Class 10 Geography — Chapter 1

RESOURCES AND DEVELOPMENT

COMPLETE QUESTION BANK

30 MCQ | 20 Fill in the Blanks | 10 Matching | 10 FAQ | 30 Short Q&A | 20 Long Q&A

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SECTION A — Multiple Choice Questions (MCQ) [30 Questions × 1 Mark = 30 Marks]

Directions: Choose the most appropriate option from (a), (b), (c) or (d). The correct answer is highlighted in green.

Q1. Everything available in our environment which can be used to satisfy our needs is called a:

(a) Natural gift
(b) Resource
(c) Ecosystem
(d) Institution

Q2. Which of the following is NOT a component required for something to become a resource?

(a) Technology
(b) Cultural acceptability
(c) Physical beauty
(d) Institutions

Q3. Resources which are found in living organisms are known as:

(a) Abiotic resources
(b) Non-renewable resources
(c) Biotic resources
(d) Stock resources

Q4. Coal, petroleum and natural gas are examples of:

(a) Renewable resources
(b) Biotic resources
(c) Non-renewable resources
(d) Community resources

Q5. A village pond used by the entire local community is an example of which type of resource?

(a) Individual resource
(b) Community resource
(c) National resource
(d) International resource

Q6. Resources which exist in a region but have not yet been properly surveyed or put to use are called:

(a) Developed resources
(b) Stock resources
(c) Reserve resources
(d) Potential resources

Q7. The concept of Sustainable Development was prominently defined by which commission?

(a) Rio Commission
(b) Brundtland Commission
(c) Club of Rome
(d) Agenda 21 Committee

Q8. The Earth Summit of 1992 was held at which city?

(a) New York
(b) London
(c) Rio de Janeiro
(d) Geneva

Q9. Agenda 21 is associated with achieving:

(a) Military cooperation
(b) Global sustainable development
(c) Space exploration
(d) Free trade agreements

Q10. What is the total geographical area of India?

(a) 32.8 lakh sq km
(b) 28.6 lakh sq km
(c) 40.5 lakh sq km
(d) 36.2 lakh sq km

Q11. What percentage of India's total land area consists of plains?

(a) 27%
(b) 30%
(c) 43%
(d) 50%

Q12. According to the National Forest Policy of 1952, what percentage of land in India should be under forest cover?

(a) 25%
(b) 33%
(c) 40%
(d) 20%

Q13. Which of the following is the leading cause of land degradation in states like Jharkhand and Chhattisgarh?

(a) Over irrigation
(b) Overgrazing
(c) Mining activities
(d) Deforestation

Q14. Wind erosion and the spread of sand dunes is a major concern in which Indian state?

(a) Kerala
(b) Assam
(c) Rajasthan
(d) West Bengal

Q15. Contour ploughing is a method used to:

(a) Increase crop yield
(b) Prevent soil erosion on slopes
(c) Irrigate dry land
(d) Reduce wind speed

Q16. Alluvial soil is primarily deposited by:

(a) Wind
(b) Glaciers
(c) Rivers
(d) Volcanoes

Q17. The term 'Bangar' refers to:

(a) New alluvial soil
(b) Old alluvial soil found on higher ground
(c) Black volcanic soil
(d) Laterite soil

Q18. Black soil is also known by which local name?

(a) Khadar
(b) Bangar
(c) Regur
(d) Laterite

Q19. Which type of soil has the remarkable property of retaining moisture for a very long time?

(a) Alluvial soil
(b) Red soil
(c) Black soil
(d) Arid soil

Q20. Black soil is most suitable for the cultivation of which crop?

(a) Rice
(b) Wheat
(c) Cotton
(d) Tea

Q21. Red soil gets its colour from the presence of which chemical compound?

(a) Calcium oxide
(b) Iron oxide
(c) Magnesium sulphate
(d) Aluminium oxide

Q22. The word 'Laterite' comes from a Latin word meaning:

(a) Rocky
(b) Fertile
(c) Brick
(d) Forest

Q23. Laterite soil is found extensively in which of the following states?

(a) Punjab
(b) Uttar Pradesh
(c) Karnataka and Kerala
(d) Rajasthan

Q24. Which crop grows particularly well in laterite soil in Tamil Nadu?

(a) Wheat
(b) Paddy
(c) Cashew nut
(d) Sugarcane

Q25. Arid soils are predominantly found in:

(a) Assam and Meghalaya
(b) Rajasthan and parts of Gujarat
(c) Bihar and Jharkhand
(d) Andhra Pradesh and Odisha

Q26. Gully erosion, when severe, creates a landform known as:

(a) Delta
(b) Bad land or ravines
(c) Alluvial plain
(d) Plateau

Q27. Planting rows of trees to check wind movement and prevent sand dune formation is called:

(a) Strip cropping
(b) Mulching
(c) Shelter belt
(d) Terrace farming

Q28. The depletion of resources for satisfying the greed of a few individuals is described as:

(a) Sustainable use
(b) Resource planning
(c) Over-exploitation
(d) Conservation

Q29. Which type of resource lies beyond the 200 nautical mile Exclusive Economic Zone and belongs to no single nation?

(a) National resource
(b) Community resource
(c) International resource
(d) Reserve resource

Q30. Waterlogging and soil salinity in Punjab and Haryana are mainly caused by:

(a) Mining
(b) Over irrigation
(c) Deforestation
(d) Overgrazing

SECTION B — Fill in the Blanks [20 Questions × 1 Mark = 20 Marks]

Directions: Fill each blank with the correct word or phrase. Answers are provided below each question.

1. Everything in our environment that can be used to satisfy our needs is called a _____.

Ans: resource

2. Resources that are formed from living organisms such as plants and animals are called _____ resources.

Ans: biotic

3. Coal and petroleum are examples of _____ resources because they cannot be replenished within a human lifetime.

Ans: non-renewable

4. A village grazing ground shared by the whole community is a classic example of a _____ resource.

Ans: community

5. Potential resources are those which _____ but have not yet been put to use due to lack of technology.

Ans: exist in a region

6. The Brundtland Commission defined Sustainable Development in its famous report titled '_____'.

Ans: Our Common Future

7. The Rio Earth Summit was held in the year _____ in Brazil.

Ans: 1992

8. Agenda 21 is an action plan aimed at achieving global _____ development.

Ans: sustainable

9. The total geographical area of India is _____ lakh square kilometres.

Ans: 32.8

10. According to the National Forest Policy, _____ per cent of India's land should be under forest cover.

Ans: 33

11. The practice of ploughing along the contour lines of a slope to prevent water runoff is called _____ ploughing.

Ans: contour

12. The most widespread and fertile soil of India, deposited by rivers, is known as _____ soil.

Ans: alluvial

13. Old alluvial soil found on higher ground away from river channels is locally called _____.

Ans: Bangar

14. Black soil is also known as _____ soil because it is ideal for growing cotton.

Ans: Regur / cotton

15. The characteristic that makes black soil special is its ability to _____ moisture even during dry spells.

Ans: retain

16. Red soil gets its reddish colour due to the presence of _____ oxide.

Ans: iron

17. The word Laterite is derived from the Latin word 'later' which means _____.

Ans: brick

18. Laterite soil is formed as a result of heavy rainfall that washes away minerals, a process called _____.

Ans: leaching

19. The formation of deep gullies due to running water, making land unfit for cultivation, is called _____ erosion.

Ans: gully

20. Planting rows of trees as wind barriers to stabilise sand dunes is known as a _____ belt.

Ans: shelter

SECTION C — Matching Questions [10 Pairs × 1 Mark = 10 Marks]

Directions: Match each term in Column A with its correct description in Column B. The correct match letter is shown in the middle column.

