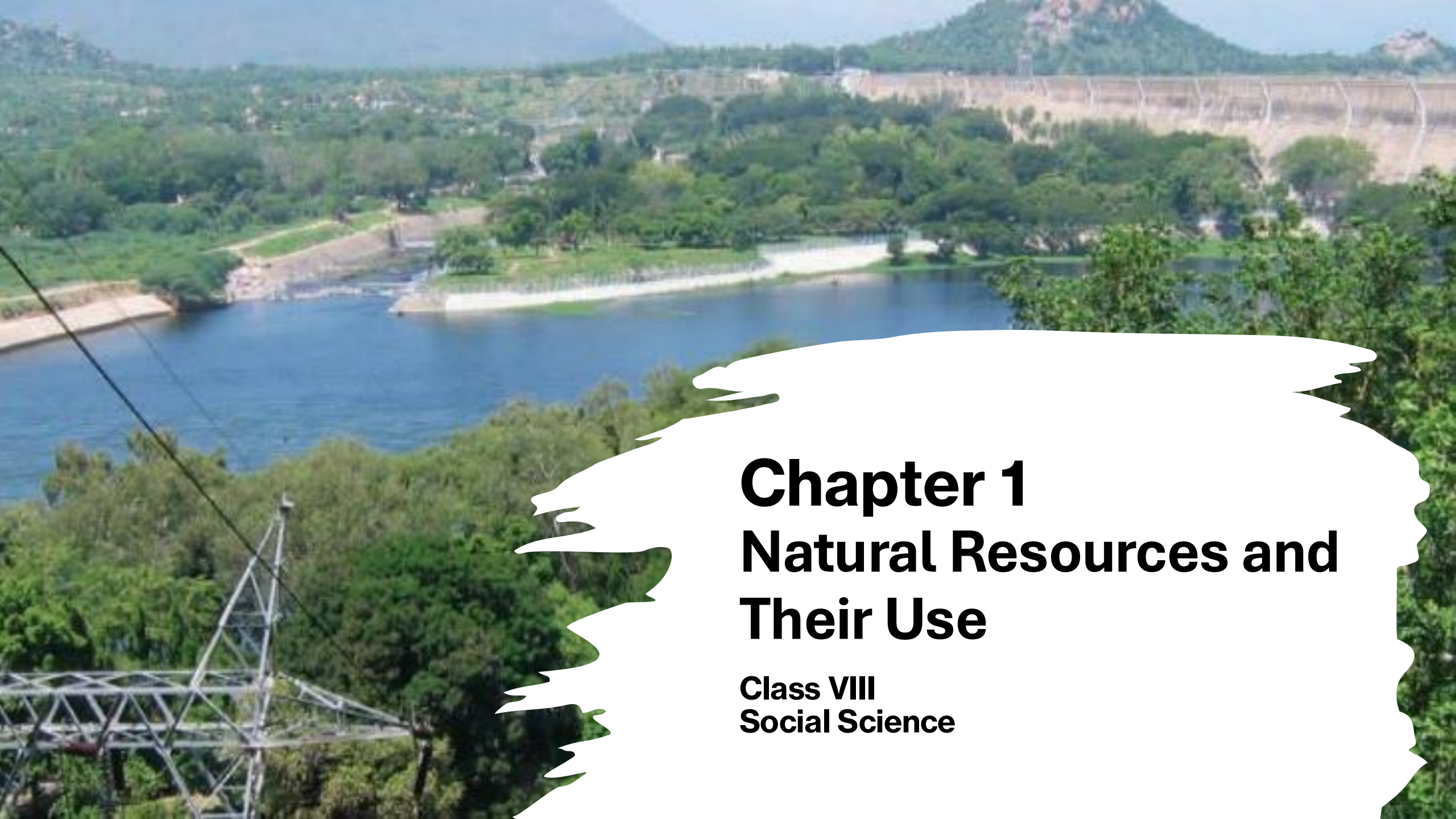




Chapter 1

Natural Resources and Their Use

Class VIII
Social Science

Dudhsagar waterfall and the railway bridge, Goa, India

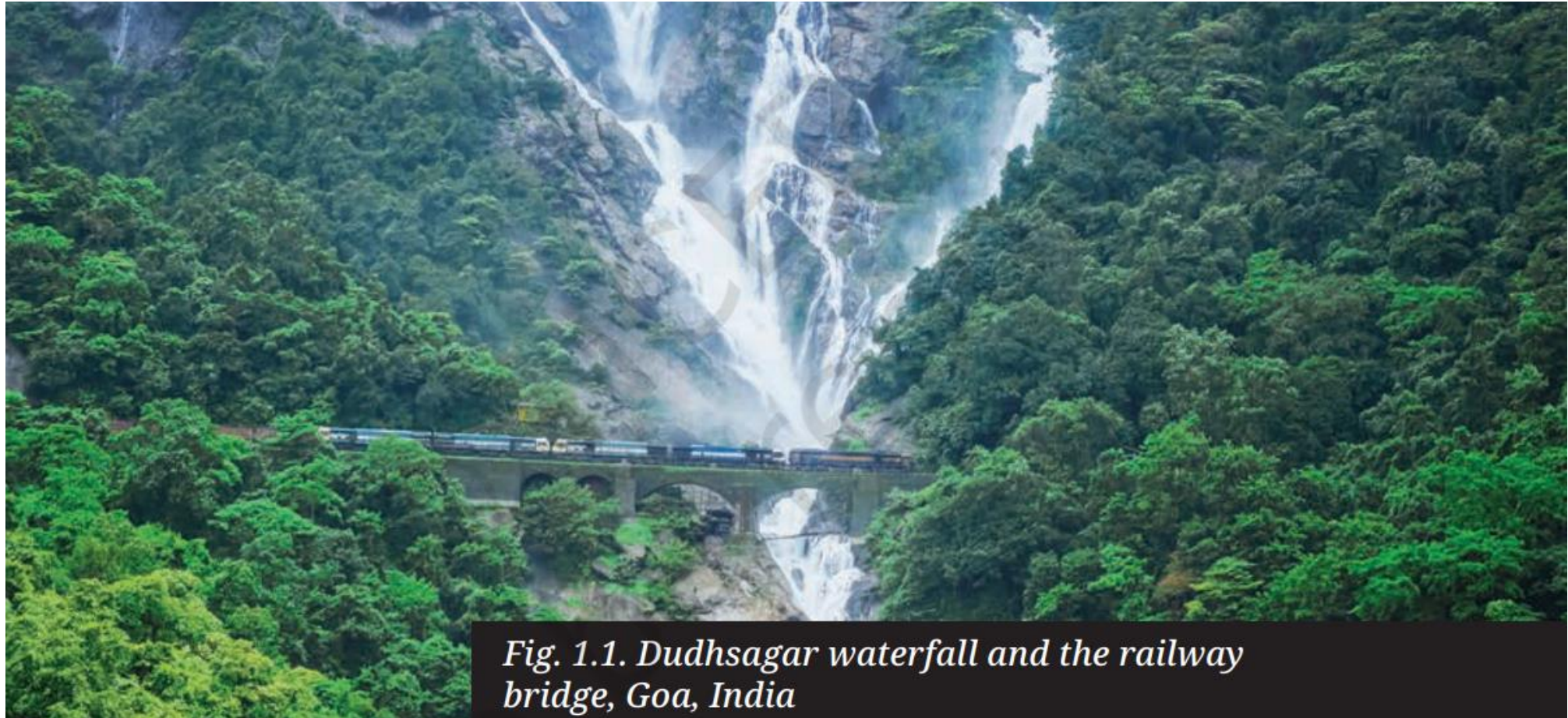


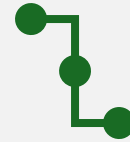
Fig. 1.1. Dudhsagar waterfall and the railway bridge, Goa, India



The Big Questions?



How do we categorise natural resources?



What is the connection between the distribution of natural resources and different aspects of life?



What are the implications of unsustainable use / over exploitation of natural resources?

When does Nature become a Resource?

Nature: Includes all life and non-life forms in the environment not created by humans.

Examples: Trees, rivers, mountains, air, animals.

Resources: Natural elements used by humans for sustenance or production.

