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A supercyclone, landscapes of 'emptiness' and shrimp aquaculture: The lesser-known trajectories of disaster recovery in coastal Odisha, India

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ABSTRACT

This paper critically examines the reconfiguration of post-supercyclone Ersama in coastal Odisha in India, to encourage the introduction of a new form of shrimp aquaculture as the principal livelihood. It demonstrates the operation of a powerful shared construction of Ersama, a typically paddy cultivating area, as a landscape rendered 'empty' and 'unproductive' by the supercyclone of 1999. The paper shows how this notion, shared by locals and external actors, facilitates the entry of the forces of commercial aquaculture at the cost of increased socio-economic inequalities and risk-taking for the poorest participants, as well as the exclusion of women from this new livelihood. Memories of previous disastrous attempts at shrimp culture are obliterated through misleading narratives about the potent productivity of a new type of shrimp by the proponents of aquaculture. The state has presided through uneven regulation, disregarding the damaging effects of commercial aquaculture for the coastal environment. The paper argues that besides the provision of disaster relief, the state restricts its own responsibilities towards disaster prone and affected populations to the creation of warning systems and physical infrastructures. However, it assigns the broader challenge of disaster recovery to ongoing processes of capitalist development. Even as the resulting precarity, both economic and environmental, threaten long-term and inclusive recovery, the state delinks disaster recovery from questions of structural risk resulting from exclusionary development pathways, depoliticising it considerably.

1. Introduction

On the 29th of October 1999, a supercyclone with a wind velocity greater than 300 km/hour made landfall in Odisha, a poor Indian state bordering the Bay of Bengal. More than 10,000 people died and there was widespread devastation (Ray-Bennett, 2018). Ersama, a block in Jagatsinghpur district with about a million people, was one of the worst affected. It suffered the full blow of a tidal wave that travelled nearly 20 km inland, resulting in many mortalities, widespread devastation of mud/thatch houses, and lasting soil and groundwater salinization. Farmers experienced a dramatic curtailment of paddy cultivation, their predominant livelihood. Despite some resumption of the crop in the ensuing years, field observations in 2019 showed there is practically no paddy being grown in the areas closest to the sea until the present day.

Driven by desperation in the early aftermath of the supercyclone, many farmers decided to convert their paddy fields into ponds or *gheris* to cultivate shrimp (colloquially known as *chungudi chasa* in Odiya, or prawn farming). In 2010, I led a study on the trajectories of livelihoods in Ersama since the supercyclone (Chhotray & Hill, 2013). I witnessed a great deal of distress on account of indebtedness, following on from failed attempts at shrimp culture. Their lands, first salinized by the supercyclone, then reconfigured into prawn ponds, lay uncultivated. So, when I returned to Ersama in 2017, and then again in 2019, to find that farmers had once again embraced aquaculture, it was a puzzle that needed to be explained.

This change centred on the shift from black tiger shrimp (*Penaeus monodon*) to the Pacific white shrimp (*Penaeus vannamei*). Similar developments had taken place in key shrimp exporting nations like Thailand from 2002 onwards and in other Indian states like Andhra Pradesh, Tamil Nadu and West Bengal a few years later (Belton & Little, 2008; Pradhan & Flaherty, 2007). Accordingly, the move to *vannamei* was triggered by its considerably higher stocking density and superior resilience to disease than the black tiger shrimp. Productivity and profitability were both important considerations. And yet, the seeming completeness of this technological explanation masks the complex political, social and ecological changes that accompany aquaculture. Shrimp culture worldwide has depended on an alliance between the local state and shrimp farming interests and Odisha is no exception. Its lucrativeness invokes fierce contests over land use and violent urges to protect

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shrimp culture, especially when when these activities fall afoul of legal limits (Paprocki & Cons, 2014; StonichStonich & Vandergeest, 2001; Vandergeest et al., 2009).

Chilika lake along the southern coast of Odisha, approximately 100 miles from Ersama block in Jagatsinghpur district, presents a clear example of such tension. Shrimp cultivation within 500 m of the Coastal Regulation Zone (CRZ) and 1000 m from Chilika and Pulikat lakes was banned by a landmark Supreme Court judgement in 1996 (Das, 2018). Nonetheless, an alliance of locally dominant landowners, regional shrimp exporters, politicians and bureaucrats, together infamously labelled the 'prawn mafia', continues to operate (Adduci, 2009; Das, 2018). Chilika is called the 'largest illegal aquaculture complex in the world' (Das, 2018, 97). This prawn mafia has clashed frequently with local traditional fishers that are still agitating for exclusive fishing rights on the lake (Adduci, 2009).

Within this turbulent context, the rather silent, even acquiescent, expansion of aquaculture into Ersama is surprising. This paper tells this lesser-known story. It argues that a powerful construction of Ersama as a space rendered 'empty' and 'unproductive' by the cyclone, which can and *should* be subject to the transformative forces of commercial aquaculture is at play. It situates this case within a longer history of narratives of improvement pursued both by colonial rulers and postcolonial development regimes (Harms, 2014; Li, 2007). Ideas valorising the conversion of 'waste' into 'value' and the 'restoration' or 'reclamation' of wasteland have been seminal for the production of enclosures and deployment of productivity-enhancing interventions (Baka, 2017; Goldstein, 2013; Mukherjee & Chakraborty, 2016). The notion of a wasteland relies on the use of particular political and economic knowledges to legitimise certain land uses, and is always historically and socially produced, regardless of juridical definitions (Sivaramakrishnan, 1999). The postcolonial development regime in India has relentlessly continued to use selective ideas of waste and value to manage and conserve key spaces like forests and coasts. Powerful state instruments like the Forest Rights Act, 2006, and the Coastal Regulation Zone notification, 2011, are expediently used to distance, disengage and disempower local communities while enabling project approvals for corporate investments (see Kashwan, 2017; Kohli & Menon, 2019). Conservation specifically rests on a particular imagination of national territory to exclude local communities (Sivaramakrishnan & Cederlof, 2012). The rise of 'middle-class environmentalism' with implicit narratives about environmental degradation implicates particular groups of people (Baviskar et al., 2014), but this environmentalism is not uniform and encompasses multiple indigenist-regional narratives around resource use that can be profoundly exclusionary. I have written about this separately in the context of the famous Gahirmatha marine sanctuary in Odisha, home to the Olive Ridley turtles, not far from Ersama (see Chhotray, 2016).

Going further, this paper focuses on emptiness, which as a broader construct than wastelands, is a historically specific formation that offers a powerful lens to understand relations between 'capital, the state, people and place' (Dzenovska, 2020, 12). In this analysis of constructed empty landscapes in coastal Odisha, the paper makes three related arguments.

First, the paper demonstrates that a widely shared notion of a landscape that is empty because it has been rendered unproductive is central to the post-supercyclone imagination of Ersama ('*khaali, aeithi kichhi naahin*' or 'it is empty, there is nothing here' is how both people and officials commonly described the land here, reeling from salinization). This has had important consequences for unfolding relationships between people and their lands, as mediated by the state and capital. As the proponents of shrimp cultivation have extended their influence to bring in a larger number of small paddy farmers into the fold of commercial aquaculture, the state has presided through uneven regulation, while ignoring the damaging effects of aquaculture on coastal ecology.[1] The precise effect has been to create new forms of differentiation as well as precarity, as a specific form of vulnerability, for the cyclone-affected peoples of this region. The uncharted environmental transformations unfolding in Ersama, specifically following the introduction of aquaculture and generally due to extractivist policies, pose a further concern for their future vulnerability to cyclones.

Second, the paper explores the changing relationships between people and the state in the specific context of a disaster, the supercyclone of 1999. While the period following a cyclone (or any other natural hazard like a flood, for that matter) is marked by a powerful moral imperative of the state bearing responsibility for its citizens (Chhotray, 2014), this responsibility does not extend beyond the immediate phase of relief. A disaster is predominantly seen as an 'external' risk stemming from a 'natural hazard', but without considering how a hazard magnifies socio-economic vulnerabilities to create a disaster (Wisner et al., 2004; Zhang, 2016). Disaster risk reduction eschews any serious engagement with questions of structural risk emanating from development (Lavell & Maskrey, 2014; Oliver-Smith, 2016). The paper argues further that the state sees its role in disaster-prone areas as mainly limited to the provision of immediate relief and the establishment of techno-infrastructural measures for risk mitigation like information systems and cyclone shelters.

