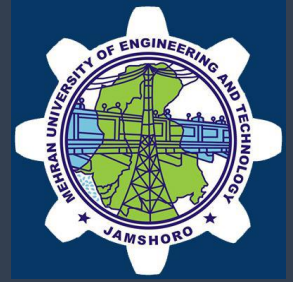


**MEHRAN UNIVERSITY OF
ENGINEERING AND
TECHNOLOGY,
JAMSHORO**



ASSIGNMENT

ENVIRONMENTAL PLANNING & MANAGEMENT

SUBMITTED BY: RASOOL BUX KHOSO (12CRP06)

SUBMITTED TO: SIR MUHAMMAD ALI MEMON

Q1. What is environmental planning and management, its elements, role and relation with your discipline?

Environmental planning and management are strategic challenges confronting businesses in the 21st century. As customers and stakeholders demand that global companies lead by showing corporate citizenship, the health, safety and security of both the people and the natural environment have become a litmus test for good citizenry.

Successful companies today are not only measured by how much profitable their products are but also how well they respond to the call to protect the natural environment. Global companies are increasingly recognizing that green products do not necessarily cost more but provide market niche that could help the company thrive. For example, the success stories of Kodak single-use camera and Xerox re-manufacturing programs have made businesses rethink their strategies and pay attention to environmental management.

The issues concerning the environment are not purely scientific but rely also on planning and management. They are part of corporate vision, mission, and strategy which need to be effectively planned to remain competitive. Corporate leaders are recognizing the increasing role of stakeholders and are accepting that their corporate strategies must focus not only on their customers but also on their stakeholders. Stakeholders are those whose actions or reactions have the potential to affect the firm's business operation and survival. Environmental burden is an issue that affects world citizens and they have the right to demand that corporate responsibility be properly defined to take into consideration these concerns. Today, companies are adapting their strategies in response to these concerns. World communities have reacted by adopting international and national laws to ensure compliance to environmental standards. It is also clear that green products may in fact, provide competitive advantage. Recently, there has been significant growth in the development of such products since the 1990s. '

Paint companies are now producing zero-VOC (Volatile Organic Compounds) products. Glidden introduced zero-VOC paint in the US in the mid-1990s and was followed by other major paint manufacturers such as Benjamin Moore and Sherman-Williams. Homeowners have responded very well to this development.

Role of Environmental Planning and management is an important tool to address urban environmental issues in a systematic and planned manner. Cities in developing countries face myriad urban environmental problems. Commonly known as the Brown Agenda, these include lack of sanitation, lack of adequate solid waste collection services, water pollution from untreated municipal and industrial wastewater, indoor and ambient air pollution, contamination of soil and land from improper disposal of solid and hazardous waste and so on. It is important to address these problems for meaningful improvements to be achieved in enhancing urban livability in cities of developing countries.

Urban environmental problems are generally very complex in nature due to their multi-sectorial nature, Air pollution owes as much to use of unclean fuels (in houses and industries) as to vehicular pollution, only exacerbated by traffic congestion. Poor sanitation is a result not only of poor drainage systems but also of dumping of solid waste in drains. Further, especially in larger cities, urban environmental problems span across multiple jurisdictions, such as collection, transportation and disposal of solid waste or water pollution in rivers traversing through several adjacent cities and towns. There are other problems that hinder proper urban environmental management, which include lack of adequate knowledge (data and analyzed information) on urban environmental problems, poor institutional capacity for planning as well as managing urban environment.

Towards Urban Environmental Strategies. Addressing the complex urban environmental problems, in order to improve urban livability through Urban Environmental Strategies (UES), involves taking stock of the existing urban environmental problems, their comparative analysis and prioritization, setting out objectives and targets, and identification of various measures to meet these objectives. This is

followed by the preparation and appraisal of alternative packages, the reexamining of the urban environmental objectives (to ensure that they are affordable and achievable), preparation of financial packages for the UES, preparation of concrete action and implementations plans for the selected urban environmental objectives, and the institutionalization of the UES. The process does not end here, but is pursued through monitoring and evaluation of the implementation process (for which urban environmental management indicators are necessary), with feedbacks leading to the updating of the UES based on implementation experience.

ELEMENTS

- Environmental policy - Develop a statement of your organization's commitment to the environment. Use this policy as a framework for planning and action.
- Environmental aspects - Identify environmental attributes of your products, activities, and services. Determine those that could have significant impacts on the environment.
- Legal and other requirements - Identify and ensure access to relevant laws and regulations, as well as other requirements to which your organization adheres.
- Objectives and targets - Establish environmental goals for your organization, in line with your policy, environmental impacts, the views of interested parties, and other factors.
- Environmental management program - Plan actions necessary to achieve your objectives and targets.
- Structure and responsibility - Establish roles and responsibilities for environmental management and provide appropriate resources.
- Training, awareness, and competence - Ensure that your employees are trained and capable of carrying out their environmental responsibilities.
- Communication - Establish processes for internal and external communications on environmental management issues.
- EMS documentation - Maintain information on your EMS and related documents.

- Document control - Ensure effective management of procedures and other system documents.
- Operational control - Identify, plan, and manage your operations and activities in line with your policy, objectives, and targets.
- Emergency preparedness and response - Identify potential emergencies and develop procedures for preventing and responding to them.
- Monitoring and measurement - Monitor key activities and track performance. Conduct periodic assessments of compliance with legal requirements.
- Nonconformance and corrective and preventive action - Identify and correct problems and prevent their recurrence.
- Records - Maintain and manage records of EMS performance.
- EMS audit - Periodically verify that your EMS is operating as intended.
- Management review - Periodically review your EMS with an eye to continual improvement.

Q2. Define pollution and its main types. Discuss the sources and causes of water, air, soil and noise pollution. Suggest mitigation measures for any two types of pollution.

ENVIRONMENT POLLUTION

Literally pollution means “destruction of purity” or to render unclean.

Scientifically pollution means “any desirable change in the physical, chemical, and biological characteristics of air, water and soil which may cause or harmfully affect the human health, plants, animals, our industrial process, living condition, and cultural areas.

EFFECTS OF POLLUTION

- a) Damage to humans
- b) Damage to plants
- c) Damage to Animals
- d) Damage to property and value assets
- e) Disruption of life support system
- f) Nuisance and aesthetic insult

Types of Pollution

- **Air Pollution**

Air pollution is the contamination of air by smoke and harmful gases, mainly oxides of carbon, sulfur, and nitrogen.

Sources of air pollution

- Exhaust fumes from vehicles
- The burning of fossil fuels, such as coal, oil or gas
- Harmful off-gassing from things such as paint, plastic production and so on
- Radiation spills or nuclear accidents

Effects of air pollution

1. Higher rain acidity
2. Crop depletion from inadequate oxygen

3. Global warming asthma, allergies and other respiratory illnesses.

- **Land/soil Pollution**

Land pollution is the degradation of the Earth's surface caused by a misuse of resources and improper disposal of waste.

Sources of land pollution

- Litter found on the side of the road
- Illegal dumping in natural habitats
- Oil spills that happen inland
- The use of pesticides and other farming chemicals
- Damage and debris caused from unsustainable mining and logging practices
- Radiation spills or nuclear accidents

Effects of land pollution

Land pollution is responsible for damage done to natural habitat of animals, deforestation and damage done to natural resources, and the general ugly-in up of our communities.

- **Water Pollution**

Water pollution is the contamination of any body of water (lakes, groundwater, oceans, etc.).

Sources of water pollution

- Raw sewage running into lake or streams
- Industrial waste spills contaminating groundwater
- Radiation spills or nuclear accidents
- Illegal dumping of substances, or items in bodies of water
- Biological contamination, such as bacteria growth

Effects of water pollution these kinds of environmental pollution are linked to health issues in humans, animals and plant-life.

- **Noise Pollution**

Noise pollution is any loud sounds that are either harmful or annoying to humans and animals.

Sources of noise pollution

- Airplanes, helicopters and motor vehicles
- Construction or demolition noise
- Manufacturing plants
- Human activities such as sporting events or concerts

Effects of noise pollution

Noise pollution is disruptive to humans' stress levels, may be harmful to unborn babies, and drives animals away, causing nervousness and decreasing their ability to hear prey or predators.

- **Thermal pollution**

Thermal pollution is the increase of temperature caused by human activity. Or it is excess in heat that creates undesirable effects over long period of time.

Sources of thermal pollution

- Power plants
- Urban sprawl
- Air pollution particulates that trap heat
- Deforestation
- Loss of temperature moderating water supply

Effects of thermal pollution

These kinds of environmental pollution can cause aquatic life to suffer or die due to the increased temperature, can cause discomfort

to communities dealing with higher temperatures and can even affect plant-life in and around the area.

- **Radioactive pollution**

It is one of the pollution that is rare, but extremely dangerous, detrimental even deadly when it occurs.

