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ARTICLE COMMENTARY



A report on the impacts of cyclone Yaas over a fish landing centre vulnerable to cyclonic storms and natural hazards – Talsari, Northern Odisha

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ABSTRACT

The present work reports the actual ground conditions prevalent at a fish landing centre in Northern Odisha, namely, Talsari in the aftermath of the cyclone “Yaas”, which made a landfall on May 26th, 2021. Local surveys showed the extensive damages to the fishing and tourism infrastructures, denoting huge setbacks to the pursuance of sustainable fishing practices. The combined stress of the lockdown due to COVID-19 pandemic as well as the successive damages to livelihoods due to the cyclones Amphan and Yaas in 2020 and 2021 respectively, has increased the risk and vulnerability of Balasore to natural hazards by multiple folds. The same requires multi-agency intervention and detailed analyses of local socio-technical factors to avoid futuristic losses.

ARTICLE HISTORY

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KEYWORDS

Cyclone; Yaas; Balasore; Odisha; vulnerability

1. Introduction

The very severe cyclonic storm “Yaas” caused peak damage to two maritime states of India, namely, Odisha and West Bengal on May 26th, 2021 in a close annual succession to the cyclonic storm “Amphan” which hit these two states last year on May 20th, 2020 under very similar pandemic scenarios related to different “waves” of COVID-19 in India (Herald 2020; Raju et al. 2020; Ranjan, Sharma, and Verma 2021). “Yaas” (pronounced as “Yass”) has been named by Oman, meaning jasmine flower in English. The cyclonic storm “Yaas” was first monitored by India Meteorological Department (IMD) on May 23 when it formed a tropical disturbance followed by a severe cyclonic storm on May 24th, 2021 and a very severe cyclonic storm on May 25th, 2021 with the northwestward movement toward lands. The speed of 180 kmph had been anticipated during its landing; however, “Yaas” landed with a wind speed of 130–140 kmph in the northern Odisha coast, approximately 20 km south of Balasore on May 26th 2021, with Chandbali in Odisha expected to bear the maximum brunt of the storm (IMD Special Bulletin 2021; Roy 2021). Despite the emergence of a weakened “Yaas”, isolated and heavy rainfall with moderate storm surges were reported in South Bengal districts of Purba Medinipur, Jhargram, Paschim Medinipur, Bankura, Hooghly, Howrah, Kolkata, North and South 24 Parganas as well as coastal districts of Odisha such as Balasore, Bhadrak, Kendrapara, Jagatsinghpur etc since May 24th, 2021.

In addition, the storm surges in the sea and overland flooding of the river due to the cyclone coincided with the perigean spring tide of the full moon on May 26th which enhanced the impacts of floods over land areas. Further, selected areas in South Bengal such as Bandel, Chinsurah in Hooghly experienced Tornado along with water turbulent in the Hooghly River like the coastal sea

in Ganjam district in Odisha (Ramesh 2021; India Today report 2021). Towards the end phase, it was reported that “Yaas” moved northwest and transformed into a depression bringing heavy rainfall over Jharkhand (as shown in Figure 1).

The present cyclonic storm further impacted the citizens already struggling to cope with an unprecedented phenomenon of “vaccine hegemony” across the different states of India with different rules and regulations concerned with the management of the lockdown. Weather forecasts and alerts were provided by the IMD towards the landfall event of a very severe cyclonic between Paradeep of Odisha and Sagar Island of West Bengal. As is the regular practice, the Ocean State Forecasts (OSF) advisories were provided by the Indian National Centre for Ocean Information Services (INCOIS) to fishers on the state of the sea (ESSO-INCOIS 2018) during the landfall event on May 26th, 2021. Despite the immense usefulness of these two advisories in saving lives, the event itself had caused huge uncertainties to the livelihoods of the coastal and marine fishers heavily dependent on the sea under lockdown conditions for their survival. An example of the case of Talsari fish landing centre (FLC) in Northern Odisha is discussed below to illustrate the high risk to natural hazards as well as the ecological, economic, and social vulnerability of these FLCs in Northern Odisha.