Column A — Term	Match	Column B — Description
Biotic Resources	**A**	Resources obtained from living organisms, e.g. forests, fish, livestock
Non-Renewable Resources	**B**	Resources that cannot be replenished naturally in a short period, e.g. coal, petroleum
Sustainable Development	**C**	Development that meets present needs without compromising future generations
Agenda 21	**D**	International action plan adopted at the 1992 Rio Earth Summit for sustainable development
Alluvial Soil	**E**	Most fertile soil of India, deposited by rivers across the northern plains
Regur / Black Soil	**F**	Volcanic soil, excellent for cotton cultivation, has high moisture retention
Laterite Soil	**G**	Soil formed by leaching in heavy rainfall areas; the word means 'brick' in Latin
Contour Ploughing	**H**	Ploughing along slope lines to slow water runoff and prevent soil erosion
Gully Erosion	**I**	Severe water erosion that carves deep channels, creating ravines or 'bad land'
Shelter Belt	**J**	Rows of trees planted to check wind speed and stabilise sand dunes

SECTION D — Frequently Asked Questions (FAQ) [10 Questions × 2 Marks = 20 Marks]

These are the questions students most commonly ask about this chapter. Read them carefully — you will very likely see something similar in your exam!

FAQ 1: Why is sunlight considered a renewable resource but coal is not?

Ans: Sunlight is continuously produced by the Sun and will not run out during our lifetime or even millions of years from now. It renews itself naturally. Coal, on the other hand, took millions of years to form from buried organic matter under heat and pressure. Once we burn it, it is gone forever — there is no way nature can replace it quickly. That is why coal is non-renewable and sunlight is renewable.

FAQ 2: What exactly is Sustainable Development? Give a real-life example.

Ans: Sustainable Development means using resources wisely today so that future generations will also have enough. Think of it this way: if a farmer over-pumps underground water every year, the wells will dry up and his children will have no water. But if he uses just what he needs and recharges the groundwater, the supply continues. Using solar panels instead of burning coal is another perfect example — sunlight will not run out, but coal will.

FAQ 3: Why did the Earth Summit of 1992 matter so much?

Ans: Before 1992, most countries focused only on economic growth without worrying about the environment. The Rio Earth Summit brought over 100 world leaders together to agree, for the first time, that development must be sustainable. They adopted Agenda 21, signed the Biological Diversity Convention, and agreed on the need to address global warming. It was a turning point in how the world thought about resources and development.

FAQ 4: How is Khadar different from Bangar soil?

Ans: Both are types of alluvial soil, but they differ in age and location. Khadar is newer alluvial soil deposited close to river channels during floods. It is lighter in colour, finer in texture, and more fertile. Bangar is older alluvial soil found on higher ground away from river channels. It is coarser, darker, and contains lime nodules called kankars. Khadar is more suitable for farming because it is regularly renewed by floods.

FAQ 5: Why is black soil called 'self-ploughing' soil?

Ans: Black soil has a very high clay content. During the dry summer months, it loses moisture and develops wide, deep cracks. These cracks allow air and plant roots to go deeper into the soil. When rain comes, the soil swells and the cracks close. This natural cycle of cracking and swelling aerates the soil without any human

effort — which is why farmers and geographers call it 'self-ploughing' soil.

FAQ 6: What is the difference between Sheet Erosion and Gully Erosion?

Ans: Sheet erosion is when a thin, even layer of topsoil is washed away across a large flat area by rainwater flowing as a sheet. It is often not visible to the naked eye until serious fertility loss has occurred. Gully erosion happens when water concentrates and flows rapidly along specific channels, cutting deep trenches or gullies into the land. Over time, gullies become ravines, making the land completely unfit for farming. Gully erosion is far more destructive and visible.

FAQ 7: Why does India need resource planning even though it is rich in resources?

Ans: India has great wealth in resources, but they are very unevenly distributed. For example, Jharkhand has abundant coal and minerals but lacks basic infrastructure. Rajasthan has enormous potential for solar and wind energy but suffers from severe water scarcity. Some states have too much of one resource but very little of another. Without careful planning, resources will be wasted where they are in surplus and remain unused where they are scarce. Resource planning ensures that every part of the country benefits fairly.

FAQ 8: How did colonialism affect the use of India's resources?

Ans: During British rule, India had enormous natural resources — forests, minerals, fertile land — but the technology and institutions were in British hands. The British used their advanced technology to extract India's resources cheaply and shipped them to England for manufacturing. The wealth was generated in England, not in India. This is why NCERT points out that merely having resources is not enough — without technology and institutions, a nation cannot truly benefit from its own wealth.

FAQ 9: What causes waterlogging and soil salinity in Punjab and Haryana?

Ans: Both problems are caused by excessive irrigation. When farmers irrigate fields heavily without proper drainage, water accumulates underground and rises towards the surface — this is waterlogging. When the waterlogged land dries out in summer, the water evaporates but leaves behind mineral salts on the surface. These salts make the soil infertile and eventually unfit for cultivation. Over-reliance on chemical fertilisers also contributes to this problem.

FAQ 10: Why is laterite soil considered poor for farming, yet it supports tea and coffee plantations?

Ans: Laterite soil forms in areas of very heavy rainfall where minerals are washed deep underground by a process called leaching. The top layer is left with mainly iron and aluminium oxides, making it hard and low in nutrients like nitrogen, potash and lime. So ordinary food crops do poorly in it. However, tea and coffee plants have

deep roots that access moisture at lower levels, and they actually thrive in slightly acidic, well-drained soil with good humidity — which is exactly what laterite areas in Karnataka and Kerala provide.

SECTION E — Short Answer Questions [30 Questions × 3 Marks = 90 Marks]

Each answer should be approximately 40 to 60 words. Write clearly and to the point.

Q1. What is a resource? Name the three essential components that transform something into a resource.

Ans A resource is anything available in our environment that can be used to satisfy human needs. The three essential components that transform a substance into a resource are: (1) Technology — knowing how to use it; (2) Institutions — systems that manage and regulate its use; and (3) Cultural Acceptability — society's willingness to accept and use it.

Q2. Distinguish between biotic and abiotic resources with two examples each.

Ans Biotic resources are obtained from living organisms. Examples: timber from forests, fish from rivers. Abiotic resources come from non-living things. Examples: iron ore (mineral), water. The key difference is that biotic resources have life, while abiotic resources do not. Both are essential for human survival and development.

Q3. What are renewable resources? Why must we still use them carefully?