Sources of radioactive pollution

- Nuclear power plants accidents or leakages
- Improper nuclear waste disposal
- Uranium mining operations

Effects of radioactive pollution

Radioactive pollution can cause birth defects, cancer, sterilization and other health problems for human and wild life. It also sterilize the land.

Q3. What Environmental problems do you see in Pakistan? Discuss briefly each of them. As a planner, do you have any solutions for these problems?

Over the past 67 years the state of terrestrial, freshwater, and marine environment-in Pakistan has declined virtually in all-respects Environmental degradation and resource depletion have escalated particularly over the past few decades due to cumulative impacts of rapid growth of human population, intensive agriculture deforestation, urbanization, and industrialization.

Today, Pakistan faces a number of environmental problems, which not only threatens natural resources, health and livelihood of her people but the security of the country as well. It has been estimated that 3-4% of GDP is lost annually due to the environmental degradation consequence of which increasing poverty. A number of key issues dominate Pakistan's environmental problems. These include,

Land degradation-or Desertification: Pakistan is predominantly an arid to semiarid country, where the annual rainfall is less than 30 cm. About 25% of the country's land area, which is suitable for cultivation is seriously subjected to desertification because of intensive agriculture to meet the excessive demand of food, peck irrigation pectizes, and excessive use of pesticides and chemical fertilizers. Our precious land resource is being destroyed at an alarming rate. Desertification is a process whereby the productivity of 6 fertile land decreases, and gradually turns into deserts. This is caused by a variety of factors. The important ones are:

a) Soil Erosion

It may be defined as removal of topsoil. Intensive agriculture and overgrazing have led to the reduction of vegetation cover resulting in the acceleration of water and wind erosion. In Pakistan, about 15.9 million ha of land is affected by soil erosion (i.e. 18% of the total). Out of this 11.17 million ha is affected by water erosion while 4.76 million ha by wind erosion. One conservative estimate puts topsoil loss of Pakistan as nearly 45 million tons per year. The erosion of soil not

only leads to sedimentation of our water bodies but reduces productivity of land by 1.5%-7.5% per year.

b) Over cultivation

In order to grow more food, croplands are planted 2 1.6 3 times a year. The intensive farming leads to declining soil fertility its nutrients are removed fast from the soil, and failing crop yields. The topsoil forms crust under the influence of sun and rain and thus makes penetration of plant roots difficult. It also increases run off, wind erosion, and encroachment of sand dunes on arable land. It is predicted that because of intensive culture and poor practices of irrigation, 50% of agriculture land will have turned into desert by 2030.

c) Rangeland degradation

This may be defined as reduction in the capacity of natural rangeland to support livestock. It occurs as a result of excessive livestock population, inadequate pasture management, or both. Pakistan has some 28.6 million hectares of rangelands of which 12.6-m ha are in Baluchistan, 5.8 m ha in Punjab, 2.9 m ha in Sindh, 4.9 m ha in NWFP and Northern Areas, and. 1.05 ha in alpine regions. Except alpine regions 80 % of rangelands have been degraded. Rapid growth of human population and increased demand of livestock have led to organizing. Organizing has following adverse effects

- Causes a decline in annual production of pasture,
- Replaces perennial vegetation with annual species that are short lived and do not hold soil against erosion,
- Compacts soil under trampling hooves of cattle,
- Destabilizes dunes when crest vegetation is eaten,
- Causes a decline in livestock's health and consequently fall in meat and milk production,
- Reduces biodiversity

d) **Deforestation** is the worst type of land degradation occurring in Pakistan. Forest degradation results from the cutting pf woody formations in excess of their capacity for re-growth. The annual forest asset of Pakistan is very small, covering less than

5% of total land area. Compared to this South America, Europe, USA, and Asia have 50%, 46%, 33%, and 17.8% respectively. Because of rapid population growth and industrial development, the demands on forest in Pakistan are high and getting higher and higher each year. According to a conservative measure, 400,000 cu m' of timber and 600,000 of firewood are harvested annually. The woody biomass is declining at 4 - 6% a year. This is world's second highest rate of deforestation. A latest study has revealed that during past twenty years, 48% of coniferous forests have vanished from Swat valley and Azad Kashmir. If the present trend of deforestation continued, it is feared that the remaining forests of Pakistan will disappear within next 20 years.

The ruthless cutting of forests is leading to wholesale disappearance, trees, shrubs, and ground flora together with the invertebrate and vertebrate fauna that they normally support. The main reasons of unsustainable commercial logging are: a) lack of political will and commitment, b) poor planning, c) unrealistic forest management plan, d) weak implementation of forest protection laws, and e) penalties or fines are so small that it can be easily paid by people.

- e) **Salinization and waterlogging** "Salinization" may be defined as deposition of salts in irrigated soils, making soils and "Waterlogging" is defined as the state of land in which the subsoil water table is located at or near the surface with the result that the yield of crops commonly grown on it is reduced well below for the land, or, if the land is not cultivated, it cannot be put to its normal use because of the high subsoil water table. "Salinity control" is defined as the physical control, management, and use of water and related land resources in such a way as to maintain or reduce salt loading and concentrations of salt in water supplies. Drainage of irrigated land is required to reduce waterlogging and soil salinization that inevitably accompanies waterlogging in arid zones. At present, about 20-30 million hectares of irrigated land are seriously affected by salinity.

Water scarcity beside overpopulation and pollution, water shortage is one of the most serious problems. Pakistan has virtually exhausted its available freshwater resources and is on the verge of becoming water deficit country.

Reasons of water scarcity our total freshwater resource are same today as they were in 1947 when Pakistan was created. The scarcity that is being forced today is due to

- Growing population, increased agriculture activities, and industrial activities.
- Wide variation in seasonal and annual rainfall.
- Frequent droughts.
- Overexploitation of ground water.
- Loss of catchment areas because of deforestation and overgrazing.
- 60% of water is lost due to overflow in the sea, during seepage and evaporation.

Q4. What are the economic losses due to environmental problems of Pakistan? How these losses can be covered.

Pakistan is suffering an enormous economic loss due to environment degradation and poor resource management. The economic contribution of environmental goods accounts for 45% of nation income, 60% of employment, and 75% of foreign exchange earnings. These indications however, despite such an important and positive contribution to economy, only of government expenditures are devoted to environment protection and management.

According to a recent study by the World Bank, the economic cost of environmental damage in Pakistan is as high as 2 billion dollars a year, in the shape of health.

Due to environmental degradation and poor resource management Pakistan continues to suffer economic loss. The impacts of degradation and biodiversity loss on productivity and public health are in the tune of 3% of GDP per year. This however is a conservative estimate and it would be higher if toxic waste disposal, biodiversity, river and coastal resource depletion were taken into account. Health problems due to polluted water have the economic cost of \$ 750 million per annum approximately. This combined with air pollution leads to a cost of \$ 1.05 billion. Moreover, for an agricultural country, water is of immense economic value. The agriculture sector has been growing at the rate of 20 % for the past 20 years, but this is heading towards a downfall because water and land have been overused and wasted. Loss of productivity and health problems related to water is around 68% of the total negative impact of environmental degradation.

Fisheries are of great commercial importance as well forming the fourth largest export from the country. Shrimp export form 80% of the total fish exports. The decline in their populations because of pollution and over-fishing is likely to cost the country dearly. 40 species of fish recorded at the coast are considered of economic importance. The amount earned from the export of fish in 1996-1997 was US \$ 140 million. However, the situation is now quite

aggravating. If the unchecked fishing continues and the pollution is not abated Pakistan is likely to suffer huge monetary losses, something it cannot afford.

Degradation of urban environment

Urban growth is estimated to be 4.6% per annum. This is mainly a consequence of the high rate of rural-urban migration that contributes to the rapid decay of urban environment. Estimates indicate that 6 million (16%) people are unemployed and this is expected to increase by 500,000 annually. The increase in population, unemployment, and pressure on agricultural lands means migration to urban areas.

The migrants usually are poor and are forced to live in urban slums. Out of the total population 45% of the people in Sindh and 50% in Punjab live in one-room houses.

Q5. Describe briefly about development of environmental policies in Pakistan. Also explain why our environmental problems are not solved quickly?

On April 22 1970, citizens of all ages in U.S.A celebrated earth day by planting trees starting gardening, cleaning lots, beaches and streets and so on. According to many it was first event that initiated environmental concern. First earth summit conference soon followed this in 1972 held at Stockholm. However for the next years little progress were made to reduce environmental problems at global level. In June 1972 representatives from 178 countries including Pakistan met in Brazil at earth summit conference-II this meeting was titled as United Nations Conference-II environmental and development (UNCED), and it was the largest gathering of the world leaders that included 115 heads of the state.