Third, the paper documents a subtle but unmistakable shift in the state's view of 'hapless' cyclone-affected peoples, that predominates in its preparedness and relief phases, who must be helped through measures ranging from food provision to physical evacuation. Beyond the immediate aftermath however, recovery becomes the business of (male) 'entrepreneurial citizens' embarking upon new livelihood ventures regardless of their pitfalls, devoid of meaningful state support. The paper demonstrates that the state implicitly assigns the broader challenge of disaster recovery to ongoing processes of capitalist development, in this case aquaculture, while purposively obliterating any links between aquaculture and disasters. This 'capital-led development' as recovery results in the dangerous normalisation of unprecedented risk for small and marginal farmers living in an area with recurrent cyclones (Chhotray & Few, 2012). It also involves the exclusion of women from these new livelihoods, creating new forms of silencing and disempowerment. The state's approach depoliticises the whole question of long-term disaster recovery, a process fundamentally marked by inequalities, uneven power relations and the competing agendas of multiple actors, including the state, shrimp companies, and farmers themselves (Few et al, 2021).

The paper seeks to make a distinctive contribution to the literature on disaster recovery through a longer-term perspective, based on research spanning over ten years (2009–2019). It draws on more than 150 interviews in 4 villages and the block office in Ersama, fishing villages around Chilika, and key informants from local and state government, NGOs, donors, shrimp companies, activist bodies and the media in Jagatsinghpur district and the state capital, Bhubaneswar. It refers to insights from a 120-household survey in 4 villages of Ersama carried out in 2010. It also utilises exhaustive secondary sources, such as archives, policies and legal documents. Long-term studies of disaster recovery are still rare (see Fayazi et al., 2019).

[1] Shrimp culture as an example of a 'high value food' that is driven by an export-led strategy has been widely studied in connection with a global political economy approach, new trade regimes and commodity chain analysis. However, these issues are outside the scope of this paper. Instead, it is the questions of unequal regulation of shrimp culture by the state and the spatial dynamics of state-capital relations with significant implications for local reconfigurations in resource use and vulnerability that are of primary interest. These issues have been firmly grounded within a political ecology approach (see Vandergeest et al. 2009).

2. On disasters and associated responses: A brief conceptual overview

Disasters continue to be treated as unpredictable and violent acts of nature that are external to society, despite a wealth of critical scholarship that has compellingly argued otherwise (Oliver-Smith, 2016; Zhang, 2016). Disaster Risk Reduction (DRR) took shape as an 'articulated perspective' with implications for policy and practice in the mid-1990 s, but initially framed the problem from a 'hazard-centric' perspective (Oliver-Smith, 2016, 74–75). This has changed over time, especially following the Pressure and Release (PAR) model, which focused attention on risk through a combination of root causes, dynamic pressures and other unsafe conditions (Wisner et al., 2004, 50). The FORIN working group of the Integrated Research on Disaster Risk programme (under the aegis of UNDRR) has argued that DRR is futile unless the systemic social roots of risk and vulnerability are considered (Oliver-Smith & Alcántara-Ayala, 2016). Despite such recognition, disasters have continued to be represented as 'environmental' externalities that are de-contextualised from social vulnerabilities and managed by professionalised agencies devoted to DRR and DRM (disaster risk management) (Oliver-Smith, 2016). The heightened impact of climate change discourses and research that tend to focus on extreme events rather than long-term risk has further reinforced the disconnection between DRR and broader development debates (Lavell & Maskrey, 2014).

In practice, the majority of disaster-response resources continue to be dedicated towards emergency management and reconstruction with questionable results like the exclusion of the poor and the entrenchment of existing power relations (Sovacool et al., 2018). There is little systematic consideration of how root causes relating to structural risk can be reduced over the long-term (Oliver-Smith & Alcántara-Ayala, 2016). Disaster agencies gravitate easily towards technical planning and mapping methods and large-scale infrastructural projects, but not towards building local capacities or strengthening secure livelihoods that would put them in a *better* position towards facing the next potential disaster; 'in order to have "recovered", a household should have not only re-established its livelihood, physical assets and patterns of access, but should be more resilient to the next extreme event' (Wisner et al., 2004, 359).

Moreover, the implicit principle that appears to guide agency thinking is that recovery would proceed in 'bell-curve type graphs': first, response activities would rise and fall, then, relief which reaches a peak after a few weeks, then, medium term reconstruction takes centre-stage, to be replaced with a set of activities that can be referred to as recovery, which can take several years (Haas et al., 1977). This presumes that there are linear, orderly parts to a larger process of recovery and disregards both the likelihood of uncertainty and the reproduction of vulnerability (Wisner et al., 2004, 357). The case of Odisha reinforces why this linear and relatively short-term thinking poses a serious problem for trajectories of disaster recovery over the longer-term.

3. The case of Odisha and the inscribing of techno-infrastructural disaster management

The coastal state of Odisha is no stranger to calamity but lacked a unified state mechanism for disaster risk management until 2000. The 1999 supercyclone (which left more than 10,000 dead in 24 h) produced both institutional trauma and introspection, culminating in the urgent creation of a single Odisha State Disaster Management Authority or OSDMA, in August the next year. The minimisation of 'avoidable deaths' from cyclones was to be the top priority for the state (Ray-Bennett, 2018). This resonated with the Sendai Framework for DRR (2015–30) which sets out the reduction of disaster mortality by 2030 as its first target. In the ensuing years, Odisha adopted a robust approach for disaster preparedness and risk reduction, emphasising a combination of 'structural' and 'non-structural' measures (Behera, 2014). Structural measures included an emphasis on the expansion and restoration of 'disaster resistant shelter buildings', both individual housing as well as embankments and godowns. There was a big push on the construction of cyclone shelters within 10 km from the sea along the entire coast of Odisha. Many were built with multiagency partnerships, as with the World Bank and the Red Cross.[2] There was heavy investment in technical information and early warning systems aimed at 'connecting the last person'; Behera, 2014). The non-structural part of the response included a programme of community mobilisation and training organised through local government and NGOs, to sensitise people living in cyclone prone areas and to nurture cyclone shelters as community assets.

This preparedness paid off in October 2013, when Cyclone Phailin struck with a wind velocity of 260 km/h. The state government guided by its 'zero casualty' mission, successfully evacuated nearly a million people to shelters and other safe spots, and the state got away with 86 deaths (Ray-Bennett, 2018). This brought Odisha into both national and international attention and several accolades, including recognition by the World Bank and UNDRR. The significance of these achievements cannot be diminished as the value of human life is quite simply, incontrovertible. And yet, the state's work was not *yet* done.[3] What would happen to longer-term recovery, once people returned to their homes after the cyclone had passed?

To understand the state's self-delimitation of what it considers as an appropriate and enduring response strategy to disasters in India, it is helpful to revisit the state's colonial origins. Disaster management throughout India derives from the earliest famine codes, as promulgated by the Famine Commission of 1880 (Dreze, 1994). This code very clearly sets out the 'paternal state obligation' of the state to alleviate suffering at the time of a 'natural calamity' because such events arose 'from causes wholly beyond human control' (ibid., 76). The state's duty of care to avert deaths at the time of the disaster, itself framed as an externally originating risk,[4] is deeply influenced by this provenance of thought. The state government of Odisha inherited the colonial famine code, which was amended in 1988 and later morphed into the Odisha Relief Code 1996, and remained the governing document until the passage of the Odisha Disaster Management Act 2005. The role of OSDMA is first and foremost to prevent deaths, supported by the Indian Meteorology Department (Ray-Bennett, 2018).

The subsequent crystallisation of Odisha's disaster management as a field of governance that includes 'relief, restoration, reconstruction and preparedness' (Ray-Bennett, 2018), but *not* recovery, is the institutional progeny of an idea that excises any connection between disasters and the longer-term structural drivers of risk. A review of the state's disaster management machinery revealed that the responsibility for overseeing recovery rests not with any particular agency but rather with 'normal government'; until 2019, few government departments had formulated any specific plans for disaster recovery (Nalla et al., 2020). While recent state and district level district management plans for coastal districts, including

[2] As compared to 75 cyclone shelters for a coastline of 485km in 1999, there were 149 additional multipurpose shelters by 2014, with a total target of 311 (Behera, 2014). These were expected to be put to other uses during normal times by the local community, and several serve as schools; there are also dedicated school cum cyclone shelters.

