

**BHARATHIDASAN UNIVERSITY TIRUCHIRAPPALLI- 620 024**

**ENVIRONMENTAL STUDIES 19UGCES**

**(Applicable to the candidates admitted from the Academic year 2019-20 onwards)**

**By**

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**Unit: 7**

**Human Population and the Environment**

**Definition (Population):**

Population is defined as a group of individuals belonging to the same species, which live in a given area at a given time.

**Population Density:**

It is expressed as the number of individuals of the population per unit area or per unit volume.

**Parameters affecting population size:**

Changes in population size are governed by 4 main parameters. They are.

**1. Birth rate of Natality:**

It is the number of life birth per 1000 people in a population in a given year.

**2. Death rate or Mortality:**

It is the number of life deaths per 1000 people in a population in a given year.

**3. Immigration:**

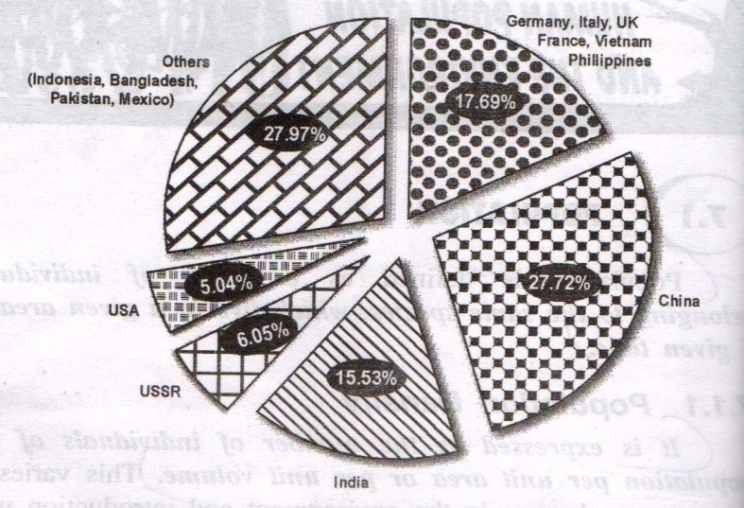
It denotes the arrival of individuals from neighboring population.

**4. Emigration:**

It denotes the dispersal of individuals from the original population to new areas.

**POPULATION GROWTH**

The rapid growth of the global’s population for the past 100 years result from the difference between the rate of birth and death.



**Causes of rapid population growth:**

* The rapid population growth is due to decrease in death rate and increase in birth rate.
* The availability of antibiotics, immunization, increased food production, clean water and air decrease the famine related deaths and infant mortality.
* In agricultural based countries, children’s are required to help parents in the fields that is population increase in the developing countries.

**Characteristics of population Growth:**

**Exponential growth:**

Population growth occurs exponentially like 10, 102,103,104 etc,.. which shows dramatic increase in global population in the past 160 years.

**Doubling time:**

It is the time required for a population to double its size at a constant annual rate .

It is calculated by the relation,

**Td ( Doubling time) = 70/r**

Where,  **r** = annual growth rate.

If a nation has 2% annual growth, its population will double in next 35 years.

**Infant mortality rate:**

It is percentage of infants died out of those born in one year. This rate has decreased in the last 50 years.

**Total fertility rates (TFR):**

* It is the average number of children delivered by a woman in her life time.
* The TFR value various from 2 in developed countries to 4.7 in developing countries.

**Replacement level:**

* Two parents bearing two children will be replaced by their off spring.
* Due to infant mortality this replacement level is changed.
* But due to high infant mortality the replacement level is generally high in developing countries.

**Male – Female ratio:**

* The male female ratio of boys and girls should be fairly balanced in a society to flourish.
* This ratio has been in many countries China and India.
* In China the ratio is 140 : 100

**Demographic transition:**

* Population growth is generally related to economic development.
* The death rate and birth rates are fall due to improved living conditions.
* This results in low population growth.
* This phenomenon is referred to as demographic transition.

**Problems (Environmental Issues) of Population Growth:**

* Increasing demands for food and natural resources.
* Inadequate housing and health services.
* Loss of agricultural lands.
* Unemployment and socio-political unrest.
* Environmental pollution.

