Resources and Development

Class 10 Social Science - Complete Study Notes

Chapter Overview

This chapter examines the concept of resources, their classification, distribution, and sustainable utilization. It focuses on land resources in India, soil types, degradation problems, and conservation methods essential for sustainable development.

Key Terms and Definitions

Resource: Anything that can be used to satisfy human needs and has utility, accessibility, and feasibility of use.

Natural Resources: Resources that are derived from nature and used without much modification (e.g., air, water, soil, minerals).

Human Resources: People with their skills, knowledge, and abilities that contribute to creating more resources.

Human-made Resources: Resources created by humans using natural resources (e.g., buildings, roads, machines).

Renewable Resources: Resources that can be renewed or replenished naturally (e.g., solar energy, wind, water).

Non-renewable Resources: Resources that cannot be renewed once exhausted (e.g., coal, petroleum, minerals).

Sustainable Development: Development that meets present needs without compromising the ability of future generations to meet their needs.

Resource Planning: Judicious use and conservation of resources to ensure their availability for future generations.

Land Degradation: Decline in land quality caused by human activities and environmental factors.

Soil Erosion: Removal of fertile topsoil by natural forces like wind and water.

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1. Types of Resources

Classification Based on Origin

Natural Resources:

- Derived directly from nature
- Examples: Land, water, forests, minerals, air, sunlight
- Form the basis for all human activities
- Available in different quantities in different regions

Human-made Resources:

- Created by humans using natural resources and technology
- Examples: Buildings, bridges, roads, machinery, vehicles
- Result of human skill, knowledge, and technology
- Can be further developed and improved

Human Resources:

- People with their knowledge, skills, and abilities
- Most important resource as they can create other resources
- Quality determined by education, health, and skills
- Can be developed through education and training

Classification Based on Exhaustibility

Renewable Resources:

- Can be renewed naturally over time
- Will not be exhausted if used judiciously
- Examples: Solar energy, wind energy, water, forests, wildlife
- Rate of consumption should not exceed rate of renewal

Non-renewable Resources:

- Cannot be renewed once exhausted
- Have finite reserves
- Examples: Coal, petroleum, natural gas, metals, minerals
- Need careful utilization to ensure availability for future

Classification Based on Ownership

Individual Resources:

- Owned by private individuals
- Examples: Houses, cars, land owned by farmers
- Rights protected by law
- Can be inherited or sold

Community Owned Resources:

- Owned by entire community
- Examples: Village ponds, common grazing grounds, parks
- Used collectively by community members
- Managed through community cooperation

National Resources:

- Owned by the nation
- Examples: Minerals, forests, wildlife, water resources
- Government has right to use for national welfare
- All citizens have equal right to benefit from them

International Resources:

- Not owned by any individual nation
- Examples: Ocean resources beyond 200 nautical miles, Antarctica
- Regulated by international laws and agreements
- Shared by entire humanity

Classification Based on Status of Development

Potential Resources:

- Exist in a region but not fully utilized
- Examples: Wind and solar energy in Rajasthan, mineral wealth in Himalayas
- Require technology and investment for development
- Can be converted to actual resources with effort

Developed Resources:

- Surveyed and their quantity and quality determined
- Currently being utilized

- Examples: Coal in Jharia, petroleum in Mumbai High
- Technology and institutions available for exploitation

Stock:

- Exist but humans lack technology to utilize them
- Examples: Hydrogen and oxygen in water, uranium in rocks
- May become resources in future with technological advancement
- Cannot be used until appropriate technology is developed

Reserves:

- Subset of stock that can be developed with existing technology
- Not being used currently due to economic or other reasons
- Examples: Water in dams for future irrigation, forest reserves
- Can be utilized when needed or profitable

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2. Development of Resources

Resource Planning

Definition:

- Strategy for judicious use of resources
- Ensures sustainable availability for present and future generations
- Involves identification, conservation, and proper utilization

Steps in Resource Planning:

1. **Identification and Inventory**
   - Survey and mapping of resources
   - Assessment of quantity and quality
   - Understanding spatial distribution
2. **Evolving Planning Structure**
   - Creating institutional framework
   - Setting goals and priorities
   - Formulating policies and programs
3. **Implementation**
   - Matching resource development with national development goals

- Coordinating resource use with environmental protection
- Monitoring and evaluation of results

Need for Resource Planning:

- Limited availability of resources
- Unequal distribution of resources
- Increasing population and demands
- Environmental degradation concerns
- Inter-regional and international disputes over resources

Resource Planning in India

Challenges:

Resource Availability:

- Rich in certain resources (iron ore, coal, manganese)
- Poor in some others (petroleum, copper, zinc)
- Uneven spatial distribution across regions
- Quality variations in available resources

Technological and Institutional Constraints:

- Lack of advanced technology for exploration and extraction
- Inadequate capital for resource development
- Weak institutional framework
- Poor coordination between agencies

Environmental Concerns:

- Resource extraction causing environmental damage
- Pollution from mining and industrial activities
- Deforestation and habitat destruction
- Need to balance development with conservation

Approaches to Resource Planning:

Survey and Exploration:

- Geological and topographical surveys
- Remote sensing and GIS technology

- Detailed resource mapping
- Assessment of reserves and potential

Conservation and Management:

- Sustainable extraction practices
- Waste reduction and recycling
- Alternative resource development
- Protection of fragile ecosystems

Equitable Distribution:

- Ensuring access for all regions and communities
- Reducing regional imbalances
- Benefit-sharing mechanisms
- Special provisions for disadvantaged areas

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3. Land Resources

Importance of Land

Multiple Uses:

- Agriculture and food production
- Housing and settlements
- Industry and infrastructure
- Recreation and tourism
- Environmental services

Fixed Total Area:

- Cannot be increased unlike other resources
- Quality can be improved or degraded
- Scarcity increases with population growth
- Competition between different uses

Foundation of Life:

- Supports all terrestrial life
- Provides habitat for plants and animals
- Source of food, fiber, and timber

- Cultural and spiritual significance

Land Utilization in India

Total Geographical Area: 32.8 million hectares

Categories of Land Use:

Forest Area:

- **Current**: 23.28% of total area (2019-20)
- **Target**: 33% as per National Forest Policy
- **Types**: Reserved forests, protected forests, village forests
- **Functions**: Biodiversity conservation, climate regulation, water cycle

Agricultural Land:

Net Sown Area:

- **Current**: About 46% of total geographical area
- **Definition**: Land sown with crops at least once in an agricultural year
- **Distribution**: Highest in northern plains, lowest in hilly regions

Gross Cropped Area:

- Land sown more than once in the same year
- **Cropping Intensity**: Ratio of gross cropped area to net sown area
- Higher in areas with irrigation facilities

Fallow Land:

- **Current Fallow**: Land left uncultivated for current agricultural year
- **Old Fallow**: Land left uncultivated for more than 5 years
- **Reasons**: Lack of water, poor soil, economic factors

Other Categories:

Land Not Available for Cultivation:

- Settlement areas, roads, railways
- Industrial areas, waterlogged areas
- Rocky and mountainous terrain
- About 8% of total geographical area

Culturable Wasteland:

- Land available for cultivation but not used
- Can be brought under cultivation with effort
- About 4% of total geographical area
- Potential for expanding agricultural area

Permanent Pastures and Grazing Land:

- Land used for livestock grazing
- About 3% of total geographical area
- Important for livestock-based livelihoods
- Often degraded due to overgrazing

Land Use Changes Over Time

Trends (1960-61 to 2010-11):

Forest Area:

- Slight increase in recent decades
- Afforestation programs show positive results
- Still below national target of 33%

Agricultural Land:

- Net sown area relatively stable
- Cropping intensity increased
- Multiple cropping expanded with irrigation

Non-Agricultural Uses:

- Significant increase due to industrialization and urbanization
- Conversion of agricultural land for other purposes
- Pressure from growing population and development needs

Factors Causing Land Use Changes:

- Population growth and urbanization
- Industrial and infrastructure development
- Agricultural intensification
- Environmental policies and conservation efforts

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4. Soil as a Resource

Formation of Soil

Process:

- Weathering of rocks over thousands of years
- Physical, chemical, and biological processes
- Climate, organisms, relief, parent material, and time

Components:

- **Mineral particles**: 45% (sand, silt, clay)
- **Organic matter**: 5% (humus from decomposed plants/animals)
- **Water**: 25% (soil moisture)
- **Air**: 25% (in soil pores)

Time Required:

- Formation of 1 cm of soil takes 100-1000 years
- Very slow renewal rate
- Practically non-renewable resource

Classification of Indian Soils

Alluvial Soils:

Distribution:

- Northern plains, river valleys, coastal areas
- Largest area coverage (about 40% of total area)
- Formed by deposition of sediments by rivers

Characteristics:

- Very fertile and suitable for agriculture
- Rich in nitrogen and phosphorus, deficient in nitrogen
- Fine particles, good water retention
- Different ages: Khadar (new alluvium), Bhangar (old alluvium)