Transformation: When humans use natural elements (e.g., cutting trees for furniture), they become resources.

Key Idea: Nature becomes a 'resource' when it is utilized for human needs.

When Does Nature Become a Resource?

Resources

- Not all natural elements are **immediately usable** as resources.

Barriers to access may include:

- **Technological limitations** (e.g., deep-sea petroleum).
- **High extraction costs** (economically unfeasible).
- **Cultural restrictions** (e.g., sacred groves).

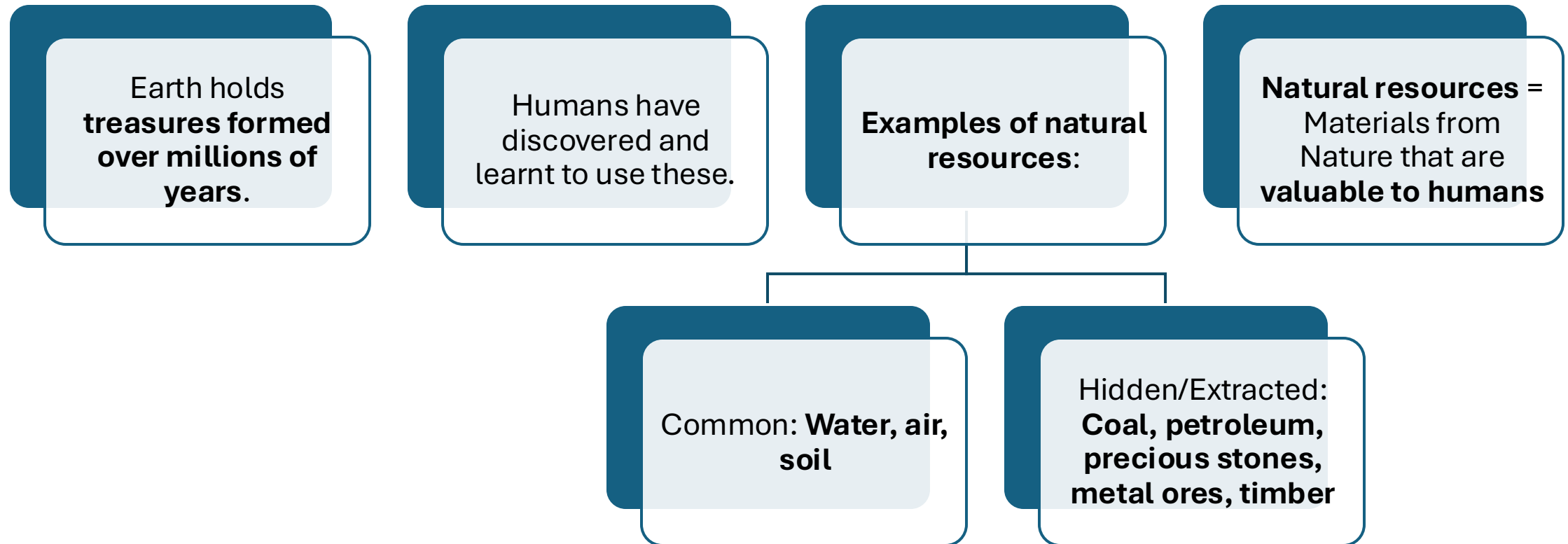
An entity is a *resource* only if:

- It is **technologically accessible**.
- It is **economically feasible** to extract.
- It is **culturally acceptable** to use.

‘Exploitation’ here means:

- **Extraction, utilisation, and consumption** of natural resources (without negative intent).

What Are Natural Resources?