[3] https://indianexpress.com/article/opinion/columns/coming-home-after-phailin/.

[4] OSDMA's mission statements refers to astrological themes like the destruction of a star, or to a 'curse of God', as ancient meanings of disasters, which have been replaced by a 'fact of life, a natural course of environmental degradation or ecological disturbance' (Behera, 2014, 2).

Jagatsinghpur, did not mention recovery, they did offer detailed inventories of infrastructure and other amenities that would contribute to disaster preparedness and enable prompt rescue and relief (ibid.). In Odisha, like in other parts of India, the avoidance of death and the pursuit of zero casualty are the holy grail of a disaster management approach that legitimates a techno-infrastructural response. This approach has been, as I will argue, unfortunately detrimental for the pursuit of long-term recovery.[5] A retired OSDMA administrator spoke on condition of anonymity,

> "Post-disasters reconstruction is quantifiable, but recovery is not measurable. That has not been a top priority for the state, perhaps because it is difficult to measure, or perhaps because it requires greater imagination to design on a sustained basis. OSDMA had been intended to serve as an agency that would focus on areas that have suffered a weather event for a longer period of time. Government departments have other routine tasks and may get distracted. This was meant to be a multidisciplinary team to help the government focus over the long-term. This is not happening. *An overemphasis on infrastructure projects for too long can be a distraction.*" (Interview, Bhubaneswar, August 2019; italics added)

4. The seaside villages of Ersama and the early years after the supercyclone

Ersama, one of 8 blocks of Jagatsinghpur district, presents several ecological and socio-economic characteristics that are typical of coastal Odisha. A fine web of estuarine rivers brings sea water inland with high tide, creating a perpetual interface between saline and fresh water. The landscape is dotted with dysfunctional sluice gates built at the mouth of local rivers (Chhotray and Hill, 2013). Most farmers here are marginal, with an average landholding size of less than 1 ha (2.5 acres). In Jagatsinghpur district, 63% of farming households own no more than 1 ha of land, and many, undoubtedly, even less.[6] Only a very small proportion of farming households (about 1.6%) own over 4 ha (9.9 acres) (GoO, 2009). Like in other rural areas across the country, village common lands serve an important purpose for grazing and other purposes.

Like in most coastal districts in Odisha, there is a mix of general castes and scheduled castes here, in varying configurations depending on the panchayat. There are also some Bengali settlers, many of whom have arrived into these parts from both west and east Bengal, particularly after the creation of Bangladesh in 1971. Many do not hold titles to land that they cultivate or use and feel discriminated against by local Odiyas (Chhotray, 2017). While we did not observe significant differences in landholding sizes across the caste groups, with a preponderance of small and marginal farmers, we did observe a higher degree of landlessness amongst the Bengali populations (Chhotray & Hill, 2013). One such Bengali village is Meenakhala,[7] a small village about 0.5 km from the shoreline, comprising approximately 180 Bengali households, with nearly 30% landless. Besides housing some of the poorest and most marginalised people in the block, Meenakhala, with its seaside location bore the harshest brunt of the supercyclone, and is relatively far from the block office (22 km). Its experiences most vividly articulate the unequal trajectories of change after 1999.

Paddy cultivation across Ersama took a hit in the years following the supercyclone. The results of a 120-household survey in 4 villages (including Meenakhala) in 2010 showed that the area cultivated for mono-cropped paddy on owned land fell from 154 acres to 73 acres over ten years (1999–2010) (Chhotray & Hill, 2013). In Meenakhala, closest to the sea of these 4 surveyed villages, this change was the most striking, with area devoted to paddy cultivation dropping by 83% from 1999 to 2003–4, and by 60% overall from 2009 to 10 (ibid.). Even when paddy is cultivated, persistent salinity means that yields have fallen greatly, compounded by a shortage of manure stemming from livestock losses in the supercyclone. Farmers told us that hybrid saline resistant varieties, whenever available, were not resistant to waterlogging. A more pervasive problem was the deficit in state support around paddy cultivation, especially in the more remote villages (Chhotray & Hill, 2013). As recently as 2019, while out on a fieldtrip with some block officials, I learnt that many had never in fact visited Meenakhala.

So, while the imagery of emptiness in Ersama in the years following 1999, I suggest, was not of a deserted moonscape with no paddy being cultivated, there were definite signs of change in cultivation patterns: reduced areas devoted to paddy, paddy as a mono-crop instead of paddy coexisting with lentils and vegetables, and lower yields. It was in this context that Meenakhala's farmers turned to aquaculture. As early as 2001–2, a number of farmers in seaside villages tried to rear black tiger shrimp in line with prevailing influences, especially from the neighbouring state of Andhra Pradesh (Chhotray & Hill, 2013). While there were a variety of permutations, a typical situation entailed marginal farmers owning about 2.5 acres of land persisting with some paddy in a portion of their lands (in about an acre and a half) with reduced yields, while converting the remaining acre or so of land into 2 *gheris*.

They soon ran into a string of problems stemming from disease and incurred massive losses of many tens of thousands of rupees in a year. Having turned to aquaculture in those early years after the supercyclone, many farmers in Meenakhala found it very difficult to restart paddy on their lands. Reduced yields within a smaller cropped area meant less to eat through the year as well (Chhotray & Hill, 2013). Crippled by indebtedness and compounded by paddy failures, many were driven to prolonged periods of hard wage labour in distant locations. Our 2010 survey showed that while the total area devoted to prawn in our sampled 120-household set increased from 33.5 acres in 1999–2000 to 42.3 acres in 2009–10, the total number of households engaging in prawn culture fell from about 35 at its peak in 2003–4 to just 15 in 2009–10. It was clear that only the relatively better-off, even within this general context of poverty, could afford to persist. Why then did so many farmers in these seaside villages once again embrace shrimp culture in 2013 and after?

5. The state in Odisha and the rise of commercial aquaculture

To answer this question, I must briefly move the spotlight away from these seaside villages to broader regional and national developments relating specifically to the promotion of commercial aquaculture by the state, and to 'extractivism' as a development paradigm more generally. These have nurtured a specific alliance of the state in Odisha with powerful forces of regional, national and international capital, within a broader economic philosophy that uncritically promotes resource extraction, like mining in Niyamgiri (Kale, 2019; Kumar, 2013), and resource conversion towards 'high-value' ends, like the privatisation of the Chilika lake (Adduci, 2009). Since the 1960s, the state in Odisha has exhibited a pro-business attitude underpinned by a close compact between politicians, bureaucrats and industrialists, generally from the same higher caste groups (Kale, 2019).

[5] The remarkable intensification of contracting around the construction of cyclone shelters, each of which costs approximately 2 crores to build, has drawn comment for attracting a new type of 'mafia politics' (an OSDMA official spoke confidentially, August 2019). On a separate note, local experiences of shelter access as well as management are highly variable (Pattnaik, 2019).

[6] This kind of land distribution is common in other coastal districts of Odisha as well (Pradhan and Flaherty, 2007).

[7] Not the true name of this village.

Odisha has aggressively supported the development of commercial aquaculture in India, which has seen the emergence of a large shrimp export sector comprising seafood companies, hatcheries and affiliated industries since economic liberalisation in 1991 (Pattanaik, 2020; Pradhan and Flaherty, 2007). Even earlier, it became the first state in India to announce a land lease policy for the allotment of government-owned brackish water lands for aquaculture in 1981.[8] It has been backed by powerful donors including the World Bank which supported a Shrimp and Fish Culture Project (1992–2000). Odisha promoted private shrimp cultivation along the fringes of Chilika from 1983 onwards and, in 1991, launched a joint venture with the Tata corporation for shrimp culture on the lake over the next 15 years (Adduci, 2009). This process provoked an angry response from local fishers' organisations, which escalated into a socio-ecological mobilisation branded as the *Chilika Bachao Andolan* to save the lake itself. This eventually led to the 1996 writ petition to the Supreme Court that resulted in the outlawing of shrimp culture within 1000 m of the lake. It also cleared the path for the legal regulation of 'sustainable aquaculture' and the establishment of a Coastal Aquaculture Authority (CAA) in 2005 (Das, 2018; Puthucherril, 2016).