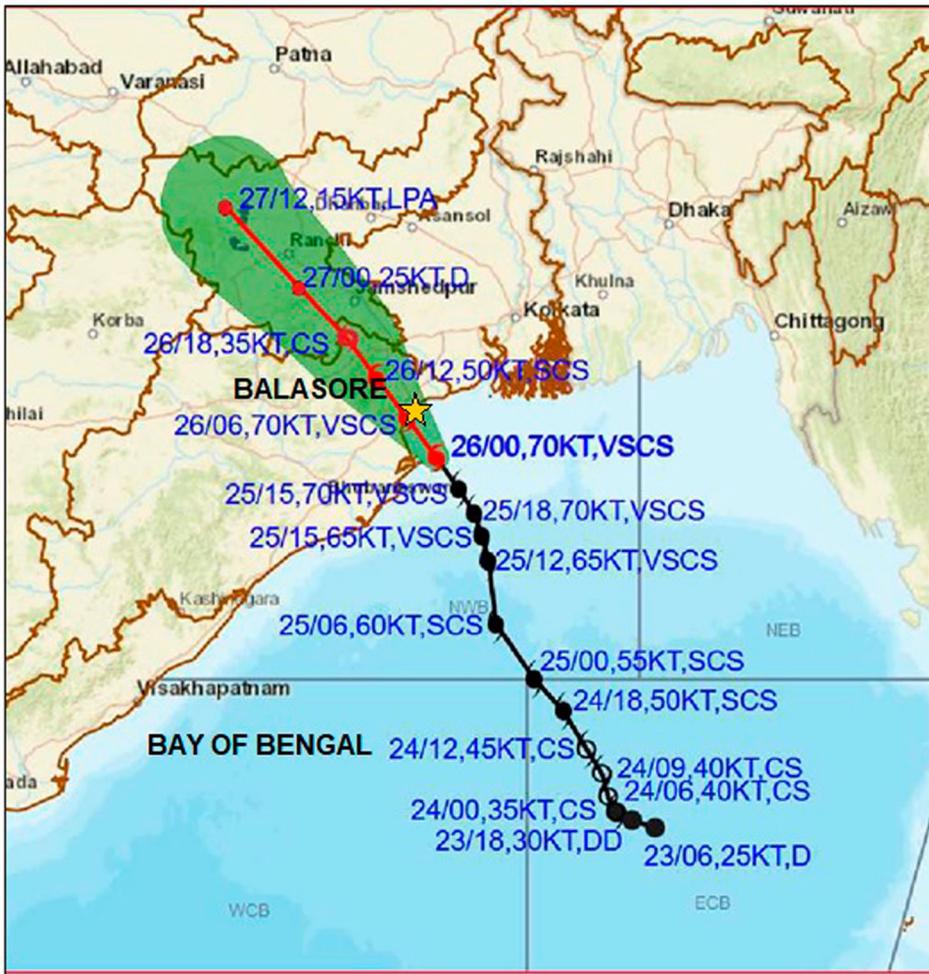


Figure 1. Track followed by very severe cyclone “Yaas” modified to show the locations of Balasore, India (source of image: IMD Special bulletin, from https://mausam.imd.gov.in/Forecast/marquee_data/20.National_Bulletin_0210526_0000UTC.pdf).

2. Vulnerability of Balasore district, Northern Odisha to multi-hazards

The northern district of Balasore (also known as “Baleshwar”) has been categorised as a vulnerable district to the effects of cyclones among the different coastal areas of Odisha (Chittibabu et al. 2004; Table 1) resulting in wide-spread flooding, cyclone-induced storm surges as well as beach ridge breaching (Barman, Chatterjee, and Paul 2016). Multiple risks attributed to natural hazards such as coastal erosion and surge inundation have been associated with the cyclone-induced vulnerability of the Balasore coast that regularly impact the tourism industry based in the district (Mukhopadhyay et al. 2016).