A microhydel plant
in Himachal
Pradesh—the
power of flowing
water converted
into electricity





An offshore oil rig extracts petroleum from below the seabed

Gentle ploughing
causes minimal
disturbance to
the underground
ecosystem and
retains soil
moisture



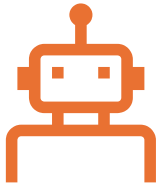
Honey from a beehive



Tulasī puja for wellbeing



Categories of Natural Resources



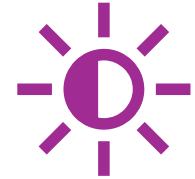
One of the ways we could
categorise natural resources is
based on the uses we put them to-



essential for our life

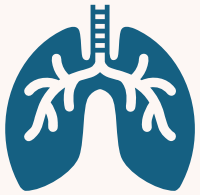


source for materials



sources for energy

1. Resources Essential for Life



Air, water, and food are vital for survival.



Sourced from:

Atmosphere (air)

Water bodies (rivers, ponds)

Soil & living organisms (food)



Cannot be manufactured by humans.

2. Resources for Materials

Used to create **objects for utility or beauty.**

Examples:

- Wood → Chair or statuette
- Marble → Sculpture
- Metals → Tools, ornaments

India's rich geography provides a wide variety:

- **Wood, marble, coal, gold, etc.**

3. Resources for Energy

Power modern life: homes, transport, industries.



Sources include:

Coal, petroleum, natural gas

Sunlight, wind, water



River water, a renewable resource as long as glaciers and forests exist





We can take timber from the forest, in limited quantities, for a long time if we allow it to regenerate.



Renewable and non-renewable resources



Renewable Resources



Can be **restored or regenerated** by Nature over time.



Aligned with Nature's ability to **heal and renew** itself.



Examples:

Sunlight, wind, water, forests (if used sustainably).



Non-Renewable Resources



Limited supply; cannot be replaced within a human lifetime.



Once used, they are **gone or greatly diminished**.



Examples:

Coal, petroleum, natural gas, minerals.

Nature's Restoration & Regeneration

Restoration Example

Replanting trees in deforested areas helps:

- **Rebuild ecosystems**
- **Provide food & shelter** to birds, squirrels, and other wildlife

Restores the **original balance** of the environment

Regeneration Example: The Forest Cycle

In Nature, **nothing goes to waste**:

- A tree falls → decomposes with help from **bacteria, fungi, insects**
- Enriches the **soil**
- **New plants grow** from the enriched soil
- The cycle continues...

Offering
arghyam to
Sūrya, the
sun-god, in
gratitude.





Waste from industries is often disposed without proper treatment



- **Renewable Resources**

-  **Characteristics of Renewable Resources**
- Naturally **replenish over time** through cycles of **restoration** and **regeneration**.
- Examples:
 -  **Solar energy**
 -  **Wind energy**
 -  **River water** (fed by rain and glaciers)
 -  **Timber** (from regenerating forests)
 -  **Soil** (replenishes through natural processes)

Conditions for Sustainability

- Must be **used responsibly**:
 - Do **not overuse** (e.g., overharvesting timber).
 - Allow **natural cycles** to function properly.

Human Impact



Disruption of cycles due to:

Industrialisation (fossil fuel use)
Deforestation (for agriculture, etc.)



Result: Climate change (e.g., glaciers melting faster than they're replenished)



Implication: Threat to water security for millions dependent on Himalayan glaciers



Traditional vs. Commercial Practices: A Case of Overfishing

-
-  Traditional Wisdom
 - Communities **regulated fishing** during **spawning seasons**.
 - Helped maintain **fish population** and ecological balance.
 -  Commercial Impact
 - **Over-fishing** due to large-scale commercialisation.
 - **Tuna populations** declined rapidly:
 - Tuna helps **balance ocean ecosystems** by eating smaller fish and shrimp.
 - Despite agreements to control fishing, **decline continues**.

Industrial Activity & Environmental Impact



Need for Industries

Industries produce the **goods we consume**.
Play a vital role in **economic development**.



Negative Impact on Nature

Industrial processes generate **waste**.
Waste is often **discharged into rivers and water bodies**.



Many industrial wastes:

Do **not decompose** naturally.
Do **not become food** for other lifeforms.

⚠ **Consequences**



Disrupts Nature's cycles of restoration and regeneration.

Water becomes **toxic** and **cannot support life**.
Leads to **loss of biodiversity** and **ecosystem imbalance**.

Non-renewable resources



Formed over **millions of years**

cannot be replenished quickly



Examples:

Fossil fuels: Coal, petroleum

Minerals and metals: Iron, copper, gold



India has **significant coal reserves**, but:

Estimated to last **about 50 years** at current consumption rates

Energy demand is **growing** due to population growth and development

Need for **judicious use** until sustainable alternatives become widespread



Distribution of Natural Resources and its Implications

- **Uneven distribution** of natural resources exists globally and within countries.
 - This shapes:
 - **Human settlements**
 - **Trade patterns**
 - **International relations and conflicts**
 - Many wars have been fought to **control valuable resources**.
-

Local Impact of Resource- Based Industries

Industries near resources create **employment** and **economic growth**.

Townships and modern facilities develop, improving quality of life.

However, this can also cause: **Displacement** of local communities. Threats to **sacred sites**, leading to conflicts.

