Non-Renewable Resources

Definition & Characteristics

- Non-renewable resources are natural resources that exist in limited quantities and cannot be replenished within a human timescale once consumed.
- These resources take millions of years to form through geological processes.
- Examples include coal, petroleum (oil), natural gas, and minerals.
- Once depleted, they cannot be restored, emphasizing the need for conservation and alternative energy sources.

Importance & Challenges

- Essential for energy production, industrial applications, and daily life.
- Their depletion can lead to energy crises, economic instability, and environmental issues like pollution and global warming.

1. Rocks: An Essential Natural Resource

- Rocks are solid natural substances composed of minerals, formed through geological processes involving heat, pressure, and material accumulation over millions of years.
- Due to their long formation time, rocks are considered non-renewable.

Types & Uses of Rocks

1. **Slate –** Used for roofing due to weather resistance and aesthetic appeal.
2. **Laterite –** Used as a building material similar to bricks in certain regions.
3. **Granite –** Hard and durable; used in flooring, countertops, and monuments.
4. **Sandstone –** Strong and easy to shape; used in construction.
5. **Marble –** Elegant with unique patterns; used in decorative purposes like statues, flooring, and interiors.
6. **Obsidian –** Shiny volcanic rock used for tools, jewelry, and ornaments.

2. Minerals

- Minerals are naturally occurring inorganic substances that form the basis of many essential materials.

- Extracted minerals are used to produce metals like:
  - **Aluminum –** Used in airplanes and cars.
  - **Gold & Silver –** Used in jewelry and luxury items.
  - **Copper & Cobalt –** Essential for electronic devices and gadgets.

3. Fossil Fuels: A Key Source of Energy

Definition & Formation

- Fossil fuels are carbon-based substances formed from decomposed organic matter over millions of years.
- When burned in the presence of oxygen, they produce heat energy.
- **Major types:**
  1. **Coal –** Commonly used for electricity generation.
  2. **Petroleum (Oil) –** Refined into petrol and diesel for vehicles but contributes to pollution.
  3. **Natural Gas –** Used for cooking and electricity generation; Compressed Natural Gas (CNG) is a cleaner alternative for vehicles.

Environmental Concerns

- Burning fossil fuels releases carbon dioxide (CO_2), leading to air pollution and global warming.
- Excessive use of fossil fuels contributes to rising temperatures, climate change, and melting ice caps.
- **Key Term:** Global Warming
- **Definition:** The increase in Earth's temperature due to the trapping of heat by greenhouse gases like CO_2.
- **Effects:** Climate change, melting glaciers, rising sea levels, and extreme weather conditions.

Conservation of Natural Resources

Why Conservation is Necessary?

- Growing population and increasing energy demands are rapidly depleting non-renewable resources.
- If overuse continues, many resources may become unavailable, leading to crises.

- Ways to Conserve Resources
- Use resources judiciously to prevent wastage.
- Adopt energy-saving practices like reducing electricity consumption.
- Switch to alternative energy sources (solar, wind, hydropower).

Sustainable Development

Definition

- Meeting present needs without compromising future generations' ability to meet their needs.
- Involves responsible resource usage and environmental conservation.

Key Goals of Sustainable Development

1. Identifying causes of resource depletion and addressing them effectively.
2. Preventing waste and overconsumption.
3. Recycling reusable materials to reduce pressure on natural resources.
4. Preventing pollution to protect ecosystems and biodiversity.
5. Preserving forests and wildlife for ecological balance.
6. Using alternative energy sources like solar and wind.

The 3Rs Principle: Reduce, Reuse, Recycle

- **Reduce:** Minimize consumption of non-renewable resources.
- **Reuse:** Use products multiple times instead of disposing of them.
- **Recycle:** Convert waste materials into reusable products.

Key Term: Biodiversity

- **Definition:** The variety of life forms (plants, animals, microorganisms) on Earth or in a specific area.
- **Importance:** Supports ecological balance and sustains life.

Conclusion

Non-renewable resources are essential but finite. Overuse leads to environmental damage and depletion. Conservation, sustainable practices, and alternative energy sources are key to ensuring resource availability for future generations.