•Quantifying the cost of inaction of climate change impacts in the vulnerable delta region

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•Climate change impacts and vulnerabilities in Bangladesh

Bangladesh is particularly vulnerable to tropical cyclones, flash flood, river bank erosion, storm, sea level rise and high rates of mortality are associated with such events.

during 1992 to 2012 overall 242 extreme events assault Bangladesh with total losses of USD 1833 million (BBS, 2015).

1^0C temperature rise is associated with 10% productivity loss in farming, indicates 4 million tonnes of food grain loss in bangladesh, amounting to about USD 2.5 billion which is about 2% of countries GDP (MoEF, 2015).

Similarly, 2^0C temperature rise will cause to loss around 4% of countries GDP.

•Climate change impacts and vulnerabilities in Bangladesh

In a low crop productivity scenario, Bangladesh would experience a net increase in poverty of 15% by 2030 (IPCC, 2014).

In Bangladesh between 13 million to 40 million people could be displaced by sea level rise by 2100 (Stott, 2014).

Bangladesh lost an estimated 5.9% of GDP to storms during 1998-2009 (BCCSAP, 2012).

In 2009, cyclone Sidr alone claimed 4,234 lives, damaged 1,86,892 hectares crops and caused US$1.67 billion worth of economic loss in the costal areas (BBS, 2015).

Climate Extremes and Impacts in the Coastal Bangladesh

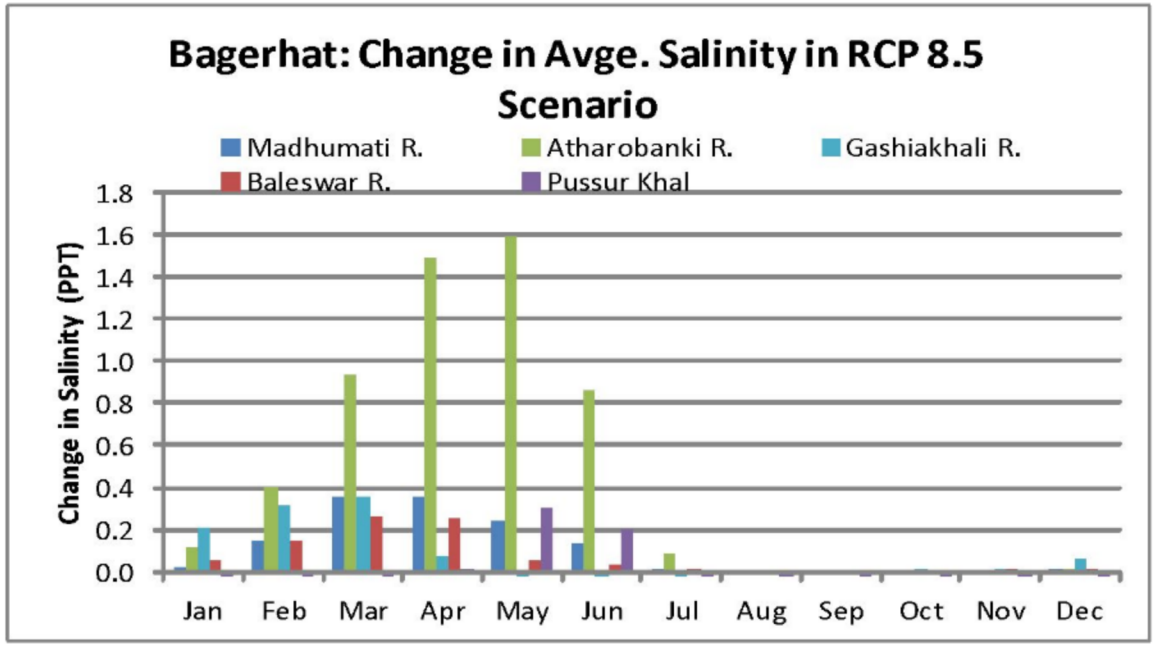
Ecosystem of South-west Bangladesh	Climate related hazards & extremes	Major Impacts	Derived Impacts
Coastal, saline and surge prone areas	Salinity Intrusion	- Low yield - Threatened freshwater aquaculture practice - Reduce natural breeding and - Affect freshwater availability - Harm fish species	- Soil degradation - Reduce employment - Squeeze opportunities in livestock subsector - Occupational shifting - Climate change refugee
	Cyclone and Storm Surge	- Damage standing crops - Loss of fishes as the disaster flash away pond/Ghers - Huge mortality of fish after cyclone and surge	- Soil degradation - Extreme salinity intrusion - Soil degradation - Damage infrastructure - Decomposition of leaves and others - Harm life, livelihood and livestock
	Coastal Flood	- Damage of standing crops - Damage to shrimp farm - Yield reduction - Reduce cropping intensity	- Influence seasonal migration - Reduce income opportunities - Damage of infrastructure - Affect life, livelihood and livestock

