketplaces (Venugopal and Viswanathan 2015). Consequently, the goal of maintaining consumption adequacy plays a substantial role in directing consumer responses to environmental disruptions in subsistence settings (Chu et al. 2018). In resource-rich settings, consumers do not confront a significant risk of consumption inadequacy (Martin and Hill 2012). Therefore, the construct of consumption adequacy is not a significant determinant of consumer behavior in affluent contexts.

Threats to consumption inadequacy can be experienced along three dimensions: exposure, sensitivity, and resilience

(Baker, Gentry, and Rittenburg 2005; Carter et al. 2004). Exposure is the probability of a consumer experiencing consumption inadequacy owing to environmental disruptions, and sensitivity is a measure of the degree of consumption inadequacy created by the impact of environmental disruption (Moser 1998). Resilience captures a consumer's ability to recover from the state of consumption inadequacy fostered by environmental disruption (Moser 1998). It is important to conceptualize the experience of consumption adequacy in such a fine-grain manner because community's agentic responses evolve to mitigate exposure and sensitivity, while bolstering their resilience.

Venugopal et al. (2019) take a micro perspective to uncover how subsistence communities are coping with the impact of climate change in a linear fashion. Such a linear, “impact-response” approach overlooks the fact that the impacts of climate change are systemic in nature and create feedback loops that alter the very nature of the system (Steinfeld et al. 2021). Such feedback loops, sparked by the community's response to environmental disruptions, fall into two broad categories (Daw et al. 2009). The first category includes adaptation strategies concerned with changing the livelihood system's configuration and characteristics to remove the threat to consumption adequacy. The second involves mitigation strategies aiming to remove the threat to consumption adequacy while preserving the system's original configuration. It is worth noting that self-directed adaptation and mitigation strategies in subsistence settings aim to remove consumption adequacy threats, which are concrete, local, and temporally proximal (Himes-Cornell and Kasperski 2015). The communities are not directly responding to the threat of climate change, which is perceived to be abstract, global, and temporally distant (Viswanathan et al. 2014b). Typically, adaptation and mitigation strategies directly addressing the threat of climate change involve the participation of a social enterprise, as captured in prior research (Steinfeld and Holt 2020).

## **Methodology**

### *Context*

We conducted our research within a small subsistence fishing community in Chennai, South India, that has a population of approximately 300 households. The community resides on one of the largest beaches in South India and, to date, has suffered two major natural disasters attributed to climate change—a tsunami (2004) and severe floods (2015). The site selection for our qualitative study was predicated on our area of theoretical concern: understanding the disequilibrating impact of environmental disruptions on subsistence livelihood systems.

Through repeated engagement, the lead author built relational trust and commitment with the fishing community and attained pertinent insights about the characteristics of the community members. For community-based research, developing goodwill in the community is crucial to enhance both the researcher's credibility and the quality of data captured (DeBerry-Spence 2010;

Viswanathan et al. 2016). The population was observed to have low literacy levels and appeared tight-knit, with strong pre-existing social networks found within the community. Gendered roles include that men generally fish early in the morning when it is dark, while women participate in selling and processing fish; as they do not have access to refrigeration, the women try to sell whatever they can and use any leftovers for cooking and personal consumption. The diet at home is largely fish-based, and this provides the main source of protein. The majority of fishers were found to use fiberglass boats, but lower-income fishers use wooden paddleboats, demonstrating income variation within the community.

The community's traditional way of life involves boys dropping out of school at a young age to go to sea with elders in the community in order to learn traditional wisdom regarding fishing. Figure 1 contains diverse pictures from the context that collectively depict various aspects of the community. We gave key informants cameras to take pictures of their local settings, which was particularly useful to capture experiences that the researchers could not directly access (for example, going out to the deep sea). We then asked informants questions during interviews based on the pictures they shared with us. This was an important way of filling knowledge gaps about experiences and settings that were not directly accessible to the researchers.

### Data Collection

For this research, we conducted 30 interviews with a sample of 27 low-income community members (18 men and 9 women) across multiple age groups to attain an intergenerational perspective. Table 1 presents informant characteristics. The age of informants ranged from 18 to 77. Seven informants had no formal education, and 17 had an education level of 10th grade or less. A purposive sampling strategy was used to capture subsistence fishers with varying fishing and life experiences.

We gathered multi-format data—including pictures, observations, and in-depth interviews—to gain a mix of visual and narrative insights and to better capture the informants' lived experiences and milieu (Ozanne, Moscato, and Kunkel 2013). As part of this, we gave cameras to fishers when they went to sea and asked them questions based on those pictures—and the meanings they attached to them—to indirectly access a world that researchers could not directly reach through observation. The interviews were semi-structured and divided into two parts. The first involved understanding the individual's overall life, and the second focused more on their livelihood and how they were being impacted by environmental disruptions. The first author conducted the interviews in the local language of the community, Tamil. Post-interview, someone from the same cultural context transcribed and audio-translated the interviews into English, taking care to preserve the voice and meaning of informants.

### Data Analysis

We followed a hermeneutical analysis of multi-source qualitative data (Grier and Brumbaugh 1999; Zhao and Belk 2008)

using our observations, interview data (Thompson 1997), and visual analysis of the photographs (Schroeder 2002). We used a grounded theory approach to extract general themes from the data (Corbin and Strauss 2008), and we employed a process of constant comparison to arrive at abstract and recurrent themes (Fischer and Otnes 2006). Our central goal during the data analysis process was to stay true to the life stories of the informants.

