Impacts of Extreme Weather Events on Bangladesh Economy

Sharmind Neelormi

Associate Professor, Department of Economics
Jahangirnagar University

neelormi1@yahoo.com

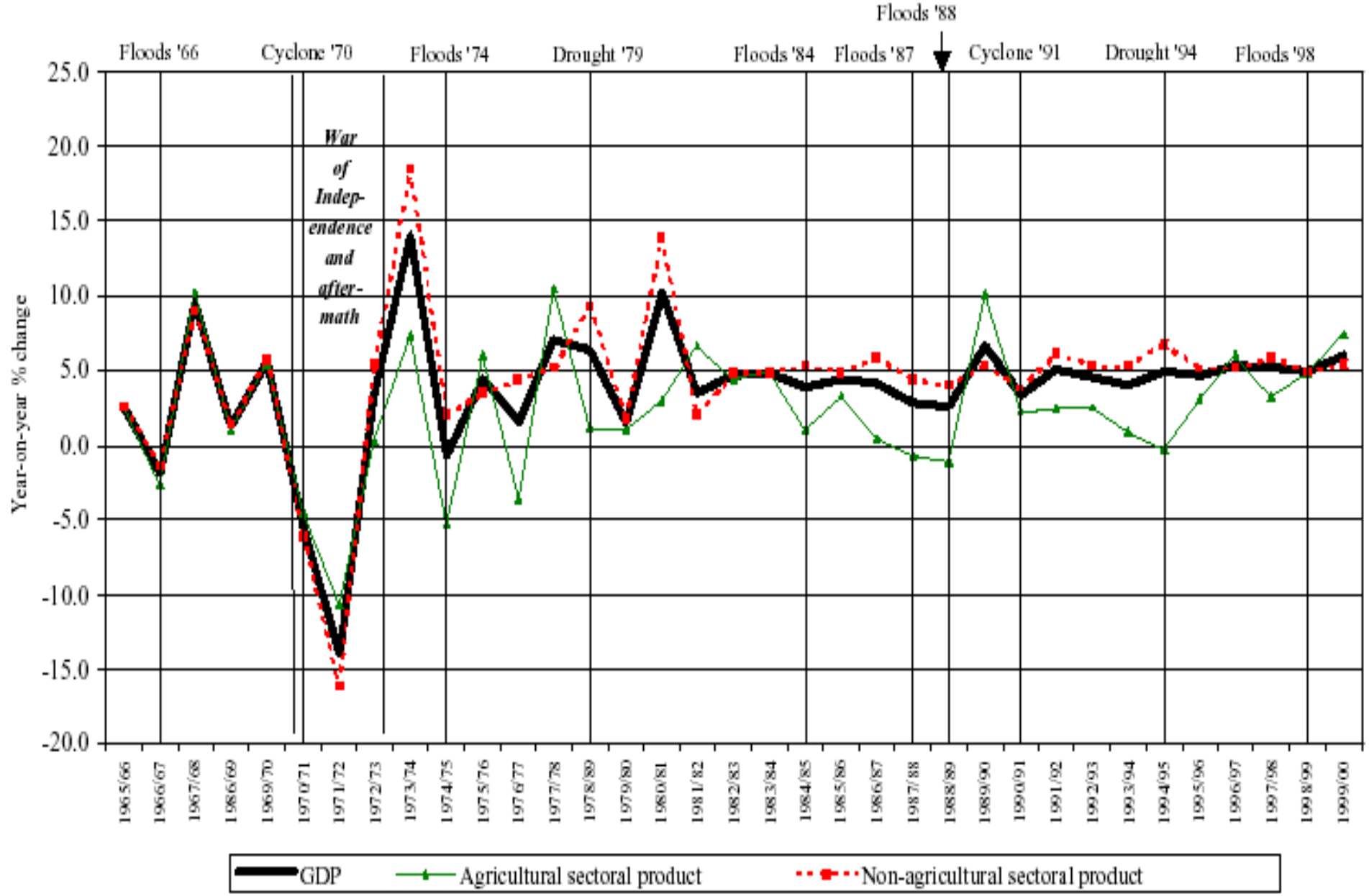

Figure : Relationship between disasters, and sectoral and national GDP

Source: Benson and Clay (2004)

- **Results show that the *real GDP of Bangladesh has increased over the years*, showing that the economy has expanded and grown with time.**

