

# Indian Space Research Organization's role in forest cover monitoring for India's REDD+ Commitments

Manini Syali

Vivekananda School of  
Law and Legal Studies,  
Delhi, India



[This Photo](#) by Unknown author is licensed under [CC BY](#).

# SCIENTIFIC MONITORING OF FOREST COVER IN INDIA

Mining activities, hydroelectric power projects, and illegal encroachment: threats to tropical forests.

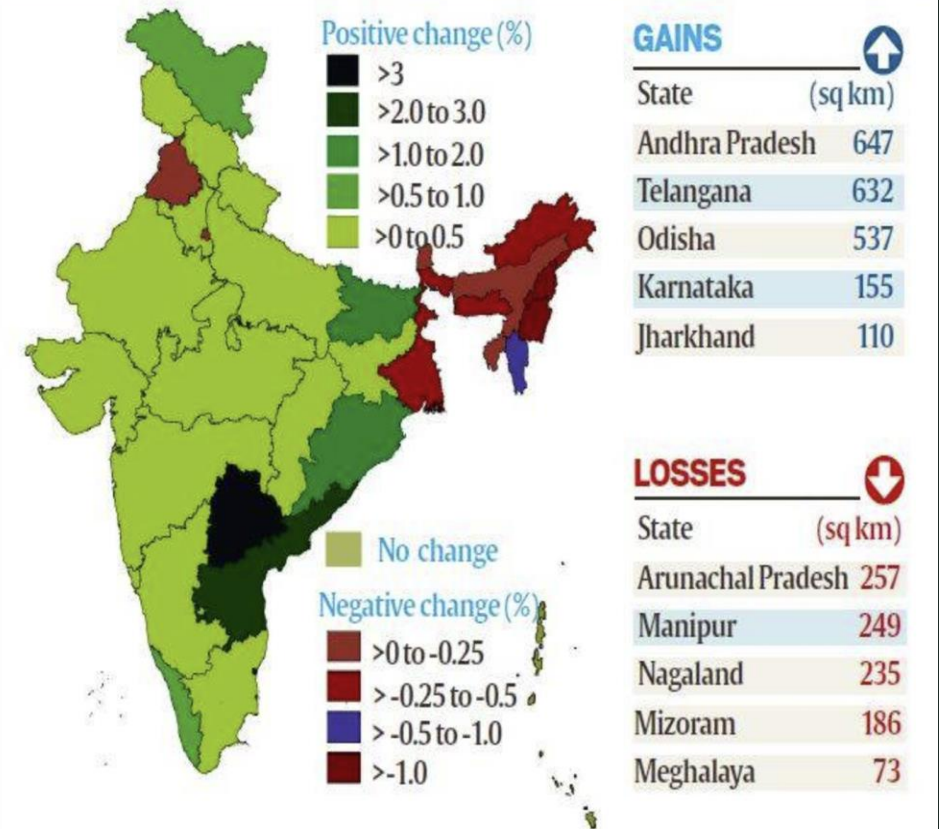
Monitoring essential to ensure long-term sustainability.

India amongst the few countries to have a scientific system of periodic forest cover assessment

The Forest Survey of India (FSI) started publishing its biennial State of Forest reports in 1987.