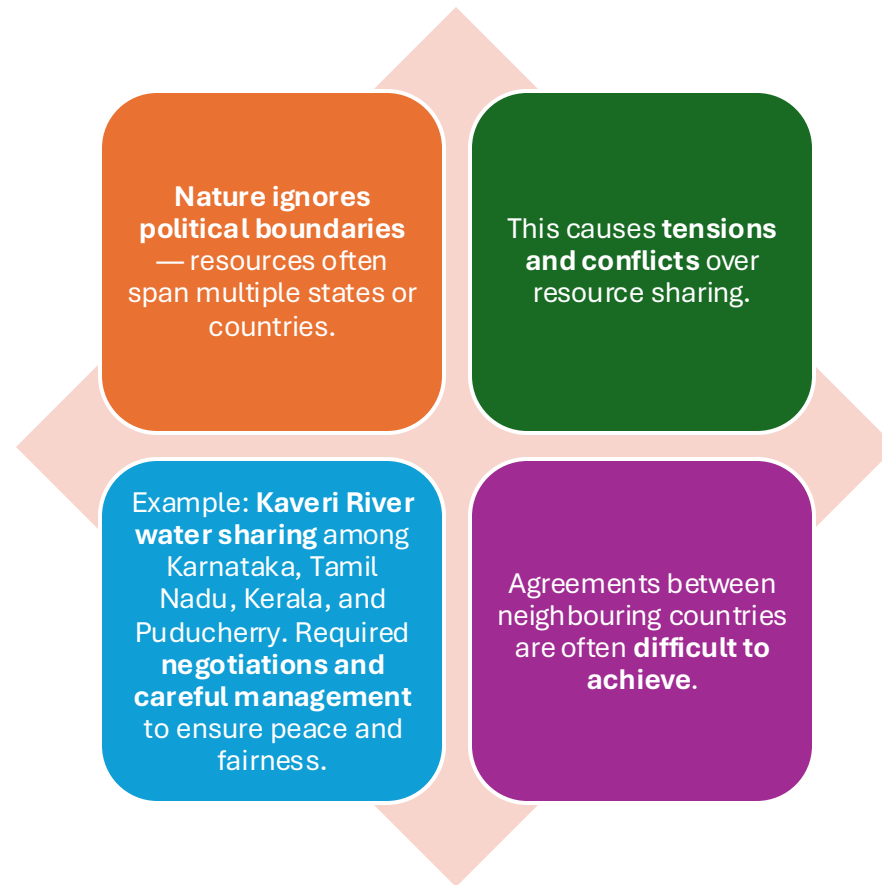
Trade and Historical Influence

Resource location drives **national and international trade**.

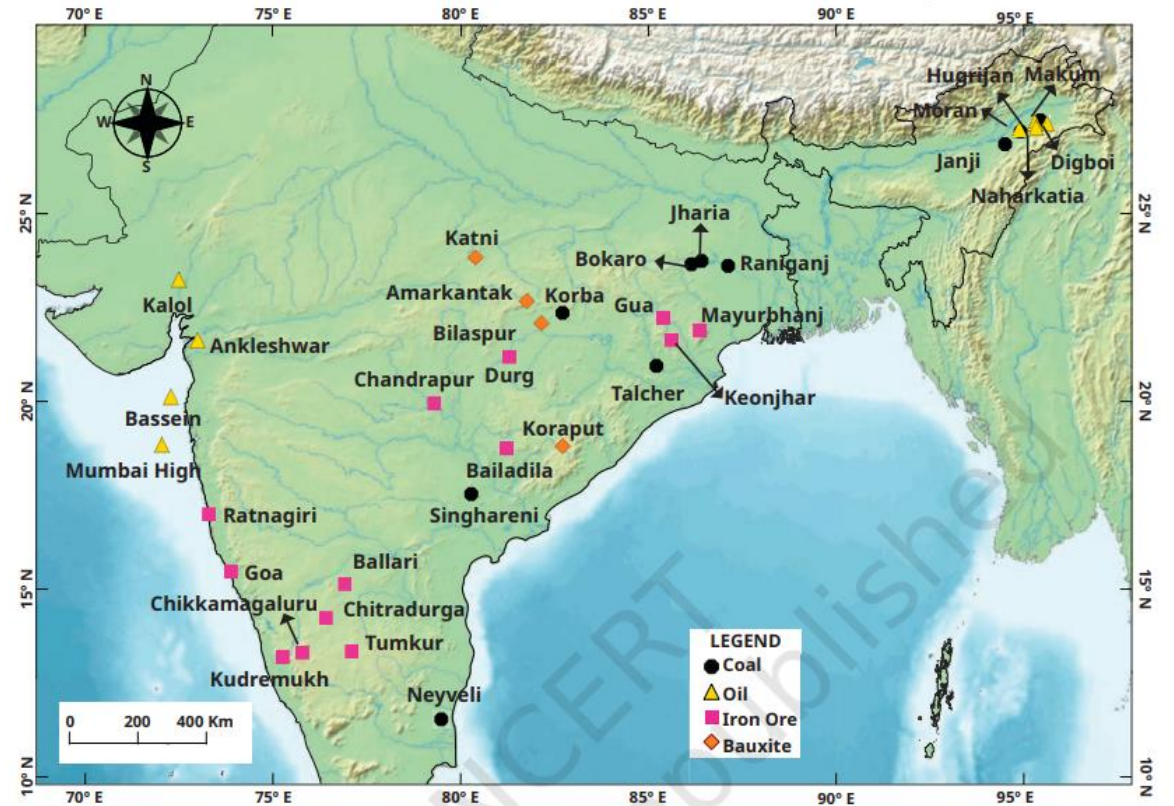
Combines with human skills to produce unique products (e.g., **Wootz steel**).

Trade of resources contributed to the rise of **large empires in India**.

