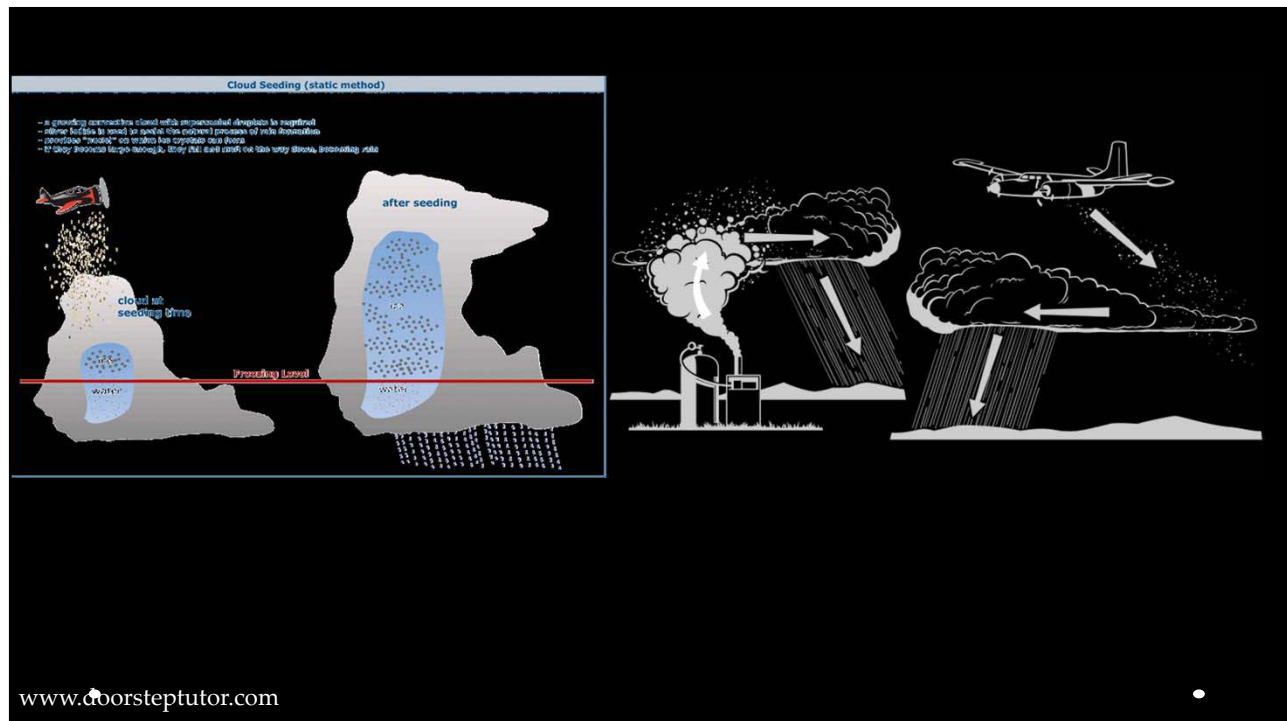


## Cloud Seeding Project for 2017 Monsoon

### AgI

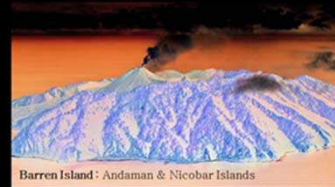
- First controlled experiment to quantify extent to which clouds form water drops large enough to make rain.
- Ground radar will be used to track clouds and verify which ones contributed rain.
- Largest cloud seeding system in world: China. Rain in arid regions in Beijing just before 2008 Olympic Games to clear air pollution.
- USA: To increase precipitation in areas of drought, to reduce size of hailstones that form in thunderstorms, and to reduce amount of fog in and around airports.
- 2006, an \$8.8 million cloud seeding project began in Wyoming.
- Australia: CSIRO's activities in Tasmania in 1960s - Seeding over Hydro-Electricity Commission catchment area on Central Plateau – increased rain to as high as 30% in autumn.
- Russian military pilots seeded clouds over Belarus after Chernobyl disaster to remove radioactive particles from clouds heading towards Moscow.