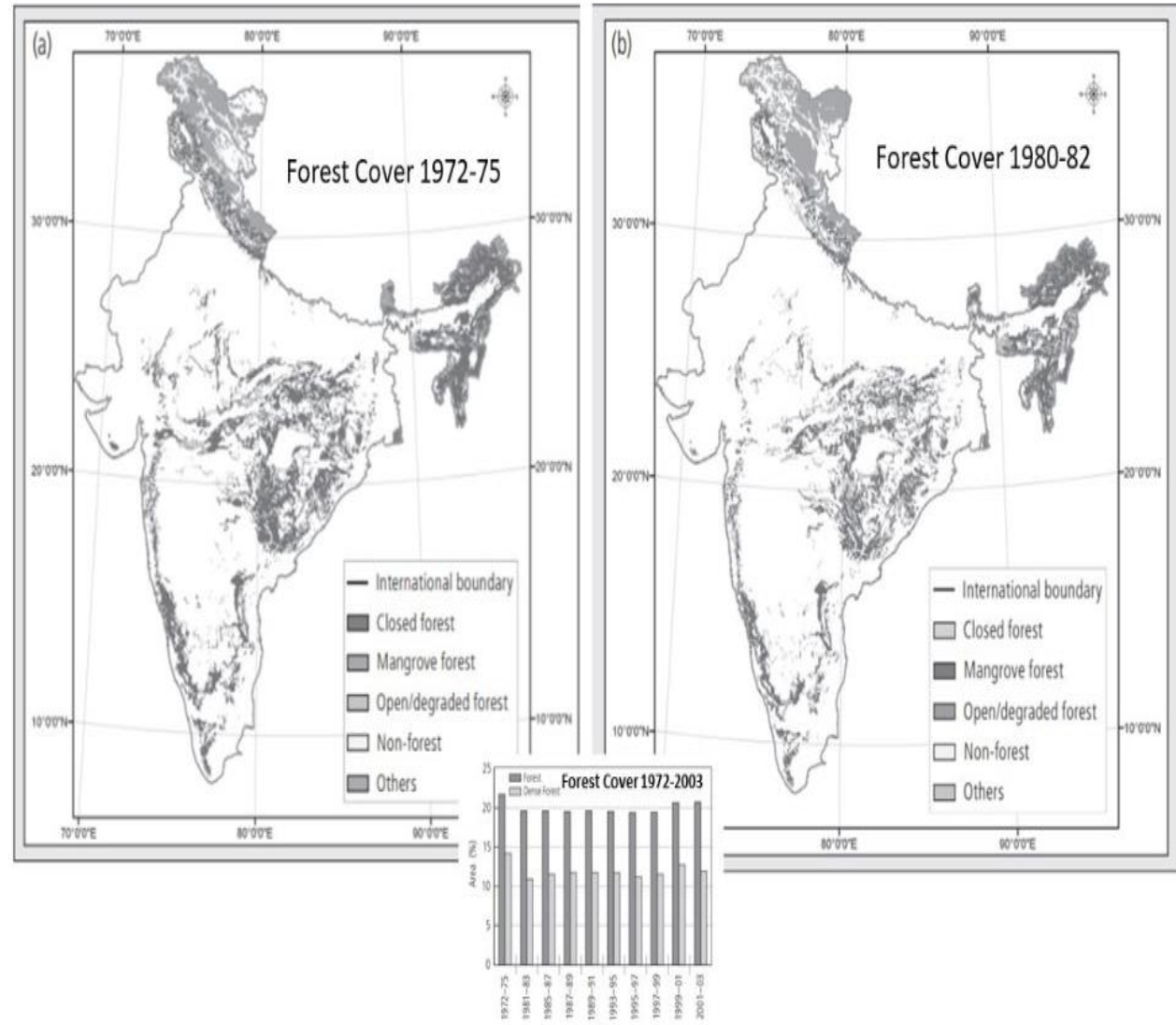
ISRO has also created portals like Bhuvan.

