

Getting Climate Smart for Disasters in Coastal Regions

EMERGING POLICY BRIEF

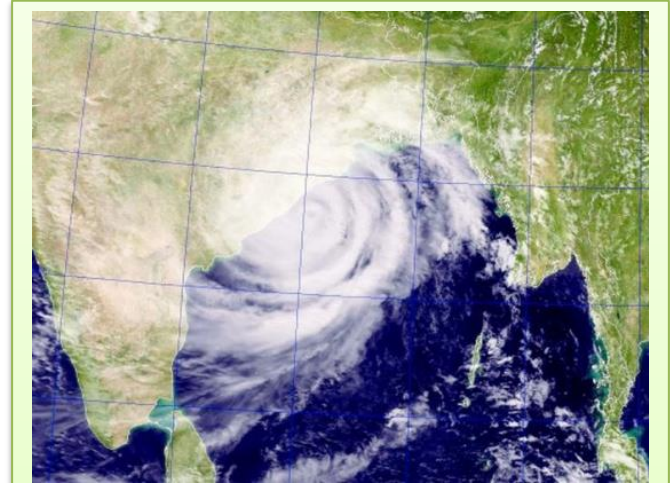
Based on Workshop and Round Table Organised on Dec 10, 2013, New Delhi

Background

Long term linear trend (1891-2013) in frequency of tropical cyclones over the North Indian Ocean as a whole, the Bay of Bengal and the Arabian Sea for different seasons, generally, show a significant decreasing trend. However, an increasing trend is observed in the frequency of tropical cyclones forming over the Bay of Bengal in the months of May and November, the principal cyclone months¹.

Keeping Phailin as an event that happened recently in the background, the role of India Meteorological Department in cyclone warning has been widely appreciated as it now has the scientific and technical capacities to track cyclones to a high degree of precision and can advise the state governments continually from at least 7 day prior till their land fall. This early warnings helped the government to evacuate affected population *enmasse* in time before Phailin land fall in Odisha. The evacuation was done by the RAF of the NDMA, and the Indian Army. IMD has now access to state of the art observation and modelling systems in partnership with various developed countries like USA and France that will enable it to continue to make more precise forecasting for all other future cyclonic events. However, damages to housing, agriculture, communication systems, electrical infrastructure and roads has occurred (see Box) and will continue to occur in development is *business as usual*.

Future projections based on theory and high-resolution dynamical models consistently indicate that greenhouse warming will cause the globally averaged intensity of tropical cyclones to shift towards stronger storms, with intensity increases of 2–11% by 2100². Existing modelling studies also consistently project decreases in the globally averaged frequency of tropical cyclones, by 6–34%. Higher resolution modelling studies typically project substantial increases in the frequency of the most intense cyclones, and increases of the order of 20% in the precipitation rate within 100 km of the storm centre².



Cyclone Phailin

In October 2013, a very severe cyclone Phailin with a wind speed of 210-220 km/hr struck the coast of Odisha. Phailin triggered India's biggest evacuation operations in Odisha in 23 years evacuating 1.15 million people. Post Phailin assessment indicates that about 12 million people in 18,117 villages and 43 ULBs were affected in Odisha. Crop area affected was 0.7 million ha, and about 200,000 rural houses were partially or fully damaged. Communication was disrupted. Roads and power infrastructure was damaged. Immediate relief included shifting to cyclone shelters, food, medicines, emergency shelter material (tarpaulin for fixing roofs) and access to clean drinking water.

Source: IMD Report on Phailin. Oct 2013. Brought out by Cyclone Warning Division, IMD, MoESc, Gol,

¹ Niyas, Srivastava and Hetwar, Variability and trends of cyclones in the North Indian Ocean, Met. Monograph No. Cyclone Warning - 3/2009

² Thomas R. Knutson¹, John L. McBride, Johnny Chan, Kerry Emanuel, Greg Holland, Chris Landsea, Isaac Held, James P. Kossin, A. K. Srivastava & Masato Sugi. *Nature Geoscience*, 3, 157 - 163 (2010). Published online: 21 February 2010 | doi:10.1038/ngeo779

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Policy Brief

Considering the intensity of cyclones is likely to increase in the future, damages are likely to get exacerbated. These can be avoided if appropriate steps are taken to update the developmental plans of the various sectors of the economy of the region to accommodate cyclone preparedness in the context of the changing nature of the climate.