## Findings

We present our findings in two sequential parts. Part 1 depicts the initial configuration of the livelihood system in nature-dependent subsistence communities. We then explain how environmental disruptions impact the livelihood system and threaten consumption adequacy. Part 2 captures the actions taken by community members when consumption adequacy is threatened. We also discuss how these loop back to either preserve or alter the very character of these communities' livelihood systems. We use the parlance of systems theory in presenting our findings, and pseudonyms are used throughout for informants to protect their privacy.

### Part 1: The Subsistence Livelihood System and Environmental Disruption

Our findings reveal that subsistence livelihood systems such as fishing are primarily geared toward helping a community meet its most basic consumption needs (Béné 2003). Our informants echoed this sentiment repeatedly with statements such as, "*We generally call it 'the Sea Mother' because the sea has been giving us food for generations*" (Ezhil, M [male respondent], 35). This state of life lies in sharp contrast to the dominant social paradigm in affluent markets, where the principal goal of the macromarketing system is to drive hyper-consumption (Kilbourne, McDonagh, and Prothero 1997). In resource-rich settings, individuals have access to financial and educational capital that drives income growth, which in turn, supports hyper-consumption (Kilbourne, McDonagh, and Prothero 1997; Venugopal et al. 2019). However, in subsistence marketplaces characterized by low levels of financial and educational capital, nature often provides the only means for economic survival (Godinho et al. 2017). One informant made us appreciate this idea by posing a rhetorical question: "*Our livelihood is based entirely on the sea. That is our only asset. You tell me: Can we pledge the sea as collateral to raise capital?*" (Ranjan, M, 39).

The entire livelihood of the subsistence fishing community depends on the sea and its fish stock. One of our informants described this reality of a "nature-dependent life" vividly: "*Our livelihood is similar to that of birds...They go in search of food every day, live their life day by day. So do we fishers who live on the seashore*" (Mani, M, 47).

Typically, in resource-rich settings, communities do not directly depend on the local environment for their income or



**Figure 1.** Pictures from the community.

consumption. Consequently, affluent markets exhibit a loose coupling among the environmental system, market system, and social system. The aforementioned loose coupling results from greater differentiation and independence among these three domains of life. Contrastingly, the way of life in subsistence communities is characterized by a strong intertwining of the market system, the social system, and the environmental system. These three tightly coupled subsystems work in concert to maintain consumption adequacy in the subsistence community, which we depict by means of overlapping circles in Figure 2. In the following paragraphs, we offer examples to illustrate how the social system, the market system, and the environmental system work in concert to support the fishing livelihood system, and in turn, the goal of maintaining consumption adequacy. We begin with a focus on the social system and will subsequently turn our attention to the market system and the environmental system.

*Social System:* Characteristics of the social system, such as traditional knowledge and social cohesion, play a pivotal role in shaping the nature of the livelihood system (Beninger and Francis 2016). We found that the key social processes in the community revolve around transmitting traditional knowledge on fishing across generations to support the fishing livelihood system. Traditional knowledge is a form of folk science on local fishing and aquaculture (Berkes 2012), which informants rely upon for their everyday livelihood. Traditional knowledge has been developed and passed on orally from generation to generation (Huntington 2000), with one informant (Amal, M, 40) emphasizing its intergenerational authenticity by saying: “As my father taught us, his father also taught and guided him about the sea. These things are being taught in families for generations.” Traditional knowledge is comprehensive,

providing intergenerationally accumulated experience on the patterns of the sea (Drew 2005), including on water levels, fishing locations, fishing seasons, types of fish, measurements, and appropriate equipment.

In addition to transmitting traditional knowledge across generations, the community members also share critical time-sensitive information about the sea with other fishers in the community. Strong social cohesion in the community ensures that fishers help each other obtain a better catch even though they are direct competitors. The emphasis on knowledge-sharing and social cohesion is critical to sustain the livelihood system, as one informant captured in vivid detail:

“If one day, fishers cast a net and there is no fish there, they would come back and share these details with co-fishermen. The same goes with rocks [in the sea], abundance of fish, variety of fish, et cetera. They share these details with other fishermen and learn from them as well. They have a separate language to share such information. It will take two to three months to understand the words they use. These terms have been there from my grandfather’s time. They give new names to places, and these are being followed thereafter. All our fishermen community are like friends. Even though everyone has a boat, and is a professional competitor, they still sit together and chat. They share all these details during their chats.” (Venky, M, 18)

*Market System:* In addition to the social system, the local market system is crucial in supporting the livelihood system. Local markets allow fishers to sell their surplus catch to earn a small income, with which they meet essential needs. When asked about the importance of local markets in his life, our informant expressed:

**Table 1.** Informant Characteristics.

Pseudonym	Gender	Age	Occupation	Highest level of education
Amal	Male	40	Fishing [fiberglass boat]	10 <sup>th</sup> grade
Cheenu	Male	54	Fishing [fiberglass boat]	7 <sup>th</sup> grade
Easwar	Male	39	Fishing [fiberglass boat], clerk	8 <sup>th</sup> grade
Ezhil**	Male	35	Fishing [fiberglass boat]	8 <sup>th</sup> grade
Ganesh	Male	44	Fishing [commercial boat]	8 <sup>th</sup> grade
Jeyama	Female	48	Fish vending, snack shopkeeper	3 <sup>rd</sup> grade
Kamana	Female	48	Fish vending	5 <sup>th</sup> grade
Kanta	Female	34	Fish vending	3 <sup>rd</sup> grade
Madan	Male	68	Fishing [paddleboat]	8 <sup>th</sup> grade
Malar	Female	58	Fish vending	None
Maliga	Female	20	Full-time student	Bachelor's degree [final year]
Malini	Female	26	Fish vending	None
Mani	Male	47	Fishing [fiberglass boat]	5 <sup>th</sup> grade
Manu	Male	36	Fishing [fiberglass boat], fish vending	5 <sup>th</sup> grade
Maran	Male	55	Fishing [fiberglass boat]	5 <sup>th</sup> grade
Mithun*	Male	50	Fishing [commercial boat]	5 <sup>th</sup> grade
Padma	Female	46	Fish vending	None
Palanisami	Male	77	Fishing [fishing on foot—retired]	None
Pavitra	Female	38	Fish vending	None
Raman	Male	40	Fishing [catamaran]	None
Ranjan	Male	39	Fishing [fiberglass boat], driver	6 <sup>th</sup> grade
Saba	Male	34	Fishing [fiberglass boat]	5 <sup>th</sup> grade
Satyan	Male	36	Fishing [fiberglass boat]	6 <sup>th</sup> grade
Suman	Female	45	Fish vending	None
Varun	Male	36	Fishing [fiberglass boat], boat engine mechanic	Bachelor's degree
Venky	Male	18	Fishing [part-time; fiberglass boat]	BBA [1 <sup>st</sup> year]
Vimal	Male	24	Fishing [fiberglass boat]	10 <sup>th</sup> grade

\* Key informant: interviewed twice.

\*\* Key informant: interviewed three times.

“When I think of it today, it is still baffling how we struggled through poverty. Despite all the struggles, the fact that we have been maintaining our family with the income from fishing is a big deal. I am very happy about that.” (Ezhil, M, 35)

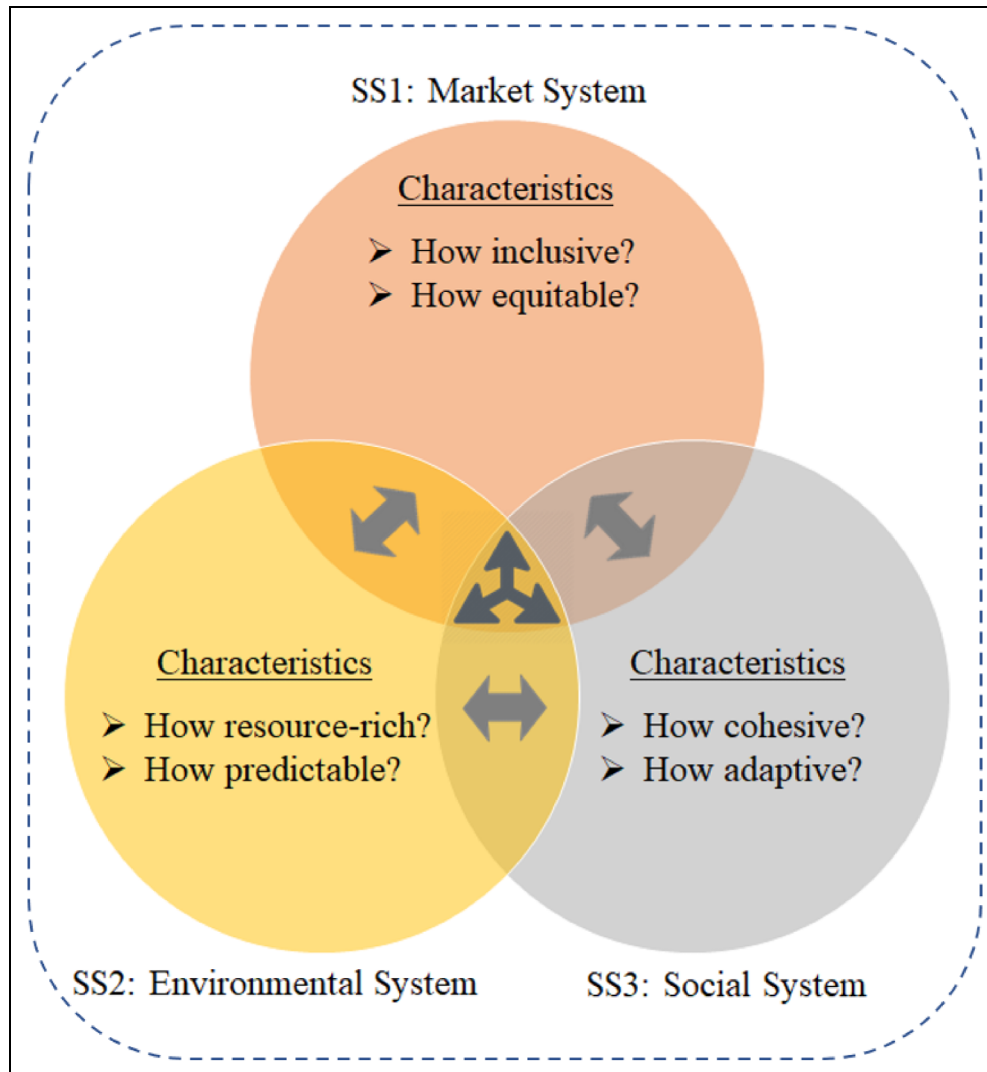
It is critical to acknowledge the significance of local markets in supporting the livelihood system. However, it is equally important to note that characteristics of the local market, such as inclusivity and equity, determine how the livelihood system distributes resources within the community. For example, unlike commercial fishers, nature-dependent subsistence fishers do not have the resources to buy bigger boats to go further out to sea and spend longer periods of time fishing. Consequently, poorer fishers have significantly lower market power compared to the richer fishers in the community. As one informant said:

“It is we people who fish using small boats who are affected most. Even if these commercial boats don't fish for six months, they earn well in the remaining six months, and they can go to any places into the sea. But can we go?” (Mani, M, 47)

It would seem like subsistence fishers could overcome this issue by taking out a loan to buy more powerful boats or advanced fishing equipment, such as GPS. However, subsistence fishers are systematically excluded from local financial markets, which is a common phenomenon in subsistence marketplaces (Beninger and Shapiro 2019). One of our informants had the following to say when asked why he did not approach a bank for a loan:

“I asked the bank manager for a loan amount for repairing or buying a new boat. But he refused, saying that the loans are not being given to fishermen.” (Saba, M, 34)

*Environmental System:* Turning to the environmental system, characteristics of the environment, such as unpredictable weather patterns and resource abundance, directly impact the livelihood system. For instance, incomes are directly related to the weather conditions at sea that determine if fishing is feasible. If there are storms and the sea is turbulent, fishers must refrain from fishing. Consequently, unstable environmental patterns create unpredictability in household income. When we asked one of our informants (Maliga, F [female respondent], 20) about what her average household income



**Figure 2.** Tightly coupled subsystems of subsistence livelihood.

was, she replied, “*It depends. There is no steady income, and only if the weather conditions are OK, the income will be OK.*” This underscores how important the local environment is in shaping the performance of the livelihood system.

In addition to the predictability of environmental patterns, the level of resource depletion in the environmental system also determines the livelihood system’s performance. Excessive natural resource depletion, carried out over extended durations, places immense burdens on the environmental system (Jackson et al. 2001). Such excessive stress can lead to drastic reductions in fish stock in the short run and to ecosystem breakdown in the long run. Community members repeatedly lamented that the availability of fish, in terms of both volume and types of species, was steadily declining. One informant bore testimony to this by saying:

“Fish was in abundance during my grandfather’s time. He used to catch huge fish. My father also used to bring huge fish. But this season, when usually big fish are available, we are not getting

fish at all. When I grow old, fish might be very scarcely available. Earlier, we fishermen were very few in numbers. We used to have only 10 boats in our whole area. But now, the number is 500 boats. Imagine if every place had 500 boats and did two shifts to fish; the species gets reduced and availability also goes down.” (Venky, M, 18)

The preceding discussion highlights the tight coupling among the three subsystems that constitute the subsistence livelihood system. This tight coupling implies that shocks experienced in one of the three subsystems will ripple through all other subsystems and disequilibrate the livelihood system as a whole. In the following paragraphs, we discuss how environmental disruptions impact the subsistence livelihood system and threaten consumption adequacy.

Over the last two decades, climate patterns have changed drastically, making the sea and the behaviors of aquatic organisms unpredictable. Seasonal winds, rains, and the intensity of waves are volatile, as one informant described:

“The direction of wind itself has changed. Earlier, rains, winds, and waves were all according to the months of the calendar [seasonal patterns]. But this has changed now. Storm strikes unexpectedly...any time...and the sea goes very calm without waves also immediately. This is not how it was back in the day. During February, March, and April, there would be no waves in the sea, and the sea would be calm. So, we used to earn well during that time. During April and May, there used to be waves, storm, rain, et cetera. But not nowadays.” (Madan, M, 68)

Owing to these disruptive changes in climate patterns, the traditional wisdom that historically guided the community in its interactions with nature has stopped being an effective guide for fishing. Consequently, fishers’ ability to catch fish has been severely diminished. In other words, subsistence communities that depend on nature for their livelihoods are more exposed to the impact of climate change. One community member explained:

“Fishermen are facing extreme difficulty. Fish breeding is much less as compared to earlier days, and fishermen are not able to catch enough. The fish used to be so good and fresh earlier. But not nowadays.” (Malar, F, 58)

Poor consumers in subsistence marketplaces constantly grapple with uneven and unpredictable incomes (Blocker et al. 2013). This is no different for subsistence life dependent on the sea; the sea offers no guarantee of a steady catch. This uncertainty is further accentuated when local ecological patterns become unpredictable. The changing nature of the sea renders communities more vulnerable to its vagaries, which has a disequilibrating effect on the livelihood system. As a result, the livelihood system’s ability to maintain consumption adequacy is seriously threatened. Kanta explained this poignant reality:

“From my single meager earnings, we have to eat and educate [children] also. In the present economic scenario, one day, we get more fish, and another day, we might not get. What to do, for the sake of children, we borrow money from others, and when our income is good on a day, we try to pay back little by little.” (Kanta, F, 34)

## Part 2: Community Responses in the Face of Environmental Disruptions

In the subsistence fishing community that we studied, the goal of maintaining consumption adequacy was seriously threatened when external environmental disruptions disequilibrated the community’s tightly coupled livelihood system. The community experienced the threat of consumption inadequacy along three dimensions: exposure, sensitivity, and resilience (Carter et al. 2004). We have employed this three-dimensional structure to unpack our findings.