Environmental awareness in Pakistan is of recent origin. Through an ordinance was promulgated in 1983 to recent environment the world environment become familiar with people of Pakistan only after 1980. Before the 1983 ordinance, Pakistan had laws that contain provisions for the protection of environmental abuses. These laws dealt with water and air quality, solid waste management, industrial effluents, vehicle fitness, regulations, gas emissions, wildlife protection, forest conservation, pesticides use and many others. But none of them were effectively and forcefully implanted.

The ordinance passed in 1983 was known as Pakistan environmental protection ordinance (PEPO). This was the first attempt to tackle the environmental problems. PEPO sanctioned the establishments of the Pakistan environmental protection council (PEPC), the Pakistan environmental protection agency (PEPA) and provincial environmental protection agencies in 1992, in attempt to reduce the nation's mounting environmental problems. The government of Pakistan issued its national conservation strategy (NCS) report.

The National Conservation Strategy Report has three explicit objectives: conservation of natural resources, promotion of sustainable development, and improvement of efficiency in the use

and management of resources. To achieve these goals 14 programs were targeted;

- maintaining soils in croplands
- increasing irrigation efficiency
- protected watersheds
- supporting forestry and plantations
- restoring rangelands and improving livestock
- protecting water bodies and sustaining fisheries
- conserving biodiversity
- increasing energy efficiency
- developing and deploying renewables
- preventing and abating pollution
- managing urban waste
- supporting institutions for common resources
- integrating population and environment programs, and preserving the cultural heritage

The PEPC, a body whose function was to formulate environmental laws and policies unfortunately met for the first time in May after a gap of 10 years. Thus during the period of 1983-1993. There was a vacuum in the environmental history of Pakistan. In its first meeting PEPC instituted national environmental quality standards (NEQS) on municipal and industrial effluents, disposal of solid waste, emission of smoke, vehicle exhausts, noise, etc. the statutory regulations were issued in 1994. The legislative measures, however could be enforced effectively. Pakistan could not backup its commitment with international organizations to the environment protection with actions.

The major constraints are:

- The monitoring and enforcement capacity of ordinance has inadequate.
- Lack of environmental awareness among public and govt. Officials.
- Political instability in the country.

- Lack of funds.
- Under paid environmental agency staff.
- Lack of progress in institution buildings.
- Lack of political will.
- Weak local govt.
- Bureaucratic hurdles.

National assembly passed a more comprehensive legislation called PEP-Act 1997, which replaced the ordinance of 1983 on 6th December 1997. PEP-Act 1997 is an improvement PEPO of 1983. Drafting and notification of following rules were finalized.

- Pollution charges for industry 2001.
- NEQS 1992 were revised and updated.
- Environment sample rules 2001.
- Laboratories certificate regulations 2001.
- Hazardous substances rules 2000.
- Review of EIA/IEE regulations.
- Composition of offenses and payment of administrative penalties rules.
- Provincial sustainable development rules.

WHY ARE ENVIRONMENTAL PROBLEMS ARE NOT SOLVED QUICKLY

The reasons are many the important ones being;

- The important reason is our failure to control the rapid growth of human population because of religious barriers, local taboos, and lack of funds, literacy and rural isolation.
- For the past several decades we have been using natural resources faster than they are being replenished. We have extracted minerals and groundwater without concern to their limit. Groundwater is polluted by agricultural and industrial chemicals cannot be readily cleaned.
- Lack of financial resources.
- Lack of technical expertise.

- Hunger and poverty are so severe that the environmental matters have assumed a less significance.
- Political instability.
- Lack of progress in institutional buildings.
- Lack of sight planning underpaid environmental agency staff.
- Above all, individually and collectively very few people think about future. We are as a whole going about our daily lives as if nothing has happened, into complacency by unrealistic dream.

Q7. What are the major ecosystems of the world? Discuss aquatic ecosystem and marine ecosystem in detail.

Ecosystem: Is an entity formed by the interaction between living organisms and the physical environment it is classified into main two categories. Terrestrial and aquatic ecosystem.

1. Terrestrial Ecosystems: Terrestrial ecosystem contain organisms that depend on physical environment on land masses of continents. Terrestrial ecosystem cover only about 20% of earth's surface.

There are seven major types.

Tropical Rain Forest

- Precipitation - 250cm/year
- Little temp. variation/abundant moisture
- Contains more species than other biomes.

Savannas

- Precipitation 90-150cm/year
- Open, widely spaced trees, seasonal rainfall
- Parts of Africa, South America & Australia

Deserts

- Precipitation 20cm/year
- Dry, scarce vegetation; scattered grasses
- Parts of Africa, Asia, Australia, North America

Temperate Grasslands

- Precipitation: 10-60cm/year
- Rich soil; tall dense grasses
- Central North America; Central Asia

Deciduous forests

- 75-250cm/year
- Warm summers, cool winters
- Europe; NE United States; Eastern Canada

Coniferous forest:

- 20-60cm/year
- Short growing season, cold winters.
- Northern Asia; Northern North America

Tundra

- 25cm/year
- Open; wind swept; dry; ground always frozen
- Far northern Asia; Northern North America

2. Aquatic ecosystem: An aquatic ecosystem is an ecosystem in a body of water. Communities of organisms that are dependent on each other and on their environment live in aquatic ecosystems. The two main types of aquatic ecosystems are marine ecosystems and freshwater ecosystems.

2.1 Marine ecosystem

Marine ecosystems cover approximately 71% of the Earth's surface. Different habitats ranging from coral reefs to estuaries make up this largest aquatic ecosystem in the planet. Prime examples of marine ecosystems include:

- Ocean: Main body of salty water that is further divided into important oceans and smaller seas. Major oceans include the Pacific Ocean, Indian Ocean, Arctic Ocean, Atlantic Ocean and Southern Ocean.
- Intertidal zone: Area which remains underwater at high tide and remains terrestrial at low tide. Different types of habitats including wetlands, rocky cliffs and sandy beaches fall under intertidal zones.
- Estuaries: Areas between river and ocean environments that are prone to tides and inflow of both freshwater and saline water. Due to this inflow, estuaries have high levels of nutrients. There are different names of estuaries such as inlets, lagoons, harbors etc.

- Coral Reefs: Often referred as the “rainforests of the sea”, coral reefs are mounds found in marine waters as a result of accumulation of calcium carbonate deposited by marine organisms like corals and shellfish. Coral reefs form the most varied marine ecosystems in the planet, but cover less than one percent of the world’s ocean. Nevertheless, around 25 percent of marine animals including different types of fishes, sponges and mollusks are found in coral reefs.

Common species found in marine ecosystems include:

- Marine mammals such as seals, whales and manatees
- Different species of fish including mackerel, flounder, dogfish, sea bass, etc.
- Organisms such as the tiny planktonic, brown algae corals, echinoderms, etc.

Marine ecosystems are important for the well-being of both terrestrial and aquatic environments. However, they are vulnerable to environmental problems such as climate change, pollution and overfishing, which can be a serious harm to marine biodiversity.

2.2 Freshwater ecosystem

Contrary to the marine ecosystem, the freshwater ecosystem covers only 0.8% of earth’s surface contains 0.009% of the total water. Three basic kinds of freshwater ecosystem.

- Streams and rivers (Lotic): Fast moving water such as streams and rivers.
- Lakes, ponds and pools (Lentic): Slow moving or still water like pools, lakes and ponds.
- Wetlands: The places in which soil is inundated or saturated for some lengthy period of time.

Freshwater ecosystems, which are one of the major types of aquatic ecosystems, are in danger because of the rapid extinction rates of several invertebrates and vertebrates, mainly because of overfishing and other activities that harm the ecosystem.

Q8. Enumerate various terrestrial ecosystem. Discuss forest system in detail.

Terrestrial ecosystem

- a) Forest ecosystem
- b) Grassland
- c)
- d) Rangeland
- e) National park
- f) Desert ecosystem

FOREST ECOSYSTEM a forest may be defined as large tract of uncultivated land covered with big trees, shrubs, herbs, and grasses with the variety of animal life. The science concerned with the study, preservation, and management of forests is term as forestry. Today forest cover about 45 million square kilometers area (30%) of the world's total land surface area. In general, all continents contains significant amount of forest lands.

REGIONS OF THE WORLD	MILLIONS OF HECTARES OF CLOSED FOREST	% OF THE WORLDS TOTAL CLOSED FORESTS
Latin America	966	28.1
USSR	755	21.9
Africa	545	15.8
Asia	489	14.2
North America	457	13.3
Europe	140	4.1
Australia	88	2.6
Total	3440	100

IMPORTANCE forest is one of the most important renewable resource. Provided the rate of cutting or degradation does not exceed the rate of re-growth. The commercial, biological and ecological importance of forest are given below.

