

Contents

{Geo – Climatology – 19/05/09} El Nino occurrences of over 400 years.....	1
{Geo – Climatology – 19/05/09} Madden-Julian Oscillation (MJO)	2
{Geo – Climatology – 19/05/09} Southern Annular Mode (SAM) or Antarctic Oscillation	4
{Geo – Climatology – 19/05/20} Western disturbances	5
{Geo – Cyclone – 19/05/01} Cyclone Fani (pronounced as FONI).....	7
{Geo – Cyclones – 19/05/09} Impact of Global Warming on Tropical Cyclones	9
{Geo – EG – 19/05/01} Wind Energy: India to install 54.7 GW wind capacity by 2022: Fitch Solutions	11
{Geo – EG – 19/05/02} Clean Energy sources: CNG, LNG, LPG and Hydrogen	11
{Geo – EG – 19/05/08} Clean Fuels (Alternate Fuels)	13
{Geo – EG – 19/05/15} Graphite reserves in India.....	17
{Geo – HG – 19/05/15} Maldharis of Kutch	17
{DM – 19/05/06} It’s time for a National Disaster Insurance Policy (Mains topic)	18
{DM – 19-05/01} National Crisis Management Committee (NCCM).....	18

{Geo – Climatology – 19/05/09} El Nino occurrences of over 400 years

[D2E](#) | 09-05-2019 | Geography > Climatology > [El Nino](#)

- A study has tracked El Nino occurrences of over 400 years.
- The El Niño trends of the past have been studied on the basis of **coral cores** spanning the Pacific Ocean.
- **Coral cores — like tree rings and ice cores** — have centuries-long growth patterns and contain isotopes that can tell us a lot about the climate of the past.
- El Niños are linked to extreme weather across the globe, with particularly profound effects on precipitation and temperature extremes in Australia, South East Asia and the Americas.
- Hence, the study is expected to strengthen the science of predicting extreme weathers and plan better.

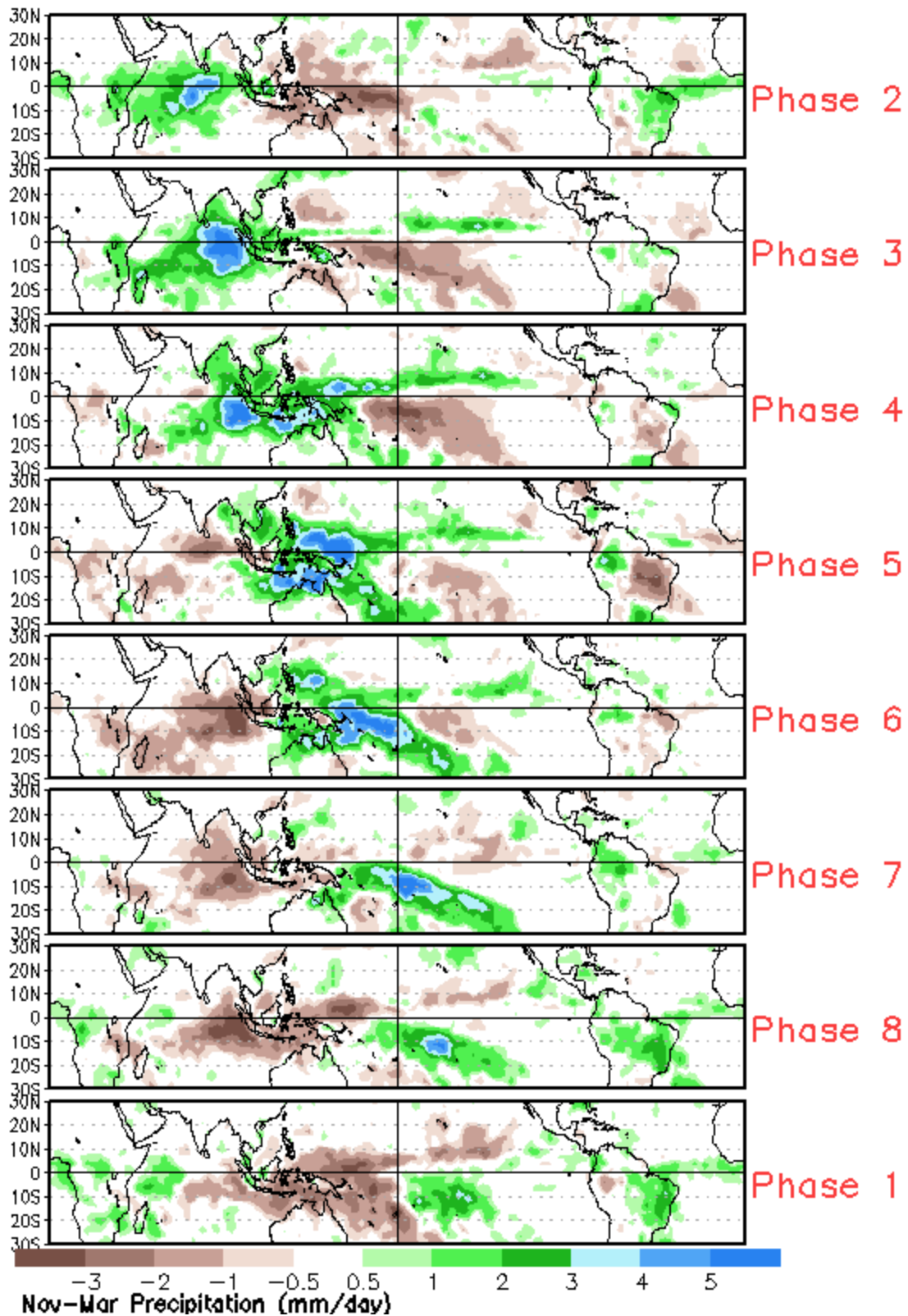
Finding of the study

- El Niños have become stronger and their pattern too has been changing.
- The trend of El Niño in the last four centuries shows a variation in El Niño types.
- There has been an increase in central Pacific events (El Niño Modoki) lately.
- The most recent 30-year period includes fewer, but more intense, eastern Pacific El Niño events.