- **Of the 4 major climatic events in the recent history of Bangladesh (after independence), *the flood of 1988 and the cyclone of 1991 are observed to have impacted the country's real GDP negatively, causing a significant structural (level) change.***
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- **The level of GDP have understandably been reduced following the occurrence of these devastating natural calamities.**

- **flood of 1998, although is seen to have impacted the GDP negatively has reportedly *not rested a statistically significant impact* to cause a structural change in the level of the series.**

Source: ***TA-8084 BAN – Supporting Implementation of the Bangladesh Climate Change Strategy and Action Plan (Subproject 2) – 1 (42478-023)***

Year wise Original & Revised and Expenditure of Annual Development Programme (ADP)

(Taka in crore)

Fiscal Year	Total Budget	ADP Allocation	Expenditure	Expenditure as % of original allocation
		Revised	Total	Total
1976 – 77	1,989.87	1005.71	999.00	81.75
1977 – 78	2,184	1202.94	1117.00	87.37
1978 – 79	2,499	1602.62	1483.00	***113.29***
1979 – 80	3,317	2329.97	2028.00	***97.97***
1980 – 81	4,108	2369.00	2364.00	87.56
1981 – 82	4,677	2715.25	2391.00	79.30
1982 – 83	4,738	3126.26	2687.00	99.52
1983 – 84	5,896	3584.75	3006.02	86.24
1984 – 85	6,699	3498.42	3498.42	89.80
1985 – 86	7,138	4095.54	4095.58	**107.05**
1986 – 87	8,504	4512.49	4439.08	93.18
1987 – 88	8,527	4650.59	4149.93	82.24
1988 – 89	10,565	4595.34	4595.34	**55.27**
1989 – 90	12,703	5102.76	5716.79	98.51
1990 – 91	12,960	6121.00	5269.88	***92.98***
1991 – 92	15,584	7150.00	6023.97	***80.32***
1992 – 93	17,607	8121.00	6550.32	***75.73***
1993 – 94	19,607	9600.00	8983.50	92.14
1994 – 95	20,948	11150.00	10302.96	93.66
1997 – 98	27,786	12200.00	11037.00	86.23
1998 – 99	29,537	14000.00	12508.86	***91.98***
1999 – 00	34,252	16500.00	15470.42	***99.81***
2000 – 01	38,524	18200.00	16151.00	92.29
2001 – 02	42,306	16000.00	14090.17	74.16
2005 - 06	61,058	21500.00	19473.41	79.48
2006 – 07	69,740	21600.00	17206.29	66.18
2007 - 08	87,137	22500.00	18419.03	69.51

Source : IMED, ERD & Planning Commission

- ***following an extreme weather event, the ADP actual expenditure goes up.***

- **From the time series data on ADP allocation and expenditure indicate that during or *following an extreme weather event, the ADP actual expenditure goes up.***

- **It is largely because of the fact that to maintain the damaged physical infrastructure (*maintaining status co*) during EWE, significant amount of investment is needed.**

- **A *1% increase in ADP is expected to lead to an 0.6% increase in GDP* in the case of Bangladesh economy (*TA-8084 BAN – Supporting Implementation of the Bangladesh Climate Change Strategy and Action Plan (Subproject 2) – 1 (42478-023*)**

- **GOB has to *divert its development money in rehabilitation and rebuilding.* If it is not required, the *opportunity cost* of this development money required additionally in subsequent years of the EWE may lead to much higher GDP growth, as the elasticity explains.**

GOB has to divert its development money in rehabilitation and rebuilding.

According to Huq,E. (2009), a rough estimate suggests that *additional 10-30% fund of ADP expenditure might be needed to retain the current level of benefits* of the projects from ADP.

If such additional cost needs to be incurred in ADP expenditure to maintain the "status co" and safeguard of the project, then the *lower end estimation indicates that to retain the benefits from already spent money in ADP projects 0.3% GDP would be lost while the estimation for higher end suggest 0.9% of GDP loss* *(TA-8084 BAN – Supporting Implementation of the Bangladesh Climate Change Strategy and Action Plan (Subproject 2) – 1 (42478-023)*

Case Study (Infrastructure related Resilience Initiative)

CALIP Project, LGED [Grant financing of US$15 million from IFAD on top of HILIP Project]

Re-excavation of choked Khal and Construction of 26+ earthen platforms/fields in Haor areas.
Dual purposes: Enhance drainage capacity of khals, and allow farmers to place harvest during flash floods.
The first proto-type was tested in 2015, which enabled the farmers to harvest over 30,000 maunds of coarse rice during the devastating 2016 flash flood.
The flash flood mauled 80~85% of potential harvest in the Haor region, however the farmers in the vicinity of the newly constructed field/platform did not lose their potential harvest despite the flash flood.