Crops:

- Wheat, rice, sugarcane, cotton
- Most productive agricultural regions

- High population density due to fertility

Black Soils (Regur Soils):

Distribution:

- Deccan plateau, parts of Gujarat, Madhya Pradesh, Maharashtra
- About 15% of total area
- Formed from weathering of basaltic rocks

Characteristics:

- High clay content, sticky when wet
- Good moisture retention capacity
- Self-plowing due to expansion and contraction
- Rich in calcium, magnesium, potash; poor in nitrogen

Crops:

- Cotton (most suitable), sugarcane, wheat, jowar
- Known as "Cotton soils"

Red and Yellow Soils:

Distribution:

- Eastern and southern plateau areas
- Parts of Odisha, Jharkhand, West Bengal
- About 18% of total area

Formation:

- Weathering of crystalline rocks
- Red color due to iron oxide
- Yellow color in hydrated form

Characteristics:

- Less fertile than alluvial soils
- Coarse texture, good drainage
- Deficient in nitrogen, phosphorus, humus
- Acidic in nature

Crops:

- Rice, wheat, sugarcane, maize
- Requires fertilizers for good yield

Laterite Soils:

Distribution:

- High rainfall areas of Western Ghats
- Parts of Odisha, Jharkhand, Assam
- Tropical regions with alternating wet and dry seasons

Formation:

- Intense leaching due to heavy rainfall
- Loss of soluble materials
- Concentration of iron and aluminum oxides

Characteristics:

- Poor fertility, acidic
- Good for plantation crops
- Hardens when exposed to air
- Used as building material

Crops:

- Tea, coffee, rubber, cashew
- Coconut, areca nut

Arid Soils (Desert Soils):

Distribution:

- Rajasthan, parts of Gujarat, Punjab, Haryana
- Arid and semi-arid regions

Characteristics:

- Sandy texture, low organic matter
- High salt content, alkaline
- Low water retention capacity
- Deficient in nitrogen and humus

Potential:

- Can be made fertile with irrigation
- Good drainage prevents waterlogging

Forest Soils:

Distribution:

- Hilly and mountainous regions
- Forest-covered areas

Characteristics:

- Vary according to climate and vegetation
- Generally acidic with low humus content
- Coarse texture in upper slopes, loamy in valleys
- Good for forest vegetation

Mountain Soils:

Distribution:

- Himalayan regions, Western and Eastern Ghats
- High altitude areas

Characteristics:

- Vary with altitude and vegetation
- Generally thin and acidic
- Rich in organic matter in forested areas
- Suitable for tea, coffee, fruits

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5. Soil Degradation and Conservation

Soil Degradation

Definition:

- Decline in soil quality and productivity
- Loss of physical, chemical, or biological properties
- Major threat to food security and environment

Types of Soil Degradation

Soil Erosion:

Water Erosion:

- **Sheet Erosion**: Uniform removal of thin soil layer
- **Rill Erosion**: Formation of small channels
- **Gully Erosion**: Formation of deep channels
- **Stream Bank Erosion**: Erosion along riverbanks

Wind Erosion:

- Common in arid and semi-arid regions
- Removal of fertile topsoil by wind
- Formation of sand dunes
- Loss of agricultural land

Chemical Degradation:

Salinization:

- Accumulation of salts in soil
- Common in arid regions and irrigated areas
- Makes soil unsuitable for most crops
- Affects about 6.73 million hectares in India

Acidification:

- Lowering of soil pH
- Common in high rainfall areas
- Reduces nutrient availability
- Affects crop growth

Nutrient Depletion:

- Loss of essential nutrients
- Continuous cropping without replenishment
- Reduced soil fertility
- Need for external inputs

Physical Degradation:

Compaction:

- Compression of soil particles

- Reduces pore space and water infiltration
- Caused by heavy machinery and overgrazing
- Affects root penetration

Waterlogging:

- Saturation of soil with water
- Poor drainage systems
- Affects about 8.5 million hectares
- Reduces crop productivity

Causes of Soil Degradation

Human Factors:

Deforestation:

- Removal of forest cover
- Loss of soil-binding roots
- Increased surface runoff
- Major cause of erosion

Overgrazing:

- Excessive grazing by livestock
- Removal of vegetation cover
- Soil compaction
- Common in arid regions

Agricultural Practices:

- **Intensive Farming**: Continuous cropping without rest
- **Monoculture**: Lack of crop rotation
- **Excessive Plowing**: Breaking soil structure
- **Excessive Use of Chemicals**: Fertilizers and pesticides