{Geo – Climatology – 19/05/09} Madden-Julian Oscillation (MJO)

[Source](#) | 09-05-2019 | Geography > [Climatology](#)

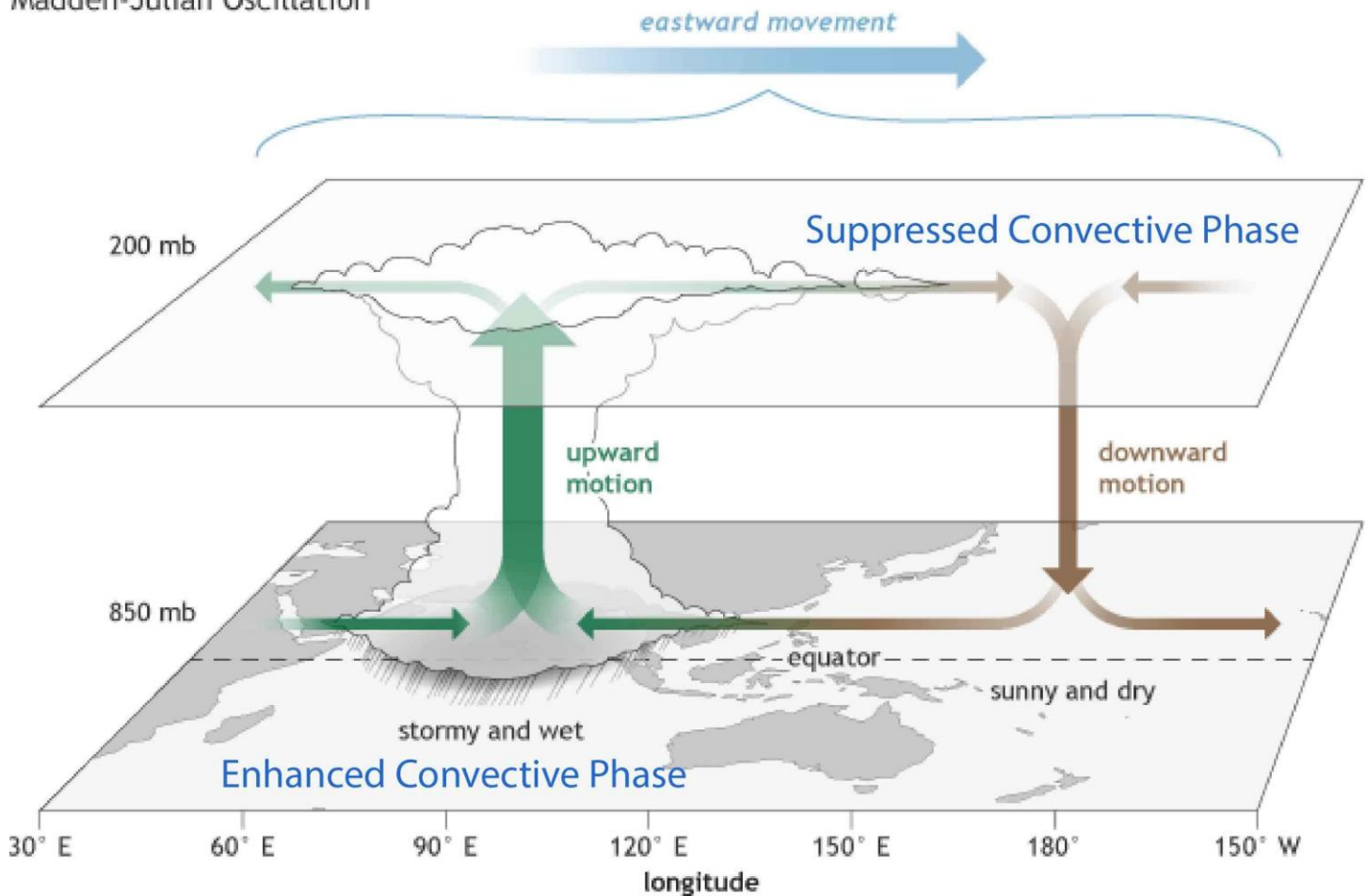
- [MJO](#) is an **eastward moving pulse of cloud & rainfall** in the tropics that **recurs every 30 to 60 days**.
- Unlike **ENSO, which is stationary** (in Pacific Ocean), the **MJO is an eastward moving disturbance**.
- ENSO is associated with persistent features that last several seasons over the Pacific Ocean basin.
- On the other hand, multiple MJO events occur within a season (i.e. weather varies on a week-to-week basis).



Madden-Julian Oscillation (MJO) [Source and Credits](#)

- The MJO consists of **enhanced rainfall convective phase** and **suppressed rainfall convective phase**.
- These two phases produce opposite changes in rainfall and this entire dipole propagates eastward.

Madden-Julian Oscillation



Madden-Julian Oscillation (MJO) [Source and Credits](#)

Madden-Julian Oscillation impact on Weather

- The MJO can modulate the timing and strength of monsoons.
- The MJO can influence tropical cyclone numbers and strength in nearly all ocean basins.
- The MJO can result in jet stream changes that can lead to cold air outbreaks, extreme heat events, and flooding rains over North America.

{Geo – Climatology – 19/05/09} Southern Annular Mode (SAM) or Antarctic Oscillation

[Source](#) | 09-05-2019 | Geography > [Climatology](#)

- SAM describes the [north-south movement of the westerly wind belt that circles Antarctica](#).
- The changing position of the westerly wind belt influences the midlatitude storms.
- SAM has a significant impact on the weather of the South Indian Ocean and Australia.

Positive phase

- Band of westerly winds contracts toward Antarctica.
- Higher pressures over southern Australia.
- Stable and dry conditions (**droughts, negatively effects tropical cyclones**).