Major Climate Stress	Adaptation options
Flood	Shifting planting time, short duration rice variety, increase the height of mad wall, using flood tolerant rice variety, floating bed agriculture, Flood warning system development
Storm/hailstorm	Replantation, early crop harvesting, short duration variety, Shifting planting time
Cold wave	Use more chemical, fertilizer and pesticides, vitamins such as Entergol, Asamil etc. are used to the cold affected crops
Salinity intrusion	Rice-prawn/shrimp farming, cultivating saline tolerant variety, rainwater harvesting, desalinization
Climate variability	Use more fertilizer, apply additional pesticides and insecticides

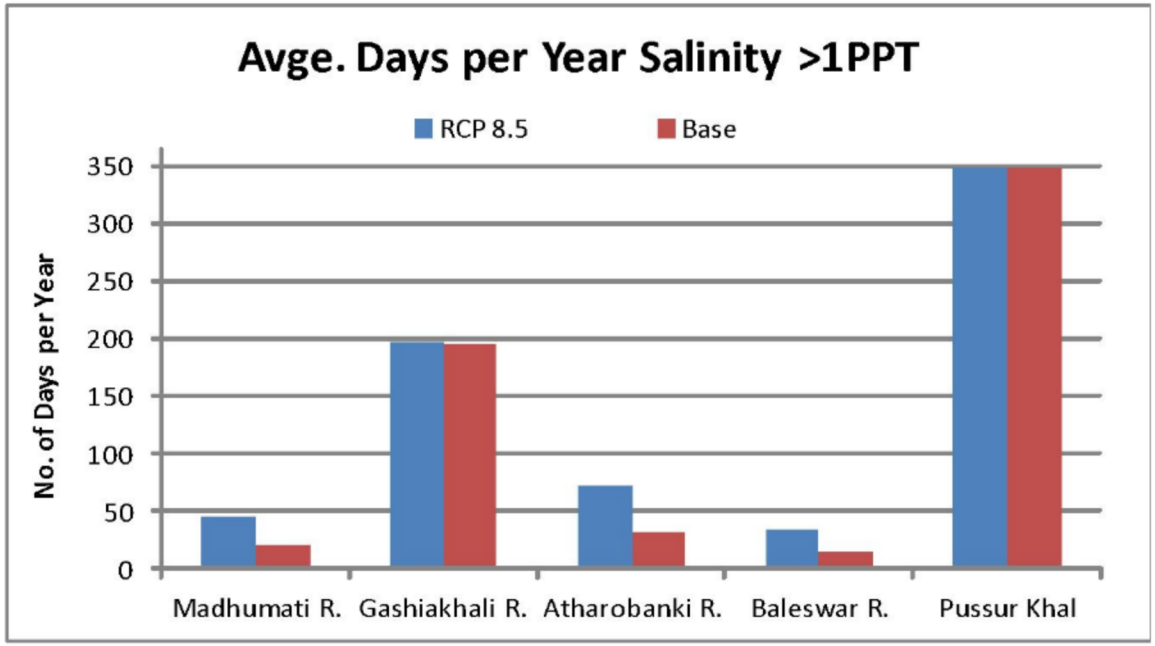
- List of adaptation practices in the Fisheries and Aquaculture sectors of Coastal Bangladesh

Major Climate Stress	Adaptation options
Flood	Raising mad walls in pond and gher, digging the drain, excess water is withdrawn by pump from the gher, using net during flood in the gher, using lime to keep fish culture germ free after flooding, increase the food supply during flood and heavy rainfall, apply Potash and Alum to the project site to reduce the aquatic diseases
Storm/ hailstorm	Early fish harvesting, using chemical and medicine to reduce aquatic diseases
Salinity intrusion	Rice-shrimp/prawn farming, rainwater harvesting, desalinization

