

SOIL EROSION

Dr.Kaustubh Bondre

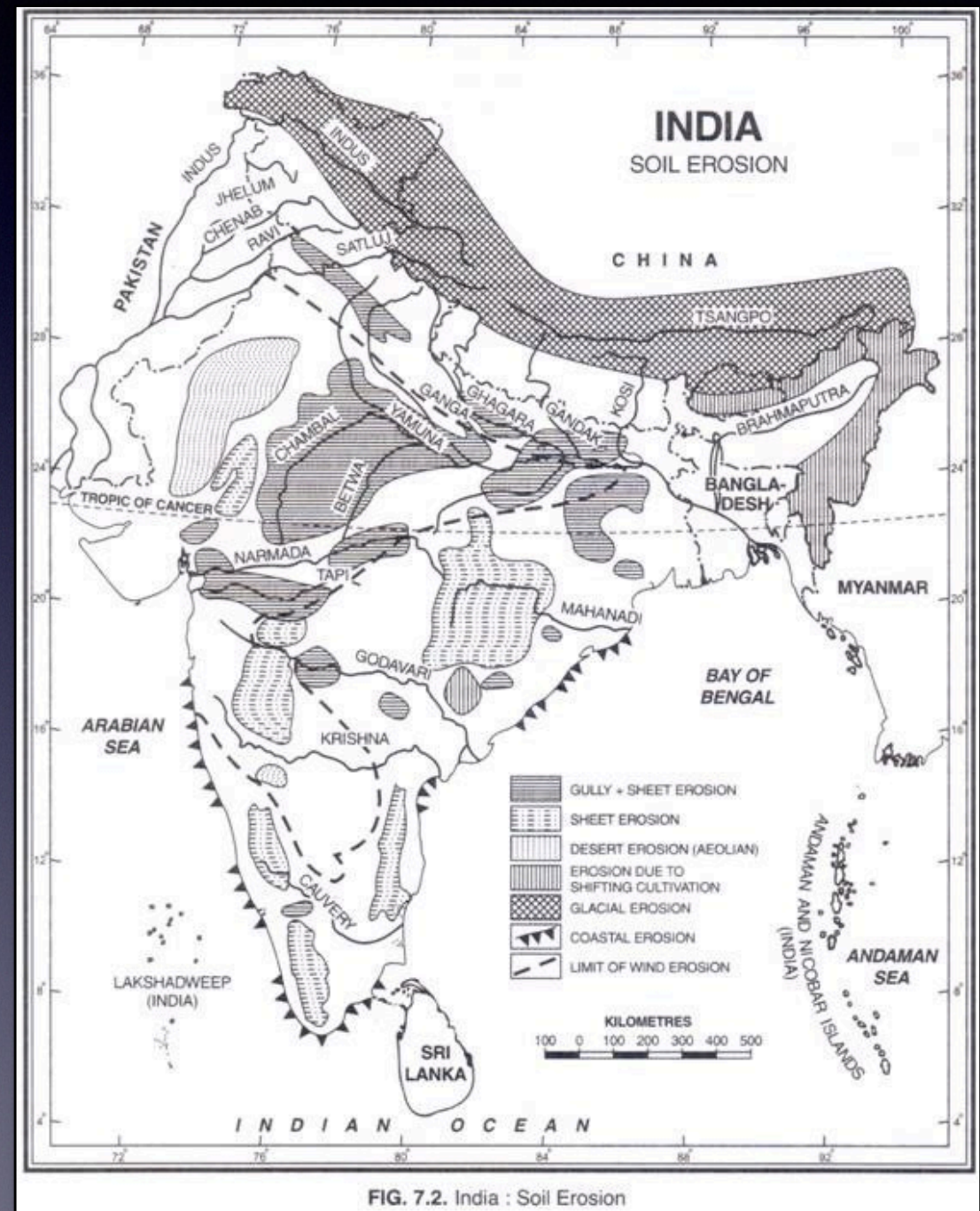
Definition

- Soil erosion occurs when soil is removed through the action of wind & water at a greater rate than it is formed.
- It is a natural process, the rate of which has been increased by man.



The problem statement

- One-fourth of total area is exposed to wind/water erosion.
- 1/8th of land has undergone serious erosion.
- Wind erosion is a serious problem in arid & semi-arid parts of NW India.



Water erosion

Sheet erosion

Sea erosion

Glacial erosion

Rill erosion

Gullying

Ravines

Badland
topography

Wind erosion

- Aeolian erosion is common in arid & semi-arid regions.
- Desertification may occur.
- Dry, bare soil susceptible.
- Overgrazing contributes.
- Saltation & surface creep.
- Desert pavements.