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### Barren Island: House of India's Active Volcano

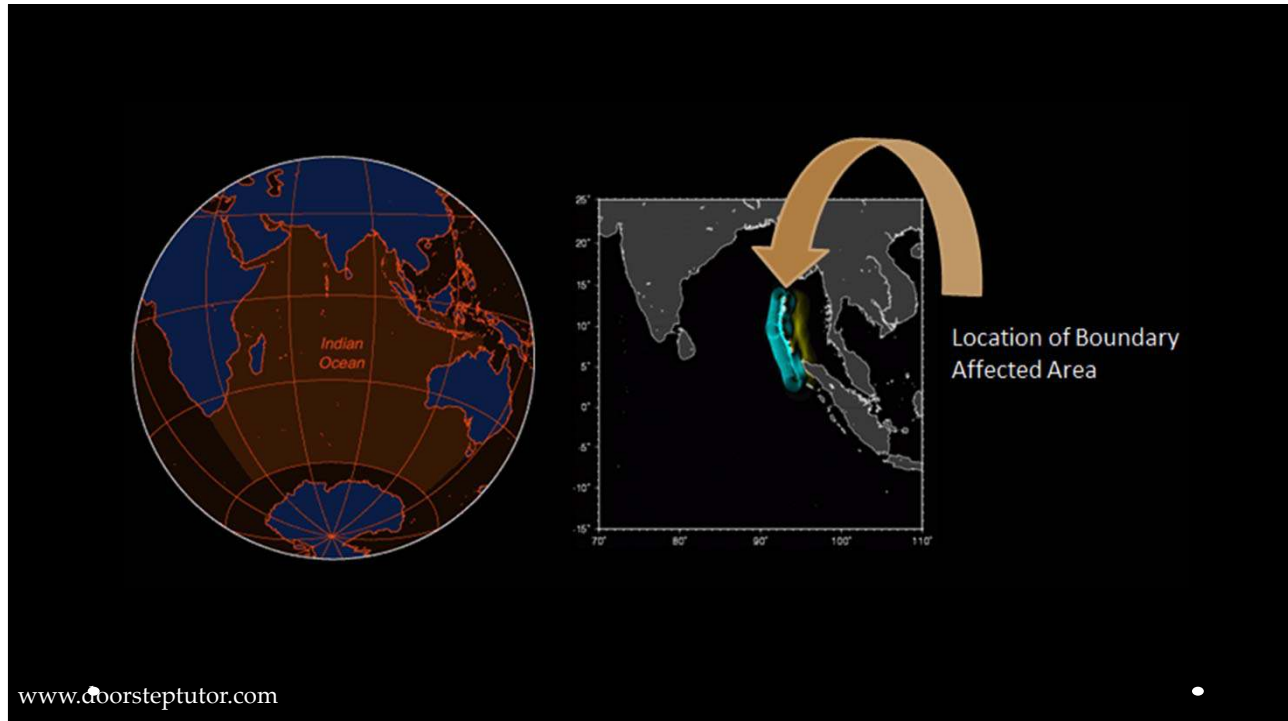
- Volcano started erupting in 1991 and has since then shown intermittent activity.
- It had started showing activity in 1991 after being dormant for over 150 years.
- Andaman Basin - sea floor samples.
- Daytime - ash clouds.
- Sunset - red lava fountains from crater.
- Scientists recovered coal-like black pyroclastic material from the area.
- Barren Island volcano is located 140-km north-east of Port Blair.