## GAINS & LOSSES IN FOREST COVER SINCE 2019

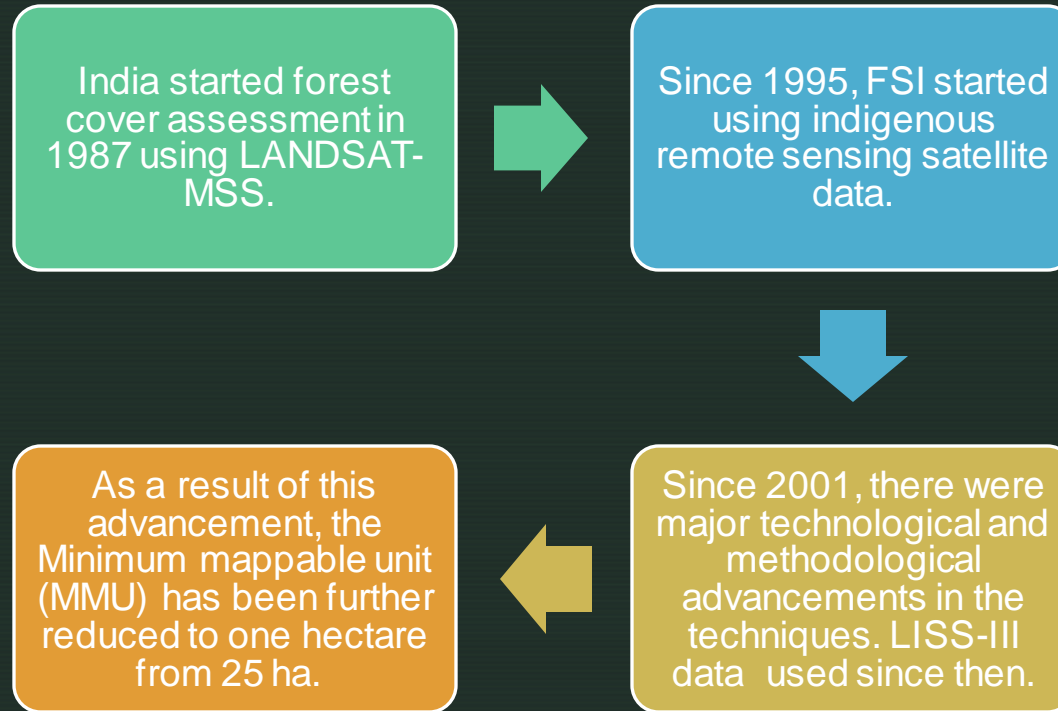


# BACKDROP OF REMOTE SENSING OF FOREST COVER

- Remote Sensing Agency given responsibility to prepare map of the forest cover, using satellite data.
- the study showed lost ~2 % forest cover in almost a decade during 1972-75 and 1980-82.
- Questions raised on the definition of forests, quality and season of satellite data used.
- ISRO undertook interaction with Forest survey of India (FSI).

