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## Locating the context of fisheries in disaster management plans and need of integrating block chain technologies for better fisheries governance and social good

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### Abstract

This paper locates context of fisheries with reference to disaster management in National and State Disaster Management Plans (DMPs) as well as other fisheries specific frameworks. Based on this, it recommends integration of disaster management in national and state level fisheries frame work sand integration of fisheries in state DMPs. Modern technological tools of communication device, internet and mobile apps needs to be given focus. New tools like embracing block chain technologies for disaster management are needed because if fisheries registrations and certifications are moved to block chain, dependency on paper documents can go away and be of help during post disaster management. Without paper files, ownerships are not established leading to conflicts and mismanagement and even unrest. Ownership of property represented by a block chain token can enable simple, error-free, and non-repudiable transfer of ownership leading to better fisheries governance and social good.

**Keywords:** disaster management, fisheries, block chain, social good

### 1. Introduction

Disaster risk reduction is a national priority and has a strong institutional basis for implementation. As per the International and National frameworks, it is recognized that disaster is to be understood in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment. People associated in the fisheries sector are vulnerable to natural/human induced disasters and emergencies like floods, droughts, earthquakes, landslides, storms, tidal surges, trans-boundary aquatic animal disease, conflict, chemical hazards, nuclear release and radioactivity. The damages from disasters in the sector can be loss of life, injury, trauma, disease outbreaks, loss of livelihoods, changes in water quality, damage to habitats, damage to infrastructure, craft, gear, cages, ponds, bunds, all kind of inputs/equipment, water supply systems, nurseries, hatcheries, feed mills, brood stock, markets, post-harvest and processing facilities, private and public sector service, support providers, pollution and predators, release of farmed fish into the wild, pollution from toxic materials, loss of market confidence, reduced selling price, aquatic systems can become vectors for pathogens and this can have destructive impacts on the environment and fisheries dependent livelihoods affecting all actors of the value chain [2]. After focusing on immediate response to disasters and humanitarian emergencies, the saving of life in the wake of a disaster; the treatment of injury and trauma; and ensuring that people have access to the basic needs of food, water, sanitation and shelter, the focus should switch to planning and delivering support for fisheries and aquaculture [1, 4]. For loss/damage and needs assessments, short, medium and long term recovery planning with a focus on phasing of activities back into normal development towards building back better be emphasized. In this reference, it is necessary to explore the context of fisheries with reference to disaster management in various plans, policies and frameworks. However, in the fisheries sector, there are lack of studies wherein the different International, National, State Disaster Management Plans and other fisheries specific policies/guidelines/codes plans/frameworks have been analyzed with reference to disaster management. This study is an effort to fill this gap and accordingly provide suggestions because integration of disaster risk reduction into national and local

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government development planning and a strategic, joined-up approach to disaster risk reduction and integration is an essential component of development plans in hazard-prone countries.

## 2. Materials and Methods

To locate the context of fisheries in International, National, State Disaster Management Plans and other fisheries specific policies/guidelines/codes plans/frameworks were analyzed with reference to disaster management and judgments were made if fisheries were integrated in these. Among the International frameworks, Sendai Framework for Disaster Risk Reduction 2016-2020, the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015 – United Nations Office for Disaster Risk Reduction (UNISDR), was studied to locate the context of fisheries [27]. In addition, National Disaster Management Plan (NDMP) and State Disaster Management Plans (SDMP) were studied. Specific policies/guidelines/codes namely Code of Conduct for Responsible Fisheries (CCRF)<sup>8</sup>, Draft Indian Marine Fisheries Code; Guidance on a Marine Fisheries; Management Model for India 2017, Draft National Inland Fisheries And Aquaculture Policy (NIFAP) 2016-17, United Nations Food and Agriculture Organization Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries (UN FAO-VGSSSF), National Marine Fisheries Policy of Department of Animal Husbandry Dairying & Fisheries (DAHDF) 2017, Drought Management Manual by Ministry of Agriculture and Farmers Welfare, Drought Contingency Planning District Agriculture Contingency Plans (DACPs), formulated by ICAR-Central Research Institute for Dryland Agriculture (CRIDA) under the aegis of the Ministry of Agriculture and Farmers Welfare and District wise agricultural contingency plan under National Innovations for Climate Resilient Agriculture (NICRA) were studied in detail. For each state, it was seen if there were any fisheries sector specific disaster management plans available on their official website and this was confirmed through telephonic call. Thus various framework were analyzed with reference to context of disaster management.