Nature of rainfall

Wind speed

Human density

Factors

Deforestation

Overgrazing

Agri practices

Physiography

Agricultural practices resulting in soil erosion

- Soil compaction
- Poor drainage
- Wrong ploughing
- Monoculture
- Lack of crop rotation
- Shifting cultivation
- Flood irrigation
- Pesticides & chemical fertilisers



Effects of soil erosion

- Erosion of top layer reduces the fertility of soil.
- Leaching occurs resulting in loss of soil nutrients.
- Percolation reduces, lowering groundwater level.
- Reduction in soil moisture affecting its fertility.
- Increase in frequency & intensity of floods & droughts.
- Silting of water bodies & threat to aquatic systems.
- Intensity of landslides increases.
- Desertification may occur. Infrastructure may be damaged.

Soil erodibility

- Soil erodibility is an estimate of the ability of soils to resist erosion, based on the physical characteristics of each soil.
- Texture is the principal characteristic affecting erodibility, but structure, organic matter and permeability also contribute.
- Generally, soils with faster infiltration rates, higher levels of organic matter and improved soil structure have a greater resistance to erosion.
- Sand, sandy loam and loam-textured soils tend to be less erodible than silt, very fine sand and certain clay-textured soils.

Emerging threats

Urbanisation

Climate change



Runoff from a construction site



Soil conservation

- Involves practices to protect the soil against erosion or deterioration.
- Involves sustainable & ecological use of soils.
- Sustainable exploitation.



Methods of soil conservation

- Information & awareness.
- Afforestation, reforestation & halting deforestation
- Restoration of wastelands
- Proper waste management
- Planting vegetation cover
- Water control & drainage (watershed)
- Reduce pollution
- Avoid overgrazing
- Dams & embankments
- Shelter belts



Agricultural techniques

- Choice of crops (ecological)
- Contour ploughing
- Contour bunding
- Terrace farming
- Zero-till farming
- Organic farming
- Crop rotation
- Strip cropping
- Mulching

