

Flood in Desert

-Dr. Sweta Baidya

With the increasing worldwide climate change, the overall frequency and intensity of all types of disasters have increased. Cyclone is no different and follows the trend. But the important development is that the frequency and intensity of cyclone has increased in West Coast and it is being observed that now it is at par with the East Coast of India. Earlier, even a decade back, the west coast was not much familiar with severe cyclone incidences. But at present the entire west coast has enlisted itself in the vulnerability list of cyclone impacts. And it was once again proved during the last cyclone, Biparjoy.

S/N	West	Name of Cyclone	Year	East	Name of Cyclone	Year	West Coast		East Coast	
1	Arabian Sea	Biparjoy	2023	Bay of Bengal	Mocha	2023	2023	1	2023	1
2		Gulab/Shaheen	2021		Sitrang	2022	2021	3	2022	2
3		Tauktae	2021		Asani	2022	2020	1	2021	1
4		Yaas	2021		Jawad	2021	2019	4	2020	4
5		Nisarga	2020		Burevi	2020			2019	2
6		Vayu	2019		Nivar	2020				
7		Hikka	2019		Nisarga	2020				
8		Kyarr	2019		Amphan	2020				
9		Maha	2019		Fani	2019				
10						Bulbul	2019	Total	9	

Among the above-mentioned cyclones, only the Hikka and Kyarr didn't make landfall.

Now certainly the question comes about the reason behind this sudden increase in the frequency of cyclones on the west coast. The reason is understood to be likely an increase in Sea Surface Temperature (SST) in the Arabian Sea ranging between ~1.2-1.4 °C from 1982 to 2018 as the study by IITM suggests.

Important Highlights of Cyclone Biparjoy:

This was one of the longest-living cyclones ever recorded in the Arabian Sea. Biparjoy brewed in the sea for 9 days. The entire system was ~ 300 km wide, with the eye of the storm alone spread across a 50 km diameter.



A view of the 'very severe' Cyclone Biparjoy in the Arabian Sea from the International Space Station. | Photo Credit: Twitter/@Astro_Alneyadi

Biparjoy brought with it storm surges 2-3m high and winds that gusted up to 140 kmph. Gusty wind over 115-120 kmph at Gujarat and 55-65 kmph in Rajasthan was experienced. This was also accompanied by heavy rainfall-induced floods in Jalore, Sirohi & Barmer district of Rajasthan. The highest rainfall recorded in Barmer, (Rajasthan) was (in 2006) 549 mm in 10 days duration. During cyclone Biparjoy, it was 1056 mm in 8 hours. This brings disastrous flood situations in the Jalore, Sirohi and Barmer districts of Rajasthan.

The state of Gujarat and Rajasthan were maximum impacted by Cyclone Biparjoy. Normally both these states have a patchy track record of Cyclones. Average rainfall in Gujarat is ~30 mm (annually), but during the cyclone, it was 12 mm in 24 hours. In Gujrat, several districts were impacted by heavy rainfall and they have already received half of their annual average rainfall, Saurashtra & Kutch (94% excess) Narmada (80%) Devbhoomi Dwarka (67%) Chhota Udepur (59%), Porbandar (58%), Valsad (57%), Surat and Navsrai (52% each and Junagadh (51%). Water logging was witnessed in several areas of Bhuj as well. Therefore, apart from the direct impacts of cyclones like the uprooting of 800 trees, 958 feeders, 1255 electric poles and 40 TC (Current Transformers), power outage in 4600 villages in Gujarat and >1000 villages in Rajasthan etc., the cyclone-induced flood has become the main concern.



Cyclone-induced rainfall impacted districts of Gujarat and Rajasthan



Cyclone Biparjoy induced flood in Gujarat | Photo: AP/ Ajit Solanki

Threat to business Continuity:

Not only the cyclone-induced flood but, the cyclone has brought in other serious indirect impacts on business continuity. Central Government has taken up various impactful schemes to strengthen the businesses of India, like, Rashtriya Krishi Vikash Yojana, ASPIRE, MUDRA Bank, Multiplier Grant Scheme, Support for International Patent Protection in Electronics & Information Technology, Credit Guarantee Scheme for Startups, Startup India and many more. But Cyclones like Biparjoy are posing a serious threat to all such initiatives.

This untimely cyclone-induced rain has caused a heavy loss in salt production as this is the peak time of salt production and especially the salt-producing areas were impacted by the cyclone. Earlier, cyclone Tauktae caused a loss of 30 lakh tonnes of salt in Gujarat.