To address the threat of consumption inadequacy, the community initiated two categories of responses, which are best conceptualized as feedback loops that aim to change the very nature of the community’s livelihood system. The first category

of responses includes adaptational loops that aim to remove the threat of consumption inadequacy by engendering greater independence among the components of the livelihood system, thereby attenuating the tight coupling. This is because a more loosely coupled livelihood system is less vulnerable to the direct impacts of environmental disruptions. The second category of responses can be labeled the mitigation loop. The mitigation loop comprises strategies that remove the threat of consumption inadequacy while preserving the tight coupling among the components of the livelihood system. It is important to note that the adaptation and mitigation loops are not mutually exclusive. We observed these two strategies simultaneously in the study community, revealing that the forces for change and for continuity coexist there. In the following subsections, we provide concrete examples of both adaptation and mitigation responses across the three dimensions of exposure, sensitivity, and resilience. We also visually depict our findings in Figure 3.

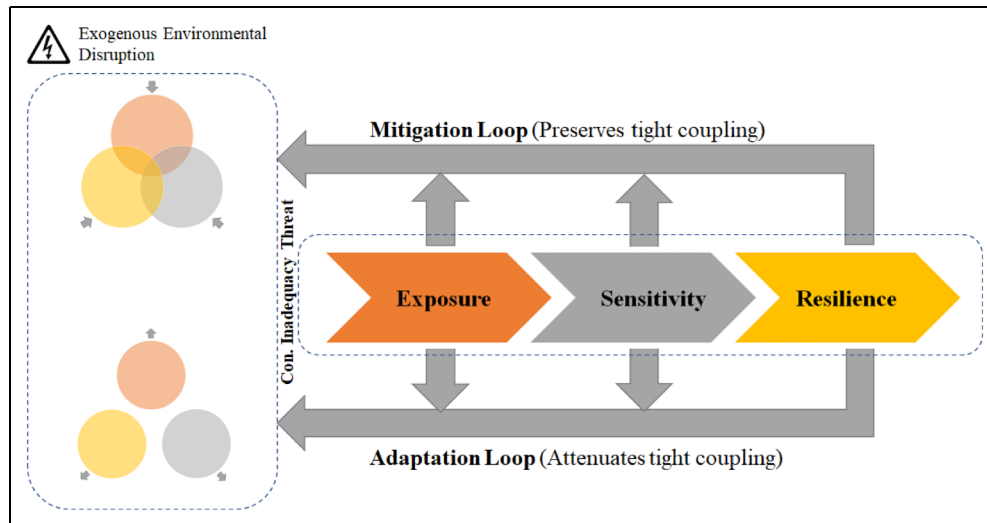
*Reducing Exposure:* In the community, we observed both adaptation- and mitigation-oriented strategies to reduce exposure to consumption inadequacy in the face of environmental disruption. In terms of mitigation-oriented strategies, the most common response we observed in the community was seasonal livelihood migration. During the lean times, fishers try to find jobs in the labor market that are not directly related to the sea, including security guard, driver, or other manual labor-based jobs that do not require formal education. Given the low education levels in the community, jobs requiring advanced degrees are generally inaccessible to the fishers. As one informant said:

“If [community members] don’t go fishing, they go for other jobs like security guard or housekeeping that do not require education. When the situation improves, they come back to their original fishing profession. Wherever you go to seek a job now, they ask for a degree at least. My father has studied only till Grade 5. So, he cannot work anywhere else. If he goes for a security guard job, that might work. But sometimes, he even stays at home at length, and my mother only runs the household. We have faced difficulty even for food. We borrow money during this period, and face lots of issues paying it back.” (Vimal, M, 24)

Vimal’s comments reveal that fishing continues to be the primary livelihood in the community. Alternative wage employment is seen as merely a transient phenomenon to tide themselves over during temporary consumption inadequacies unleashed by seasonal income drops. This strategy is particularly relevant during the spawning season, when the government bans all types of fishing.

However, there are some challenges that prevent community members from entirely switching their means of livelihood. These challenges are because social identities and social practices in the community are strongly linked with being a fisher. Fishing is not seen merely as a market-oriented activity, which is one of the implications of the tight coupling described earlier in the paper. Therefore, community members experience dissonance when circumstances force them to take up





**Figure 3.** Response to environmental disruption-induced consumption inadequacy.

temporary jobs outside of fishing. One informant bore testimony to this, saying:

“It is difficult working outside. Though many are working outside, their whole mind will be on fishing and sea only. Their whole body craves going out into the sea. They don’t take fishing as a profession. It is like a way of life to them. They go out to sea in groups, eat their food, share jokes, chat, and enjoy themselves. But a watchman’s job is not as fun. They have to simply sit the whole day.” (Venky, M, 18)

Thus far, we have described mitigation strategies that do not require a drastic change in the community’s way of life. These strategies focus on preserving the tight coupling, while reducing the exposure to consumption inadequacies. Adaptation strategies, on the other hand, require a fundamental shift in the community’s way of life that attenuates the tight coupling. For example, we explained earlier how the social process of information-sharing is crucial to the functioning of the livelihood system. However, increasingly, many community members are adopting the latest fishing technologies, which obviates the need to acquire traditional knowledge. These technologies provide an enhanced ability to navigate the sea in the face of environmental disruptions, without relying on socially acquired traditional knowledge. One informant said:

“The knowledge that our grandfathers used to have, people have started forgetting that. They have started using more of technologies now. Earlier, if they fished at a place yesterday, to identify the same place today is a little difficult without traditional knowledge. But now, they use the GPS to note the coordinates and go back there without any difficulty.” (Vimal, M, 24)

Adopting modern technologies is not a path that is available to all members of the community. Affordability or literacy barriers can prevent some members from embracing the use of such

technological aids in fishing. The forces of change and continuity coexist in the community, with one informant saying:

“My father still does it like the old times. He does not use mobile or GPS. He is still using what my grandfather taught him. In fact, near my area, my father is the only one who is like this. Everyone else is modernized, which is very easy.” (Vimal, M, 24)

*Reducing sensitivity:* Reducing sensitivity to the impact of environmental disruptions entails finding buffer resources that help cushion the impact of consumption inadequacy fostered by environmental disruption. Mitigation strategies aimed at reducing sensitivity maintain one’s current way of life and harness resources already in the current system. For example, informants mobilize their social capital to borrow money from friends and family in order to limit the extent of consumption inadequacy during environmental disruptions. Typically, this process involves approaching community members who are financially better off and taking out zero-interest loans from them. This community-embedded system operates as a form of social insurance to help people tide themselves over during crisis. When we asked one informant how he mitigates the impact of environmental disruptions, he replied:

“People like us who have no other ways of investment, go to persons like you or any other friends, request and borrow some 1 lakh [US\$1,500] or so, and repay the amount as and when we earn some money.” (Saba, M, 34)

This form of social insurance has also been observed in other subsistence livelihood systems, such as farming in countries like Thailand (Townsend 1995). However, these social insurance mechanisms have some limitations. They work best when environmental disruptions are either infrequent or have nonuniform impacts within the community. There was a general perception within the community that this form of social insurance is becoming less and less effective because

the frequency of environmental disruptions is increasing, rendering incomes from fishing highly irregular. This unpredictability in income disincentivizes people from borrowing money from their social network because they do not want to damage their social relationships if they are unable to return the borrowed money. One informant described this predicament by saying:

“With our investment we do in the sea, we cannot earn a salary on the first of every month like we earn in other jobs. We are not able to do anything with this sea. I am frightened about borrowing and investing also. If we are not able to repay, what will happen? If I go for a job, I can borrow without any hesitancy because I can repay with the assured salary I earn at the end of the month.” (Saba, M, 34)

Furthermore, environmental disruptions are impacting most members of the community, and it is difficult to request money from others in one’s social network when they are undergoing a financial crisis themselves. These considerations have limited community members’ ability to rely on their social networks to mitigate sensitivity to consumption inadequacy caused by environmental disruption.

In parallel to the mitigation strategies articulated by our informants, we also witnessed many adaptation strategies that represented a clear departure from the community’s traditional way of life. For instance, we described earlier that the community relies extensively on social cohesion and knowledge-sharing among fishers despite their being direct competitors. This state of affairs is facing intense pressure in the community. Increasingly, the balance is tilting away from collaboration and toward competition. In the face of consumption inadequacy, there is a tendency to engage in a zero-sum game with other fishers in the community to garner scarce resources for oneself. Jeyama lamented this emerging state of affairs:

“Historically, we don’t have the habit, feeling jealous of others. Only of late, jealousy is slowly creeping into us. Now, if we go ask someone, they are not ready to share. Earlier, this never used to be the case. Fish has become costly, and if more fish, more income. So, they started thinking that one person earns more and others do not; this leads to jealousy, and when one gets more fish in a place, they stop sharing that information with others.” (Jeyama, F, 48)

What is evident in the quote is the emerging self-construal of oneself as a purely economic entity in competition with others in a zero-sum game. The discerning reader will note that such adaptive strategies represent a slow decoupling of the market system, the social system, and the environmental system. This is in contrast to mitigation strategies that preserve the tight coupling among these three subsystems and strive to unearth new resources that reside within them.

*Increasing resilience:* Thus far, our focus has been on reducing exposure and sensitivity to consumption inadequacy. In this section, we outline adaptation and mitigation strategies employed by the community to bolster resilience (Barrett and

Constas 2014). Looking first at mitigation strategies: In response to the increasing frequency of environmental disruptions, the community has started making investments in both traditional knowledge on fishing and higher education. This dual investment is leading to widespread livelihood diversification in the community. Community members continue to fish as their primary livelihood activity, but they are also blending this with employment in the formal economy that requires high literacy:

“Fishing is our family profession. My dad used to say that though I study, I should also know about our family profession as well. One day or another, this will come in handy. Having encouraged me so, now I am well aware of the fishing profession also. I study well also.” (Venky, M, 18)

The phenomenon illustrated by Venky differs from the temporary livelihood migration we described in the impact section. That is because temporary livelihood migration does not entail making new investments in acquiring formal education. It relies on short-term, manual labor-based jobs with limited long-term prospects.