ICSD in collaboration with AIDMI and IDS organised a one day workshop on “**Getting Climate Smart for Disasters in Coastal Regions**”, on **10th Dec 2013**, in New Delhi under the aegis of the project they are doing on, supported by START-CDKN, to explore the opportunities for integrating the changing nature climate in development in coastal region susceptible to cyclones. **The workshop had representation from the highest policy and research such NDMA, MoEF, NIDM, MoES, DST, Delhi government, and IMD. In addition the bi-lateral institutions such as GIZ, SDC, IDRC along with prominent national and local NGOs such as TERI and SWAD, and Consulting companies participated in the event.**

In order to understand the opportunities of integration, the following key questions were explored:

- Q1. How can cyclone disaster risk mitigation in a climate change context be integrated in planning?*
- Q2. What can be the steps towards ensuring food security in cyclone prone coastal areas?*
- Q3. How are the choices to be made for long term sustainable adaptation and risk reduction?*

Q1. How can disaster risk mitigation in a climate change context be integrated in planning?

India prepared its National Action Plan on Climate Change in 2008, with eight missions focussing on adaptation to and mitigation of climate change. Subsequently all states and union territories are preparing their respective plans. The responsibility of preparing this at the centre lies with the MoEF, but disaster management is the responsibility of the National Disaster Management Authority. Strategies planned within the SAPCC’s need to be either reviewed by the respective State Disaster Management Authorities or the SDMA needs to be part of the different working groups that have been formed to design the adaptation strategies for different sectors. In many of the states this is not the case. Despite this gap, there exists multiple opportunities through which this integration can be done. The discussions during round table session in the workshop lead to the emergence of the following avenues through which disaster risk mitigation in a climate change context can be integrated into planning.

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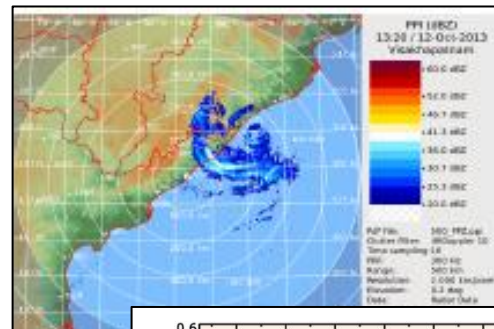
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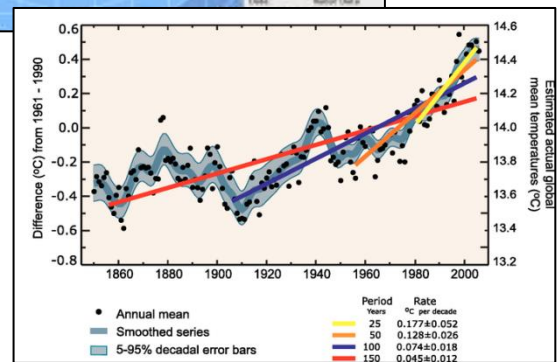
i. **Within the cyclone guidelines issued by the NDMA:** Cyclone guideline is the basis of development of the district disaster management plans for cyclones. The cyclone guidelines constitute of putting in place the Early Warning Systems, Communication and dissemination of Warning, Structural Mitigation Measures, Management of Coastal Zones, Awareness Generation, Disaster Risk Management and Capacity Development, and Response. The entire Response and Mitigation guidance is based on the observed trend of the cyclones in the last 100 years and associated risks and there is no inclusion of projected climate risks, the nature of which is likely to be different from what has happened in the last 100 years. Therefore modelled projections need to be considered for risk assessment and sectoral planning.

ii. **Through Dissemination of easily understood and appropriately simplified communications on long term observed climate trends (1891 to present³) and climate projections (upto next 100 years), to state level departments, district level departments, BDOs, ULBs, Banks (e.g. NABARD), insurance companies** for them to plan their activities and investments accordingly. The information can be made available through

- **An interactive web portal⁴** of the Ministry of Earth Sciences, where
 - One or two pagers may be uploaded giving the summary of the current climate trends and future projections at national, state, district level.
 - Data extraction facilities along with visualisation mechanisms may be provided to extract data for further research
 - Analysis of recurrence of cyclones that are severe over next 100 yr period
 - Area to be inundated. Depth of inundation, Intensity of rain fall etc., Wind speeds expected, Cyclone paths
 - This can be combined with advisory on climate resilient housing and region wise agriculture etc.
- **Easy to decipher Communication for village level planning-** it is important that such information gets integrated but level of climate projection information has to be appropriately simplified
- **Launch of a weather channel** to reach out to all on near and medium range forecasting.
- **Training on extraction of climate data and GIS display** for district and state level officials from each department enabling them to extract the data directly from the portal.