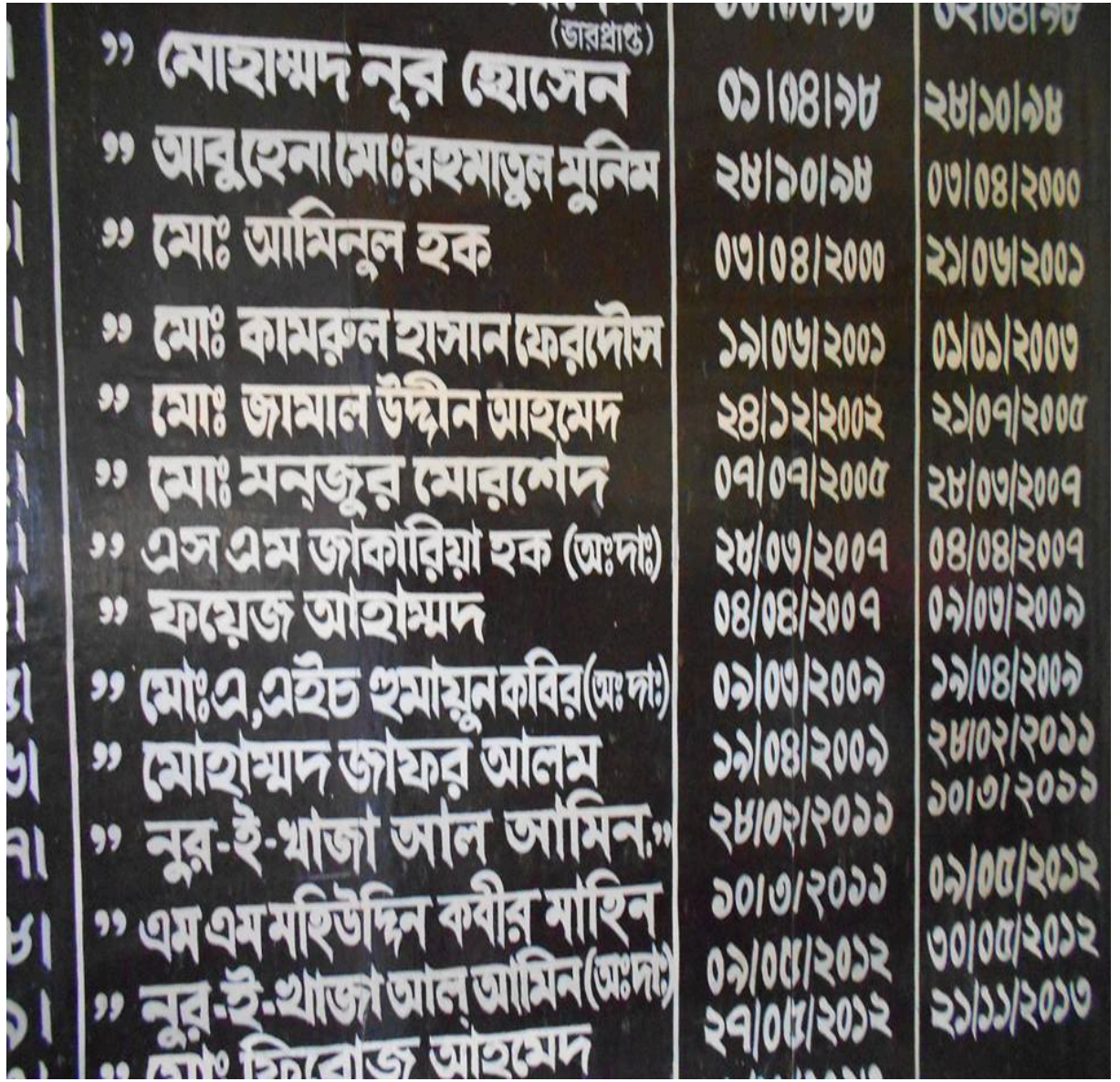
Cooking energy insecurity during and aftermath of an EWE is an huge issue which is completely missed out in DRR and Energy discussion.
Power cut in an EWE causes insecurity to men and women, especially the adolescent girls.