Despite these significant developments, lake privatisation unleashed seemingly irreversible commercial processes that hungered for the profits of shrimp culture. A 'prawn mafia' comprising not only local elites but also regional Odiya fish and shrimp exporting businesses, politicians, bureaucrats and the police connived to sustain aquaculture in and around the lake, even when it was strictly prohibited (Adduci, 2009). As an elderly chairperson of a primary fishing cooperative said,

> "People are enjoying our land and waters forcibly and earning lakhs of rupees. The government is denying wrongdoing, but it is not acceptable to lie just by sitting on a chair. . .. all the current efforts to evict illegal mafia and break illegal shrimp *gheris* are a sham. And the fishers of Chilika are going out to make bricks on daily wage labour when they have their beautiful lake here." (Interview, Balugaan, Chilika, August 2019)

Contrasted with such dark 'mafia' dealings implicating the state in particular localities was the shiny discourse of technological innovation and economic opportunity presented by the Pacific white shrimp, or *vannamei*, in the higher echelons and institutional arenas of the Odisha state government. By 2011, the 'game-changing' *vannamei* shrimp had arrived in India, and leading Odiya entrepreneurs like Sea Gold Overseas Limited and Falcon Marine Exports acquired it from hatcheries in Chennai and propagated these in other coastal districts like Balasore and Puri. This led to close interactions between these entrepreneurs, technical personnel from shrimp companies in other states, the fisheries department and top bureaucrats. In an interview in August 2019 in Bhubaneswar, a large-scale shrimp exporter proudly described how it was after a field visit to his farm in Balasore that the Fisheries Secretary was convinced of the growth potential of *vannamei*.

> "In 2013, came the turning point. The Federation of Indian Exporters' Organization (FEO) organised a workshop, which was attended by the Director General of Foreign Trade and the Chief Secretary of Odisha. I had the opportunity to present the export potential in the marine sector. At that time, the export potential was of 1000 crores from our seafood exports, but I presented a vision for taking it to 10,000 crores within 5 years."[9]

According to shrimp exporters as well as farmers, the chief advantage offered by *vannamei* over the black tiger shrimp lies in its considerably higher stocking density (nearly 50,000 shrimp per acre for the former, as compared to approximately 1000 per acre for the latter), which leads to greater production capacity. One informant estimated that whereas black tiger shrimp could yield 1–2 tonnes only per hectare, *vannamei* can yield 10–12 tonnes of shrimp per hectare. This comes with additional demands, especially power for farm equipment like pumps and water filters, to the tune of 20 hp units for 1 ha of the pond area. In a strong show of state-capital partnership, the Seafood Exporters' Association worked closely together with the Fisheries Department, Government of Odisha, to promote and expand shrimp aquaculture along the coastal districts. A total of 107 block-level clusters throughout the coastal districts were identified in order to streamline infrastructural requirements around electricity and roads.

The Odisha Fisheries Policy of 2015 seeks to promote aquaculture entrepreneurship widely. The government has promised single window clearance (like for mining projects) for the issue of licenses and registration of aquaculture farms. Importantly, these clusters would be created on government and private lands, and leased out on a long-term basis to fish farmers for commercial aquaculture. Despite some lags in provision, especially around electricity, Odisha has considerably expanded its export potential. In 2015–16, the total value of its seafood exports was 1787 crore rupees, and this grew to 2439 crores in 2017–18.[10] The state has aggressive plans to increase this to 20,000 crore rupees by 2023.[11] It intends to develop 1000 ha of coastal land for aquaculture every year, with 5 lakhs (0.5 million) rupees being spent for infrastructural development per hectare.

6. 'Empty, unproductive landscapes' and the acquiescent adoption of aquaculture

A basic feature of capitalist activity is its continuous search for new spaces to expand into, all the while revealing new flexibilities in institutional arrangements as well as technologies. Harvey (2019) explains that diverse material processes, from the physical to the ecological and social, must be deployed and reconfigured in order to pursue capital accumulation. In this part of the paper, I will argue that the supercyclone and its associated disaster became an incredibly important mobilising metaphor for reconfiguration of the land and its uses, as well as people here and their relationship with it, all within a broader capitalist development strategy. At the same time, the state pursued a narrow approach to disaster management that disregarded broader risks associated with such a strategy.

In the mid-2000s, the small and marginal farmers of Meenakhala and other villages in Ersama were beginning to register their first show of losses from black tiger shrimp. Around the same time in 2005, the state government, aggressively pursuing extractive development on numerous fronts, signed a Memorandum of Understanding with the South Korean steel conglomerate POSCO to build a 12 million tonne capacity plant in Ersama block. A lot of trees along the coastline were felled for the project, which itself revealed a cynical disregard for coastal ecology and the role of mangroves for holistic disaster management (Das & Vincent, 2009).

Massive land acquisition was underway, with the state government undertaking to provide 4000 ha of land for this purpose. Although POSCO withdrew from the project in 2017 following

[8] http://www.fao.org/3/ac279e/AC279E11.htm#annII5

[9] Interview with Managing Director of a seafood exports company, Bhubaneswar, August 2019.

[10] 10 million equals 1 crore.

[11] http://fardodisha.gov.in/sites/default/files/misc/Seafood%20Exports%20from%20Odisha.PDF

unprecedented local resistance,[12] land prices shot up in the area due to speculation after the project's announcement in 2005. Many well-connected politicians and bureaucrats bought land here expecting to sell these later at a higher rate. Local informants explained that amongst these buyers were people from Paradip port, in Jagatsinghpur district, where several sea foods exports companies are based.[13] Sensing a ready entrepreneurial opportunity, these new landholders were instrumental in re-introducing shrimp cultivation in Ersama.

By 2019, small and marginal landholders in Ersama up to 5–7 km inland or more had taken up *vannamei* culture through *gheri* cultivation.[14] Jagachowk,[15] a village 3.6 km from the sea, had little black tiger prawn in the first round of aquaculture but, in 2019, nearly 25% of its households cultivated *vannamei* on either owned or rented-in lands, while the rest found wagework on paddy or shrimp gheris in further locations.[16] Penetration of shrimp culture further inland was clear evidence of the circulation of outside shrimp capital, but what stood out was the widespread take-up of *vannamei*. For the first time in the years following the devastation of 1999, I even saw some signs of prosperity, with plenty more motorcycles and small vehicles parked amidst narrow villages lanes. There were a few conspicuously large houses too, belonging to company 'finance-men' who supplied small farmers with credit and market linkages, almost entirely absent in the first round of shrimp cultivation.

In other shrimp growing countries like Thailand, high intensity shrimp culture on inland agricultural land by small holders is driven by land scarcity, itself a function of competition from other land uses like tourism (Vandergeest et al, 2009). This has led to conflicts between shrimp farmers and paddy farmers due to the mixing of saline and fresh waters that threatens paddy cultivation. In coastal Bangladesh, an alliance between powerful landowners, politicians and local goons has driven many landless groups off land and forced smallholders to sell or lease their lands for shrimp production, producing pockets of resistance (Paprocki & Cons, 2014). The remarkable difference in Ersama is that the very same farmers who can no longer grow paddy after the supercyclone are trying to make an alternative livelihood through shrimp (though with important differences in levels of success, as I discuss in section 8). Little wonder that aquaculture in Ersama has been adopted without the customary conflicts between existing resource users and new claimants, despite this area being no stranger to popular protests (as against POSCO in 2017).

Contrary to the pronouncement of a top-ranking official at the OSDMA, "Aquaculture has nothing to do with disasters or with managing cyclones," there would appear to be a distinct connection.[17] Moreover, the proliferation of this second wave of *vannamei* shrimp has decisively reconfigured the coastal landscape of Ersama. Land cover changes in Jagatsinghpur district between 1997 and 2020 showed an extraordinary increase in land devoted to aquaculture from 1.76 sq km in 1997 (before the supercyclone), to 8.43 in 2009 (when *vannamei* was yet to be introduced), to 17.19 in 2015 (shortly after *vannamei* came to the district around 2012–13), to 43.55 in 2020 (Sen et al., 2020).