Source: IMD Report on Phailin, 2013



Global Temperature trend, IPCC, AR4

iii. **Through the Planning Commissions Environmental Performance Index (PC-EPI⁵) for each state:** The strategy for a sustainable economic development in our country has been to realise an effective and balanced utilization of the country's resources. Considering the influence of natural resources depletion and unabated pollution on many sectors of the economy, an environmental

³ E-Atlas's are produced by IMD for hydrometeorological disasters, e.g for cyclones.

⁴ A web site already exists giving information on cyclones. It is not interactive and does not contain ready to use information for various uses in sectoral planning

⁵ Chandrashekhar et al, 2013. Construction of Environmental performance index and ranking of states

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performance index (EPI) was evolved to recognize the efforts made by the states to arrest degradation of the environment. EPI scores of a state is a criteria for devolving Central funds to states. The EPI criteria's includes Air pollution, Forests, Water Policy, Waste management, and Climate change. The climate change criteria include indicators such as SAPCC preparation, RE growth rate including mini hydro, and Electricity intensity of SGDP. In order to develop resilient natural resources with reducing disaster risks, the Climate change criteria can also include Climate Smart Disaster Preparedness which can be met if a state also prepares climate resilient state and district disaster management plans.

- iv. **Allocate central funds on Climate Smart Disaster Readiness:** It will provision for budgets as a part of the state 5 year plan budgets, focussing on climate smart disaster resilient housing, infrastructure, water resources, agriculture, and forest produce etc. The budgets need to have prioritised activities ensuring long term well being of communities and the ecosystems prone to hydro-meteorological disasters. This is in addition to the National and State Disaster Response Funds (NDRF, SDRF), that are meant to be provided for relief after disasters towards search and rescue operation, temporary accommodation, food, clothing, medical care, air dropping of essentials, emergency supply of drinking water, Clearance of affected areas, assistance to small and marginal farmers for loss of land due to silting, landslides, changes of course of rivers etc., Input subsidy fir agriculture, supply of milch cows, draught animals, equipment for fishermen including boats, canoe, net etc., handicrafts- damaged tools and loss of raw material; Housing and Infrastructure.
- v. **Include CC risk assessment as a part of all Environment Impact Assessments (EIAs).** Environmental Impact Assessment (EIA) is an important management tool for ensuring optimal use of natural resources for sustainable development. The ministry of Environment and Forests may need to revisit it guidelines on EIA to integrate climate risks as well that lead to disasters for investments.
- vi. **Use CSR funds for climate readiness in corporate investments:** Companies with net profit of Rs 5 crore (\$1 million) or more during the past three financial years must spend at least 2 percent of their average net profits from the three preceding years on Corporate Social Responsibility initiatives. It has been legally mandated by the Ministry of Corporate Affairs. This fund can be tapped by the companies to ensure disaster risk readiness in its own investments in areas that are at risk to cyclones or any other disasters hence avoiding future disasters. This will ensure environmental sustainability as well as sustainability of the population in and around the facilities.
- vii. **Creation of community based micro insurance mechanisms for disaster risk management-** which are over and above the Modified National Agricultural Insurance. Weather indexed micro insurance facilities will enable easy clearance of claims for agriculture, loss in livelihood such as fisheries, weaving, etc. Community weather stations may need to be planned, as micro climates differ from place to place.
- viii. **People first-** A campaign to provide training to communities for mobilising themselves to help each other to reduce morbidity,



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mortality and loss of assets in times of impending disasters. Regular practice of community drills for evacuation need to be in place. A policy on this line can be instituted by the NDMA for the SDMAs and DDMAAs to follow, with development of a guideline on the same.

Q2. What can be the steps towards ensuring food security in cyclone prone coastal areas?

The frequency of cyclones are more in the Bay of Bengal than in the Arabian Sea, the ratio being 4:1. The monthly frequency of tropical cyclones in the north Indian Ocean displays a bi-modal characteristic with a primary peak in November and secondary peak in May (see figure along side). The months of May-June and October-November are known to produce cyclones of severe intensity. Tropical cyclones developing during the monsoon months (July to September) are generally not so intense. However, this year cyclones have come in the month of December as well.

In this scenario the field crops during the Kharif season are vulnerable and get damaged at the mature stage due to cyclones hitting in October/November, and ensuing heavy rain fall in the higher reaches, flooding and ingress of salt water are also causes of damage. **Desired production levels can be achieved if crop varieties are planted that mature earlier and hence can be harvested earlier.** For this **short duration varieties** need to be introduced, that fit into the period of June to September. **OR flood tolerant varieties** can be used in flood prone areas which do not get salt water ingress during the cyclone.