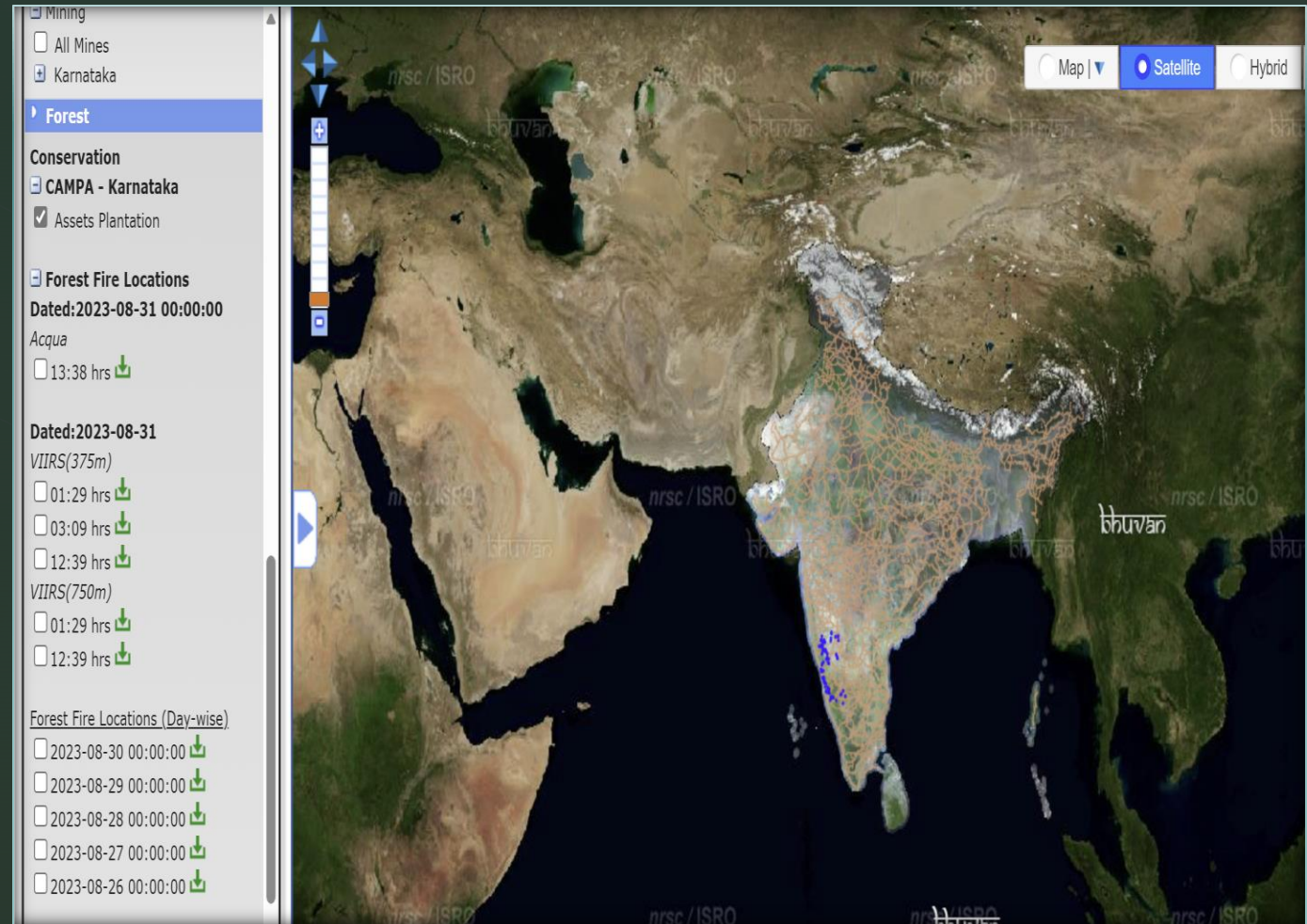


# EVOLUTION



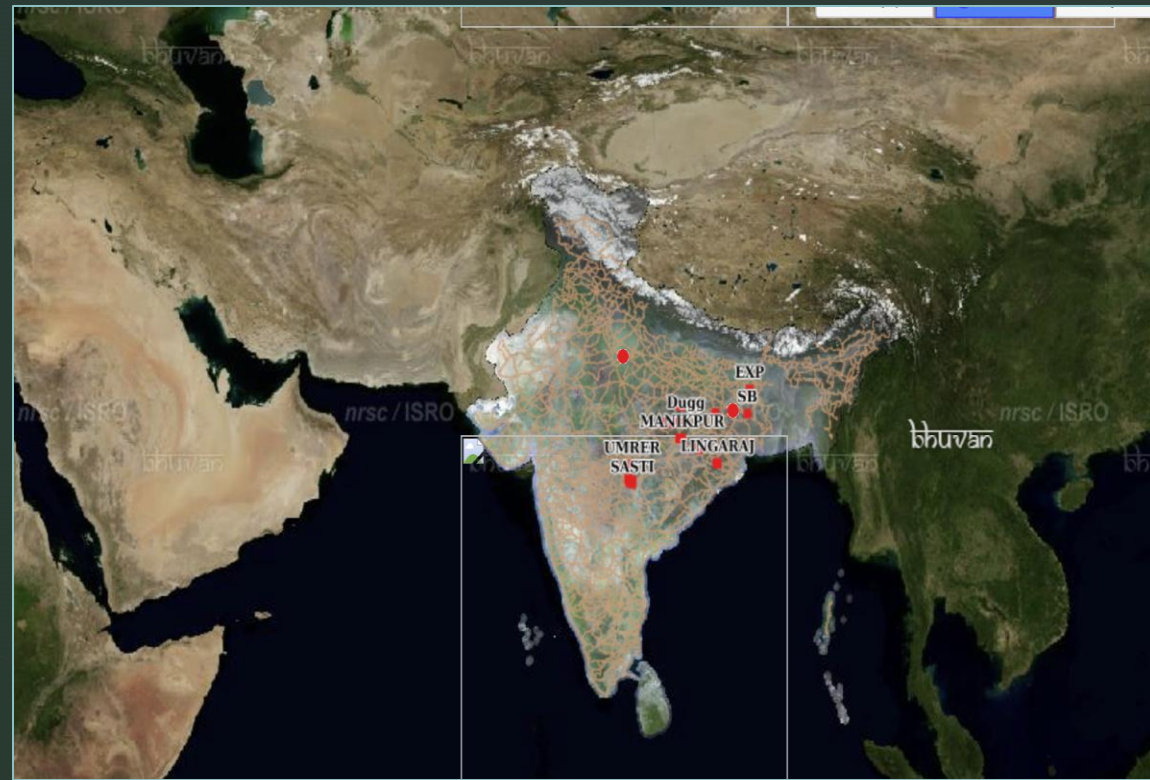
# DIFFERENT APPLICATIONS OF REMOTE SENSING DATA OF ISRO

- Remote sensing data is used for varieties of applications in forestry and environment.
- The multi-resolution satellite data (eg. IRS AWiFS, INSAT and others) are used