Industrial Activities:

- Mining operations
- Industrial pollution
- Dumping of waste materials
- Contamination of soil

Natural Factors:

Climate:

- Heavy rainfall causing erosion
- Drought conditions
- Extreme temperatures
- Wind patterns

Topography:

- Steep slopes increase erosion
- Poor natural drainage
- Altitude effects

Extent of Soil Degradation in India

Statistics:

- About 147 million hectares affected by degradation
- 45% of total geographical area
- Different types affect different regions

Regional Patterns:

- **Himalayan Region**: Landslides, sheet erosion
- **Indo-Gangetic Plains**: Salinization, alkalinization
- **Arid Regions**: Wind erosion, salinization
- **Deccan Plateau**: Water erosion, gully formation
- **Coastal Areas**: Saline water intrusion

Soil Conservation

Definition:

- Protection of soil from erosion and degradation
- Maintaining soil fertility and productivity
- Ensuring sustainable use of soil resources

Methods of Soil Conservation

Contour Plowing:

- Plowing along contour lines

- Reduces surface runoff
- Prevents formation of rills and gullies
- Suitable for gentle slopes

Strip Cropping:

- Alternating strips of different crops
- Dense-rooted crops hold soil
- Reduces wind and water erosion
- Maintains soil fertility

Terracing:

- Construction of step-like structures on slopes
- Reduces slope length and gradient
- Prevents rapid water flow
- Common in hilly areas

Shelter Belts:

- Planting trees in rows to break wind force
- Reduces wind erosion
- Provides additional benefits (timber, fruits)
- Common in arid regions

Afforestation:

- Planting trees on barren land
- Soil binding through root systems
- Reduces surface runoff
- Improves microclimate

Controlled Grazing:

- Limiting livestock numbers
- Rotational grazing systems
- Allowing vegetation recovery
- Prevents overgrazing

Crop Rotation:

- Growing different crops in sequence

- Maintains soil nutrients
- Breaks pest and disease cycles
- Legumes add nitrogen to soil

Organic Farming:

- Use of organic manures
- Avoid chemical fertilizers and pesticides
- Maintains soil health
- Sustainable agriculture practice

Mulching:

- Covering soil with organic materials
- Prevents erosion and moisture loss
- Adds organic matter to soil
- Controls weeds

Government Initiatives for Soil Conservation

National Programs:

Integrated Watershed Management Program:

- Comprehensive approach to land and water conservation
- Community participation in planning and implementation
- Focus on rainfed areas
- Multiple benefits: agriculture, environment, employment

National Mission for Sustainable Agriculture:

- Part of National Action Plan on Climate Change
- Promotes sustainable farming practices
- Focus on soil health improvement
- Technology dissemination and farmer training

Soil Health Card Scheme:

- Provides soil nutrient status to farmers
- Recommendations for balanced fertilizer use
- Promotes soil testing
- Implemented across the country

State and Regional Initiatives:

Jhum Control Programs:

- Alternative livelihood options for shifting cultivation
- Terrace farming promotion
- Forest conservation efforts
- Common in northeastern states

Desert Development Programs:

- Afforestation in arid regions
- Water harvesting structures
- Alternative energy sources
- Sand dune stabilization

Coastal Area Management:

- Protection from saline water intrusion
- Mangrove plantation
- Sustainable aquaculture
- Coastal regulation zones

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6. Case Studies

Success Stories

Haryali Watershed Development:

- **Location**: Rajasthan
- **Approach**: Community-based water and soil conservation
- **Results**: Increased groundwater levels, improved crop yields
- **Lessons**: Importance of community participation

Sukhomajri Village Model:

- **Location**: Haryana
- **Innovation**: Water harvesting and equitable distribution
- **Impact**: Improved soil conservation, increased incomes
- **Replication**: Model adopted in other regions

Ralegan Siddhi:

- **Leader**: Anna Hazare
- **Methods**: Watershed development, water conservation
- **Transformation**: From drought-prone to prosperous village
- **Principles**: Community participation, sustainable practices

Challenges and Solutions

Kerala's Laterite Soil Management:

- **Problem**: Low fertility laterite soils
- **Solutions**: Organic farming, spice cultivation, plantation crops
- **Success**: High agricultural productivity despite poor soils

Rajasthan's Desert Management:

- **Challenge**: Wind erosion and desertification
- **Measures**: Afforestation, shelter belts, water conservation
- **Innovation**: Traditional water harvesting revival