Ans Renewable resources are those which can be replenished naturally over time, such as solar energy, wind, water, and forests. Although they are naturally restored, careless overuse can damage them permanently. For instance, forests regenerate, but excessive deforestation destroys ecosystems before they can recover. Responsible use ensures these resources remain available for future generations.

Q4. Explain the difference between 'stock' and 'reserve' resources.

Ans Stock resources exist in nature but cannot yet be used because humanity lacks the technology to do so. For example, hydrogen in seawater is a vast energy source, but the technology to harness it economically does not yet exist widely. Reserve resources are a part of the stock that CAN be used with existing technology — they are simply set aside for future use, such as river water stored in dams.

Q5. What are individual and community resources? Give one example of each.

Ans Individual resources are privately owned by a single person, such as a farmer's field or a person's house. Community resources are owned collectively by a group and are accessible to all its members — for instance, a village pond, a public park, or common grazing land. The key distinction lies in ownership and access rights.

Q6. Why is sustainable development considered essential in today's world?

Ans Our current rate of resource consumption is rapidly depleting the Earth's natural wealth. If this continues, future generations will inherit a planet stripped of its resources. Sustainable development ensures we meet today's needs without

destroying the capacity of the Earth to meet tomorrow's needs. It balances economic growth with environmental protection and social justice.

Q7. What was the significance of the Rio Earth Summit of 1992?

Ans The Rio Earth Summit was the first major international gathering where world leaders formally committed to sustainable development. More than 100 heads of state attended. They adopted Agenda 21 as a global action plan, endorsed the Global Planet Principles, and signed the Biological Diversity Convention. It marked a turning point in global environmental awareness and cooperation.

Q8. What is Agenda 21? What was its primary goal?

Ans Agenda 21 is an international action plan adopted at the Rio Earth Summit in 1992. Its primary goal was to achieve global sustainable development in the 21st century. It required every local government worldwide to create its own local Agenda 21 — a plan to address environmental degradation and ensure sustainable use of resources at the community level.

Q9. Explain why resource planning is necessary for India.

Ans India is a vast country with highly uneven distribution of resources. Some states are mineral-rich but lack infrastructure; others have water but no technology to use it. Without resource planning, some regions will experience wastage while others suffer scarcity. Resource planning ensures fair distribution, prevents over-exploitation, and aligns resource use with national development goals.

Q10. Name and briefly describe the three stages of resource planning in India.

Ans The three stages are: (1) Survey and Mapping — identifying and mapping all available resources across the country; (2) Planning Structure — creating a framework with appropriate technology, skill, and institutions to develop those resources; (3) Implementation — integrating the resource development plan with the overall National Development Plan so that action follows planning.

Q11. How did colonialism exploit India's natural resources? What lesson does this teach us?

Ans British colonisers used their superior technology and institutional control to extract India's minerals, timber, and agricultural produce, shipping the wealth to England. India had the raw materials but the British held the technology and institutions. The lesson is clear: possessing resources is not enough. A nation must also develop its technology and strong institutions to truly benefit from its natural wealth.

Q12. Define Land Degradation. Name any three human activities that cause it.

Ans Land degradation is the deterioration of the quality of land, making it less productive or entirely unfit for use. Three major human activities causing it are: (1) Deforestation — removing tree cover exposes soil to erosion; (2) Overgrazing —

excessive livestock grazing destroys vegetation and compacts the soil; (3) Mining — excavation disrupts the land structure and creates waste dumps that render surrounding areas infertile.

Q13. Explain how over-irrigation leads to land degradation in states like Punjab.

Ans When farmers apply irrigation water in excess of what crops need, the surplus water seeps into the ground. Over time, the underground water table rises and the land becomes waterlogged. As waterlogged land dries in summer, the moisture evaporates and leaves mineral salts behind on the soil surface. This salinisation makes the once-fertile soil infertile, a serious problem in Punjab, Haryana and western Uttar Pradesh.

Q14. What is contour ploughing? In which type of landscape is it most useful?

Ans Contour ploughing means ploughing along the contour lines of a hillside rather than up and down the slope. Each furrow acts like a small dam, slowing down rainwater and giving it time to soak into the soil rather than rushing down and washing away the topsoil. It is most useful on gentle to moderate slopes — for example, in the lower Himalayan foothills and hilly areas of central India.

Q15. Describe the method of strip cropping and how it prevents soil erosion.

Ans Strip cropping involves growing crops in alternating strips across a field — one strip of a soil-binding crop (such as grass or legumes) alongside a strip of a regular crop (such as wheat). The dense root system of the binding crop holds the soil firmly in place. When water or wind moves across the field, the binding strips act as barriers, slowing erosion. It is widely used on gently sloping land.

Q16. What is alluvial soil? Why is it the most important agricultural soil of India?

Ans Alluvial soil is formed by sediments deposited by rivers as they slow down and spread across plains. It covers the entire Indo-Gangetic Plain and is India's most fertile soil. It is rich in potash and contains adequate lime and phosphoric acid. It supports a wide variety of crops — wheat, rice, sugarcane, cotton and pulses — and feeds the majority of India's population.

Q17. What is the difference between Khadar and Bangar soil?

Ans Khadar is newer alluvial soil deposited by rivers during annual floods. It lies close to river channels, is light-coloured, fine-grained, and very fertile because it is regularly renewed with fresh sediment. Bangar is older alluvial soil deposited on higher ground far from active river channels. It is coarser, contains lime concretions called kankars, and is less fertile than Khadar. Farmers prefer Khadar land for intensive cropping.

Q18. Describe the formation and main characteristics of black soil.

A Black soil is formed from volcanic lava rock (basaltic rock) that cooled and

Ans weathered over millions of years across the Deccan Plateau. It is rich in calcium carbonate, magnesium, potash and lime but low in nitrogen. Its most characteristic feature is that it retains moisture for a very long time and develops deep cracks in summer — a process sometimes called self-ploughing. It is ideal for cotton, which requires a long growing season and steady moisture.

Q19. Why does red soil appear red, and where is it found in India?

Ans Red soil gets its distinctive colour from ferric oxides (iron oxide compounds) present throughout the soil. When wet or in lower depths, it often appears yellowish due to hydration of the iron compounds. It develops on ancient crystalline rocks in low-rainfall areas. In India it is found across Odisha, Chhattisgarh, parts of Madhya Pradesh, the eastern and southern Deccan Plateau, along the Western Ghats, and in Tamil Nadu.

Q20. What is laterite soil? How is it formed, and what makes it nutritionally poor?

Ans Laterite soil forms in regions of very high rainfall and high temperature, such as the Western Ghats and northeastern India. Heavy rain washes away (leaches) soluble nutrients like silica, calcium and nitrogen deep into the ground. What remains is a hard, reddish layer rich in iron and aluminium oxides. This leaching process leaves the soil highly acidic and deficient in nitrogen, potash, lime and organic matter, making it generally poor for food crops without fertiliser input.

Q21. What are arid soils? Why do they have a high salt content?

