Combating Climate Extremes

What is the issue?

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In early 2017, **unprecedented rates of glacier melts** have been reported both in the Antarctic and the Arctic.

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What had happened in the past?

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- The earth has enjoyed a more or less stable temperature for the last 10,000 years.
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- Prior to that there were several ice ages and periods of warmer temperature, also known as **inter-glacials**.
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- The ice ages are believed to have been caused **by small shifts in the earth's orbit,** but all the reasons for the temperature fluctuations observed are not yet entirely understood.
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- During the Pliocene epoch, global sea levels were close to 30 metres higher than they are today, while average global temperatures were only about 3-4 degrees Celsius warmer.
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What is happening in Antarctic at the moment?

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- The Antarctic ice sheet is 14 million sq km in area and holds a large amount of frozen fresh water.
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- If all the ice over the Antarctic were to melt, sea levels would rise by about 60 metres.
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- Several media reports have covered the expanding rift or crack along the **Larsen C shelf** in the Antarctic, which is expected to break off at any time.
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- Normally, ice shelves lose mass by the breaking off, or calving, of some of the portions and also by melting.
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- When such large chunks break away from an ice shelf, **they speed up the collapse of the entire shelf.**
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- Since this is attached to the rest of the glacier, these processes can increase the speed at which the glacier flows into the ocean.
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- Thus, even though the Larsen C collapse by itself, **since it is in the water, will not raise sea levels,** it will hasten the melting of the glacier it is connected to.
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- While the entire West Antarctic Ice Sheet may take a few hundred to a thousand years to completely melt, the process and **the resultant collapse are now recognised as unstoppable.**
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What is happening in Arctic at the moment?

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- In the Arctic, if all the ice in the Greenland ice sheet were to melt, it would raise global sea levels by about 7 metres.
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- For the last several years, glaciologists have noticed that ice melt in the summer has increased and they say a lot of the recent melt has been due to increasing surface melt, and calving or breaking off of chunks of ice.
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- **Soot and dust** carried by air from various places, bacteria and algal pigments in the meltwater, any other pigments in the glacier can all **reduce the reflection of the sunlight,** thus increasing the absorption of heat energy by the ice.
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- This consequently increases ice melt, which then absorbs more solar radiation, thus **accelerating a feedback process.**
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- The meltwater flows into deep shafts, or moulins, that then **speed up the flow of the glacier.**

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- Also, temperatures in Northern Greenland have been much warmer and in fact, surface melt has doubled Greenland's contribution to sea level rise over the period 1992-2011.
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- Carbon dioxide concentrations have crossed 400 ppm in the atmosphere and are the highest they have been in the past 4,00,000 years.
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How vulnerable is India?

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- Protecting the coast is an expensive undertaking and even then dikes, sea walls and similar structures provide only partial protection, based on studies undertaken by the **Dutch Delta Committee**.
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- For India, **the east coast,** especially certain low-lying districts, are extremely vulnerable to intensive storms, which then lead to flooding, salt-water intrusion, and loss of land and livelihoods.
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- **On the west coast,** while there are generally fewer storms, the concern is coastal erosion and flooding from sea level rise.
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- The discussion regarding sea level rise and potential coastal impacts needs also to be understood not just as a coastal phenomenon, but also as an **issue that ripples through the entire economy.**
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- Flooding in Chennai two years back did not affect just the land, but went through the economy as a whole and a reinsurance company, has estimated losses to be $2.2 billion.
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What is the way forward?

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- Thus, enforcing the coastal regulation zone, protecting vulnerable districts and vulnerable communities which rely on ecosystems and the sea for their livelihoods are areas that need strengthening.
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- **Regional agreements related to refugees from climate effects** need to be initiated.
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- As a country which has generally been open to refugees, initiating and taking forward the conversation on regional planning for extreme events such as sea level rise would be important for India.
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Source: The Hindu

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