Given the fact that the cyclone are likely to be less frequent but more intense, the most viable window for agriculture available for the coastal zone then becomes the dry season. **The full productivity potential of the dry season/Rabi season can be harnessed by augmenting water resources for irrigation** (enabling ground water recharge and having more surface structures for storing water), and by **introducing varieties that are salt tolerant**, as salt concentration in the soil during dry season is more in coastal areas that are flooded.

In Jagatsighpur district, a coastal district in Odisha, salt tolerant varieties were introduced and this practice spread rapidly there-10 times more than when it started. Similarly, in the aftermath of Aila, Central Soil Salinity Research Inst distributed salt tolerant rice varieties to farmers in Canning which have worked very well.

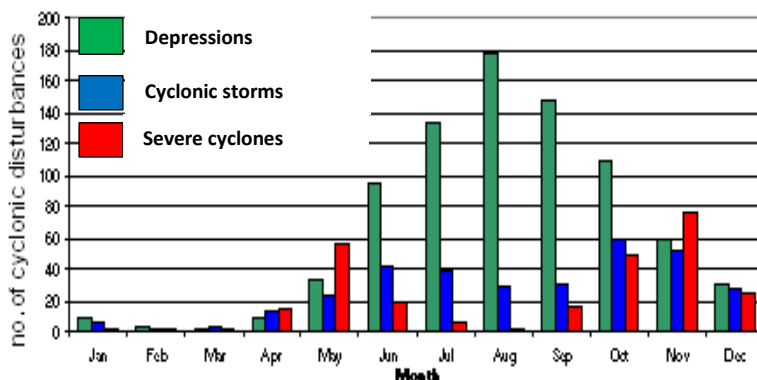


Figure: The frequencies of Cyclonic systems over north Indian Ocean during 1891-2006. Source: IMD web site



Damaged Rice Crop in Ganjam district, Odisha due to Cyclone Phailin

Q3. How are the choices to be made for long term sustainable adaptation?

Some of the participants including ICSD who visited Ganjam district, immediately after cyclone Phailin, found that the vulnerable population in the district are demanding for to five adaptation

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services (i) restoration of damaged dwellings, (ii) compensation for loss of livelihood, (iii) compensation for crop loss and (iv) avoidance of threat to food security.

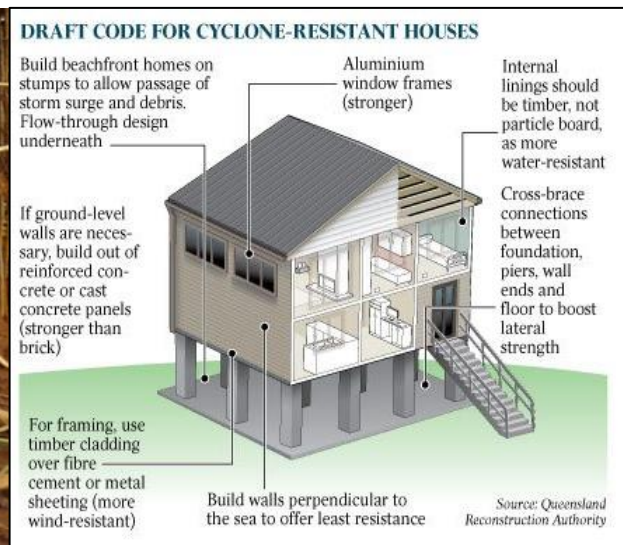
Relief given in the aftermath of Phailin is in the form of (i) Polythene sheets distributed by district administration, and later compensation for rebuilding kuttcha houses, (ii) Food distribution, (iii) Essential kits, (iv) Short-term income/ livelihood compensation, (v) Crop damage compensation given for debris clearance and input subsidy when crop damage is 50% and above etc. These are very short term remedies, and have to be done year after year whenever a severe cyclone strikes the area.

Therefore the round table concluded that there is a need for prioritization of the support to be provided by the government that leads to long term sustainability of the systems. For example, a Kuttcha house rebuilding cost is Rs 17,600⁶-. Building it at the same price every three years when it gets damaged will cost Rs 2,93,33/- at the end of next 50 years. However, an amount of Rs.70,000/- invested for building pucca house will last atleast for next 30 yrs and building two such houses in the span of 50 years will cost Rs 1,40,000/-, which is 2.1 times less than constructing kuttcha houses again and again.

Therefore it was felt that a **cost benefit analysis of various adaptation services in the short and long term, needs to be carried out to prioritise adaptation services and hence allocate funds in consecutive 5 year plans for long term adaptation** causing the exchequer to incur less costs in comparison to its spending on recurrent low hanging fruits.



Damaged Kuttcha House in Ganjam District after Cyclone Phailin



⁶ State Disaster Response Fund and National Disaster Response Funds- Norms laid out by the NDMA, 2013