Need to have social acceptance for the modality of electricity generation

1MW wind Power Plant in Kutubdia

In Kutubdia, no UNO could station there for more than a year or so since its inception in 1983. Only one UNO following the devastating cyclone in 1991, stayed there for three years.

জনাব	সৈয়দ আহমদ	২২/০৩/৮৩	২১/০৩/৮৪
”	কাজী আবদুল মতিন	২১/০৩/৮৪	২১/১২/৮৪
”	মোঃ জহিরুল হক (ভারপ্রাপ্ত)	২২/১২/৮৪	০৯/০২/৮৫
”	এ,বি,এম,ফরিদ উদ্দিন	১০/০২/৮৫	০৪/০২/৮৮
”	শফিক আহমেদ	০৪/০২/৮৮	২৭/১২/৮৯
”	শাহাবুদ্দিন	২৩/১২/৮৯	১৩/০৫/৯১
”	মোঃ হাফিজুর রহমান	১৩/০৫/৯১	১০/০৯/৯১
বাবু	কমল কান্তি বৈদ্য (ভারপ্রাপ্ত)	১০/০৯/৯১	২৫/০১/৯২
”	তপন কুমার দে	২৫/০১/৯২	০২/১১/৯২
”	কমল কান্তি বৈদ্য ”	০২/১১/৯২	১২/১২/৯২
জনাব	আলহাজ্ব মুহাম্মদ নুরুল হক	১২/১২/৯২	১১/০১/৯৬
”	মোঃ মোজাফেকর আলী (ভারপ্রাপ্ত)	১১/০১/৯৬	০৫/০৫/৯৬
”	শাওকত মোস্তফা	০৬/০৫/৯৬	০২/০১/৯৭
”	মোঃ মোজাফেকর আলী (ভারপ্রাপ্ত)	০২/০১/৯৭	২৮/০১/৯৭
”	ফজলুল করিম	২৮/০১/৯৭	১৩/০৩/৯৮



”	মোহাম্মদ নূর হোসেন (ভারপ্রাপ্ত)	০১/০৪/৯৮	২৮/১০/৯৮
”	আবু হেনা মোঃ রহমাতুল মুনিম	২৮/১০/৯৮	০৩/০৪/২০০০
”	মোঃ আমিনুল হক	০৩/০৪/২০০০	২১/০৬/২০০১
”	মোঃ কামরুল হাসান ফেরদৌস	১৯/০৬/২০০১	০১/০১/২০০৩
”	মোঃ জামাল উদ্দীন আহমেদ	২৪/১২/২০০২	২১/০৭/২০০৫
”	মোঃ মনজুর মোরশেদ	০৭/০৭/২০০৫	২৮/০৩/২০০৭
”	এস এম জাকারিয়া হক (অঃদাঃ)	২৮/০৩/২০০৭	০৪/০৪/২০০৭
”	ফয়েজ আহাম্মদ	০৪/০৪/২০০৭	০৯/০৩/২০০৯
”	মোঃএ,এইচ হুমায়ুন কবির(অঃ দাঃ)	০৯/০৩/২০০৯	১৯/০৪/২০০৯
”	মোহাম্মদ জাফর আলম	১৯/০৪/২০০৯	২৮/০২/২০১১
”	নুর-ই-খাজা আল আমিন,”	২৮/০২/২০১১	১০/৩/২০১১
”	এম এম মহিউদ্দিন কবীর মাহিন	১০/৩/২০১১	০৯/০৫/২০১২
”	নুর-ই-খাজা আল আমিন (অঃদাঃ)	০৯/০৫/২০১২	৩০/০৫/২০১২
”	মোঃ ফিরোজ আহমেদ	২৭/০৫/২০১২	২১/১১/২০১৩

Notes

Impacts on power by recent storm events

Storm events	Impact on power system
1991	The supply of electricity was cut off for one to few days in several storm hit cities including Chittagong, the main commercial city of Bangladesh
2007	Bangladesh experienced the worst ever blackout after the sever tropical storm SIDR. All of the 26 power plants had tripped and failed for varying durations. The power lines and poles have been severely damaged. It took 2-7 days to restore full supply.
2008(April)	Cyclone uprooted electricity poles and damaged power lines, leaving parts of the southeast areas without power.
2008(May)	Damaged the Wind Battery Hybrid Power Installation in the castal region of Bangladesh. Three months were taken to resume the supply.
2009	Caused numerous electric poles uprooted and power lines downed, causing widespread powder outages in southwest coastal belt of Bangladesh.