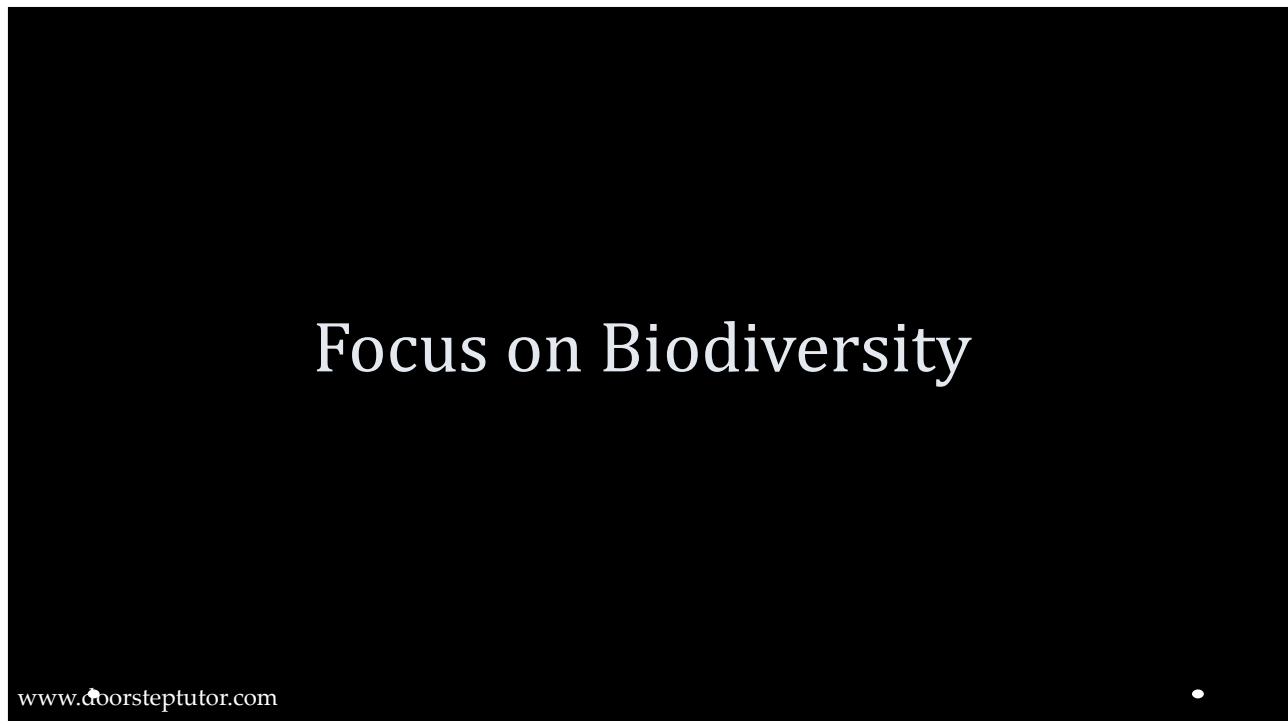
### Newly Formed Fracture in Indian Ocean May Trigger Quakes in Future

- Nanyang Technological University in Singapore and the Indonesian Institute of Sciences
- New plate boundary forming on the floor of Indian Ocean in the Wharton Basin.
- Conducted sea floor depth analysis by venturing into the ocean aboard a research vessel.
- New fault system off the coast of Sumatra that was involved in the 2012 quakes.
- Plate had broken along a 1, 000 km fracture zone - site of future fault-slip quakes.
- Wharton Basin

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## Biosphere

### Agasthyamala among 20 UNESCO world biosphere reserves

- **Location** -Western Ghats
- Comprises mostly of tropical forests
- Shendurney, Peppara, Neyyar & Kalakad Mundanthurai Tiger reserve

### Myanmar's first UNESCO Biosphere Reserve

- **Location:** Inle Lake in Shan state

### Man and the Biosphere (MAB) Program (1971)

**Aim:** Improve relationships between people & environments

- To safeguard natural and managed ecosystems
- Promoting innovative approaches to economic development

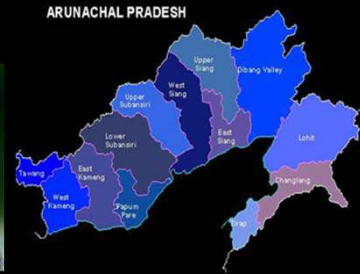


## Pakke Tiger Reserve

- East Kameng district of Arunachal Pradesh has won the 'India Biodiversity Award 2016'
  - Conservation of *threatened* species category for its Hornbill Nest Adoption Programme
- Hornbill Nest Adoption Programme**
- Joint collaboration of Ghora-Aabhe Society, Nature Conservation Foundation & State Forest Department.
  - Urban citizens contribute money to protect hornbill nests (4 species)

### India Biodiversity Award

- 4 categories
  - Conservation of Threatened Species
  - Sustainable use of biological resources
  - Successful models for access and benefit sharing
  - Biodiversity Management Committees
- Joint initiative of the Ministry of Environment, Forest and Climate Change (MoEFCC), National Biodiversity Authority (NBA) and UNDP
- Winner: Cash prize of 1 lakh rupees & runners up receive 50,000 rupees



## Declining Vulture Population

- In Wayanad Wildlife Sanctuary (WWS), Kerala
- Culprit: Diclofenac, an anti-inflammatory drug
- Constituent of – Nilgiri Biosphere Reserve and Elephant Reserve No.7 (world's largest recorded population of Asiatic elephant).