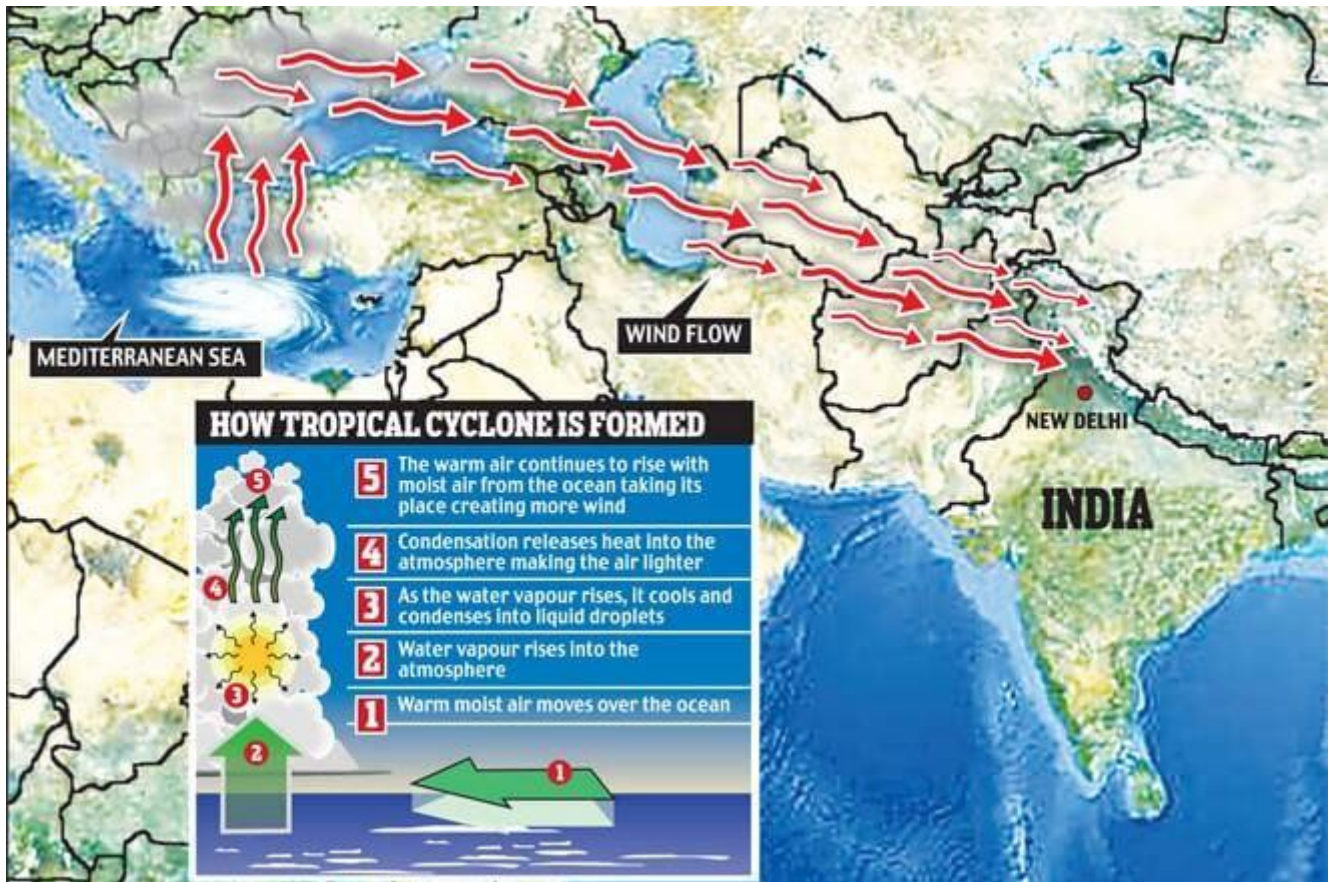
Negative phase

- Band of westerly winds expands towards the equator.
- More (or stronger) low pressure systems over southern Australia.
- **Increased tropical storms and rain.**

{Geo – Climatology – 19/05/20} Western disturbances

[D2E](#) | 20-05-2019 | Geography > Indian Climatology > [Western Disturbances](#)

- Every **winter** the weather systems that drape the Himalayas with snow come as visitors from far off lands.
- These visiting storms or low pressure areas **originate in the Mediterranean region and the Atlantic.**
- These storms come from a **westward direction** with respect to India, hence the name western disturbance.
- Then they travel towards Afghanistan, Pakistan and India **along high altitude** and **brisk westerly winds** which are perennially flowing from the west to the east across the surface of the Earth.
- Along their way they pick up moisture from the **Mediterranean Sea, Black Sea, Caspian Sea and the Arabian Sea.**



- When the WDs come up against the Himalayas they shed their moisture in the form of rain and snow.
- Sometimes they move along the northern mountainous states of Jammu and Kashmir, Himachal Pradesh, Uttarakhand and towards the north eastern states.
- While other times they move along more southward regions through Punjab, Haryana, Rajasthan, Uttar Pradesh and Bihar (**good for rabi crops**).

The WDs are not always the harbingers of good weather

- WDs can cause extreme weather events like flash floods, landslides, dust storms, hailstorms and cold waves.
- The 2013 Uttarakhand disaster was a result of an anomalous WD.
- The unusual dust storms in the summer of 2018, floods in Kashmir in 2014 and the cloud burst in Leh in 2010 can also be attributed to the same reason.
- The cold waves that hit northern and north western India from December 2018 to February 2019 were triggered by an absence of intense WDs in the region.
- The weak WDs that did arrive did not move enough in the southward direction. The cold waves continued as the intensity of the WDs suddenly increased in January.