**VARIATION OF POPULATION AMONG NATIONS**

* Different regions of the world find different stages of demographic from high to low mortality and fertility.
* At present the world population crossed 6 billion.
* The existing population is not evenly distributed.
* Less developed countries have 80% population and developed countries have only 20%.
* Less developed countries like Africa, Asia, and South America have 80% of the total world population and occupy less than 20% of the total land area.
* Most developed countries like U.S.A, Canada, Australia; the population increases the rate of less than 1% per year.
* But the less developed countries the population increases the rate of greater than 1% per year.
* Kenya is the greatest population country in the world, where 20 million people are residing.
* China and India’s population was above `1000 million in 2000 year. It is about one third of the world’s population.
* Europe and North America accounts for 14% of world’s population.

**Variation of population based on Age structure:**

Based on age structure population can be classified into three classes.

i) Pre-productive population (0-14 years)

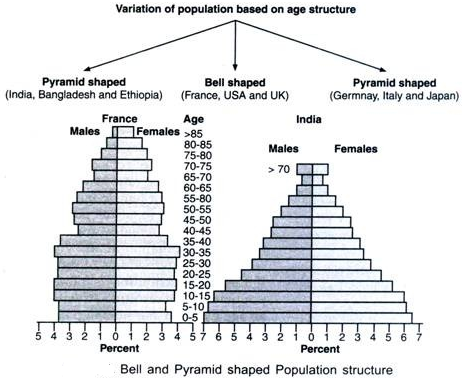
ii) Reproductive population (15-44 years)

iii) Post reproductive population (above 45 years)

Variation of population is based on the above classes

**1. Pyramid Shaped Variation of population:**

* The pre-productive age group population is more indicated at the base of the pyramid and the post reproductive age group population population is less indicated at the top of pyramid.
* The large number of young age people enter into reproductive age group, which increases the population growth.
* The less number of old age people indicates less loss of population due to death.



**Example:** India, Bangladesh, Ethiopia, Nigeria etc.

**2. Bell Shaped variation of Population:**

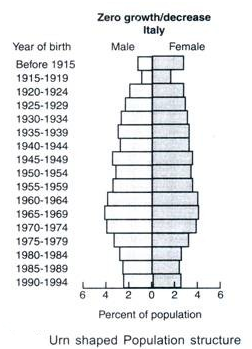
* The pre-productive age group population (0-14 years) and reproductive age group population (15-44 years) are more or less equal.
* So the people enter into the reproductive age group will not change the population.
* Thus the population growth is stable.

**Example:** France, USA< UK, Canada etc.

**3. Urn Shaped Variation of population:**

* The pre-productive age group population (0-14 years) is smaller than the reproductive age group population (15-44 years).
* This results in the decrease in population growth.

**Example:** Germany, Italy, Sweden, Japan etc.

3

**POPULATION EXPLOSION**

**Definition:**

The enormous increase in population due to low death rate and high birth rate is termed as population explosion.

**Causes (or) Reasons for Population Explosion:**

* Invention of modern medical facilities reduces the death rate and increases the birth rate, which leads to population explosion.
* Increase of life expectancy.

**Ex:** The average life expectancy is 40 years in 1951, now it is 61 years.

* Illiteracy is one of the reasons for population explosion.

**Effects of Population Explosion (or) Environmental and social impacts of growing population:**

* The main effect of population explosion is poverty, which leads to malnutrition and causes various diseases.
* Environmental degradation.
* Over exploitation of natural resources, it leads to the shortage of resources for the future generation.
* Renewable resources like forests, grass lands are under threat.
* Increase in population will increase diseases, economic inequity, and communal war.
* Over-crowding of cities leads to development of slums
* Lack of basic amenities like water supply and sanitation, education, health etc.
* Unemployment and low living standard of people.

**Remedy:**

We should reduce the fertility rate through birth control programs.

**POPULATION EQUATION**

Pt+1=Pt + (B - D) + (I - E)

Where,

Pt and Pt+1 = Sizes of population in an area at two different points in time **t** and **t+1**

**B =** Birth rate

**D** = Death rate

**I** = Immigration

**E** = Emigration

**FAMILY WELFARE PROGRAMME**

Family welfare programme was implemented by the Government of India as a voluntary programme.  
**Objectives of family welfare programme:**

* Slowing down the population explosion by reducing fertility.
* Over exploitation of natural resources is reduced.