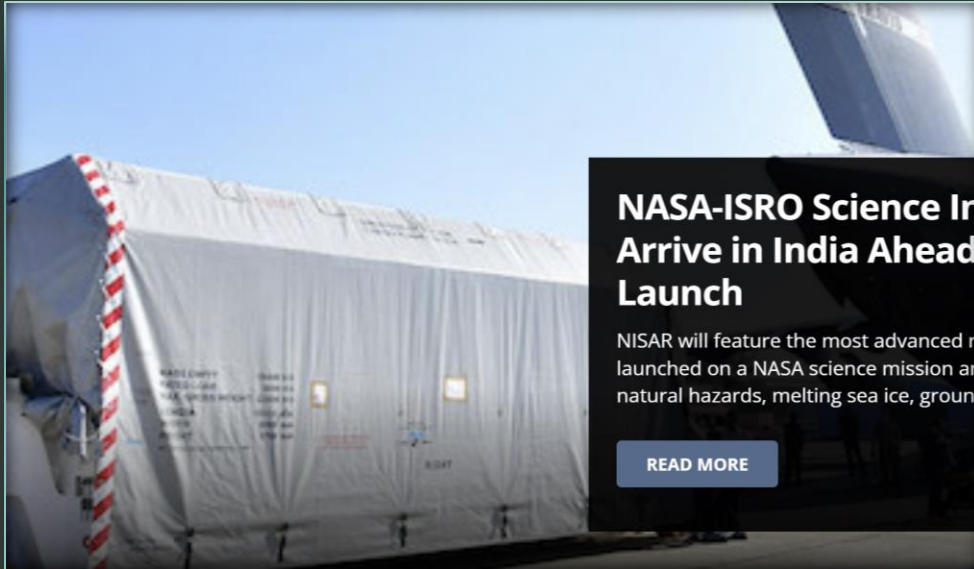
**EXAMPLE: ACTIVE FOREST FIRE –  
REAL TIME INFORMATION**

Forest fires are routinely monitored using multi temporal data and near real time satellite data and are provided to Forest Survey of India (FSI), MoEF&CC and other state forest departments for field interventions.