It is critical to acknowledge that opinions in the community are not uniform on the way forward, and we have made a concerted effort to present the varied perspectives that exist within the community. The impulse to adapt coexists with the impulse to adjust, not just in the community but also within the household. For example:

“My mother doesn’t like me learning about fishing. But my father wanted me to use my free time properly and know about the fishing profession also. But my mother still does not want me to take fishing as a profession. She just wants me to study well and earn well.” (Venky, M, 18)

Mitigation strategies aiming to bolster resilience take tentative steps away from the community’s traditional way of life. However, a strong allegiance to the traditional livelihood system remains the cornerstone for maintaining consumption adequacy. Adaptations strategies for building resilience, on the other hand, take a definitive step away from the traditional way of life and embrace an entirely new livelihood system.

There is an undeniable line of thinking in the community that views moving away from fishing as the only viable long-term adaptation strategy for their predicament. As one informant expressed:

“My parents and neighbors always encouraged us to study well and come up in life. Because they did not want us to go through the hardships that they were going through. There is not much income in the fishing industry now. [With fishing,] you cannot buy something immediately even if you want to. But if we study and earn well, we can live life comfortably. You will gain respect only if we study well, and my father used to say this often. Because it has become most important now. We can live life only if we study. We have to take care of ourselves.” (Maliga, F, 20)

While community members bemoaned the prospect of their traditional livelihood system being lost forever, they also saw the pragmatic need to adapt to changing circumstances. They expressed that they do not have the luxury of romanticizing the past when their consumption adequacy is constantly under threat. At the same time, they were also unwilling to let their traditional livelihood system slip away without a fight. The sentimental words of Venky (M, 18) continue to resonate: *“In the depths of my heart, I still want to be a fisherman only. However much I grow in my professional life, I won’t let my family profession go.”* Venky’s words reinforce the continued centrality of the fishing livelihood system in the lives of community members.

## Implications

### *Grounding Research and Practice in the Ethical Framework of Sufficiency*

Although climate change is a global phenomenon, our research shows that the burdens of climate change are differentially distributed across socioeconomic segments of society (Morton 2007). Given the nonuniform distribution, though, how does one determine how society’s resources and the attention of scholars and policymakers should be allocated?

Determining how society’s resources should be apportioned in the face of climate change requires us to adopt a robust and defensible ethical framework (Lacznik and Shultz 2021). Prior research in philosophy has advanced several competing ethical frameworks that could address the problem at hand (Crisp 2003). We have selected sufficiency ethics because its precepts address the key concerns of maintaining consumption adequacy that emerged from our findings (Benbaji 2006). The principal implication of sufficiency ethics is that societal resource distribution must prioritize worse-off individuals, provided their level of well-being is below a certain threshold of sufficiency. In other words, the underlying concern of the sufficiency framework is to ensure that ‘all have adequate levels of resources’ (Freiman 2012).

Applying the sufficiency approach dictates prioritizing the maintenance of consumption adequacy in subsistence contexts when climate change is threatening the community’s ability to meet its basic consumption needs. This central ethical thrust of sufficiency is implicit in several independent studies on poverty carried out in macromarketing research. For example, Scott et al. (2011) invoke the idea of sufficiency by calling for the conceptualization of the smallest basket of goods and services necessary to realize human potential. Similarly, Martin and Hill (2012) use the label “consumption adequacy” to capture the notion of sufficiency and demonstrate that the character of consumption challenges are fundamentally different in contexts where consumption adequacy is realized compared to those where it remains to be realized.

The subsistence marketplaces literature is another example of an entire body of consumer research that begins with the

premise that having the ability to meet one’s basic consumption needs should be a central challenge that consumer research addresses (Venugopal and Viswanathan 2017). We advocate that macromarketing scholarship on climate change must be grounded in the ethical framework of sufficiency because it provides a strong ethical basis for the egalitarian aspirations contained in these approaches to poverty within consumer research.

### *Lessons for Affluent Markets*

The implications we have discussed so far are of direct relevance to macromarketers focused on subsistence marketplaces around the world. However, it is worth pondering on our study’s implications for the architects of the macromarketing system in resource-rich settings. The world of hyperconsumption in the West is composed of self-interested, atomized consumers engaging in arms-length transactions with other actors in the macromarketing system (Kadirov, Varey, and Wolfenden 2016; Prothero et al. 2011). However, the picture in subsistence livelihood systems is one of interdependence, shared goals, and relational exchanges within the community. Although this way of life is under threat, our data highlight how it provides meaning and sustenance to the community, making them want to fight to preserve this way of life.

Our data also help us appreciate how human life is closely intertwined with nature, with others in the community, and with one’s cultural heritage. Meaning and gratification in life come not just from the unidimensional pursuit of material growth but also from one’s proximity to nature, culture, and community. This illuminates an alternative way of life that is more robust and rewarding than the mere pursuit of personal material gain. Some of these central features of subsistence livelihood systems are important to learn from and infuse into Western market practices in order to foster a sustainable world (Lacznik and Santos 2011). An exemplary study that embodies this aspiration is Kennedy, McGouran, and Kemper (2020) research that aims to derive general insights for sustainability from the Māori worldview.

## Limitations and Future Research

We acknowledge in our findings section that the impact of climate change is not uniformly experienced within the community and that power hierarchies play a central role in determining these varied impacts (Steinfeld et al. 2021). Although our treatment of this important issue remains at a cursory level, there is an emerging conversation in the macromarketing literature that takes an explicit ecological-intersectionality perspective to study how intersecting social identities shape vulnerabilities to environmental disruption (Steinfeld and Holt 2020). Macromarketing literature must encourage more research that employs an ecological-intersectionality perspective to study how contextually salient social identities such as class, race, caste, and gender shape the experience of environmental disruption.