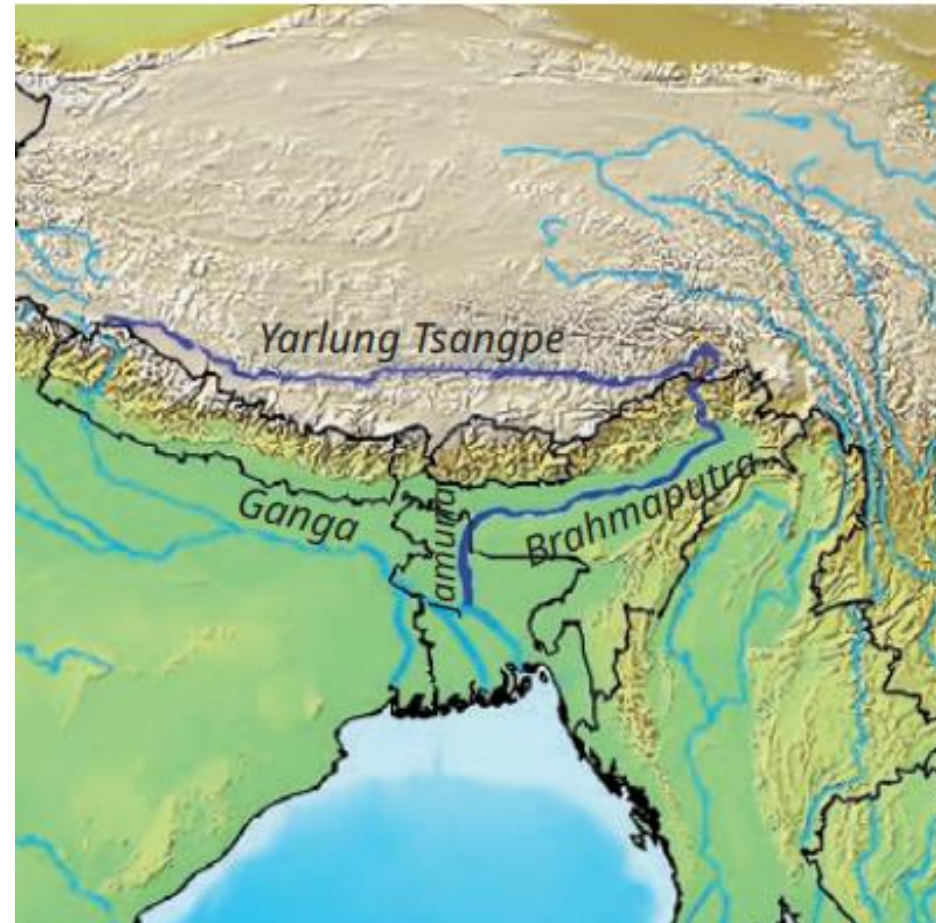
Natural Resources & Political Boundaries



Distribution of important minerals



Shared waters of the Brahmaputra river





Mettur dam in Tamil Nadu built on the Kaveri river

The 'Natural Resource Curse'

01

Abundance of natural resources does not guarantee economic prosperity.

02

Some resource-rich regions experience slower growth and development — known as the 'natural resource curse' or 'paradox of plenty'.

03

Often caused by: Failure to develop industries that add value to raw resources.

04

India has mostly **avoided this curse** by investing in industries to meet its needs.



 LET'S
EXPLORE

What inputs are needed to use natural resources effectively in different areas?

Sustainability

Key to Sustainability:

- Balancing **resource extraction** with **sustainability** is crucial.

Success depends on:

- **Human knowledge**
- **Good governance**
- **Strategic planning**

Determines if resources become

- **Lasting benefits** or
- Just **temporary windfalls**.

Responsible and Wise Use of Natural Resources: Stewardship

Sustaining life requires:

- Respecting **Nature**
- Using **renewable resources** so they can **restore and regenerate**
- Using **non-renewable resources** responsibly and **judiciously**

Scientists warn that **irresponsible use** leads to:

- **Pollution**
- **Loss of biodiversity**
- **Accelerated climate change**

Restoration and Regeneration of Renewable Resources

Overuse example: Groundwater extraction for irrigation

- Extraction rate $>$ natural replenishment rate in many states.
- Leads to:
 - Rising **cost of extraction**
 - **Depletion** of groundwater
 - Risk of **water shortages** in growing cities.



Solutions and Initiatives

- Raising groundwater levels through:
 - **Traditional water harvesting methods**
 - **Rejuvenation of ponds and tanks**
 - Reducing **wasteful water consumption**
 - **Processing and reusing water**

Soil Degradation & Traditional Farming Practices

Improper use of chemical fertilisers and pesticides causes:

- **Soil degradation**
- Reduced fertility and crop failure

Traditional practices respected soil as part of Mother Earth, such as:

- Use of **cow dung** and natural fertilisers
- **Mulching**
- **Multi-cropping** for better soil health

Learning from these can help:

- **Prevent further soil degradation**
- **Replenish and rejuvenate soil**



Crop failure on account of injudicious use of chemical fertilisers



Overexploitation of Groundwater: Punjab Case Study

Punjab, the birthplace of the **Green Revolution**, helped India achieve **food self-sufficiency**.



Today, Punjab faces **severe groundwater depletion** and **sustainability challenges**.



Key reasons:

Shift in 1960s to **high-yielding wheat and paddy varieties** needing more water.

Over-extraction of groundwater to meet irrigation demands.