**STATEMENT SHOWING Active Fire Locations AS ON 2023-08-31 00:00:00 13:38:01**

Longitude	Latitude	Sensor
86.208	23.778	Aqua
78.664	26.767	Aqua



## INTERNATIONAL COOPERATION AND ACCESSIBILITY OF ISRO DATA

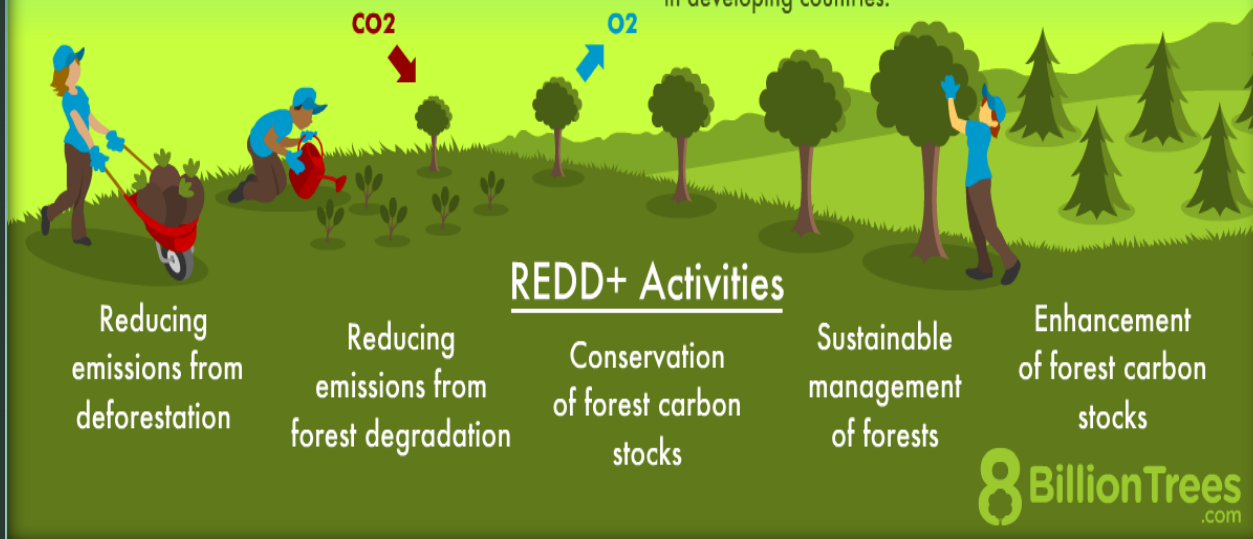
- Committee on Earth Observation Satellites (CEOS),
- Group on Earth Observations (GEO)
- G20 initiative
- Collaboration with ASEAN for resource assessment and disaster management support.
- ISRO, along with other BRICS Space Agencies signed an agreement for sharing remote sensing satellite.

# SPACE REMOTE SENSING'S APPLICATION FOR REDD+ MECHANISM

## What is REDD+ ?

REDD+ stands for Reducing Emissions from Deforestation and forest Degradation, and the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries.

It is an international framework developed by the United Nations Framework Convention on Climate Change (UNFCCC) in 2005. It aims to stop global warming through the enhancement and conservation of forests in developing countries.



- One of the major applications of ISRO's space remote sensing is to support India's commitments under the UNFCCC and REDD+.



# Elements of REDD+ and UNFCCC Decision (Cancun Agreements Para 71)



Key elements of REDD+ to be developed by developing country Parties

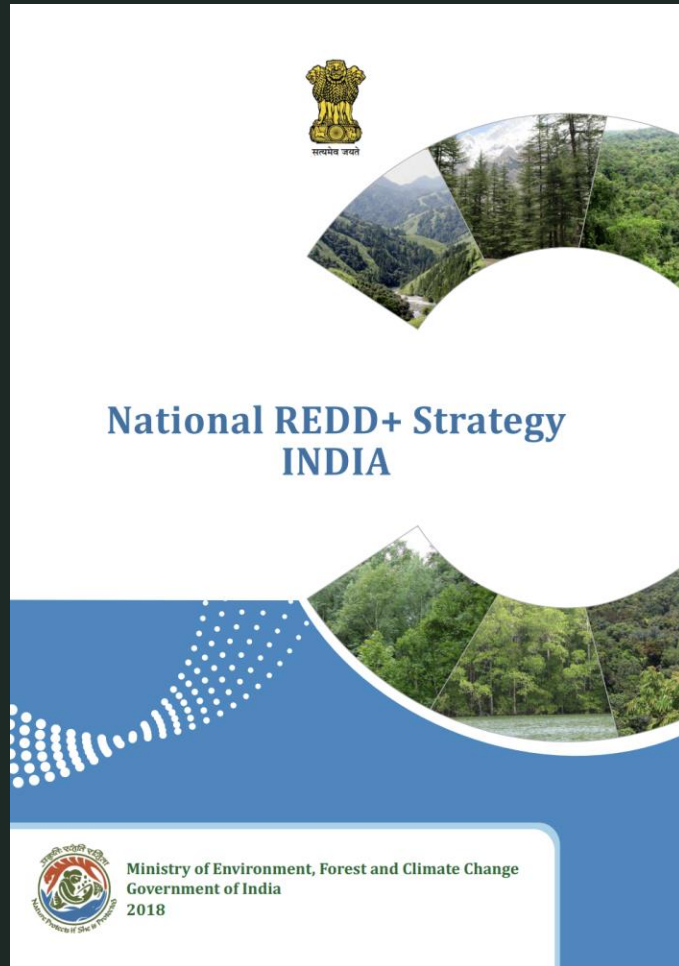
## REDD+ AND DEVELOPING COUNTRIES

adequate and predictable support, including financial resources key component of REDD+.