Ans Arid soils are found in desert and semi-arid regions such as Rajasthan and parts of Gujarat. They are sandy, have very low moisture and almost no humus or organic matter. The high salt content occurs because in arid climates water evaporates rapidly from the surface, leaving dissolved salts deposited as a crust. Irrigation can make arid soils productive, but care must be taken to avoid waterlogging and further salt build-up.

Q22. Explain sheet erosion and why it is considered a 'silent' danger.

Ans Sheet erosion is the removal of a thin, relatively uniform layer of topsoil from a large area by the action of rainwater flowing across the surface. Because the loss happens very gradually and uniformly, it is not obvious to farmers — there are no visible gullies or channels. Yet over years, it strips away the nutrient-rich upper layer of soil, causing a steady and serious decline in soil fertility. By the time a farmer notices the problem, significant damage has already occurred.

Q23. How do shelter belts help in soil and land conservation?

Ans Shelter belts are rows or strips of trees planted perpendicular to the direction of prevailing winds. They reduce wind speed, preventing loose topsoil from being blown away — a process called wind erosion. In Rajasthan and parts of western India, shelter belts have successfully stabilised sand dunes and stopped their advance towards agricultural land. They also help retain moisture in the soil and

create a microclimate that benefits nearby crops.

Q24. What is terrace farming? In which regions of India is it practised?

Ans Terrace farming involves cutting a series of flat, step-like platforms ('terraces') into the slopes of hills and mountains. Each terrace holds water and soil like a giant step, preventing it from rushing downhill during heavy rain. It makes otherwise uncultivable slopes productive. In India, terrace farming is widely practised in the hilly states of the Northeast — such as Nagaland, Manipur and Meghalaya — as well as in parts of Uttarakhand and Himachal Pradesh.

Q25. Name two states where mining has caused significant land degradation and explain why.

Ans Jharkhand and Chhattisgarh are two states where intensive coal and iron ore mining has caused severe land degradation. Open-cast mining involves stripping away entire layers of topsoil and rock, leaving behind large pits, waste dumps and spoil heaps. These spoil heaps are chemically toxic, prevent vegetation from growing, and allow heavy metals to leach into nearby streams and groundwater, damaging a wide area around the mining site.

Q26. Why is the permanent pasture land in India shrinking, and what are the consequences?

Ans Permanent pasture land — land kept for grazing livestock — has been shrinking steadily in India because of encroachment for agriculture, construction and other uses. Yet India has one of the world's largest cattle populations. The result is overgrazing on the remaining pasture: too many animals eat the grass faster than it can regrow, destroying roots, compacting the soil, and reducing the land's ability to hold water. This ultimately leads to desertification in vulnerable areas.

Q27. What does the term 'bad land' or 'ravine' mean in the context of soil erosion?

Ans When gully erosion is severe and prolonged, it creates a complex network of deep, steep-sided gullies across the landscape. This makes the terrain so broken and irregular that it cannot be cultivated or even walked across easily. Such land is called 'bad land' or locally 'ravines'. The Chambal Valley in Madhya Pradesh and Rajasthan is a famous example. Ravines are also prone to flooding, making rehabilitation extremely difficult and expensive.

Q28. What is mulching, and how does it help conserve soil?

Ans Mulching is the practice of covering bare soil around plants with a layer of organic material — such as straw, dried leaves, grass clippings or compost. This protective layer reduces the impact of raindrops on the soil, prevents surface crust formation, slows down water runoff, retains moisture, and suppresses weed growth. As the mulch decomposes, it also adds organic matter to the soil, improving its fertility and structure over time.

Q29. Explain how industrial effluents contribute to land degradation.

Ans Many industries discharge liquid waste (effluents) that contain heavy metals, acids, and toxic chemicals. When these effluents are released onto land or into water bodies that then flood nearby land, they contaminate the soil. Toxic metals such as lead, mercury and cadmium accumulate in the soil and kill soil microorganisms that are essential for fertility. Industrial pollution has caused serious land degradation around factory zones in states like Maharashtra, Gujarat and Tamil Nadu.

Q30. What is the relationship between deforestation and soil erosion?

Ans Trees and their root systems act as a natural armour for soil. Their canopy intercepts heavy rainfall and breaks its force, while roots bind soil particles together. When forests are cleared, raindrops hit the bare soil with full force, dislodging particles and carrying them away with runoff. Without roots to bind it, the topsoil is quickly washed into rivers, causing both soil loss on land and siltation of water bodies downstream. Deforestation is thus the primary trigger of accelerated soil erosion.

Q31. What is Resource Conservation? Why is it important for a country like India?

Ans Resource conservation means using resources in a planned, careful and sustainable manner to avoid their depletion, degradation or destruction. India has a very large and growing population that places enormous demands on land, water, minerals and forests. Without conservation, these resources will be exhausted or damaged beyond recovery within decades. Conservation also ensures that poorer and rural communities — who depend directly on natural resources for their livelihoods — are not left without the basics of life.

SECTION F — Long Answer Questions [20 Questions × 5 Marks = 100 Marks]

Each answer should be approximately 150 to 200 words. Use sub-points where appropriate. Quality and accuracy will earn full marks.

Q1. Explain in detail the classification of resources on the basis of origin, exhaustibility, ownership and status of development.

1. On the basis of ORIGIN: Resources are either Biotic (from living things — e.g. forests, fish, livestock) or Abiotic (from non-living things — e.g. minerals, water, rocks).

2. On the basis of EXHAUSTIBILITY: Renewable resources replenish naturally (e.g. solar energy, wind, water, forests if managed well). Non-renewable resources are finite and take millions of years to form (e.g. coal, petroleum, natural gas).

3. On the basis of OWNERSHIP: Individual resources are privately owned (e.g. farmland, house). Community resources are shared by a group (e.g. village pond). National resources belong to the state (e.g. rivers, minerals). International resources lie beyond national boundaries (e.g. the open ocean beyond 200 nautical miles).

4. On the basis of STATUS OF DEVELOPMENT: Potential resources exist but are not yet used (e.g. solar power in Rajasthan). Developed resources are surveyed and in use. Stock resources cannot yet be exploited due to technological limits. Reserve resources are part of the stock that can be used in the future.

5. Understanding these categories helps planners allocate and conserve resources efficiently for long-term national development.

Q2. What is Sustainable Development? Discuss the role of the Rio Earth Summit 1992 and Agenda 21 in promoting sustainable development globally.

1. SUSTAINABLE DEVELOPMENT is defined as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' (Brundtland Commission, 1987). It balances economic growth, social equity and environmental protection.

2. RIO EARTH SUMMIT 1992 (Rio de Janeiro, Brazil): This was a landmark global event attended by over 100 heads of state. It formally committed the international community to sustainable development for the first time.

3. Key outcomes of the Summit included: signing of the Rio Declaration on Environment and Development; endorsement of the Global Planet Principles; adoption of the Biological Diversity Convention; and most importantly, adoption of AGENDA 21.

4. AGENDA 21 is an international action plan for the 21st century. Its core idea was that every local government should prepare a local Agenda 21 plan, ensuring sustainable resource use at the grassroots level.