**Population stabilization ratio:**

* The ratio derived by dividing crude birth rate by crude death rate.
* Stabilization of population in developing countries is possible only through various family welfare programme.

**FAMILY PLANNING PROGRAMME**

* Family planning program provides educational and clinical services to help couples to choose how many children to have?
* It vary from culture to culture.
* It provide information on birth spacing, birth control and health care for pregnant women and infants.
* It reduces the number of legal and illegal abortions per year and decreases the risk of death from pregnancy.

**Objectives of family planning programme:**

* Reduce infant mortality rate.
* Achieve 100% registration of births, deaths, marriage and pregnancy.
* Encourage late marriages and later- child bearing.
* Encouraging mother feeding.
* Improve women’s health, education and employment. 5
* It gives the idea about the number of children chosen and the spacing of births.
* Constrain the spread of **AIDS / HIV.**
* Prevent and control of communal diseases.
* Promote vigorously the small family norms.
* Making school education upto age 14 free and compulsory.

**Fertility control methods (or) Methods of family planning:**

**1. Traditional method:**

It includes traditions like taboos and folk medicine.

**2. Modern method:**

**i). Permanent method:**

It is done by a minor surgery.

**a)Tubectomy:**

It is female sterilization done by tying the tubes that carry the ovum to the uterus.

**b)Vasectomy:**

It is male sterilization done by tying the tubes that carry the sperm.

**2.Temporary method:**

**a) Condoms:**

Condoms are used by males to prevent sperms.

**b) Copper Ts:**

* Copper Ts are small objects that can be placed by a doctor in the uterus so the ovum cannot be implanted, even if fertilized.
* They do not disturb any function in the woman’s life.
* Oral contraceptive pills and inject able drugs are available that prevent sperms from fertilizing the ovum.

**ENVIRONMENT AND HUMAN HEALTH**

* Human health and environment are two inseparable entities.
* If one gets disturbed other will be automatically disturbed.
* Physically fit person not suffering from any disease is called a **healthy person.**
* Factors like nutritional, biological, chemical or psychological, which cause harmful changes in the body’s conditions, are called **disease**.

**Factors influencing human health:**

* Human health is influenced by
* Nutritional factors
* Biological factors
* Chemical factors
* Psychological factors

**Important Hazards and their Health effects:**

**Types of Hazards**

Hazards are of the following types

1. Physical hazards

2. Chemical hazards

3. Biological hazards

**1. Physical hazards**

|  |  |  |
| --- | --- | --- |
| S.No | Physical Hazards | Health Effects |
| 1. | Radioactive radiations | Affects the cells in the body and function of glands and organs. |
| 2. | UV radiations | Skin Cancer. |
| 3. | Global warming | Increase in temperature causes famine, mortality. |
| 4. | Chloro fluorocarbons | Damage ozone layer and causes skin cancer. |
| 5. | Noise | Painful and irreparable damage to human ear. |

**2. Chemical hazards**

* Chemical hazards are the activities, where chemical accidents like fires. Explosions, leakages could occur under certain circumstances.

|  |  |  |
| --- | --- | --- |
| S.No | Chemical Hazards | Health Effects |
| 1. | Combustion of fossil fuels | Asthma and other lung diseases. |
| 2. | Industrial effluents | Kill cells and cause cancer. |
| 3. | Pesticides like DDT | Affect food chain. |
| 4. | Heavy metals | Contaminate water and cause ill effects |

**3. Biological hazards**

* Materials derived from medical treatment of animal or human which cause harm to humans.

|  |  |  |
| --- | --- | --- |
| S.No | Biological Hazards | Health Effects |
| 1. | Bacteria, viruses and parasites. | Diarrhoea, malaria, Cholera, Respiratory diseases etc. |

**Preventive Measures:**

* Always wash your hands before sitting for food.
* Cut short and clean your nails systematically.
* Maintaining the skin, teeth, hair of our body.
* Drinking chemically treated and filtered water.
* Before cooking wash the raw vegetables and fruits with clean water.
* Try to avoid plastic containers and aluminium vessels.
* Do physical exercise to have proper blood circulation in the body.

**NIMBY syndrome:**

NIMBY means Not In My Back Yard, which describes the opposition of residents to the nearby location of something they consider undesirable, even if it is clearly a benefit for many.