Commercial Importance: an essential 5000 commercial products come from our forests. These include

- a) Timber: forests provide timber for housing, railway sleepers, furniture, poles etc. wood plays a part in more activities than does any other community. Total wood consumption has been estimated to be 3.7 million metric tons per annum. 80% of the wood obtained from coniferous forests, 18% from temp forests, and 2% hardwood from tropical forests. International trade in wood and wood products amounts to more than 100 billion dollars.
- b) Firewood: more than half the people in the world depend on firewood or charcoal as their principal source of heating and cooking.
- c) Paper pulp: wood pulp is the main component of paper and card board manufacturing.
- d) Food products: forests provide hundreds of food products such as berries, nuts, fruits, species, coffee and many others.
- e) Medicines: the key active ingredients in half of the world's prescription and non-prescription drugs come from plants growing in forests. About 70% of the world's population relies upon plants and their extracts as source of medicine.

Biological Importance: forests especially tropical ones are the richest becomes in terms of number and kind and plant and animal species. There may be 100 different trees species in each hectare, as opposed to fewer than 10 species in a hectare of temp forest. Biological estimate the millions of species of plants and animals in this have not yet been collected and examined for their possible use as human food resources or for its medical value. Many of these would surely be of great value and use to us if we knew about their properties.

Ecological Importance: the ecological importance of the forests out weights its commercial importance forests perform a number of vital ecological services for us and other living species are.

- a) Forests under sheds act as giant sponges slowing down run-off and absorbing and holding water that recharges ground water, streams and lakes, thus they regulate flow of water from highlands to croplands and urban areas and reduce the amount of sediment entering into our water bodies.

- b) Forest help control soil erosion
- c) Forest reduce severity of floods
- d) Forests influence local, regional and global climate
- e) Forests are vital to the global carbon and oxygen cycle
- f) Forests act as an importance defense against global warming
- g) Forests act as buffer zones against noise
- h) Forests absorbs number of air pollutants
- i) Forests help in recycling of water

According to an interesting, calculation a typical tree in a forest during its lifetime provides ecological benefits such as recycling of gases all purification, humidity control, habitats, for wildlife, and many other worth 196250 dollars. If the same tree is cut and sold in market, it is worth 590 dollars only.

Aesthetic Importance: like wild animals, wild plants, in forests are also as profound importance to people as source of beauty, wonder, joy, and recreation.

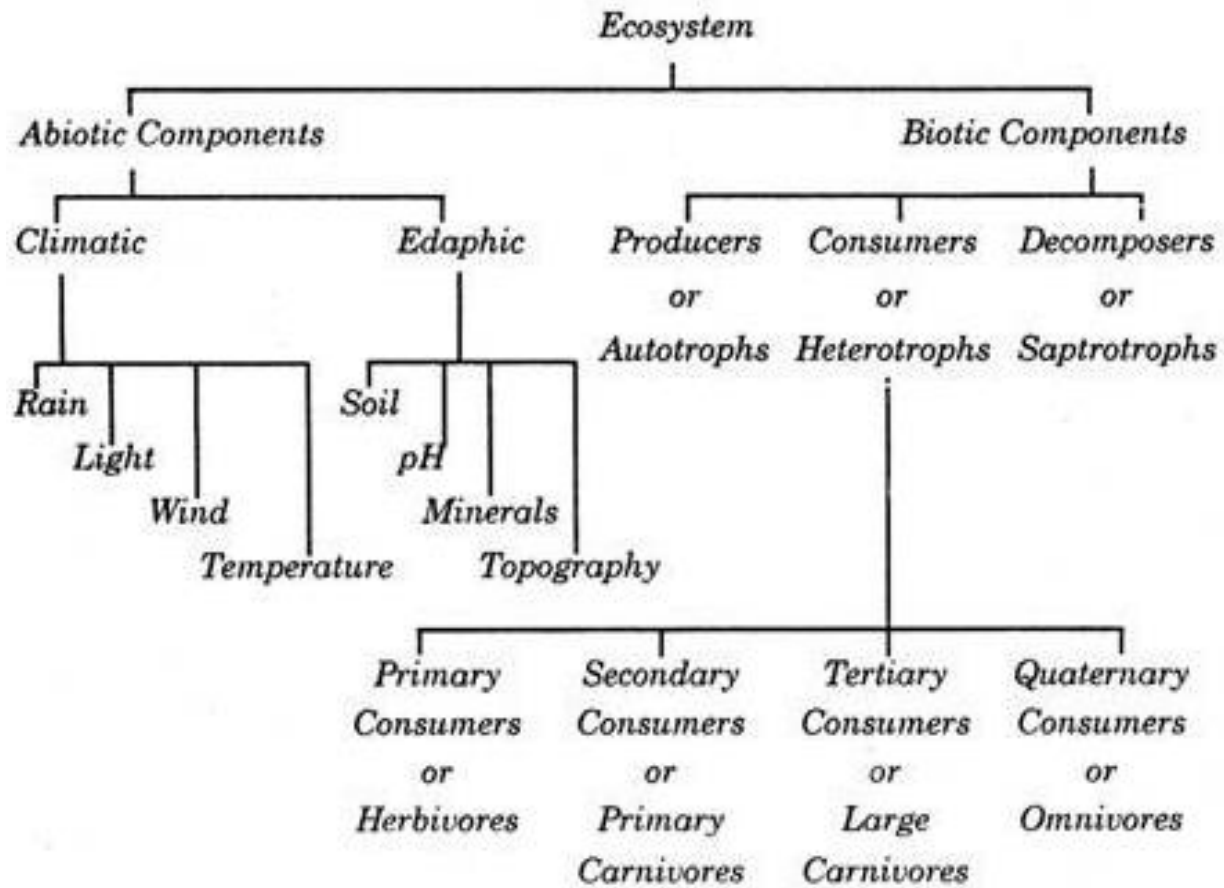
Q9. Define the term ecology. What are objectives of ecology? Brief about the structure and analysis of the ecosystem.

Ecology: The word ecology was coined by the German zoologist Ernst Haeckel, who applied the term oekologie to the “relation of the animal both to its organic as well as its inorganic environment.” The word comes from the Greek oikos, meaning “household,” “home,” or “place to live and logy means to study.” Thus, ecology deals with the organism and its environment.

Objectives of ecological study

The main objective of ecology is to study:

1. The development in the course of evolution or evolutionary development.
2. The inter-relationship between organisms in population and communities.
3. The structural adaptations and functional adjustments of organisms to their physical environment.
4. The behavior of organisms under natural conditions.
5. The biological productivity of nature and its relationship with mankind.
6. Temporal changes in the occurrence, abundance and activities of organisms.
7. The development of mathematical models to relate interaction of parameters and to predict the effects.



Schematic Representation of the Structure of an Ecosystem.

Q10. Explain environmental issues at (a) Home (b) City (c) Work place.

Environmental Issues at Home

- RADON

Radon gas exists in some soils, particularly clay, and enters through the basement walls and floors.

- ASBESTOS

Asbestos is a mineral fiber that has been used commonly in a variety of building construction materials for insulation and as a fire-retardant.

- HOUSEHOLD PRODUCTS

Organic chemicals are widely used as ingredients in household products. Paints, varnishes, and wax all contain organic solvents, as do many cleaning, disinfecting, cosmetic, degreasing, and hobby products.

- LEAD

Lead has long been recognized as a harmful environmental pollutant. There are many ways in which humans are exposed to lead: through air, drinking water, food, contaminated soil, deteriorating paint, and dust.

- SEPTIC SYSTEM

In small towns and remote areas rely on septic tanks for on-site treatment of waste water; which produce hazard for health.

- WELL WATER QUALITY

One or many contaminants may exist in well water, including nitrates, pesticides, bacteria and VOC's (volatile organic compounds).

Environmental Issues at Workplace

- STRESS

A high-stress work environment can lead to health problems and work errors.

- AIR QUALITY

Poor air quality isn't just a problem in manufacturing or heavy-duty work sites that emit pollutants. Office buildings that are sealed up tight and rely on air circulation systems can end up circulating viruses, allergens and even gases or residue from toxic cleaning chemicals.

- NOISE

A noisy work environment can cause headaches in the short term. Repeated exposure over a long period of time can lead to hearing loss and heart disease.

- ERGONOMICS

Insufficient lighting and uncomfortable desk chairs are examples of workplace ergonomics that can lead to health problems, fatigue and reduced productivity and work quality.

Environmental issues at city

Defining urban environmental problems as 'the degradation of urban water, air and land' excludes many of the environmental health problems suffered predominantly by the poor, as well as the extra-urban impacts that threaten regional and global sustainability. While both very broad and very narrow usage are common in the literature, when people complain of 'environmental problems' they are typically referring to damage to the physical environment, mostly caused by other people, and usually with harmful consequences for human welfare, either now or in the future.