5. SIGNIFICANCE: The Summit shifted global thinking from purely economic growth to environmentally responsible development. It recognised that resource depletion is a global crisis requiring international cooperation and local action simultaneously.

Q3. Describe the importance of Resource Planning in India. What are its three main stages?

1. IMPORTANCE: India is a vast country with enormous diversity in resource distribution. Some states are mineral-rich but lack water or skilled labour. Others have fertile land but limited minerals. Without planning, resources are wasted in surplus areas and remain unused in deficit areas, leading to regional inequality and environmental damage.

2. Resource Planning also ensures that India's development goals are achieved in a sustainable manner — using resources efficiently while conserving them for the future.

3. STAGE 1 — SURVEY AND MAPPING: The entire country is surveyed to identify and map all available resources — minerals, soil types, forest cover, water bodies and more. This creates a comprehensive national resource inventory.

4. STAGE 2 — PLANNING STRUCTURE: A detailed plan is created that includes the technology, skills and institutional framework needed to develop the identified resources. This stage determines HOW resources will be developed.

5. STAGE 3 — NATIONAL INTEGRATION: The resource development plan is integrated with the Overall National Development Plan (Five Year Plans historically). This ensures that resource development supports national economic and social goals, not just isolated regional interests.

6. Historically, India's First Five Year Plan (1951) emphasised resource development, and subsequent plans have continued to refine this approach.

Q4. Explain the problems that arise from over-exploitation of resources, and why equitable distribution of resources is essential.

1. PROBLEM 1 — RESOURCE DEPLETION: When resources are used far faster than they can be renewed, they run out. Non-renewable resources like coal and petroleum are being consumed at an alarming rate, threatening future energy security.

2. PROBLEM 2 — CONCENTRATION IN FEW HANDS: Unchecked exploitation leads to accumulation of wealth in the hands of a few individuals, deepening economic inequality. The rich become richer while the poor lose access to resources they depend on for survival.

3. PROBLEM 3 — GLOBAL ECOLOGICAL CRISES: Over-exploitation causes deforestation, loss of biodiversity, soil degradation, water pollution and climate change. These are not local problems — they affect every living being on Earth.

4. PROBLEM 4 — SOCIAL UNREST: When communities are displaced from their resource-rich lands (as in mining regions), it creates poverty and conflict.

5. WHY EQUITABLE DISTRIBUTION MATTERS: Resources belong to all citizens — present and future. Fair distribution ensures that every region and every community has access to what it needs to live and develop. It reduces regional imbalances, prevents exploitation, and supports social justice.

6. Conclusion: Resource conservation combined with equitable distribution is the foundation of a just and sustainable society.

Q5. Describe in detail the Land Use pattern in India. Why has Net Sown Area not increased significantly since 1960-61?

1. LAND USE CATEGORIES in India include: Forests; Land not available for cultivation (barren land + non-agricultural uses); Other uncultivated land excluding fallow (permanent pastures, miscellaneous tree crops, culturable waste land); Fallow lands (current fallow and other fallow); and Net Sown Area (NSA).

2. KEY STATISTICS: India's total geographical area is 32.8 lakh sq km. However, land use data is available only for about 93% of this area, as border states like Jammu & Kashmir and Arunachal Pradesh are partially excluded.

3. NSA covers approximately 54% of the reported area. Forest cover is about 23%, well below the 33% target set by the National Forest Policy of 1952.

4. WHY NSA HAS NOT GROWN MUCH SINCE 1960-61: Almost all easily cultivable land is already under the plough. New land cannot be easily brought under cultivation because remaining waste land is either too rocky, too steep, too arid or legally protected.

5. Meanwhile, agricultural land is being lost to urbanisation, road construction, industrial zones and mining — so even maintaining the current NSA is a challenge.

6. Gross Cropped Area (GCA) has increased, however, because farmers now grow two or three crops per year on the same land — a sign of improved technology rather than more land.

Q6. What is Land Degradation? Discuss its major causes across different Indian states with specific examples.

1. LAND DEGRADATION is the decline in the biological and economic productive capacity of land, caused by human activities or natural processes. It makes land less fertile, unstable or completely unusable.

2. DEFORESTATION (All regions): Clearing forests for agriculture, timber and construction leaves soil exposed. States like Uttarakhand and Himachal Pradesh have seen serious hillside erosion after deforestation.

3. OVER-IRRIGATION AND WATERLOGGING (Punjab, Haryana, Western UP): Excessive use of groundwater for irrigation without adequate drainage causes the water table to rise. The soil becomes waterlogged, and evaporation leaves behind salt deposits — salinity ruins the once-fertile land.

4. MINING (Jharkhand, Chhattisgarh, Goa): Open-cast mining strips topsoil over vast

areas, creates toxic waste dumps, and allows heavy metals to leach into soil and rivers. Goa's iron ore mines have caused serious degradation of its red laterite soil.

5. OVERGRAZING (Rajasthan, Gujarat, Maharashtra): India's enormous cattle population puts intense pressure on pasture land. Overgrazing removes vegetation, compacts soil, reduces water absorption and leads to desertification.

6. INDUSTRIAL EFFLUENTS (Maharashtra, Gujarat, Tamil Nadu): Factory waste containing acids, heavy metals and chemicals poisons agricultural land near industrial zones.

7. CONCLUSION: Land degradation has become a national crisis. Coordinated action — afforestation, controlled irrigation, regulated mining and proper waste management — is urgently needed across all states.

Q7. Describe the methods of Land Conservation and Soil Conservation. Why are they necessary for India's future?

1. LAND CONSERVATION METHODS: (1) Afforestation — planting trees on barren and degraded land stabilises soil and restores the ecological balance. (2) Controlled Grazing — designated grazing zones with regulated cattle numbers prevent overgrazing. (3) Reclamation of wastelands — using fertilisers, irrigation and vegetation to restore productivity of degraded land.

2. SOIL CONSERVATION METHODS: (1) Contour Ploughing — ploughing along contour lines slows water runoff on slopes. (2) Terrace Farming — step-like terraces on hillsides hold soil and water. (3) Strip Cropping — alternating cash crops with soil-binding crops controls both wind and water erosion. (4) Shelter Belts — rows of trees perpendicular to wind direction break wind speed and prevent dune formation, crucial in Rajasthan. (5) Mulching — covering soil with organic matter retains moisture and prevents surface erosion. (6) Check Dams — small water-retaining structures in gullies slow runoff.

3. WHY NECESSARY FOR INDIA: India's population is nearly 1.4 billion and growing. Agriculture employs nearly half the workforce. If the soil is degraded, food security collapses. Forests regulate climate, store carbon and provide livelihoods to millions of tribal communities. Land and soil are India's most basic national assets — losing them means losing the foundation of the entire economy and civilisation.

4. Conservation today is an investment in tomorrow's survival.

Q8. Give a detailed account of Alluvial Soil — its formation, distribution, types, characteristics and agricultural importance.

1. FORMATION: Alluvial soil is formed by the deposition of sediments — sand, silt and clay — carried by rivers from the mountains and deposited as they slow down on the plains. Over thousands of years, these deposits have built up into deep, fertile layers.