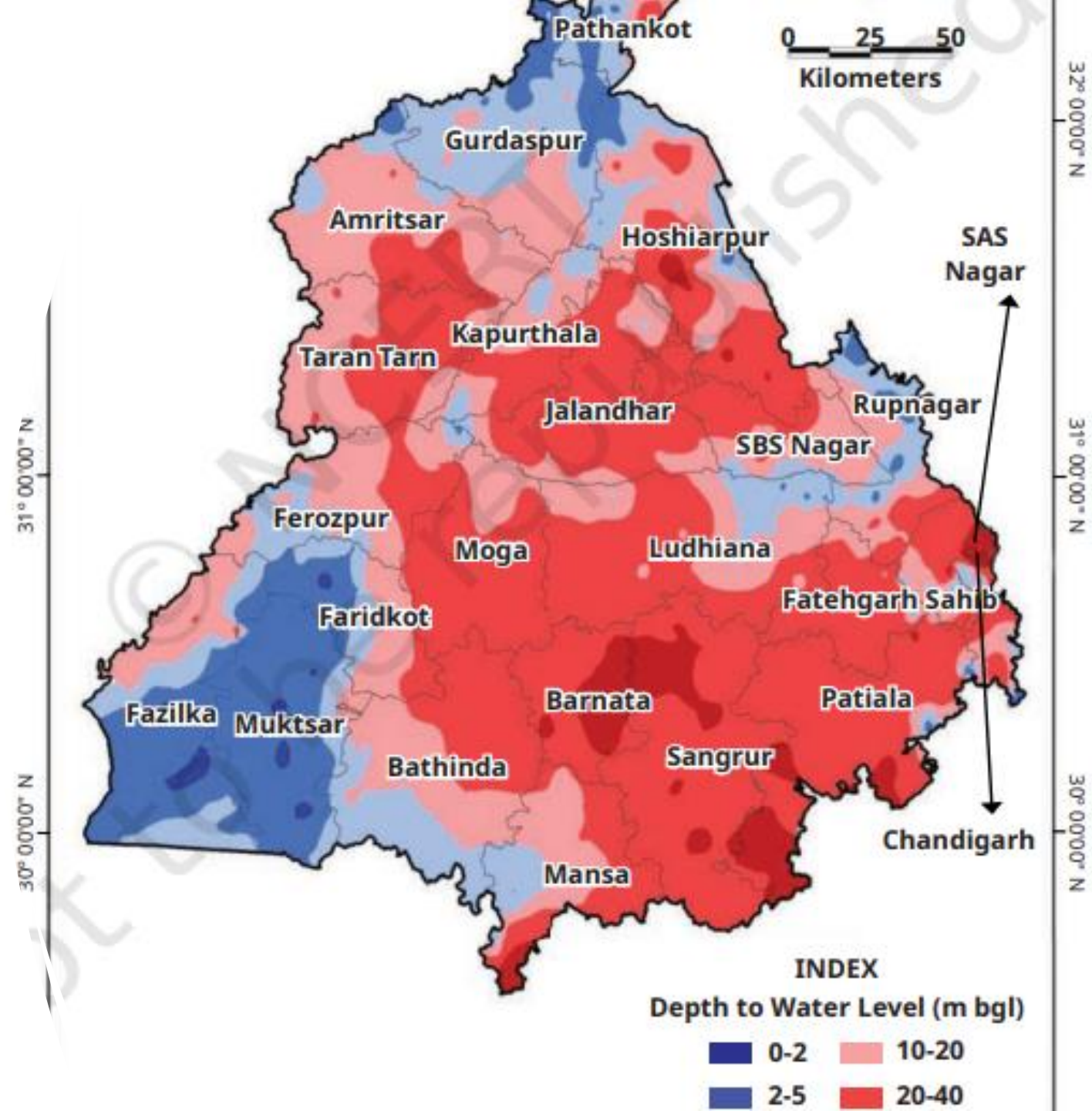
Availability of **free power** encouraged **over-pumping**.

Increased use of **chemical pesticides and fertilisers** with modern farming.

Consequences of Groundwater Overexploitation in Punjab

- Groundwater has become **inaccessible up to 30 meters deep** in large parts of Punjab.
- Chemicals from pesticides and fertilisers have **contaminated groundwater**, causing **health hazards**.
- Approximately **80% of Punjab is classified as 'overexploited'**: Water is drawn **faster than it can be naturally replenished**.
- **Short-term food security** was achieved.
- **Long-term environmental and health impacts** require time and effort to address.

Depth to water level
map of Punjab and
Chandigarh, June
2022 (m bgl =
metres below
ground)





Jaisalmer fort, Rajasthan. A mud structure built in the 12th century and refurbished later using sandstone.

The Case of Cement

Cement is essential for:

- **Buildings,**
- **Bridges,**
- **Roads, and**
- **Airports.**

Cement production is one of the **most polluting industries:**

- Releases **fine dust** harmful to lungs of humans and animals.
- Dust **settles on plants**, reducing crop yields.
- Causes **soil and water pollution.**