More info: <https://www.pmfias.com/western-disturbances-cloudburst/>

{Geo – Cyclone – 19/05/01} Cyclone Fani (pronounced as FONI)

[PIB](#) | 01-05-2019 | Must Read: Geography > Climatology > [Tropical Cyclones](#)

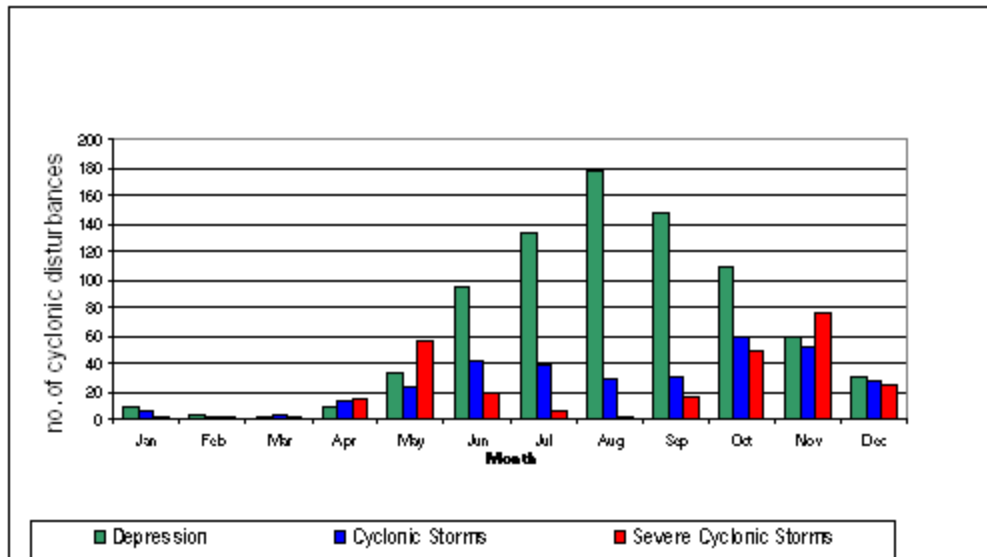
- Cyclone Fani is an **Extremely Severe Cyclonic Storm**.
- Fani is moving slow (11-18 kmph) → more moisture and energy it gained from the ocean.

Tropical Cyclone Scale by Indian Meteorological Department

S. No.	Intensity	Strength of wind	Wave height (m)
1.	Depression (L)	31- 49 kmph (17-27 knots)	1-4
2.	Deep Depression (DD)	50 - 61 kmph (28-33 knots)	4-6
3.	Cyclonic Storm (CS)	62 - 87 kmph (34-47 knots)	6-9
4.	Severe Cyclonic Storm (SCS)	88-117 kmph (48-63 knots)	9-14
5.	Very Severe Cyclonic Storm (VSCS)	118-166 kmph (64-89 knots)	14+
6.	Extremely Severe Cyclonic Storm (ESCS)	167-221 kmph (90-119 knots)	14+
7.	Super Cyclonic Storm (SuCS)	222+ kmph (120+ knots)	14+

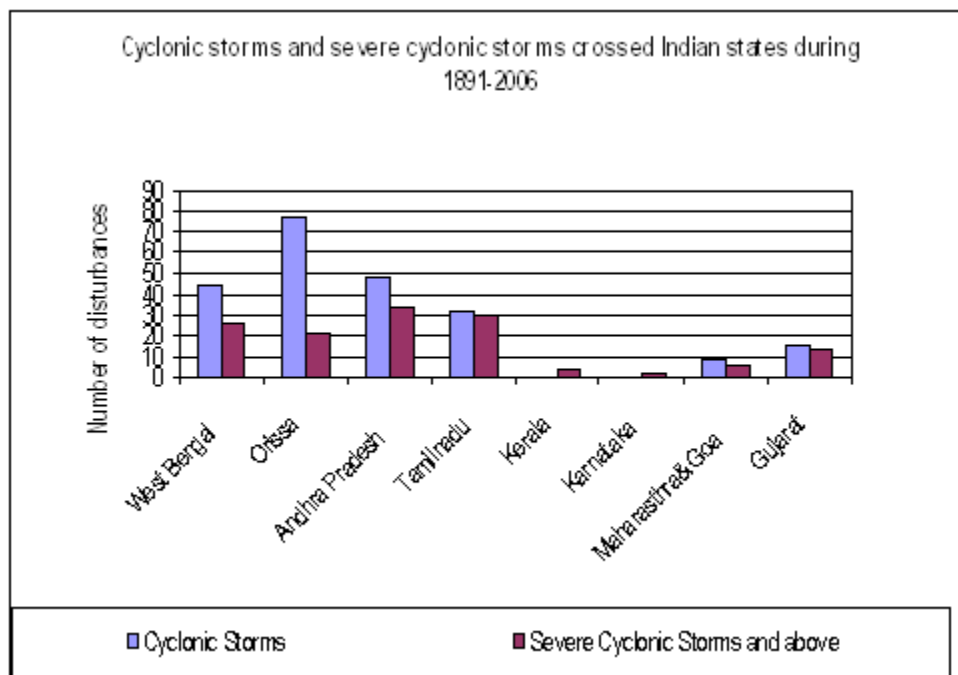
Tropical cyclones in the north Indian Ocean – Important facts and observations

- The frequency is more in the Bay of Bengal than in the Arabian Sea, the ratio being **4:1**.
- The average annual frequency of tropical cyclones in the north Indian Ocean (Bay of Bengal and Arabian Sea) is about **5** ([about 5-6 % of the global annual average of 80 cyclones](#)).
- About 20-30 severe tropical storms occur around the world every year.
- Out of total disturbances
 - ✓ [35% intensify to Cyclones](#)
 - ✓ [16 % intensify to severe cyclones](#)
 - ✓ [07% intensify to very severe cyclones](#)



Monthly frequency of Tropical Cyclones in North Indian Ocean [Source](#)

- The months of **May** 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.
- Monthly frequency of SCS in **November** > **May** > **October** > December
- Monthly frequency of CS in **October** > **November** > June
- Monthly frequency of Depressions in **August** > September > July



The frequencies of Cyclonic systems over north Indian Ocean during 1891-2006. [Source](#)

- The frequency of SCS for **AP** > **TN** > **WB** > **Odisha** > **Gujarat**
- The frequency of CS for **Odisha** > **AP** > **WB** > **TN** > **Gujarat**

- **Gujarat** is most vulnerable state on the west coast.

