3. Discuss how space technology can help India cope with floods. (150 words) 10

Approach:

- Briefly explain India's vulnerability towards flood.
- Explain how space technology can be used in flood management.
- Conclude accordingly.

Answer:

As per National Flood Commission, around 40 million hectares of land in the country are subject to floods and on an average 18.6 million hectare of land is affected annually. In recent times, due to climatic change, there is a shift in rainfall patterns and increased frequency of cyclones, which has led to floods in regions other than the traditional flood prone Indo-Gangetic-Brahmaputra plains.

Although floods cannot be prevented, the damage they cause can be minimised by proper management measures. In this context, space technology comes in handy to cope with the phenomenon in the following ways:

During Preparation phase:

- Observation satellites enable **continuous monitoring** of atmospheric as well as surface parameters attributing to the flood. They can be used to provide **early warning** such as area where a cyclone will pass/strike, cloud formation leading to heavy rainfall, rise in river water level, etc.
- Using past remote sensing data acquired during floods, **mapping or hazard zonation** can be done to show areas, which are severely or moderately at risk.
- Using flood inundation models in GIS environment, optimum plans can be generated for carrying out rescue operations.

During Floods:

- Because of the clear difference in the spectral signatures, it is possible to **map areas** under standing water, areas from where flood water had receded, submerged standing crop areas, sand casting of agricultural lands, breaches in the embankments, marooned villages and towns etc.
- Satellite data can be used at regular intervals for **updation of the flood condition on the ground** in terms of flood progression, recession and persistence, which can be used in quick actions and decision-making.
- Space technology can also be used to **disseminate critical information** to authorities and people on a real time basis.

During Mitigation phase:

- Using high-resolution historic and present satellite imagery, mapping of river configuration and flood control works, changes in the river configuration, and studies on bank erosion/deposition can be carried out. It can also demarcate the drainage congestion areas.
- Analysis of satellite data can also help in further identification and **rehabilitation** of the affected population. **Subsidies, insurances and other claims** can be sorted out with the help of these data.
- GIS can also provide **evidence-based status of flood control works**.

In India, the Disaster Management Support (DMS) Programme, comprehensively addresses various aspects of natural disasters in the country, using space-based inputs. ISRO disseminates relevant information in interactive geo-spatial domain through various geoportals like Bhuvan, National Database for Emergency Management and MOSDAC for the administrators to better understand the impact and for improved decision support.