This definition includes:

1-Localized environmental health problems such as inadequate household water and sanitation and indoor air pollution. 2-City-

regional environmental problems such as ambient air pollution, inadequate waste management and pollution of rivers, lakes and coastal areas. 3-Extra-urban impacts of urban activities such as ecological disruption and resource depletion in a city's hinterland, and emissions of acid precursors and greenhouse gases. 4-Regional or global environmental burdens that arise from activities outside a city's boundaries, but which will affect people living in the city

SUMMARY: Range of city-related environmental hazards by scale and type		
SCALE	TYPE OF HAZARD	SOME SPECIFIC EXAMPLES (This list of examples is not intended to be comprehensive)
Within house and its plot	Biological pathogens	Water-borne, water-washed (or water-scarce), airborne, food-borne, vector-borne, including some water-related vectors (e.g. Aedes mosquitoes breeding in water containers where households lack reliable piped supplied).
	Chemical pollutants	Indoor air pollution from fires, stoves or heaters. Accidental poisoning from household chemicals. Occupational exposure for home workers.
	Physical hazards	Household accidents – burns and scalds, cuts, falls. Physical hazards from home-based economic activities. Inadequate protection from rain, extreme temperatures.
Neighborhood	Biological pathogens	Pathogens in waste water, solid waste (if not removed from the site), local water bodies. Disease vectors, e.g. malaria-spreading Anopheles mosquitoes breeding in standing water or filariasis-spreading Culex mosquitoes breeding in blocked drains, latrines or septic tanks.
	Chemical pollutants	Ambient air pollution from fires, stoves....; also perhaps from burning garbage if there is no regular garbage collection service. Air and water pollution and wastes from 'cottage' industries and from motor vehicles.
	Physical hazards	Site-related hazards, e.g. housing on slopes with risks of landslides; sites regularly flooded, sites at risk from earthquakes.
Workplace	Biological pathogens	Overcrowding/poor ventilation aids transmission of infectious diseases.
	Chemical pollutants	Toxic chemicals, dust.....
	Physical hazards	Dangerous machinery, noise.....

City (or municipality within larger city)	Biological pathogens	Pathogens in the open water bodies (often from sewerage); also at municipal dumps; contaminated water in piped system.
	Chemical pollutants	Ambient air pollution (mostly from industry and motor vehicles; motor vehicles' role generally growing); water pollution; hazardous wastes.
	Physical hazards	Traffic hazards. Violence. 'Natural' disasters and their 'unnaturally large' impact because of inadequate attention to prevention and mitigation.
	Citizens' access to land for housing	Important influence on housing quality directly and indirectly (e.g. through insecure tenure discouraging households investing in improved housing, and discouraging water, electricity and other utilities from serving them).
	Heat island effect and thermal inversions	Raised temperatures a health risk, especially for vulnerable groups (e.g. elderly, very young). Air pollutants may become trapped, increasing their concentration and the length of people's exposure to them.
City-region (or city periphery)	Resource degradation	Soil erosion from poor watershed management or land development or clearance; deforestation; water pollution; ecological damage from acid precipitation and ozone plumes; loss of biodiversity.
	Land or water pollution from waste dumping	Pollution of land from dumping of conventional household, industrial and commercial solid wastes and toxic/hazardous wastes. Leaching of toxic chemicals from waste dumps into water. Contaminated industrial sites. Pollution of surface water and groundwater from sewage and surface runoff.
	Pre-emption or loss of resources	Fresh water for city pre-empting its use for agriculture; expansion of paved area over good quality agricultural land.
Links between city and global issues	Non-renewable resource use	Fossil fuel use; use of other mineral resources; loss of biodiversity; loss of non-renewable resources in urban waste streams.
	Non-renewable sink use	Persistent chemicals in urban waste streams; greenhouse gas emissions, stratospheric ozone depleting chemicals.
	Overuse of 'finite' renewable Resources	Scale of consumption that is incompatible with global limits for soil, forests, freshwater....

Q11. What are different stages of growth of city or housing environment? Explain various environmental considerations in town planning?

- 1) URBANIZATION: urban expansion are a global phenomenon. Urbanization is linked with economic development and is inevitable since 60 percent of the national income is generated in cities.
- 2) HOUSING: 20 to 30% population live in slums, 42% hire on one room houses and 28% hire two room houses.
- 3) WATER: 30% of urban population have no access to safe water. 60% of urban deaths are from water borne diseases.
- 4) SEWERAGE: only 20% of the sewage of class 1 cities and 2 percent in class 1 to 2 is being treated.
- 5) SOLID WASTES: collection efficiency in town and cities varies from 50-90% safe disposal is practically non-existent.
- 6) POLLUTION: suspended particulate matters (SPM) is 4-5 times the permissible in all cities maintained by national ambient air quality monitoring (NAQM). All cities have 6-22 vehicle per 100 population plying on the roads. Creating heavy traffic pollution including noise.

It has become necessary to carefully plan further urban growth in order to avoid social disruption and complete chaos in urban life. Policy making at national regional and local level should coordinate to control urban growth rates, to level commensurate with the available resources land water, food power etc. industries which are overloading the urban civic infrastructures should pay more or do more for city development.

- 7) SLUMS: slum is an area characterized by sub-standard housing conditions. The slum “sub-standard” should be taken in a relatively social sense referring to the living conditions with reference to a given time in a specific country.

ENVIRONMENTAL CONSIDERATION IN TOWN PLANNING

OBJECTS OF TOWN PLANNING The four essential objects or ideals of any town planning scheme are beauty, convenience, environment and health.

- The object of beauty is achieved by taking the most possible advantages of the natural conditions surrounding the town and also by giving architectural finishes to the various components of the town.
 - The object of convenience is understood in the form of various economic, social and recreational amenities to be given to the public.
 - The object of environment is important in the sense that environment should be molded in such a way that man can go about his normal activities with the least amount of strain.
 - The object of health is accommodated in a town planning scheme by making right use of land for right purpose, by providing parks and playgrounds for the public.
- 1) Green belt: The provision of a green belt on the periphery of town results in the limitation of its size and hence, the final size of the town can well be anticipated.
 - 2) Separate industrial area: industrial zone of any city should be kept separate from the residential zone and a wide spread green belt must separate them both. The location of industrial zone should be such that normally wind from this zone should not blow to residential zone. The city of Chandigarh provide a perfect example of this consideration.
 - 3) Housing: Extreme care should be taken to provide housing accommodation to various categories of people. It should be observed that there is no development of slums and further, if slums are existing, they are cleared by the provision of some alternative arrangement
 - 4) Public buildings: There should be a well-balanced grouping and distribution of various public buildings throughout the town. The unnecessary concentration of public buildings at certain spots of the town should be avoided.

- 5) Recreation centers: Depending upon the size of town, enough space should be reserved for the development as recreation centers for the general public.
- 6) Road systems: The efficiency of any town is measured by the layout of its roads. A nicely designed road system puts a great impression in the minds of people, especially the visitors to the town. The provision of a faulty road system in the initial stages of town formation proves to be too difficult and costly to repair or to re-arrange in future.
- 7) Transport facilities: The town should be provided with suitable transport facilities so that there is minimum loss of time from place of work to the place of residence.
- 8) Zoning: The town should be divided into suitable zones such as commercial zone, industrial zone, residential zone, etc. and suitable rules and regulations should be formed for the development of each zone.
- 9) Satellite Towns: when a town reaches a certain size some sort of satellite growth bound to take place. The development of satellite town is mainly due to lack of space in certain town.
- 10) Historical Monuments: efforts should be made to preserve our historical monuments from the ravages of air and water pollution. The monuments should not be allowed to suffer from “stone leprosy” or “stone cancer”.
- 11) Eco-friendly landscape gardening: landscape gardening in urban areas should not merely be a cosmetic effect or greening process but an eco-habitat for human substance. Green design alternatives and simple management techniques of biotic factors soil water, choice of flora and fauna and pestcontrol practices pave way to sustainable development.
- 12) Stringent Laws: stringent laws should be enacted and effectively implemented to prevent pollution of any sort. The industries which are harmful effluents should be directed to install effluent treatment plants before discharging their effluents. The height of chimneys should be adequate enough that the polluted air does not return to the ground. Polythene bags and other non-bio-degradable materials should be banned, the use of dustbins in the

markets should be strictly enforced. Germany has already introduced the green lines where household put their recyclable waste. Heavy traffic congestion during the peak working hours should be reduced by segregation/staggering timings of different offices. There should be more efficient and effective maintenance of the city.

Q12. Define the term sustainable development. Discuss in detail the concept of its evolution. How resources consumption and Economic sustainability is related to environmental sustainability?