Impact of Global Warming on Tropical Cyclones (Mains topic)

- Fani is India's [strongest April cyclone in 43 years](#). The unusual timing (**leads to crop damage**) could be a consequence of **global warming** (unusual warming of the Bay of Bengal).
- Fani's protracted gestation period of early 10 days is an extremely long period.
- In recent times, cyclones have had unusual timing, like Cyclone Pabuk in January.
- Some of the CS also tend to follow a very unusual path **making forecasting difficult** (E.g. Cyclone Titli).
- Seas and oceans have been unusually warm this March. The increasing ocean temperatures gave rise to devastating [Idai cyclone in March](#) (1000 died).
- Cyclone Idai (one of the worst tropical cyclones to affect Africa and the Southern Hemisphere) had an impact on the coast of Mozambique in southern Africa.

Mains Practise: What are the consequences of Global Warming (anthropogenic impact) on the Indian weather conditions?

- Answer must include El Nino, Tropical Cyclones, Hotter summers – devastating heat waves. Include examples like 2018 Kerala floods, 2015 Chennai Floods, Severe Cyclonic Storm Fani in April, etc.

{Geo – Cyclones – 19/05/09} Impact of Global Warming on Tropical Cyclones

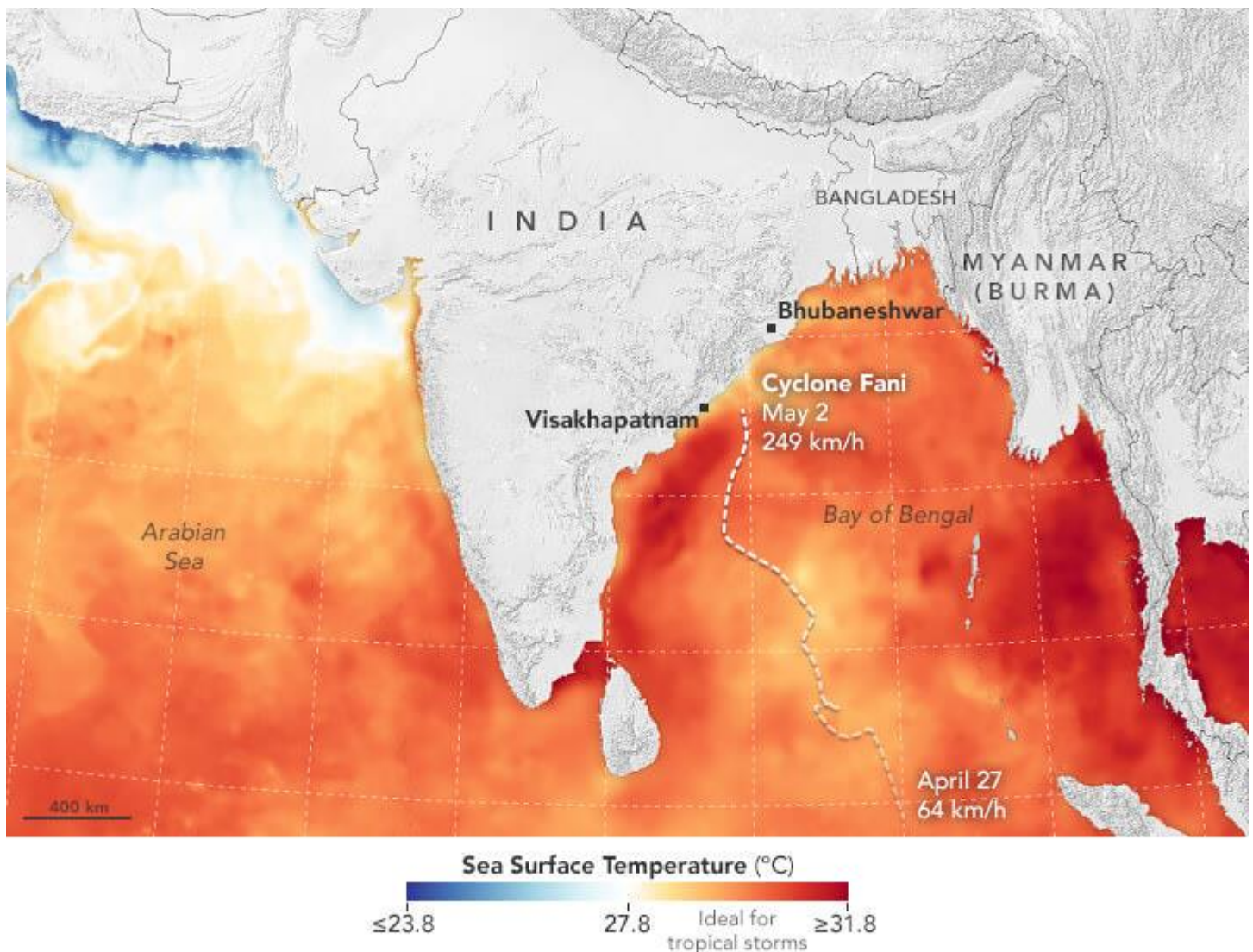
[Business Standard](#) | 09-05-2019 | Geography > [Tropical Cyclones](#) | Environment > [Climate Change](#)

Unusual development, frequency and behaviour of tropical cyclones

- There is a noticeable increase in frequency of high intensity storms in the Indian Ocean.
- Fani is India's [strongest April cyclone in 43 years](#).
- Fani's protracted gestation period of early 10 days is an extremely long period.
- In recent times, cyclones have had unusual timing, like Cyclone Pabuk in January.
- Some of the them also tend to follow a very unusual path (E.g. Cyclone Titli).
- The increasing ocean temperatures gave rise to devastating [Idai cyclone in March](#) (1000 died in Africa).
- Tropical cyclone Idai is one of the most severe storms to have made landfall in Mozambique.
- Kenneth, a category 4 tropical cyclone made landfall over the border of Mozambique and Tanzania in April.
- It was the northernmost tropical cyclone and the first to make landfall on Tanzania.
- It occurred very late in the season. Most cyclones in the region occur from January to March.
- It was also unusual for the Mozambique Channel to experience two severe tropical cyclones.