2. DISTRIBUTION: It covers the entire northern plains — the Indus, Ganga and Brahmaputra river systems — making it the most widespread soil type in India. It also

extends into Rajasthan and Gujarat through river valleys, and into the coastal deltas in eastern and southern India.

3. TYPES: (a) Khadar — newer alluvial soil deposited close to river channels, fine-grained, light-coloured, very fertile, regularly renewed by floods. (b) Bangar — older alluvial soil on higher ground, coarser, contains lime nodules (kankars), less fertile than Khadar.

4. CHEMICAL CHARACTERISTICS: Rich in potash, phosphoric acid and lime. Adequate for most crops. However, it tends to be deficient in nitrogen and organic (humus) matter, especially in drier areas.

5. AGRICULTURAL IMPORTANCE: Alluvial soil supports the cultivation of a wide range of crops — wheat, rice, sugarcane, cotton, oilseeds, maize and pulses. It feeds the majority of India's population. The Indo-Gangetic Plain, underlain by alluvial soil, is often called the 'bread basket of India'.

6. Conclusion: Alluvial soil is India's agricultural backbone and must be protected from urbanisation and pollution.

Q9. Compare and contrast Black Soil and Red & Yellow Soil under the headings: formation, distribution, characteristics and suitable crops.

1. FORMATION: Black soil formed from the solidification and slow weathering of volcanic (basaltic) lava rock across the Deccan Plateau. Red and Yellow soil formed from the weathering of ancient crystalline igneous rocks in low-rainfall conditions.

2. DISTRIBUTION: Black soil covers Maharashtra, Madhya Pradesh, parts of Gujarat, Andhra Pradesh and Tamil Nadu — broadly coinciding with the Deccan Trap lava region. Red and Yellow soil is found in Odisha, Chhattisgarh, parts of MP, Tamil Nadu, the eastern Deccan Plateau and along the Western Ghats.

3. CHARACTERISTICS — BLACK SOIL: Dark grey to black; high clay content; retains moisture extremely well; develops wide cracks in dry weather (self-ploughing); rich in calcium, magnesium, potash and lime; deficient in nitrogen and phosphorus.

4. CHARACTERISTICS — RED AND YELLOW SOIL: Red colour due to iron oxide (turns yellow when hydrated); coarser texture; low water retention; deficient in nitrogen, phosphorus and humus; responds well to fertilisers and irrigation.

5. CROPS — BLACK SOIL: Cotton (its defining crop), wheat, jowar, linseed, Virginia tobacco, citrus fruits.

6. CROPS — RED AND YELLOW SOIL: Millets (jowar, bajra), pulses, groundnut, some rice and wheat with irrigation.

7. CONCLUSION: Black soil is naturally richer and more moisture-retentive, making it excellent for cotton without heavy irrigation. Red soil needs more inputs but covers a large area of India and still supports significant agriculture.

Q10. Describe Laterite Soil and Arid Soil in detail. How can each be made more productive?

1. LATERITE SOIL — FORMATION: Formed in areas of very high temperature and heavy seasonal rainfall (e.g. the Western Ghats, northeast India). Intense rainfall leaches away silica, calcium and other nutrients, leaving a soil rich in iron and aluminium oxides. It hardens on exposure to air, resembling brick — hence the name from the Latin 'later' (brick).

2. LATERITE SOIL — DISTRIBUTION: Karnataka, Kerala, Tamil Nadu, Odisha, Assam, parts of West Bengal and the northeastern states.

3. LATERITE SOIL — CHARACTERISTICS: Reddish, hard when dry; highly acidic; very low in nitrogen, potash, lime and humus. Poor water retention. Not naturally good for food crops.

4. LATERITE SOIL — MAKING IT PRODUCTIVE: Adding lime (to reduce acidity), fertilisers, and organic manure transforms it. Tea, coffee, rubber, coconut and cashew nut grow naturally. With amendments, food crops are also possible as seen in parts of Tamil Nadu.

5. ARID SOIL — FORMATION: Found in hot, dry desert conditions (Rajasthan, Gujarat). Wind deposits sand over ancient rock surfaces. Evaporation is very high.

6. ARID SOIL — CHARACTERISTICS: Sandy, low humus, low moisture, high salt content due to rapid evaporation, lacks nitrogen and organic matter. Reddish-brown to grey in colour.

7. ARID SOIL — MAKING IT PRODUCTIVE: Irrigation (as with Rajasthan Canal) provides water. Adding organic matter improves fertility. Salt must be carefully managed to prevent salinisation. Short-duration, drought-resistant crops like bajra and pulses are best suited.

Q11. What is Soil Erosion? Describe its various types and the natural and human factors that cause it.

1. SOIL EROSION is the removal of the topmost fertile layer of soil by natural agents such as wind and water, or by human activities. It is one of the most serious environmental problems because topsoil takes hundreds to thousands of years to form.

2. TYPE 1 — SHEET EROSION: A thin, uniform layer of topsoil washed away by flowing surface water, often invisible until significant fertility loss has occurred. Happens on gently sloping land during heavy rain.

3. TYPE 2 — RILL EROSION: When water concentrates into small channels and cuts tiny trenches (rills) into the soil surface. The intermediate stage between sheet and gully erosion.

4. TYPE 3 — GULLY EROSION: Water flows powerfully along channels, cutting deep, wide gullies or ravines. Creates 'bad land' that is useless for farming. Severe in the Chambal Valley.

5. TYPE 4 — WIND EROSION: In arid and semi-arid regions, strong winds lift and carry fine soil particles long distances. Results in sand dune formation and desertification. Major problem in Rajasthan.

6. NATURAL CAUSES: Heavy and intense rainfall, steep slopes, naturally sandy or loose soils, sparse natural vegetation in arid zones.

7. HUMAN CAUSES: Deforestation — removes protective cover. Overgrazing — destroys root systems. Faulty agricultural practices (e.g. ploughing up and down slopes). Construction activities — expose and compact soil. Mining — strips topsoil and leaves loose waste.

8. Prevention requires addressing both natural vulnerability and human pressure.

Q12. Discuss the various methods of Soil Conservation practised in India, explaining how each method works.

1. CONTOUR PLOUGHING: On sloping land, farmers plough furrows along the contour (horizontal lines of equal elevation) rather than up and down the slope. Each furrow holds water, preventing it from rushing downhill and carrying topsoil with it. Widely used in the Deccan Plateau and Himalayan foothills.

2. TERRACE FARMING: Hillsides are cut into broad, flat steps ('terraces'). Each terrace is essentially a small flat field that holds soil and water. Widely practised in the northeastern hill states (Nagaland, Manipur) and in Uttarakhand. Very effective on steep terrain.

3. STRIP CROPPING: Fields are planted in alternating strips of erosion-prone crops (like wheat) and soil-binding crops (like grass or clover). The binding strips slow water movement and hold soil. Wind erosion is also reduced because the dense strips act as barriers.

4. SHELTER BELTS: In Rajasthan and other arid regions, rows of trees are planted perpendicular to prevailing winds. These tree lines break wind speed, preventing sand from being blown across agricultural land and stabilising sand dunes. Shelter belts have played a major role in halting desertification in western India.