Development processes rely on the complex interplay of meanings resulting in material reconfigurations of land, and wastelands as empty spaces available for improvement remain a dominant construct (Sud, 2020). In Baka's (2017) analysis, the government of Tamil Nadu embarked on a process of 'clearing the wasteland' by physically removing the Prosopis plantations that served a range of energy needs for the rural and urban poor, in order to facilitate the conversion of 'waste' into 'value' by planting biofuels instead. But no physical clearance was necessary in Ersama, where the supercyclone's legacy precisely lay in the rendering of a space as 'empty' and 'unproductive'. Notions of emptiness depend on the use of particular techniques: the obfuscation of local land-use practices like maps in the state's knowledge systems (Robbins, 2001) to very specific processes of 'knowing into oblivion' that marginalise the participation of people (Harms, 2014). In my story, the optimistic techno-modernist narratives about *vannamei* shrimp promoted by the state and shrimp exporters alike, obliterated the memory of suffering from the first disastrous aquaculture experiment.

For example, a company financier who supplies inputs to shrimp farmers argued that *vannamei* shrimp can thrive in conditions of low salinity, and that it was a 'myth' that salinity affected paddy culture. "It is the same farmer who does prawn farming, instead of paddy, because while he needs to wait for a few years to even the costs incurred in paddy, he gets profit twice a year with prawn. *He finds the culture worth doing.* In fact, some farmers are growing both paddy and prawn, and in what land they are unable to cultivate, they give it on lease to others."[18] Many farmers that I spoke to challenged his claims, but the financier's account illustrates the making of a powerful narrative about the 'benign' introduction of shrimp culture to these parts. Moreover, as I will consider in some depth, such narrative glosses over the complex unfolding changes as a result of *vannamei* aquaculture, from economic to ecological. Next, I turn my attention to the specific modes of uneven regulation by the state complicit in this act.

7. The political ecology of uneven regulation by the state

Disasters create the illusion of a blank slate or *terra nullis* and have been used opportunistically by states in alliance with private capital to pursue vested interests, often amounting to significant reconfiguration of resource ownership and access within the local landscape (Klein, 2008). However, 'disaster capitalism' can present itself very differently, depending on the context (Schuller & Maldonado, 2016). In Ersama, there are no lush urban developments or tourist traps unlike in post-tsunami Thailand and Sri Lanka (Cohen, 2011). Physical change here however, while less conspicuous (prawn gheris nested within paddy fields), is not necessarily less damaging. The role of the state in enabling these changes is accordingly subtle, with the lack of regulation of aquaculture proving to be significant.

As per the Coastal Aquaculture Act 2005, all aquaculture farms must be registered. Registered shrimp farmers qualify for up to a 50% subsidy under the government's *Rashtriya Krushi Vikas Yojana* scheme. Besides, registered farmers can avail of training from the Coastal Aquaculture Authority of India, and are entitled to compensation from the government if there are losses on account of cyclones or floods. "Our job is to help those who are registered,' said a block-level official, in charge of processing registrations.[19] Registration imparts a license for 5 years and requires an official certification of landownership or a land lease deed registered with the Sub-Registrar of the district for a minimum of 10 years. The government is specifically promoting commercial aquaculture through long-term leasing of government-owned brackish water areas for a minimum period of 15 years.

[12] https://scroll.in/article/832463/as-posco-exits-steel-project-odisha-is-left-with-thousands-of-felled-trees-and-broken-job-promises
[13] Interview with an ex-Sarpanch of the Padmapur Panchayat, October 2017.
[14] Locals simply refer to it as 'venaami'.
[15] Not the actual name of the village.
[16] Interview with Sarpanch, Gadaharishpur Panchayat, August 2019.
[17] Interview, Bhubaneswar, August 2019.
[18] Interview, Ersama, August 2019.
[19] Interview, Ersama, August 2019.

Here lies the problem. Many farmers in Ersama cultivate shrimp on rented-in lands, a trend that began after the supercyclone and was compounded by the failures of black tiger shrimp, which had resulted in peoples' own lands being put to disuse (no paddy or prawn) (Chhotray & Hill, 2013). Neither small farmers nor landowners favour long-term land leases due to the risks of shrimp culture & volatility of shrimp prices. Consequently, the large majority of small shrimp cultivators in Ersama have taken up short-term land leases for 2–3 years only (landlords are often absentee and settled in coastal towns/cities). Moreover, these are informal arrangements, and do not meet the requirements for registration. In practice, what goes on in much of Ersama has been described elsewhere as 'slash and burn aquaculture', as a deliberate strategy to cope with environmental degradation (Hall, 2004).

The data of registered farms held by the CAA for the whole of Jagatsinghpur district showed an increase from 0 farms in 2013 to 152 in 2017 and a fall to 62 in 2019 and 50 in 2020.[20] It also showed that 123 registrations lapsed in 2016, and were not renewed.[21] This is a gross underrepresentation of the actual numbers of farmers taking up prawn cultivation along this coast. Practically nobody with aquaculture on leased land has a registration. Of these, several lie within the prohibited CRZ and are therefore illegal as well, but the government turns a blind eye. In neighbouring Kendrapara district, site of the protected Bhitarkanika National Park, illegal shrimp *gheris* are routinely demolished.[22] But this has never been done in Ersama, because, as one block official candidly put it,

> "There is no compelling reason to dismantle illegal farms here. They (farmers) are doing a productive activity which benefits them, and also earns revenue for the state. . .. After the supercyclone, there was nothing much for them to do here anyway." (Interview, Ersama, August 2019; paraphrased from a longer conversation in Odiya.)

The willingness of the state to look away from its own rules is motivated by its overwhelmingly favourable view of aquaculture, backed by a cosy alliance between state elites and aquaculture capitalists. However, this omission by the state engenders at least two negative consequences. First, only registered farms are compulsorily required to install the Effluent Treatment System (ETS) set out in the guidelines for sustainable aquaculture by the CAA. There is no such requirement for unregistered farms, which although small individually, make up for a considerable land area under shrimp cultivation.[23] Neither block-level nor state-level officials were able to provide further information about environmental assessments of the area (to do with soil salinity or groundwater quality for example, which farmers anecdotally observed changes with, following the reintroduction of shrimp culture).[24] These are amongst the known environmental impacts of aquaculture and should be monitored (Paprocki & Cons, 2014). Meanwhile, it is common practice for shrimp farmers in Ersama to discharge used gheri waters into the ground and local estuaries after treating it with bleach only.

The state's cavalier attitude towards the broader environmental consequences of aquaculture persists despite the well-known negative impacts on mangroves resulting from shrimp culture in Odisha, worsening the coastal population's vulnerability to cyclones (Das & Vincent, 2009; Mohanty & Mohapatra, 2018). The ICZMP (Integrated Coastal Zone Management Programme) constitutes the state's biggest intervention for the protection of the coastline though,[25] but here too, the emphasis has been on infrastructural measures like the construction of 'sea walls' in coastal areas. Officials at OSDMA concurred that aquaculture has prompted massive land use changes along the coastline, while simultaneously announcing a disconnection with cyclones.[26] This suggests the lack of an institutional link between aquaculture (much of it illegal and unregulated), mangrove erosion, holistic coastal ecosystem management and long-term disaster recovery. There is no mention of aquaculture in the state's disaster management plans (Odisha State DMP 2019), with a limited discussion around how to rehabilitate aquaculturists in district disaster planning (Sen et al., 2020).

Second, the large number of unregistered farmers may escape the state's scrutiny as mentioned above, but they are also deprived of its support. The twinning of state support with registration, which small farmers cannot undertake due to the practicalities of land leasing, is thus highly unfair. All of the 27 long-term leases handed out by the government in Ersama following the 2015 fisheries policy are to established aquaculturists, who own 20 or more acres of land.[27] A further problem is small farmers would also not qualify for any compensation were there to be losses during a cyclone (already meagre for the fisheries sector). State priorities around the promotion of commercial aquaculture have produced both the lack of regulation and the absence of proper support which are adversely affecting the poorest participants. The scene is set for small farmers to fall into the snare of company middlemen.

8. Finance-men, differentiation and precarity in Ersama

Shrimp cultivation worldwide is capital intensive. According to rough estimates provided by the sarpanch of a local panchayat in Ersama in 2019, it costs approximately 800,000 rupees for one cycle of *vannamei* culture on 1 acre of land (1 acre can hold 2 gheris). All of the costs, aside from staff payments and costs of diesel for the motor, need to be met upfront (more details in Fig. 1). Labour costs are relatively small compared to the other categories of expenses but cannot be met from within the household only for two important reasons (one, a need for someone to be on-site constantly to guard the expensive machinery and shrimp, and two, a concentration of 6–8 workers at the time of key tasks like seeding, cleaning and harvesting). Small and marginal farmers in Ersama therefore cannot afford to practise aquaculture without external assistance. They rely on 'finance-men', a term reserved for intermediaries who provide shrimp fry, feed and medicines to farmers in return for all of their produce.