The agenda of "Reducing emissions from deforestation and forest degradation in developing countries (REDD)" first introduced in UNFCCC as climate change mitigation.

REDD+ decision in Cancun (COP16), Governments agree to boost action to curb emissions from deforestation in developing countries with t support.

With India's intervention for inclusion of policy approach of conservation the concept added.



# REDD+ AND INDIAN COMPLIANCE

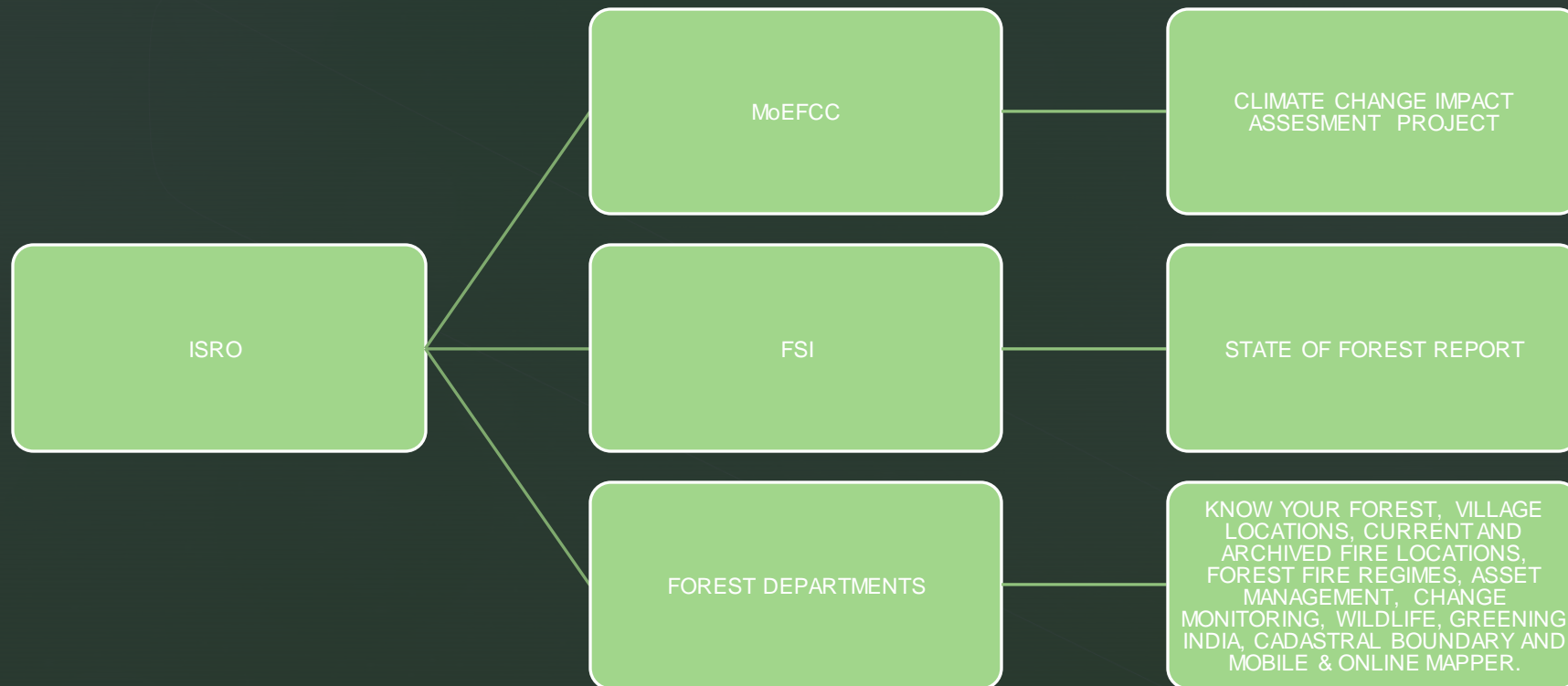
- India has submitted its national forest reference level (FRL) and forest reference emission level (FREL) to the UNFCCC, based on the construction by a consortium of institutions in the domain of forest and environmental management, like Forest Survey of India, Indian Institute of Science etc.