5. MULCHING: Covering soil with organic material (straw, leaves) reduces erosion from rain impact, retains moisture, and adds fertility as it decomposes.

6. AFFORESTATION AND REFORESTATION: Planting trees on bare or degraded land provides long-term soil stability, regulates water flow, and rebuilds ecosystems.

7. CHECK DAMS: Small barriers built across gullies to slow water flow, allow sediment to settle and recharge groundwater. Commonly used in Maharashtra and Rajasthan under watershed development programmes.

Q13. Explain the concept of equitable distribution of resources and what happens when resources are concentrated in the hands of a few.

1. EQUITABLE DISTRIBUTION means that resources are shared fairly among all members of society — across regions, communities and income groups. It is a fundamental principle of social justice and is essential for national stability and sustainable development.

2. WHAT HAPPENS WHEN RESOURCES ARE CONCENTRATED: When a small

group of individuals or corporations controls the majority of resources, several serious problems arise.

3. ECONOMIC INEQUALITY: The resource-owning group accumulates enormous wealth while the majority remain poor. India's tribal communities living in coal-rich Jharkhand are a classic example — the land was taken for mining, yet they remain among India's poorest.

4. POLITICAL INSTABILITY: Communities deprived of resources often resort to protests, agitations or even armed conflict. Resource conflicts are a major source of social unrest in mineral-rich but economically poor regions.

5. ENVIRONMENTAL DAMAGE: Private corporations driven solely by profit have little incentive to conserve resources or restore damaged land. Unchecked exploitation by the few harms the environment for everyone.

6. LOSS OF FUTURE POTENTIAL: When resources are depleted for the benefit of a few in one generation, future generations inherit an impoverished natural environment.

7. SOLUTION: Strong resource governance, fair taxation of natural resource extraction, community rights over local resources, and transparent resource planning are essential to ensure equitable distribution and long-term sustainability.

Q14. Why is India particularly vulnerable to land degradation? Discuss at least five specific factors with state-level examples.

1. India is especially vulnerable to land degradation due to its enormous population pressure, diverse agro-climatic conditions, rapid industrialisation and long history of resource exploitation. Here are five specific factors with examples.

2. DEFORESTATION: India loses significant forest cover every year to agriculture, logging and construction. In the northeastern states, 'jhum' (slash-and-burn) cultivation has degraded large areas of hilly land. Uttarakhand has seen devastating landslides and erosion following deforestation.

3. EXCESSIVE IRRIGATION AND WATERLOGGING: Punjab and Haryana, two of India's most agriculturally productive states, are suffering from rising water tables, waterlogging and soil salinity due to decades of over-irrigation using tube wells and canals. Highly fertile soil is being rendered barren.

4. MINING AND INDUSTRIAL ACTIVITY: Jharkhand and Chhattisgarh have extensive open-cast coal mines that have stripped topsoil over hundreds of square kilometres. Mining wastewater has poisoned rivers and agricultural land around mine sites.

5. OVERGRAZING: Rajasthan, Gujarat and Maharashtra have far more livestock than their grazing land can sustainably support. This overgrazing destroys grass cover, compacts soil, and promotes desertification, advancing the Thar Desert eastward.

6. INDUSTRIAL AND URBAN POLLUTION: In states like Maharashtra, Gujarat and Tamil Nadu, industrial effluents have contaminated agricultural land near factory zones. Urban sprawl has also consumed productive farmland at an alarming rate

around cities like Pune, Surat and Chennai.

7. CONCLUSION: India must adopt an integrated national land-use policy that balances agriculture, industry, conservation and urban growth.

Q15. Write a detailed note on the Alluvial Plains of India — their formation, soil characteristics, agricultural richness and challenges they face.

1. FORMATION OF ALLUVIAL PLAINS: The great alluvial plains of northern India were formed over millions of years by the Indus, Ganga and Brahmaputra river systems carrying sediment from the Himalayan mountains and depositing it across the lowland basin. The plains are among the world's most extensive and thickest deposits of alluvial material.

2. SOIL CHARACTERISTICS: The alluvial soil is deep, porous and well-drained in most areas. Khadar (newer alluvial) soil is found close to river channels — light, fine and very fertile. Bangar (older alluvial) soil on higher ground is coarser and contains lime concretions. The soil is rich in potash, phosphoric acid and lime but tends to be low in nitrogen and humus.

3. AGRICULTURAL RICHNESS: The Indo-Gangetic Plain is India's most productive agricultural region. It produces the majority of India's wheat, rice, sugarcane, oilseeds and pulses. The Green Revolution of the 1960s was largely concentrated here, and these plains still feed hundreds of millions of people.

4. CHALLENGES: (1) Over-irrigation has caused waterlogging and salinity in Punjab and Haryana, degrading once-fertile land. (2) Excessive use of chemical fertilisers has reduced soil health over time. (3) Rapid urbanisation — particularly around Delhi, Lucknow, Kanpur and Patna — is consuming prime agricultural land. (4) Groundwater depletion due to tube well irrigation is a growing crisis. (5) Flooding remains a seasonal hazard in Bihar and Assam.

5. CONCLUSION: The alluvial plains are India's greatest agricultural asset. Protecting their soil health through sustainable farming, regulated irrigation and controlled urbanisation is a matter of national food security.

Q16. Examine how technology and institutions determine whether a substance becomes a resource or remains merely a material.

1. THE CORE IDEA: NCERT defines a resource as something available in the environment that can satisfy human needs — but crucially, it becomes a resource only when we have the technology to use it and the institutions to manage it. Without these, it is simply a raw material or inert substance.

2. EXAMPLE 1 — URANIUM: Uranium ore has existed in rocks for billions of years. For most of human history, it was just another rock. Only after the development of nuclear science and reactor technology in the 20th century did uranium become a valuable energy resource. Without that technology, it is worthless.

3. EXAMPLE 2 — SOLAR ENERGY: Sunlight has always fallen on the Thar Desert in

Rajasthan. But without photovoltaic technology and the grid infrastructure to distribute the electricity generated, this solar energy is a 'potential resource' — it exists but cannot be used.

4. EXAMPLE 3 — DEEP-SEA MINERALS: The ocean floor holds enormous deposits of manganese nodules and rare earth metals. Technology to mine these depths sustainably does not yet exist economically — so these are 'stock resources'.

5. ROLE OF INSTITUTIONS: Even when technology exists, resources cannot be properly managed without institutions — laws, agencies, property rights, and governance systems. India's coal resources existed for centuries before British colonial institutions and technology began extracting them systematically.

6. LESSON FROM COLONIALISM: India was resource-rich but the British held the technology and institutions. The wealth flowed to Britain. This teaches us that developing our own technology and strong institutions is as important as having resources themselves.

7. CONCLUSION: Resources are not fixed — they are created by the intersection of nature, human knowledge, and social organisation.

Q17. Discuss the impact of the Club of Rome report, Gandhian philosophy, the Brundtland Commission and the Rio Summit on ideas of Sustainable Development.