## 3. Results and Discussion

**3.1 International and national frameworks:** In the Sendai Framework for Disaster Risk Reduction 2016-2020 which is the successor instrument to the HFA 2005-2015-UNISDR, there is a mention of strengthening the protection of livelihoods and productive assets, including livestock, working animals, tools and seeds. As India is a signatory of this framework, in 2016 it has come out with National Disaster Management Plan (NDMP). However, we already had the Disaster Management Act, 2005. The Act calls for the establishment of the National Disaster Management Authority (NDMA). The NDMA is responsible for "laying down the policies, plans and guidelines for disaster management" and to ensure "timely and effective response to disaster". Under section 6 of the Act it is responsible for laying "down guidelines to be followed by the State Authorities in drawing up the State Plans". All State Governments are mandated under Section 14 of the act to establish State Disaster Management Plans (SDMPs). The NDMP has included fisheries.

**3.2 Fisheries specific policies/guidelines/codes:** In CCRF, it is mentioned that 'important fish habitats such as wetlands,

mangroves, reefs and lagoons, should be protected from destruction and pollution. Where natural disasters harm fisheries resources, countries should be prepared to take emergency conservation and management measures when necessary'. In the Draft Indian Marine Fisheries Code; Guidance on a Marine Fisheries; Management Model for India 2017 no mention of disaster is there. Hazard analysis is with reference to Hazard Analysis and Critical Control Points (HACCP) and hazards due to chemicals. However, this is open for comments, so suggestion has been recently provided based on this study. In the Draft National Inland Fisheries and Aquaculture Policy (NIFAP) 2016-17 Disaster Management section has been incorporated and suggestions provided during a National level workshop organized in 2017 at ICAR-CIFE, Mumbai. UN-FAO VGSSSF in the Context of Food Security and Poverty Eradication part 2 has a chapter on Disaster Risks and Climate Change. In the National Marine Fisheries Policy of DAHDF 2017 under the section Fisher Welfare, Social Security Nets & Institutional Credits section 43.0 it is mentioned that weather events of extreme nature such as storm surges, cyclones and rogue waves will be considered as natural calamities. Drought Management Manual by Ministry of Agriculture and Farmers Welfare has a reference to fisheries for providing assistance to fishers by Direct Benefit Transfer to fishers. Drought Contingency Planning District Agriculture Contingency Plans (DACPs), have been formulated for more than 600 agriculturally important districts in the country so far by the ICAR-CRIDA under the aegis of the Ministry of Agriculture and Farmers Welfare to suggest contingency strategies to farmers to cope with major weather related aberrations, including delay in onset of south-west monsoon, dry spells etc. Under NICRA, district wise agricultural contingency plan have been prepared which are exhaustive with reference to fisheries too. Included Number of fishermen, fish farmers, crafts, gears, production and contingency plans in case of a specific disaster.