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The goal is to ensure that there will not come a time when development will be halted due to lack of naturally occurring materials as a result of environmental degradation. The concern with extraction of resources which at the same time allowing the environment to replenish itself. The issue of sustainability can be divided into three constituent parts:

- Environmental sustainability
- Economic sustainability
- Sociopolitical sustainability

Environmental sustainability

We seek equilibrium between the amount and processes of extractions with the ability of the environment to tolerate it without sliding into a point where there will be an irreversible slide in ecological balance. The environment from which we extract food and raw material is more often than not disturbed, the trip of ecological balance moved over a long period of time into point where there is a steady degradation. Until such time when it can no longer support itself, hence dying out and denying us a steady source of much needed materials in the future.

Theoretically the long term result of environmental degradation is the inability to sustain the human life. Such degradation on a global scale could imply extinction for humanity. An unsustainable situation occurs when natural capital (the sum total of natural resources) is used up faster that it can be replenished.

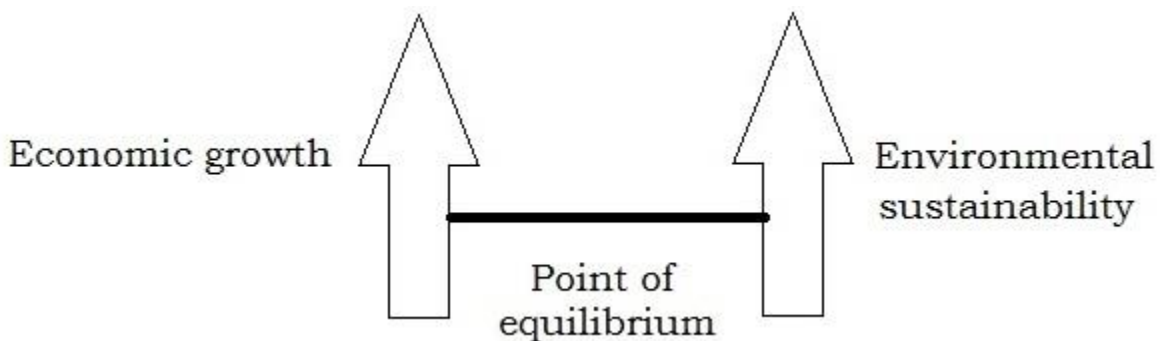
Economic sustainability

Economic sustainability refers to the ability of the economy to supply the demands of the markets with rooms for profit to ensure the steady growth over a period of time. Positive growth is indicated by an increase in the GDP over two year period while a negative growth is indicated by the opposite.

Economics are measured through this:

- Gross domestic product (GDP): the total financial value of the final goods and services rendered in a country over a one year period.

DEMAND FOR GOODS AND SERVICES	SUPPLY OF RAW MATERIAL NEEDED TO SUSTAIN THE ECONOMY	ECONOMIC PERFORMANCE	ENVIRONMENTAL SUSTAINABILITY
High	High	Positive	Negative
Low	High	Negative	Positive/negative
High	Low	Negative	Positive
Low	Low	Positive/negative	Positive



Although there is no direct cause and effective relationship between environmental sustainability and the socio political scene. It is essential to look at the power structures in given societies, even in the global level, to understand the policies implemented in certain areas, with regards to development sustainability.

Q: 13: Discuss the reasons for land degradation and suggest steps to control it?

The causes of land degradation can be divided into natural hazards, direct causes, and underlying causes. Natural hazards are the conditions of the physical environment which lead to the existence of a high degradation hazard, for example steep slopes as a hazard for water erosion. Direct causes are unsuitable land use and inappropriate land management practices, for example the cultivation of steep slopes without measures for soil conservation. Underlying causes are the reasons why these inappropriate types of land use and management are practiced; for example, the slopes may be cultivated because the landless poor need food, and conservation measures not adopted because these farmers lack security of tenure.

There is a distinction, although with overlap, between unsuitable land use and inappropriate land management practices.

Unsuitable land use is the use of land for purposes for which it is environmentally unsuited for sustainable use. An example is forest clearance and arable use of steeply sloping upper watershed areas which would have more value to the community as water sources, managed under a protective forest cover.

Inappropriate land management practices refer to the use of land in ways which could be sustainable if properly managed, but where the necessary practices are not adopted. An example is the failure to adopt soil conservation measures where these are needed. It can also refer to land use which is ecologically sustainable under low intensity of use but in which the management becomes inappropriate at higher intensities. Examples are shifting cultivation and the grazing of semi-arid rangelands.

Causes of degradation as given in the GLASOD assessment

Type of degradation	Percentage area of degradation type caused by			
	Deforestation	Overgrazing	Agricultural activities	Overcutting of vegetation
Water erosion	61	67	2	44
Wind erosion	21	46	1	98
Soil fertility decline	25	0	75	0
Salinization	34	30	14	87
Waterlogging	0	0	85	33
Lowering of water table	12	22	65	34
All types of degradation	37	46	15	63

For water erosion:

- monsoonal rains of high intensity;
- steep slopes of the mountain and hill lands;
- Soils with low resistance to water erosion (e.g. salty soils, vertisols).

For wind erosion:

- semi-arid to arid climates;
- high rainfall variability, with liability to drought spells;
- Soils with low resistance to wind erosion (e.g. sandy soils).
- An open cover of natural vegetation.

For soil fertility decline:

- Strong leaching in humid climates;
- Soils which are strongly acid, and/or with low natural fertility.

For waterlogging:

- Alluvial plains or interior basins which restrict outward drainage of groundwater.

For salinization:

- semi-arid to arid climates with low leaching intensity;
- plains and interior basins which restrict outward drainage of groundwater;
- Soils which are naturally slightly saline.

For lowering of the water table:

- Semi-arid to arid climates with low rates of groundwater recharge.

Q: 14 what is EIA? Discuss various process or stages of EIA?

Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

Environmental Impact Assessment (EIA) as a tool used to identify the environmental, social and economic impacts of a project prior to decision-making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision-makers. By using EIA both environmental and economic benefits can be achieved, such as reduced cost and time of project implementation and design, avoided treatment/clean-up costs and impacts of laws and regulations.

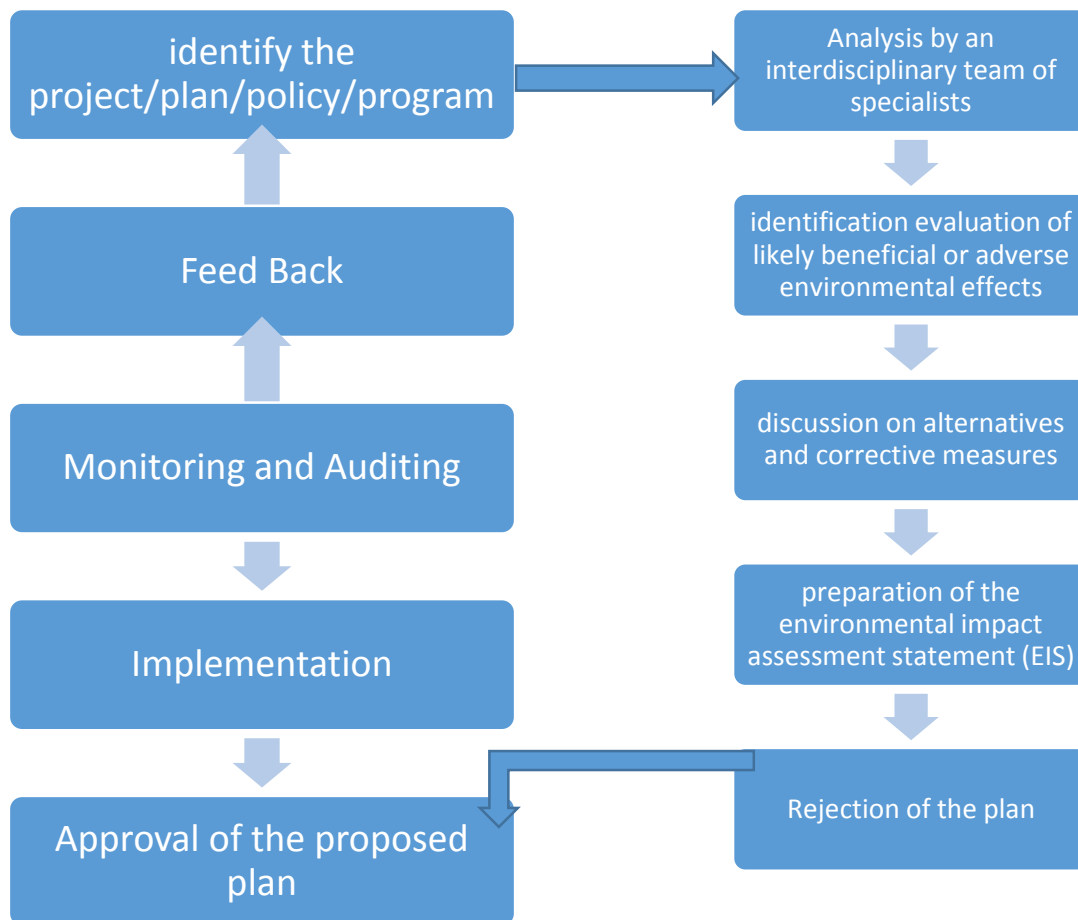
EIA is a valuable decision making tool indicating the:

- a) Alternative routes of development
- b) Alternative project site
- c) Alternative process technologies
- d) Carrying capacity of the specific ecosystem
- e) Quality of the environment before, during and after the proposed development activities.