1. CLUB OF ROME (1968): The Club of Rome was a group of scientists and intellectuals who first warned, in a systematic way, that unlimited resource exploitation would lead to global ecological collapse. Their 1972 report 'The Limits to Growth' showed through computer modelling that if industrial growth continued unchecked, the world would run out of key resources within 100 years. This planted the seed of resource conservation in global thinking.

2. GANDHIAN PHILOSOPHY (popularised by Schumacher, 1974): E.F. Schumacher's book 'Small is Beautiful' drew on Gandhian ideas to argue against mass production and over-consumption. Gandhi famously said: 'The Earth has enough for everyone's need, but not for everyone's greed.' This philosophy emphasised appropriate technology, local self-sufficiency, and using only what is truly necessary — ideas that deeply influenced sustainable development thinking.

3. BRUNDTLAND COMMISSION (1987): The UN World Commission on Environment and Development, chaired by Gro Harlem Brundtland, published 'Our Common Future' — the most influential document in sustainable development history. It gave the world its most widely accepted definition: 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs.' It placed sustainability at the centre of global development policy.

4. RIO EARTH SUMMIT (1992): Building on the Brundtland Commission's work, the Rio Summit translated philosophy into action. It produced Agenda 21, the Biological Diversity Convention, and the Framework Convention on Climate Change. For the first time, world leaders made binding and non-binding commitments to sustainable development.

5. CONCLUSION: These four milestones represent a gradual evolution of thinking — from alarm, to philosophy, to definition, to global action — ultimately shaping how every nation, including India, now approaches resource development.

Q18. Write a detailed essay on the soil types of India, linking each soil type to its geographical region, agricultural use and major limitations.

1. India's diverse geology, climate and vegetation have produced six main soil types, each with distinct characteristics.

2. ALLUVIAL SOIL (Indo-Gangetic Plain, coastal deltas): India's most important soil. Formed by river deposition. Supports wheat, rice, sugarcane, cotton. Limitation: low nitrogen and humus; faces waterlogging and salinisation from over-irrigation.

3. BLACK SOIL / REGUR (Deccan Plateau — Maharashtra, MP, Gujarat): Formed from volcanic lava. Ideal for cotton — retains moisture very well, self-ploughing. Limitation: low nitrogen and phosphorus; becomes sticky when wet and cracked when dry, making it difficult to work.

4. RED AND YELLOW SOIL (Odisha, Tamil Nadu, eastern Deccan): Formed from crystalline rock. Grows millets, groundnut, pulses. Limitation: low water retention; deficient in nitrogen, phosphorus and humus. Needs irrigation and fertilisers for productive cultivation.

5. LATERITE SOIL (Karnataka, Kerala, Tamil Nadu hills, Assam): Formed by leaching in heavy rainfall. Grows tea, coffee, rubber, cashew. Limitation: acidic, very poor in nutrients; unsuitable for most food crops without heavy amendment.

6. ARID SOIL (Rajasthan, Gujarat): Sandy with high salt content and minimal organic matter. Can grow drought-resistant crops with irrigation. Limitation: prone to waterlogging and salinisation if over-irrigated; naturally infertile.

7. FOREST SOIL (Himalayas, hill regions): Organic matter is high in valley floors; thin and coarse on steep slopes. Supports forest-based agriculture and horticulture. Limitation: highly variable quality; susceptible to landslides and erosion if forests are cleared.

8. CONCLUSION: India's soil diversity is both a strength and a responsibility. Each soil type requires a tailored, respectful approach to cultivation and conservation.

Q19. Analyse the statement: 'India has enormous resource potential, yet many of its people remain poor.' How does resource planning address this contradiction?

1. THE PARADOX: India has the world's fourth-largest coal reserves, vast reserves of iron ore, bauxite, manganese and mica. It has enormous potential for solar, wind and hydroelectric energy. Its alluvial plains are among the most fertile on Earth. Yet according to multiple global indices, large sections of India's population suffer from poverty, malnutrition and lack of basic services. How can a resource-rich nation have so many poor people?

2. REASON 1 — UNEVEN DISTRIBUTION: Resources are heavily concentrated in

specific regions. Jharkhand and Chhattisgarh are rich in coal and minerals, yet they rank among India's poorest states. The communities living atop these resources have often been displaced rather than benefited.

3. REASON 2 — TECHNOLOGY AND INSTITUTIONAL GAPS: Merely possessing resources is not enough. Many areas with potential resources (e.g. solar energy in Rajasthan, wind energy in Ladakh) lack the technology and investment to develop them.

4. REASON 3 — COLONIAL LEGACY: Centuries of colonial extraction created an economy geared to exporting raw materials rather than developing domestic industries that would create jobs and value locally.

5. REASON 4 — POOR GOVERNANCE AND CORRUPTION: Resource revenues in some states have not been equitably invested in public services like education, health and infrastructure.

6. HOW RESOURCE PLANNING HELPS: (1) National-level surveys identify ALL resources and their potential. (2) Planning ensures resources are developed with appropriate technology, not just handed to the highest bidder. (3) Integration with national development plans means resource revenue is directed towards reducing poverty and improving infrastructure. (4) Sustainable use prevents resources from being depleted before they have a chance to lift communities out of poverty.

7. CONCLUSION: Resource planning is not just an economic tool — it is an instrument of social justice.

Q20. Explain how climate, parent rock, topography and time interact to determine the type of soil formed in a region, with examples from India.

1. Soil formation is a slow, complex process influenced by the interplay of five key factors: parent rock, climate, vegetation, topography and time.

2. PARENT ROCK: The mineral composition of the rock from which soil forms determines its chemistry. Basaltic lava in the Deccan Plateau created black soil — rich in calcium and magnesium. Ancient crystalline igneous rocks in peninsular India broke down into red and yellow soils. Himalayan rock fragments, carried by rivers, built up India's deep alluvial plains.

3. CLIMATE: Temperature and rainfall govern the rate of weathering and the type of soil processes. In high-rainfall areas like Kerala and Karnataka, intense leaching removes nutrients and creates laterite soil. In dry Rajasthan, minimal rainfall means poor weathering, little organic accumulation, and sandy arid soils. In moderate climates of the Gangetic Plain, alluvial deposits weather gently into fertile loams.

4. VEGETATION: Plants contribute organic matter (humus) to soil as they die and decompose. Dense tropical forests in northeastern India create organic-rich forest soils. Sparse vegetation in Rajasthan means negligible humus in arid soils.

5. TOPOGRAPHY: On steep slopes, young thin soils form because water washes sediment away faster than it accumulates — as seen on Himalayan hillsides. In valleys and plains, sediment accumulates, building up deep, fertile soils — as in the Ganga valley.

6. TIME: Older soils (like Bangar alluvial soil) have had more time to develop distinct layers (horizons) and different mineral compositions from newer soils like Khadar.

7. CONCLUSION: Soil is not simply 'dirt' — it is a living, historically formed system shaped by millions of years of geological and ecological interaction. This is why protecting soil is protecting the very foundation of life on Earth.

All the very best in your examination!