# SPACE REMOTE SENSING FOR REDD+ IN INDIA

- REDD+ requires accurate, consistent and transparent measurement, reporting and verification (MRV).
- National Forest Monitoring System (NFMS) of India is synergy of processes that support strategic decision making
- various forest monitoring systems and applications: Geosphere-Biosphere Programme (ISRO-GBP), Vegetation Carbon Pools (VCP) and Soil-Vegetation-Atmosphere Carbon Flux (SVAF) projects, and the Biodiversity Characterisation at Landscape Level.

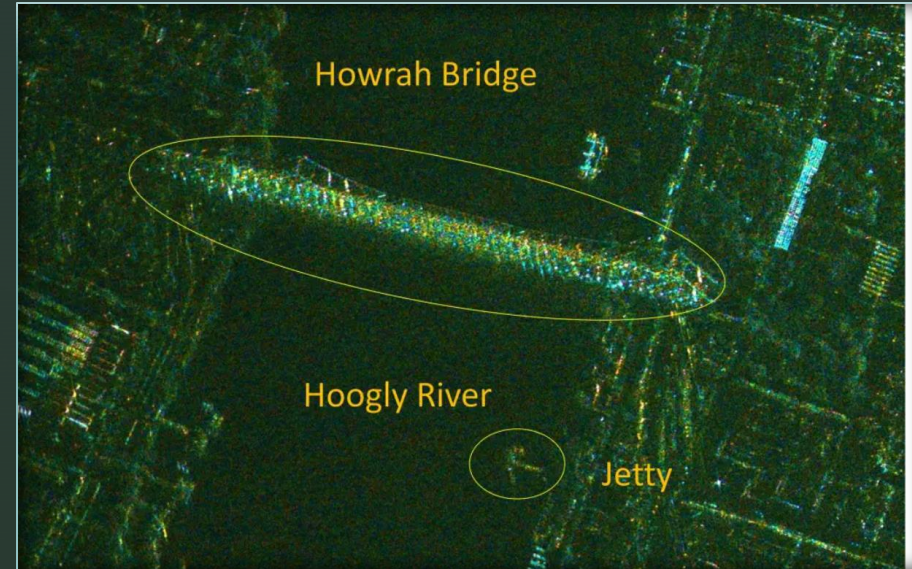


# Ground level Climate Action by Different Agencies



# RISAT-1, SAR DATA FOR REDD+ MECHANISM

- Optical data have some limitations, such as cloud cover, haze and shadows- not very sensitive to forest structure and biomass.
- ISRO has also explored the use of synthetic aperture radar (SAR) data, such as from the RISAT-1 satellite, for forest cover mapping.
- SAR data can complement optical data by providing additional information.
- It can improve the accuracy of forest cover classification.
- SAR data can help in detecting subtle changes in forest cover.
- ISRO's contribution towards forest cover mapping using remote sensing data has been significant for India's REDD+ commitments.



# LEARNINGS

- ISRO has been instrumental in developing and implementing India's National Forest Monitoring System (NFMS) for REDD+ reporting.
- Provided satellite data, geospatial tools, and technical support
- Contributed to India's Forest Reference Emission Level (FREL) and Forest Reference Level (FRL).
- ISRO has demonstrated applying remote sensing and geospatial technologies for forest monitoring and REDD+ reporting, which can be useful for other developing countries as well.

# WAY FORWARD

1

Need for FSI's redefinition of 'forest'.

2

Need for dedicated satellite mission for monitoring forest.

3

Develop a robust national forest inventory system.

4

Enhance the capacity of forest managers for REDD+ reporting

5

Strengthen the institutional and policy framework for REDD+.

6

Promote regional and international collaboration on REDD+.



THANK YOU