There were approximately 30 finance-men active in Ersama at the time of fieldwork in 2019, all with ties to exporting companies. Finance-men are typically large-scale shrimp cultivators themselves, renting hundreds of acres of land on lease for the purpose. They are generally local to the district, medium to large landholders, and from the general castes without exception (no Scheduled Castes are finance-men here). One finance-man I interviewed,

[20] This reduction in registered shrimp farms could be for two reasons: the first is to do with the lack of renewals due to apathy, and the second, concrete difficulties which are making it hard for farmers to continue with shrimp, and will be discussed next.

[21] http://caa.gov.in/CAA/php/result.php?a[dist_id]=53&a[state_id]=8&a[key]=ba70bab7792d263efe2be08f22b79203

[22] https://www.newindianexpress.com/states/odisha/2020/aug/19/illegal-prawn-farms-near-odishas-bhitarkanika-razed-by-forest-personnel-2185435.html For a fascinating discussion of the significance of illicit transactions in land use dynamics, please see Tellman et al. (2020).

[23] No data are available about the extent of land under shrimp culture, either in total, or disaggregated into registered and unregistered farms. This is a wider problem with the governance of inland shrimp culture in dense coastal regions, like in Thailand (Flaherty et al., 1999).

[24] Officials interviewed at the Ersama block office, and the Odisha Secretariat in Bhubaneswar, including at the ICZMP office (Field research, August 2019).

[25] http://www.iczmpodisha.org/aim_and_objective.htm

[26] Interview, OSDMA, Bhubaneswar, August 2019.

[27] Interview, Block Office, Ersama, August 2019.

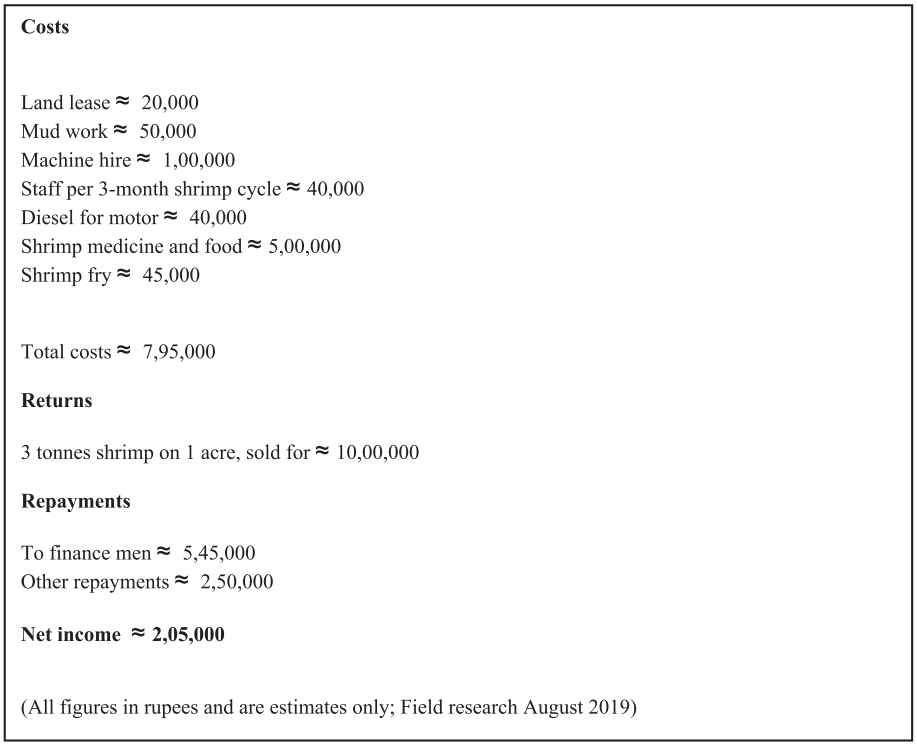

Fig. 1. itemised estimates of costs of shrimp *gheri* culture on 1 acre of land, Ersama).

Mihir Mohapatra,[28] started cultivating black tiger shrimp in 2002 and entered the commercial financing business when *vannamei* arrived here in 2013. Finance-men like Mohapatra have ties with Falcon marine exports, the dominant company in these parts, though not exclusively so. Nearly 90% of Odisha's shrimp companies are active in Ersama. Finance-men obtain shrimp feed from exporters on cash or credit and deposit the shrimp that they collect from farmers in company processing centres at a price set by the company, while earning a commission. Fig. 1 below sets out the details of one cycle of shrimp cultivation that lasts about 5 months in total (it is common practice here to have one only cycle a year, though many also attempt two with varying degrees of success). The same land is not used for any other kind of cultivation at other times.

The farmer is disadvantaged in a number of respects in such an equation, not least because the company is free to sell the shrimp at a considerably higher price to onward chains, and there is little to no transparency about the extent of the difference.[29] In a good year, a yield of 3 tonnes per acre would fetch around 10,00,000 rupees approximately (as told to me by farmers in 2019). The farmer stands to make 2,05,000 after repaying the finance-men (about 545,000 rupees for shrimp fry, medicine and food) and offsetting other costs for land lease, mud work, machine hire, labour costs and diesel (about 250,000 rupees).[30] However, a return of approximately 200,000 for the acre is a large amount for a farmer who is faced either with very small profits or even losses from paddy (see Fig. 2), which incentivises the risk taking.[31]

Notably, the burden of risk for shrimp culture is borne entirely by the farmer. In case of a failed or diminished harvest, the loan amount owed to finance-men is simply added to the farmer's debt account the following year. Finance-men wield immense power in these transactions, and can (and do) hold back capital from serial defaulters, while tarnishing borrowers' reputations locally. 'Feed technicians' employed by the company work closely with finance-men, exercising vigilance while offering technical support.

While the operation of financial intermediaries has enabled the incorporation of small and marginal shrimp cultivators into the broader processes of commercial aquaculture (see Aga 2019),[32] such integration is on the worst possible terms. Neither finance-men nor the exporting companies offer any buffer for the enormous risks, provide any support in the leasing of land for shrimp culture or take any responsibility for their welfare. There is however one group of aquaculturists from Ersama that does not depend on finance-men.[33] They belong to a smaller category of semi-medium/medium landholders, owning between 5 and 10 and 10–25 acres of land respectively, comprising no more than 12% of all farming households in the Jagatsinghpur district (GoO, 2009).

Ganeshwar Sahoo is a good example.[34] He owns 10 acres but has leased an additional 20 acres to pursue *vannamei* shrimp since its introduction in 2013.[35] An ex-paddy farmer, Sahoo used earnings from his contracting business to embark upon aquaculture on a larger scale than is possible for most other farmers here. He is able to sustain his operations independently and can avoid the losses that farmers dependent upon finance men incur, due to being charged

[28] Not his actual name. Interview, Ersama, August 2019.

[29] An exporting company representative I interviewed on the telephone only vaguely justified this on account of processing costs (August 2019).

[30] Field research, Ersama, August 2019. This information was collated after multiple interviews with farmers, many of which took place near their gheris, allowing for observation.

[31] It costs less to lease an acre of land for paddy (5000 rupees) than to lease an acre of land with 2 gheris for shrimp as these have been dug by the landholder (20000–30000 rupees).

[32] Aga (2019)'s fascinating ethnography of agribusiness marketing agents in western Maharashtra documents their critical role in integrating farmers with larger processes of capital accumulation.

[33] There are also wealthy outsiders who have bought hundreds of acres of land for shrimp culture in many coastal districts, including in Jagatsinghpur, and set up large shrimp farms. They experience very different kinds of opportunities and constraints from even the relatively better off aquaculturists I refer to here.

[34] Not his real name.

[35] This land is not registered because of an informal arrangement for the land lease.

Costs

Seed 20 kg ≈500
Fertiliser 200kg ≈3000
Labour 22 persons @350 per head ≈ 7700
Ploughing ≈1800
Harvesting ≈ 2000
Lease ≈ 5000

Total costs ≈ 20,000

Returns

Production 25 bags (70kg per bag) ≈ 1750 kg/17.50 quintal
Price (Government Minimum Support Price) ≈ 1800 rupees per quintal

Total returns (1800*17.5) ≈ 31,500

Net income ≈ 11,500

(All values are in rupees and are estimates only; information collected from Ersama over the telephone, December 2020)

Fig. 2. Itemised costs and returns from paddy on 1 acre of land for comparison, Ersama).

more for everything (see Fig. 3).[36] Besides, independent operators can exercise quality control over inputs, and sell directly in the market at potentially higher rates.