Why are vultures important?

- Natural disposal of livestock carcasses.
- Livestock carcasses can cause anthrax, and encourage pest species, such as rats.
- Increase in the number of feral dogs - bites can lead to human rabies
- Substitute for Diclofenac – Meloxicam (Safe for Vultures)
- Haryana Government launched Asia's first 'Gyps Vulture Reintroduction Programme' at the Jatayu Conservation Breeding Centre at Pinjore

## Raptor MoU



- Conservation of birds of prey in Africa and Eurasia
- India->56<sup>th</sup> country to sign the Raptor MoU
- Agreement under Article IV paragraph 4 of the CMS and is not legally binding.
- Raptors MoU extends its coverage to 76 species of birds of prey
- 46 species, including vultures, falcons, eagles, owls, hawks, kites, harriers, etc. also occur in India.
- In line with existing Wild Life (Protection) Act 1972.
- Pakistan and Nepal also signed the MoU.

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## Nagaland's Doyang Lake

- Doyang lake, Wokha in Nagaland, famous for the world's longest travelling raptors - Amur falcons
- They come to roost here during their flight from Mongolia to South Africa
- Doyang lake area as an eco-tourism spot
- **Pangti village in Nagaland** -World's Amur Falcon capital (more than one million birds can be seen in just 30 minutes)
- IUCN has categorized and evaluated these falcon species and has listed them as of "Least Concern"



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## NGT halts Tawang hydro power project

Tawang hydro power project in Arunachal Pradesh.

**Black-necked crane:** Breeds on the Tibetan plateau and migrates to Tawang for the winter.

- Listed in India's Wildlife Act as a Schedule 1 species (gives animals and birds the highest legal protection)
- India – "*Vulnerable*" - IUCN – Sacred to Buddhists
- Common in China
- Legally protected in Bhutan

### Other Species in the region:

- Red Panda
- Snow Leopard
- Arunachal Macaque



## Biological Diversity Act, 2002

To conserve and promote sustainable use of biological diversity

To regulate the access to biological resources of the country with equitable share in benefits

### Set up:

- National Biodiversity Authority (NBA)
- State Biodiversity Board (SBB)
- Biodiversity Management Committees

Protect knowledge of local communities, traditional knowledge related to biodiversity and secure sharing of benefits with local people.

### South Asia Wildlife Enforcement Network (SAWEN)

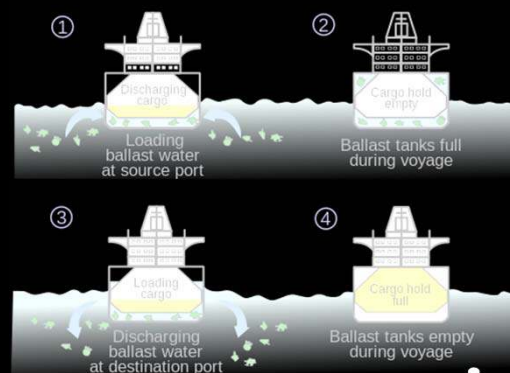
- Approval for India
- Ministry of Environment and Forests is the nodal agency
- Helps to control the trans-boundary wildlife crime
- SAWEN, a Regional network is comprised of 8 countries in South Asia:
  - Afghanistan
  - Bangladesh
  - Bhutan
  - India
  - Maldives
  - Nepal
  - Pakistan
  - Sri Lanka
- Strong regional intergovernmental body for combating wildlife crime
- Region has precious biodiversity and large markets very vulnerable to illegal traffic and wildlife crimes.