**Ex:** An incinerator, an ethanol plant, a nuclear power plant.

An airport is an example for NIMBY complex.

**HUMAN RIGHTS**

**Definition:**

Human rights are the fundamental rights, which are possessed by all human beings irrespective of their caste, nationality, sex and language.

**UNIVERSAL DECLARATION OF HUMAN RIGHTS**

Universal declaration of human right by the UN was established in 1948. The main declarations are,

* Human right to freedom
* Human right to property
* Human right to freedom of religion
* Human right to culture and education
* Human right to constitutional remedies
* Human right to equality
* Human right against exploitation
* Human right to food and environment
* Human right to good health.

**Human right to freedom:**

* Every citizen has the freedom to express his views freely.
* Citizens can assemble at any place to express their views.
* They have freedom to form unions or associations.
* They have built their houses wherever they like.
* They have full right to start any profession.

**Human right to property:**

Every human being has the right to earn property.

**Human right to freedom of religion:**

* Every citizen has the freedom to choose their religion according to his wishes.
* All regions are equal before the law.

**Human right to culture and education:**

* All the citizens have equal rights both in culture and education.
* The minority communities like Christians, Muslims have own rights to conserve culture, language and establish educational institutions of their own choice.

**Human rights to constitutional remedies:**

If a citizen is denied any fundamental rights he or she can go to the court for protection.

**Human right to equality:**

* All citizens are equal before the law.
* There is no any discriminations on religion, caste, sex (or) place of birth.
* All are given equal opportunity for employment.

**Human right against exploitation:**

* Children should not employed as labours.
* Every citizen has the right to fight against exploitation.

**Human right to food and environment:**

All human beings have the right to get sufficient healthy food, safe drinking water and healthy environment.

**Human right to good health:**

All human beings have the right to have very good physical and mental health.

**INDIAN CONSTITUTION**

Indian constitution provides for civil, social, cultural, educational and political rights including the right to judicial enforceability.

**Article14:**

It provides for equality before law

**Article15:**

It prohibits discrimination on the grounds of race, religion, caste, sex or place of birth.

**Article16:**

It provides for equal opportunity for all citizens.

**Article19:**

It provides for freedom of speech and expression, forming associations and unions and so on.

**Article 20:**

It provides for protection from conviction except in accordance with the law of the land.

**Article 22:**

It lays down the rights of a person in custody.

**Article 23:**

It prohibits traffic in human beings and all other forms of forced labour.

**Article 24:**

It prohibits the explosion of labour children.

**Article 25:**

It guarantees freedom to profess, practice and propagate a religion of one’s choice.

**Article 26:**

It authorizes the right to establish and maintain charitable and religious institutions.

**Article 27:**

It prohibits compulsion to pay any tax meant for promotion of any religion etc.,

**Article 28:**

It guarantees the secular character of instruction in educational institutions etc.,

**Article 29:**

It guarantees to the minorities the rights to conserve their language etc,.

**Article 30:**

It guarantees the rights of linguistic minority and religious to establish and administer educational institutions etc,.

**Article 32:**

It provides for right to constitutional remedies for the enforcement of fundamental rights by appropriate proceeding in the supreme court of India.

**VALUE EDUCATION**

**Education**

Education is nothing but learning about the particular thing through knowledge. We can identify our values and ourselves with the help of knowledge and experience.

**Types of value education:**

**Formal Education:**

* It is the self related learning process.
* All people will read, write, will get good jobs and tackle any problems only with help of formal education.

**Value Education:**

* Value education is an instrument used to analyze our behavior and provide proper direction to our youths.
* It teaches the distinction between right and wrong, to be compassionate, helpful, loving, generous and tolerant.
* So the youth can move towards the sustainable future.

**Value-based environment education:**

* It based on environment.
* It provides knowledge about the principles of ecology, fundamentals of environment and biodiversity.
* It creates a sense to care for the natural resources and manage them in a sustainable way.

**Objectives (or) Need (or) Importance of Value Education:**

* To improve the integral growth of human begins.
* To create attitudes and improvement towards sustainable lifestyle.
* To increase awareness about our national history our cultural heritage, constitutional rights, national integration, community development and environment.
* To create and develop awareness about the values and their significance and role.
* To understand about natural environment in which how land, air and water are interlinked.
* To know about various living and non- living organisms and their interaction with environment.