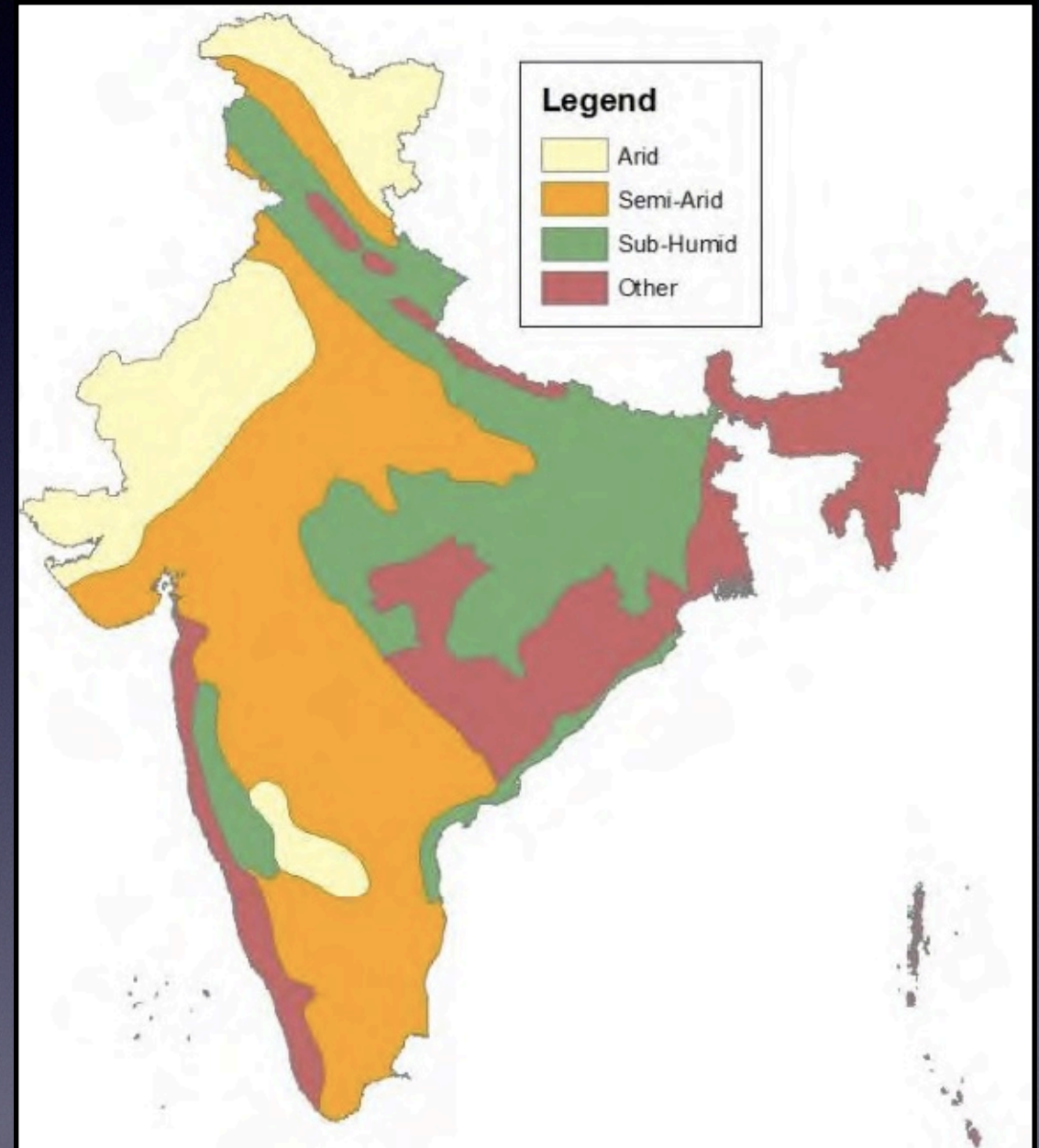


Desertification

Defined as the spread of desert-like conditions in the arid & semi-arid areas due to human actions or climate change.

The concept

- Nearly 30% of India is facing desertification
- Drylands are more prone
- Nearly 90% of Indian states have reported increase in areas under desertification
- Climate change is complicating factor