Cyclone Biparjoy also forced the seaport and airport closures. Flight operations were suspended in Jamnagar and Mumbai airports. Activities were stopped at Jakhau, Kandla, Mundra and Pipavav seaports during Biparjoy. These port closures have incurred huge economic losses and in future also, similar losses are expected unless we have proper preparedness. In Gujarat itself, 100 trains were cancelled and 39 were short-terminated, which has caused inconvenience to the need of thousands of people. Due to the blockage of roads, the entire supply chain was disrupted.



Blocked road at Naliya near Jakhau in Gujarat on June 16, 2023, in the aftermath of Cyclone Biparjoy's landfall. | Photo Credit: Vijay Soneji and AP/Ajit Solanki

The power outage in the entire cyclone-affected area has forced many industries to remain shut for a few days, which also has caused huge production losses to the local industries. Only the adoption of appropriate mitigation measures can ensure business continuity in future.

Incidences and commendable initiatives taken by Government:

S/N	Incidences	Nos.
1.	People injured	47
2.	Animal fatalities	234
3.	Homes in eight coastal districts suffered full or partial damage	700
4.	Boats brought ashore	21,585
5.	Fisherman returned	1 lakh
6.	People shifted	1.08 L
7.	Trees pruned	3.28 L
8.	Restoration teams	1,433
9.	Hoardings brought down	4,317
10.	Pregnant ladies shifted safely	1206
11.	Safe birth of babies during cyclone	707

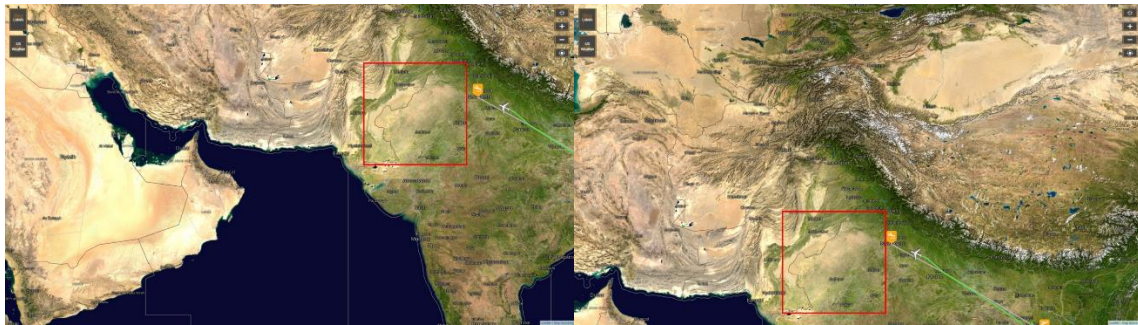
Recommendations:

1. Mitigation measures and better preparedness for the cyclone-induced floods in Gujarat and Rajasthan need to be ensured as the people and houses of Rajasthan and Gujarat are not well equipped to withstand 20 times more rainfall than normal, as it happened during cyclone Biparjoy.
2. The creation of more drainage networks or reviving the old drainage network and proper maintenance can solve the water inundation problem. Especially in urban areas, where frequent urban flood has become the new normal.
3. New Building codes for Rajasthan and Gujarat may also be required for mitigating the impacts on the houses.

4. Business continuity has to be ensured for upcoming disasters to maintain sustainability for all types of businesses.
5. Ports, which are at the seafront, should have proper Cyclone Management Protocols and SOPs to reduce infrastructure loss.
6. Govt. of Gujarat enabled Mobile Service portability during Biparjoy. This practice can be continued for any other such disasters throughout the country.

Future Forest?

What if in future the Rajasthan becomes a favourite tourist destination for forest lovers? Yes, you have read it right 'Forest'! Rajasthan at present is known for the Thar Desert and its marvellous forts and palaces. But this was not the case in the distant past. Research has proved that 55 million years ago Rajasthan had a vast network of rivers covered by tropical forests (Mathur et al. 2018). A set of rare wood boring trace fossils were found in the Barmer region of Rajasthan. There is a fossil park in the Jaisalmer District of Rajasthan named Akal Wood Fossil Park, where the fossils of dinosaurs were found. Not only dinosaurs but trees like Chir, Deodar and Redwoods also existed in this park, 180 million years ago. Therefore, if climate change brings us such frequent heavy rainfall in Rajasthan and Gujarat areas (As was seen during cyclone Biparjoy), then maybe in future, lush green tropical forests will develop once again in these areas. Because a warm and humid climate is ideal for growing forests.



The Thar Desert is much greener than other surrounding deserts