It has been recognised that the geomorphology of the coast, as well as the inability of the rivers and reservoirs in the district to contain excess floodwaters due to rainfall events, contribute to the high proportions of the floods in the district (Barman, Chatterjee, and Paul 2016). The shoreline change rate at Talsari is also known to be quite high (~20 m/y; Jana and Bhattacharya 2013) leading to high rates of accretion or erosion, which further contribute to an increase in the coastal vulnerability of Balasore. The high population density of the district elevates the moderate natural hazard vulnerability to the high-risk category (Barman, Chatterjee, and Paul 2016). Until recently, including the effects of the Amphan cyclone of the year 2020, there exists vast literature describing the loss of ecosystem services and economic losses accrued by the district (Raju et al. 2020). While the central and local disaster management authorities disseminate weather-related and OSF advisories consistently and regularly (ESSO-INCOIS 2018), the reception and use of these advisories remain quite low in the district.

3. Impacts on Talsari fish landing centre, North Odisha – a ground report

The impacts of “Yaas” which were experienced at the marine fish landing centre (FLC) of Talsari, located in the northern part of Balasore district, Odisha are described here. Talsari, which is 8 km away from Digha, West Bengal is an inter-tidal zone with a shoreline highly vulnerable to the landward and seaward impacts of cyclonic storms in the Bay of Bengal as described earlier (Jana and Bhattacharya 2013).

The livelihoods of the people of Talsari FLC are centred on marine fishing and while a growing tourism industry; the latter has also been perceived to contribute to the increase in coastal vulnerability attributed to anthropogenic activities in the region such as denudation of coastal plantations and dune vegetation to make way for tourist enclosures etc. (Jana and Bhattacharya 2013). Adequate information, warnings and announcements offering support by agencies such as IMD, INCOIS, National Disaster Management Agency (NDMA), Odisha State Disaster Management Authority (OSDMA) were reported to have disseminated in the wake of “Yaas” cyclone which led to minimal losses in lives. However, the local fishers incurred insurmountable damages to properties including housing, fishing infrastructure, shops, and tourist enclosures (Figure 2 shows photos of the damages incurred).

Table 1. List of severe cyclones and their impacts on Balasore district in Northern Odisha in the last decade (compiled from references cited herein).

Name	Date of occurrence	Impacts of the cyclone	References
Phailin	October 14, 2013	Flash floods affected a population of 7,50,000 in 1211 villages, loss of natural forests on 120 acres due to floods	Dash (2013)
Hudhud	October 8, 2014	Loss of agricultural productivity	Ghosh and Das (2018)
Titli	October 8, 2018	Heavy damage to power infrastructures and transformers in the district to high stellar tides, inundation of thickly populated coastal areas	Mohanty (2021)
Fani	April 26, 2019	“Damages were due to the vulnerability of the coastal district to high stellar tides, inundation of thickly populated coastal areas”	Mishra et al. (2020)
Amphan	May 20, 2020	“INR 10,59,57,000 was estimated as financial losses in marine fisheries sector”	Raju et al. (2020)
Yaas*	May 26, 2021	Heavy inundation and damage to fishing landing centres and inland flooding	Present investigation

3.1 Impacts on marine fishers

Residents who lived in “Kutchha” houses (not reinforced concrete structures), were evacuated to the Multi-purpose Cyclone Shelter (MCS), specially prepared for the management of natural disaster like a cyclone as part of the process of evacuation, helping in minimising the loss to human lives. Visual records obtained from resident fishers, Talsari indicated the total collapse of infrastructural facilities



Figure 2. Field observations from Talsari illustrating the ground-level damages incurred by marine fishers including the losses to properties and infrastructures. (a) shows the damages to a large-sized motorised craft lodged in the sand after being run ashore; (b) highlights the damages to non-motorised crafts which need extensive repairs to make them functional; (c) shows the damages to all the shops, including hotels, which supported tourist activities; (d) shows the extensive inundation and submergence of one-storeyed structures in Talsari village.

of the landing centre due to the effect of very strong storm surges and rainfall, submerging the landing centre underwater completely for a couple of days. The fishing boats moored to the shore were awash along with other onboard and on-shore fishing equipment, compounding the economic losses to fishers to the tune of several tens of lakhs of Indian rupees (for reference: 1 USD = 74.49 INR). Temporary shop structures which supported the tourist activities also were seen to have collapsed completely.