**Methods (or) Elements of imparting value education:**

The important methods of imparting value education are,

**Telling:**

It is the process of developing values to enable a pupil to have a clear picture of a value-laden situation by means of his own narration of the situation.

**Modeling:**

It is a method in which a certain individual perceived as ideal values is presented to the learners as a model.

**Role playing:**

Acting out the true feelings of the actors by taking the role of another person but without the risk of reprisals.

**Problem Solving:**

It is a method wherein a dilemma is presented to the learners and asking them what decisions they are going to taken.

**Studying biographies of great man:**

This method uses the lives of the great man as the subject matter for trying to elicit their good deeds and thoughts worthy for emulation.

**Types of values**

**Universal values (or) social values:**

* It tells about the importance of the human conditions.
* These values are reflected in life, joy, love, compassion, tolerance, service, truth etc.,

**Cultural values:**

* Cultural values vary with time and place.
* These values are concerned with right, wrong, good and bad, true and false behavior of human beings.
* It is reflected in language, aesthetics, education, law, economics, philosophy etc.

**Individual values:**

* It results the individual personality and experiences.
* Parents and teachers are the main key to shape our individual values.
* It is reflected in individual goals, relationships, commitments, etc.

**Global values:**

Global values stress the human civilization.

**Spiritual values:**

* It promotes the conservationism and transforms our consumeristic approach.
* It is reflected in self-restraint, discipline, contentment, reduction of wants etc.

**HIV /AIDS**

AIDS is the abbreviated form for **Acquired Immuno Deficiency Syndrome** caused by a virus called HIV (**Human Immune deficiency Virus**).

**Origin of HIV/AIDS:**

**1. Through African Monkey:**

* Most of the evidences suggested that AIDS has spread from Africa.
* HIV has transferred to humans through African monkey or Chimpanzees.

**2. Through Vaccine Programmes:**

* HIV has spread in Africa through HIV contaminated Polio, small pox vaccine from monkey’s kidney.
* It had spread through Hepatitis-B viral vaccine-Los Angles and New York.

**Factors influencing modes of Transmission of HIV**

* Unprotected sex with infected person.
* Using needles or syringes from HIV positive person.
* During pregnancy, breast feeding HIV transmits from mother to infant babies.
* Blood transfusion during accident and pregnancy.
* Biologically the male to female transmission is 2 to 4 time more efficient than female to male transmission.
* Women’s cervical tissue is more vulnerable to HIV than men.
* Majority of HIV infections occur in women of child-bearing age, transmission of HIV to their new born babies happen easily.

**Factors not influencing transmission of HIV**

HIV is not spreading by the following activities,

* Tears, food, air, cough, handshake and normal kissing.
* Mosquito flies and insect bites.
* Sharing of utensils, clothes, toilets and bathroom.

**Functions of HIV in human body**

* White blood cells (WBC) are responsible for the formation of antibodies called T-helper cells.
* T-helper cells are the key infection fighters in the immune system. Once HIV cells are enter into the boy they destroy the T-cells and cause many infection diseases.

**Symptoms:**

**I. Minor symptoms**

* Persistent cough for more than one month.
* General skin disease.
* Viral infection.
* Fungus infection in mouth and throat.
* Frequent fever, headache and fatigue.

**II. Major symptoms**

* Fever for more than one month.
* Diarrhea for more than one month.
* Cough and TB for more than one month.
* Fall of hairs from the head.
* 10% of body weight loss within short period.

**Control and Preventive measures**

**Education:**

Health education enables the people to avoid the indiscriminate sex, use of sharing razors, needles and syringes.

**Prevention of Blood borne HIV transmission:** Blood should be screened for HIV before transmission and strict sterilization practices should be followed in the hospitals.

**Primary health care:**

AIDS awareness programmes should be encouraged.

**Counselling services:**

Counselling services should be provided either in person or through phone.

**Drug treatment:**

* Seeking early medical care and staying active are very vital in managing HIV.
* The immune system has to be boosted by taking nutrious diet and maintaining a stress-free mind.

**Effects:**

* Death which affect environment and natural resources.
* Loss of labour and level of production decreases.
* More water is required for maintaining hygiene
* Inability to work due to lack of energy.