GOALS

- Resource conservation
- Waste minimization
- Recovery of by-products
- Efficient equipment

Fig describes the environmental impact assessment process.



PHASES

- a) Organizing the job
- b) Performing the assessment
- c) Writing EIS
- d) Review of the EIS

There are five broad stages to the process:

Screening

Determining whether a proposed project falls within the remit of the Regulations, whether it is likely to have a significant effect on the environment and therefore requires an assessment.

Scoping

Determining the extent of issues to be considered in the assessment and reported in the Environmental Statement. The applicant can ask the local planning authority for their opinion on what information needs to be included (which is called a 'scoping opinion').

Preparing an Environmental Statement

Where it is decided that an assessment is required, the applicant must compile the information reasonably required to assess the likely significant environmental effects of the development. To help the applicant, public authorities must make available any relevant environmental information in their possession. The information finally compiled by the applicant is known as an Environmental Statement.

Making a planning application and consultation

The Environmental Statement (and the application for development to which it relates) must be publicized. The statutory 'Consultation Bodies' and the public must be given an opportunity to give their views about the proposed development and the Environmental Statement.

Decision making

The Environmental Statement, together with any other information which is relevant to the decision, comments and representations made on it, must be taken into account by the local planning authority and/or the Secretary of State in deciding whether or not to give consent for the development. The public must be informed of the decision and the main reasons for it.

Q: 15 What is SIA? Discuss in detail the various stages?

Definitions for "social impact assessment" vary by different sectors and applications. According to the International Association for Impact Assessment, "Social impact assessment includes the processes of analyzing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions. Its primary purpose is to bring about a more sustainable and equitable biophysical and human environment."

STAGES IN SIA

Baseline Conditions

The baseline conditions are the existing conditions and past trends associated with the human environment in which the proposed activity is to take place.

1. Population characteristics
2. Community and institutional structures

Public Involvement

This requires identifying and working with all potentially affected groups starting at the very beginning of planning for the proposed action. Groups affected by proposed actions include those who live nearby; those who will hear, smell or see a development; those who are forced to relocate because of a project; and those who have interest in a new project or policy change but may not live in proximity.

Identification of Alternatives

In the next step, the proposed action is described in enough detail to begin to identify the data requirements needed from the project proponent to frame the SIA. At a minimum, this includes:

- Location
- Land requirements

- Needs for ancillary facilities (roads, transmission lines, sewer and water lines)
- Construction schedule
- Size of the work force (construction and operation, by year or month)
- Facility size and shape
- Need for a local work force
- Institutional resources

Scoping

After initial scoping, the social impact assessor selects the SIA variables for further assessment situations. Consideration needs to be devoted both to the impacts perceived by the acting agency and to those perceived by affected groups and communities.

- Probability of the event occurring;
- Number of people including indigenous populations that will be affected;
- Duration of impacts (long-term vs. short-term);
- Value of benefits and costs to impacted groups (intensity of impacts);
- Extent that the impact is reversible or can be mitigated;
- Likelihood of causing subsequent impacts;
- Relevance to present and future policy decisions;
- Uncertainty over possible effects; and
- Presence or absence of controversy over the issue.

Predicting Responses to Impacts

This is a difficult assessment task often avoided, but the responses of affected parties frequently will have significant subsequent impacts. After direct impacts have been estimated the assessor must next estimate how the affected people will respond in terms of attitude and actions. Their attitudes before implementation predicts their attitudes afterwards, though there are increasing data that show fears are often overblown and that expected (often promised) benefits fail to meet expectations.

Monitoring

A monitoring program should be developed that is capable of identifying deviations from the proposed action and any important unanticipated impacts. A monitoring plan should be developed to track project and program development and compare real impacts with projected ones. It should spell out (to the degree possible) the nature and extent of additional steps that should take place when unanticipated impacts or impacts larger than the projections occur.

Monitoring programs are particularly necessary for projects and programs that lack detailed information or that have high variability or uncertainty. It is important to recognize, in advance, the potential for "surprises" that may lie completely outside the range of options considered by the SIA. If monitoring procedures cannot be adequately implemented, then mitigation agreements should acknowledge the un-certainty faced in implementing the decision.

Q: 16 EMS?

An Environment Management System (EMS) is a tool for managing the impacts of an organization's activities on the environment. It provides a structured approach to planning and implementing environment protection measures.

An EMS monitors environmental performance, similar to the way a financial management system monitors expenditure and income and enables regular checks of a company's financial performance. An EMS integrates environmental management into a company's daily operations, long term planning and other quality management systems.

PURPOSE

An EMS brings together the people, policies, plans, review, mechanisms and procedures used to manage environmental issue at a facility or an organization.

BENEFITS

- Helps maintain compliance
- Reduce operating costs
- Integrate environmental programs into missions
- Increase employee involvement
- Reduce environmental impacts

EMS FRAMEWORK

The international standards ISO 14001 is the most widely used and respected organizations however, use many EMS framework and models.

A basic EMS framework

Plan, Do, Check, Act



EMS COMPONENTS

- Environmental policy
- Planning
- Implementation and operation
- Checking and corrective action
- Management review

PLANNING

- Identify aspects and impacts from facility, activities, products and services
- Review legal requirements
- Set objectives and targets
- Establish formal EMS program

IMPLEMENTATION AND OPERATION

- Define roles and responsibilities
- Providing EMS tracing
- Establish internal and external communication mechanisms
- Establish documented control system
- Establish operational controls
- Integrate with or establish emergency preparedness procedures

MANAGEMENT REVIEW

- Conduct periodic senior management review of EMS
- Revise policies as needed

CHECKING AND CORRECTIVE ACTION

- Conduct periodic monitoring and environmental program
- Identify root causes of findings
- Maintain environmental records
- Conduct periodic EMS audit

BOTTOM LINE EMS REQUIREMENT

- Must have commitment of top managers. An EMS does not exist in isolation
- Must be consistent with other management e.g IT in your organization
- An EMS must be owned by everyone in your organization.

Q: 17 In what way wild life is important to us? What do you understand by wild life management?

Wildlife traditionally refers to non-domesticated animal species, but has come to include all plants, fungi and other organisms which grow or live wild in an area without being introduced by humans. Domesticating wild plant and animal species for human benefit has occurred many times all over the planet, and has a major impact on the environment, both positive and negative.

Wildlife can be found in all ecosystems. Deserts, forests, rain forests, plains, grasslands, and other areas including the most developed urban sites, all have distinct forms of wildlife. While the term in popular culture usually refers to animals that are untouched by human factors. Most scientists agree that wildlife around is affected by human activities.

- Importance as food
- Economic value
- Medicinal value
- Ecological value
- Eco-tourisms
- Scientific value
- As genetic resources
- Recreational value
- Aesthetic value
- As a cultural asset
- Ethological obligations

Wildlife management

Wildlife management attempts to balance the needs of wildlife with the needs of people using the best available science. Wildlife management can include game keeping, wildlife conservation and pest control. Wildlife conservation aims to halt the loss in the Earth's biodiversity by taking into consideration ecological principles such as carrying capacity, disturbance and succession and environmental conditions such as physical geography, penology and hydrology with

the aim of balancing the needs of wildlife with the needs of people. Most wildlife biologists are concerned with the preservation and improvement of habitats although rewilding is increasingly being used. Techniques can include reforestation, pest control, nitrification and denitrification, irrigation, coppicing and hedge laying.

- a) Accurate estimation of population size.
- b) Growth rates
- c) Sources and mortality and other than hunting
- d) Carrying capacity
- e) Understanding of how the environment and the population of interest vary naturally over time.

BASIC APPROACHES FOR MANAGEMENT

- a) The species approach
- b) The ecosystem approach
- c) The wildlife management approach

MEASURES TO PROTECT, PRESERVE AND CONSERVE

- a) Study and preservation of habitats
- b) Wildlife census
- c) Wildlife research
- d) Wildlife legislation
- e) Establishment of research centers
- f) Establishment of gene banks
- g) Wildlife veterinary service
- h) Wildlife education
- i) Wildlife conscious among public
- j) Wildlife protected areas
- k) Involvement of international agencies
- l) Wildlife awards

Q: 18 Alternative energy resources or non-conventional source of energy?