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### Ballast Water Discharge

Used by ocean bound ships to provide balance and stability while navigation

- Exotic species transported
- Globally more than 10,000 exotic marine species are transported
- In India - 10 invasive exotic species in the coastal waters of Kerala
- Damage to our coastal ecosystems and lead to severe loss of biodiversity
- 10 Common Species
  - Cholera *Vibrio cholerae*
  - Cladoceran Water Flea *Cercopagis pengoi*
  - Mitten Crab *Eriocheir sinensis*
  - Toxic algae (red/brown/green tides)
  - Round Goby *Neogobius melanostomus*
  - North American Comb Jelly *Mnemiopsis leidyi*
  - North Pacific Seastar *Asterias amurensis*
  - Zebra Mussel *Dreissena polymorpha*
  - Asian Kelp *Undaria pinnatifida*
  - European Green Crab *Carcinus maenas*



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## Snowflake Corals

- For first in 1972 it was reported as an invasive species from Hawaii
- Native of the tropical Western Atlantic and Caribbean
- Spread to countries like Australia, Thailand, Indonesia and the Philippines
- Inhabit reefs and underwater structures such as piers and shipwreck
- Can attach itself to metal, concrete and even plastic

### In India:

- Andaman and Nicobar Islands
- Gulf of Mannar
- Gulf of Kutch
- Goa

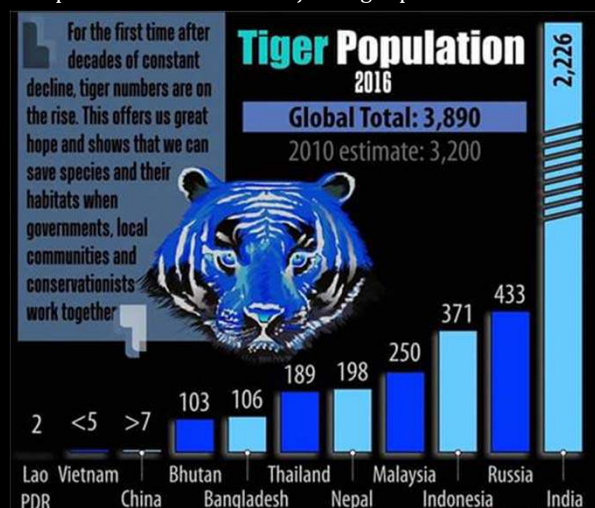
### Threats:

- Can destabilize the marine ecosystem
- It can crowd out other marine species



## Asia Ministerial Conference on Tiger Conservation

- Co-organized by Ministry of Environment, Forest and Climate Change, National Tiger Conservation Authority, Global Tiger Forum, Global Tiger Initiative Council, Wildlife Institute of India, WWF and Wildlife Conservation Trust
- Project Tiger in 1972 - 70% of the global wild tiger population is in India
- National Tiger Conservation Authority is responsible for implementation of the Project Tiger plan
- 13 Tiger Range Countries
  - Bangladesh
  - Bhutan
  - Cambodia
  - China
  - Indonesia
  - India
  - Laos
  - Malaysia
  - Myanmar
  - Nepal
  - Russian Federation
  - Thailand
  - Vietnam



## Gorewada Zoo and Wildlife Rescue Centre

- India's biggest Wildlife Rescue Centre
- At Gorewada near Nagpur, Maharashtra
- **Managed by:** Forest Development Corporation of Maharashtra (FDCM)
- Created on the lines of Gujarat based Gir National Park
- 1914 Hectares of land



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## Russian Poplars

Mass awareness campaign in Kashmir to protect the poplar trees

**In 2014:** J&K High Court first banned the sale, purchase and plantation of Russian Poplars

During summers, populous deltoids—female poplar—sheds a cotton-like material carrying seeds that cause allergy and respiratory disorders.

### Russian Poplars

- Nothing to do with Russia
- *Russi Frass* variety from USA
- It grows faster than the local variety
- Central to rural economy in Kashmir
- Source of livelihood for many because fruit boxes are made of it
- Forms a canopy over the highways
- Tourist attraction



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# Focus on Waste Management

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## TRASH TREATMENT

**Environment ministry comes out with draft rules for comprehensively managing**

- Municipal Solid Waste
- Electronic Waste (e-waste)
- Plastic Waste
- Medical Waste



**INDIA GENERATES EVERY YEAR**

 <b>400,000 tonnes</b> of electronic waste		
 <b>1.5 million tonnes</b> of plastic waste	 <b>1.7 million tonnes</b> of medical waste	 <b>48 million tonnes</b> of municipal waste

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### **E-Waste Management Rules 2016**

Supersession of e-waste (Management & Handling) Rules, 2011.