Observations by the marine fishers at a ground-level, showed extensive damages to 90% of the one-storied buildings as well as submergence in seawater, while the 1st floors of some multi-storied buildings were also inundated. However, during the ground survey, local fishers mentioned the non-availability of adequate assistance to recoup their economic and material losses even after one week of the disaster. Support associated with ration, food, medical facilities etc. were still awaited, forcing the fishers to buy essential commodities like rice, mustard oil etc. by paying extra money above maximum retail prices (MRP) in distant towns, under the additional duress of collapsed demand-supply chain affected by lockdown. Under the circumstances, these local-scale factors are bound to affect the return to normal fishing activities.

The tourism and commercial establishments also were completely destroyed due to the effect of the extreme wind and inundation attributed to the storm surge associated with Yaas. Therefore, the cumulative vulnerability of the local environment increased due to the primary losses to properties and livelihoods due to the absence of local markets, and loss of local travel options, as well as secondary losses due to the absence of tourism. Moreover, the emergence of second wave of Covid-19 and lockdown imposed by the state government lead to the decrease in the overall quality of fishers suffering from the availability of daily essentials at reasonable prices.

3.2 Estimation of losses incurred as fishers' perceptions

The cyclone impacted the lives of the fishers in the following ways:

- (1). Loss to fishing crafts and gears (high impact)
- (2). Loss to properties including shops and local markets (moderate to high impact)
- (3). Loss of access to area of distribution/usage of public goods such as ration shops, schools, health care facilities etc. (low to moderate impact)
- (4). Loss of local travel options on land and into the sea along with the loss of active working days (low to moderate impact)

The scales at which the local environment impacted is illustrated in [Figure 3](#). Based on the qualitative analyses of the cumulative damage incurred to the local environment from local survey, the damages incurred were low, moderate or high, which acutely impacted the resource usages as well as the quality of lives of the fishers for the period of 30 days from the time of peak damage incurred.

[Table 2](#) provides a quantification of the total losses estimated by the fishers from their own practical experiences of recovery from past cyclonic damages to properties and livelihoods. The cumulative losses as quantified from the fishers' descriptions of the losses incurred by them is provided in Equation (1) below:

$$\text{Total impacts } (I) = L_B + L_G + L_H + L_S \quad (1)$$

where L_B : lost of fishing boats/crafts; L_G : lost of fishing gears; L_H : lost of houses and living shelters; L_S : lost of commercial establishments including local markets and shops.

It has emerged from the present survey that losses to the tune of One crore and ninety lakhs in Indian Rupees could be incurred due to the impacts of "Yaas" in Talsari FLC as per the fishers' estimates of their losses. However, the official survey of the losses by the government sources is awaited. The cyclone advisory for "Yaas" was being disseminated to the villagers associated with Talsari FLC in