Hydropower

Energy in water can be harnessed and used. Since water is about 800 times denser than air, even a slow flowing stream of water, or moderate sea swell, can yield considerable amounts of energy. There are many forms of water energy:

- Hydroelectric energy is a term usually reserved for large-scale hydroelectric dams. The largest of which is the Three Gorges Dam in China and a smaller example is the Akosombo Dam in Ghana.
- Micro hydro systems are hydroelectric power installations that typically produce up to 100 kW of power. They are often used in water rich areas as a remote-area power supply (RAPS).
- Run-of-the-river hydroelectricity systems derive kinetic energy from rivers and oceans without the creation of a large reservoir.

Wind power

Airflows can be used to run wind turbines. Modern utility-scale wind turbines range from around 600 kW to 5 MW of rated power, although turbines with rated output of 1.5–3 MW have become the most common for commercial use; the power available from the wind is a function of the cube of the wind speed, so as wind speed increases, power output increases up to the maximum output for the particular turbine.[25] Areas where winds are stronger and more constant, such as offshore and high altitude sites, are preferred locations for wind farms. Typical capacity factors are 20-40%, with values at the upper end of the range in particularly favorable sites.

Solar energy

Solar energy, radiant light and heat from the sun, is harnessed using a range of ever-evolving technologies such as solar heating, photovoltaics, concentrated solar power, solar architecture and artificial photosynthesis.

Solar technologies are broadly characterized as either passive solar or active solar depending on the way they capture, convert and distribute solar energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light dispersing properties, and designing spaces that naturally circulate air.

Active solar technologies encompass solar thermal energy, using solar collectors for heating, and solar power, converting sunlight into electricity either directly using photovoltaics (PV), or indirectly using concentrated solar power

Biomass

Biomass is biological material derived from living, or recently living organisms. It most often refers to plants or plant-derived materials which are specifically called lignocellulose biomass. As an energy source, biomass can either be used directly via combustion to produce heat, or indirectly after converting it to various forms of biofuel. Conversion of biomass to biofuel can be achieved by different methods which are broadly classified into: thermal, chemical, and biochemical methods.

Biogas

Biogas include a wide range of fuels which are derived from biomass. The term covers solid biofuels, liquid biofuels, and gaseous biofuels. Liquid biofuels include bio alcohols, such as bioethanol, and oils, such as biodiesel. Gaseous biofuels include biogas, landfill gas and synthetic gas.

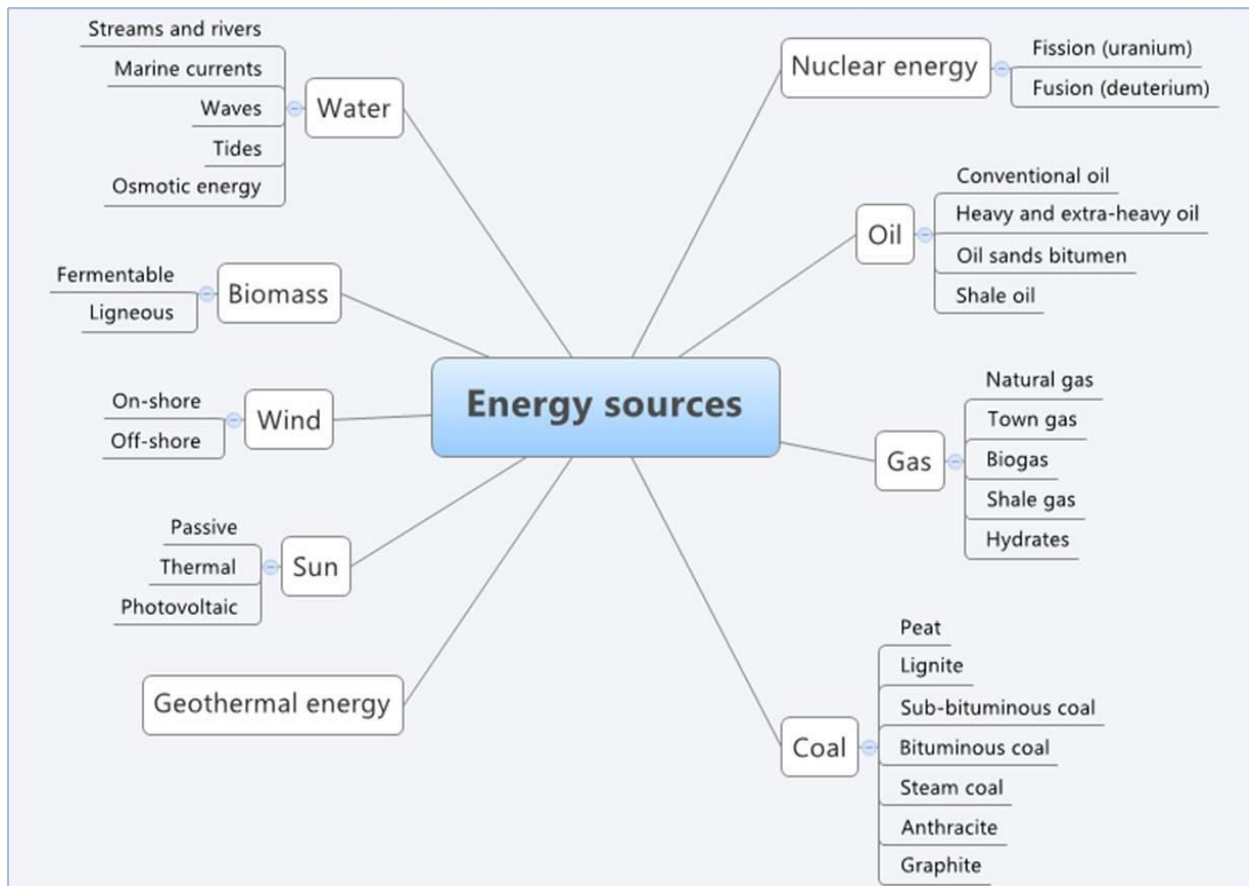
Geothermal energy

Geothermal energy is from thermal energy generated and stored in the Earth. Thermal energy is the energy that determines the temperature of matter. Earth's geothermal energy originates from the original formation of the planet (20%) and from radioactive decay of minerals (80%). The geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the

core to the surface. The adjective geothermal originates from the Greek roots geo, meaning earth, and thermos, meaning heat.

Wave power

Wave power is the transport of energy by ocean surface waves, and the capture of that energy to do useful work – for example, electricity generation, water desalination, or the pumping of water (into reservoirs). A machine able to exploit wave power is generally known as a wave energy converter (WEC).



Q: 19 Short notes on (NCS, Solid Waste Management, Urbanization)

1. NCS

Introduction

The Pakistan National Conservation Strategy (NCS), approved by the government on March 1, 1992, provides a broad framework for addressing environmental concerns in the country. The strategy was formulated through a three-year long process of consultation between individuals, groups and organizations representing a broad spectrum of views and interests in the issue. Because of its consensual nature, it shall enable effective coordination between the actions of federal and provincial governments, NGOs, the private sector, local bodies and local communities in pursuit of sustainable development.

OBJECTIVES

- conservation of natural resources
- promotion of sustainable development
- improvement of efficiency in the use and management of resources

To achieve these goals 14 programs were targeted;

- maintaining soils in croplands
- increasing irrigation efficiency
- protected watersheds
- supporting forestry and plantations
- restoring rangelands and improving livestock
- protecting water bodies and sustaining fisheries
- conserving biodiversity
- increasing energy efficiency
- developing and deploying renewables
- preventing and abating pollution
- managing urban waste
- supporting institutions for common resources
- integrating population and environment programs, and preserving the cultural heritage

2. SOLID WASTE MANAGEMENT

Waste management is the "generation, prevention, characterization, monitoring, treatment, handling, reuse and residual disposition of solid wastes". There are various types of solid waste including municipal (residential, institutional, commercial), agricultural, and special (health care, household hazardous wastes, sewage sludge). The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics.

There is a wide array of issues relating to waste management and those areas include:

- Generation of waste
- Waste minimization
- Waste removal
- Waste transportation
- Waste treatment
- Recycling and reuse
- Storage, collection, transport, and transfer
- Treatment
- Landfill disposal
- Environmental considerations
- Financial and marketing aspects
- Policy and regulations
- Education and training
- Planning and implementation.

3. URBANIZATION

Urban expansion are a global phenomenon. Urbanization is linked with economic development and is inevitable since 60% of the national income is generated in cities. 30% of India's population about 8 crore live in urban areas.

Urbanization is the increasing number of people that migrate from rural to urban areas. It predominantly results in the physical growth of urban areas.

Urbanization occurs because people move from rural areas. This is usually happens in developing countries.

CAUSES

- Industrial revolution
- Industrialization
- Emergence of the large manufacturing
- Job opportunities
- Availability of easy transportation
- Availability of facilities
- Migration