All because of global warming

- Tropical cyclones require a sea surface temperature of **26.5°C** to form, while the highest intensity storms require much warmer sea surface temperatures of 28-29°C.
- The frequent high intensity storms have been tied to the **very warm sea surface temperatures**.
- Temperatures of 30°C are occurring more often and over longer periods of time.
- The South Indian Ocean that previously experienced the temperatures of 26.5°C is now experiencing temperatures as warm as 30-32°C.
- Regions further from the equator are more regularly experiencing the threshold temperature or 24-26°C widening the range of formation of tropical cyclones (greater the range, greater the intensity and frequency).
- These conditions are exacerbated by global forcing mechanisms including [El Niño](#), [Indian Ocean Dipole](#), [Southern Annular Mode](#) and [Madden-Julian Oscillation](#) (these in turn are affected by global warming).



Abnormally hot sea surface temperatures due to global warming [Source and Credits](#)

{Geo – EG – 19/05/01} Wind Energy: India to install 54.7 GW wind capacity by 2022: Fitch Solutions

[The Hindu](#) | 01-05-2019 | Geography > Economic Geography > [Energy Sources](#) > [Renewable Energy](#)

- India is likely to install 54.7 GW of wind capacity by 2022 against the **60-GW target**.
- It was determined that **175 GW** of renewable energy capacity will be installed by 2022.

As of October 2018

Sector	Target (GW)	Installed capacity (GW) as on 31.10.2018
Solar Power	100	24.33
Wind power	60	34.98
Bio Energy	10	9.54
Small Hydro	5	4.5
Total	175	73.35

- India attains global [4th and 5th positions](#) in wind and solar power installed capacities.
- India is at [5th global position](#) for overall installed renewable energy capacity

Source	Installed Capacity (GW) as of October, 2018	Percentage
Thermal	221.76 GW	(63.84%)
Nuclear	6.78 GW	(1.95%)
Hydro	45.48 GW	(13.09%)
Renewable	73.35 GW	(21.12%)
Total	347.37 GW	(100%)

- Renewable energy generation accounts for about **34 per cent** of total installed power generation capacity.

Renewable energy: Challenges

- Solar Energy Corporation of India (SECI) is calling tenders for gigawatt-scale battery backup projects.

Why is the need for batteries?

- Rapid growth of the renewable energy sector has thrown up new challenges such as:
 1. Difficulty in managing spikes in renewable energy output and balancing it with conventional projects.
 2. Lack of round-the-clock dependability and non-availability during peak hours.

{Geo – EG – 19/05/02} Clean Energy sources: CNG, LNG, LPG and Hydrogen

Liquefied Petroleum Gas (LPG)

- LPG consists mainly of **propane, butane, butylene, propylene**, etc. in various mixtures.
- It is produced as a **by-product of natural gas (mostly methane)** processing and petroleum refining.
- The components of LPG are gases at normal temperature and pressure.
- One challenge with LPG is that it can vary widely in composition.
- As **LPG is heavier than air**, places with poor ventilation tend to trap the gas in case of leakage.
- LPG is **odourless** in its natural state. **Ethyl Mercaptan** or **Ethanethiol** (reaction of ethylene with hydrogen sulphide) that has a strong odour is added to LPG to detect leakage.

Compressed Natural Gas (CNG)

- [Natural gas](#) is drawn from gas wells or in conjunction with crude oil.
- When natural gas is compressed and stored in tanks it is called Compressed Natural Gas or CNG.
- Natural gas is mostly **methane** and to some extent **ethane** and **propane**.
- Other gases such as nitrogen, **carbon dioxide, sulphur** compounds, etc. are also present.
- A sulphur-based odorant is normally added to CNG to facilitate leak detection.
- Advantage over LPG is that **CNG is lighter than air and thus will quickly dissipate** in the case of a leak.
- CNG is a clean burning fuel, i.e., burning it **leaves little or no residue (reduced engine maintenance)**.
- Although natural gas **produces GHGs**, it is considerably reduced compared to petrol or diesel.
- CNG is much **safer** compared to petrol and diesel. It has a **high auto-ignition temperature**.
- CNG is **cheaper** than petrol and diesel.
- CNG also carries a [high calorific value](#) (50,000 kJ/kg) as compared to petrol (45000 kJ/kg).
- Disadvantages: **Large fuel tanks, less range, very few filling stations, old vehicles not designed for CNG.**

Liquefied Natural Gas (LNG)

- Liquefied Natural Gas or LNG is natural gas stored as a **super-cooled liquid (cryogenic)** (-120 to -170°C).
- Advantage: takes up less space thereby extending range and reducing refuelling frequency.
- Disadvantage: **high cost** of cryogenic storage, transportation and dispensation.
- LNG is used in heavy-duty applications in developed countries like the US, Japan, etc.
- For many developing nations, using LNG is currently not a practical option.

Biogas

- Biogas is primarily **methane (CH₄) (50-65%)** and **carbon dioxide (CO₂) (35-50%)**.
- Bio-gas is produced through a process of **anaerobic decomposition** (anaerobic digestion) from biomass.
- Anaerobic digestion uses the process of **fermentation** to breakdown organic matter.
- Biomass sources include agriculture residue, cattle dung, **sugarcane press mud**, municipal waste, etc.
- After purification, it is compressed and called **CBG (pure methane content of over 95%)**.
- CBG (calorific value ~52,000 KJ/kg) is similar to CNG in its composition and energy potential.
- Given the abundance of biomass in the country, CBG has the potential to replace CNG.
- The potential for CBG production in India is estimated at about 62 million tonnes per annum.
- Biogas production is **carbon-neutral**, i.e., there is no net addition of carbon to the environment (the carbon in biogas comes from plant matter that fixed this carbon from atmospheric CO₂).
- Challenges: Lack of bio-waste segregation and collection at the household level.

Hydrogen

- Hydrogen is **highly flammable** and will burn at concentrations as low as 4%.
- Hydrogen is generally used in two forms:
 1. In combustion, it is burned as conventional gaseous fuels
 2. A **fuel cell uses hydrogen to generate electricity**.
- Hydrogen gas is an energy storage medium, not an energy source.
- The energy used to produce it usually comes from a more conventional source.
- Hydrogen can be obtained utilizing methane, coal, LPG, from **electrolysis of water**, etc.
- Advantage: very low vehicle emissions and flexible energy storage.
- Challenges: current technologies are commercially unviable for production and utilization of H₂.