**3.3 State disaster management plans:** With reference to the SDMPs, in the state of Odisha and Daman and Diu fisheries is integrated. In the Risk Assessment and Disaster Management Plan for Pondicherry also, fisheries is integrated. Among the SDMPs of the coastal states like Tamilnadu, Kerala and Andhra Pradesh fisheries is mentioned as one of the priorities. Fisheries disintegrated in the Policy Note of the Revenue and Disaster Management Department of Tamilnadu. For Gujarat, Maharashtra, West Bengal, Karnataka and Goa it has a mention of providing warnings, and evacuations. State of Assam, Bihar, Manipur, Sikkim and Tripura, has a brief mention of fisheries in their DMPs. For other states/Union Territories like Arunachal Pradesh, Andaman and Nicobar islands, Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Lakshadweep, Meghalaya, Mizoram, Nagaland, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Punjab, and Rajasthan fisheries needs to be incorporated. DMPs of Telangana, Chhattisgarh and Dadar and Nagar Haveli could not be accessed. However, in Telangana, State Action plan on Climate Change, fisheries sector is recognized as vulnerable to climate change effects and extreme weather conditions. Telangana also has a heat wave state action plan 2016 and in the committee fisheries department is included. However, mention of safeguarding cattle and poultry is done. In Lakshadweep Action Plan on Climate Change, fisheries is covered under different chapters. Report of the National Task Force for a Special Study of

Lakshadweep Islands to Assess Vulnerability to various Hazards and Suggest Mitigation/Prevention Measures also has a separate chapter on fisheries. Revenue department of many states deal with the subject of disaster management.

**3.4 Fisheries sector state disaster management plans:** It was observed that Odisha and Tripura are the only two states

which have specific fisheries sector DMPs available on their websites. Kerala, Tamilnadu and Andhra Pradesh too had specific fisheries projects for disaster management. Through telephonic call it was revealed that Maharashtra has a Fisheries DMP in place but is not on website. In case of Puducherry a draft Fisheries SDMP is available. The above mentioned findings are elaborated in table 1.

**Table 1:** Locating the context of fisheries in different plans

Framework/Code/Policy/Plan	Context of Fisheries	
<b>International and National</b>		
1.	Sendai Framework for Disaster Risk Reduction 2016-2020 <sup>[27]</sup>	Strengthening the protection of livelihoods and productive assets, including livestock, working animals, tools and seeds
2.	National Disaster Management Plan 2016 <sup>[10]</sup>	Dissemination of warnings to all (including fishermen), down to the last mile – remote, rural or urban; Regular updates to people in areas at risk and evacuations
3.	Code of Conduct for Responsible Fisheries <sup>[8]</sup>	Important fish habitats such as wetlands, mangroves, reefs and lagoons, should be protected from destruction and pollution. Where natural disasters harm fisheries resources, countries should be prepared to take emergency conservation and management measures when necessary
4.	Draft Indian Marine Fisheries Code; Guidance on a Marine Fisheries; Management Model for India 2017 <sup>[14]</sup>	No mention of disaster is there. Hazard analysis is with reference to HACCP and hazards due to chemicals
5.	Draft National Inland Fisheries Policy <sup>[15]</sup>	A discussion on disaster in fisheries is included
6.	UN-FAO Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries <sup>[3]</sup>	Context of Food Security and Poverty Eradication part 2 has a chapter on Disaster Risks and Climate Change
7.	National Marine Fisheries Policy- 2017 <sup>[24]</sup>	Under the section Fisher Welfare, Social Security Nets & Institutional Credits section 43.0, weather events of extreme nature such as storm surges, cyclones and rogue waves will be considered as natural calamities
8.	Drought Management Manual <sup>[23]</sup>	Reference to fisheries for providing assistance to fishers by direct benefit transfer to fishers
9.	Drought Contingency Planning District Agriculture Contingency Plans <sup>[16]</sup>	Suggested contingency strategies to farmers to cope with major weather related aberrations, including delay in onset of south-west monsoon, dry spells etc. for fisheries
10.	ICAR-National Innovations for Climate Resilient Agriculture <sup>[13]</sup>	District wise agricultural contingency plan have been prepared which are exhaustive with reference to fisheries too. Included Number of fishermen, fish farmers, crafts, gears, production and contingency plans in case of a specific disaster
<b>State disaster management plans (SDMP)</b>		
11.	Odisha <sup>[25]</sup>	Fisheries is integrated
12.	Daman and Diu <sup>[9]</sup>	Fisheries is integrated
13.	Puducherry <sup>[26]</sup>	In the Risk Assessment and Disaster Management Plan fisheries is integrated
14.	Tamilnadu, Kerala and Andhra Pradesh <sup>[29]</sup>	Fisheries is mentioned as one of the priorities In the policy Note of Revenue and Disaster Management Department of Tamilnadu fisheries is integrated
15.	Gujarat, <sup>[19]</sup> Maharashtra, <sup>[21]</sup> West Bengal, <sup>[32]</sup> Karnataka and Goa <sup>[18]</sup>	Has a mention of providing warnings and evacuations
16.	Assam <sup>[6]</sup> , Bihar <sup>[7]</sup> , Manipur <sup>[22]</sup> , Sikkim <sup>[28]</sup> and Tripura <sup>[31]</sup>	Has a brief mention of fisheries in their DMPs
17.	Arunachal Pradesh, Andaman and Nicobar islands, Chandigarh, Delhi, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Lakshadweep, Meghalaya, Mizoram, Nagaland, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Punjab, and Rajasthan	Fisheires is not disussed. Fisheries needs to be incorporated
18.	Telangana, State Action plan on Climate Change <sup>[30]</sup>	In the State Action Plan on Climate Change, fisheries sector is recognized as vulnerable to climate change effects and extreme weather