Small shrimp producers are also faced with ever-mounting operational costs, like keeping motors running for pond oxygenation. This then produces further losses, as more shrimp die from the lack of oxygen due to diesel shortages. Moreover, smaller cultivators are unable to keep up with proper cleaning protocol at the end of a cycle. As a group of wage labourers explained, "Some people clean the *gheri* from the ground up, others clean it superficially from the top. People always try to manage with fewer workers. It really depends upon the condition of your pocket."[37]

A longer-term view as taken in this paper reveals the extent of immiseration that can result from different modes of shrimp culture. Despite being amongst the earliest to take up black tiger prawn after the supercyclone, people in the remotest seaside villages of Ersama now participate in *vannamei* culture through their wage labour only. Many of these wage labourers are Bengali immigrants from sea-lined villages like Meenakhala. A third of its 180 households are landless, but the large majority of the remainder cannot afford to take up *vannamei* culture. With paddy cultivation having been effectively halted here post-1999, most people in Meenakhala do not cultivate their lands anymore.

One group of wage workers estimated that while paddy work would yield about 300–350 rupees for about 8 h of work per person, gheri work could yield the same in 3–4 h, enabling twice the daily earnings.[38] In the summer months, gheri work stops, and they are forced to travel outside the block, since there is no paddy work around here for at least 25 km. Some men told me in a group meeting,

> "The most important livelihoods change since the supercyclone is that we used to be *chasas* (farmers who used to grow paddy and vegetables as a second crop) and now have become *majdoors* (wage labourers). We work on the lands of other wealthier people who have come to Ersama, bought land and are now leasing it out. Not many people from Meenakhala are able to lease in land for aquaculture, we simply do not have the capital. We are only labourers now."

There are mixed feelings about the changeover to shrimp. As one man said, "Undoubtedly there is money in prawn. But prawn culture requires almost 1 lakh (1,00,000) at the start, and then more later on. How would poor people like us invest 1 lakh rupees? On the other hand, if we could have got 10 bags of paddy from one acre, then that would be good for us."[39] Although each person here is keenly aware of the utter destitution they would face if shrimp were to fail, there was only an uncomfortable silence when we tried to raise the issue. Constraints in wage work in the future are a high possibility; as one finance-man said, "75% of the shrimp farming in Ersama has now halted due to problems with financing."[40]

9. The exclusion of women from shrimp livelihoods

The introduction of *vannamei* culture into Ersama is unleashing another important set of social and economic effects. Women feel terribly excluded as the work is seen as plainly 'unsuitable' for women. It is in distant locations and women are not seen as appropriate for guarding the *gheris* ("Who would guard the women?", retorted the men.) As for gheri labour during harvesting season, it is a limited spurt of work that is physically arduous, and women's sarees pose a significant risk because they can get caught in the blades of the motor that needs to keep running at all times. There have been a few tragedies associated with this. There are also some less commonly heard 'cultural' explanations, of women as seen to be doing much 'dirty' work as it is and are not encouraged therefore to work around prawn for fear of 'infecting' the prawn.[41]

The gender dynamics around shrimp culture represent a fertile area for research. There are some examples of women facing disproportionate violence in course of coercive shrimp expansion,

[36] Interview, Ersama, August 2019.
[37] Interview, Meenakhala, Ersama, August 2019.
[38] Focus group discussion, Meenakhala, August 2019.
[39] Interview, Meenakhala, August 2019.
[40] Interview, Ersama, August 2019.
[41] Group meetings with women in Meenakhala and Jagachowka, August 2019.

Lime < 600 per packet (otherwise available at 310)
Bleach < 800 per acre (otherwise 480/490)
Medicine < 20% sellers' discount not passed onto farmers
Shrimp fry < 14 lakh to purchase 10 lakh fry (otherwise available for 8 lakh) (1 lakh = 100,000)

(All costs in rupees; Field research, August 2019)

Fig. 3. Estimate of costs incurred by farmers dependent upon finance-men.

such as in Bangladesh's Khulna Delta in the early 1990s. [42]At the same time, there is the more empowering case of women collecting tiger prawn fry (or seed) from rivers in the Sundarban forests in West Bengal in India (Jalais, 2010). This activity began in the 1970s, and despite the criticisms of environmental organisations, became very popular amongst islanders facing persistent problems of soil salinity following the disastrous cyclones of 1981 and 1988. Jalais notes that prawn-seed collection by poor women became a subversive activity, enabling labourers and sharecroppers to reject low wages in the fields.

In Ersama too, I heard accounts of women collecting prawn-fry (colloquially called *jaanla*) from estuaries and the sea, but the introduction of capital-intensive *vannamei* has effectively put an end to this except for seaside villages like Meenakhala, where some women continue to collect fry. In fact, I also observed a few women working in *gheris* as I arrived in Meenakhala village, and learnt that this was on their own lands, and without the involvement of finance-men. Albeit on a very small scale given the high level of landlessness here, it was still a powerful contrast to women in villages further inland, like Jagachowk, where commercial *vannamei* has an absolute hold on shrimp culture. In these villages, women told me about 'feeling useless' now that there was no paddy to work on.[43] The change is striking as previously, women were centrally involved in the more labour-intensive paddy cultivation.

The non-recognition and non-quantification of various forms of livelihoods generating activities, especially those undertaken by poorer women, has rightly drawn attention in the wider gender scholarship. In India, the female work participation rate has fallen to 24.8 per 100 women in 2011/12 from 32.8 in 1993–94 (NSSO Fig.s reported in Dewan, 2020). Agriculture, the biggest employer of women, has seen a drop in employment by 1.6 million within this period (Srivastava & Bhaskar, 2020). Though shrimp culture does not feature separately, female intensity in non-crop agriculture including fisheries, besides animal husbandry, plantations and forestry is high, and women's workdays have declined in all these. The Ersama case offers additional insights regarding the exclusion of women from important land-use transformations in the post-supercyclone period. More dedicated research is needed to gauge what this means in terms of women's work in other household areas, like poultry, kitchen gardens etc. The NSSO data worryingly shows that a decline in self-employed and casual labour by rural women from 1993/4 to 2011/12 has been offset by a rise in 'other domestic duties' like poultry, and some have argued that this only constitutes a shift from paid to unpaid work (Srivastava & Bhaskar, 2020, 205). The feelings of uselessness reported to me by many women in Ersama may also reflect this trend. Many women complained of the rise of gambling and alcoholism amongst men, given the sudden influx of cash in aquaculture, and their inability to do much about it. [44]

10. The entrepreneurial citizen and the normalisation of risk: state-people relations in post-supercyclone Ersama

In the introduction of commercial aquaculture to post-supercyclone Ersama, I also encountered a worrying normalisation of the idea of poor people taking risks to be gainfully incorporated into a broader capitalist chain. In this approach, risk is viewed in positive terms as a more 'active construct' than vulnerability, which is generally regarded passively and not in terms of more 'affirmative notions of capacity' (Alexander, 1997; Wisner et al., 2004, 12). However, while risk-taking as 'entrepreneurial' may be seen positively, this view disregards the extreme precarity that comes with risk. Such precarity has now become an integral and structural aspect of the vulnerability experienced by people in this cyclone-prone region.

In the aftermath of a disaster, states commonly view affected peoples as helpless victims, which then shapes the state's paternalistic duties and obligations to provide help and relief to their citizens (Chhotray, 2014; Zhang, 2016). Drawing from the case of Ersama, the paper shows that once this period is past, the passive recipient of relief becomes transposed into the male entrepreneurial citizen. There is a subtle but unmistakeable shift in popular position, from a *helpless victim* that needs 'embodied' help in the form of physical evacuation to a cyclone shelter and tangible relief materials like food parcels/blankets, to an *enterprising aquaculturist* that is able to take all possible risks (including the physical risks involved in running gheris in remote locations), but be given little or no support. Moreover, 'his' (typically, male) productivity is seen not only as an individual choice, but as essential entrepreneurship that is a part of a larger assertion of the 'duties of social citizenship within neoliberal times' (Jayal, 2013, 176) (when small shrimp farmers, clearly suffering from an unjust system, are seen by state officials and company representatives to be contributing to the state's export revenues, for example).