Titbit: ONGC is the largest producer of oil ([72%](#)) and natural gas ([48.5%](#)) in the country.

Titbit: At present, over [78 per cent](#) of India's oil requirements are being met through imports.

{Geo – EG – 19/05/08} Clean Fuels (Alternate Fuels)

[Indian Express](#) | [The Hindu](#) | [The Hindu](#) | [PIB](#) | 08-05-2019 | Economic Geography > [Energy Sources](#)

Fuel	Calorific Value (Heat Value) in Megajoules/kg (MJ/kg = 1000 x KJ/Kg)
Hydrogen	141
Methane (CH ₄)	55

Ethane (C ₂ H ₆)	52
Natural gas and CNG	52
Liquefied petroleum gas (LPG)	50
Propane, butane	50, 49
Petrol/gasoline	46.4
Kerosene	46.2
Diesel fuel	45.5
Biodiesel (methyl ester)	37
Ethanol (CH ₃ -CH ₂ -OH)	29
Methanol (CH ₃ OH)	23
Coal anthracite has highest – 32; peat has the lowest – 17)	17-32
Firewood (dry)	16

[Source1](#), [Source2](#)

Backdrop

- Scientists have identified an enzyme that helps methanotrophic bacteria convert **methane to methanol**.
- Methanotrophs are [prokaryotes](#) (prokaryotic cells lack nuclear membrane) that metabolize methane as their only source of carbon and energy.
- Importance: The finding could help develop human-made catalysts that can convert methane to methanol.
- Methanol is currently produced by breaking down **natural gas (methane)** at high pressure and temperatures into **hydrogen gas** and **carbon monoxide** before reassembling them — expensive process.
- **Methanol Economy** is the “Bridge” to the dream of a complete “Hydrogen based fuel systems”.
- The Concept of “Methanol Economy” is being actively pursued by China (10% of fuel in transport sector).
- NITI Aayog has drawn out a comprehensive plan to **replace 20% of crude imports from Methanol alone**.
- The government aims to increase fuel blending (**methanol, ethanol or biodiesel**) to **20 per cent by 2030**.

Methanol	Ethanol
• Methyl Alcohol (CH ₃ OH)	• Ethyl Alcohol (drinking alcohol) (CH ₃ -CH ₂ -OH)
• Methanol is toxic and hence it is not suitable for consumption .	• Ethanol is used in alcoholic beverages, as additive in foods, etc.
• Methanol is mostly used to create other chemicals such as acetic acid and formaldehyde.	• It has antiseptic properties and is found in anti-bacterial wipes and hand gels.

	<ul style="list-style-type: none"> It is also the base of many paints and perfumes because it is a good solvent.
<ul style="list-style-type: none"> Its odour is distinctive, and it burns as a bright white flame. 	<ul style="list-style-type: none"> It has a strong, burning odour and will burn as a bright blue flame.
<ul style="list-style-type: none"> Most of the methanol is produced from coal and natural gas. 	<ul style="list-style-type: none"> Most of the ethanol is produced by fermentation of biowaste and food crops.
<ul style="list-style-type: none"> Volatile, flammable, colourless They are both used as solvents Both are clean fuels Both can be blended with petrol and used as automobile fuel 	

Methanol

- Methanol and ethanol can be produced from **coal, petroleum, natural gas and biomass waste**.
- Methanol and ethanol can be used as **clean alternative fuels** in automobiles.
- These fuels can contribute to '**Import substitution**' of crude oil.
- [India imports methanol from Saudi Arabia and Iran](#) at present.
- Methanol economy will help India use its vast reserves of coal (burning coal directly is bad).

Advantages of methanol as fuel

- Methanol and ethanol are relatively cleaner fuel (low carbon emissions).
- Unit cost of energy produced from methanol is **cheaper** than that from petrol, diesel, LPG, etc.
- It is **lighter** than petrol and diesel but heavier than LPG.
- CO₂ can be converted to methanol ([treating CO₂ with hydrogen gas \(H₂\)](#) can produce methanol or methane).
- Methanol burns efficiently in all internal combustion engines, produces no particulate matter, no soot, almost nil SOX and NOX emissions.
- Methanol 15 % blend (M15) in petrol [will reduce pollution by 33%](#) & diesel replacement by methanol will reduce by more than 80%.
- To adopt Methanol as a transport fuel, it requires little infrastructure modifications compared to other alternative fuels such as CNG, LPG, etc.

Biodiesel (renewable energy)

- Biodiesel is made from **renewable sources** such as **vegetable/plant/animal oils** for use in diesel engines.
- Vegetable oils are chemically called [triglycerides \(fats\)](#).

- Biodiesel comprises esters of long chain [fatty acids](#) derived from these oils.
- To make biodiesel, fats in the vegetable oil (triglycerides) are reacted with **alcohol** — usually **methanol**.
- In this reaction, glycerine (in triglycerides) is replaced by methanol to produce **methyl ester (biodiesel)**.
- Biofuel development in India centres around the cultivation of **Jatropha plant seeds** — rich in oil (40%).
- In 2008, the Indian Government announced its '**National Biofuel Policy**'.
- It aims to meet 20% of India's diesel demand with fuel derived from plants.

Biodiesel blend

- The biodiesel blend is a mix of biodiesel with fossil fuel, designated as BXX, where XX represents the volume percentage of biodiesel in the blend (**B100 means pure biofuel**).
- Currently, biodiesel is blended with the fossil fuel in the proportion of 2%, 5%, etc, although technically it can be used as a pure fuel with some minor modifications in existing engine systems.
- The blend ratio is based more on the available quantity of biodiesel rather than technical reasons.
- Filling stations in the European Union countries and the United States supply everything from B2 to B100.
- **Except B100**, these blends can be **used in any existing diesel engine without any modifications**.