Areas affected by desertification

Irrigated croplands

Rainfed croplands

AREAS

Grazing
lands

Dry
woodlands

Causes of desertification

Water erosion

Wind erosion

Vegetation loss

Salinity

Human settlements

Agriculture practices

Overgrazing

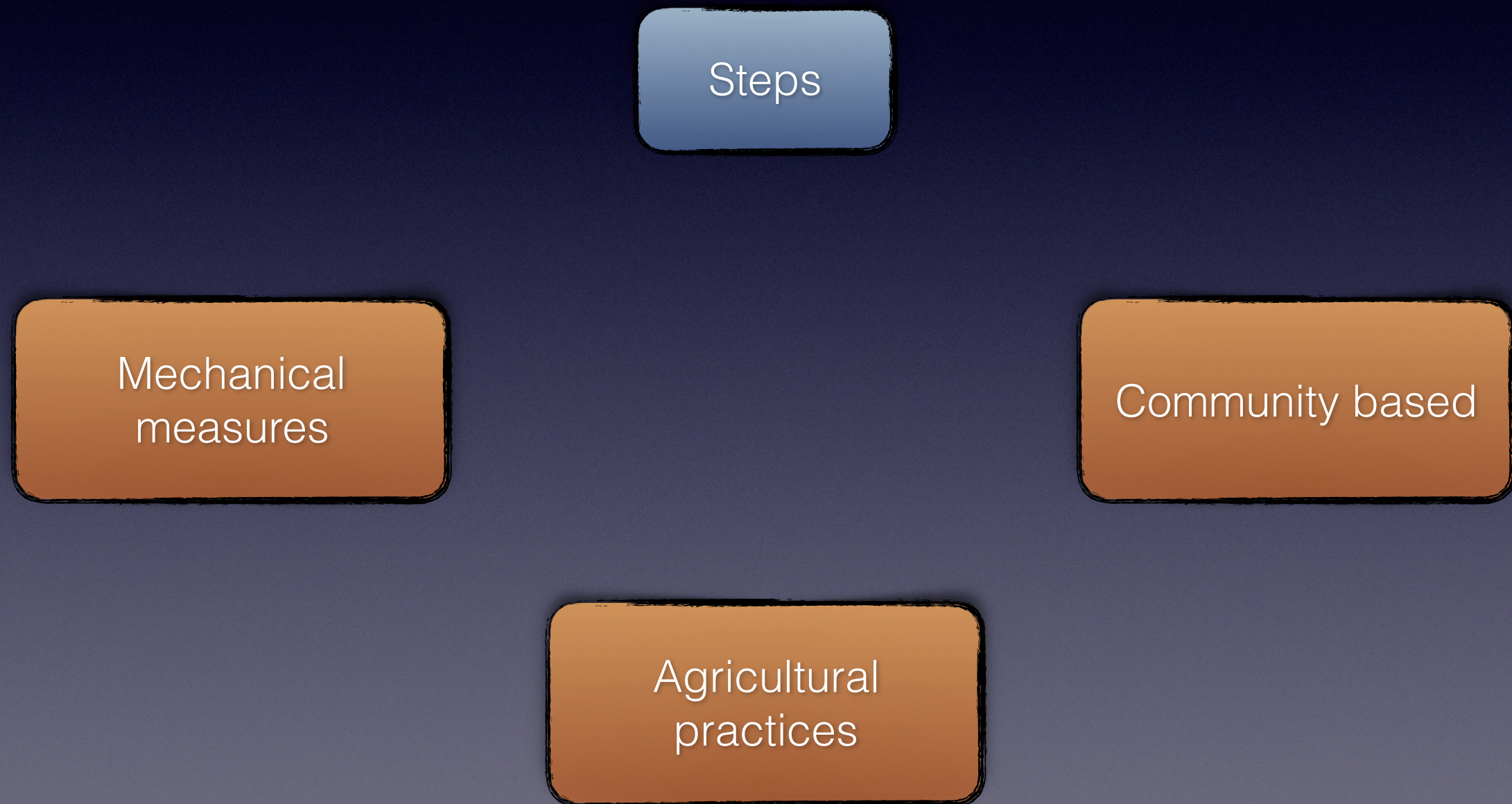
Natural disasters

Effects of desertification

- Loss of arable land
- Hunger & malnutrition
- Flooding
- Decline in water quality
- Overpopulation
- Poverty
- Communicable diseases
- Increased droughts & wastelands



Steps to prevent desertification

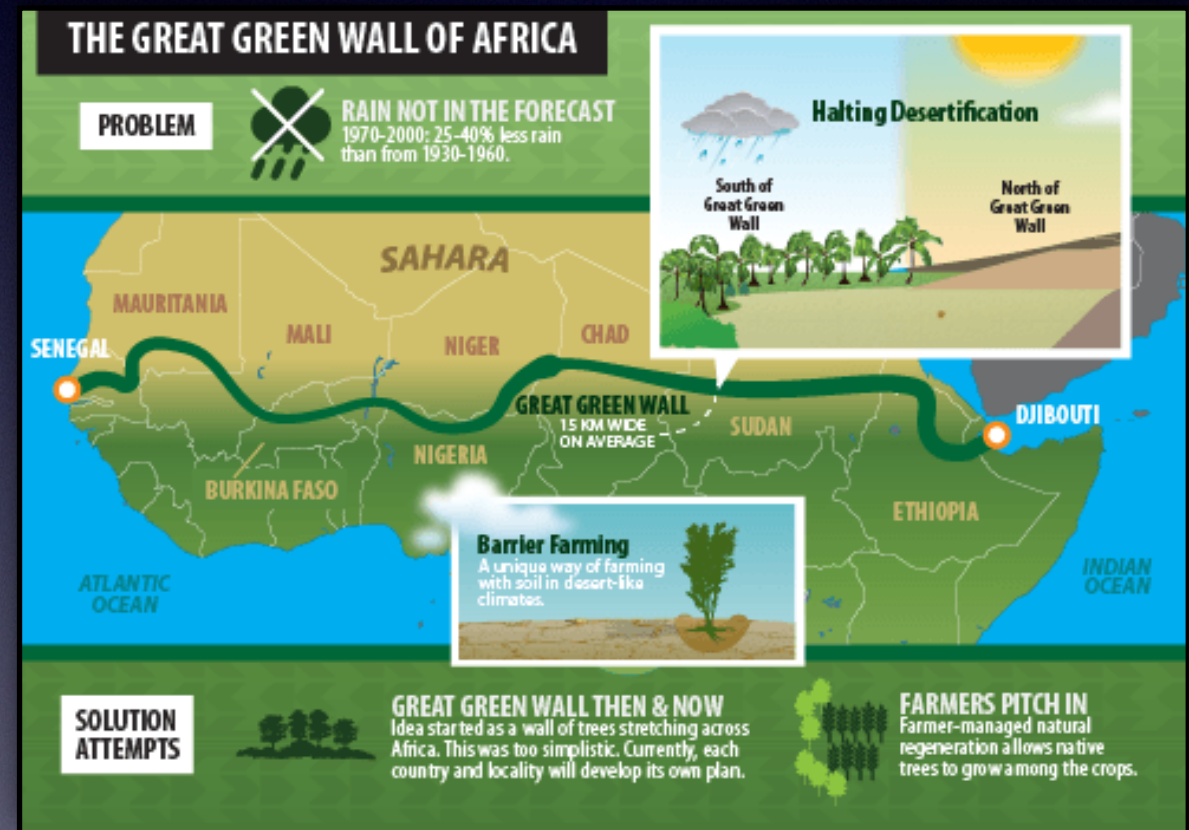


Important points

- Watershed management approach
- Land-use & policy changes for sustainable agri practices
- Scientific & modern agricultural technology
- Sustainable agriculture using traditional knowledge
- Empowering the local communities & Promotion of alternative livelihoods
- Effective measures to counter soil erosion & Rotational grazing
- Seed banks & introduction of selected species
- Supplying people efficient & modern fuel & energy sources
- Awareness generation for population control

Case study of great green wall in Sahel Sahara

- Eleven countries in Sahel region of Africa are focussing on reversing desertification
- Traditional practices & use of local species is encouraged
- Partly managed by Global Environment Facility (GEF)



THANK
YOU..!!