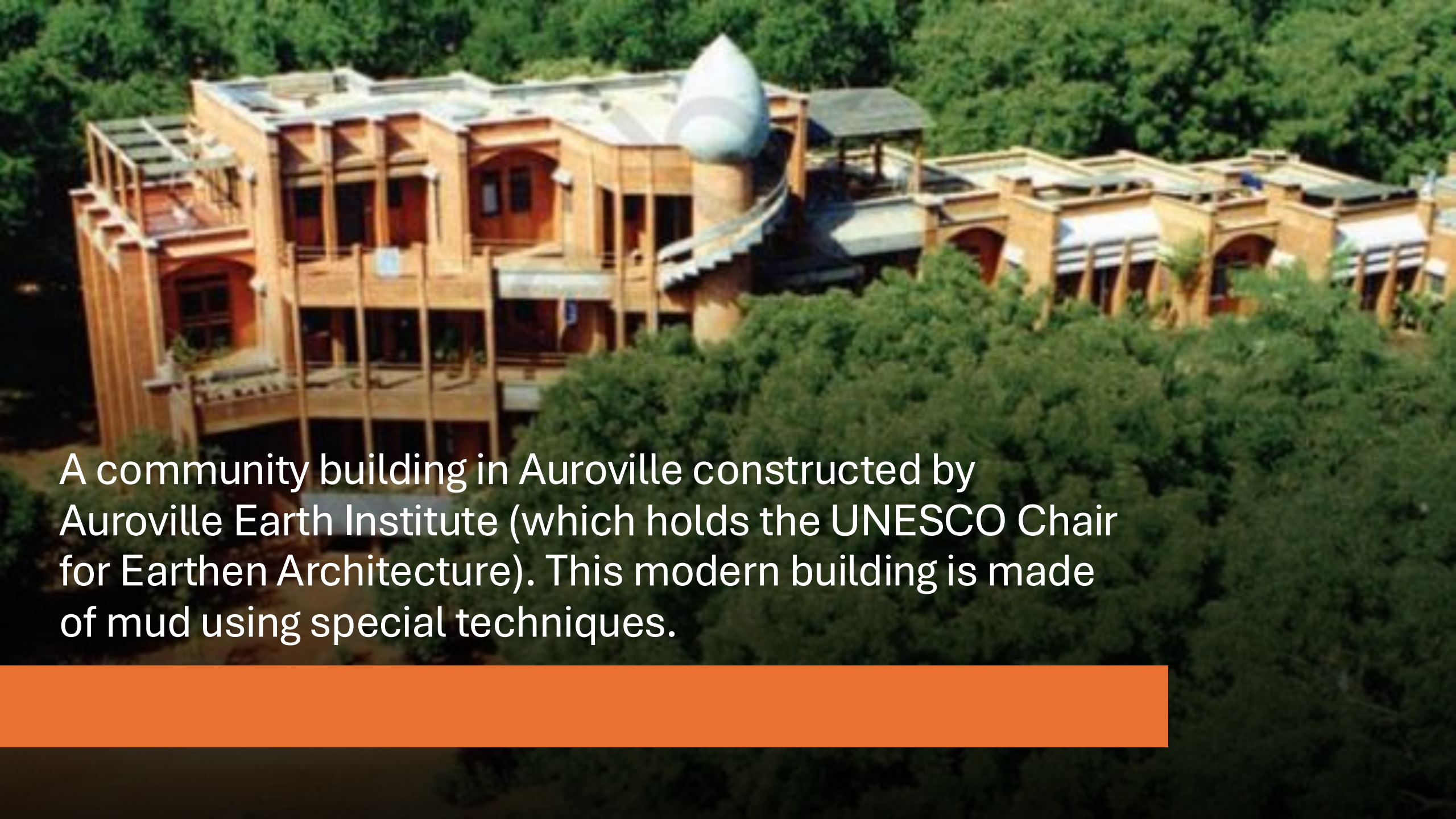
Pollution Control & Alternatives



The Central Pollution Control Board sets guidelines to
Minimise pollution from cement factories.



Alternatives are being developed, including:
Traditional materials like **stone and mud**.
Plant-based building materials.
Recycled materials from waste plastic.

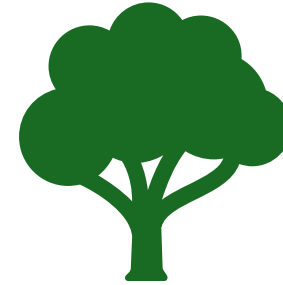


A community building in Auroville constructed by Auroville Earth Institute (which holds the UNESCO Chair for Earthen Architecture). This modern building is made of mud using special techniques.

Sustainable Building Materials: Tradition Meets Technology



Traditional materials and methods are combined with modern technology to create new, sustainable materials.



Benefits include:

Less polluting production processes

Generation of **local employment**

Design adapted to the **local climate** for better efficiency and comfort

Vṛikṣhāyurveda: Ancient Indian Botanical Science

Meaning:

- *Vṛikṣha* = Tree
- *Ayurveda* = Science of life or health

Dates back to **10th century CE**, formalized in texts like

- **Surapala's Vṛikṣhāyurveda.**

Focuses on

- **study and care of plants and trees** with sustainable practices.

Key Features of Vṛikṣhāyurveda



Plant recommendations based on **soil types**.



Detailed methods for **seed collection, preservation, and pre-planting treatments**.



Specific **irrigation techniques** based on plant species, growth stage, and season.



Natural pest management using repellents and companion planting.



Promotes **crop rotation** and **mixed cropping** for soil health.

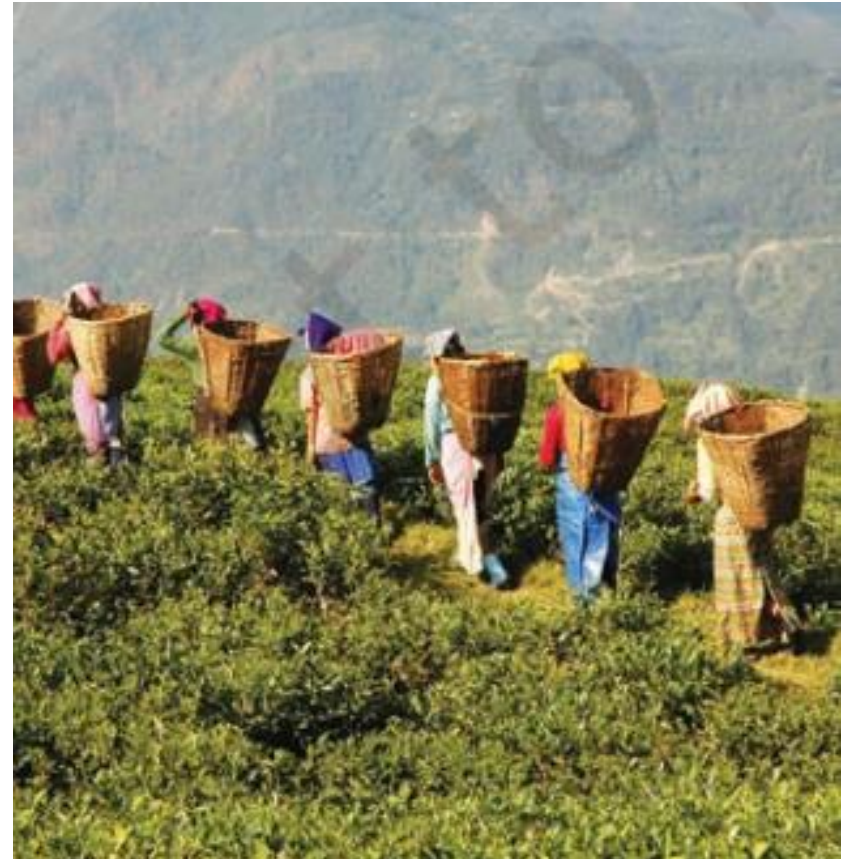


Advises proper **ploughing methods** to retain soil moisture and support beneficial soil organisms.



Caselet: Organic Farming in Sikkim

- Pema's family farm faced:
 - **Declining crop yields**
 - **Mounting debts** due to costly chemical inputs
- Sikkim government promoted a **statewide organic farming policy**.
- Transition was challenging:
 - Initial **drop in yields** as soil recovered from years of chemical use.
- Represents a move towards **sustainable agriculture** and soil health restoration.