The erasure of women's labour within this construct of entrepreneurship is a particularly insidious aspect of the gendering of capitalist development.[45] The 'fiction' of male productivity is an essential construct of capitalism, resting on an artificial separation between production as 'value-generating' and reproduction as 'non-value'; this renders the main activities (typically performed by women and subaltern groups) on which such productivity is based as 'unremunerated' (Fortunati, 1981 cited in Mezzadri, 2020, 1188). Women themselves normalised these ideas of their own lack of value, while performing all of the work at home and in their homesteads that in turn allowed the men in their households to embark on risky shrimp culture (albeit unwillingly), as I observed during my fieldwork. Social reproduction analysis is dismantling these binaries between production and reproduction, encompassing not only 'the institutions and activities entangled in domestic and care work, but also the labour relations and practices central to the reproduction of capitalism overall' (Mezzadri, 2020, 1192). The growth of precarious work and livelihoods across the global south

[42] https://ejfoundation.org/resources/downloads/smash_and_grab.pdf
[43] Interviews with women in Jagachowka, August 2019.
[44] Focus group discussion with women, Jagachowk, August 2019.
[45] I thank the two anonymous reviewers of this paper for this vital insight.

has blurred these boundaries further. The Ersama case is paradigmatic in this sense; as shrimp culture has pushed more people into precarity, women are differently exploited from men through their exclusion and non-recognition.

Moreover, the historically embedded 'time and space specific' structure of resources has shaped the relative normalisation of risk-taking by poor farmers in Ersama (Luig, 2012). Propelled by powerful interests backed by the state, the dominant narrative of aquaculture is of a livelihood that reinforces productivity and creates the possibility of prosperity. Even as temporary earnings have represented a break from poverty, the risks and precarity of aquaculture, as well as its environmental consequences, have been thoroughly downplayed within this narrative (see Paprocki and Cons, 2014). The perceived absence of other alternatives, directly related to ideas of emptiness following on from the supercyclone, shapes social constructions of 'acceptable risk-taking' (Haltermann, 2012 in Luig, 2012), certainly by officials and, to a great extent, by people themselves. An aspect of the normalisation of risk is to view environmental problems in terms of farmers' profits. As a finance-man quipped, "The farmer has the most to lose from not maintaining cleanliness in his ponds, so why would he not do so?"[46] This perspective has its own limitations, as we have seen, with farmers of limited means being forced to compromise on pond cleaning. There is also the fallout of the 'slash and burn' aquaculture with most marginal cultivators leasing lands on a short-term basis and the lack of environmental regulation for large swathes of land under 'unregistered' aquaculture (Flaherty et al., 1999).

The vulnerability of poor people to cyclones is of concern to the state; their vulnerability to precarity, as a clear outcome of new livelihoods related to the expansion of capitalist development following the supercyclone is less so. Some proponents of aquaculture, whom I interviewed,[47] held the firm view that in an area facing the constant threat of cyclones and salinization due to tidal intrusion, aquaculture and not paddy, as a livelihood, was the only way out for people. However, pursuing aquaculture in a sustainable manner would necessitate a far more proactive and supportive role from the state than is currently the case. Disregarding such precarity is necessarily short-sighted as an approach to disaster recovery. Precarity, both economic and ecological, will shape the ability of people in Ersama to cope with and recover from the next major disaster (recovery should mean greater resilience to the next extreme event, argue Wisner et al., 2004). A key concern is food security that is absolutely critical following any disaster, given their reduced ability to rely on paddy grown on their own lands.[48] However, as disaster risk is considered to be an 'externality to be managed... its dependent relationship with development processes has been blurred and obscured' (Lavell & Maskrey, 2014, 271).

11. Conclusion

In the eastern Indian state of Odisha, aquaculture has emerged as the principal mode of livelihood in areas that had been severely affected following the supercyclone of 1999. This paper adopts a critical gaze on the uncontested and, to a great extent, unregulated, penetration of commercial *vannamei* cultivation into Ersama, a block in Jagatsinghpur district, which suffered the brunt of the supercyclone. While Odisha has had a turbulent history of aquaculture with the well-publicised protests of traditional fishers around the Chilika lake, and the operation of the infamous 'prawn mafia', much less is known about the drivers of expansion into these post-supercyclone areas.

This gaze is informed through research over ten years (2009–19). The longer-term perspective adopted here revealed that *vannamei* shrimp was actively taken up in 2012–13, even though there had been disastrous experiments with black tiger shrimp in the immediate aftermath of 1999. The paper tries to explain this phenomenon by revealing a powerful construct of Ersama as a space rendered empty and unproductive by the supercyclone, which can and should be subject to the transformative forces of aquaculture. 'Emptiness is emerging as a concrete spatial–temporal coordinate in the global landscape of capitalism and state power',[49] and this paper contributes to this body of work. It situates this phase of post-supercyclone shrimp culture within the longer history of state-private capital alliances promoting aquaculture in Odisha. It shows how this construct obliterates memories of indebtedness and suffering from the previous attempt at shrimp cultivation *and* prompts the state to preside through highly uneven regulation. Not only does this stance of the state amount to the normalisation of extraordinary precarity and risk for small and marginal cultivators, and the exclusion of women, it also forebodes environmental change that is not being monitored. This is concerning. A national-level climate vulnerability and risk assessment in 2019–20 under the aegis of the Department of Science and Technology, Government of India, ranked Odisha at the 3rd highest level on the composite vulnerability index.[50]

Accompanying the normalisation of risk-taking, there is an overwhelming tendency to credit *vannamei* adoption to its technical superiority, while disregarding the key economic, social and ecological changes that have come in its wake. These changes include the reconfigurations of land use, credit and indebtedness, changing composition of wage work, exclusion of women, and discernible spatial differences. All of these, and others, could be explored in more depth in further research. And yet, the main proponents of shrimp culture routinely refer to the '*vannamei*' phase being much better than the 'pre-*vannamei*' phase because a 'faulty' shrimp has been replaced by a hardy and resilient one. One sea foods exporter said, "Even if the *vannamei* develops problems, there will be other fish. There is always a cycle for everything."[51] Existing research has shown that shrimp culture is entrenched in ways that are difficult to reverse 'either ecologically or politically' (Flaherty et al., 1999, 2045). There is every indication of political intent to further aquaculture in Odisha.

Finally, the state government's explicit disconnection between 'aquaculture and cyclones' is deeply resonant of the limitations of disaster risk reduction approaches worldwide. While the Odisha government has done well to lay a solid techno-infrastructural foundation for risk- mitigation during cyclones, the scope of its disaster management unfortunately steers clear of addressing structural risks that arise from development processes like aquaculture and can compromise long-term recovery. This approach has further depoliticised the state's disaster response, as DRR is dominated by technical narratives which obscure the powerful agendas that shape long-term recovery. As the paper has shown, there is a tremendous backing of the idea of aquaculture as remunerative and entrepreneurial by influential stakeholders in alliance with the state.

The paper observes how the state-people relationship has transformed from one of care and provision for citizens at times of 'active disaster' to one where the same people perform entrepreneurial duties, despite unprecedented risk and with minimal support in later years. All too often, people in disaster-affected

[46] Interview, Ersama, August 2019.
[47] Interview, Bhubaneswar, August 2019.
[48] See Paprocki and Cons, 2014 for an excellent discussion of this issue in the case of coastal Bangladesh. A detailed consideration of food security in post-supercyclone Ersama is beyond the scope of this paper.
[49] https://culanth.org/fieldsights/emptiness-an-introduction
[50] https://dst.gov.in/sites/default/files/Full%20Report%20%281%29.pdf
[51] Interview, Bhubaneswar, August 2019.

places languish in neglect once the immediate phases of relief and reconstruction have passed. However, as this paper shows, there are important transformations underway that can only be observed long after the visible crisis left behind by a massive 'event' like a supercyclone or indeed an earthquake has passed (see Fayazi et al., 2019). Even as disaster recovery is implicitly assigned to the processes of capitalist development, the experiences of aquaculture in post-supercyclone Ersama reveal a trajectory of recovery that is both tenuous and unequally experienced.

CRediT authorship contribution statement

Vasudha Chhotray: Conceptualization, Formal Analysis, Writing- original draft.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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