**WOMANS WELFARE**

The main aim of women welfare is to improve the status of the women by providing opportunities in education, employment and economic independence.

**Need of Women welfare:**

Women face the following problems in the society.

* Women suffer gender discrimination and devaluation at home, wok places, in matrimony, in public life and power.
* High number of cases of dowry deaths, rape, domestic violence, criminal offences and mental torture to women.
* The human rights of women are violated, in the male dominated society.
* In policy making and decision making process, women are neglected.

**Objectives of Women Welfare:**

To overcome the problems against women we need the following objectives,

* To provide education
* To impart vocational training
* To generate awareness about the environment
* To improve employment opportunities
* To aware problems of population.
* To restore dignity, status, equality and respect for women.

**Objectives of A National Commission for Women:**

A National Commission for women has created by Government of India. Its objectives are,

* To examine constitutional and legal rights for women.
* To review existing legislations.
* To sensitize the enforcement and administrative machinery to women’s causes.

**Environmental degradation and Women welfare:**

The developmental work not only affects the natural environment but also affects the traditional, social, cultural and family life of women.

**Measures (or) Various schemes of Various organizations Towards Women Welfare:**

**1. The National Network for Women and Mining:**

It is fighting for a “gender audit” of India’s mining companies.

**2. United Nations Decade for Women:**

It witnessed inclusion of several women welfare related issues on international agenda.

**3. International Convention on the Elimination of All forms of Discrimination against Women (CEDAW):**

It has created an international standard for the protection and promotion of women’s human and socio-economic upliftment.

**4. Non Government Organizations as Mahila Mandals:**

It creates awareness among women of remote villages to empower them, train them, educate them and help them to become economically self- dependent.

**5. Ministry for Women and Child Development:**

It aims to work for the upliftment of women by Family planning, health care, education and awareness.

**CHILD WELFARE**

* Children occupy nearly 40% of total population.
* They are considered to be the assets of a society.
* Children in our country are estimated to be working as child labours in various hazardous industries like match industry, fire work industry, pottery industry.

**Reason for child labors**

1. **Poverty:** poverty is the main reason to force these children to work in unhealthy conditions.
2. **Want of money:** parents require money for their family, so they are in a position to send their children for work.

**Measures (or) various schemes of Various Organizations towards Child Welfare**

**1. UN Conventions on Rights of Child (or) International Law** :

It formulated a set of international standards and measure to promote and protect the well being of children in our society.

**Rights of the Child:**

The international laws denies right of the child to survival, participation, development and protection.

**i)The right to survival:**

It emphasizes on good standards of living, good nutrition and health.

**ii)The right to participation:**

It means freedom of thought and appropriate information to the child.

**iii)The right to development:**

It ensures access to education, childhood care and support, social security and recreation.

**iv)The right to protection:**

It means freedom from exploitation, inhuman treatment and neglect.

**2.World summit on Children:**

It focussed agenda for the well being children targeted to be achieved in the beginning of the new millennium.

**3.Ministry of Human Resource Development(MHRD):**

It concentrates on child’s health, education, nutrition, clean and safe drinking water, sanitation and environment.

**ENVIRONMENTAL IMPACT ASSESSMENT**

* **EIA** is defined as a formal process of predicting the environmental consequences of any development projects.
* It is used to identify the environmental, social and economic impacts of the project prior to decision making.

**Objectives of EIA:**

* To identify the main issues and problem of the parties.
* To identify who is the party.
* To identify what are the problems of the parties.
* To identify why are the problems arises.

**Benefits of EIA:**

* Cost and time of the project is reduced.
* Performance of the project is improved.
* Waste treatment and cleaning expenses are minimised.
* Usages of resources are decreased.
* Biodiversity is maintained.
* Human health is improved.

**Process of EIA (or) Key Elements of EIA:** The key elements used in the process of EIA are,

* Scoping
* Screening
* Identifying and evaluating alternatives
* Mitigating measures dealing with uncertainty.
* Issuing environmental statements.

**Scoping:**

* Used to identify the key issues of the concern in the planning process at an early stage.
* It is also used to aid site selection and identify any possible alternatives.

**Screening:**

It is used to decide whether an EIA is required or not based on the information collected.