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7. Resource Conservation

Need for Conservation

Resource Depletion:

- Increasing consumption rates
- Limited availability of resources
- Threat to future generations
- Economic and environmental costs

Environmental Degradation:

- Pollution from resource extraction
- Habitat destruction
- Loss of biodiversity
- Climate change impacts

Principles of Resource Conservation

Sustainable Development:

- Meeting present needs without compromising future
- Balancing economic, social, and environmental goals
- Intergenerational equity
- Long-term perspective

3 Rs Approach:

- **Reduce**: Minimize resource consumption
- **Reuse**: Use resources multiple times
- **Recycle**: Convert waste into useful products

Conservation Strategies:

Efficient Use:

- Technology improvement
- Better management practices
- Waste reduction
- Energy efficiency

Substitution:

- Renewable for non-renewable resources
- Less scarce for scarce resources
- Environmentally friendly alternatives
- Innovation and research

Protection:

- Legal frameworks
- Protected areas
- Environmental regulations
- International cooperation

Important Questions for Examination

1. **What is a resource? Explain the classification of resources with examples.**
2. **Why is resource planning essential? Describe the steps involved in resource planning.**
3. **Describe the distribution of different types of soils found in India.**
4. **What are the main causes of soil degradation in India? Suggest measures for soil conservation.**

5. **Explain the land use pattern in India and the changes over time.**
6. **How are human resources different from other resources? Why are they important?**
7. **What is sustainable development? How can we achieve it?**
8. **Describe any three methods of soil conservation with examples.**

Important Statistics and Facts

Land Use in India (2018-19)

- **Total Geographical Area**: 328.7 million hectares
- **Forest Area**: 23.28% (76.5 million hectares)
- **Net Sown Area**: 46.0% (151.0 million hectares)
- **Current Fallow**: 3.4% (11.2 million hectares)
- **Culturable Wasteland**: 4.2% (13.8 million hectares)

Soil Degradation

- **Total Degraded Land**: 147 million hectares (45% of total area)
- **Water Erosion**: 83.69 million hectares
- **Wind Erosion**: 9.48 million hectares
- **Salinization/Alkalinization**: 6.73 million hectares
- **Waterlogging**: 0.88 million hectares

Forest Cover

- **Total Forest Cover**: 80.9 million hectares (24.62% of geographical area)
- **Dense Forest**: 29.9 million hectares
- **Open Forest**: 29.1 million hectares
- **Scrub**: 4.7 million hectares

Maps to Study

Important Maps:

- Types of soils in India
- Land use pattern in India
- Forest distribution in India
- Major soil degradation areas

- Water and wind erosion areas
- Watershed development projects

Current Issues and Challenges

Contemporary Problems

Climate Change Impact:

- Changing rainfall patterns affecting soil
- Increased frequency of extreme weather
- Sea level rise and coastal erosion
- Temperature changes affecting soil organisms

Urbanization Pressure:

- Conversion of agricultural land
- Expansion of urban areas
- Infrastructure development needs
- Loss of productive land

Population Growth:

- Increasing demand for land and resources
- Pressure on available land
- Food security concerns
- Competition between different uses

Future Strategies

Technology Integration:

- Precision agriculture techniques
- Remote sensing for resource monitoring
- GIS-based planning and management
- Biotechnology for soil improvement

Policy Measures:

- Integrated land use planning
- Incentives for conservation practices
- Strict implementation of environmental laws

- International cooperation for global issues

Community Participation:

- Local involvement in resource management
- Traditional knowledge integration
- Capacity building and awareness
- Participatory planning approaches

Conclusion

Resource and development is a critical aspect of geography that deals with the relationship between natural resources and human society. Understanding the classification, distribution, and sustainable utilization of resources is essential for ensuring a balance between development needs and environmental conservation.

Key Learning Points:

1. **Resources are valuable** when they have utility, accessibility, and feasibility of use
2. **Resource planning is essential** for sustainable development and equitable distribution
3. **Land and soil are finite resources** that require careful conservation and management
4. **Human activities** are major causes of resource degradation
5. **Conservation measures** can help maintain resource quality and availability
6. **Sustainable development** requires balancing present needs with future requirements

Relevance: This chapter provides foundation for understanding environmental challenges, sustainable development goals, and the need for conservation practices. It helps students appreciate the importance of judicious resource use and environmental protection for ensuring the well-being of present and future generations.

The concepts learned here are applicable to current global challenges like climate change, food security, and sustainable development, making this chapter highly relevant for understanding contemporary environmental and development issues.