Advantages of Biodiesel

- Biodiesel has **intrinsic lubricating properties** due to the presence of long chain fatty acids, which significantly helps reduce engine wear and tear.
- The **Cetane Index (CI)**, a measure of the inflammability of fuel, is more than 56 to 58 for biodiesel compared 50/52 for fossil fuel. A higher CI value will mean **better ignition and combustion**.
- The biodiesel molecule contains about 11% oxygen, facilitating improved combustion and **less soot**.
- The sulphur content in biodiesel is as low as 0.001%.
- As its viscosity is similar to fossil fuel, **no changes are required in the existing fuel injection equipment**.
- It is **less toxic** and biodegradable.
- It is much safer to handle due to its **high flash point** — more than 130 °C compared to 51 °C for fossil diesel.
- Substantial reduction in the emission of particulate matter, unburnt hydrocarbons and carbon monoxide and complete elimination of sulphur products in exhaust emission.
- Biodiesel requires **less energy to produce** than fossil fuels (for every unit of energy needed to produce biodiesel, 3.24 units of energy are gained) (each litre of biodiesel saves [2.2 kg greenhouse gases](#)).
- Biodiesel production doesn't hurt the production of edible oil ('food or fuel' dilemma doesn't exist).

Advantages over other alternative fuels (CNG, LNG, LPG and ethanol)

Mains practise: Biodiesel emerges as the most promising alternate fuel. Examine.

- Unlike alternative fuels such as CNG, LNG, LPG, and ethanol, biodiesel is both **renewable and sustainable**.
- Unlike other alternative fuels, biodiesel doesn't require significant modifications in existing infrastructure.
- CNG, LNG, LPG, etc. (**low energy content per volume** = frequent refuelling) require bigger storage space.
- Ethanol manufactured from molasses is renewable, but its calorific value is less than that of biodiesel.
- Switching to biodiesel would be **far smoother and cheaper**.
- Abundant availability of fallow land and labour, favourable weather conditions, availability of a wide range of oilseed crops such as [soybean, neem, mohwa, jatropha, castor, kusum palash and karanjia](#).

{Geo – EG – 19/05/15} Graphite reserves in India

[The Hindu](#) | 15-05-2019 | Geography > Economic Geography > [Mineral Distribution > Graphite](#)

- Arunachal Pradesh has asked the Geological Survey of India (GSI) to explore the possibility of surveying and drilling for minerals along the India-China border.
- The GSI presented data showed that the State has **35% of the total graphite reserves in India – the highest in the country**.
- The GSI's 2013 report, however, showed **Arunachal Pradesh** sits on 43% of the country's graphite resources followed by Jammu & Kashmir (37%), Jharkhand (6%), Tamil Nadu (5%), and Odisha (3%).
- Mining the resource from Arunachal can cut down India's import of the mineral.

Graphite

- Graphite is the only non-metal element that is a good conductor of electricity.
- Graphite is known as a dry lubricant for its greasy feel.
- Graphite has many industrial uses, particularly for products that need very high heat.

More info: <https://www.pmfias.com/diamond-graphite-distribution-india-world-differences-between-diamond-graphite/#Graphite>

{Geo – HG – 19/05/15} Maldharis of Kutch

[The Hindu](#) | 15-05-2019 | Geography > Social Geography (part of Human Geography) for Prelims

- **Banni**, an arid grassland system, too saline for agriculture, but fertile for certain grasses, is home to a centuries-old pastoral community — the **Maldharis**.

- **Maldharis** have developed uniquely tolerant breeds of livestock such as the kankrej, the **Banni buffalo (produces high-fat milk despite water scarcity)**, and the **kharai camel (swimming camel)**.
- **Prosopis juliflora (mad babool)** species were introduced in the 60s to prevent desertification.
- The **Banni** grasslands are now under threat from these invasive trees (**Prosopis juliflora**).
- But it has also meant unexpected income: **Prosopis charcoal** has a sizeable market demand.

{DM – 19/05/06} It's time for a National Disaster Insurance Policy (Mains topic)

[Livemint](#) | 06-05-2019 | Disaster Management | Notes on Disaster Management is in the making.

- National Disaster and Management Authority (NDMA) was set up in the wake of 2004 tsunami.
- NDMA was created by an Act of Parliament in **2005**.
- NDMA has been successful in reducing the casualties during disasters like cyclones.
- Now it's time to move to the next level and work out ways to minimize the loss of property and assets.
- Disaster insurance would spread the risk of exposure to calamities across large populations.

Policy is not easy to achieve

- Even developed countries are struggling to design effective insurance programmes for the disaster struck.
- Citizen's may not participate in such insurance schemes (already paid GST, income tax na, why more!).
- Governments usually don't have enough money and the insurers will not participate in the high risk schemes.
- Big ticket schemes are financially unviable without people's cooperation. E.g. Ayushman Bharat looks attractive initially but will have long term financial implications. (GOI simply doesn't have so much money!).

Ideas

- Premium fees need to be borne by both the government and the citizens.
- **Region and disaster specific insurance schemes** can be launched so that the citizens of the potential disaster zones can be convinced to join the insurance scheme.
- The principle of **progressive rates** would need to apply based on the disaster exposure of the region (e.g. coastal dwellers will pay high premium compared to non-coastal residents).

{DM – 19-05/01} National Crisis Management Committee (NCCM)

[PIB](#) | 01-05-2019 | Disaster Management | Notes on Disaster Management is in the making

- NCCM meets to take stock of disaster management arising out of the ESCS 'Fani'.

About NCMC

- It is an ad hoc committee (**temporary committee**) set up by the GOI in the wake of a **natural calamity**.
- It is headed by **Cabinet Secretary of GOI** (top-most executive official of GOI).
- On the constitution of NCMC, the Secretaries of other departments must abide by the NCMC's instructions.
- NCMC will give directions to the Crisis Management Group of the Home Ministry as deemed necessary.

Functions of NCMC

- Coordinate the activities of the Central Ministries (Departments of GOI) and the State Governments in relation to dealing with a natural calamity (disaster preparedness and relief).
- Oversee effective coordination and implementation of relief measures and operations.
- Review every year Contingency Plans formulated by the Central Ministries/Departments.
- Review the measures required for dealing with a natural calamity.