Change in Average River Salinity in Costal River basins of Bangladesh due to 2°C Warming

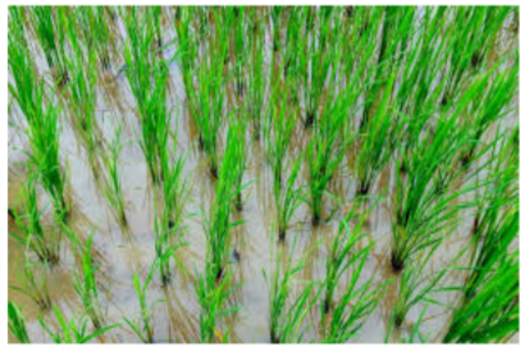


Duration of River Salinity Above 1PPT in in Costal River basins due to 2°C Warming



Economic Analysis of Climate Action

Adopting Saline Tolerant Rice Varieties	Amount (USD)
Cost of saline tolerant varieties Per ha	29.3
Total production cost per ha	732.64
Productivity per ha (M.ton)	6.08
Production loss without adaptation	46%
Cost of inaction	419.79
Share of adaptation cost on total investment	4%
Revenue per ha	898.71
Net revenue per ha	166.06



Economic Analysis of Climate Action

Adopting Rice-prawn Farming	Amount (USD)
Cost of rice variety & prawn per ha	82.77
Total production cost per ha	793.70
Productivity per ha (M.ton)	10.93
Production loss without adaptation	18.04%
Cost of inaction	232.01
Share of adaptation cost on total investment	10.43%
Revenue per ha	2532.52
Net revenue per ha	1739

Economic Analysis of Climate Action

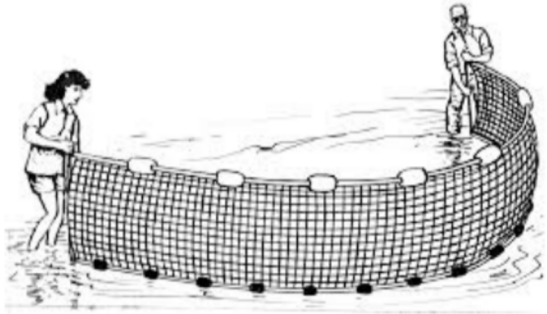
Adopting Short Duration Rice Varieties	Amount (USD)
Cost of short duration rice variety	9.77
Total production cost per ha	1016
Productivity per ha (M.ton)	6.2
Production loss without adaptation	70%
Cost of inaction	831.36
Share of adaptation cost on total investment	1%
Revenue per ha	1187.66
Net revenue per ha	171.72
Benefit cost ratio	1.17

Economic Analysis of Climate Action

Raising Mud Walls in Gher/pond	Amount (USD)
Cost of raising mud walls per ha	915.81
Total production cost per ha	5090
Productivity per ha (M.ton)	18.05
Production loss without adaptation	44%
Cost of inaction	3663.24
Share of adaptation cost on total investment	17.99%
Revenue per ha	5800.13
Net revenue per ha	710
Benefit cost ratio	1.14

Economic Analysis of Climate Action

Using Net Surrounding the Gher	Amount (USD)
Per hector cost of using net	439.59
Total production cost per ha	4935.73
Productivity per ha (M.ton)	18.05
Production loss without adaptation	44%
Cost of inaction	3663.24
Share of adaptation cost on total investment	8.91%
Revenue per ha	5800.13
Net revenue per ha	864
Benefit cost ratio	1.18



Concluding sentences

- Though climate action has some costs, proper planning and management can provide benefits.
- Strategies should be developed in such a way so that benefit and sustainability can be maximized in each climate action.
- If the minimum cost and maximum benefit principle can be attained in climate action, the community will be interested to spend in the climate action.
- In order to reduce the loss and damages and increase the community resilience under 2^0C global warming emphasize should be given on adaptation finance and innovation.
- Availability of soft credit need to be ensured to the poor and vulnerable group.

Thank You..

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