**Identifying and evaluating alternatives:**

It involves knowing alternatives sites and alternative techniques and their impacts.

**Mitigating measures dealing with uncertainty:**

It reviews the action taken to prevent (or) minimize the adverse effects of a project.

**Environmental Statements:**

* This is the final stage of the EIA process.
* It reports the findings of the EIA.

**ROLE OF INFORMATION TECHNOLOGY IN ENVIRONMENT PROTECTION**

* Information technology plays a vital role in the field of environmental education.
* Information technology means collection, processing storage and dissemination of information.

**Software’s for Environment Education:**

The important software’s developed to environment and health are,

* Remote Sensing
* Database
* Geographical Information System
* Satellite data
* World wide web

**1. Remote sensing**

Remote sensing can be used to gather information about an object without actually coming in contact with it.

**Functions**

* Origin of electromagnetic energy
* Transmission of energy
* Interaction of energy
* Detection of energy
* Preprocessing of data
* Data analysis and interpretation
* Integration and other applications.

**Remote Sensing System for Resource Management:**

* Remote sensing data have been used to derive thematic information on various natural resources and environment.
* The information extracted depends on the expertise of the analyst.

**Applications of Remote Sensing:**

**In agriculture:**

* In India the agricultural sector sustains the livelihood of around 70% of the population and contribution about 35% of the net national product.
* It can provide the valuable information for land and water management.

**In forestry:**

* Sustainable forest management requires reliable information on the type, density, and extent of forest cover, wood volume and biomass, forest fire, pest and disease induced losses, encroachment etc.
* It provides all information clearly.

**In Land cover:**

* Spatial information on land use is required at different scales depending upon use.
* Remote sensing data is converted to map, the spatial resolution plays a role on the scale of mapping.

**Water resources:**

* Remote sensing data has been used in many applications related to water resources such as surface water body mapping, ground water targeting, wetland, inventory, flood monitoring, reservoir sedimentation, water quality monitoring, run-off modeling, snow cover monitoring and irrigation water management.
* One of the simplest applications is inventorying surface water bodies.

**Data** **Base**

* Database is the collection of inter related data on various subjects.
* Database is arranged in a systematic manner that is easily manageable and can be very quickly retrieved.

**Applications of Database:**

**a) Ministry of environment and forest:**

* They are compiling a database on various biotic communities.
* Database is also available for diseases like HIV/AIDS, Malaria, Fluorosis, etc,

**b) National management information system (NMIS):**

They compiled a database on R & D projects along with information about research scientists and personnel involved.

**c) Environmental information system (ENVIS):**

They generate a network of database on areas like pollution control, clean technologies, remote sensing, biodiversity, environmental management, desertification etc

**3. Geographical information system (GIS)**

**GIS** is a technique of superimposing various thematic maps using digital data on a large number of inter-related aspects.

**Applications of GIS:**

* Thematic maps containing digital information on various aspects like water resources, soil type, forest land, crop land, grass land are superimposed on a layered form in computer using softwares.
* Interpretation of polluted zones, degraded lands can be made based on GIS.
* To check unplanned growth and related environmental problems.

**4. Satellite data**

* Satellite data helps in providing correct and reliable information about forest cover
* Provide information of atmospheric phenomena like monsoon, ozone layer depletion, smog and forecasting weather.
* From the satellite data many new reserves of oil, minerals can be discovered.

**5. World Wide Web**

It provides **Current data**.

**Applications:**

* Online learning centre provides the current and relevant information on principles, problems, queries, application of environmental science.
* Digital files of photos, power- point lecture presentations, animations, web-exercises and quiz.
* These are useful to both students and teachers of environmental studies.

**ROLE OF INFORMATION TECHNOLOGY IN HUMAN HEALTH PROTECTION**

* Information technology plays a key role in human health.
* It has changed the human life style completely.

The health service technology involves three systems

* Finance and accounting
* Pathology
* Patient Administration – clinical system.

**Applications**

* With the help of data regarding birth and death rates, immunization and sanitation programme are maintained.
* To monitor the health of the people effectively
* The information regarding the outbreak of epidemic diseases can be conveyed.
* Online Consultation to provide better treatment and services to the patient.
* With a central control system the hospital can run effectively.
* Drugs and its replacement can be administrated.

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