Organic Farming Success in Sikkim

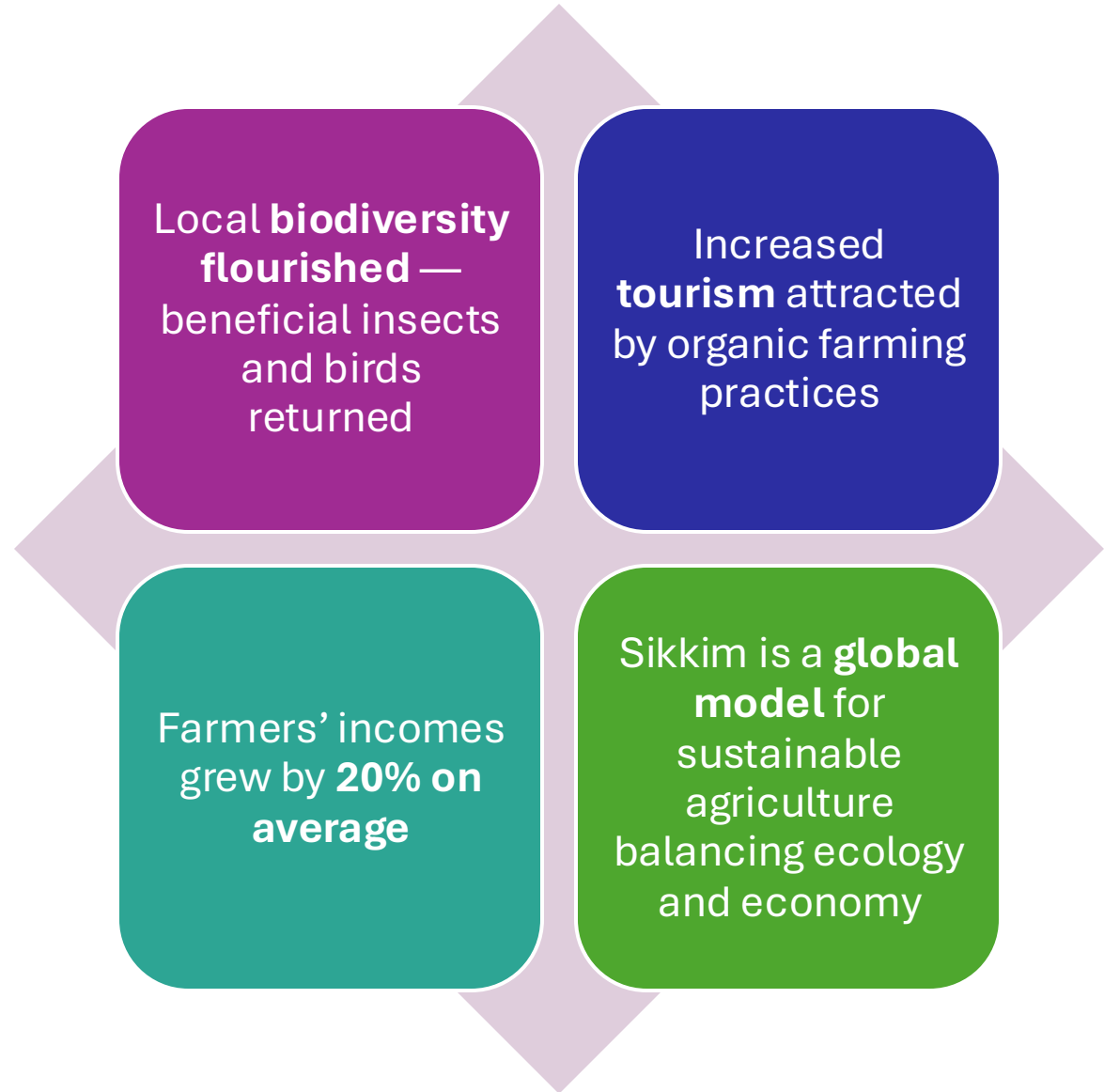
Pema's family switched to:

- **Compost** for soil health
- Natural pest repellents like **neem and garlic**
- **Multiple cropping** throughout the year

After 5 years, the farm thrived:

- Sold **cardamom, ginger, and traditional vegetables** at premium prices
- In 2016, **Sikkim became the first 100% organic state** in India

Transformational Effects





Responsible and Judicious Use of Resource



Non-renewable resources must be used carefully and sparingly.



Goal: Extend their availability until **sustainable alternatives** are widely accessible.



Example: Shift from fossil fuels to **renewable energy sources** (solar, wind, hydro) wherever possible.



Encourages long-term **environmental balance** and resource security.

Satellite image of one of the largest solar parks in the world located in Rajasthan. It can generate enough electricity to power about 15% of the current needs of Rajasthan.



International Solar Alliance (ISA)

India's Leadership in Renewable Energy

Launched in **2015** by India and France

Coalition of **sunshine-rich countries** committed to solar energy use

Channels **billions of dollars** into solar projects across developing nations

Shares **technical expertise** and creates **affordable financing**

Bhadla Solar Park: A flagship project showcasing India's solar ambitions

Represents a commitment to **environmental responsibility** and **economic opportunity**

Fair Distribution and Stewardship of Natural Resources



ACCESS TO BASIC RESOURCES
LIKE **WATER AND CLEAN AIR** IS
OFTEN **UNEQUAL**.



MANY URBAN AREAS FACE
IRREGULAR WATER SUPPLY
AND **HIGH POLLUTION** LEVELS.



VULNERABLE COMMUNITIES
SUFFER MOST FROM
INDUSTRIAL POLLUTION AND
FOSSIL FUEL USE.



WE MUST **HONOR OUR**
RELATIONSHIP WITH NATURE
AND ACT AS **RESPONSIBLE**
STEWARDS.



THE **BHAGAVAD GĪTĀ'S**
LOKASANGRAHA TEACHES US
TO RISE ABOVE PERSONAL
INTERESTS AND WORK FOR THE
WELLBEING OF ALL.



IS IT TIME FOR US TO
SERIOUSLY EMBRACE THIS
PRINCIPLE FOR
SUSTAINABILITY?



THANK YOU