#### **E-Waste Rules**

- Stringent norms and reflect the government's commitment to environmental governance.
- Include Compact Fluorescent Lamp (CFL) and other mercury containing lamps
- Producers under Extended Producer Responsibility (EPR), along with targets.
- Collection is Producers responsibility.
- Ensure safety, health and skill development of the workers involved in dismantling and recycling operations.
- Provision of penalty for violation of rules has been introduced.
- Simplify process of dismantling and recycling by one system of authorization
- Single authorization by Central Pollution Control Board in India.

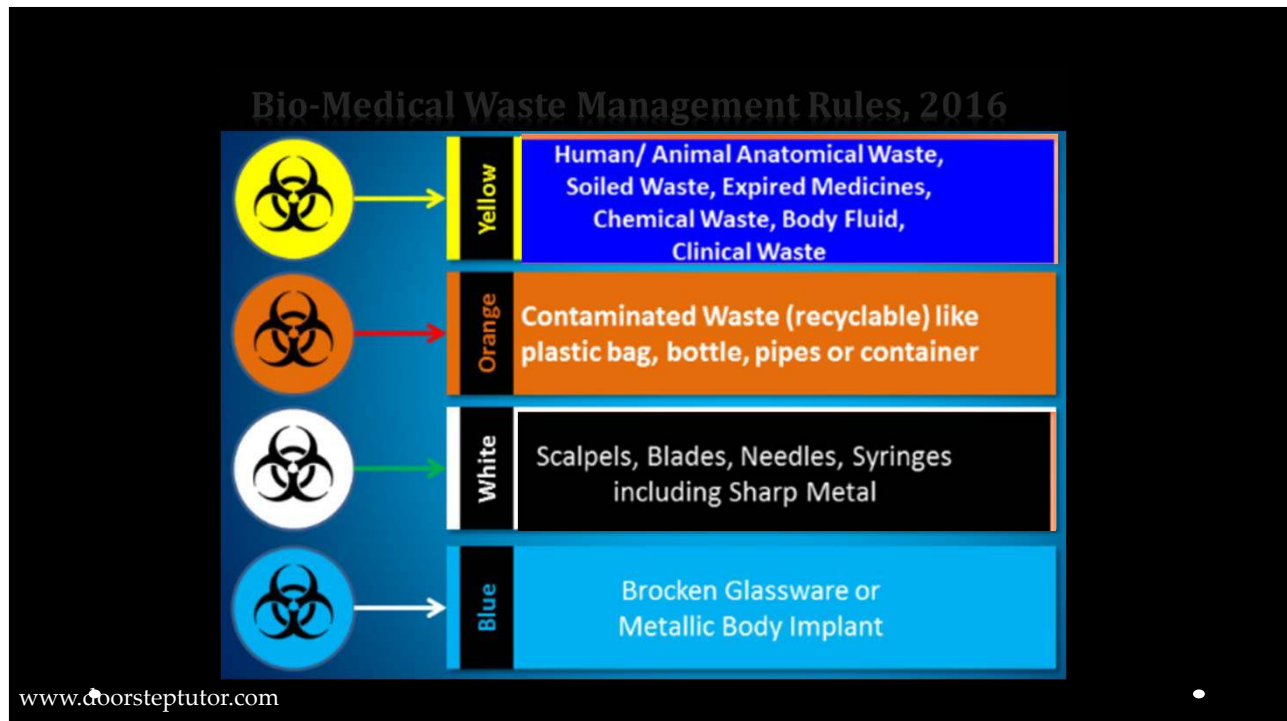
### **Hazardous Waste (Management, Handling & Transboundary Movement) Rule, 2016**