Shahid, S. (2012) Vulnerability of the power sector of Bangladesh to climate change and extreme weather events. Regional Environmental Change, 12(3): 595-606

Notes

Impacts on power system by recent flood events

Flood events	Impact on power system
1988	Eighteen electric power sub-stations were flooded. About 2000 km 11-KV line had to de-energize.
1998	Prolong floods severely affect the power supply system of Dhaka . Power lines had to de energize in different parts of Bangladesh which affected over a million people
2004	Power supply was shut down in some parts of Dhaka city for few days. Some south eastern sub-districts were out of power for more than a week.
2007	Electricity poles were washed away by the flooded rivers in the north west and nort east Bangladesh which caused disruption of electric supply in many parts of the country and paralyzed the normal life of the people.

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The biggest wind power generation project of Bangladesh (1000 kWp capacity Wind Battery Hybrid Power Project) in the coastal region of the southeast District was heavily damaged by tropical cyclones of the Bay of Bengal several times.

During the project implementation phase, the Super Cyclone SIDR crossed the coastal areas of Bangladesh. There was a 10 to 15 feet higher tidal surge above the dam in front of the project. All equipment and materials were submerged by those high waters. Some 3-ton steel towers were washed away by strong waves.

All completely ready civil constructions were fully damaged. After the SIDR the implementation works started again and were completed

by 2007. The Tropical Cyclone Nargis with winds of about 200 to 240 km/hr again severely damaged the project. It took about three-month to re-start power generation (Rahman 2009). The first biggest solar photovoltaic system of Bangladesh installed at a

Climate phenomena and related economic impact types as applicable in Bangladesh

Notes

Cause Effect Relationship	Economic Impact Type		
	Direct	Secondary Impact	Tertiary Impact
Global warming leading to rise in temp	Deterioration of health	Escalation of moisture stress in crop agriculture Escalation of pests and diseases	Increased cost of production
Higher monsoon rainfall leading to flood, drainage congestion	Lives lost (drowning, snake bite) Crop Loss Damage in Infrastructure Damage to industries (loss of production, submerged units becoming non-functional) Damage to dwelling/homestead Livestock lost Fisheries lost (investment lost)	Loss of livelihoods, food Insecurity Health deterioration Loss of employment in industries	Temporary relocation Climate induced displacement Industrialization process being adversely affected
	Disruption of urban economic activities	Loss of livelihoods of urban poor Health implications	
Increased variability in pre-monsoon rainfall availability	Significant change in crop growing season		

Notes

Cause Effect Relationship	Economic Impact Type	
	Direct	Secondary Impact
Increased variability in pre-monsoon rainfall availability	Significant change in crop growing season	
Rise in sea surface temp leading to frequent formation of low and depressions	Lives lost Damage to Infrastructure Loss of livelihoods of fishermen Salinization of low lying coastal lands Crop loss / Livestock lost	Loss of livelihoods (general mass Loss of crop suitability in salinized lands
Rise in air temp, wind speed & moisture evaporation from top soil	Crop loss Additional public and private investments in irrigation and water management	Food security
High intensity rainfall & runoff, flow	Destruction of habitat Loss of crop land Loss of infrastructure	Loss of livelihoods Climate induced displacement
Sea level rise (Salinization)	Decrease in crop suitability Increase in availability of drinking water	Food security Deterioration of human health Loss of livelihoods

Notes

Cause Effect Relationship	Economic Impact Type		
	Direct	Secondary Impact	Tertiiary Impact
SLR (Water Logging)	Loss of habitat Loss of agricultural activities	Relocation of affected communities Health implications Food insecurity Non-availability of drinking water	Loss of employment opportunities in affected pockets
Rise in sea surface temperature (Increased wind interaction, Stronger waves)	Failure of protective embankments Loss of habitats Loss of crop lands Loss of infrastructure	Climate induced displacement	
Rainfall (Rainfall extremes/ cloud outburst)	Urban drainage congestion (severe) Land slide in hilly terrains	Loss of lives Loss of livelihoods	Loss of employment of poor urban inhabitants

Thanks