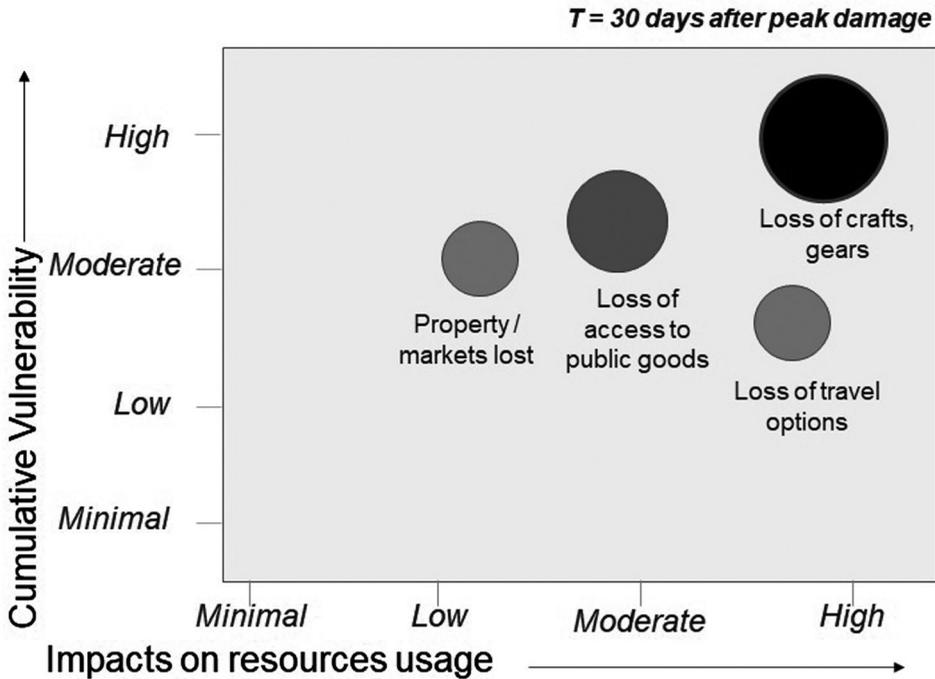


Figure 3. Impacts of the cyclone “Yaas” on the local fishers of Talsari fish landing centre, Odisha in the time frame of about 30 days post the peak damage incurred to the local environment.

Table 2. Detail impacts of cyclone “Yaas” in Talsari Fish Landing Centre (costs are in INR; One USD = 74.49 INR).

Impacts on various assets	Fishing boats lost		Fishing nets/ gears lost	Houses (kutcha) lost	Shops lost
	Absolute demolish	Partial damage			
Total number of lost (L)	10	40	20	10	100
Price per unit to buy/repair (P)	1,000,000	50,000	200,000	100,000	20,000
Total cost (C = L × P)	10,000,000	2,000,000	4,000,000	1,000,000	200,000
Total economic loss (∑ C)	19,000,000 (One crore and ninety lakhs)				

three days advance through public broadcast using mobile vans. Further, residents of the “Kutcha” houses were also evacuated to the MCS at Talsari. Both these factors helped to avert the loss of lives, despite severe damage to the fishing boats, nets, gears etc.

4. Conclusions

The present report on the immediate impacts of a cyclone highlights the implications for enhancing developmental benefits in the Northern Odisha not only from a socio-economic perspective but, also to transition towards sustainable fishing practices in both short- and long-terms. While the immediate focus of the marine fishers devastated by the combined effects of pandemic and cyclonic storms, can expectedly be centred on improving the local economy and enhancing the value chain for the marine commodities, more often, this would lead to short-term compromises on achieving sustainable yields, with multiplicative effects over the years. Hence, for such communities to overcome challenges from successive years of pandemics and cyclones, the need is to identify the actual socio-technical constraints which can be addressed in order to assist the marine fishing community to transition and adapt to sustainable fishing practices even over long-terms.

In order to restart the local economy, it has been observed that the following factors of concern need to be addressed immediately:

- (1) Strengthening the MCSs, which have proven to be pivotal infrastructures being implemented with the help of local participation, with the necessary infrastructure (e.g. a community refrigerator/storage containers) to store essential commodities for extended periods. This will facilitate faster recovery of the local population and quickly reduce vulnerability to deterioration in the socio-economic conditions.
- (2) Provision of a minimal monetary assistance to provide for quick repair and purchase of important fishing assets.
- (3) Appointment of a local liaising representative to facilitate the exchange of reliable information on the ground-level with higher officers in the state and central disaster management cell, fisheries departments and rural development ministries.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

Authors' contributions

- Sudip Kumar Kundu – ground data, information and photographs collection, compilation of the data from secondary sources, survey of literature, drafted the paper
- Harini Santhanam – manuscript writing, creation of figures and tables, finalising the draft, communication

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