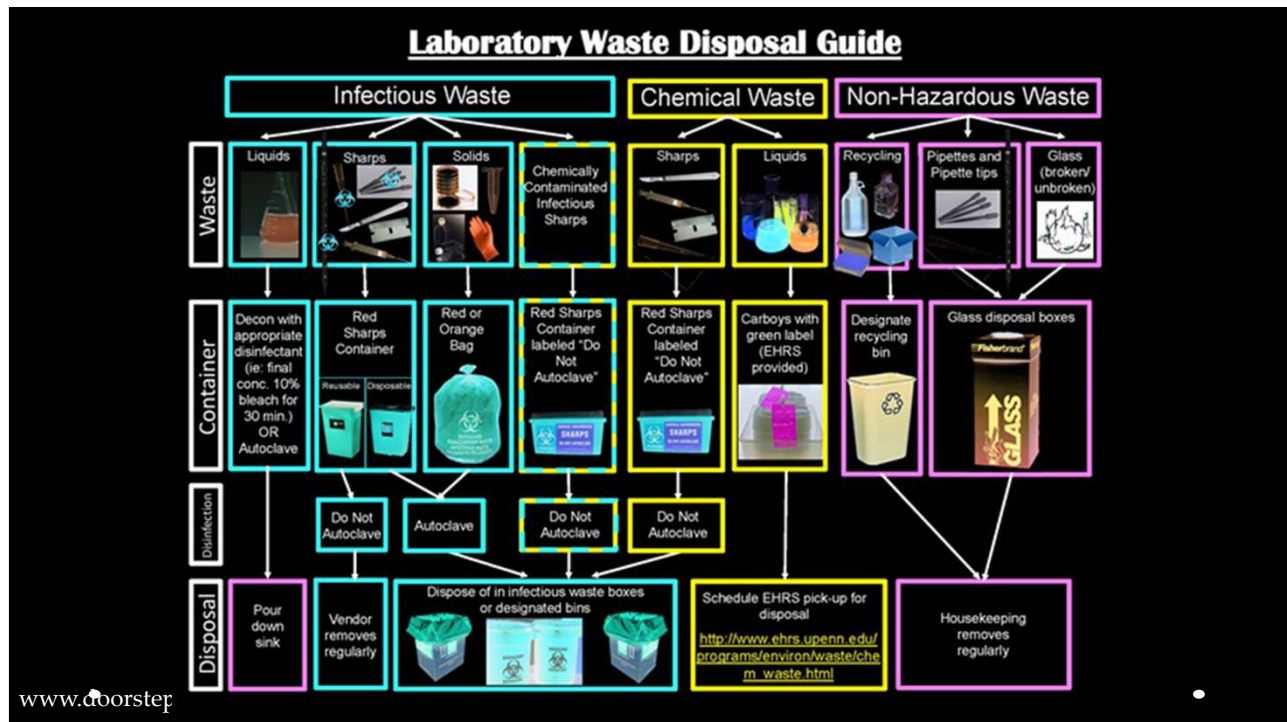
- Total hazardous waste: 7.46 million metric tons per annum from 44,000 industries
- Started in 1989, 2000, 2003, 2008 & 2016
- Ambit of the Rules has been expanded to 'Other Waste'.
- Prevention, minimization, reuse, recycling, recovery, co-processing; and safe disposal has been incorporated.
- Revise rules for permission, import/export, filing of annual returns, transportation, etc.
- Merge all the approvals as a single window clearance.
- Co-processing as preferential mechanism over disposal for use of waste as supplementary resource, or for recovery of energy has been provided.
- Streamline approval.
- Import of metal scrap, paper waste and various categories of electrical and electronic equipments for re-use purpose has been exempted.
- Standard Operating Procedure (SOPs) specific to waste type given.

## Biomedical Waste Management Rules, 2016

- Changed from Management and Handling, 2011 to Management in 2016
- From 10 categories to 4 categories
- Barcode system for disposal
- Phase-out use of chlorinated plastic bags, gloves and blood bags within two years
- Immunize all its health care workers & those involved in handling of bio-medical waste for protection against diseases including Hepatitis B and Tetanus - transmitted by handling of bio-medical waste

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# Focus on Disaster Mitigation

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## National Disaster Management Plan, 2016

- First ever national plan prepared in the country
- Ethical guidelines for media – respecting dignity and privacy of community

**Aim:** To make India disaster resilient and reduce loss of lives

**Based on:** Four priority themes of the “Sendai Framework”

- Understanding disaster risk
- Improving disaster risk governance
- Investing in disaster risk reduction (through structural and non-structural measures)
- Disaster preparedness, early warning and building back better in the aftermath of a disaster

## Sendai Framework

- 15-year, voluntary, non-binding agreement for disaster reduction.

**Targets by 2030**

- Reduce global disaster mortality.
- Reduce the number of affected people globally.
- Reduce direct disaster economic loss in relation to global GDP.
- Reduce disaster damage to critical infrastructure and disruption of basic services.
- Increase the number of countries with national and local disaster risk reduction.
- Enhance international cooperation to developing countries.
- Increase the availability of and access to multi-hazard early warning systems and disaster risk information.