Our explicit goal in the study has been to understand the dynamics of livelihood systems over an extended time horizon. The drawback of trying to understand system dynamics over an extended sweep of time is that one loses sight of how communities deal with the intense mental distress suffered by community members in the immediate aftermath of environmental disruptions. For example, scholars have shown that the aftermath of environmental disasters can be saturated with distressing emotions, requiring community members to renegotiate object meanings as a coping strategy (Baker and Hill 2013). System-oriented research tends to ignore emotional experiences that are concomitant to disruptions and changes to the system. We need more research that reveals to us the intricate world of the emotional realm during climate change-induced environmental disasters.

## Conclusion

The urgent need for more macromarketing research on climate change is derived from the fact that climate change is a planet-wide phenomenon with profound implications for consumers, societies, ecosystems, and the future of species across the globe (Little and Helm 2019; Walther et al. 2002; Wright et al. 2018). Recognizing the significance of the topic, scholars have already begun tackling the threat of climate change in affluent contexts by studying ways of mitigating the causes of climate change (Wells, Ponting, and Peattie 2011). However, there is still a dearth of research exploring the impacts of climate change in subsistence marketplaces, barring a few notable exceptions (Baker et al. 2015; Chakrabarti and Mason 2014; Steinfeld et al. 2021; Steinfeld and Holt 2020; Viswanathan et al. 2014b).

In subsistence marketplaces, the principal macromarketing challenge is the threat to consumption inadequacy engendered by climate change (Venugopal et al. 2019). Our paper provides a systemic perspective for studying climate change's widespread and far-reaching impacts on consumption adequacy in subsistence marketplaces. Given that billions of consumers live in subsistence marketplaces around the world, we need more research focused on this important but neglected topic. Such research will not only advance fresh academic insights but also have a transformative impact on the lives of some of the most vulnerable consumers in society who live in subsistence contexts (Corus et al. 2016; Varey 2010).

Our investigation sought to answer two research questions: Firstly, how are resource-constrained subsistence livelihood systems reconfigured in response to climate change-induced environmental disruptions? Secondly, how the strength of coupling among the livelihood system's subcomponents changes based on agentic actions sparked within the community in response to environmental disruptions.

To address these questions, we conducted an empirical study on subsistence livelihood systems and demonstrated how they can be readjusted to maintain consumption adequacy amidst environmental disruption. We found adaptational loops create independence, while mitigation loops preserve interdependence

within the livelihood system. We have added to the marketing systems perspective (Layton 2007; Sredl, Shultz, and Brečić 2017; Wooliscroft 2021) by bringing in a lens of consumption adequacy (Hill and Martin 2014) to better understand how this can be met for a nature-based livelihood system. In doing so, we have shown how adaptation strategies attenuate tight coupling and change the components of the livelihood system to protect it from the direct impacts of environmental disruption. By contrast, mitigation strategies can remove threats of consumption inadequacy by preserving tight coupling in order to retain the original configuration of the livelihood system.

As forces of continuity and change perpetuate and coexist among subsistence communities facing climate change, we have shown how structure and processes can interlink through the use of feedback loops (Mittelstaedt et al. 2014). This research demonstrates the importance of adopting a systems perspective to understanding the impact of climate change and how structure and processes can together operationalize livelihood systems (Steinfeld and Holt 2020). Additionally, we have shown how structure may spark processes and how processes may change or sustain the configuration of a system, thereby rejecting a more reductive analysis of systems as isolated subcomponents (Wooliscroft 2021). With regards to adapting, we have seen how some communities previously reliant on the livelihood of subsistence fishing are abandoning traditional ways of life and moving away. Despite this, mitigating aspects show us how the same communities are trying to hold on and not give up the fight.

Our article underscores the importance of placing the environment at the foreground of research phenomena (Kennedy, McGouran, and Kemper 2020). While the interdependence of the social system and the market system is well established within subsistence marketplaces research (Mwiti and Onyas 2018; Viswanathan et al. 2014b), we add to that stream of literature by illuminating the interaction of the social and market systems with the environmental system. There is much to be gained by understanding the environment's role as equal to that of the economic and social instead of being a trade-off (Daly and Townsend 1993; Kennedy, McGouran, and Kemper 2020). Our research shows that for nature-dependent fishing communities, the "environment" (i.e., climate change-caused environmental disruptions) plays a critical role in disequilibrating subsistence livelihood systems and, thereby, threatening consumption adequacy (Martin and Hill 2012; Venugopal et al. 2019; Steinfeld and Holt 2020).

In conclusion, our research has revealed that climate change is a human crisis and not simply an "environmental crisis," as usually framed in popular media and policy debates. Furthermore, our research shows that climate change is not a distant possibility but a reality that is already here and impacting some of the most vulnerable among us. However, we often do not pay the requisite attention to this problem because the impacted subsistence communities are far away from us, and their voices often go unheard. Additionally, elements of responses to the climate crisis can also be reinforced by discrimination, segregation, and displacement among marginalized

people, which entrenches a system of climate apartheid (Rice, Long, and Levenda 2021). Macromarketing researchers can play a pivotal role in redressing this problem by conducting more research on this topic from a transdisciplinary systems perspective.

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