		conditions Telangana also has a heat wave state action plan 2016 and in the committee fisheries department is included. However, mention of safeguarding cattle and poultry is done
19.	Lakshadweep Islands <sup>[33]</sup>	In Lakshadweep Action Plan on Climate Change, fisheries is covered under different chapters. Report of the National Task Force for a Special Study of Lakshadweep Islands to Assess Vulnerability to various Hazards and Suggest Mitigation/Prevention Measures also has a separate chapter on fisheries
<b>Fisheries sector state disaster management plans/projects</b>		
20.	Odisha, <sup>[11, 25]</sup> Tripura, <sup>[12, 31]</sup> Maharashtra, <sup>[21]</sup> Puducherry <sup>[26]</sup>	Have specific fisheries sector DMPs on their website Have a fisheries sector DMP Have a draft fisheries sector DMP
21.	Kerala, <sup>[20]</sup> Tamilnadu <sup>[29]</sup> and Andhra Pradesh <sup>[5]</sup>	Specific fisheries projects for disaster management

#### 4. Conclusion

Based on the study it is clear that many states do not have their own fisheries sector disaster management plans. In addition, there is a need to integrate fisheries in International, National, State and District Disaster Management Plans and frameworks. Within the fisheries policies, disaster management needs to be integrated like Odisha and Tripura. Within the State Disaster Management Plans, fisheries need to be integrated like Odisha, Daman and Diu and Puducherry. Community based disaster management and cluster approach initiatives also should be addressed recognizing the need of integrated and holistic approaches, including cross-sectoral collaboration. To achieve efficient coordination, the model followed by United Nations Office for the Coordination of Human Affairs (UN OCHA) which is part of the United Nations Secretariat can be adopted which is responsible for bringing together all humanitarian actors to ensure a coherent response to emergencies. It is recommended that recent technological solutions for disasters like modern communication device, internet, mobile apps need to be integrated. It is also needed to embrace new technologies like block chain for disaster management <sup>[17]</sup>. If fisheries registrations and certifications are moved to block chain, dependency on paper documents can go away. This will be very helpful post disaster management as important documents may get destroyed in the disaster. Without paper files, ownerships are not established leading to conflicts and mismanagement and even unrest in fishing communities. Digitizing the records, can be achieved in a better way with the block chain technology than just having computerized records as backups because block chain is universal record of transactions that cannot be modified. With the digital India campaign in place, this needs to be encouraged as ownership of property represented by a block chain token enables simple, error-free, and non-reputable transfer of ownership. This can be very helpful in case of disaster management as well as better fisheries governance and social good.

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